

**MINUTES OF THE REGULAR MEETING
OF THE
POWER AUTHORITY OF THE STATE OF NEW YORK**

October 15, 2014

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Minutes of the Regular Meeting of the Power Authority of the State of New York held via videoconference at the following participating locations at approximately 8:40 a.m.

- 1) New York Power Authority, 123 Main Street, White Plains, NY
- 2) VC Rooms LLC, 247 West Fayette Avenue, Suite 202, Syracuse, NY

Members of the Board present were:

John R. Koelmel, Chairman
Joanne M. Mahoney, Vice Chair – via videoconference
Eugene L. Nicandri, Trustee
Anne M. Kress, Trustee

| | |
|--------------------|---|
| Gil Quiniones | President and Chief Executive Officer |
| Edward Welz | Chief Operating Officer |
| Robert Lurie | Executive Vice President and Chief Financial Officer |
| Justin Driscoll | Executive Vice President and General Counsel |
| Joseph Kessler | Senior Vice President – Power Generation |
| James Pasquale | Senior Vice President – Economic Development & Energy Efficiency |
| Bradford Van Auken | Senior Vice President – Operations Support Services & Chief Engineer |
| Rocco Iannarelli | Acting Senior Vice President – Enterprise Shared Services |
| Jill Anderson | Vice President – Public and Regulatory Affairs and Chief of Staff |
| Kristen Barbato | Vice President – Customer Energy Solutions |
| Thomas Concadoro | Vice President and Controller |
| Joseph Leary | Vice President – Community and Government Relations |
| Joseph Gryzlo | Vice President and Chief Ethics and Compliance Officer |
| Karen Delince | Corporate Secretary |
| James Bejarano | Director – Energy Efficiency |
| Ricardo DaSilva | Project Manager – PM – Northern NY/Transmission |
| Alan Ettlinger | Manager – Research and Development |
| Timothy Muldoon | Manager – Power Contracts |
| Gregory Jablonsky | Manager – Network Services – Infrastructure |
| John Giumarra | Senior Account Executive |
| Silvia Louie | Senior Project Manager – Executive Office, Public and Regulatory Affairs/Chief of Staff |
| Glenn Martinez | Senior Network Analyst – Infrastructure |
| Lorna Johnson | Associate Corporate Secretary |
| Sheila Baughman | Assistant Corporate Secretary |
| Joseph Rivera | Contractor – Infrastructure |
| Anna Devine | Executive Director, Advisory Services – Ernst & Young |
| Lynne Coviello | Senior Manager, Advisory Services – Ernst & Young |

Chairman Koelmel presided over the meeting. Corporate Secretary Delince kept the Minutes.

Introduction

Chairman Koelmel welcomed the Trustees and staff members who were present at the meeting. He said that the meeting had been duly noticed as required by the Open Meetings Law and called the meeting to order pursuant to the Authority's Bylaws, Article III, Section 3.

1. **Adoption of the October 15, 2014 Proposed Meeting Agenda**

Upon motion made and seconded, the meeting Agenda was adopted.

Conflicts of Interest

The following Trustees declared conflicts of interest as indicated below and said they will not participate in the discussions or votes as it relate to those matters:

Vice Chair Mahoney: ARCADIS of New York, Inc. (Item #2c i); CH2M Hill Engineering (Item #s 2c i and 2c vii) and Wendel Energy Services (Item #5)

Trustee Kress: LaBella Associates (Item #5)

The items above were not adopted due to lack of a quorum.

Chairman Koelmel and Trustee Nicandri declared no conflicts.

2. **CONSENT AGENDA:**

Chairman Koelmel said the contract relating to Burns & McDonnell Consultants, PC (Item #2c i) has been withdrawn. In addition, since Vice Chair Mahoney filed conflicts of interest with respect to ARCADIS of New York, Inc. and CH2M Hill Engineering the Consent Agenda was approved with the exclusion of those firms because the conflicts resulted in a failure to attain the required number of votes necessary for their approval.

In response to a question from Trustee Nicandri, Mr. Van Auken said with regard to the request for approval of the contract for Tug Boats replacement, the Authority splits the cost of the contract with Ontario Power Generation. In response to further questioning from Trustee Nicandri, Mr. Van Auken said NYPA is the only signee to the contract. Mr. Welz added that the Authority does several projects with Ontario Power Generation related to its St. Lawrence and Niagara power plants, the costs of which are shared jointly between Authority and Ontario Power Generation; the replacement of the ice boom work barge is one such joint project with Ontario Power Generation. The Authority will pay approximately \$7 million for the Tug Boats and Ontario Power Generation will reimburse the Authority in 2015 for approximately \$3.5 million that they owe for the project. Responding to still further questioning from Trustee Nicandri, Mr. Welz said the Trustees only have to approve the Authority's portion of the cost of the contract, approximately \$3.5 million.

Upon motion made and seconded, the Consent Agenda was approved.

a. **GOVERNANCE MATTERS:**

i. **Approval of the Minutes**

The Minutes of the Regular Meeting held on July 29, 2014 were unanimously adopted.

b. POWER ALLOCATIONS:

**i. Contract for the Sale of Western New York
Hydropower – Transmittal to the Governor**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to: (1) approve a proposed final contract for the sale of Replacement Power (‘RP’) to Durez Corporation (‘Durez’), the business described in Exhibit ‘2b i-B’; and (2) authorize transmittal of the proposed final contract to the Governor for his review and requested authorization for the Authority to execute the contracts pursuant to Public Authorities Law (‘PAL’) §1009. The proposed final contract is attached as Exhibit ‘2b i-A.’

BACKGROUND

Under PAL §1005(13), the Authority may allocate and sell directly or by sale for resale, 250 megawatts (‘MW’) of Expansion Power (‘EP’) and 445 MW of RP to businesses located within 30 miles of the Niagara Power Project, provided that the amount of EP allocated to businesses in Chautauqua County on January 1, 1987 shall continue to be allocated in such county.

At their meeting on May 22, 2014, the Trustees awarded a 100 kilowatt (‘kW’) allocation of RP to Durez as described in Exhibit ‘2b i-B.’ The contract before the Board would provide for the sale of this allocation to Durez. The sale of the allocation would be made under a direct sale arrangement. Transmission and delivery service would be provided by Durez’s local utility in accordance with the utility’s Public Service Commission-filed delivery service tariff. The following is a summary of some pertinent provisions of the contract:

- The contract would provide for the direct billing of all production charges (*i.e.* demand and energy) as well as all New York Independent System Operator, Inc. (‘NYISO’) charges, plus taxes or any other required assessments, as set forth in the Trustee approved Service Tariff WNY-1 (‘ST WNY-1’).
- The contract includes the company’s agreed-upon commitments with respect to employment, power utilization and capital investment. The Authority would retain the right to reduce or terminate the allocation if employment, power utilization, or capital investment commitments are not met.
- The contract provides for the sale of additional allocations of EP and/or RP to the customer in appropriate circumstances under the contract by incorporating new allocations into Schedule A of the contract. The Trustees approved this convention in the 2010 long-term extension contract, which simplifies contract administration.
- To accommodate non-payment risk that could result from the direct billing arrangement with the Authority, the contract form includes commercially reasonable provisions concerning, among other things, the ability to require deposits in the event of a customer’s failure to make payment for any two monthly bills. This is consistent with recent Authority contracts that incorporate direct billing, including the Authority’s Recharge New York sales contracts.
- The contract requires the company to perform an energy efficiency audit at least once within five years at the facility receiving the low-cost power to help ensure the hydropower is utilized as effectively as possible.

The Authority has discussed the proposed contract with Durez and has received its consent to the contract. Durez has acknowledged that ST WNY-1 rates will apply to its allocation consistent with all allocations of EP and RP as of July 1, 2013.

As required by PAL §1009, when the Authority has reached agreement with its co-party on such a contract, it is required to transmit the proposed contract to the Governor and other elected officials and hold a public hearing on the proposed contract. At least 30-days' notice of the hearing must be given by publication once in each week during such period in each of six selected newspapers. Following the public hearing, the contract may be modified, if advisable.

Upon approval of the final proposed contract by the Authority, the Authority must 'report' the proposed contract, along with its recommendations and the public hearing record, to the Governor and other elected officials. Upon approval by the Governor, the Authority may execute the contract.

DISCUSSION

As noted above, the Trustees, at their May 22, 2014 meeting, awarded the aforementioned allocation to Durez, and also authorized the Corporate Secretary to transmit the proposed contract for Durez to the Governor and legislative leaders and to schedule a public hearing on the contract.

A public hearing for the contract was held on July 30, 2014 at the Niagara Power Project's Power Vista Visitors' Center in Lewiston, New York. There were no oral statements made at the public hearing and no written statements were submitted. The official transcript of the public hearing is attached as Exhibit '2b i-C.'

RECOMMENDATION

The Manager – Business Power Allocations and Compliance recommends that the Trustees approve the proposed final contract for the sale of Replacement Power to Durez Corporation that is attached as Exhibit '2b i-A' and authorize the transmittal of the contract to the Governor for his review pursuant to PAL §1009.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That the contract for the sale of Expansion Power and/or Replacement Power to Durez Corporation ("Contract"), is in the public interest and in accordance with Public Authorities Law §1009 and should be submitted to the Governor for his review and that copies of the Contract, along with the record of the public hearing thereon, be forwarded to the Speaker of the Assembly, the Minority Leader of the Assembly, the Chairman of the Assembly Ways and Means Committee, the Temporary President of the Senate, the Minority Leader of the Senate and the Chairman of the Senate Finance Committee; and be it further

RESOLVED, That the Chairman and the Corporate Secretary be authorized and directed to execute such Contract in the name of, and on behalf of, the Authority if the Contract is approved by the Governor; and be it further

RESOLVED, That the Senior Vice President – Economic Development and Energy Efficiency, or his designee, be, and hereby is, authorized, subject to the approval of the form thereof by the Executive Vice President and General Counsel, to negotiate and execute any and all documents necessary or desirable to implement the Contract with the business as set forth in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

ii. **Extension of Hydropower Contracts with Upstate Investor-Owned Utilities for the Benefit of Rural and Domestic Consumers – Notice of Public Hearing**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to approve proposed contract extensions for the sale to Niagara Mohawk Power Corporation d/b/a National Grid (‘National Grid’), New York State Electric and Gas Corporation (‘NYSEG’) and Rochester Gas and Electric Corporation (‘RGE’) (hereinafter referred to collectively as the ‘Utilities’) of a total of 360 MW of firm ‘peaking’ hydropower for a term of up to three years (ending December 31, 2017), with either party having the right to terminate the contract extension after a basic initial term of one year, on thirty (30) days’ written notice. The extensions are subject to the public hearing and gubernatorial review process in Public Authorities Law (‘PAL’) §1009. Accordingly, the Trustees are further requested to authorize: (1) a public hearing on the final proposed contract extensions; (2) transmittal of the proposed contracts to the Governor and legislative leaders as provided for in PAL §1009; and (3) if necessary, the execution of the 2014 contract extensions to provide for the sale of the allocations on a short-term, month-to-month basis pending completion of the public hearing process and gubernatorial approval of the 2014 extensions. The proposed contract extensions are attached as Exhibit ‘2b ii-A’ (National Grid), Exhibit ‘2b ii-B’ (NYSEG) and Exhibit ‘2b ii-C’ (RGE), respectively.

BACKGROUND

In accordance with hydropower contracts signed with the Utilities in 1990 (‘1990 Hydro Contracts’) and subsequent contract extensions, the Utilities have purchased both firm power and firm peaking power from the St. Lawrence/FDR and Niagara Power Projects.

The Utilities have purchased such power at the Authority’s cost-based hydropower rate, the benefits of which have been passed on to the Utilities’ residential and small farm customers (also referred to as their rural and domestic or ‘R&D consumers’) without markup, through the electric service provided by the Utilities under their retail tariffs.

Since August 31, 2007, the original expiration date of the 1990 Hydro Contracts, the Authority’s Trustees have been careful not to approve any long-term contract commitments for the sale of this hydropower in anticipation of enacted legislation providing for the creation of a new hydropower-based economic development program.

Chapter 60 (Part CC) of the Laws of 2011 created the Recharge New York Power Program (‘RNY Program’). This law authorized the Authority to use the firm hydropower previously allocated to the Utilities for the RNY Program. *See* PAL §1005(13-a).

Effective August 1, 2011, the Authority withdrew the firm power allocations from the Utilities in accordance with the withdrawal provisions of the 2010 contract extensions and the new law, and terminated the firm power allocations of 189 MW for National Grid, 167 MW for NYSEG and 99 MW for RGE, but continued to sell the firm peaking power to the Utilities.

Beginning with the 2012 extension of the 1990 Hydro Contracts, the Authority’s Trustees approved two-year contract extensions for the peaking hydropower.

DISCUSSION

The proposed 2014 contract extensions would continue the sale of 360 MW of firm peaking hydropower to the Utilities, which consists of 175 MW for National Grid, 150 MW for NYSEG and 35 MW for RGE. These peaking power allocations would continue to allow the Authority to pass on the benefits of the firm peaking power to the Utilities’ R&D consumers.

The Authority is currently negotiating the extension terms with the Utilities. It is anticipated that the parties will agree to an extension of the 1990 Hydro Contracts covering the firm peaking power for up to three years, with NYPA having the right to terminate each contract upon thirty days' notice to the Utilities and the Utilities having the right to terminate their contracts after one year, upon thirty days' notice to the Authority.

As noted, the proposed 2014 extensions are subject to the public hearing and gubernatorial review process provided for in PAL §1009. Accordingly, staff further recommends that the Trustees authorize a public hearing on the final proposed contract extensions. In addition, because the 2012 extensions are scheduled to expire on December 31, 2014, staff recommends that it be authorized to execute the 2014 contract extensions providing for the sale of the peaking power allocations on a month-to-month basis pending completion of the public hearing process and gubernatorial approval of the 2014 contract extensions. In the unlikely event that gubernatorial approval is not received, the extensions would expire on the last day of the month following disapproval or the date by which the Governor is required to act on the contracts.

FISCAL INFORMATION

The proposed 2014 contract extensions would provide that the Utilities continue to pay for firm peaking hydropower at the same rates they are currently charged, *i.e.*, the cost-based rates that are currently charged to the Authority's preference customers and determined in accordance with the Authority's rate-setting methodologies and principles. The Trustees approved a preference power rate increase at their November 2011 meeting, which became effective in the December 2011 billing period. The proposed 2014 contract extensions would reflect the new preference power rates. Accordingly, there will be no fiscal impact to the Authority associated with these contract extensions.

RECOMMENDATION

The Manager – Power Contracts recommends that the Trustees: (i) authorize staff to negotiate extensions of the 1990 Hydro Contracts for terms of up to three years, with either party having the right to terminate the contract extension after a basic initial term of one year, on thirty (30) days' written notice; (ii) authorize the Corporate Secretary to convene public hearings on the final negotiated 2014 contract extensions and transmit copies of such extensions to the Governor and legislative leaders pursuant to PAL §1009; and (iii) authorize staff to execute final negotiated 2014 contract extension which would provide for the sale of firm peaking power on a month-to-month basis, if necessary, pending completion of the public hearing process and gubernatorial approval of the 2014 contract extensions.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That the Corporate Secretary be, and hereby is, authorized to convene a public hearings on the final proposed contract extensions in accordance with the procedures set forth in Public Authorities Law ("PAL") §1009; and be it further

RESOLVED, That the Corporate Secretary be, and hereby is, authorized to transmit copies of final proposed contract extensions to the Governor, the Speaker of the Assembly, the Minority Leader of the Assembly, the Chairman of the Assembly Ways and Means Committee, the Temporary President of the Senate, the Minority Leader of the Senate and the Chairman of the Senate Finance Committee pursuant to PAL §1009; and be it further

RESOLVED, That the Senior Vice President – Economic Development and Energy Efficiency or his designee be, and hereby is, authorized, subject to approval of the form thereof by the Executive Vice President and General Counsel, to negotiate and execute any and all documents necessary or desirable to implement the final proposed 2014 contract extensions with National Grid, New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation providing for the sale of firm peaking power on a month-to-month basis, if necessary, pending gubernatorial approval of the 2014 contract extensions as set forth in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That the Chairman, the Vice Chair the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

c. PROCUREMENT (SERVICES) CONTRACTS:

**i. Procurement (Services) Contracts –
Business Units and Facilities –
Awards, Extensions and/or Additional Funding**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to approve the award and funding of the multiyear procurement (services) contracts listed in Exhibit ‘2c i-A,’ as well as the continuation and/or funding of the procurement (services) contracts listed in Exhibit ‘2c i-B,’ in support of projects and programs for the Authority’s Business Units/Departments and Facilities. Detailed explanations of the recommended awards and extensions, including the nature of such services, the bases for the new awards if other than to the lowest-priced bidders and the intended duration of such contracts, or the reasons for extension and the projected expiration dates, are set forth in the discussion below.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for procurement contracts involving services to be rendered for a period in excess of one year.

The Authority’s Expenditure Authorization Procedures (‘EAPs’) require the Trustees’ approval for the award of non-personal services, construction, equipment purchase or non-procurement contracts in excess of \$3 million, as well as personal services contracts in excess of \$1 million if low bidder, or \$500,000 if sole-source, single-source or non-low bidder.

The Authority’s EAPs also require the Trustees’ approval when the cumulative change- order value of a personal services contract exceeds \$500,000, or when the cumulative change-order value of a non-personal services, construction, equipment purchase or non-procurement contract exceeds the greater of \$1 million or 25% of the originally approved contract amount not to exceed \$3 million.

DISCUSSION

Awards

The terms of these contracts will be more than one year; therefore, the Trustees’ approval is required. Except as noted, all of these contracts contain provisions allowing the Authority to terminate the services for the Authority’s convenience, without liability other than paying for acceptable services rendered to the effective date of termination. Approval is also requested for funding all contracts, which range in estimated value from \$20,000 to \$5 million. Except as noted, these contract awards do not obligate the Authority to a specific level of personnel resources or expenditures.

The issuance of multiyear contracts is recommended from both cost and efficiency standpoints. In many cases, reduced prices can be negotiated for these long-term contracts. Since these services are typically required on a continuous basis, it is more efficient to award long-term contracts than to rebid these services annually.

Extensions

Although the firms identified in Exhibit ‘2c i-B’ have provided effective services, the issues or projects requiring these services have not been resolved or completed and the need exists for continuing these contracts. The Trustees’ approval is required because the terms of these contracts will exceed one year including the extension, the term of extension of these contracts will exceed one year and/or because the cumulative change-order limits will

exceed the levels authorized by the EAPs in forthcoming change orders. The subject contracts contain provisions allowing the Authority to terminate the services at the Authority's convenience, without liability other than paying for acceptable services rendered to the effective date of termination. These contract extensions do not obligate the Authority to a specific level of personnel resources or expenditures.

Extension of the contracts identified in Exhibit '2c i-B' is requested for one or more of the following reasons: (1) additional time is required to complete the current contractual work scope or additional services related to the original work scope; (2) to accommodate an Authority or external regulatory agency schedule change that has delayed, reprioritized or otherwise suspended required services; (3) the original consultant is uniquely qualified to perform services and/or continue its presence and rebidding would not be practical or (4) the contractor provides a proprietary technology or specialized equipment, at reasonable negotiated rates, that the Authority needs to continue until a permanent system is put in place.

The following is a detailed summary of each recommended contract award and extension.

Contract Awards in Support of Business Units/Departments and Facilities:

Enterprise Shared Services

Corporate Support Services

The contracts with **FlightSafety International, Inc. ('FlightSafety')** and **FlyRight Holdings, Inc. dba FlyRight, Inc. ('FlyRight') (Q14-5672)** would provide for flight simulator training and other aviation-related training for the Authority's pilots. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 20 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Three proposals were received and evaluated; the two lowest-priced bidders were evaluated in greater detail, as further set forth in the Award Recommendation documents. Staff recommends the award of contracts to two firms: **FlightSafety**, the more technically qualified bidder for recurrent training comprising required annual refreshers including King Air 350 simulator as well as classroom training, **and FlyRight**, the lowest-priced evaluated bidder for initial pilot training related to the FAA Type rating, as needed. The contracts would become effective on or about March 15, 2015, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contracts, \$164,000 for FlightSafety and \$81,000 for FlyRight, respectively.

The contract with **Michael Bellantoni, Inc. ('Bellantoni') (Q14-5630)** would provide for lawn and landscape maintenance and snow and ice management services for the Clarence D. Rappleyea Building. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 26 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Four proposals were received and evaluated, as further set forth in the Award Recommendation documents. Staff recommends the award of a contract for all such services to Bellantoni, the lowest-priced evaluated bidder (based on the bidders' unit pricing as well as the Authority's historical usage), which meets the bid requirements and is qualified to perform such work. The contract would become effective on or about October 31, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contract, \$1,030,000.

The contract with **Valles Vendiola, LLP ('Vendiola') (Q14-5691)** would provide for independent audit services of the operating expenses of the Authority's Clarence D. Rappleyea Building in White Plains (specifically, the allocation of Common Area Maintenance charges to the tenants of the building). The Authority owns the Rappleyea Building, which is a Class B, 420,000-square-foot, 17-story structure with 30,000-square-foot floors. The Authority occupies approximately 86% of the building (including vacant space); the balance is occupied by tenants. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 37 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Four proposals were received and evaluated, as further set forth in the Award Recommendation documents. Staff recommends the award of a contract to Vendiola, the lowest-priced bidder, which meets the bid requirements and is

qualified to perform such work. The contract would become effective on or about October 16, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contract, \$20,000. It should be noted that Vendiola is both a NYS-certified Minority- and Woman-owned Business Enterprise ('M/WBE').

Law

Due to the urgent need to commence services, the contract with **McCarter & English, LLP (4500250091)** became effective on September 18, 2014, for the interim award amount of \$250,000, subject to the Trustees' ratification and approval as soon as practicable, in accordance with the Authority's Guidelines for Procurement Contracts and EAPs. Such contract provides for legal representation services in an action arising out of work performed as part of an Authority Energy Efficiency Project. Due to the time constraints involved, immediate action was required to protect the interests of the Authority, and it was not feasible to solicit formal proposals. However, Law Department staff conducted a detailed and comprehensive competitive search to identify and evaluate qualified firms specializing in construction law and construction litigation, as further set forth in the Award Recommendation documents. Based on the foregoing, as well as in-person interviews with representatives from each of the two finalists, staff determined that the McCarter & English firm is best qualified for this assignment, and possesses the requisite experience, specialized skill, and resources to represent the Authority's interests in this action, as well as to provide representation, advice and counsel to the Authority in connection with other construction litigation matters or such other services, as may be requested. The intended term of this contract is up to three years (two-year award with an option to extend for one additional year), subject to the Trustees' ratification and approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contract, \$250,000.

Operations

Environment, Health and Safety

The contracts with **Abscope Environmental, Inc. ('Abscope')**, **Buffalo Environmental Consultants, Inc. dba AFI Environmental ('AFI')**, **Pinnacle Environmental Corp. ('Pinnacle')** and **SCE Environmental Group, Inc. ('SCE') (Q14-5638; PO#s TBA)** would provide for planned and emergency response asbestos, lead and PCB abatement services at Authority facilities and sub-facilities throughout New York State. Services include asbestos/lead/PCB abatement, transport and disposal services and emergency response services for asbestos/lead/PCB removal, repair, encapsulation, enclosure or cleanup, as required, at Authority facilities in four geographic regions of the state (Northern, Western, Capital/Central and Southeastern). The scope of work includes all labor, supervision, material, equipment, vehicles, fuel, highway use taxes, insurance, permits, licenses, other forms of governmental approval and any other services necessary to contain, clean up, remove, transport and dispose of asbestos/lead/PCB-containing materials and asbestos/lead/PCB-contaminated materials. The work will be performed by licensed asbestos contractors with all requisite certifications, in the most environmentally safe, responsible and timely manner and in compliance with the latest version of all applicable federal, State and local laws and regulations and Authority specifications, and within a response time to each Authority facility of not more than three hours. All services must employ the most cost-effective, up-to-date and appropriate technologies that will efficiently mitigate the asbestos/lead/PCB hazard. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 62 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Proposals were received from 11 firms and were evaluated, as further set forth in the Award Recommendation documents. Staff recommends the award of contracts to the four most technically qualified firms for the specified regions: Abscope (Northern Region), AFI (Western Region), Pinnacle (Southeastern Region) and SCE (Capital/Central Region), respectively. The contracts would become effective on or about October 16, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the aggregate total amount expected to be expended for the term of the contracts, \$5 million. Such contracts will be monitored for utilization levels, available approved funding and combined total expenditures.

Cultural resources compliance is an integral element of the permitting process that requires strategic and knowledgeable approaches to identify, evaluate, and document cultural and historic resources. Pursuant to the new Licenses for the Niagara and St. Lawrence/FDR Projects and the related Historic Properties Management Plans ('HPMP') and/or Programmatic Agreements among the Authority, State and federal resource agencies, local and tribal governments and non-governmental organizations, the Authority has undertaken and will continue to undertake numerous activities and projects at these and other locations where such activities and projects may have the potential to impact cultural and historic resources. The contracts with **Hartgen Archeological Associates, Inc. ('Hartgen')**, **Landmark Archaeology, Inc. ('Landmark')**, **Research Foundation of SUNY, Archaeological Survey, SUNY AB ('Research Foundation')** and **Richard Grubb and Associates, Inc. ('Grubb') (Q14-5671; PO#s TBA)** would provide for cultural resources consulting services to assist the Authority, on an 'as needed' basis, with work related to the investigation and management of cultural and historic resources at various Authority or third-party facilities, as mandated by various federal, State and local statutory requirements. Services include, but are not limited to: implementation of various field and office investigations related to the potential effect of Authority activities on historic resources; documentation of cultural and historic resources to be altered or demolished; monitoring of existing historic resources to assess the potential effects of project operations, construction, erosion, vehicle traffic and/or vandalism; providing support to the Authority in responding to unanticipated discoveries of human remains and archeological resources; and the preparation of nomination documents for resources that may be eligible for listing in the National Register of Historic Places. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 52 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Twelve proposals were received and evaluated, as further set forth in the Award Recommendation documents. All the bidders were determined to be technically qualified, proficient and able to perform the work as specified in the bid requirements, therefore the selection of the recommended awardees was based on the projected costs of labor (for four typical cultural resource projects of various sizes and scopes, as calculated by Authority staff using each bidder's quoted labor rates and expenses.) Based on the foregoing, staff recommends the award of contracts to four firms: Hartgen, Landmark, Research Foundation and Grubb, the lowest-priced evaluated bidders, which are qualified to perform such work and meet the bid requirements. Two of these firms have provided satisfactory service under the previous contracts for such work. Specific assignments will be determined by the consultant's geographic location, experience and expertise, workload and ability to respond or other relevant criteria, including cost. The new contracts would become effective on or about October 16, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the aggregate total amount expected to be expended for the term of the contracts, \$1.5 million. Such contracts will be monitored for utilization levels, available approved funding and combined total expenditures. It should be noted that Landmark is a NYS-certified WBE.

Power Generation / Support Services

The contract with **DiVal Safety Equipment, Inc. ('DiVal') (RFQ 6000150934; PO# TBA)** would provide for a service agreement to maintain approximately 540 portable and wheeled fire extinguishers at the Niagara Power Project and any satellite locations that are part of the Project's normal business operations (e.g., boat docks, intake structures, ice boom areas). Services include, but are not limited to, annual on-site inspections (in compliance with NFPA-10 requirements), testing, recharging, refilling and other maintenance services, on an 'as needed' basis. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 22 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Six proposals were received and evaluated, as further set forth in the Award Recommendation documents. Staff recommends the award of a contract to DiVal, the lowest-priced evaluated bidder, which is qualified to perform such services and meets the bid requirements. The contract would become effective on or about October 16, 2014, for an intended term of up to four years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contract, \$30,000.

The contract with **Sirio Sistemi Elettronici SPA ('SSE') (6000149112; PO# TBA)** would provide for Instrumentation and Control support services for three Nuovo Pignone gas compressors at the 500 MW Plant. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 33 firms, including those that may have responded to a notice in the New York State *Contract Reporter*. Two proposals were received and evaluated, as further set forth in the Award Recommendation documents. Staff

recommends the award of a contract to SSE, which is uniquely qualified to perform such work, based on its role in the original design and implementation of the control system logic and software for Nuovo Pignone, the original equipment manufacturer. SSE owns the intellectual property associated with the control logic of the system and possesses the specialized expertise to perform this work. The other bidder lacks the expertise with this particular control system logic, software, operating and control philosophy, and therefore does not fully meet the bid requirements. The contract would become effective on or about October 16, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the total amount expected to be expended for the term of the contract, \$400,000.

Public and Regulatory Affairs

Project Development & Licensing

The Authority periodically requires the services of consultants experienced in licensing and environmental permitting tasks relative to the development of new generation and transmission projects. The consultants' analytical tools and expertise in these areas provide the Authority with valuable knowledge, data and analysis. This input assists staff in identifying projects that the Authority could pursue in the future based on the changing regulatory landscape, the competitive utility industry and the Authority's mission. The proposed contracts with **ARCADIS of New York, Inc., Burns & McDonnell Consultants, PC, CH2M HILL Engineering, PA, Ecology and Environment Engineering, PC, ESS Group, Inc., Gomez and Sullivan Engineers, DPC, Henningson, Durham & Richardson Architecture and Engineering, PC, Louis Berger & Associates, PC, POWER Engineers Consulting, PC, Tetra Tech, Inc. The Chazen Companies and TRC Environmental Corporation (Q14-5680; PO#s TBA)** would provide for such consulting services to support Authority goals and initiatives in connection with generation and transmission project evaluations and analyses, as well as Public Service Commission ('PSC') proceedings. The recommended firms would provide a broad range of expertise with relevant experience in technical, siting and environmental aspects of power system development, on an 'as needed' basis. Bid documents were developed by staff and were downloaded electronically from the Authority's Procurement website by 181 entities (of which 21 were duplicates), including those that may have responded to a notice in the New York State *Contract Reporter*; fifteen proposals were received and evaluated, as further set forth in the Award Recommendation documents. Staff recommends the award of contracts to twelve of the fifteen firms that submitted proposals to provide services in one or more of the requested areas of expertise. The twelve firms listed above submitted proposals that demonstrated their respective experience and expertise in the various disciplines, meet the bid requirements and were deemed most technically qualified to perform such work. Several of these firms have provided satisfactory service under existing contracts for this and similar work. Due to the diverse nature of the required services, staff anticipated awarding contracts to more than one firm in each area of expertise. This award strategy would afford the Authority more flexibility in obtaining sufficient resources and services when needed, ensure that a complete range of disciplines within each area of expertise would be available, allow the Authority to respond expeditiously to emergent generation and transmission needs and effectively evaluate the potential impacts of regulatory changes and PSC proceedings on the Authority's assets. The new contracts would become effective on or about November 15, 2014, for an intended term of up to five years, subject to the Trustees' approval, which is hereby requested. Approval is also requested for the aggregate total amount expected to be expended for the term of the contracts, \$5 million. Such contracts will be closely monitored for utilization levels, available approved funding and combined total expenditures.

Contract Extensions and/or Additional Funding:

Law

The contract with **Ernst & Young LLP ('EY') (4500245948)** provides for the services of a third party auditor to assist with the management of the Authority's Internal Audit Department and to conduct audits and assessments, as requested by the Authority. The original contract, which was awarded as the result of a competitive search, became effective on April 28, 2014 for an initial term of approximately eight months, in the initial award amount of \$900,000. At their meeting of July 29, 2014, the Trustees ratified and approved the subject contract award for a term through December 31, 2014, in the total amount of \$1.653 million. Subsequently, the Authority's Audit and Executive Management Committees recommended that additional EY services be retained to support and

augment the Authority's Internal Audit activities. Interim approval to commence the augmented services was authorized in accordance with the Authority's Procurement Guidelines and EAPs; formal approval of the corresponding six-month extension for this work is now requested. The current contract amount is \$1.653 million; staff anticipates that additional funding in the amount of \$2,218,600 may be required for the extended term, including estimated expenses. The Trustees are requested to ratify and approve the aforementioned extension of the subject contract through June 30, 2015, with an option to extend for an additional six-month period through December 31, 2015. Approval is also sought for the additional funding requested, thereby increasing the total approved compensation limit to \$3,871,600.

The contract with **Gibson, Dunn & Crutcher LLP ('Gibson Dunn') (4500238151)** provides for legal counsel and representation services in connection with certain confidential ongoing matters. The original contract, which was awarded as the result of a competitive search, became effective on October 1, 2013 for an initial term of up to one year, in the initial amount of \$500,000. Cumulative additional funding totaling \$500,000 and a short-term interim extension through October 15, 2014 were subsequently authorized in accordance with the Authority's Procurement Guidelines and EAPs. These confidential ongoing matters will likely result in additional requests for information and other related services. Gibson Dunn has established credibility with all parties during the past year and it is both beneficial and efficient for the Authority to maintain the status of these relationships through Gibson Dunn's continued counsel and representation services. A two-year extension is therefore requested. The current contract amount is \$1 million; staff anticipates that additional funding in the amount of \$1 million may be required for the extended term. The Trustees are requested to approve extension of the subject contract through September 30, 2016, as well as the additional funding requested, thereby increasing the total approved compensation limit to \$2 million.

Operations Support Services

Project Management

At their meeting of September 24, 2013, the Trustees approved the award of a contract to **Beebe Construction Services, Inc. (4500236532)** to construct a new Security Building and associated site development, as part of the Support Facilities Improvement Project at the Blenheim-Gilboa Pumped Storage Power Project and a total contract amount of \$3.62 million. The original award, which was competitively bid, became effective on September 25, 2013, for an initial term of up to one year and an award amount of \$3,618,017. Additional funding in the amount of \$51,527 (above the originally approved \$3.62 million) and a short-term interim extension through October 15, 2014 were subsequently authorized in accordance with the Authority's Guidelines for Procurement Contracts and EAPs. Several factors contributed to delays in project completion: the long winter with late season ice and deep frost ground conditions severely hampered scheduled site work during the spring months; a complete analysis of an existing well supplying potable water to the complex and development of a custom water treatment process were required to satisfy Schoharie County Health Department requirements; and the extended review and approval process by the Authority's dam safety consultant and the Federal Energy Regulatory Commission had to be completed prior to excavating the lower reservoir's dam crest to install the buried electric supply feeder duct bank. An extension of approximately three months is therefore required to complete the work. The current contract amount is \$3,671,527; if required, additional funding will be authorized in accordance with the EAPs. The Trustees are requested to ratify the short-term interim extension and to approve the additional extension of the subject contract through December 31, 2014.

The contract with **HydroPower Performance Engineering, Inc. ('HPPE') (4500235703)** provides for index testing and analysis of 12 turbine-generator units at the St. Lawrence Project, upgraded as part of the Life Extension and Modernization Program. Services include, but are not limited to, all necessary expertise, manpower, tools and equipment to conduct field tests and data analyses and prepare reports documenting the results of the testing. Such post-upgrade performance validation and water sharing verification (with Ontario Power Generation, 'OPG') are required to comply with International Joint Commission ('IJC') requirements. The original award, which was competitively bid, became effective on October 8, 2013, for an initial term up to one year and an award amount of \$364,560. Additional funding in the amount of \$32,170 and a short-term interim extension through October 15, 2014 were subsequently authorized in accordance with the Authority's Procurement Guidelines and EAPs. HPPE is currently preparing the aforementioned reports and additional reports have been requested. An extension of up to one year is now requested in order to allow HPPE to complete the additional reports and to

support the Authority's review with OPG and IJC, should additional information be required. The current contract amount is \$396,730; if required, additional funding will be authorized in accordance with the EAPs. The Trustees are requested to ratify the short-term interim extension and to approve the additional extension of the subject contract through October 7, 2015.

The contract with **Northline Utilities, LLC ('Northline') (4500236946)** provides for construction services in connection with the power supply to the Spillway and new Security Buildings at the Blenheim-Gilboa Pumped Storage Power Project. The original award, which was competitively bid, became effective on October 2, 2013, for an initial term up to one year and an award amount of \$2,223,818. A short-term extension through October 15, 2014 was subsequently authorized in accordance with the Authority's Guidelines for Procurement Contracts and EAPs. The same factors as set forth in the aforementioned Beebe contract extension contributed to delays in completion of this work and an extension of approximately three months is therefore required. The current contract amount is \$2,223,818; if required, additional funding will be authorized in accordance with the EAPs. The Trustees are requested to ratify the short-term interim extension approve the additional extension of the subject contract through December 31, 2014.

FISCAL INFORMATION

Funds required to support contract services for various Business Units/Departments and Facilities have been included in the 2014 Approved O&M Budget. Funds for subsequent years, where applicable, will be included in the budget submittals for those years. Payment will be made from the Operating Fund.

Funds required to support contract services for capital projects have been included as part of the approved capital expenditures for those projects and will be disbursed from the Capital Fund in accordance with the project's Capital Expenditure Authorization Request.

RECOMMENDATION

The Senior Vice President – Operations Support Services and Chief Engineer, the Senior Vice President – Power Generation, the Vice President and Chief Ethics and Compliance Officer, the Vice President – Environment, Health & Safety, the Vice President – Project Development & Licensing, the Acting Vice President – Project Management, the Acting Vice President – Procurement, the Vice President – Information Technology and Chief Information Officer, the Regional Manager – Western New York, the Regional Manager – Northern New York, the Regional Manager – Central New York and the Regional Manager – Southeastern New York recommend that the Trustees approve the award of multiyear procurement (services) contracts to the companies listed in Exhibit '2c i-A' and the extension and/or funding of the procurement (services) contracts listed in Exhibit '2c i-B,' for the purposes and in the amounts discussed within the item and/or listed in the respective exhibits.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was adopted with the exception of the contract to Burns & McDonnell Consultants, PC which was withdrawn; and ARCADIS of New York, Inc. and CH2M HILL Engineering since they failed to pass due to lack of a quorum.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, the award and funding of the multiyear procurement services and other contracts set forth in Exhibit "2c i-A," attached hereto, are hereby approved for the period of time indicated, in the amounts and for the purposes listed therein, as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, the contracts listed in Exhibit “2c i-B,” attached hereto, are hereby approved and extended for the period of time indicated, in the amounts and for the purposes listed therein, as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

NIAGARA

ii. **Procurement (Services) Contract –
Robert Moses Niagara Power Project –
Ice Boom Tugboat Replacement –
Capital Expenditure Authorization Request
and Contract Award**

The President and Chief Executive Officer submitted the following report:

SUMMARY

The Trustees are requested to authorize capital expenditures in the amount of \$6,900,200 and approve the award of a three-year contract to Great Lakes Shipyard ('GLS'), of Cleveland, Ohio, in the amount of \$4,938,662, to fabricate two tugboats associated with the Niagara Power Project Lake Erie Ice Boom. As this is a Joint Works Project, costs for this project will be shared equally with Ontario Power Generation ('OPG').

To provide the additional time necessary to complete the vessel design and meet the delivery date for the first vessel, interim approval for this contract (Value Agreement 4600002840) in the amount of \$250,000 was authorized in September 2014 by the Chief Operating Officer in accordance with the Authority's Guidelines for Procurement Contracts.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority's Guidelines for Procurement Contracts require the Trustees' approval for non-personal services contracts in excess of \$3 million and contracts involving services to be rendered for a period in excess of one year.

The existing tugboats, the *Daniel Joncaire* and the *Breaker*, are critical to the winter operations of the Niagara Power Project and OPG's Sir Adam Beck Plant. These vessels are used during the installation, removal, and in-service maintenance and repair of the Lake Erie Ice Boom, in addition to ice breaking duties, on the Niagara River.

In 2012, a study was conducted to evaluate the condition of the 30 plus year-old *Daniel Joncaire* and 50 plus year-old *Breaker*. The study identified that both tugboats have exceeded their service lives for towing vessels. Several options for refurbishment were evaluated. However, based on the cost and extensive modifications that would be required, it was determined that both tugboats should be replaced. These vessels will be designed and built in accordance with the latest codes and standards prescribed by the American Bureau of Shipping, the Environmental Protection Agency, and the United States Coast Guard.

In July 2013, the Trustees approved the award of a five-year contract to Bristol Harbor Group, Inc. ('Bristol'), of Bristol, RI, for professional marine engineering and construction support services for the design and fabrication of the new vessels. Bristol completed the vessel design in early 2014 and will be responsible for fabrication oversight and vessel inspections, as well as ensuring the vessels meet the requirements needed to be documented with the United States Coast Guard.

DISCUSSION

The Authority issued a Request for Proposal (Q14-5658FS) in the New York State *Contract Reporter* on May 22, 2014. On July 10, 2014, the following two proposals were received:

| <u>Firms</u> | <u>Location</u> | <u>Lump Sum w/ Selected Options</u> |
|----------------------|-------------------|-------------------------------------|
| Great Lakes Shipyard | Cleveland, OH | \$4,938,662.00 |
| Metal Trades, Inc. | Yonges Island, SC | \$5,808,416.72 |

The proposals were evaluated by an Evaluation Committee consisting of Authority staff. The Evaluation Committee based its review of the proposals on cost, technical qualifications, safety and prior work experience.

GLS's proposal was the lowest in price and was also technically acceptable. The company has extensive experience in the field of vessel fabrication, has demonstrated knowledge of the scope-of-work, and is capable of completing this project in accordance with the required schedule.

GLS's experience, resources and capabilities meet the Authority's requirements as described in the bid document. In addition, GLS has performed to the Authority's satisfaction on previous projects.

The scope-of-work under this contract includes the fabrication and delivery of the two tugboats replacing the existing *Daniel Joncaire* and *Breaker*. In addition, the contract with GLS includes the options to provide crew familiarization training and a Vessel Information Book ('VIB'). The VIB consolidates the installation, technical, and maintenance manuals for all systems and components onboard the vessels. The vessel fabrication and crew training will be performed in three phases as follows:

- | | |
|--|-------------------------------------|
| 1. Fabricate/Deliver <i>Daniel Joncaire II</i> | 2014 – 2015 |
| 2. Fabricate/Deliver <i>Breaker II</i> | 2016 – 2017 |
| 3. Crew Training and VIB | At time of delivery for each vessel |

The Trustees are also requested to approve expenditures for engineering, procurement, construction, and Authority direct and indirect costs for the completion of this project as follows:

| | Previous Authorization (\$000) | Current Request (\$000) | Total Authorization (\$000) |
|-----------------------|--------------------------------|-------------------------|-----------------------------|
| Engineering/Design | 77.0 | 418.0 | 495.0 |
| Construction/Install. | 287.5 | 5,583.3 | 5,870.8 |
| NYPA Direct Expense | 15.7 | 190.1 | 205.8 |
| NYPA Indirect Exp. | 19.0 | 309.6 | 328.6 |
| Total | 399.2 | 6,501.0 | 6,900.2 |

In accordance with the Memorandum of Understanding between the Authority and OPG, dated October 26, 1966, and as amended October 2, 1988, these vessels are considered Joint Works assets and, therefore, 50% of the costs will be reimbursed to the Authority.

FISCAL INFORMATION

Payment associated with this project will be made from the Authority's Capital Fund. Future year funding will be included in the Capital Budget requests for those years.

Costs for this project will be shared with OPG.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Acting Vice President – Procurement, the Project Manager and the Regional Manager of Western New York recommend that the Trustees authorize capital expenditures in the amount of \$6,900,200 and approve the award of a three-year contract to Great Lakes Shipyard of Cleveland, Ohio, in the amount of \$4,938,662, for the Niagara Power Project – Joint Works – Ice Boom Tugboats Replacement.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Authority's Expenditure Authorization Procedures, capital expenditures are hereby approved in the amount of \$6,900,200 for the Niagara Power Project – Joint Works – Ice Boom Tugboats Replacement Project, as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to award a three-year contract to Great Lakes Shipyard of Cleveland, Ohio, in the amount of \$4,938,662, for the Niagara Power Project – Joint Works – Ice Boom Tugboats Replacement Project, as recommended in the foregoing report of the President and Chief Executive Officer;

| <u>Contractor</u> | <u>Contract Approval</u> |
|---|--------------------------|
| Great Lakes Shipyard Cleveland, Ohio (4600002840) | <u>\$4,938,662</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

iii. **Procurement (Services) Contract –
Robert Moses Niagara Power Project –
Unit Controls and Control Room Assessment –
Contract Award**

The President and Chief Executive Officer submitted the following report:

SUMMARY

The Trustees are requested to approve the award of a two-year contract in the amount of \$434,630 to Hatch Associates Consultants Inc. ('Hatch'), of Amherst, NY, as the fully compliant and technically qualified bidder to perform the Unit Controls and Control Room Assessment at the Robert Moses Niagara Power Plant ('RMNPP').

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority's Guidelines for Procurement Contracts require the Trustees' approval for procurement contracts involving services to be rendered for a period in excess of one year.

The existing RMNPP Central Control Room ('CCR') is the primary operations center for the daily operation of the Niagara facility, including monitoring and remote control of the 13 generating units at RMNPP, 12 generating/pump units at Lewiston Pumped Generating Plant ('LPGP') and the switchyard circuit breakers serving the electric transmission system.

The Authority is planning a major upgrade to the monitoring and control systems at RMNPP with modern technology and redundancy in order to secure an additional 40 years of enhanced operation and therefore, a CCR upgrade is required. The project will also include modifications to the CCR and the upgrade of the unit control systems of the 13 RMNPP generating units similar to the unit automation upgrades that are presently underway under the LPGP Life Extension and Modernization ('LEM') program.

The scope-of-services under this contract includes a technical and fiscal assessment of the existing generating unit control systems, auxiliary control systems, CCR remote control and monitoring systems, Human Factors analysis for all operator functions and modifications to the CCR. In addition, the scope includes the development of an implementation plan, cost estimates and identification of the environmental hazards that may be encountered during project implementation.

DISCUSSION

An advertisement to solicit bids (Q14-5605 HM) was issued and appeared in the New York State *Contract Reporter* on March 12, 2014. A single proposal was received on April 30, 2014.

The final proposal price is as follows:

| <u>Bidder</u> | <u>Base Bid Price</u> |
|-----------------------------------|-----------------------|
| Hatch Associates Consultants Inc. | \$434,630 |

The proposal was evaluated by an Evaluation Committee with representatives from Engineering, Project Management and Procurement, using cost, schedule and technical criteria.

Queries were sent to Hatch to clarify its proposal and to provide an opportunity to explain the proposed work plan, guaranteed characteristics and pricing. Hatch's responses were acceptable to the Committee.

Hatch's initial base bid price was \$373,070. A Post-Bid Meeting was held at the Authority's White Plains offices on June 9, 2014 with Hatch to further discuss its proposal and ensure compliance with the Authority's requirements.

Hatch submitted the revised bid on July 18, 2014, which was \$102,130.00 higher than the base bid. The Authority requested Hatch to itemize and justify the increase in its bid amounts. Hatch submitted Revision 2 of its proposal on August 27, 2014 for a lump-sum bid price of \$434,630.

Hatch took minimal commercial and technical exceptions which are acceptable to the Authority. In the recent past, Hatch successfully completed several projects for the Authority including the design of a temporary control room for the St. Lawrence/FDR Hydropower Plant.

FISCAL INFORMATION

Payment associated with this project will be made from the Authority's Capital Fund and is included in the 2014 approved Capital budget.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Acting Vice President – Procurement, the Project Manager and the Regional Manager – Western New York recommend that the Trustees approve the award of a two-year contract to Hatch Associates Consultants Inc. of Amherst, NY, in the amount of \$434,630, to perform the Unit Controls and Control Room Assessment at the Robert Moses Niagara Power Plant.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to award a two-year contract to Hatch Associates Consultants Inc. of Amherst, NY, in the amount of \$434,630, to perform the Unit Controls and Control Room Assessment at the Robert Moses Niagara Power Plant, as recommended in the foregoing report of the President and Chief Executive Officer;

| <u>Contractor</u> | <u>Contract Approval</u> |
|--|--------------------------|
| Hatch Associates Consultants Inc. (Q14-5605 HM) | <u>\$434,630</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

iv. **Procurement (Services) Contract –
Niagara Power Project – Lewiston Pump Generating Plant –
Life Extension and Modernization Program –
Servomotor Design and Fabrication – Contract Extension**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to extend the subject contract with Voith Hydro Inc. of York, PA (‘Voith’) from July 31, 2017 to July 31, 2021, for the procurement of 12 sets of servomotors and associated items, as part of the Life Extension and Modernization (‘LEM’) Program at the Lewiston Pump Generating Plant (‘LPGP’). This contract extension will result in no cost increase for the procurement of the servomotors.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for any contract extension term in excess of one year.

At their June 29, 2010 meeting, the Trustees approved the LPGP LEM Program at the estimated cost of \$460 million. As of their July 29, 2014 meeting, the Trustees have authorized a capital expenditure amount of \$300 million for the LPGP LEM Program, and the value of this contract falls within that capital expenditure authorization.

The principal reason for the life extension work at LPGP is the aging condition of the generating equipment. Failure to maintain the LPGP would result in significant loss of peaking and firm capacity from the Niagara Power Project, impacting the ability of the Niagara Power Project to meet requirements under power contracts with the Authority’s customers.

Each of the 12 LPGP units has two servomotors located inside the turbine pit that regulate the water flow through the turbines by moving the wicket gates and these original equipment were placed in service in 1961. The servomotors are large oil pistons constructed of cast iron which have experienced cracking and have been temporarily repaired; permanent repair of the cast iron is not possible. Based on equipment condition assessments, it was determined that all of the servomotors should be replaced with servomotors constructed of steel in lieu of cast iron as was done for the individual unit refurbishment work.

DISCUSSION

At their meeting of June 26, 2012, the Trustees awarded a five-year contract to Voith in the amount of \$5,999,139, for the procurement of 12 sets of servomotors and associated items. The scope-of-work under this contract includes the design, manufacturing and delivery of 12 sets of servomotors. Initially, the Authority only released the first five sets of the servomotors due to the limited storage space. The first two new sets of servomotors have been installed in LPGP LEM Units #11 and #5, and have been operating successfully.

The Operational and Maintenance (‘O&M’) manual for the new servomotors requires a pressure test prior to installation on units that are stored longer than six months before being placed in service so that the 10-year warranty can be maintained. These pressure tests were not included in the contract and are being performed at additional costs. In order to address the storage issue, mitigate the extra costs of testing, maintain the warranty and the LPGP LEM schedule, the Authority elected to accept delivery of the remaining seven sets of servomotors in three stages. The delivery would be staggered as follows: two sets in January 2016; two sets in March 2017 and the last three sets in August 2018. Voith will continue to perform the pressure tests, prior to installation, on servomotors stored more than six months.

In order to receive the remaining sets of the servomotor in stages as outlined above, a contract extension to July 2021 is required. The last set of servomotors is scheduled to be installed in the last unit in the September 2020 time-frame, in accordance with the LPGP LEM schedule.

FISCAL INFORMATION

Payment associated with this project will be made from the Authority's Capital Fund and is included in the 2014 approved Capital budget.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Acting Vice President – Procurement, the Project Manager and the Regional Manager – Western New York recommend that the Trustees extend the Servomotor design and fabrication contract with Voith Hydro Inc. of York, PA from July 31, 2017 to July 31, 2021, for the procurement of 12 sets of servomotors and associated items, as part of the Life Extension and Modernization Program at the Lewiston Pump Generating Plant.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to extend the servomotor design and fabrication contract with Voith Hydro Inc. of York, PA from July 31, 2017 to July 31, 2021, for the procurement of 12 sets of servomotors and associated items, as part of the Life Extension and Modernization program to renovate and modernize the Lewiston Pump Generating Plant, as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

ST. LAWRENCE

v. **Procurement (Services) Contract –
St. Lawrence/FDR Power Project –
Safety Systems Upgrade – Capital Expenditure
Authorization Request and Contract Award**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to authorize capital expenditures in the amount of \$7,103,300 and approve the award of a contract in the amount of \$4,937,712, for up to a three-year period, to Johnson Controls, Inc. (‘JCI’) of Amherst, NY, for engineering, procurement, installation, start-up, testing, demolition and commissioning services associated with the Safety Systems Project (‘Project’) at the St. Lawrence/FDR Power Plant (‘STL’). This Project entails the replacement of the existing safety systems which include the public address, fire alarm and emergency lighting systems, and emergency exit signage in all occupied structures at Barnhart Island.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for procurement contracts involving services to be rendered for a period in excess of one year. Also, in accordance with the Authority’s Expenditure Authorization Procedures, the award of non-personal services or equipment purchase contracts exceeding \$3 million require the Trustees’ approval.

In 2013, Aon Fire Protection Engineering Corporation (‘Aon FPE’) performed an engineering assessment of the existing public address system, fire alarm system, and the exit and emergency lighting systems at STL for compliance with the present code requirements and provided the Authority with recommendations for improvements.

The assessment reported that the existing public address system is not audible in most areas and the system is considered unreliable for notifying building occupants in the event of an emergency. In addition, the control equipment is not able to detect circuit faults, which is a code requirement for systems used for occupant evacuation. The National Fire Protection Association Standard 72 restricts the use of speakers with volume controls that can be manually adjusted by the building’s occupants. The existing public address system will be replaced with new hardware.

The fire alarm systems throughout the facility and surrounding buildings (‘Facility’) are required to provide audible alarm notification in the event of a fire. In some areas, the alarm sound levels were found to be below the code-required 15dB above ambient threshold. The Facility does not have a fire alarm system and most building areas do not have code-required visible alarm notification appliances. A full replacement of the fire alarm system would address these issues and meet code compliance.

The majority of the Facility buildings lack code-compliant exit signs and many do not properly identify the exits or the direction to an exit. To address this issue, new LED-type exit signs with integral 90-minute battery backup will replace and expand the existing internally illuminated and self-luminous exit signs.

The Facility’s 125 VDC emergency lighting system was tested and found inoperable. Facility personnel subsequently made the necessary repairs, replacing the spent lamps to restore operation to the system. Many buildings at the facility do not contain emergency lighting as required by code. To address these issues, new 120 – 240/277 VAC emergency lighting pack units will be installed throughout the Power Dam Facility and the nine auxiliary buildings.

EVALUATION

In response to the Authority's request for proposal advertised in the New York State *Contract Reporter* on June 3, 2014 (RFQ No. Q14-5656JT), fifty-seven (57) firms downloaded the bid documents. The following two (2) proposals were received on June 24, 2014:

| <u>Company</u> | <u>Evaluated Price</u> |
|---|------------------------|
| Johnson Controls, Inc. (JCI) (Amherst, NY) | \$4,937,712 |
| S&L Electric (S&L) (Colton, NY) | \$6,368,215 |

The Authority's Fair Cost Estimate for the project is \$3,625,000.

The proposals were reviewed by an Evaluation Committee consisting of Authority staff. JCI provided the lowest cost and technically acceptable proposal. It included a detailed project execution and resource plan describing JCI's approach for management of the project scope, cost, schedule, safety, quality and a specific identification of the major work tasks to be performed. JCI's proposal meets the criteria as specified in the Authority's construction specification. JCI has also successfully completed several projects for the Authority. JCI took no exceptions to the Authority's technical specifications and commercial terms and conditions.

FISCAL INFORMATION

Payments associated with this project will be made from the Authority's Capital Fund.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Acting Vice President – Procurement, the Project Manager, and the Regional Manager – Northern New York recommend that the Trustees authorize capital expenditures in the amount of \$7,103,300 and the award of a contract in the amount of \$4,937,712 to Johnson Controls, Inc. of Amherst, NY, for the Safety Systems Upgrade at the St. Lawrence/FDR Power Plant.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Authority's Expenditure Authorization Procedures, capital expenditures in the amount of \$7,103,300 are hereby authorized for the St. Lawrence/FDR Power Project's Safety Systems as recommended in the foregoing report of the President and Chief Executive Officer; and be it further.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to approve the award of a contract, in the amount of \$4,937,712, to Johnson Controls, Inc. to provide engineering, material, installation, demolition and testing services for the St. Lawrence/FDR Power Project's Safety Systems, as recommended in the foregoing memorandum of

the President and Chief Executive Officer and as set forth below:

| <u>Contractor</u> | <u>Contract Approval</u> |
|---|--------------------------|
| Johnson Controls, Inc. Amherst, NY (Q14-5656JT) | <u>\$4,937,712</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

SENY

vi. **Procurement (Services) Contract –
HRSG Valves and Platform Installation Project –
Contract Award**

The President and Chief Executive Officer submitted the following report:

SUMMARY

The Trustees are requested to approve a two-year contract, in the amount of \$2.24 million, to Fresh Meadow Mechanical Corp. ('FM') to perform Heat Recovery Steam Generator ('HRSG') Valves and Platform Installation, (the 'Project') at the 500 MW Combined Cycle Power Plant (The Facility) in Astoria, New York.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority's Guidelines for Procurement Contracts require the Trustees' approval for procurement contracts involving services to be rendered for a period in excess of one year.

The Authority's Expenditure Authorization Procedures ('EAPs') require the Trustees' approval for the award of non-personal services, construction, equipment purchase or non-procurement contracts in excess of \$3 million, as well as personal services contracts in excess of \$1 million if low bidder, or \$500,000 if sole-source, single-source or non-low bidder.

This project is Part 2 of the approved Capital Project and includes the installation of the HRSG redundant block and bleed valves and associated maintenance platforms. Part 1 was awarded in September 2014 and included equipment procurement as well as the installations for the Fuel Gas ('FG') system. To ensure proper Lock-Out/Tag-Out and safe operation of the systems, a second or 'redundant' block and bleed valve, along with new platforms for safe maintenance access, needs to be installed. Currently, the 500 MW FG and HRSG systems do not have these redundancies. To install these valves, a full plant outage is required. The prior awarded Part 1 work will occur during the Fall 2014 outage; this Part 2 work will be implemented in the upcoming 2015 outage.

DISCUSSION

In response to the Authority's request for proposal advertised in the New York State *Contract Reporter* on May 23, 2014, one proposal was received for the HRSG work on June 25, 2014. Through clarifications with the sole bidder and those who downloaded the bid documents, the Authority issued an addendum and requested revised bids due by July 22, 2014. Four bids were received as listed below.

| BIDDING CONTRACTOR | LOCATION | BID* |
|-----------------------------------|-------------------------|-----------------------|
| Fresh Meadow Mechanical Corp. | Fresh Meadows, NY | \$2,240,000.00 |
| Migrant Corporation | West Babylon, NY | \$2,360,000.00 |
| Durr Mechanical Construction Inc. | New York, NY | \$3,321,797.00 |
| Dynamic Mechanical Contractors | Hackensack, NJ | \$4,058,000.00 |
| NYPA FCE | White Plains, NY | \$2,480,911.00 |

*Performance and Payment Bonds included in Prices

On July 30, 2014, pre-award interviews were conducted with the two lowest bidders, Fresh Meadow Mechanical Corp. ('FM') and Migrant Corporation ('MC'); the Evaluation Committee consisting of representatives from Project Management, Procurement, Engineering and GPI, the Authority's Consultant Engineer, to review and confirm various technical and commercial aspects of their bids.

Both bidders demonstrated a complete understanding of the work and confirmed schedule compliance and are prepared to have skilled labor available during extended hours, if necessary, to accommodate completion of the work during the Outage. Both bidders have adequate experience and presented an acceptable approach to the work in accordance with the technical drawings and specifications. Based on the interviews and abbreviated (10-day) Outage period, the evaluation committee recommends the award of this work to FM. FM was awarded a \$300,000 contract for Part 1 of the work in September 2014 and has successfully worked with the Authority on the 2011 and 2013 Flynn HRSG Refurbishment Projects. FM has met all requirements of the bid documents, has a clear understanding of the scope, is capable of completing the work in accordance with the schedule and is the lowest bidder. The company's bid is consistent with NYPA's Fair Cost Estimate.

FISCAL INFORMATION

Payments associated with this Project will be made from the Capital Fund under the \$5.66 million Capital Expenditure Authorization Request ('CEAR') approved by the Trustees in January 2014.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Vice President – Engineering, the Acting Vice President – Project Management, the Acting Vice President – Procurement and the Regional Manager – SENY recommend that the Trustees approve the award of a two-year contract in the amount of \$2.24 million, to Fresh Meadow Mechanical Corp. of Fresh Meadows, New York, for the 500 MW Heat Recovery Steam Generator ('HRSG') Valves and Platform Installation Project.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to award a two-year contract in the amount of \$2.24 million, to Fresh Meadow Mechanical Corp. of Fresh Meadows, New York for the 500 MW Heat Recovery Steam Generator ("HRSG") Valves and Platform Installation Project as recommended in the foregoing report of the President and Chief Executive Officer

| <u>Contractor</u> | <u>Contract Approval</u> |
|--|---|
| Fresh Meadow Mechanical Corp. Fresh Meadows, NY | Two-Year Contract <u>\$2,240,000</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

vii. **Procurement (Services) Contract –
On-Call Services: Engineering, Construction
Management and Oversight Services – Contract Award**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to approve the award of a multi-year (5-year) contract for the On-Call Engineering, Construction Management and Oversight Services (the ‘Services’) in the aggregate, not-to-exceed amount of \$50 million to the five most technically acceptable bidders: Eneractive Solutions, AECOM USA Inc., Jacobs, RCM Technologies and CH2MHILL.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for procurement contracts involving services to be rendered for a period in excess of one year.

The Authority’s Expenditure Authorization Procedures (‘EAPs’) require the Trustees’ approval for the award of non-personal services, construction, equipment purchase or non-procurement contracts in excess of \$3 million, as well as personal services contracts in excess of \$1 million if low bidder, or \$500,000 if sole-source, single-source or non-low bidder.

On-Call services are required to ensure proper implementation of planned, emergent and on-going projects and to supplement existing resources within the Project Management (‘PM’) group. Services under these contracts allow for extensions of staff to manage the increasing number of PM-owned projects; allow for construction oversight of the projects; and allow for engineer of record services, as necessary. In 2011 and 2013, the Authority awarded separate contracts for the current Project Management and Transmission Life Extension and Modernization (‘T-LEM’) On-Call Services which will expire in September 2015 and December 2017, respectively.

Project Management and staff located in White Plains have been tasked with execution and implementation of extensive projects, such as T-LEM and Poletti Deconstruction, with more demanding schedules, and an increase in Capital, O&M and emerging projects. As such, funding for the existing On-Call Contracts is depleting and new contracts are required.

A new stable of Master Service Agreements will support Project Management at all Authority facilities on major projects, such as the continuing T-LEM. Past experience has shown that an award to multiple firms allows for a broader selection and availability of skilled personnel to support the varying range of projects.

DISCUSSION

In response to the Authority’s request for proposal (Q14-5621DK) advertised in the New York State *Contract Reporter* on July 29, 2014, 252 firms downloaded the bid document. On August 19, 2014, 17 proposals were received for the Project.

A complete bid review and analysis was conducted by the Evaluation Committee consisting of staff from Project Management and Procurement. Evaluation criteria were based on relevant experience, quality of services (confirmed by references) and hourly rates for Authority required support. All 17 firms were ranked by assigning a score in each criteria area and then an overall ranking (lower number representing higher rating) was determined using a weighted factor applied across the criteria score.

For successful project execution and implementation, the firms’ experience, particularly with power and utility projects, and proven track record to provide quality services is considered essential and, as such, was

weighted most in the scoring system. Based on the review of the written proposals, Eneractive Solutions, AECOM USA Inc., Jacobs, RCM Technologies and CH2MHILL were the top five ranked firms.

All five of these firms have relevant and good experience in the power and utility industry; successful track records implementing projects of various dollar value, duration and complexity; experience working with City, State or Government agencies; and current or past successful track record working with the Authority. As such, these five firms were further evaluated based on their hourly rates.

Based on the review of the proposals and the evaluation criteria, an award is recommended to the five most technically acceptable bidders: Eneractive Solutions, AECOM USA Inc., Jacobs, RCM Technologies and CH2MHILL.

Services under this contract will be provided on an as-needed basis and/or availability, using the hourly rates.

FISCAL INFORMATION

Payments associated with this Project will be made from the Authority's Capital and Operating Funds.

RECOMMENDATION

The Chief Operating Officer, the Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Procurement and the Acting Vice President – Project Management recommend that the Trustees approve award of a multi-year (5-year) contract for the On-Call Engineering, Construction Management, and Oversight Services (the 'Services') in the aggregate, not-to-exceed amount of \$50 million to the five most technically acceptable bidders: Eneractive Solutions, AECOM USA Inc., Jacobs, RCM Technologies and CH2MHILL.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was adopted with the exception of CH2M HILL Engineering since it failed to pass due to lack of a quorum.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority and the Authority's Expenditure Authorization Procedures, approval is hereby granted to award a five-year Contract for the aggregate total of \$50 million to Eneractive Solutions, AECOM USA Inc., Jacobs, RCM Technologies, CH2MHILL as recommended in the foregoing report of the President and Chief Executive Officer;

| <u>Contractor</u> | <u>Location</u> | <u>Contract Approval</u> |
|------------------------|-----------------|--------------------------|
| • Eneractive Solutions | New York, NY | Multiyear (5-year) |
| • AECOM USA Inc. | New York, NY | On-Call Engineering, |
| • Jacobs | New York, NY | Construction |
| • RCM Technologies | Parsippany, NJ | Management & |
| • CH2MHILL | Paterson, NJ | Oversight Services |
| | | <u>\$50,000,000</u> |
| | | <u>(aggregate)</u> |
| (Q14-5621DK) | | |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

TRANSMISSION LEM

viii. **Procurement (Services) Contract –
Transmission Life Extension and Modernization Program –
Clark Energy Center Switchyard – Capital Expenditure
Authorization Request and Contract Award**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to authorize capital expenditures in the amount of \$41.009 million for the Clark Energy Center (‘CEC’) Switchyard Life Extension and Modernization (‘LEM’) (‘Project’). The Project is part of the Transmission Life Extension and Modernization Program.

The Trustees are also requested to approve the award of a contract in the amount of \$6.28 million to ABB, Inc. of Mount Pleasant, PA to design, furnish and deliver six 765 kV three-pole circuit breakers and one 765 kV single-pole circuit breaker for the CEC Switchyard LEM.

The President and Chief Executive Officer, in accordance with the Authority’s Expenditure Authorization Procedures, approved the amount of \$309,000 for preliminary Project engineering.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for non-personal services contracts in excess of \$3 million and contracts involving services to be rendered for a period in excess of one year.

The Transmission LEM is a multiyear program that will upgrade the Authority’s existing transmission system to maintain availability, increase reliability, and ensure regulatory compliance. The Program encompasses transmission assets in the Central, Northern, and Western Regions and has been divided into several projects. The Program is estimated to cost \$726 million and includes:

- Upgrades, refurbishments, and replacements associated with switchyards and substations
- Transmission line structures or towers and associated hardware, including tower painting
- Replacement of the submarine cable on PV-20
- Work along rights-of-way, including access roads

The CEC Switchyard consists of 765 kV and 345 kV substations. There are a total of six 765 kV three-pole and one 765 kV single-pole live-tank air blast SF6 circuit breakers at the substation which were put into service in 1978. The Project will replace:

- 765 kV Power Circuit Breakers
- 765 kV Potential Transformers
- 345 kV Circuit Breakers
- 13.8 kV Switchgear
- 13.8 kV/480V Station Service Transformers
- 480V Station Service Switchgear

The CEC Switchyard power circuit breakers are nearing the end of their useful life and have been identified for replacement as a result of internal and external assessments which have identified issues due to aging, increased maintenance and unavailability of spare parts. The existing circuit breakers are scheduled for replacement between 2016 - 2020.

DISCUSSION

The Project has been structured in a manner to prioritize the replacement of poor performing and aged equipment. Replacement of listed equipment will be sequenced in conjunction with planned equipment replacements, outages and internal resource availability during the Project's duration, 2014 – 2020.

This capital expenditure authorization is comprised of the following:

| | |
|---|----------------------|
| Preliminary Engineering (Previously Approved) | \$ 294,300 |
| Engineering and Design | \$ 4,089,100 |
| Procurement | \$ 10,766,800 |
| Construction/Installation | \$ 16,574,400 |
| Authority Indirect and Direct Expenses | <u>\$ 9,284,600</u> |
| TOTAL | \$ 41,009,200 |

In response to the Authority's Request for Proposal (Q14-5644RH) advertised in the New York State *Contract Reporter* on May 5, 2014, forty-one (41) firms downloaded the bid documents. The following five (5) proposals were received on June 25, 2014:

| <u>Bidder</u> | <u>Base Price</u> | <u>Evaluated Price</u> |
|---|------------------------------------|-------------------------------|
| HICO America Sales & Technology Inc. Pittsburg, PA 15276 | \$7,941,265.72 | Disqualified |
| Mitsubishi Electric Warrendale, PA15086 | \$9,321,514.00 | \$9,321,514.00 |
| Alstom Grid Charleroi, PA 15022 | Did not submit proposal for 765 kV | |
| HVB AE Power Systems Suwanee, GA 30024 | \$7,294,756.64 | \$ 7,294,756.64 |
| ABB Inc. Mount Pleasant, PA 15666 | \$ 5,775,735.07 | \$6,277,251.18 |

During the process of evaluation and, as a consequence of the post-bid clarifications, ABB's revised pricing resulted in it being higher than its base proposal; however, it still remained the lowest evaluated bidder.

FISCAL INFORMATION

Payment associated with this project will be made from the Authority's Capital Fund.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Vice President – Transmission, the Acting Vice President – Procurement, and the Project Manager recommend that the Trustees authorize capital expenditures in the amount of \$41.009 million and approve the award of a \$6.28 million contract to ABB, Inc. of Mount Pleasant, PA, for the Clark Energy Center Switchyard Life Extension and Modernization Project.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Authority’s Expenditure Authorization Procedures, capital expenditures in the amount of \$41.009 million are hereby authorized for the Clark Energy Center Switchyard Life Extension and Modernization Project as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to award a contract to ABB, Inc., in the amount of \$6.28 million, to design, furnish and deliver six 765 kV three-pole and one 765 kV single-pole circuit breakers for use at the Clark Energy Center Switchyard, as recommended in the foregoing report of the President and Chief Executive Officer:

| <u>Contractor</u> | <u>Contract Approval</u> |
|---|--------------------------|
| ABB, Inc. Mount Pleasant, PA (Q14-5644RH) | <u>\$6.28 million</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

BLenheim-GILBOA

ix. **Procurement (Services) Contract –
Blenheim-Gilboa Power Project –
Generator Rotor Repair – Contract Award**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to award a contract to General Electric International, Inc. ('GE'), located in Medford, MA, in the amount of \$10.3 million, to repair the bent lamination of the main generator rotors at the Blenheim-Gilboa Power Project ('B-G').

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority's Guidelines for Procurement Contracts require the Trustee approval for procurement contracts involving services to be rendered for a period in excess of one year. Also, in accordance with the Authority's Expenditure Authorization Procedures, the award of non-personal services or equipment purchase contracts exceeding \$3 million require the Trustee approval.

During the upgrade and Life Extension and Modernization ('LEM') Program of the pump-turbine units and ancillary systems at B-G in 2006-2010, it was observed that the lower motor-generator rotor laminations were deformed at the base of the rotor rim where the spider posts intersect. In addition, rim keys were discovered to have migrated upwards, deforming the keeper plates.

Repair of the damaged generator laminations during the B-G/LEM Program were considered, however, no bidders were willing to provide a quotation for this work, except on an open-ended time and materials basis. During the Unit #2 LEM outage, measurements of the rotor and some disassembly of the affected parts were made to allow for a more complete engineering evaluation and to provide data for designing a repair.

NYPA Engineering staff, working in conjunction with an engineering consultant (Power Engineering), has determined that the deformed laminations are a potential problem for continued, long-term operation of the unit because the metallurgical stress of the spider post ledges, which carry the weight of the rim and poles, may have increased significantly to the point of exceeding the theoretical yield point of the steel and fatigue fracture is eventually possible, which could result in a catastrophic failure. Therefore, a permanent repair is required.

In order to reduce the stresses on the spider posts, and to allow for a complete inspection, special tooling is needed to facilitate separation of the rotor rim from the central spider frame. NYPA does not have the necessary skills or tools necessary to implement the permanent repairs required to ensure safe and reliable operation of the units in the future.

THE BIDDING PROCESS

The Authority issued a Request for Quotation ('RFQ') (**Q14-5601JT**) in the New York State *Contract Reporter* and bid packages for the B-G main generator rotor repair on March 10, 2014. Two (2) proposals were received on July 18, 2014.

The proposals were reviewed by an evaluation committee comprising of staff from B-G, Engineering, Procurement, and Project Management.

The Evaluation Committee reviewed in detail, the two bids initially submitted and determined that the bid from GE was the low and technically acceptable bid. GE is knowledgeable regarding the B-G main rotors as they removed, refurbished and reinstalled the main rotor poles during the B-G LEM. GE has demonstrated in its proposal, and through a telephone interview, that it can perform the main rotor repair that meets NYPA's technical

requirements. The Authority's prior experience with GE has been satisfactory with acceptable results in the past. The contract work will be performed from 2014 to 2017.

FISCAL INFORMATION

Payments associated with this project will be made from the Authority's O&M budget.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, and the Regional Manager – Central New York recommend that the Trustees approve a contract award to General Electric International in the amount of \$10.3 million for the main generator rotor repair at the Blenheim-Gilboa Power Project.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to award a contract to General Electric International, Inc. in the amount of \$10.3 million to furnish all labor, supervision, materials, tools, and equipment to engineer, design, and repair the bent lamination of the main generator rotors at the Blenheim-Gilboa Power Project.

| <u>Contractor</u> | <u>Contract Approval</u> |
|---|--------------------------|
| General Electric International, Inc. Medford, MA (Q14-5601JT) | <u>\$10.3 million</u> |

AND BE IT FURTHER RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

d. REAL ESTATE

i. Lease of Office Space – Electric Tower, Buffalo, New York

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to authorize the execution of a lease with Iskalo Electric Tower Master Tenant LLC (Landlord) for office space located at 535 Washington Street, Buffalo New York, commonly known as the Electric Tower. The proposed lease would be for a term of five years and two months commencing within ninety days of lease execution for a leased space of 3,614 square feet. It is anticipated that the lease will commence prior to the end of 2014. The average base rental per square foot is approximately \$22.00 (\$79,785.00 per annum) and on terms more particularly set out in Exhibit ‘2d i-A,’ attached hereto.

BACKGROUND

The Authority currently sublets approximately 1,054 square feet of office space from the New York State Urban Development Corporation d/b/a Empire State Development Corporation (‘ESDC’) at 95 Perry Street, Buffalo New York. However, this space has become inadequate for the Authority’s current staffing needs. Staff explored several options for obtaining additional space within the 95 Perry Street building, but no suitable space was available.

DISCUSSION

The Authority has determined that it is desirable to maintain its business presence within the City of Buffalo. Authority Real Estate staff researched various alternatives for the relocation of the required office space and the Electric Tower location was chosen as the preferable site. The Electric Tower is an historic structure, constructed in 1912 to serve as a showcase for the public benefit of electricity, then a relatively new technology. It has recently been extensively renovated.

The rental rates and other charges set out above are competitive with similar space in the City of Buffalo’s Central Business District.

The current lease at 95 Perry Street expires on June 30, 2015. However, ESDC has expressed its willingness to release the Authority from the lease prior to the expiration date.

FISCAL INFORMATION

Payment associated with this lease will be made from the Authority’s capital fund.

RECOMMENDATION

The Acting Vice President – Procurement and the Director – Site Purchasing, Materials Management and Real Estate recommend that the Trustees approve the execution of a lease agreement with Iskalo Electric Tower Master Tenant LLC for office space in the Electric Tower, 535 Washington Street, Buffalo, New York on terms substantially in accordance with the foregoing and with Exhibit ‘2d i-A’ attached hereto.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, that the President and Chief Executive Officer, the Acting Vice President – Procurement and the Director of Site Purchasing, Materials Management and Real Estate be, and hereby are, authorized to enter into a Lease Agreement between the Authority and Iskalo Electric Tower Master Tenant LLC, on substantially the terms set forth in the foregoing report of the President and Chief Executive Officer and subject to the approval of the documents by the Executive Vice President and General Counsel or his designee; and be it further

RESOLVED, that the Acting Vice President – Procurement or the Director of Site Purchasing, Materials Management and Real Estate is hereby authorized to execute any and all other agreements, papers or instruments on behalf of the Authority that may be deemed necessary or desirable to carry out the foregoing, subject to the approval by the Executive Vice President and General Counsel; and be it further

RESOLVED, that the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer, the Executive Vice President and Chief Financial Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution subject to the approval of the form thereof by the Executive Vice President and General Counsel.

e. FINANCE MATTERS

i. New York Power Authority Other Post-Employment Benefits and Nuclear Decommissioning Trust Funds: Selection of Fixed-Income Investment Managers

The President and Chief Executive Officer submitted the following report:

SUMMARY

The Trustees are requested to approve the award of multiyear procurement contracts to MacKay and Shields LLC ('MacKay & Shields') of New York, NY, Garcia Hamilton & Associates, L.P. ('Garcia Hamilton') of Houston, TX, and CS McKee L.P. ('CS McKee') of Pittsburgh, PA for professional investment management services in connection with the Authority's Other Post-Employment Benefits Trust ('OPEB Trust') and Nuclear Decommissioning Trust ('NDT') Fund. Specifically, MacKay & Shields will replace fixed-income manager Bradford & Marzec LLC ('Bradford & Marzec') in the OPEB Trust and Garcia Hamilton and CS McKee will replace J.P. Morgan Investment Management ('J.P. Morgan') in the NDT Fund.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority's Guidelines for Procurement Contracts require the Trustees' approval for procurement contracts involving services to be rendered for a period in excess of one year. Moreover, the Authority's Expenditure Authorization Procedures require the Trustees' approval for the award of personal services contracts in excess of \$1 million if low bidder, or \$500,000 if sole-source or non-low bidder. The terms of the contracts considered herein are for more than one year and, in some cases estimated to exceed the dollar thresholds over the term of the agreement, therefore, the Trustees' approval is required.

OPEB Trust

Certain Governmental Accounting Standards Board ('GASB') standards* issued in 2004 require governmental employers to account for other post-employment benefit ('OPEB') liabilities on an 'accrual' basis (i.e., as the benefits are earned during the working career of the employee) rather than on a 'pay-as-you-go' basis, where costs are recorded as the benefits are paid during the employee's retirement years. OPEBs may include medical, prescription drug, dental, vision, life and other long-term care benefits for retirees and eligible beneficiaries. Similar GASB standards for pensions have existed since 1994. The Authority began reporting its OPEB obligations in this manner in 2002. The GASB rules do not mandate funding of the accrued OPEB obligations, only a recognition of the accrued OPEB liability on the employer's financial statements. If left unfunded, however, the amount of the unfunded liability could significantly impact the employer's overall financial condition and its credit rating with an attendant impact on the cost of debt financing.

At their July 31, 2007 meeting, the Trustees (1) approved the creation of the Power Authority of the State of New York Other Post-Employment Benefits Trust (the 'Trust'); (2) adopted the Trust Investment Policy Statement; (3) appointed a Trustee Custodian and (4) approved an initial \$225 million funding plan. Subsequently, in October 2011, the Trustees approved an on-going annual funding plan for the OPEB Trust and certain amendments to the Investment Policy Statement clarifying diversification and credit quality standards.

As of August 31, 2014, the market value of assets held in the OPEB Trust Fund totaled \$450 million, of which \$301 million were invested in equities, \$122 million were invested in fixed income securities, and \$27 million were invested in real estate investment trust securities. When compared to the actuarial accrued liability of \$573 million (as of December 31, 2013), this represents a funding level of 79%. The fixed-income portion of the OPEB Trust is currently managed by two portfolio managers: Bradford & Marzec, with assets under management of \$62

* These standards include Statement No. 43 – Financial Reporting for Post-employment Benefit Plans Other Than Pension Plans and Statement No.45 – Accounting and Financial Reporting by Employers for Post-employment Benefits Other than Pensions.

million, and Wells Capital Management Inc., with assets under management of \$57 million. The Bradford & Marzec agreement is scheduled to expire in accordance with its terms on November 2, 2014.

NDT Fund

Pursuant to U. S. Nuclear Regulatory Commission ('NRC') ruling NUR-0584, the Authority established the NDT Fund in 1990. The purpose of the fund is to ensure that there are sufficient funds available to pay for the decommissioning costs (i.e., removing the spent fuel and dismantling any systems or components containing activation products) of the James A. FitzPatrick ('FitzPatrick') and Indian Point 3 ('IP3') Power Plants at license expiration. On November 21, 2000, the Authority completed the sale of its IP3 and FitzPatrick nuclear plants to two subsidiaries of Entergy Corporation pursuant to a purchase-and-sale agreement dated March 28, 2000. In accordance with the Decommissioning Agreements, the Authority retains contractual decommissioning liability until license expiration, a change in the tax status of the fund or any early dismantlement of the plants, at which time the Authority will have the option to terminate its decommissioning responsibility and transfer the plant's fund to the Entergy subsidiary owning the plant. At that time, the Authority will be entitled to be paid an amount equal to the excess of the amount in the fund over the Inflation-Adjusted Cost Amount (a fixed estimated decommissioning cost amount adjusted in accordance with the effect of increases and decreases in the NRC's minimum cost-estimate amounts applicable to the plant), if any. The Authority's decommissioning liability is limited to the lesser of the Inflation-Adjusted Cost Amount or the amount of the plant's fund, guaranteeing that no additional cost burdens may be placed on the Authority.

As of August 31, 2014, the market value of assets held in the NDT Fund totaled \$1.39 billion, of which \$530 million were invested in equities and \$856 million were invested in fixed-income securities. The fixed-income portion of the NDT Fund is currently managed by five portfolio managers: J.P. Morgan, with assets under management of \$230 million, Garcia Hamilton, with assets under management of \$152 million, Prudential, with assets under management of \$235 million, Bradford & Marzec, with assets under management of \$125 million, and Schroders, with assets under management of \$114 million. The J.P. Morgan agreement is scheduled to expire in accordance with its terms on November 3, 2014.

DISCUSSION

On May 23, 2014, the Authority solicited a Request For Proposals ('RFP') for professional fixed-income investment management services by notice to a number of firms providing such services and advertisement in the New York State *Contract Reporter* in order to determine qualified fixed-income portfolio managers for the OPEB Trust and the NDT Fund. On or before June 24, 2014, the Authority received a total of 75 proposals.

Authority staff, with the support of its financial advisor, PFM Advisors ('PFM'), evaluated each proposal, taking into consideration quantitative and qualitative criteria. From a quantitative standpoint, staff evaluated historical performance; various risk metrics (including, but not limited to, each manager's standard deviation, Sharpe Ratio, tracking error and Information Ratio), and the schedule of fees. From a qualitative standpoint, firms were evaluated based on team duration and experience, investment style and research capabilities. After conducting an extensive review and analysis of each proposal, Authority staff, with the concurrence of PFM, invited the eight firms with the highest relative rankings to give oral presentations. Based on the above criteria and oral presentations, the following firms were identified to have the highest overall rankings to manage the fixed-income assets in the OPEB Trust and the NDT Fund: MacKay & Shields for the OPEB Trust, Garcia Hamilton and CS McKee for the NDT Fund.

MacKay & Shields' strategy is targeted to minimize downside risk in the portfolio by conducting rigorous credit screening analysis on all potential securities and to eliminate the ones with the highest risk. While being highly risk aware, MacKay & Shields has shown the propensity to deliver strong performances, historically, through security selection from domestic and international markets. It is recommended that MacKay & Shields manage **\$62 million** in assets.

As a result of **Garcia Hamilton's** high quality investment strategy, conservative investment philosophy and success in managing the Authority's assets, it is recommended that Garcia Hamilton manage an additional **\$75**

million in assets. Garcia Hamilton is 100% employee-owned, with almost 75% of the firm owned by ethnic minority and women partners. To complete the reallocation of J.P Morgan's assets under management, it is also recommended that **CS McKee** manage **\$155 million** in assets due to their disciplined risk management practice, higher quality investment focus, and value driven security selection approach.

It is recommended that the three firms be awarded five-year contracts, with asset allocations as noted below, subject, however, to early termination at any time by the Authority on 60 days' notice. The allocation amounts are based on the assets' ending market value as of August 31, 2014 and will be adjusted proportionally for the actual asset value on the transition date of the assets.

| | Asset Allocations (in \$millions) |
|------------------|--------------------------------------|
| MacKay & Shields | 62 |
| Garcia Hamilton | 75 |
| CS McKee | <u>155</u> |
| Total | <u>292</u> |

FISCAL INFORMATION

The fees for the three recommended investment managers are expected to range from 16 basis points to 35 basis points (a basis point is equal to 1/100th of 1%, or 0.01%) dependent on investment management style and the amount of assets under management, subject to negotiation, and will be paid from the OPEB Trust and the NDT Fund.

RECOMMENDATION

The Deputy Treasurer recommends the Trustees' approval of the award of multiyear service contracts to MacKay and Shields LLC, Garcia Hamilton & Associates, L.P., and CS McKee L.P. for professional investment management services in connection with the Authority's Other Post-Employment Benefits Trust and Nuclear Decommissioning Trust Fund.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below."

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, the award of the multiyear investment management service contracts to MacKay and Shields LLC, Garcia Hamilton & Associates, L.P., and CS McKee L.P., for professional investment management services in connection with the Authority's Other Post-Employment Benefits Trust and Nuclear Decommissioning Trust Fund, as recommended in the foregoing report of the President and Chief Executive Officer, is hereby approved and the execution of such contracts by the Executive Vice President and Chief Financial Officer or the Treasurer, subject to the approval of the form thereof by the Executive Vice President and General Counsel, on behalf of the Authority is approved; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer, the Executive Vice President and Chief Financial Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

DISCUSSION AGENDA:

3. Staff Reports:

a. Report of the President and Chief Executive Officer

Performance Scorecard:

President Quiniones reported that, based on the Performance Scorecard, NYPA's performance as of the end of the third quarter remains strong. He said with regards to its financial, workforce and infrastructure goals, the Authority has exceeded its targets on those measures. The Authority also exceeded its year-to-date target for investments in energy efficiency projects under Governor Cuomo's Build Smart NY program. The "MMBTUs Saved" measure for energy savings, although below target, has improved since the last report as projects continue to be completed. This target is expected to be met by the end of the year.

President Quiniones said there were two measures that are rated "significantly below target" this month. The Y-T-D Safety measure or "DART Rate" is currently at 1.34. This value is below the Bureau of Labor Standards rate of 1.4 but above NYPA's aspirational target of .78. The other is the "Environmental Incidents" measure; however, the year-end target is achievable. Authority staff continues to focus on leading indicators and staff awareness for these measures. He said Mr. Joseph Kessler, who will be presenting the Chief Operating Officer's report, will provide additional information regarding the environmental and safety measures.

Strategic Initiatives:

President Quiniones said staff will be providing an update on three of the Authority's strategic initiatives concerning infrastructure and customer issues: Customer Solutions - which will provide an update on the plan to significantly expand the services NYPA provides to customers; Smart Generation and Transmission - which are the Authority's infrastructure modernization initiative for its transmission and generation operations and Asset Management to ensure peak performance of the Authority's assets. He said these initiatives are in the advance stage of the Business Planning process and staff will make the initial funding request for the projects under these initiatives to the Board in December.

KEY ACTIVITIES UPDATE:

- *On August 14, Fitch, one of the rating agencies, revised NYPA's outlook from "Stable" to "Positive" emphasizing NYPA's "above average and highly consistent financial metrics."*

Fitch noted NYPA's "solid balance sheet, consistently healthy cash flow and debt service coverage averaging 2.7 times over the past five years; these are particularly strong relative to Fitch's 'AA' median levels" of comparable power utilities. Fitch also cited NYPA's "solid customer base" and "financial projections" that are based on "conservative hydro flow forecasts"

North Country Economic Development

- *On August 28, Governor Cuomo announced the establishment of the North Country Economic Development Fund to provide low-cost loans to businesses expanding their facilities and creating or retaining jobs in the North Country. This \$10 million fund is from a long-term power contract between the New York Power Authority and Alcoa.*
- *The fund will give local businesses access to capital for start-up loans to invest in land, equipment and technology to help create jobs in the North Country.*
- *On October 10, the Board administering the fund announced that it has approved a loan to Carthage Specialty Paperboard, Inc. in the amount of \$225,000. The company has committed to retain 89 jobs and create 9 new jobs over the course of 3 years.*

K-Solar Program

- *On September 4, NYPA announced the rollout of K-Solar, a landmark program under the \$1 billion gubernatorial NY-Sun Initiative, to help public school districts throughout New York State lower their energy costs with clean, renewable power.*
- *NYPA will provide each school district with site assessments to determine if the schools' facilities are suitable for solar and cost-effective for their facilities.*
- *NYPA is in the process of selecting qualified vendors and consultants for this program so that the school districts can take advantage of the high volume pricing and standardized terms of a Power Purchase Agreement which will help minimize administrative costs for school districts.*
- *146 School Districts in 50 Counties representing more than 650 individual schools have registered into the K-Solar Program.*
- *81 of the registered school districts have completed the required questionnaire.*
- *Almost 300 individual school locations have been summited to NYPA for site assessment.*

NYC DEP Hydro Project Development in Cannonsville

- *On September 15, the New York City Department of Environmental Protection (“DEP”) announced the building of a new hydroelectric facility at the City’s Cannonsville Reservoir located in Delaware County.*
- *NYPA and DEP are working to finalize an agreement whereby:*
 - *The City would, upon FERC approval, transfer to NYPA the portion of the license necessary for building the generating and transmission facilities and those assets necessary for the continuing operating and maintenance of the project.*
 - *NYPA would construct, own and operate the project.*
 - *DEP would reimburse NYPA for all construction, operating and maintenance costs.*
- *The hydroelectric facility will generate enough electricity to power roughly 6,000 homes and it will avoid the emission of 25,620 metric tons of greenhouse gases each year.*

Energy Efficiency Projects:

Projects in Progress:

- *Rikers Island - Installation of two 7.5 MW combustion turbine generators. Project cost is \$120 million with annual savings of \$8 million.*
- *Grand Central Terminal Phase 2 - Installation of chillers, motors, meters, steam distribution, lighting upgrades, cooling tower and compressed air systems. Project cost is \$24.8 million with savings of \$2.4 million per year.*
- *Coney Island Hospital - Upgrade of boiler system with energy efficient equipment at Coney Island Hospital. Raise new boilers and associated equipment above the FEMA designated 100-year flood line. Project cost is \$9.9 million with savings of \$1.2 million.*

Projects Completed:

- *SUNY Buffalo (Phase 3 & Governors Dorm) - energy-saving improvements completed at SUNY Buffalo include more than \$20 million in heating, ventilation and air-conditioning upgrades and interior and exterior lighting enhancements. Annual savings nearly \$1 million.*
- *SUNY Upstate Medical Phase 3 & 4 - Energy efficiency improvements include heating, ventilation and air-conditioning upgrades, interior and exterior lighting enhancements, boiler controls and hot water upgrades.*

In addition, the improvements feature a 50-kilowatt photovoltaic solar array. Total cost of both projects nearly \$7 million with annual savings of nearly \$500,000.

Employee Awards

The following employees were recognized for industry awards:

- *Joseph Kessler, Senior Vice President of Power Generation, received the 2014 Professional Engineer in Government Award from the New York State Society of Professional Engineers (“NYSSPE”).*
- *Lena Smart, Vice President of Information Technology and Chief Information Officer, received the 2014 Energy Sector Leader of the Year award at the organization’s 10th Anniversary Security Summit held in Austin, Texas.*
- *Jill Anderson, Vice President of Public and Regulatory Affairs and Chief of Staff, was cited in Diversity Journal’s 2014 Women Worth Watching.*

Key Press Events

Hollingsworth and Vose – Recharge NY

- *On August 12, there was a press event with Hollingsworth & Vose (“H&V”), a ReCharge NY customer in Washington County. H&V is among 48 business and not-for-profit operations in the Capital Region benefiting from the program, which is directly linked to nearly 17,000 jobs in the area. Because of the low-cost hydropower allocation the Authority provided, the company was able to maintain jobs and expand its operations.*

Corning Canton Expansion – Preservation power

- *On August 21, representatives of Corning Incorporated, NYPA’s Trustee, Eugene Nicandri, and President Quiniones along with staff from Empire State Development, joined with local officials in Canton to formally commence the start of Corning’s expansion project, which will lead to 40 new jobs at the site. Because of the low-cost hydropower allocation the Authority provided, the company is able to expand its facility and add 40 new jobs at that site.*

Niagara Falls Transportation Authority (NFTA) – Electric Vehicle Charging Stations

- *On September 19, two new charging stations at Niagara Falls International Airport were opened for the public.*
- *NFTA informed the Authority that there has been increasing demand for more charging stations at the airport.*

BuildSmart Innovators Summit

- *On September 16, the Authority held a BuildSmart NY Innovators Summit in Albany to recognize the achievements of State agencies and authorities, as well as individuals, who have been innovative leaders in advancing the goal of the BuildSmart NY program.*
- *The Authority is on its way to realizing Governor Andrew M. Cuomo’s ambitious goal of increasing energy efficiency in state facilities 20 percent by 2020.*
- *Seven agencies and two individuals received BuildSmart NY Innovator Summit awards for their outstanding achievements in driving down energy consumption and costs in facilities such as universities, hospitals, office buildings and transportation centers.*

Alcoa Apprenticeship Program

- *On October 9, President Quiniones met with employees participating in the Alcoa aluminum manufacturer’s expanded apprentice training program, which was broadened as a result of an agreement reached earlier this year with NYPA in connection with the closure of the Massena East plant.*
- *NYPA agreed to maintain Alcoa’s competitive power supply contract in return for the company’s avoidance of layoffs and its commitment to fund a workforce development program of the highest caliber to train employees for technical jobs that will be needed in the future.*
- *Alcoa currently has approximately 50 apprentices enrolled in the expanded training program (1/3 electrical; 2/3 mechanical). Each apprentice is paired with an experienced worker during the regular workday, and takes two related courses at night during the week. The mechanical program will be completed after three years and the electrical after four years.*

Public Speaking Engagements

President Quiniones participated in the following events:

- *September 11 – NERC Leadership Summit*
- *September 29 – Alliance to Save Energy - Energy 2030 conference in NYC*
- *October 1 – LPPC Investor Conference in NYC*
- *October 2 – Keynote Speaker at the NHA Hydropower Finance Summit in NYC*
- *October 8 – Alliance to Save Energy Board meeting.*

In response to a question from Chairman Koelmel, President Quiniones said with regards to operational priorities, the challenge for the Authority in 2015 will be focusing on its base measures, as outlined in the performance metrics, in addition to new projects as a result of the roll-out of the strategic initiatives, and balancing them effectively and efficiently. As the Authority makes investments in the organization, it will need to educate its customers and rate- payers regarding the value of these investments to them because the Authority will eventually go to them for appropriate rate adjustments. Responding to further questioning from Chairman Koelmel, President Quiniones said the Authority will hire at differing levels as new talent will be required to advance the strategic initiatives. This is intended to enhance and complement the staffing of the organization. Organizational processes will also be restructured to meet the challenges of the new initiatives.

Responding to still further questioning from Chairman Koelmel, President Quiniones said financially and operationally the Authority will out-perform its metrics. He has been working with Mr. Welz regarding the Authority's safety measure. While this measure is better than industry standards, the Authority may not reach its stretch goal for that measure. Mr. Lurie added that the Performance Scorecard will be revised next year to incorporate the goals of the new strategic plan and report those measures.

Responding to a question from Trustee Nicandri, President Quiniones said as the utility industry is changing, the Authority's strategic planning initiatives, e.g. Smart G&T, will make its generation and transmission grid more flexible and more resilient. It is anticipated that in years to come there will be more distributed resources and renewable energy, so the Authority's goal is to make sure that its generation and transmission assets are ready and evolving for the next fifty years for its customers. As to the Authority's

Customer Energy Solutions initiative, the Authority's goal is to increase that portfolio of services and to have the capability of delivering the services that customers have been demanding from the Authority.

In response to a question from Chairman Koelmel, President Quiniones said customer behavior and attitude towards energy is starting to shift. Historically it has been very difficult to do energy efficiency projects in schools, but now they are more receptive. Also, some private sector companies are looking to generate some or all of their power, especially since natural gas is cost-effective making it cheaper for them to generate power; it would make them more resilient, in the event of a severe weather condition, if they have their own source of power. It's important for the Authority to educate its customers on the costs and benefits of the new sources of energy. The Authority is uniquely positioned for this role since it is a public benefit corporation and can be that unbiased source of facts related to new sources of energy. He said the Authority is not only doing programs that are required by legislation or executive order, it now has to understand its customers' needs and develop the programs, products and services that address those needs.

In response to further questioning from Chairman Koelmel, Mr. Lurie said the Authority has one of the highest ratings in the public power industry. When the Authority is compared to other similarly rated public power entities in the country, its metrics, across the board, are better; hence the change in the Authority's outlook to positive. President Quiniones added that last year the Authority had an upgrade from Standard & Poor's from "Stable" to "Positive." This year, Fitch revised the Authority's outlook from "Stable" to "Positive." The Authority is now waiting for the rating from Moody's; however, it is optimistic based on the strength of the Authority's financial and operations profile.

b. Report of the Chief Operating Officer

Mr. Joseph Kessler, Senior Vice President of Power Generation, provided highlights of the Chief Operating Officer's report to the Trustees.

Performance Summary

- *Operational Performance – Mr. Kessler said to date, the operations of the Authority continues to be very strong, meeting targets.*
- *Environmental Incidents – Mr. Kessler said there was another R-22 release from a HVAC unit at Poletti. Staff has taken a proactive approach to this incident and will be replacing all the R-22s throughout the Authority's system. Although we did not meet the target for this reporting, staff is of the view that we will meet it by the end of the year. As President Quiniones pointed out in his report, the Bureau of Labor Standards rate for safety measure is 1.4, so based on the performance metrics the Authority's measure is below that standard.*

In response to a question from Trustee Nicandri, Mr. Kessler said the Authority is not required to include the DART measure for its contractors. Therefore, the numbers for the contractors is not a part of the Performance Scorecard. However, staff does report on them internally to make sure that the Authority is aware of what is going on with its contractors and that they meet its standard for safety practices.

In response to further questioning from Trustee Nicandri, Mr. Kessler said the Authority has contract employees that work under the direct supervision of a NYPA employee and they are offered training in safety. If contractors have their own safety program, the Authority's project management team reviews these safety programs to make sure they are not violating those programs.

In response to a question from Chairman Koelmel, Mr. Kessler said there are a number of things the Authority is undertaking in terms of safety, for example it is more involved in job safety briefings, providing more details and training staff how to do them. The job hazard analysis, with its new computer maintenance program, is more detailed. It is also concentrating on best practices.

- **DART Report**

Mr. Kessler said regarding the Authority's Environmental and Safety measure, the Authority changed from reportable incidents rate which counted the number of safety incidents to the DART Rate (Days Away Restrictions and Transfers) which provides a review of the severity of the incidents. As a result of

using this measure, it was observed that although the number of incidents was reduced, there was a trend of slips, trips and falls. Corrective action was taken and an ergonomics specialist was retained to work with staff on Safety Outreach, Preparedness and Fire Safety, the goal of which is to enhance the culture for employees to take a perspective of their entire life, at home and at work, and bring in those behaviors to work. Although the Authority will not meet this performance measure, as indicated in the Performance Scorecard, by the end of year, this measure is still below the industry standard.

POLAR VORTEX

- *NERC released its Polar Vortex Review in September 2014. (the review focused on fuel delivery system which affects NYPA)*
- *Power Magazine featured articles on Polar Vortex in its October 2014 issue.*
- *US Energy Information Administration is predicting milder weather.*

Responding to a question from Chairman Koelmel, Mr. Kessler said staff is comfortable that there won't be severe issues relating to polar vortex that was experienced last year. It has been projected that there will be approximately 6% savings on fuel purchases this year due to a lack of demand.

Responding to a question from Trustee Nicandri, Mr. Kessler said the intent of the "Knowledge Capture" strategic initiative, is to capture knowledge and the Authority's responses to incidents (such as the 2003 Black-out, hurricanes and winter storms) so that the Authority can know the state of its systems during any of these events.

- *SENY (Southeastern New York)*
 - *A-10 Dock modified.*
 - *Building containment on various pieces of heat-taped equipment (Air Injectors, Transmitters, Demineralization tanks, etc.)*
 - *FLYNN - Testing oil-gas transfers after outage this week.*
- *NNY (Northern New York)*
 - *Enhanced Ice Monitoring – Cameras, Prototype deicer at Long Sault dam.*
 - *Winter mix – diesel, especially for stationary back-up equipment.*
- *WNY (Western New York)*
 - *Ice management – boats, fuel, training, cameras, rounds, etc.*
- **EMERGENT ISSUES**
 - **BG Unit #3 Unit Cracks**
 - *Deformed laminations in LEM 2006-2010*
 - *Request for Contract to GE – \$10.3 Million – based on inspections done during the LEM on the rotors at B-G which were not covered in the LEM*
 - *Expediting inspection of remaining units.*

- *Pandemic Plans*
 - *Authority has pandemic plans Regionally, but they were based on SARS & Bird Flu*
 - *Plans will be updated this Fall to include:*
 - Ebola related scenarios that may not have been contemplated. – Remote Control Rooms & Command Posts (for security & reliability).*

c. Report of the Chief Financial Officer

Mr. Thomas Concadoro, Vice President and Controller, presented highlights of the Chief Financial Officer's report to the Trustees.

- *Net income through September 30, 2014, was \$218.0 million, which was \$88.8 million higher than the budget:*
 - *Higher margins on market-based sales (\$33.3 million) primarily due to higher market energy prices caused by severe winter weather conditions.*
 - *Lower O&M (\$19.1 million) and other operating expenses (\$33.4 million) including underruns in non-recurring projects, industrial incentive awards, and the energy efficiency and solar market acceleration programs.*
 - *Non-operating income was higher by \$7.3 million including an insurance reimbursements related to prior year transformer equipment failures, and the positive impact of a smaller mark-to-market loss on the Authority's investment portfolio due to lower market interest rates.*
- *Net income for the 3rd quarter was \$8.5 million lower than the budget as market energy prices were lower due to the mild summer weather.*
- *Projected net income for 2014 (\$266 million) is expected to significantly exceed the budget primarily due to the early year positive variances above. Energy prices for the rest of the year are projected to be slightly lower than budget while hydro generation will be higher, resulting in earnings about equal to budgeted levels for the remainder of 2014.*
- *The Authority is meeting its debt service (3.5 vs 3.1) and liquidity targets.*
- *The Authority received its first repayment of \$18 million from the state related to the temporary asset transfer that was made in 2009.*

In response to a question from Trustee Nicandri, Mr. Lurie said the hydro flows have been ahead of the long-term average. The Great Lakes averages are still relatively high; therefore, the outlook for the next couple of years is positive.

In response to a question from Chairman Koelmel, Mr. Lurie said looking ahead, financially, it is expected that next year will be another good year for the Authority; this is also reflected in the rating agencies projections. Contracts with customers will provide adequate revenues that will cover the Authority's debt service

and operating expenses; also strong hydro flows and not many large-scale risks in its business. He said next year the focus will be on planning processes – integrating risk with the Authority’s Strategic Plan and making sure that it has the resources needed to execute the Plan. To that end, staff has to make sure the Authority’s base business is cost-effective while making room in its budget for the new initiatives.

4. POWER ALLOCATIONS:

Western New York Hydropower Allocations and Notice of Public Hearing

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to approve allocations of 100 kilowatts (‘kW’) of Replacement Power (‘RP’) to Kreher’s Sunrise Farm, LLC (Genesee County), and two separate allocations totaling 3,300 kW of RP to Unifrax I LLC for two projects in Tonawanda (Erie County), as further described herein and in Exhibits ‘4-A,’ and ‘4-A-1’ through ‘4-A-3.’ These allocations will support capital expansion totaling approximately \$58.5 million and the creation of 85 jobs in Western New York (‘WNY’).

The Trustees are also requested to authorize a public hearing pursuant to Public Authorities Law (‘PAL’) §1009 on the proposed direct sale contracts for Kreher’s Sunrise Farm, LLC and Unifrax I LLC (for the Line #5 project), which would be new Replacement Power customers, the current forms of which are attached as Exhibits ‘4-B-1’ and ‘4-B-2.’

BACKGROUND

Under PAL §1005(13), the Authority may contract to allocate 250 megawatts (‘MW’) of firm hydroelectric power as Expansion Power (‘EP’) and up to 445 MW of RP to businesses in the State located within 30 miles of the Niagara Power Project, provided that the amount of power allocated to businesses in Chautauqua County on January 1, 1987 shall continue to be allocated in such county.

Each application for an allocation of EP and RP must be evaluated under criteria that include but need not be limited to, those set forth in PAL §1005(13)(a), which details general eligibility requirements. Among the factors to be considered when evaluating a request for an allocation of hydropower are the number of jobs created as a result of the allocation; the business’ long-term commitment to the region as evidenced by the current and/or planned capital investment in the business’ facilities in the region; the ratio of the number of jobs to be created to the amount of power requested; the types of jobs to be created, as measured by wage and benefit levels, security and stability of employment, and the type and cost of buildings, equipment and facilities to be constructed, enlarged or installed.

The Authority works closely with business associations, local distribution companies and economic development entities to garner support for the projects to be recommended for allocations of Authority hydropower. Discussions routinely occur with National Grid, Empire State Development (‘ESD’), the Buffalo Niagara Enterprise and Niagara County Center for Economic Development (‘NCCED’) and Erie County Industrial Development Agency (‘ECIDA’) to coordinate other economic development incentives that may help bring economic development to New York State. Staff confers with these entities to help maximize the value of hydropower to improve the economy of WNY and the State of New York. Each organization has expressed support for today’s recommended allocations, with the exception of NCCED which withheld support for the Unifrax I LLC recommendations.

DISCUSSION

At this time, 9,295 kW of unallocated EP and 33,763 kW of unallocated RP is available to be awarded to businesses under the criteria set forth in PAL §1005(13)(a).

Kreher's Sunrise Farm

Kreher's Sunrise Farm, LLC, ('Kreher's Farm') located on Alleghany Road in Basom (Genesee County) submitted an application for hydropower requesting 200 kW in connection with a proposed \$7 million expansion project to construct three additional poultry houses, a compost building and a pullet house.

Kreher's Farm, owned by a third generation of family egg farmers, was started in 2009. The family also owns and operates the original Kreher Farm Fresh Eggs in Clarence (Erie County), started in 1924 by the grandparents of the current owners, and Wayne County Eggs in Wolcott (Wayne County), which was purchased from Wegmans in 2007.

The 240-acre Basom farm produces organic eggs, which are primarily sold to Wegmans and Tops grocery store chains. It currently has six poultry houses in operation, and a total of \$20 million has been invested at its facility since 2009. In order to address the increased demand for organic eggs, Kreher's Farm plans to invest \$7 million to construct three, new, 45-feet-wide by 514-feet-long poultry houses for egg-laying hens, an additional composting facility (29,000-square feet) and a pullet house for baby chickens. The investment also includes new equipment, including ventilation fans and automated feed lines. Two poultry laying houses and the compost facility are projected to be completed by November 2014.

Ten new jobs would be created above the current base employment of nineteen (19). Additional benefits from this expansion include increased sales at four local WNY-based feed and organic products suppliers (that would see sales increase as Kreher's Farm would require more feed for its hens), and increased employment levels at the company's two other locations (in Erie & Wayne Counties) where the eggs get washed, graded and packed.

The job creation ratio for the proposed allocation of 100 kW is 100 new jobs per MW. This ratio is well above the historic average of 27 new jobs per MW based on allocations made over the past four years. The total project investment of \$7 million would result in a capital investment ratio of \$70 million per MW. This ratio is above the four-year historic average of \$24.5 million per MW.

Staff recommends that an allocation of 100 kW of RP be awarded to Kreher's Sunrise Farm in support of an investment of \$7 million and the creation of 10 new jobs at its facility in Western New York, as detailed in Exhibits '4-A' and '4-A-1.'

Unifrax I LLC (Line #3)

Unifrax I LLC ('Unifrax') is a manufacturer of ceramic fiber insulation products for the automotive industry, with a worldwide customer base as its products are used anywhere cars are produced. Its corporate headquarters is located in Tonawanda and it operates 28 manufacturing facilities worldwide.

Unifrax submitted an application for hydropower requesting 2,700 kW in support of a \$33 million expansion project to add a third production line in a to-be-built 43,000-square-foot facility located at 360 Firetower Drive, Tonawanda, that will connect between two existing Unifrax-owned buildings at that site, referred to as the Line #3 project.

A longtime NYPA customer, Unifrax employs 378 at its three facilities in WNY: (1) its headquarters/R&D facility located at 600 Riverwalk Parkway, Tonawanda; (2) a production facility located at Cory Road, Sanborn, (Niagara County); and (3) the production facility located at 360 Firetower Drive, Tonawanda where this expansion project is proposed to be located. Unifrax currently has 4,955 kW of RP at this facility with an employment commitment of 238 jobs and an annual capital investment commitment of more than \$340,000. The company is compliant with its contract obligations as of 2013, the most recent compliance review period.

The reason for the Line #3 expansion is tied to Unifrax's need to increase capacity within a growing market. The \$33 million investment includes construction costs relating to the new building (\$9 million), rotoformers, ovens and other equipment and machinery, and \$1.7 million to upgrade electrical needs. Unifrax has committed to creating 50 new, well-paying jobs (30 within the first year of production), above the current

employment of 268, for a total employment commitment of 318 positions within three years of the project's completion. Ground would be broken on this project before the year's end with operations projected to start in October 2015.

Unifrax stated that the new production line could easily be located at Unifrax's Indiana facility where the raw material that it uses is produced, which would reduce its transportation costs. Countering that advantage is the fact that professional and engineering staff needed for the project and operations are located in Tonawanda. In addition, the Firetower Drive complex has been configured in a way to allow future expansions, facilitating the creation of more jobs and investment in Erie County.

The job creation ratio for the proposed allocation of 1,900 kW is 26 new jobs per MW. This ratio is just below the historic average of 27 new jobs per MW based on allocations made over the past four years. The total project investment of \$33 million would result in a capital investment ratio of \$17.4 million per MW. This ratio is below the four-year historic average of \$24.5 million per MW.

Additional state and local support includes up to \$800,000 under the Excelsior Jobs Program from ESD and certain tax exemption incentives from the ECIDA.

Staff recommends that an allocation of 1,900 kW of RP be awarded to Unifrax I LLC in order to help secure an investment of \$33 million and the creation of 50 new jobs at its facility in Erie County, as detailed in Exhibits '4-A' and '4-A-2.'

Unifrax I LLC (Line #5)

Unifrax submitted a second application for hydropower requesting 2,000 kW in support of an \$18.5 million project to build a new production facility, an 82,000-square-foot building that would be located in an industrial park in the Town of Tonawanda, which would house a new production line referred to as the Line #5 project.

To meet growing market demand for an insulation product currently sourced from a Japanese partner that is operating at maximum production capacity, Unifrax is looking to put this expansion in one of its facilities, including the Indiana plant or in Europe, Asia, South America and South Africa. However, the company believes a hydropower allocation and other incentives make this a viable project in Western New York, effectively 'in-sourcing' the extra capacity needed to meet the growing market demand.

The \$18.5 million project investment includes costs relating to the land purchase and construction of a new manufacturing plant (\$5.75 million) and equipment and machinery costs including compressors, ovens and related systems. The company stated that the buildings' design and construction would happen in a way to facilitate additional production lines in the future. Unifrax has committed to creating 25 new, well-paying jobs at this new facility over a three-year period. If the project moves forward, operations are projected to start in August 2015.

The job creation ratio for the proposed allocation of 1,400 is 18 new jobs per MW. This ratio is below the historic average of 27 new jobs per MW based on allocations made over the past four years. The total project investment of \$18.5 million would result in a capital investment ratio of \$13.2 million per MW. This ratio is below the four-year historic average of \$24.5 million per MW.

Additional state and local support includes up to \$600,000 in the Excelsior Jobs Program support from ESD and various tax exemption incentives from the ECIDA.

Staff recommends an allocation of 1,400 kW of RP be awarded to Unifrax I LLC in order to help secure an investment of \$18.5 million and the creation of 25 new jobs at the proposed new facility in Western New York, as detailed in Exhibits '4-A' and '4-A-3.'

Contract Information

The Authority is in the process of discussing proposed hydropower sales contracts with Kreher's Sunrise Farm, LLC and Unifrax I LLC (for the Line #5 project) and anticipates receiving customer approval of a contract substantially similar to the forms attached as Exhibits '4-B-1' and '4-B-2.' Accordingly, the Trustees are requested to authorize a public hearing pursuant to PAL §1009 on the contract forms attached as Exhibit '4-B-1' and '4-B-2.' A public hearing is not needed for Unifrax I (Line #3) as it is an existing hydropower customer with a contract form that allows additional allocations and associated commitments to be folded into its existing contract for the facility at issue.

As required by PAL §1009, when the Authority believes it has reached agreement with its prospective co-party on a contract for the sale of EP or RP, it will transmit the proposed form of the contract to the Governor and other elected officials, and hold a public hearing on the contract. At least 30-days' notice of the hearing must be given by publication once in each week during such period in each of six selected newspapers. Following the public hearing, the form of the contract may be modified, if advisable. Staff will report to the Board of Trustees on the public hearing and the proposed contract at a later time and make additional recommendations regarding the proposed contract.

Upon approval of the final proposed contract by the Authority, the Authority must 'report' the proposed contract, along with its recommendations and the public hearing records, to the Governor and other elected officials. Upon approval by the Governor, the Authority may execute the contract.

The general form of the proposed contract is consistent with recently-approved contracts for the sale of EP and RP. Some pertinent provisions of the proposed form of the contract include the provision for direct billing of all production charges (i.e., demand and energy) as well as all New York Independent System Operator, Inc. ('NYISO') charges, plus taxes or any other required assessments, as set forth in the Authority's Service Tariff No. WNY-1. The proposed form of the contract would also include (i) commercially reasonable provisions relating to financial security to reflect a direct billing arrangement between the Authority and its EP/RP customers, and (ii) provisions authorizing data transfers and addressing other utility-driven requirements which are necessary for efficient program implementation. Such provisions have been used in other Authority contract forms, including the Authority's Recharge New York Power Program contracts.

The provision of electric service for all hydropower allocations are subject to enforceable employment and usage commitments. The standard contract form includes annual job reporting requirements and a job compliance threshold of 90%. Should actual jobs reported by any company receiving a hydropower allocation fall below the compliance threshold, the Authority has the right to reduce the allocation on a pro-rata basis as provided for in the contract.

The recommended allocations would be sold pursuant to the Authority's Service Tariff No. WNY-1, which applies to all allocations of EP and RP. Transmission and delivery service would be provided by National Grid or New York State Electric & Gas in accordance with its Public Service Commission-filed service tariffs.

RECOMMENDATION

The Vice President – Marketing recommends that the Trustees approve allocations of Authority hydropower to Kreher's Farm (100 kW of RP), Unifrax (1,900 kW of RP for the Line #3 project), and Unifrax (1,400 kW of RP for the Line #5 project), as further described herein and in Exhibits '4-A,' and '4-A-1' through '4-A-3.'

The Trustees are also requested to authorize the Corporate Secretary to convene a public hearing on the form of the proposed contracts finally negotiated with Kreher's Farm and Unifrax, the current forms of which are attached as Exhibits '4-B-1' and '4-B-2,' and transmit copies of the proposed form of the contracts to the Governor and legislative leaders pursuant to PAL §1009.

For the reasons stated, I recommend approval of the above-requested action by adoption of the resolution below.”

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That allocations of Authority hydropower to Kreher’s Sunrise Farm, LLC (100 kW of Replacement Power)(“RP”), Unifrax I LLC (1,900 kW of RP for the Line #3 project), and Unifrax I LLC (1,400 kW of RP for the Line #5 project), as detailed in Exhibits “4-A” and “4-A-1” through “4-A-3” be, and hereby are, approved on the terms set forth in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That the Trustees hereby authorize a public hearing pursuant to Public Authorities Law (“PAL”) §1009 on the terms of the proposed form of direct sale contracts for the sale of hydropower and energy finally negotiated with Kreher’s Sunrise Farm, LLC and Unifrax I LLC (the ‘Contracts’), the current forms of which are attached as Exhibits “4-B-1” and “4-B-2”, subject to rates previously approved by the Trustees; and be it further

RESOLVED, That the Corporate Secretary be, and hereby is, authorized to transmit copies of the proposed Contracts to the Governor, the Speaker of the Assembly, the Minority Leader of the Assembly, the Chairman of the Assembly Ways and Means Committee, the Temporary President of the Senate, the Minority Leader of the Senate and the Chairman of the Senate Finance Committee pursuant to PAL §1009; and be it further

RESOLVED, That the Corporate Secretary be, and hereby is, authorized to arrange for the publication of a notice of public hearing in six newspapers throughout the State, in accordance with the provisions of PAL §1009; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

5. ENERGY EFFICIENCY:

**Statewide Energy Efficiency Program –
Authorization to Expand Program Funding and
Award Services Contracts to Support the Program**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to approve additional funding in the amount of \$117 million for the Statewide Energy Services Program, henceforth referred to as the Statewide Energy Efficiency Program (‘Statewide EEP’), to support additional future energy efficiency work for eligible program participants across all of New York State (‘NYS’) except New York City (‘NYC’) and Westchester County which are included in the Governmental Customers Energy Efficiency Program (‘GC EEP’). The increased funding would be in addition to the \$833 million previously approved by the Trustees, bringing the total Statewide EEP funding to \$950 million.

The Trustees also are requested to authorize the award of contracts (as described below) to twelve firms to provide Audit, Energy Master Planning, Retro Commissioning, Design, Engineering, Construction and Construction Trade Management services, including the procurement of equipment and installation labor, operation and maintenance and other related energy efficiency or sustainability services. The aggregate total for all twelve proposed awards is \$300 million. The term of each contract will be five years. These twelve contracts will be used to support the Statewide EEP, and funding for these contracts will be allocated from the aforementioned \$950 million total approved Statewide EEP funding. This funding will generally be recovered directly from Statewide EEP participants.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for procurement contracts involving services to be rendered for a period in excess of one year. In accordance with the Authority’s Expenditure Authorization Procedures, the award of non-personnel services or equipment contracts in excess of \$3 million require the Trustees’ approval.

To meet the goal of increasing energy efficiency set forth in Executive Order 88, Governor Andrew Cuomo launched ‘Build Smart NY,’ emphasizing cost-effective improvements for energy savings. Build Smart NY also supports the Governor’s economic development goals to accelerate energy efficient projects that will create jobs and improve infrastructure within the State. The addition of funding and the twelve new contracts to support the Statewide EEP will greatly enhance NYPA’s role under Build Smart NY.

DISCUSSION

The Statewide EEP provides energy efficiency services to customers meeting the eligibility criteria under NYS Public Authorities Law (‘PAL’), Section 1005. Energy efficiency services provided through Statewide EEP include audits, energy master planning and retro commissioning, design, construction management, construction trade management and turn-key implementation services, operation and maintenance, and other related energy efficiency or sustainability services.

The Authority recently issued a Request for Proposals (‘RFP’) seeking proposals from contractors to support the Statewide EEP. Bidders were evaluated by specific regions and specific categories for which they submitted proposals.

The following are the regions as they were defined in the RFP:

- Region 1: NYC Suburbs – Nassau, Suffolk, Rockland, Putnam, Dutchess, Orange, Sullivan and Ulster counties
- Region 2: Capital Region – Counties north of Region 1 and east of Oswego, Onondaga, Cortland, and Broome counties.
- Region 3: Western Region – Oswego, Onondaga, Cortland and Broome counties and all counties west of Oswego, Onondaga, Cortland and Broome counties

The following are the categories of services from which the bidders were able to select:

- Option A: Audit and Retro Commissioning (Audits & RCx)
- Option B: Design/Engineering Services (Design)
- Option C: Construction Management Services (Const. Mgmt.)
- Option D: Construction Trade Management Services (Trade Mgmt.)
- Option E: Turn-Key Implementation Services (Turn-Key Svcs.)

The RFP was issued on June 5, 2014. One hundred thirty-six firms downloaded the bid document. On June 16, 2014, the Authority held a pre-bid video conference simultaneously in the cities of White Plains, Lewiston and Albany. Forty-two companies attended the video conference. On July 10, 2014, the Authority received thirty-one proposals for the aforementioned services.

The Authority's evaluation committee of six (6) Energy Efficiency department representatives, a Build Smart NY representative and a Procurement representative reviewed and evaluated the proposals. The evaluation criteria used to score each proposal was established prior to evaluation of the bids. Each region and each category was scored individually.

Of the thirty-one firms that submitted proposals, the committee found ten proposals non-responsive, incomplete, not cost-effective or they were disqualified. The committee evaluated the twenty-one remaining proposals for each category and region bid, and recommended awards based on the best combination of cost, qualifications, interview performance and references and the resources required to support the Statewide EEP as further described in Exhibit '5-A.' Based on the evaluations further set forth in the recommendation award documents for the Statewide Energy Efficiency program, the committee recommended the award of the twelve contracts summarized in Table 1 below:

Table 1: Contract Award Recommendation Summary

| Categories of Services: | A: Audits & RCx | B: Design | C: Const. Mgmt. | C: Trade Mgmt. | E: Turn-Key Svcs. |
|-----------------------------------|--------------------------------------|-----------|-----------------|----------------|-------------------|
| Proposed Contractors | Recommended Regions for Award | | | | |
| Cannon Design | 3 | | | | |
| The Daylight Savings Company | 1 | | | | |
| Ecosystems / LiRo Energy Group II | | | 1,3 | 1,3 | |
| EME Group | 1, 2, 3 | 1, 2, 3 | | | |
| Eneractive Solutions | | | 1 | | |
| Energy & Resource Solutions | 1 | | | | |
| The Fulcrum Group | | 1, 2 | | | |
| Guth DeConzo Consulting Engineers | 1, 2, 3 | | 2 | 1, 2, 3 | 1, 2, 3 |
| LaBella Associates | | 2, 3 | | | |
| PRES Services | 1, 2, 3 | | 1, 2, 3 | 1, 2, 3 | 1, 2, 3 |

Table 1: Contract Award Recommendation Summary

| Categories of Services: | A: Audits & RCx | B: Design | C: Const. Mgmt. | C: Trade Mgmt. | E: Turn-Key Svcs. |
|-------------------------|-------------------------------|-----------|-----------------|----------------|-------------------|
| Proposed Contractors | Recommended Regions for Award | | | | |
| RCM Technologies | | | 1 | | |
| Wendel Energy | 1, 2, 3 | 1, 2, 3 | 1, 2, 3 | | 1, 2, 3 |

FISCAL INFORMATION

Additional funding of \$117 million is requested to fund the Authority's energy efficiency projects offered under the Statewide EEP program bringing the total program funding to \$950 million. Of these funds, \$300 million, in aggregate, will be allocated to the contracts with the twelve firms listed herein. The funding will be provided from the proceeds of the Authority's Commercial Paper Notes and/or the Operating Fund. In addition, projects may be funded, in part, with monies from the Petroleum Overcharge Restitution ('POCR') funds. Funding will be allocated as projects are assigned, based on each firm's performance and workload, subject to the Approval Limits for Execution of Commitments in the Authority's Expenditure Authorization Procedures. All Authority costs, including Authority overheads and the costs of advancing funds, but excluding the POCR grants, will be recovered as is consistent with other Energy Efficiency Programs.

RECOMMENDATION

The Senior Vice President – Economic Development and Energy Efficiency and the Vice President – Energy Efficiency recommend that the Trustees approve \$117 million in additional funding for the Statewide Energy Efficiency Program and award twelve contracts, in the aggregate amount of \$300 million of the previously-mentioned \$950 million, to be allocated for up to a five-year term, to the following bidders: Cannon Design, The Daylight Savings Company, Ecosystems / LiRo Energy Group II, EME Group, Eneractive Solutions, Energy & Resource Solutions, The Fulcrum Group, Guth DeConzo Consulting Engineers, LaBella Associates, PRES Services, RCM Technologies, and Wendel Energy.

For the reasons stated, I recommend the approval of the above requested actions by adoption of the resolution below."

Mr. James Bejarano provided highlights of staff's recommendation to the Trustees. In response to a question from Chairman Koelmel, Mr. Bejarano said to date, \$428 million has been spent for projects that have been completed or are in development. Of those projects, it is expected that an additional \$222 million will be spent for their completion. This will bring the total to \$650 million. Mr. Bejarano continued that the Authority is going to award another \$300 million to new contractors and that will bring the program's total to \$950 million which is equivalent to the previously authorized amounts, \$833 million, and the \$117 million being requested. He added that \$183 million of the previous commitment will go to new contracts.

Responding to further questioning from Chairman Koelmel, Mr. Bejarano said \$381 million of the work is complete and \$193 million has already been repaid. The remaining \$428 million is for projects that are in development or under construction. Also, the customers' repayments are through amortizations over time. Responding to still further questioning from Chairman Koelmel, Mr. Bejarano said the Authority expects to

recover all of the loans to the customers. President Quiniones added the Authority has no bad debt with its financing; it has been successful with customers paying on their loans.

In response to a comment from Trustee Kress, Mr. Bejarano said, in the future, staff will provide the information in a table format and a schedule of the amortized payments so that the Trustees can get a better sense as to when the repayments will be completed.

Since Vice Chair Mahoney and Trustee Kress filed conflicts of interest with respect to Wendel Energy Services and LaBella Associates, respectively, staff's recommendation was approved with the exclusion of those firms because the conflicts resulted in a failure to attain the required number of votes necessary for their approval.

The following resolution, as submitted by the President and Chief Executive Officer, was adopted with the exception of LaBella Associates and Wendel Energy since they failed to pass due to lack of a quorum.

RESOLVED, That the Trustees authorize the President and Chief Executive Officer, the Chief Operating Officer, the Senior Vice President – Economic Development and Energy Efficiency and the Vice President – Energy Efficiency or such officer designated by the President and Chief Executive Officer to execute agreements and other documents between the Authority and Statewide Energy Efficiency Program (“Statewide EEP”) participants and to execute agreements and other documents with contractors, such agreements having such terms and conditions as the executing officer may approve, subject to the approval of the form thereof by the Executive Vice President and General Counsel, to facilitate the implementation of the Statewide EEP; and be it further

RESOLVED that the authorized funding level be increased by \$117 million, in addition to the \$833 million previously authorized for the Statewide EEP, as listed below:

| <u>Commercial Paper Program/ Operating Fund / POCR</u> | <u>Statewide EEP Authorization</u> |
|--|--|
| Previously Authorized | \$833 million |
| Additional Funding | <u>\$117 million</u> |
| Total Amount Authorized | <u>\$950 million</u> |

AND BE IT FURTHER RESOLVED, That in accordance with the Guidelines for Procurement Contracts adopted by the Authority and the Authority’s Expenditure Authorization Procedures, that an aggregate \$300 million, of the previously mentioned \$950 million, be allocated for funding of contracts for energy auditing, engineering and design, construction management, and construction trade management services, including procurement of equipment and installation services, as outlined below:

| <u>Commercial Paper Program/ Operating Fund/POCR</u> | <u>Ceiling</u> | <u>Termination Date</u> |
|--|------------------------------|-------------------------|
| Cannon Design, The Daylight Savings Company, Ecosystems / LiRo Energy Group II, EME Group, Eneractive Solutions, Energy & Resource Solutions, The Fulcrum Group, Guth DeConzo Consulting Engineers, LaBella Associates, PRES Services, RCM Technologies, Wendel Energy | \$300 million (Aggregate) | October 14, 2019 |

AND BE IT FURTHER RESOLVED, That the Authority's Commercial Paper Notes, Series 1, Series 2 and Series 3, and Operating Fund monies may be used to finance Statewide Energy Efficiency Program costs; and be it further

RESOLVED, That the Vice President – Energy Efficiency is authorized to determine which projects will be deemed to be energy efficiency projects within the meaning of Section (7) of Part P of Chapter 84 of the Laws of 2002 (the “Section (7) POCR Legislation”) to be funded, in part, with Petroleum Overcharge Restitution (“POCR”) Funds allocated pursuant to the Section (7) POCR Legislation; and be it further

RESOLVED, That POCR funds allocated to the Authority by the Section (7) POCR Legislation may be used to the extent authorized by such legislation, in such amounts as may be deemed necessary or desirable by the Senior Vice President – Economic Development and Energy Efficiency and the Vice President – Energy Efficiency to finance projects within the Statewide Energy Efficiency Program; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, and take any and all actions and execute and deliver any and all certificates, agreements and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

6. Power Proceeds

**Awards of Fund Benefits from the Western New York
Economic Development Fund Recommended by the
Western New York Power Proceeds Allocation Board**

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to accept the recommendations of the Western New York Power Proceeds Allocation Board (‘WNYPPAB’) and approve the awards of Fund Benefits from the Western New York Economic Development Fund to Cobey Inc., Higher One, Inc., and The WNY Women’s Foundation, Inc. the eligible applicants listed in Exhibit ‘6-A,’ and authorize the other actions described herein with respect to such applicants and recommended awards.

For informational purposes, Exhibit ‘6-B’ lists a project that has been preliminarily recommended for an award of Fund Benefits but which is not being forwarded to the Board at this time pending a determination of whether the project must satisfy additional legal requirements before an award decision can be made by the Trustees.

BACKGROUND

1. Western New York Power Proceeds Allocation Act

On March 30, 2012, Governor Cuomo signed into law the Western New York Power Proceeds Allocation Act (the ‘Act’). The Act provides for the creation, by the Authority, of the Western New York Economic Development Fund. The Fund consists of the aggregate excess of revenues received by the Authority from the sale of Expansion Power (‘EP’) and Replacement Power (‘RP’) produced at the Niagara Power Project that was sold in the wholesale energy market over what revenues would have been received had such energy been sold on a firm basis to an eligible EP or RP customer under the applicable tariff or contract.

Under the Act, an ‘eligible applicant’ is a private business, including a not-for-profit corporation. ‘Eligible projects’ is defined to mean ‘economic development projects by eligible applicants that are physically located within the State of New York within a thirty-mile radius of the Niagara power project located in Lewiston, New York that will support the growth of business in the state and thereby lead to the creation or maintenance of jobs and tax revenues for the state and local governments.’ Eligible projects include, for example, capital investments in buildings, equipment, and associated infrastructure owned by an eligible applicant for fund benefits; transportation projects under state or federally approved plans; the acquisition of land needed for infrastructure; research and development where the results of such research and development will directly benefit New York state; support for tourism and marketing and advertising efforts for western New York state tourism and business; and energy-related projects.

Eligible projects do not include public interest advertising or advocacy; lobbying; the support or opposition of any candidate for public office; the support or opposition to any public issue; legal fees related to litigation of any kind; expenses related to administrative proceedings before state or local agencies; or retail businesses as defined by the board, including without limitation, sports venues, gaming and gambling or entertainment-related establishments, residential properties, or places of overnight accommodation.

Fund Benefits have been provided to successful eligible applicants in the form of grants. It is anticipated that Fund Benefits will be disbursed as reimbursement for expenses incurred by an Eligible Applicant for an Eligible Project.

At least 15% percent of Fund Benefits must be dedicated to eligible projects which are ‘energy-related projects, programs and services,’ which is ‘energy efficiency projects and services, clean energy technology projects

and services, and high performance and sustainable building programs and services, and the construction, installation and/or operation of facilities or equipment done in connection with any such projects, programs or services.'

Allocations of Fund Benefits may only be made on the basis of moneys that have been deposited in the Fund. No award may encumber future funds that have been received but not deposited in the Fund.

2. Western New York Power Proceeds Allocation Board

Under the Act, the WNYPPAB is charged with soliciting applications for Fund Benefits, reviewing applications, making eligibility determinations, and evaluating the merits of applications for Fund Benefits. WNYPPAB uses the criteria applicable to EP, RP and PP, and for revitalization of industry as provided in Public Authorities Law §1005. Additionally, WNYPPAB is authorized to consider the extent to which an award of Fund Benefits is consistent with the strategies and priorities of the Regional Economic Development Council having responsibility for the region in which an eligible project is proposed. A copy of these criteria (collectively, 'Program Criteria'), adapted from WNYPPAB's 'Procedures for the Review of Applications for Fund Benefits,' is attached as Exhibit '6-C.'

The WNYPPAB met on March 4, 2013 and, in accordance with the Act, adopted by-laws, operating procedures, guidelines related to the application, and a form of application. At that time, WNYPPAB defined 'retail business' to mean a business that is primarily used in making retail sales of goods or services to customers who personally visit such facilities to obtain goods or services.

WNYPPAB also designated the Western New York Regional Director of Empire State Development Corporation ('ESD') to be its designee ('Designee') to act on its behalf on all administrative matters. Among other things, the Designee was authorized to preform analyses of the applications for Fund Benefits and make recommendations to WNYPPAB on the applications.

Under the Act, a recommendation for Fund Benefits by WNYPPAB is a prerequisite to an award of Fund Benefits by the Authority, and the Act authorizes the Authority to award Fund Benefits to an applicant upon a recommendation of the WNYPPAB. Upon a showing of good cause, the Authority has discretion as to whether to adopt the WNYPPAB's recommendation, or to award benefits in a different amount or on different terms and conditions than proposed by the WNYPPAB. In addition, the Authority is authorized to include within the contract covering an award ('Award Contract') such other terms and conditions the Authority deems appropriate.

3. Application Process

In an effort to provide for the efficient review of applications and disbursement of Fund Benefits, the WNYPPAB established a schedule of dates through the end of 2014 on which the WNYPPAB would meet to consider applications. At this time, applications are being accepted on a rolling basis. In addition, the application process was promoted through a media release and with assistance from state and local entities, including the Western New York and Finger Lakes Regional Economic Development Councils, the Empire State Development Corporation and other local and regional economic development organizations within the State. A webpage was created that is hosted on WWW.NYPA.GOV/WNYPPAB with application instructions, a link to the approved application form and other program details including a contact phone number and email address staffed by the Western New York Empire State Development regional office.

DISCUSSION

For this eighth round of WNYPPAB action, the WNYPPAB considered four applications seeking over \$2.6 million in Fund Benefits. WNYPPAB's staff analyzed the applications and made recommendations to WNYPPAB concerning each of the applications based on eligibility requirements and Program Criteria. Copies of the recommendations from staff to the WNYPPAB regarding recommended awards of Fund Benefits can be found in Exhibit '6-D.'

At its September 8, 2014 meeting, the WNYPPAB took the following actions on applications for Fund Benefits:

1. Recommendations for Awards of Fund Benefits

The WNYPPAB is recommending to the Trustees that the applications listed on Exhibit '6-A' receive an award of Fund Benefits in the amounts indicated. The applicants have indicated that the proposed projects would directly create or retain approximately 259 jobs in Western New York. The total to be expended on the proposed projects is expected to exceed \$2.5 million. These three recommendations are presently before the Trustees for consideration.

Given the nascent stage of the proposed projects, it was not possible at this time to identify all of the terms and conditions that would be applicable to each award and memorialized in an Award Contract. With the Trustees' authorization, it is anticipated that the Authority, in consultation with ESD, will negotiate final terms and conditions with successful applicants after receipt of more detailed information concerning the projects and proposed schedules. In addition to appropriate business terms, staff anticipates that Award Contracts will contain provisions for periodic audits of the successful applicant for the purpose of determining contract and program compliance and, where appropriate, terms providing for the partial or complete recapture of Fund Benefits disbursements if the applicant fails to maintain agreed-upon commitments, relating to, among other things, employment levels and/or project element due dates.

2. Other Determinations

For your information, Exhibit '6-B' lists a project that has been preliminarily recommended for an award of Fund Benefits but which is not being forwarded to the Board at this time pending a determination of whether the projects must satisfy additional legal requirements, such as review under the State Environmental Quality Review Act ('SEQRA'), before an award decision is made by the Trustees. The Authority is subject to SEQRA. Under SEQRA, the Authority must review the environmental impacts of projects that it funds, approves or undertakes which change the use or appearance of any natural resource or structure, as well as planning activities that commit the Authority to a future course of action. The Authority's decision to award Fund Benefits to an 'eligible applicant' is often an action subject to SEQRA. As such, the Authority must review each application to determine if it is subject to SEQRA and, if so, what must be done in order to comply with SEQRA.

This information is being provided to the Trustees for their information only. No action by the Trustees is required with respect to this matter. With respect to projects that have received recommendations for awards, but which have not yet been forwarded to the Trustees for action, WNYPPAB staff will keep NYPA apprised on the determinations and the status of the underlying projects.

RECOMMENDATION

The Vice President – Marketing recommends that:

- (1) the Trustees accept the recommendations of the Western New York Power Proceeds Allocation Board ('WNYPPAB') and make awards of Fund Benefits to the applicants and in the amounts identified in Exhibit '6-A,' conditioned upon an agreement to be negotiated with each applicant on the final terms and conditions that would be applicable to each award to be contained in an Award Contract approved by the President and Chief Executive Officer and approved by the Executive Vice President and General Counsel as to form;
- (2) the Senior Vice President – Economic Development and Energy Efficiency, or his designee(s), in consultation with the Empire State Development Corporation ('ESD'), be authorized to negotiate with the applicants concerning such final terms and conditions that will be applicable to the awards;

- (3) the Senior Vice President – Economic Development and Energy Efficiency, or his designee, be authorized to execute on behalf of the Authority Award Contracts for the awards listed on Exhibit ‘6-A’ subject to the forgoing conditions.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

Mr. John Giumarra presented highlights of staff’s recommendation to the Trustees. In response to a question from Chairman Koelmel, Mr. Pasquale said staff has been working with the local economic development agencies to stimulate awareness of the program. He added that businesses applying for this fund have to adhere to very specific criteria, which is the same for businesses applying for an hydropower allocation. Responding to further questioning from Chairman Koelmel, Mr. Pasquale said one of the issues with an expanded marketing campaign is that many of the applicants may not meet the criteria.

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

WHEREAS, the Western New York Power Proceeds Allocation Board (“WNYPPAB”) has recommended that the Authority make awards of Fund Benefits from the Western New York Economic Development Fund (“Fund”) to the eligible applicant(s) listed in Exhibit “6-A”;

NOW THEREFORE BE IT RESOLVED, That the Authority hereby accepts the recommendation of the WNYPPAB and authorizes the awards of Fund Benefits to the applicant(s) and in the amounts listed in Exhibit “6-A,” conditioned upon an agreement between the Authority and each applicant on the final terms and conditions that would be applicable to each award and set forth in a written award contract (“Award Contract”) between the Authority and each applicant approved by the President and Chief Executive Officer and approved by the Executive Vice President and General Counsel as to form; and be it further

RESOLVED, That the Senior Vice President – Economic Development and Energy Efficiency, or his designee, in consultation with the Empire State Development Corporation, is authorized to negotiate with the successful applicants concerning such final terms and conditions that will be applicable to the awards; and be it further

RESOLVED, That the Senior Vice President – Economic Development and Energy Efficiency, or his designee, is authorized to execute on behalf of the Authority Award Contracts for the awards listed on Exhibit “6-A” subject to the forgoing conditions; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things, take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

7. Infrastructure

Marcy-South Series Compensation Project – Capital Expenditure Authorization Request and Contract Award

The President and Chief Executive Officer submitted the following report:

“SUMMARY

The Trustees are requested to authorize additional capital expenditures in the amount of \$45.4 million for engineering, licensing, equipment procurement and construction for the Marcy-South Series Compensation (‘MSSC’) Project (‘Project’) (total estimated project cost is \$54.3 million). The President and Chief Executive Officer previously approved \$3.0 million for system studies, preliminary engineering, licensing and initial detail engineering work.

The Trustees are also requested to approve the award of an engineering, procurement, and construction (‘EPC’) multi-year contract (2014 through 2016) in the amount of \$23.7 million to ABB Inc. (‘ABB’) of Raleigh, NC, to provide professional engineering, procurement, fabrication, installation, testing and commissioning services for two Series Capacitors (‘SC’) and ancillary equipment to be installed on land owned by the New York State Electric and Gas Company (‘NYSEG’) at Fraser Substation in Delhi, NY.

The Project entails the addition of series compensation capacitors to increase power transfer by reducing the series impedance of the existing Marcy-South 345kV circuits. The Project will install three SC banks and ancillary equipment at the Fraser Substation in Delhi, NY, replace/upgrade circuit breakers, protection relays and communication systems at substations owned by NYPA, NYSEG, National Grid, Central Hudson and Orange & Rockland. In addition to increasing power transfers, the Project contributes to solving reliability issues related to the potential retirement of the Indian Point Energy Center.

BACKGROUND

Section 2879 of the Public Authorities Law and the Authority’s Guidelines for Procurement Contracts require the Trustees’ approval for procurement contracts involving services to be rendered for a period in excess of one year.

The Authority’s Expenditure Authorization Procedures (‘EAPs’) require the Trustees’ approval for the award of non-personal services, construction, equipment purchase or non-procurement contracts in excess of \$3 million, as well as personal services contracts in excess of \$1 million if low bidder, or \$500,000 if sole-source, single-source or non-low bidder.

Governor Cuomo announced the Energy Highway Initiative during the January 2012 State of the State address. The Energy Highway Initiative recognized a number of challenges to the state’s energy infrastructure including expanding the state’s transmission system to move excess power from upstate and the need to address potential retirement of several power plants. The Energy Highway Blueprint, developed by the Governor’s Energy Highway Task Force, recommended that the Public Service Commission (‘PSC’) initiate the following actions:

1. Develop and implement a reliability contingency plan for the closure of the Indian Point Energy Center (‘IPEC’).
2. Invite developers and transmission owners to propose transmission projects to expand the capacity to move electricity from upstate/central New York to the Hudson Valley and New York City.

On November 30, 2012, the PSC issued the following administrative orders:

1. Directed Con Edison, with the assistance from NYPA, to develop a contingency plan for the potential closure of IPEC upon the expiration of its existing licenses by the end of 2015.

2. Solicited written public Statements of Intent from developers and transmission owners proposing projects that will increase transfer capacity through the congested transmission corridor described above.

On February 1, 2013, Con Edison and NYPA submitted an Indian Point Contingency Plan. The Contingency Plan is composed of a three-pronged approach including a plan for Con Edison and NYPA to develop three Transmission Owners Transmission Solutions Projects ("TOTS"). The MSSC Project is a part of this plan. NYPA, as a member of the New York Transmission Owners, also submitted a Statement of Intent to propose construction of the MSSC Project to address congestion issues addressed in the PSC Alternating Current Transmission Upgrade Proceeding.

On April 19, 2013, the PSC issued its order authorizing Con Edison, NYSEG and Central Hudson, with the assistance from NYPA, to move forward with the preliminary development activities for the TOTS including the MSSC Project. The MSSC was selected as one of the projects to be constructed to address the IPEC issue. The MSSC project must be completed by June 2016.

On May 7, 2013, the Authority approved preliminary funding of \$2.8 million to proceed with preliminary engineering, system studies and detailed engineering and licensing activities to support completion of the MSSC Project by June of 2016. Detailed engineering and licensing activities began in June of 2013. Additional preliminary funding of \$200,000 was authorized by the President and Chief Executive Officer on July 1, 2014.

On January 17, 2014, NYPA submitted an Amendment Application to the PSC seeking approval to construct the SC banks on land owned by NYSEG at the Fraser Substation in Delhi, NY. A public statement hearing was held on September 15, 2014, and subsequent PSC approval is anticipated by the end of October.

DISCUSSION

The MSSC Project will add switchable series compensation capacitors to increase power transfer by reducing series impedance over the existing 345kV Marcy-South circuits. Specifically, the Project will add a 915 MVA SC bank (40% compensation) on the Marcy-Coopers Corners 345 kV line, a 315 MVA SC bank (25% compensation) on the Edic-Fraser 345 kV line, and a 240 MVA SC bank (25% compensation) on the Fraser-Coopers Corners 345 kV line. The three SC banks will be installed near the Fraser Substation. In addition, the Project includes replacing the conductor lines on approximately 21.8 miles of the NYSEG-owned Fraser-Coopers Corners 345kV line and will replace/upgrade circuit breakers, protection relays and communication systems at substations owned by NYPA (Marcy, Blenheim-Gilboa), NYSEG (Fraser, Coopers Corners, Oakdale), National Grid (Edic, Clay, Volney, New Scotland), Central Hudson (Rock Tavern) and Orange & Rockland (Middletown).

NYPA will be responsible for reimbursing National Grid, Central Hudson and Orange & Rockland for the engineering, procurement, installation, testing and commissioning of equipment replacement/upgrade at each utility's substation. NYSEG will be responsible for its costs associated with installation of one SC bank and ancillary equipment at Fraser Substation, replacing the conductor lines on 21.8 miles of the Fraser-Coopers Corners 345kV line and equipment/upgrade at NYSEG owned substations. NYSEG costs are not included in the NYPA capital expenditure request.

The Authority issued a Request for Proposals ('RFP') to pre-qualified EPC contractors. The RFP was advertised in the New York State *Contract Reporter* on March 21, 2014 (RFP No. Q14-5580LW), and three proposals were received on June 25, 2014. The bid evaluations have been completed and the recommendation is to award a multi-year contract (2014 through 2016) to ABB, Inc., the lowest priced and highest ranked technically qualified bidder. Actual award notification of this approval to ABB is contingent upon the PSC's approval of the Amendment Application to construct the two NYPA SC banks on land owned by NYSEG. PSC approval is anticipated by the end of October 2014. In the event of a delay with the PSC approval, interim approval will be requested in accordance with the Expenditure Authorization Procedures to commence engineering activities.

The President and Chief Executive Officer previously approved \$3.0 million for the initial engineering and licensing activities necessary to implement an aggressive schedule to complete the work by June of 2016 as required by the PSC Staff. Additional capital expenditure authorization to complete the detailed engineering, procurement and construction phases of the project is summarized below:

| | |
|--------------------------------|---------------------|
| • Engineering/Design | \$ 6,302,500 |
| • Procurement | \$ 3,750,000 |
| • Construction/Installation | \$30,960,100 |
| • NYPA Direct/Indirect Expense | \$ <u>4,421,300</u> |
| Total Current Request | \$45,433,900 |

The Estimated Total Capital Expenditure is \$54,333,900. Subsequent to final detailed engineering to be completed at a later date, the remaining funds will be requested.

FISCAL INFORMATION

Payments associated with this project will be made from the Authority's Capital Fund.

RECOMMENDATION

The Senior Vice President and Chief Engineer – Operations Support Services, the Acting Vice President – Project Management, the Vice President – Engineering, the Vice President – Project Development and Licensing, the Acting Vice President – Procurement, the Project Manager, and the Vice President – Transmission recommend that the Trustees approve capital expenditures in the amount of \$45.4 million for the Marcy-South Series Compensation Project and the award of a contract in the amount of \$23,634,424.47 to ABB Inc., of Raleigh, NC.

For the reasons stated, I recommend the approval of the above-requested action by adoption of the resolution below.”

Mr. Ricardo DaSilva presented highlights of staff's recommendation to the Trustees.

In response to a question from Trustee Nicandri, Mr. DaSilva said although being used by the Authority for the first time, this technology is well-established and typically used in the western part of the country. Also, staff visited Dominion Power in Virginia, which uses the technology, to get some input on its installation.

The following resolution, as submitted by the President and Chief Executive Officer, was unanimously adopted.

RESOLVED, That pursuant to the Authority's Expenditure Authorization Procedures, additional capital expenditures in the amount of \$45.4 million are hereby authorized for the Marcy-South Series Compensation ("Project") as recommended in the foregoing report of the President and Chief Executive Officer; and be it further

RESOLVED, That pursuant to the Guidelines for Procurement Contracts adopted by the Authority, approval is hereby granted to authorize the award of a contract to ABB, Inc. of Raleigh, NC in the amount of \$23,634,424.47 to provide professional engineering, procurement, installation, testing and commissioning services for the Project, as recommended in the

foregoing report of the President and Chief Executive Officer and as set forth below:

| <u>Contractor</u> | <u>Contract Approval</u> |
|--|--------------------------|
| ABB, Inc. Raleigh, NC (Q14-5580LW) | <u>\$23,634,424.47</u> |

AND BE IT FURTHER RESOLVED, That the Authority, in accordance with Treasury Regulation Section 1.150-2, hereby declares its official intent to finance as follows: The Authority intends to reimburse to the maximum extent permitted by law with the process of tax-exempt obligation to be used by the Authority all expenditures made and which may be made in accordance with the Project described in the foregoing report of the President and Chief Executive Officer, with the maximum principal amount of obligations to be used for such project expected to be \$45.4 million; and be it further

RESOLVED, That the Chairman, the Vice Chair, the President and Chief Executive Officer, the Chief Operating Officer and all other officers of the Authority are, and each of them hereby is, authorized on behalf of the Authority to do any and all things and take any and all actions and execute and deliver any and all agreements, certificates and other documents to effectuate the foregoing resolution, subject to the approval of the form thereof by the Executive Vice President and General Counsel.

8. Informational Items

a. Strategic Initiative Business Plans: Smart Generation & Transmission and Asset Management

“SUMMARY

This memorandum provides an informational item to the Trustees on the Authority’s Smart Generation & Transmission Business Plan (Exhibit ‘8a-A’) and Asset Management Business Plan (Exhibit ‘8a-B’).

BACKGROUND

The Authority’s 2014 - 2019 Strategic Plan (‘Plan’) was adopted at the March 25, 2014 Trustee’s meeting. The Plan was developed around three key themes that reflect the transformative change taking place in the energy industry and economy. These themes – Customer Empowerment, Infrastructure Modernization and Resource Alignment – are composed of six specific and actionable initiatives. The two Infrastructure Modernization initiatives, Smart Generation & Transmission and Asset Management, are being presented in this item. With the implementation of these business plans, staff is strengthening the Authority’s foundation while allowing for the flexibility needed to successfully adapt to the change required by the 2014-2019 Strategic Plan.

DISCUSSION

The Smart Generation & Transmission initiative seeks to reimagine the grid and to facilitate the increasing pace of industry transformation by paving the way for increased benefits to customers by providing the State with a market leading platform for future technologies and services. The Authority’s Smart Generation & Transmission journey has already begun and a foundation has been built through ongoing work. This initiative proposes to build on that foundation through the advancement of a progressive research and development schedule and deployment of a number of recommended projects. Building on this foundation, the Smart Generation & Transmission initiative will look to develop capability in a series of areas including: increased reliability and resiliency, enhanced situational awareness, optimizing transmission assets, optimizing generation assets, integration of bulk renewables, and integration of distributed generation.

The Asset Management Strategic Initiative aims to develop and implement an asset management approach aligned to the provisions of the internationally recognized asset management standards, International Standards Organization (‘ISO’) 55000. The ISO 55000 standards provide guidelines for cross-industry, best practice for asset management and takes a holistic approach that encompasses traditional considerations associated with the value chain for managing assets alongside life cycle planning, asset financial/operational performance, and risk profiling. The ISO 55000 provisions will comprise the backbone of the Authority’s asset management approach and will be complemented by projects that effectively encompass people, process, technology and data considerations. Significant strides toward enhancement of the Authority’s approach toward asset management have already begun and a foundation is being built through ongoing work. This initiative proposes to build on that foundation through four main work streams: establishment of a clear framework of governance for the initiative; development of a set of consistent practices to govern asset management at the Authority; securing robust data and analysis to support asset management decisions; and establishing a world class research and development laboratory for applied research and testing for high voltage assets. The long-term goal of this initiative is to establish and maintain a flexible process that will allow the Authority to readily adapt to the future, changing operating world. This flexible process will allow the Authority to continue to manage existing assets, have a framework in place for new assets, and will enable the potential expansion of the Authority’s role of asset management with its customers through additional customer services and enhanced energy services’ projects.”

Mr. Lurie said staff will be presenting informational items on the Authority's Business Plans for two of its strategic initiatives relating to asset modernization – Smart Generation and Transmission and Asset Management. He recalled that one of the main drivers of the Authority's Strategic Plan is based on the fact that the structure of the electric industry is evolving toward the view that generation is done at the distributed or customer level relative to the amount that is being done through large-scale power plants and this will result in the need to move power flows around the system more quickly and flexibly. The Smart Generation and Transmission initiative will focus on making sure that the transmission grid, control and communication systems will be able to accommodate that flexibility in the future. The asset management initiative will focus on how the Authority's assets need to operate in the future; how to maintain them at a low cost, maintaining their reliability, and keeping in mind they will need to function differently.

Mr. Ricardo DaSilva, Project Manager of Operations and Mr. Alan Ettlinger, Manager of Research and Technology Development, provided highlights of the Authority's strategic initiatives for infrastructure modernization -- Smart Generation & Transmission and Asset Management Strategic Initiative Business Plans to the Trustees.

In response to a question from Trustee Kress, Mr. DaSilva said the Authority is the lead agency in this investment. As part of the roll-out of this initiative, one of the goals is to conduct outreach to the other utilities in order to move them in that direction. President Quiniones added that many of the projects under these two initiatives will be beneficial to the Authority from a cost/benefit perspective. The Authority will need cooperation from other utilities for some of the projects and it is expected they will cooperate.

In response to a question from Chairman Koelmel, Mr. Lurie said since these are long-term investments, e.g. the smart Generation and Transmission initiative, staff intends to have a process where initial assumptions for the Business Plans under these initiatives are reassessed annually and involve the Board in that process. To that end, when staff recommends individual projects to the Board for approval, they will be able to state the benefits as well as the costs of those projects.

Responding to further questioning from Trustee Kress, Mr. Lurie said the Authority's workforce strategy, which will show the demand for the future and which staff will be presenting to the Board at the next meeting, is a key foundation for achieving these initiatives.

b. Customer Energy Solutions

Mr. Lurie said the Customer Energy Solutions (“CES”) Business Plan introduces a new business for the Authority from an infrastructure and foundational perspective as well as skills, technology and customer preferences. He then asked Ms. Kristen Barbato, Vice President of Customer Energy Solutions, to provide highlights of the Plan to the Trustees. (Exhibit “8b-A”)

Ms. Barbato said the Business Plan discusses:

- **The Challenge** – *what is the Authority’s market challenge (for the customers and for the Authority)*
 - *Conducted a Market Intelligence Study with customers and Authority employees and findings indicated that:*
 - *Customers are seeking cost savings*
 - *Customers want to do more energy savings projects with the Authority*
 - *Customers view NYPA as trustworthy, responsive, and knowledgeable*
 - *Customers are open to partnering with NYPA on new energy projects*
- **The Vision**
 - *Customer Energy Solutions although a Start up! – can build up on the Authority’s successes over the years working with its customers.*
 - **Goals**
 - *Build the “demand” side of NYPA’s business to be on par with the “supply” side of NYPA’s business*
 - *Become and remain NYPA’s customers’ trusted energy advisor*
 - *Serve as a marketplace for accessing energy services*
 - *Internally coordinate and externally present “one NYPA” with fully integrated service offerings*
 - *Proactively address the energy needs of NYPA’s customers*
 - *Recover costs on a net CES basis*
 - **Core Ideology**
 - *NYPA will deliver results, value, and satisfaction for customers*
- **The Approach** – *how the Authority will engage with the customers for different types of services.*

Key Next Steps

- ***Business Plan integrates CES functions with current and future programs /initiatives***
 - ***Other Strategic Initiatives***
 - ***State Policy – Reforming the Energy Vision (REV)***
 - ***Customer Programs (EE INC, K-Solar, BuildSmart NY, NY Energy Manager)***
- ***Begin CES functional alignment with customer engagement***
- ***Establish the near-term and long-term budget to support services expansion***

In response to a question from Chairman Koelmel, Ms. Barbato said the CES team has approximately 40 employees comprised of current NYPA employees. A cross-functional team from across the company was engaged to assist in building the CES Business Plan and Market Intelligence Report.

President Quiniones said the base for the CES has already been established within the Authority's energy efficiency projects. He has charged the group to act as a subsidiary within the Authority. Mr. Lurie added that some of the market segments that they are going to go after include local government, schools and some industrial customers. This is an opportunity to engage the Authority's existing customers, and also reach out to a whole new segment of customers that have never been served by the Authority.

9. *Motion to Conduct an Executive Session*

Mr. Chairman, I move that the Authority conduct an executive session pursuant to the Public Officers Law of the State of New York section §105 to discuss an ongoing investigation, contract negotiations, labor negotiations, and matters leading to the promotion or demotion of a particular person. Upon motion made and seconded an Executive Session was held.

10. Motion to Resume Meeting in Open Session

Mr. Chairman, I move to resume the meeting in Open Session. Upon motion made and seconded, the meeting resumed in Open Session.

11. Next Meeting

The Regular Meeting of the Trustees will be held on **December 16, 2014, at 11:00 a.m., at the Clarence D. Rappleyea Building, White Plains, New York**, unless otherwise designated by the Chairman with the concurrence of the Trustees.

Closing

Upon motion made and seconded, the meeting was adjourned by the Chairman at approximately 1:20 p.m.

A handwritten signature in black ink, appearing to read "Karen Delince", written in a cursive style.

Karen Delince
Corporate Secretary

October 15, 2014

EXHIBITS

For

October 15, 2014

Regular Meeting

Minutes

POWER AUTHORITY

OF THE

STATE OF NEW YORK

30 South Pearl Street
10th Floor
Albany, New York 12207-3425

AGREEMENT FOR THE SALE
OF EXPANSION POWER AND/OR REPLACEMENT POWER
to
DUREZ CORPORATION

The POWER AUTHORITY OF THE STATE OF NEW YORK (“Authority”), created pursuant to Chapter 772 of the New York Laws of 1931 and existing under Title I of Article V of the New York Public Authorities Law (“PAL”), having its office and principal place of business at 30 South Pearl Street, 10th Floor, Albany, New York 12207-3425, hereby enters into this Agreement for the Sale of Expansion Power and/or Replacement Power (“Agreement”) with Durez Corporation (“Customer”), with offices at 5000 Packard Road, Niagara Falls, New York 14304. The Authority and the Customer are from time to time referred to in this Agreement as “Party” or collectively as “Parties” and agree follows:

RECITALS

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, Federal Energy Regulatory Commission (“FERC”) Project No. 2216, known as “Expansion Power” (or “EP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, FERC Project No. 2216, known as “Replacement Power” (or “RP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, EP consists of 250 megawatts (“MW”) of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, RP consists of 445 MW of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, the Authority is authorized pursuant to PAL § 1005(13)(a) to award EP and/or RP based on, among other things, the criteria listed in the PAL, including but not limited to an applicant’s long-term commitment to the region as evidenced by the current and planned capital investment; the type and number of jobs supported or created by the allocation; and the state, regional and local economic development strategies and priorities supported by local units of governments in the area in which the recipient’s facilities are located;

WHEREAS, the Customer applied to the Authority for an allocation of hydropower to support operations at a new and/or expanded facility to be constructed and operated by the Customer (defined in Section I of this Agreement as the “Facility”);

WHEREAS, on May 22, 2014, the Authority’s Board of Trustees (“Trustees”) approved a 100 kilowatt (“kW”) allocation of RP to the Customer for a seven (7) year term (defined in Section I of this Agreement as the “Allocation”) in connection with the construction and operation of the Facility as further described in this Agreement;

WHEREAS, on May 22, 2014, the Trustees also authorized the Authority to, among other things, take any and all actions and execute and deliver any and all agreements and other documents necessary to effectuate its approval of the Allocation;

WHEREAS, the provision of Electric Service associated with the Allocation is an

unbundled service separate from the transmission and delivery of power and energy to the Customer, and delivery service will be performed by the Customer's local electric utility in accordance with the Utility Tariff;

WHEREAS, the Parties have reached an agreement on the sale of the Allocation to the Customer on the terms and conditions provided for in this Agreement;

WHEREAS, the Authority has complied with requirements of PAL § 1009 which specifies the approval process for certain contracts negotiated by the Authority; and

WHEREAS, the Governor of the State of New York has approved the terms of this Agreement pursuant to PAL § 1009(3).

NOW THEREFORE, in consideration of the mutual covenants herein, the Authority and the Customer agree as follows:

NOW THEREFORE, the Parties hereto agree as follows:

I. Definitions

- A. **Agreement** means this Agreement.
- B. **Allocation** refers to the allocation of EP and/or RP awarded to the Customer as specified in Schedule A.
- C. **Contract Demand** is as defined in Service Tariff No. WNY-1.
- D. **Electric Service** is the Firm Power and Firm Energy associated with the Allocation and sold by the Authority to the Customer in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules.
- E. **Expansion Power** (or **EP**) is 250 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- F. **Facility** means the Customer's facilities as described in Schedule A to this Agreement.
- G. **Firm Power** is as defined in Service Tariff No. WNY-1.
- H. **Firm Energy** is as defined in Service Tariff No. WNY-1.
- I. **FERC** means the Federal Energy Regulatory Commission (or any successor organization).
- J. **FERC License** means the first new license issued by FERC to the Authority for the continued operation and maintenance of the Project, pursuant to Section 15 of the Federal Power Act, which became effective September 1, 2007 after expiration of the Project's original license which became effective in 1957.

- K. **Hydro Projects** is a collective reference to the Project and the Authority's St. Lawrence-FDR Project, FERC Project No. 2000.
- L. **Load Serving Entity** (or **LSE**) means an entity designated by a retail electricity customer (including the Customer) to provide capacity, energy and ancillary services to serve such customer, in compliance with NYISO Tariffs, rules, manuals and procedures.
- M. **NYISO** means the New York Independent System Operator or any successor organization.
- N. **NYISO Tariffs** means the NYISO's Open Access Transmission Tariff or the NYISO's Market Administration and Control Area Services Tariff, as applicable, as such tariffs are modified from time to time, or any successor to such tariffs.
- O. **Project** means the Niagara Power Project, FERC Project No. 2216.
- P. **Replacement Power** (or **RP**) is 445 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- Q. **Rules** are the applicable provisions of Authority's rules and regulations (Chapter X of Title 21 of the Official Compilation of Codes, Rules and Regulations of the State of New York), as may be modified from time to time by the Authority.
- R. **Service Tariff No. WNY-1** means the Authority's Service Tariff No. WNY-1, as may be modified from time to time by the Authority, which contains, among other things, the rate schedule establishing rates and other commercial terms for sale of Electric Service to Customer under this Agreement.
- S. **Schedule A** refers to the Schedule A entitled "Expansion Power and/or Replacement Power Allocations" which is attached to and made part of this Agreement.
- T. **Schedule B** refers to the Schedule B entitled "Expansion Power and/or Replacement Power Commitments" which is attached to and made part of this Agreement.
- U. **Schedule C** refers to the Schedule C entitled "Takedown Schedule" which is attached to and made part of this Agreement.
- V. **Substitute Energy** means energy that the Authority provides at the request of the Customer to replace hydroelectricity that would otherwise have been supplied to the Customer under this Agreement. Unless otherwise agreed upon by the Parties, Substitute Energy refers to energy purchased by the Authority for the Customer from markets administered by the NYISO.
- W. **Taxes** is as defined in Service Tariff No. WNY-1

- X. **Unforced Capacity (or “UCAP”)** means the electric capacity required to be provided by LSEs to serve electric load as defined by the NYISO Tariffs, rules, manuals and procedures.
- Y. **Utility Tariff** means the retail tariff(s) of the Customer’s local electric utility filed and approved by the PSC applicable to the delivery of EP and/or RP.

II. Electric Service

- A. The Authority shall make available Electric Service to enable the Customer to receive the Allocation in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules. The Customer shall not be entitled to receive Electric Service under this Agreement for any EP and/or RP allocation unless such EP and/or RP allocation is identified on Schedule A.
- B. The Authority will provide, and the Customer shall pay for, Electric Service with respect to the Allocation specified on Schedule A. If Schedule C specifies a Takedown Schedule for the Allocation, the Authority will provide, and the Customer shall take and pay for, Electric Service with respect to the Allocation in accordance with such Takedown Schedule.
- C. The Authority shall provide UCAP in amounts necessary to meet the Customer’s NYISO UCAP requirements associated with the Allocation in accordance with the NYISO Tariffs. The Customer shall be responsible to pay the Authority for such UCAP in accordance with Service Tariff No. WNY-1.
- D. The Customer acknowledges and agrees that Customer’s local electric utility shall be responsible for delivering the Allocation to the Facility specified in Schedule A, and that the Authority has no responsibility for delivering the Allocation to the Customer.
- E. The Contract Demand for the Customer’s Allocation may be modified by the Authority if the amount of Firm Power and Firm Energy available for sale as EP or RP from the Project is modified as required to comply with any ruling, order, or decision of any regulatory or judicial body having jurisdiction, including but not limited to FERC. Any such modification will be made on a pro rata basis to all EP and RP customers, as applicable, based on the terms of such ruling, order, or decision.
- F. The Contract Demand may not exceed the Allocation.

III. Rates, Terms and Conditions

- A. Electric Service shall be sold to the Customer based on the rates, terms and conditions provided for in this Agreement, Service Tariff No. WNY-1 and the Rules.
- B. Notwithstanding any provision of this Agreement to the contrary, the power and energy rates for Electric Service shall be subject to increase by Authority at any time upon 30 days prior written notice to Customer if, after consideration by Authority of its legal obligations, the marketability of the output or use of the Project and Authority’s

competitive position with respect to other suppliers, Authority determines in its discretion that increases in rates obtainable from any other Authority customers will not provide revenues, together with other available Authority funds not needed for operation and maintenance expenses, capital expenses, and reserves, sufficient to meet all requirements specified in Authority's bond and note resolutions and covenants with the holders of its financial obligations. Authority shall use its best efforts to inform Customer at the earliest practicable date of its intent to increase the power and energy rates pursuant to this provision. Any rate increase to Customer under this subsection shall be on a non-discriminatory basis as compared to other Authority customers after giving consideration to the factors set forth in the first sentence of this subsection. With respect to any such increase, Authority shall forward to Customer with the notice of increase, an explanation of all reasons for the increase, and shall also identify the sources from which Authority will obtain the total of increased revenues and the bases upon which Authority will allocate the increased revenue requirements among its customers. Any such increase in rates shall remain in effect only so long as Authority determines such increase is necessary to provide revenues for the purposes stated in the preceding sentences.

IV. Expansion Power and/or Replacement Power Commitments

- A. Schedule B sets forth the Customer's specific "Expansion Power and/or Replacement Power Commitments." The commitments agreed to in Schedule B are in addition to any other rights and obligations of the Parties provided for in the Agreement.
- B. The Authority's obligation to provide Electric Service under this Agreement, and the Customer's obligation to take and pay for such Electric Service, are expressly conditioned upon the Customer's timely completion of the commitments described in Schedule B.
- C. In the event of partial completion of the Facility which has resulted in such Facility being partly operational and the partial attainment of the Base Employment Level, the Authority may, upon the Customer's request, provide Electric Service to the Customer in an amount determined by the Authority to fairly correspond to the completed portion of the Facility, provided that the Customer demonstrates that the amount of requested Electric Service is needed to support the operations of the partially completed Facility.
- D. The Customer shall give the Authority not less than ninety (90) days' advance notice in writing of the anticipated date of partial or full completion of the Facility. The Authority will inspect the Facility for the purpose of verifying the completion status of the Facility and notify Customer of the results of the inspection. The Authority will thereafter commence Electric Service within a reasonable time after verification based on applicable operating procedures of the Authority, the Customer's local electric utility and the NYISO.
- E. In the event the Customer fails to complete the Facility expansion by May 22, 2017 (*i.e.*, within three (3) years of the Authority's award of the Allocation), the Allocation, at the option and discretion of the Authority, may be canceled or reduced by the total amount of kilowatts determined by the Authority to fairly correspond to the uncompleted portion of the Facility, provided that in such event, and upon request of the Customer, such date may be extended by the Authority in its sole discretion.

V. Rules and Service Tariff

Service Tariff No. WNY-1, as may be modified or superseded from time to time by the Authority, is hereby incorporated into this Agreement with the same force and effect as if set forth herein at length. In the event of any inconsistencies, conflicts, or differences between the provisions of Service Tariff No. WNY-1 and the Rules, the provisions of Service Tariff No. WNY-1 shall govern. In the event of any inconsistencies, conflicts or differences between the provisions of this Agreement and Service Tariff No. WNY-1, the provisions of this Agreement shall govern.

VI. Transmission and Delivery of Firm Power and Firm Energy; Responsibility for Charges

- A. The Customer shall be responsible complying with all requirements of its local electric utility that are necessary to enable the Customer to receive delivery service for the Allocation. Delivery of the Allocation shall be subject to the Utility Tariff.
- B. The Customer shall be solely responsible for paying its local electric utility for delivery service associated with the Allocation in accordance with the Utility Tariff. Should the Authority incur any charges associated with such delivery service, the Customer shall reimburse the Authority for all such charges.
- C. The Customer understands and acknowledges that delivery of the Allocation will be made over transmission facilities under the control of the NYISO. The Authority will act as the LSE with respect to the NYISO, or arrange for another entity to do so on the Authority's behalf. The Customer agrees and understands that it shall be responsible to the Authority for all costs incurred by the Authority with respect to the Allocation for the services established in the NYISO Tariff, or other applicable tariff ("NYISO Charges"), as set forth in Service Tariff No. WNY-1 or any successor service tariff, regardless of whether such NYISO Charges are transmission-related. Such NYISO Charges shall be in addition to the charges for power and energy.
- D. By entering into this Agreement, the Customer consents to the exchange of information between the Authority and the Customer's local electric utility pertaining to the Customer that the Authority and the local electric utility determine is necessary to provide for the Allocation, sale and delivery of EP and/or RP to the Customer, the proper and efficient implementation of the EP and/or RP programs, billing related to EP and/or RP, and/or the performance of such parties' obligations under any contracts or other arrangements between them relating to such matters.
- E. The provision of Electric Service by the Authority shall be dependent upon the existence of a written agreement or other form of understanding between the Authority and the Customer's local electric utility on terms and conditions that are acceptable to the Authority.
- F. The Customer understands and acknowledges that the Authority may from time to time require the Customer to complete forms, provide documentation, execute consents and provide other information (collectively, "Information") which the Authority determines is necessary for the provision of Electric Service, the delivery of EP and/or RP, billing

related to the EP and/or RP program, the effective and proper administration of the EP and/or RP program, and/or the performance of contracts or other arrangements between the Authority and the Customer's local electric utility. The Customer's failure to provide such Information shall be grounds for the Authority in its sole discretion to withhold or suspend Electric Service to the Customer.

VII. Billing and Billing Methodology

- A. The billing methodology for the Allocation shall be determined on a "load factor sharing" basis in a manner consistent with the Utility Tariff and any agreement between the Authority and the Customer's local electric utility. An alternative basis for billing may be used provided the Parties agree in writing and the local electric utility provides its consent if such consent is deemed necessary.
- B. The Authority will render bills by the 10th business day of the month for charges due for the previous month. Such bills shall include charges for Electric Service, NYISO Charges associated with the Allocation (subject to adjustment consistent with any later NYISO re-billings to the Authority), and other applicable charges.
- C. The Authority may render bills to the Customer electronically.
- D. The Authority and the Customer may agree in writing to an alternative method for the rendering of bills and for the payment of bills, including but not limited to the use of an Authority-established customer self-service web portal.
- E. The Authority will charge and collect from the Customer all Taxes (including local, state and federal taxes) the Authority determines are applicable, unless the Customer furnishes the Authority with proof satisfactory to the Authority that (i) the Customer is exempt from the payment of any such Taxes, and/or (ii) the Authority is not obligated to collect such Taxes from the Customer. If the Authority is not collecting Taxes from the Customer based on the circumstances described in (i) or (ii) above, the Customer shall immediately inform the Authority of any change in circumstances relating to its tax status that would require the Authority to charge and collect such Taxes from the Customer.
- F. Unless otherwise agreed to by the Authority and the Customer in writing, if the Customer fails to pay any bill when due, an interest charge of two percent (2%) of the amount unpaid shall be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent (1 1/2%) of the sum unpaid shall be added on the first day of each succeeding billing period until the amount due, including interest, is paid in full.
- G. Unless otherwise agreed to by the Authority and the Customer in writing, in the event the Customer disputes any item of any bill rendered by Authority, the Customer shall pay such bill in full within the time provided for by this Agreement, and adjustments, if appropriate, will be made thereafter.
- H. If at any time after commencement of Electric Service the Customer fails to make complete and timely payment of any two (2) bills for Electric Service, the Authority shall

have the right to require the Customer to deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit shall be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. If the Customer fails or refuses to provide the deposit within thirty (30) days of a request for such deposit, the Authority may, in its sole discretion, suspend Electric Service to the Customer or terminate this Agreement.

- I. All other provisions with respect to billing are set forth in Service Tariff No. WNY-1 and the Rules.
- J. The rights and remedies provided to the Authority in this Article are in addition to any and all other rights and remedies available to Authority at law or in equity.

VIII. Hydropower Curtailments and Substitute Energy

- A. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of the Authority's firm power customers served by the Authority from the Hydro Projects, curtailments (*i.e.* reductions) in the amount of Firm Power and Firm Energy associated with the Allocation to which the Customer is entitled shall be applied on a *pro rata* basis to all firm power and energy customers served from the Hydro Projects, consistent with Service Tariff No. WNY-1 as applicable.
- B. The Authority shall provide reasonable notice to Customer of any curtailments referenced in Section VIII.A of this Agreement that could impact Customer's Electric Service under this Agreement. Upon written request by the Customer, the Authority will provide Substitute Energy to the Customer to replace the Firm Power and Firm Energy that would otherwise have been supplied pursuant to this Agreement.
- C. For each kilowatt-hour of Substitute Energy supplied by the Authority, the Customer will pay the Authority directly during the billing month: (1) the difference between the market cost of the Substitute Energy and the charge for firm energy as provided for in this Agreement; and (2) any NYISO charges and taxes the Authority incurs in connection with the provision of such Substitute Energy. Billing and payment for Substitute Energy shall be governed by the Billing and Payments provision of the Authority's Rules (Section 454.6) and shall apply directly to the Substitute Energy service supplied to the Customer.
- D. The Parties may enter into a separate agreement to facilitate the provision of Substitute Energy, provided, however, that the provisions of this Agreement shall remain in effect notwithstanding any such separate agreement. The provision of Substitute Energy may be terminated by the Authority or the Customer on fifteen (15) days' prior written notice.

IX. Effectiveness, Term and Termination

- A. This Agreement shall become effective and legally binding on the Parties upon execution of this Agreement by the Authority and the Customer.
- B. Once commenced, Electric Service under the Agreement shall continue until the earliest of: (1) termination by the Customer with respect to its Allocation upon ninety (90) days prior written notice to the Authority; (2) termination by the Authority pursuant to this Agreement, Service Tariff No. WNY-1, or the Rules; or (3) expiration of the Allocation by its own term as specified in Schedule A.
- C. The Customer may exercise a partial termination of the Allocation upon at least thirty (30) days' notice prior written notice to the Authority. The termination shall be effective commencing with the first billing period as defined in Service Tariff No. WNY-1.
- D. The Authority may cancel service under this Agreement or modify the quantities of Firm Power and Firm Energy associated with the Allocation: (1) if such cancellation or modification is required to comply with any final ruling, order or decision of any regulatory or judicial body of competent jurisdiction (including any licensing or re-licensing order or orders of the FERC or its successor agency); or (2) as otherwise provided in this Agreement, Service Tariff No. WNY-1, or the Rules.

X. Additional Allocations

- A. Upon proper application by the Customer, the Authority may in its discretion award additional allocations of EP or RP to the Customer at such rates and on such terms and conditions as the Authority establishes. If the Customer agrees to purchase Electric Service associated with any such additional allocation, the Authority will (i) incorporate any such additional allocations into Schedule A, or in its discretion will produce a supplemental schedule, to reflect any such additional allocations, and (ii) produce a modified Appendix to Schedule B, as the Authority determines to be appropriate. The Authority will furnish the Customer with any such modified Schedule A, supplemental schedule, and/or a modified Appendix to Schedule B, within a reasonable time after commencement of Electric Service for any such additional allocation.
- B. In addition to any requirements imposed by law, the Customer hereby agrees to furnish such documentation and other information as the Authority requests to enable the Authority to evaluate any requests for additional allocations and consider the terms and conditions that should be applicable of any additional allocations.

XI. Notification

- A. Correspondence involving the administration of this Agreement shall be addressed as follows:

To: The Authority

New York Power Authority

123 Main Street
White Plains, New York 10601
Email:
Facsimile: _____
Attention: Manager – Business Power Allocations and Compliance

To: The Customer

Durez Corporation
5000 Packard Road
Niagara Falls, NY 14304

Email:
Facsimile:
Attention:

The foregoing notice/notification information pertaining to either Party may be changed by such Party upon notification to the other Party pursuant to Section XI.B of this Agreement.

- B. Except where otherwise herein specifically provided, any notice, communication or request required or authorized by this Agreement by either Party to the other shall be deemed properly given: (1) if sent by U.S. First Class mail addressed to the Party at the address set forth above; (2) if sent by a nationally recognized overnight delivery service, two (2) calendar days after being deposited for delivery to the appropriate address set forth above; (3) if delivered by hand, with written confirmation of receipt; (4) if sent by facsimile to the appropriate fax number as set forth above, with written confirmation of receipt; or (5) if sent by electronic mail to the appropriate address as set forth above, with written confirmation of receipt. Either Party may change the addressee and/or address for correspondence sent to it by giving written notice in accordance with the foregoing.

XII. Applicable Law

This Agreement shall be governed by and construed in accordance with the laws of the State of New York to the extent that such laws are not inconsistent with the FERC License and the Niagara Redevelopment Act (16 USC §§836, 836a).

XIII. Venue

Each Party consents to the exclusive jurisdiction and venue of any state or federal court within or for Albany County, New York, with subject matter jurisdiction for adjudication of any claim, suit, action or any other proceeding in law or equity arising under, or in any way relating to this Agreement.

XIV. Successors and Assigns; Resale of Hydropower

- A. The Customer may not assign or otherwise transfer an interest in this Agreement.

- B. The Customer may not resell or allow any other person to use any quantity of EP and/or RP it has purchased from the Authority under this Agreement.
- C. Electric Service sold to the Customer pursuant to this Agreement may only be used by the Customer at the Facility specified in Schedule A.

XV. Previous Agreements and Communications

- A. This Agreement shall constitute the sole and complete agreement of the Parties hereto with respect to the subject matter hereof, and supersedes all prior negotiations, representations, warranties, commitments, offers, contracts and writings, written or oral, with respect to the subject matter hereof.
- B. Except as otherwise provided in this Agreement, no modification of this Agreement shall be binding upon the Parties hereto or either of them unless such modification is in writing and is signed by a duly authorized officer of each of them.

XVI. Severability and Voidability

- A. If any term or provision of this Agreement shall be invalidated, declared unlawful or ineffective in whole or in part by an order of the FERC or a court of competent jurisdiction, such order shall not be deemed to invalidate the remaining terms or provisions hereof.
- B. Notwithstanding the preceding paragraph, if any provision of this Agreement is rendered void or unenforceable or otherwise modified by a court or agency of competent jurisdiction, the entire Agreement shall, at the option of either Party and only in such circumstances in which such Party's interests are materially and adversely impacted by any such action, be rendered void and unenforceable by such affected Party.

XVII. Waiver

- A. Any waiver at any time by either the Authority or the Customer of their rights with respect to a default or of any other matter arising out of this Agreement shall not be deemed to be a waiver with respect to any other default or matter.
- B. No waiver by either Party of any rights with respect to any matter arising in connection with this Agreement shall be effective unless made in writing and signed by the Party making the waiver.

XVIII. Execution

To facilitate execution, this Agreement may be executed in as many counterparts as may be required, and it shall not be necessary that the signatures of, or on behalf of, each Party, or that the signatures of all persons required to bind any Party, appear on each counterpart; but it shall be sufficient that the signature of, or on behalf of, each Party, or that the signatures of the persons required to bind any Party, appear on one or more of the counterparts. All counterparts shall collectively constitute a single agreement. It shall

not be necessary in making proof of this Agreement to produce or account for more than a number of counterparts containing the respective signatures of, or on behalf of, all of the Parties hereto. The delivery of an executed counterpart of this Agreement by email as a PDF file shall be legal and binding and shall have the same full force and effect as if an original executed counterpart of this Agreement had been delivered.

[SIGNATURES FOLLOW ON NEXT PAGE]

AGREED:

DUREZ CORPORATION

By: _____

Title: _____

Date: _____

AGREED:

POWER AUTHORITY OF THE STATE OF NEW YORK

By: _____
John R. Koelmel, Chairman

Date: _____

**SCHEDULE A TO AGREEMENT FOR THE SALE OF EXPANSION POWER AND/OR REPLACEMENT POWER TO
CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER ALLOCATIONS

Customer: DUREZ CORPORATION

| Type of Allocation | Allocation Amount (kW) | Facility | Trustee Approval Date | Expiration Date |
|--------------------|---------------------------|--|--------------------------|--|
| Replacement Power | 100 kW | 5000 Packard Road Niagara Falls, NY 14304 | May 22, 2014 | Seven (7) years from commencement of Electric Service of any portion of this Allocation. |
| | | | | |

**SCHEDULE B TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER COMMITMENTS

I. Employment Commitments

A. Employment Levels

The provision of EP and/or RP to the Customer hereunder is in consideration of, among other things, the Customer's creation and/or maintenance of the employment level set forth in the Appendix of this Schedule (the "Base Employment Level"). Such Base Employment Level shall be the total number of full-time positions held by: (1) individuals who are employed by the Customer at Customer's Facility identified in the Appendix to this Schedule, and (2) individuals who are contractors or who are employed by contractors of the Customer and assigned to the Facility identified in such Appendix (collectively, "Base Level Employees"). The number of Base Level Employees shall not include individuals employed on a part-time basis (less than 35 hours per week); provided, however, that two individuals each working 20 hours per week or more at such Facility shall be counted as one Base Level Employee.

The Base Employment Level shall not be created or maintained by transfers of employees from previously held positions with the Customer or its affiliates within the State of New York, except that the Base Employment Level may be filled by employees of the Customer laid off from other Customer facilities for *bona fide* economic or management reasons.

The Authority may consider a request to change the Base Employment Level based on a claim of increased productivity, increased efficiency or adoption of new technologies or for other appropriate reasons as determined by the Authority. Any such change shall be within Authority's sole discretion.

B. Employment Records and Reports

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority, of the total number of Base Level Employees who are employed at or assigned to the Customer's Facility identified in the Appendix to this Schedule, as reported to the United States Department of Labor (or as reported in such other record as agreed upon by the Authority and the Customer). Such report shall separately identify the individuals who are employed by the Customer, and the individuals who are contractors or who are employed by contractors of the Customer, and shall be certified to be correct by an officer of the Customer, plant manager or such other person authorized by the Customer to prepare and file such report and shall be provided to the Authority on or before the last day of February following the end of the most recent calendar year. The Authority shall have the right to examine and audit on reasonable advance written notice

all non-confidential written and electronic records and data concerning employment levels including, but not limited to, personnel records and summaries held by the Customer and its affiliates relating to employment in New York State.

II. Reductions of Contract Demand

A. Employment Levels

If the year-end monthly average number of employees is less than 90% of the Base Employment Level set forth in this Schedule B, for the subject calendar year, the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount of reduction will be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average monthly employment during the subject calendar year divided by the Base Employment Level. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, the Agreement shall automatically terminate.

B. Power Utilization Levels

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority on or before the last day of February following the end of the most recent calendar year, of the maximum demand utilized each month in the Facility receiving the power covered by the Agreement. If the average of the Customer's six (6) highest Billing Demands (as such term is described in Service Tariff No. WNY-1) for Expansion Power and/or Replacement Power is less than 90% of the Customer's Contract Demand in such calendar year the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount by which the Authority may reduce the Contract Demand shall be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average of the six (6) highest Billing Demands for in such calendar year divided by the Contract Demand. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, this Agreement shall automatically terminate.

C. Capital Investment

The Customer agrees to undertake the capital investment set forth in the Appendix to this Schedule.

Notwithstanding any other provision of the Agreement, the Customer shall provide the Authority with such access to the Facility, and such documentation, as the Authority deems necessary to determine the Customer's compliance with the Customer's obligations provided for in this Schedule B.

D. Notice of Intent to Reduce Contract Demand

In the event that the Authority determines that the Contract Demand will be wholly or partially reduced pursuant to this Schedule, the Authority shall provide the Customer with at least thirty (30) days prior written notice of such reduction, specifying the amount of the reduction of Contract Demand and the reason for the reduction, provided, however, that before making the reduction, the Authority may consider the Customer's scheduled or unscheduled maintenance or Facility upgrading periods when such events temporarily reduce plant employment levels or electrical demand as well as business cycle.

III. Energy Efficiency Audits; Information Requests

Unless otherwise agreed to by the Authority in writing, the Customer shall undergo an energy efficiency audit of its Facility and equipment at which the Allocation is consumed at the Customer's expense at least once during the term of this Agreement but in any event not less than once every five years. The Customer will provide the Authority with a copy of the audit or, at the Authority's option, a report describing the results of the audit, and provide documentation requested by the Authority to verify the implementation of any efficiency measures implemented at the Facility.

The Customer agrees to cooperate to make its Facility available at reasonable times and intervals for energy audits and related assessments that the Authority desires to perform, if any, at the Authority's own expense.

The Customer shall provide information requested by the Authority or its designee in surveys, questionnaires and other information requests relating to energy efficiency and energy-related projects, programs and services.

The Customer may, after consultation with the Authority, exclude from written copies of audits, reports and other information provided to the Authority under this Article trade secrets and other information which if disclosed would harm the competitive position of the Customer.

APPENDIX TO SCHEDULE B

BASE EMPLOYMENT LEVEL

Within three (3) years of commencement of Electric Service, the Customer shall employ at least sixty-two (62) full-time employees (“Base Employment Level”) at the Customer’s Facility. The Base Employment Level shall be maintained thereafter for the term of the Allocation in accordance with Article I of Schedule B.

CAPITAL INVESTMENT

The Customer shall make a total capital investment of at least \$800,000 to renovate and furnish the Facility (the “Capital Investment”). The Capital Investment for the Facility is expected to consist of the following specific expenditures:

| | |
|---------------------------------|-----------|
| Repurposed Reactor: | \$710,000 |
| Transfer Pumps: | \$ 40,000 |
| Liquid Expansion T-90 Agitator: | \$ 50,000 |

Total Capital Investment: \$800,000

The Capital Investment shall be made, and the Facility shall be completed and fully operational, no later than May 22, 2017 (*i.e.*, within three (3) years of the date of the Authority’s award of the Allocation). Upon request of the Customer, such date may be extended in the sole discretion of the Authority.

**SCHEDULE C TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

TAKEDOWN SCHEDULE

N/A



POWER AUTHORITY OF THE STATE OF NEW YORK
30 SOUTH PEARL STREET
ALBANY, NY 12207

Schedule of Rates for Sale of Firm Power to Expansion and
Replacement Customers located
In Western New York

Service Tariff No. WNY-1

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Schedule of Rates for Firm Power Service

I. Applicability

To sales of Expansion Power and/or Replacement Power (as defined below) directly to a qualified business Customer (as defined below) for firm power service.

II. Abbreviations and Terms

- kW kilowatt(s)
- kW-mo. kilowatt-month
- kWh kilowatt-hour(s)
- MWh megawatt-hour(s)
- NYISO New York Independent System Operator, Inc. or any successor organization
- PAL New York Public Authorities Law
- OATT Open Access Transmission Tariff

Agreement: An executed “Agreement for the Sale of Expansion and/or Replacement Power and Energy” between the Authority and the Customer (each as defined below).

Annual Adjustment Factor or **AAF**: This term shall have the meaning set forth in Section V herein.

Authority: The Power Authority of the State of New York, a corporate municipal instrumentality and a political subdivision of the State of New York created pursuant to Chapter 772 of the New York Laws of 1931 and existing and operating under Title 1 of Article 5 of the PAL, also known as the “New York Power Authority.”

Customer: A business customer who has received an allocation for Expansion Power and/or Replacement Power from the Authority and who purchases Expansion Power and/or Replacement Power directly from the Authority.

Electric Service: The power and energy provided to the Customer in accordance with the Agreement, this Service Tariff and the Rules.

Expansion Power and/or **Replacement Power**: Firm Power and Firm Energy made available under this Service Tariff by the Authority from the Project for sale to the Customer for business purposes pursuant to PAL § 1005(5) and (13).

Firm Power: Capacity (kW) that is intended to be always available from the Project subject to the curtailment provisions set forth in the Agreement between the Authority and the Customer and this Service Tariff. Firm Power shall not include peaking power.

Firm Energy: Energy (kWh) associated with Firm Power.

Load Serving Entity or **LSE**: This term shall have the meaning set forth in the Agreement.

Load Split Methodology or **LSM**: A load split methodology applicable to a Customer's allocation. It is usually provided for in an agreement between the Authority and the Customer's local electric utility, an agreement between the Authority and the Customer, or an agreement between the Authority, the Customer and the Customer's local electric utility, or such local utility's tariff, regarding the delivery of WNY Firm Power. The load split methodology is often designated as "Load Factor Sharing" or "LFS", "First through the Meter" or "FTM", "First through the Meter Modified" or "FTM Modified", or "Replacement Power 2" or "RP 2".

Project: The Authority's Niagara Power Project, FERC Project No. 2216.

Rate Year or **RY**: The period from July 1 through June 30 starting July 1, 2013, and for any year thereafter.

Rules: The Authority's rules and regulations set forth in 21 NYCRR § 450 *et seq.*, as they may be amended from time to time.

Service Tariff: This Service Tariff No. WNY-1.

Target Rate: This term shall have the meaning set forth in Section III herein.

All other capitalized terms and abbreviations used but not defined herein shall have the same meaning as set forth in the Agreement.

III. Monthly Rates and Charges

A. Expansion Power (EP) and Replacement Power (RP) Base Rates

Beginning on July 1, 2013, there will be a 3-year phase-in to new base rates. The phase-in will be determined by the rate differential between the 2012 EP/RP rates and a "Target Rate." The Target Rate, specified in Section III.A.1. below, is based on the rates determined by the Authority to be applicable in RY 2013 for sales of "preservation power" as that term is defined in PAL § 1005(13). The following Sections III.A.1-4 describe the calculation and implementation of the phase-in.

1. The initial rate point will be established by the EP/RP rates (\$/kW and \$/MWh), determined by mid-April 2012 and made effective on May 1, 2012 in accordance with the Authority's then-applicable EP and RP tariffs. The Target Rate (*i.e.* demand and energy rates) for RY 2013 shall be \$7.99/kW and \$13.66/MWh.
2. The difference between the two rate points is calculated and divided by 3 to correspond with the number of Rate Years over which the phase-in will occur. The resulting quotients (in \$/kW and \$/MWh) are referred to as the "annual increment."
3. The annual increment will be applied to the base rates for the 3-year period of the 2013, 2014 and 2015 Rate Years, which shall be as follows:

RY 2013: July 1, 2013 to June 30, 2014

RY 2014: July 1, 2014 to June 30, 2015

RY 2015: July 1, 2015 to June 30, 2016

The annual rate adjustments normally made effective on May 1, 2013 under then-applicable EP and RP tariffs will be suspended, such that demand and energy rates established in 2012 shall be extended through June 30, 2013.

4. Effective commencing in RY 2013, the Annual Adjustment Factor ("AAF") described in Section V herein, shall be applied as follows:
 - A. For the RY 2013 only, the AAF will be suspended, and the RY 2013 rate increase will be subject only to the annual increment.
 - B. For the RYs 2014 and 2015, the AAF will be applied to the demand and energy rates after the addition of the annual increment to the rates of the previous RY rates. Such AAF will be subject to the terms and limits stated in Section V herein.
 - C. Beginning in RY 2016, the AAF will be applied to the previous RY rates, and the annual increment is no longer applicable.

B. EP and RP Rates no Lower than Rural/Domestic Rate

At all times the applicable base rates for demand and energy determined in accordance with Sections III.A and V of this Service Tariff shall be no lower than the rates charged by the

Authority for the sale of hydroelectricity for the benefit of rural and domestic customers receiving service in accordance with the Niagara Redevelopment Act, 16 U.S.C. § 836(b)(1) and PAL § 1005(5) (the "Rural/Domestic Rate"). This provision shall be implemented as follows: if the base rates, as determined in accordance with Sections III.A and V of this Service Tariff, are lower than the Rural/Domestic Rate on an average \$/MWh basis, each set of rates measured at 80% load factor which is generally regarded as representative for EP and RP Customers, then the base rates determined under Sections III.A and V of this Service Tariff will be revised to make them equal to the Rural/Domestic Rate on an average \$/MWh basis. However, the base rates as so revised will have no effect until such time as these base rates are lower than the Rural/Domestic Rate.

C. Monthly Base Rates Exclude Delivery Service Charges

The monthly base rates set forth in this Section III exclude any applicable costs for delivery services provided by the local electric utility.

D. Minimum Monthly Charge

The minimum monthly charge shall equal the product of the demand charge and the contract demand (as defined herein). Such minimum monthly charge shall be in addition to any NYISO Charges or Taxes (each as defined herein) incurred by the Authority with respect to the Customer's Allocation.

E. Estimated Billing

If the Authority, in its sole discretion, determines that it lacks reliable data on the Customer's actual demand and/or energy usage for a Billing Period during which the Customer receives Electric Service from the Authority, the Authority shall have the right to render a bill to the Customer for such Billing Period based on estimated demand and estimated usage ("Estimated Bill").

For the purpose of calculating a Billing Demand charge for an Estimated Bill, the demand charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated demand (kW) will be calculated based on an average of the Customer's Billing Demand (kW) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated demand (kW) value for the Estimated Bill will equal the Customer's Takedown (kW) amount.
- For Customers whose allocation is subject to a First through the Meter/ FTM, FTM Modified, or RP 2 LSM, the estimated demand (kW) value will equal the Customer's Takedown (kW) amount.

For the purpose of calculating a Billing Energy charge for an Estimated Bill, the energy charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated energy (kWh) will be based on the average of the Customer's Billing Energy (kWh) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated energy value (kWh) will be equal to the Takedown (kW) amount at 70 percent load factor for that Billing Period.

- For Customers whose allocation is subject to a First through the Meter/FTM, FTM Modified, or RP 2 LSM, the estimated energy (kWh) will be equal to the Takedown (kW) amount at 100 percent load factor for that Billing Period.

If data indicating the Customer's actual demand and usage for any Billing Period in which an Estimated Bill was rendered is subsequently provided to the Authority, the Authority will make necessary adjustments to the corresponding Estimated Bill and, as appropriate, render a revised bill (or provide a credit) to the Customer.

The Minimum Monthly Charge provisions of Section III B.D. shall apply to Estimated Bills.

The Authority's discretion to render Estimated Bills is not intended to limit the Authority's rights under the Agreement.

F. Adjustments to Charges

In addition to any other adjustments provided for in this Service Tariff, in any Billing Period, the Authority may make appropriate adjustments to billings and charges to address such matters as billing and payment errors, the receipt of actual, additional, or corrected data concerning Customer energy or demand usage.

G. Billing Period

Any period of approximately thirty (30) days, generally ending with the last day of each calendar month but subject to the billing cycle requirements of the local electric utility in whose service territory the Customer's facilities are located.

H. Billing Demand

The billing demand shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

I. Billing Energy

The billing energy shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

J. Contract Demand

The contract demand of each Customer will be the amount of Expansion Power and/or Replacement Power, not to exceed their Allocation, provided to such Customer by the Authority in accordance with the Agreement.

IV. General Provisions

A. Character of Service

Alternating current; sixty cycles, three-phase.

B. Availability of Energy

1. Subject to Section IV.B.2, the Authority shall provide to the Customer in any billing period Firm Energy associated with Firm Power. The offer of Firm Energy for delivery shall fulfill the Authority's obligations for purposes of this provision whether or not the Firm Energy is taken by the Customer.
2. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of NYPA's Firm Power customers served from the Hydro Projects, hydropower curtailments (*i.e.* reductions) in the amount of Firm Power and Energy to which the Customer is entitled shall be applied on a *pro rata* basis to all Firm Power and Energy customers served from the Hydro Projects. Reductions as a percentage of the otherwise required Firm Power and Energy sales will be the same for all Firm Power and Energy customers served from the Hydro Projects. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to the Customer in later billing periods. The Customer will receive appropriate bill credits as provided under the Rules.

C. Delivery

For the purpose of this Service Tariff, Firm Power and Firm Energy shall be deemed to be offered when the Authority is able to supply Firm Power and Firm Energy to the Authority's designated NYISO load bus. If, despite such offer, there is a failure of delivery caused by the Customer, NYISO or local electric utility, such failure shall not be subject to a billing adjustment pursuant to Section 454.6(d) of the Rules.

D. Adjustment of Rates

To the extent not inconsistent with the Agreement, the rates contained in this Service Tariff may be revised from time to time on not less than thirty (30) days written notice to the Customer.

E. Billing Methodology and Billing

Unless otherwise specified in the Agreement, the following provisions shall apply:

1. The billing methodology to be used to render bills to the Customer related to its Allocation shall be determined in accordance with the Agreement and delivery agreement between the Authority and, as applicable, the Customer or local electric utility or both.

2. **Billing Demand** –The Billing Demand charged by the Authority to each Customer will be the highest 15 or 30-minute integrated demand, as determined by the local utility, during each Billing Period recorded on the Customer’s meter multiplied by a percentage based on the Load Split Methodology provided for in any contract between the Authority and the Customer’s local electric utility, any contract between the Authority and the Customer, or any contract between the Authority, the Customer and the Customer’s local electric utility for delivery of WNY Power. Billing Demand may not exceed the amount of the Contract Demand.
3. **Billing Energy** –The kilowatt-hours charged by the Authority to each Customer will be the total number of kilowatt-hours recorded on the Customer’s meter for the Billing Period multiplied by a percentage based on the methodology provided for in any contract between the Authority and the Customer’s local electric utility for delivery of WNY Power.

F. Payment by Customer to Authority

1. Demand and Energy Charges, Taxes

The Customer shall pay the Authority for Firm Power and Energy during any billing period the higher of either (i) the sum of (a), (b) and (c) below or (ii) the monthly minimum charge as defined herein:

- a. The demand charge per kilowatt for Firm Power specified in this Service Tariff or any modification thereof applied to the Customer’s billing demand (as defined in Section IV.E, above) for the billing period; and
- b. The energy charge per MWh for Firm Energy specified in this Service Tariff or any modification thereof applied to the Customer’s billing energy (as defined in Section IV.E, above) for the billing period; and
- c. A charge representing reimbursement to the Authority for all applicable Taxes incurred by the Authority as a result of providing Expansion Power and/or Replacement Power allocated to the Customer.

2. Transmission Charge

The Customer shall compensate the Authority for all transmission costs incurred by the Authority with respect to the Allocation, including such costs that are charged pursuant to the OATT.

3. NYISO Transmission and Related Charges (“NYISO Charges”)

The Customer shall compensate the Authority for the following NYISO Charges assessed on the Authority for services provided by the NYISO pursuant to its OATT or other tariffs (as the provisions of those tariffs may be amended and in effect from time to time) associated with providing Electric Service to the Customer:

- A. Ancillary Services 1 through 6 and any new ancillary services as may be defined and included in the OATT from time to time;
- B. Marginal losses;

- C. The New York Power Authority Transmission Adjustment Charge ("NTAC");
- D. Congestion costs, less any associated grandfathered Transmission Congestion Contracts ("TCCs") as provided in Attachment K of the OATT;
- E. Any and all other charges, assessments, or other amounts associated with deliveries to Customers or otherwise associated with the Authority's responsibilities as a Load Serving Entity for the Customers that are assessed on the Authority by the NYISO under the provisions of its OATT or under other applicable tariffs; and
- F. Any charges assessed on the Authority with respect to the provision of Electric Service to Customers for facilities needed to maintain reliability and incurred in connection with the NYISO's Comprehensive System Planning Process (or similar reliability-related obligations incurred by the Authority with respect to Electric Service to the Customer), applicable tariffs, or required to be paid by the Authority in accordance with law, regardless of whether such charges are assessed by the NYISO or another third party.

The NYISO Charges, if any, incurred by the Authority on behalf of the Customer, are in addition to the Authority production charges that are charged to the Customer in accordance with other provisions of this Service Tariff.

The method of billing NYISO charges to the Customer will be based on Authority's discretion.

4. Taxes Defined

Taxes shall be any adjustment as the Authority deems necessary to recover from the Customer any taxes, assessments or any other charges mandated by federal, state or local agencies or authorities that are levied on the Authority or that the Authority is required to collect from the Customer if and to the extent such taxes, assessments or charges are not recovered by the Authority pursuant to another provision of this Service Tariff.

5. Substitute Energy

The Customer shall pay for Substitute Energy, if applicable, as specified in the Agreement.

6. Payment Information

Bills computed under this Service Tariff are due and payable by electronic wire transfer in accordance with the Rules. Such wire transfer shall be made to J P Morgan Chase NY, NY / ABA021000021 / NYPA A/C # 008-030383, unless otherwise indicated in writing by the Authority. In the event that there is a dispute on any items of a bill rendered by the Authority, the Customer shall pay such bill in full. If necessary, any adjustments will be made thereafter.

G. Rendition and Payment of Bills

1. The Authority will render bills to the Customer for Electric Service on or before the tenth (10th) business day of the month for charges due for the previous Billing Period. Bills will reflect the amounts due and owing, and are subject to adjustment as provided for in the Agreement, Service Tariff No. WNY-1 and the Rules. Unless otherwise agreed to by the Authority and the Customer in writing, the Authority shall render bills to the Customer electronically.
2. Payment of bills by the Customer shall be due and payable by the Customer within twenty (20) days of the date the Authority renders the bill.
3. Except as otherwise agreed by the Authority in writing, if the Customer fails to pay any bill when due an interest charge of two percent of the amount unpaid will be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent of the sum unpaid shall be added on the first day of each succeeding Billing Period until the amount due, including interest, is paid in full.
4. If at any time after commencement of Electric Service the Customer fails to make complete payment of any two (2) bills for Electric Service when such bills become due pursuant to Agreement, the Authority shall have the right to require that the Customer deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit will be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. The failure or refusal of the Customer to provide the deposit within thirty (30) days of a request for such deposit will be grounds for the Authority in its sole discretion to suspend Electric Service to the Customer or terminate this Agreement.

H. Adjustment of Charges

1. Distribution Losses

The Authority will make appropriate adjustments to compensate for distribution losses of the local electric utility.

I. Conflicts

The Authority's Rules shall apply to the Electric Service provided under this Service Tariff. In the event of any inconsistencies, conflicts or differences between the provisions of this Service Tariff and the Rules, the provisions of this Service Tariff shall govern.

J. Customer Resales Prohibited

The Customer may not resell any quantity of Expansion Power and/or Replacement Power.

V. Annual Adjustment Factor

A. Adjustment of Rates

1. The AAF will be based upon a weighted average of three indices described below. For each new Rate Year, the index value for the latest available calendar year ("Index Value for the Measuring Year") will be compared to the index value for the calendar year immediately preceding the latest available calendar year (the Index Value for the Measuring Year -1"). The change for each index will then be multiplied by the indicated weights. As described in detail below, these products are then summed, producing the AAF. The AAF will be multiplied by the base rate for the current Rate Year to produce the base rates for the new Rate Year, subject to a maximum adjustment of $\pm 5.0\%$ (" $\pm 5\%$ Collar"). Amounts outside the $\pm 5\%$ Collar shall be referred to as the "Excess."

Index 1, "BLS Industrial Power Price" (35% weight): The average of the monthly Producer Price Index for Industrial Electric Power, commodity code number 0543, not seasonally adjusted, as reported by the U.S. Department of Labor, Bureau of Labor Statistics ("BLS") electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 1, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

Index 2, "EIA Average Industrial Power Price" (40% weight): The average weighted annual price (as measured in cents/kWh) for electric sales to the industrial sector in the ten states of CT, MA, ME, NH, NJ, NY, OH, PA, RI and VT ("Selected States") as reported by Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration ("EIA"); U.S. Department of Energy Form EIA-861 Final Data File. For Index 2, the Index Value for the Measuring Year will be the index for the calendar year two years preceding July 1 of the new Rate Year.

Index 3, "BLS Industrial Commodities Price Less Fuel" (25% weight): The monthly average of the Producer Price Index for Industrial Commodities less fuel, commodity code number 03T15M05, not seasonally adjusted, as reported by the U.S. Department of Labor, BLS electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 3, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

2. Annual Adjustment Factor Computation Guide

- Step 1: For each of the three Indices, divide the Index Value for Measuring Year by the Index Value for the Measuring Year-1.
- Step 2: Multiply the ratios determined in Step 1 by percentage weights for each Index. Sum the results to determine the weighted average. This is the AAF.
- Step 3: Commencing RY 2014, modifications to the AAF will be subject to $\pm 5\%$ Collar, as described below.
- a) When the AAF falls outside the $\pm 5\%$ Collar, the Excess will be carried over to the subsequent RY. If the AAF in the subsequent RY is within the $\pm 5\%$ Collar, the current RY Excess will be added to/subtracted from the subsequent Rate Year's AAF, up to the $\pm 5\%$ Collar.

- b) Excesses will continue to accrue without limit and carry over such that they will be added to/subtracted from the AAF in any year where the AAF is within the $\pm 5\%$ Collar.

Step 4: Multiply the current Rate Year base rate by the AAF calculated in Step 2 to determine the new Rate Year base rate.

The foregoing calculation shall be performed by the Authority consistent with the sample presented in Section V.B below.

3. The Authority shall provide the Customer with notice of any adjustment to the current base rate per the above and with all data and calculations necessary to compute such adjustment by June 15th of each year to be effective on July 1 of such year, commencing in 2014. The values of the latest officially published (electronically or otherwise) versions of the indices and data provided by the BLS and EIA as of June 1 shall be used notwithstanding any subsequent revisions to the indices.
4. If during the term of the Agreement any of the three above indices ceases to be available or ceases to be reflective of the relevant factors or of changes which the indices were intended by the Parties to reflect, the Customer and the Authority shall mutually select a substitute Index. The Parties agree to mutually select substitute indices within 90 days, once notified by the other party that the indices are no longer available or no longer reflect the relevant factors or changes with the indices were intended by the Parties to reflect. Should the 90-day period cover a planned July 1 rate change, the current base rates will remain in effect until substitute indices are selected and the adjusted rates based on the substitute indices will be retroactive to the previous July 1. If unable to reach agreement on substitute indices within the 90-day period, the Parties agree to substitute the mathematic average of the PPI—Intermediate Materials, Supplies and Components (BLS Series ID WPUSOP2000) and the PPI-- Finished Goods (BLS Series ID WPUSOP3000) indices for one or more indices that have ceased to be available and shall assume the percentage weighting(s) of the one or more discontinued indices as indicated in Section V.A.1.

B. Sample Computation of the AAF (hypothetical values for July 1, 2014 implementation):

STEP 1

Determine the Index Value for the Measuring Year (MY) and Measuring Year - 1 (MY-1) for Each Index

- Index 1 - Producer Price Index, Industrial Power

| | Measuring Year <u>(2013)</u> | Measuring Year - 1 <u>(2012)</u> |
|------------------|------------------------------------|--|
| January | 171.2 | 167.8 |
| February | 172.8 | 167.6 |
| March | 171.6 | 168.2 |
| April | 173.8 | 168.6 |
| May | 175.1 | 171.6 |
| June | 185.7 | 180.1 |
| July | 186.4 | 182.7 |
| August | 184.7 | 179.2 |
| September | 185.5 | 181.8 |
| October | 175.5 | 170.2 |
| November | 172.2 | 168.8 |
| December | 171.8 | 166.6 |
| Average | 177.2 | 172.8 |
| Ratio of MY/MY-1 | | 1.03 |

- Index 2 – EIA Industrial Rate

| <u>State</u> | <u>Revenues</u> (\$000s) | <u>Sales</u> (MWh) | <u>Avg. Rate</u> (cents/kWh) |
|------------------------------|-----------------------------|-----------------------|---------------------------------|
| <u>Measuring Year (2012)</u> | | | |
| CT | 590,972 | 6,814,757 | |
| MA | 1,109,723 | 13,053,806 | |
| ME | 328,594 | 4,896,176 | |
| NH | 304,363 | 2,874,495 | |
| NJ | 1,412,665 | 15,687,873 | |
| NY | 2,001,588 | 26,379,314 | |
| OH | 3,695,978 | 78,496,166 | |
| PA | 3,682,192 | 63,413,968 | |
| RI | 152,533 | 1,652,593 | |
| VT | <u>155,903</u> | <u>2,173,679</u> | |
| TOTAL | 13,434,511 | 215,442,827 | 6.24 |

Measuring Year -1 (2011)

| | | | |
|-------|----------------|------------------|-------------|
| CT | 579,153 | 6,678,462 | |
| MA | 1,076,431 | 12,662,192 | |
| ME | 310,521 | 4,626,886 | |
| NH | 298,276 | 2,817,005 | |
| NJ | 1,370,285 | 15,217,237 | |
| NY | 1,891,501 | 24,928,452 | |
| OH | 3,622,058 | 76,926,243 | |
| PA | 3,571,726 | 61,511,549 | |
| RI | 144,144 | 1,561,700 | |
| VT | <u>152,785</u> | <u>2,130,205</u> | |
| TOTAL | 13,016,880 | 209,059,931 | 6.23 |

Ratio of MY/MY-1 **1.00**

- Index 3 – Producer Price Index, Industrial Commodities Less Fuel

| | Measuring Year (2013) | Measuring Year -1 (2012) |
|------------------|-----------------------------|--------------------------------|
| January | 190.1 | 187.2 |
| February | 190.9 | 188.0 |
| March | 191.6 | 188.7 |
| April | 192.8 | 189.9 |
| May | 194.7 | 191.8 |
| June | 195.2 | 192.3 |
| July | 195.5 | 192.3 |
| August | 196.0 | 193.1 |
| September | 196.1 | 193.2 |
| October | 196.2 | 193.8 |
| November | 196.6 | 193.7 |
| December | 196.7 | 194.0 |
| Average | 194.4 | 191.5 |
| Ratio of MY/MY-1 | | 1.02 |

STEP 2

Determine AAF by Summing the Weighted Indices

| <u>Index</u> | <u>Ratio of MY to MY-1</u> | <u>Weight</u> | <u>Weighted Factors</u> |
|--------------------------------------|--------------------------------|---------------|-----------------------------|
| PPI Industrial Power | 1.03 | 0.35 | 0.361 |
| EIA Industrial Rate | 1.00 | 0.40 | 0.400 |
| PPI Industrial Commodities less fuel | 1.02 | 0.25 | <u>0.255</u> |
| AAF | | | 1.016 |

STEP 3

Apply Collar of $\pm 5.0\%$ to Determine the Maximum/Minimum AAF.

$-5.0\% < 1.6\% < 5.0\%$; collar does not apply, assuming no cumulative excess.

STEP 4

Apply AAF to Calculate the New Rate Year Base Rate

| | <u>Demand</u> \$/kW-mo. | <u>Energy</u> \$/MWh |
|-----------------------------|----------------------------|-------------------------|
| Current Rate Year Base Rate | 7.56 | 12.91 |
| New Rate Year Base Rate | 7.68 | 13.12 |

New York Power Authority
Contracts for the Sale of Western New York Hydropower - Transmittal to the Governor

Exhibit "2b i-B"
October 15, 2014

| Line | Company Name | Program | City | County | Trustee Public Hearing Authorization Date | Allocation (kW) | New Jobs | Total Job Commitment | Capital Investment | Proposed Direct Sale Contract Term |
|------|-------------------|---------|---------------|---------|--|--------------------|-------------|----------------------------|-----------------------|---|
| 1 | Durez Corporation | RP | Niagara Falls | Niagara | 7/30/2014 | 100 | 6 | 62 | \$800,000 | 7 Years |

Public Hearing
New York State Power Authority

July 30, 2014



METSCHL
AND ASSOCIATES

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1
2
3 New York State Power Authority

4 Wednesday, July 30, 2014

5 2:30 p.m. - 6:30 p.m.

6 Niagara Power Project Visitors' Center

7 5777 Lewiston Road

8 Lewiston, New York 14092
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22 Patricia A. Schreier
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RS :

MS . DELINCE 3 , 9

MR . PASQUALE 5

1 MS. DELINCE: Good afternoon. This is a public
2 hearing required by law and authorized by the New York
3 Power Authority's Board of Trustees on the proposed
4 direct sale contracts for the sale of hydropower to
5 Captive Plastics, LLC (d/b/a Berry Plastics) and Durez
6 Corporation.

7 My name is Karen Delince and I'm the Authority's
8 corporate secretary.

9 New York State Public Authorities Law, Section
10 1009, sets forth procedures for executing certain
11 contracts negotiated by the Authority.

12 First, prior to the hearing, it requires that
13 notice of the hearing be provided. Therefore, a notice
14 was sent to the Governor, the Senate's President Pro
15 Temp, the Senate Minority Leader and the Senate Finance
16 Committee Chair, the Assembly Speaker, the Assembly
17 Minority Leader, the Assembly Ways and Means Committee
18 Chair.

19 In addition, notices appeared in the following
20 newspapers once a week for the four weeks leading up to
21 this hearing.

22 Niagara Gazette, Buffalo News, Buffalo Business
23 First, Lewiston Porter Sentinel, Albany Times Union,

1 Dunkirk Observer.

2 The public was also given access to the proposed
3 contracts on the Authority's website and at the
4 Authority's White Plains office during the 30 day period
5 prior to today's hearing.

6 After the hearing, the public will be given access
7 to the hearing transcript at www.nypa.gov and at the
8 White Plains office once it is completed.

9 The next step in the process set forth in Section
10 1009 will be for the NYPA Trustees to reconsider the
11 proposed contracts, in light of public comments.

12 Once the Trustees have completed their final
13 review, the contracts will be forwarded to the Governor
14 for his consideration and approval.

15 If you plan to make an oral statement at this
16 hearing, I ask that you so indicate on the sign-in
17 sheet.

18 Also, if you have a written statement, please give
19 a copy to Lorna Johnson at the sign-in table and one to
20 the reporter.

21 Written statements may be of any length and will
22 appear in the record of the hearing in addition to oral
23 statements.

1 The record of the hearing will remain open for
2 additional comments through close of business, Thursday,
3 July 31.

4 Additional comments should be mailed, faxed or
5 e-mailed to the Corporate Secretary at 123 Main Street,
6 11-P, White Plains, New York, 10601 or (914)390-8040 or
7 secretarys.office@nypa.gov.

8 At this point I would like to introduce Mr. James
9 Pasquale, the Authority's Senior Vice President of
10 Economic Development and Energy Efficiency, who will
11 provide additional details on the proposed direct sale
12 contracts.

13 Thank you. Mr. Pasquale.

14 MR. PASQUALE: Thank you, Ms. Delince. Good
15 afternoon. My name is James F. Pasquale and I'm the
16 Senior Vice President of Economic Development and Energy
17 Efficiency at the New York State Power Authority. I'm
18 here today to present a summary of the proposed
19 contracts to two companies for the direct sale of
20 Expansion Power or Replacement Power hydropower that is
21 generated here at the Authority's Niagara Power Project.

22 Under Public Authorities Law Section 1005
23 Subsection 13 the Authority may allocate and sell

1 directly or by sale-for-resale 250 MW of Expansion
2 Power, known as EP, and 445 MW of Replacement Power,
3 known as RP, to businesses located within 30 miles of
4 the Niagara Power Project provided that the amount of EP
5 allocated to businesses in Chautauqua County on
6 January 1, 1987 shall continue to be allocated in
7 Chautauqua County.

8 Two companies have been awarded hydropower
9 allocations by the Authority's Trustees in return for
10 commitments made to create or expand their businesses in
11 Western New York. Specifically:

12 Captive Plastics LLC (d/b/a Berry Plastics) was
13 awarded 500 kilowatts to expand its existing Dunkirk
14 based (Chautauqua County) facility by 20,000 square feet
15 to facilitate the production of food bottles, committing
16 to \$17.8 million in capital investment and the creation
17 of ten new jobs.

18 Durez Corporation was awarded 100 kilowatts for an
19 on-site expansion to repurpose unused production
20 equipment for the manufacturing of a new product at its
21 Niagara Falls facility, creating six new jobs and
22 investing \$800,000.

23 In aggregate, the two companies have committed to

1 capital spending of over \$18 million in their Western
2 New York facilities while creating 16 jobs.

3 To summarize some of the pertinent provisions of
4 the proposed contracts, first, the contracts provide for
5 the direct billing of all hydropower supply charges, all
6 New York Independent System Operator, Inc.(NYISO)
7 charges and taxes.

8 Each contract includes the customer's agreed upon
9 commitments with respect to employment and capital
10 investment. The contracts retain the Authority's right
11 to reduce or terminate a customer's allocation if
12 employment, power utilization or capital investment
13 commitments are not met.

14 For example, the contracts include an annual job
15 reporting requirement and a job compliance threshold of
16 90 percent. Should a company's average annual
17 employment fall below the compliance threshold of
18 90 percent of the employment commitment, the Authority
19 has the right to reduce the allocation on a pro rata
20 basis.

21 The contract compels the company to perform an
22 energy audit at the facility at least once within five
23 years, helping to ensure the customer uses the

1 hydropower efficiently. Additionally, to accommodate
2 nonpayment risk that could result from the direct
3 billing arrangement, the contract includes commercially
4 reasonable provisions concerning the Authority's ability
5 to charge late payment fees and to require deposits in
6 the event of customer failure to make payment for any
7 two monthly bills. These contract provisions are
8 consistent with other Authority direct sale contracts,
9 including the Recharge New York Sales contracts.

10 The contracts will serve the allocations in
11 accordance with the Authority's Service Tariff WNY-1
12 which specifies the rates and other terms applicable to
13 all EP and RP allocations. The Service Tariff specifies
14 a three year rate phase-in to a target rate based on the
15 rate of the Authority's other hydropower program -
16 Preservation Power - to ultimately ensure consistency
17 among the Authority's three hydropower programs.
18 Transmission and delivery service for these allocations
19 will be provided by the National Grid or NYSEG in
20 accordance with the utilities' Public Service Commission
21 approved delivery service tariffs.

22 As Ms. Delince stated earlier, the Authority will
23 accept your comments on the proposed contracts until the

1 close of business on Thursday, July 31. I will now turn
2 the forum back to Ms. Delince.

3 MS. DELINCE: Thank you, Mr. Pasquale. We will
4 recess now and reconvene when the first speaker arrives.

5 (recess)

6 MS. DELINCE: The public hearing on the
7 proposed direct sale contracts for the sale of
8 hydropower to Captive Plastics, LLC, (d/b/a Berry
9 Plastics) and Durez Corporation is now officially
10 closed.

11 Thank you and good night.

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14 (Hearing closed at 6:30 p.m.)
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2014 Amendment to 1990 Service Agreement

This 2014 Amendment to 1990 Service Agreement, dated this ____ day of _____, 2014 is made between Niagara Mohawk Power Corporation, d/b/a National Grid (“Company”) and the Power Authority of the State of New York (“Authority”).

WHEREAS, the Company and the Authority are parties to an agreement dated February 22, 1989 under which the Authority has sold certain quantities of hydroelectric power and energy in accordance with Authority Service Tariff (“ST”) No. 41 and ST. No. 42 from Authority’s Niagara and St. Lawrence Projects to Company for resale to its rural and residential consumers (the “1990 Service Agreement”).

WHEREAS, Company and Authority have previously modified and extended the 1990 Service Agreement, most recently by the “2012 Amendment to 1990 Service Agreement” (the “2012 Amendment”).

WHEREAS, by letter dated June 29, 2011, Authority withdrew all 189 MW of Firm Hydroelectric Power and Energy allocated under ST No. 41 and terminated service under the 1990 Service Agreement under ST No. 41 with respect to all 189 MW of Firm Hydroelectric Power and Energy, effective August 1, 2011, for use in the Recharge New York Power Program created pursuant to Chapter 60 (Part CC) of the Laws of 2011 (the “Firm Power and Energy Withdrawal/Termination”).

WHEREAS, Company and Authority agree to further modify and extend certain terms of the 1990 Service Agreement as follows:

- 1) As a result of the Authority’s Firm Power and Energy Withdrawal/Termination, the amount of Firm Hydroelectric Power and Energy allocated to Company under ST No. 41 is zero (0), and the Firm Peaking Power allocation of 175 MW under ST No. 42 will remain unchanged.
- 2) Article E - Rates. The current text is deleted in its entirety and is replaced with the following text.

“The rates charged by the Authority under this Agreement shall be established In accordance with this Article.

The Authority shall charge and Company shall pay the preference power rates adopted by the Authority on November 15, 2011, as such rates may be revised from time to time. Company waives any and all objections, suits, appeals or other challenges to the preference power rates adopted by the Authority on November 15, 2011, except as otherwise provided for below.

Company waives any challenges to any of the following methodologies and principles used by the Authority to set future preference power rates, numbers (i) through (vii) as set forth in the “January 2003 Report on Hydroelectric Production Rates” as modified by the April 2003 “Staff Analysis of Public Comments and Recommendations”:

- (i) The principles set forth in the March 5, 1986 Settlement Agreement settling *Auer v. Dyson*, No. 81-124 (Sup. Ct. Oswego Co.), *Auer v. Power Authority*, index No. 11999-84 (Sup. Ct. N.Y. Co.) and *Delaware County Electric Cooperative, Inc. v. Power Authority*, 82 Civ. 7256 (S.D.N.Y.) (the “*Auer Settlement*”).
- (ii) Recovery of capital costs using Trended Original Cost and Original Cost methodologies.
- (iii) Treatment of sales to third parties, including the New York independent System Operator.
- (iv) Allocation of Indirect Overheads.
- (v) Melding of costs of the Niagara Power Project and St. Lawrence-FDR Power Project for ratemaking.
- (vi) Post-employment benefits other than pensions (i.e., retiree health benefits).
- (vii) Rate Stabilization Reserve (RSR) methodology.

In the event the Authority ceases to employ any of the methodologies and principles enumerated above, the Company shall have the right to take any position whatsoever with respect to such methodology or principle, but shall not have the right to challenge any of the remaining methodologies and principles that continue to be employed by the Authority.”

- 3) Article F - Transmission. The current text is deleted in its entirety and is replaced with the following text.

“In accordance with the terms of the existing transmission service agreement, which by its terms will expire on August 31, 2007, Company will cease taking transmission service from Authority and will instead take transmission service under the New York Independent System Operator’s (“NYISO”) Open Access Transmission Tariff. Company agrees to settle any outstanding transmission charges that may apply prior to September 1, 2007 including any subsequent NYISO true up settlements.”
- 4) Article G - Notification. In the contact address for Authority replace “10 Columbus Circle, New York, NY 10019” with 123 Main Street, White Plains, NY 10601”.
- 5) Article J- Cancellation or Reduction. The following sentence is added at the end of Article J:

Company may also cancel or reduce such service during the period from January 1, 2016 through December 31, 2017, for any reason upon thirty (30) days’ prior written notice to the Authority.

6) Article K - Restoration of Withdrawn Power and/or Energy is deleted in its entirety.

7) Article L - Term of Service, is revised to read as follows:

“Service under this contract shall commence at 12:01 A.M. on January 1, 1990 and shall continue unless cancelled as provided for In the “Withdrawals of Power and/or Energy” or the “Cancellation or Reduction” provisions until December 31, 2017, subject to earlier termination by the Authority at any time with respect to any or all of the quantities of power and energy provided hereunder on at least thirty (30) days’ prior written notice to Company.”

8) Article M - Availability of Energy - Firm and Firm Peaking Hydroelectric Power Service. In the third paragraph, line 1, starting with the words “In the event that...” through “... minimize the impact of such reductions.” on line 10, replace with the following:

“The Authority will have the right to reduce on a pro rata basis the amount of energy provided to Company under Service Tariff No. 42 if such reductions are necessary due to low flow (i.e. hydrologic) conditions at the Authority's Niagara Project hydroelectric generating station. In the event that hydrologic conditions require the Authority to reduce the amount of energy provided to Company, reductions as a percentage of the otherwise required, energy deliveries will be the same for all firm Niagara Project customers. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to Company in later billing periods. The offer of Energy for delivery shall fulfill Authority's obligations for purposes of this Provision whether or not the Energy is taken by Company. The Authority shall provide reasonable notice to Company of any condition or activities that could result, or have resulted, in low flow conditions consistent with the notice provided to other similarly affected customers.”

9) This amendment shall be referred to as the “2014 Amendment to the 1990 Service Agreement”.

10) Continuation of service under this 2014 Amendment to the 1990 Service Agreement shall be subject to ultimate approval by the Governor of the State of New York pursuant to Public Authorities Law § 1009. If the Governor disapproves this 2014 Amendment to the 1990 Service Agreement, service will cease on the last day of the month following the month during which the Governor disapproved this 2014 Amendment to the 1990 Service Agreement. If the Governor takes no action within the time frame provided for in Public Authorities Law § 1009, service will cease on the last day of the month following the month during which such timeframe expired.

Except as expressly provided in this 2014 Amendment to the 1990 Service Agreement, the 1990 Service Agreement shall remain unchanged and in full force and effect.

This 2014 Amendment to the 1990 Service Agreement shall be governed by and construed in accordance with the laws of the State of New York applicable to contracts and to be performed in such state, without regard to conflict of laws principles.

This 2014 Amendment to the 1990 Service Agreement may be signed in any number of

counterparts, each of which shall be an original, with the same effect as if the signature thereto and hereto were upon the same instrument.

Upon approval of the Governor of the State of New York pursuant to Public Authorities Law § 1009, and upon execution by the Chairman of the Authority, this 2014 Amendment to the 1990 Service Agreement shall come into full force and effect, provided however that pending such gubernatorial approval and execution, this 2014 Amendment to the 1990 Service Agreement shall take effect upon the expiration of the 2012 Amendment and continue on a month to month basis.

This 2014 Amendment to the 1990 Service Agreement may be amended or modified by written agreement signed by the Authority and the Company.

AGREED:

Niagara Mohawk Power Corporation, d/b/a National Grid

By: _____

Title: _____

Date: _____

Power Authority of the State of New York

By: _____

Name: John R. Koelmel

Title: Chairman

Date: _____

2014 Amendment to 1990 Hydropower Contract

This 2014 Amendment to 1990 Hydropower Contract, dated this ____ day of _____, 2014 is made between New York State Electric & Gas Corporation (“Company”) and the Power Authority of the State of New York (“Authority”).

WHEREAS, the Company and the Authority are parties to an agreement dated February 22, 1989 under which the Authority sells certain quantities of hydroelectric power and energy from Authority’s Niagara and St. Lawrence Projects to Company for resale to its rural and residential consumers (the “1990 Hydropower Contract”).

WHEREAS, Authority, Rochester Gas and Electric Corporation (“RGE”) and Company are also parties to a letter agreement dated February 14, 2008 (“February 14, 2008 Letter Agreement”) which modified Article D - Regulation of Rates and Charges as it pertained to the calculation of the monthly savings realized by the customers of Company and RGE from the purchase of Authority hydropower.

WHEREAS, Company and Authority have previously modified and extended the 1990 Hydropower Contract, most recently by the “2012 Amendment to 1990 Hydropower Contract” (the “2012 Amendment”).

WHEREAS, by letter dated June 29, 2011, Authority withdrew all 167 MW of Firm Hydroelectric Power and Energy allocated under Service Tariff No. 41 and terminated service under the 1990 Hydropower Contract with respect to all 167 MW of Firm Hydroelectric Power and Energy, effective August 1, 2011, for use in the Recharge New York Power Program created pursuant to Chapter 60 (Part CC) of the Laws of 2011 (the “Firm Power and Energy Withdrawal/Termination”).

WHEREAS, Company and Authority agree to further modify and extend certain terms of 1990 Hydropower Contract as follows:

- 1) As a result of the Authority’s Firm Power and Energy Withdrawal/Termination, the amount of Firm Hydroelectric Power and Energy allocated to Company under Service Tariff No. 41 is zero (0). The Firm Peaking Power allocation of 150 MW under Service Tariff No. 42 will remain unchanged.
- 2) Article E - Rates. The current text is deleted in its entirety and is replaced with the following text.

“The rates charged by the Authority under this Agreement shall be established In accordance with this Article.

The Authority shall charge and Company shall pay the preference power rates adopted by the Authority on November 15, 2011, as such rates may be revised from time to time. Company waives any and all objections, suits, appeals or other challenges to the preference power rates adopted by the Authority on November 15, 2011, except as otherwise provided for below.

Company waives any challenges to any of the following methodologies and principles used by the Authority to set future preference power rates, numbers (i) through (vii) as set forth in the “January 2003 Report on Hydroelectric Production Rates” as modified by the April 2003 “Staff Analysis of Public Comments and Recommendations”:

- (i) The principles set forth in the March 5, 1986 Settlement Agreement settling *Auer v. Dyson*, No. 81-124 (Sup. Ct. Oswego Co.), *Auer v. Power Authority*, index No. 11999-84 (Sup. Ct. N.Y. Co.) and *Delaware County Electric Cooperative, Inc. v. Power Authority*, 82 Civ. 7256 (S.D.N.Y.) (the “*Auer Settlement*”).
- (ii) Recovery of capital costs using Trended Original Cost and Original Cost methodologies.
- (iii) Treatment of sales to third parties, including the New York independent System Operator.
- (iv) Allocation of Indirect Overheads.
- (v) Melding of costs of the Niagara Power Project and St. Lawrence-FDR Power Project for ratemaking.
- (vi) Post-employment benefits other than pensions (i.e., retiree health benefits).
- (vii) Rate Stabilization Reserve (RSR) methodology.

In the event the Authority ceases to employ any of the methodologies and principles enumerated above, the Company shall have the right to take any position whatsoever with respect to such methodology or principle, but shall not have the right to challenge any of the remaining methodologies and principles that continue to be employed by the Authority.”

- 3) Article F - Transmission. The current text is deleted in its entirety and is replaced with the following text.

“In accordance with the terms of the existing transmission service agreement, which by its terms will expire on August 31, 2007, Company will cease taking transmission service from Authority and will instead take transmission service under the New York Independent System Operator's (“NYISO”) Open Access Transmission Tariff. Company agrees to settle any outstanding transmission charges that may apply prior to September 1, 2007 including any subsequent NYISO true up settlements.”

- 4) Article G - Notification. In the contact address for Authority replace “10 Columbus Circle, New York, NY 10019” with 123 Main Street, White Plains, NY 10601”. For Company, delete the current reference in its entirety and replace with the following “Dave Kimiecik, Vice President, Energy Supply, New York State Electric & Gas

Corporation, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224”.

- 5) Article J- Cancellation or Reduction. The following sentence is added at the end of Article J:

Company may also cancel or reduce such service during the period from January 1, 2016 through December 31, 2017, for any reason upon thirty (30) days’ prior written notice to the Authority.

- 6) Article K - Restoration of Withdrawn Power and/or Energy is deleted in its entirety.

- 7) Article L - Term of Service, is revised to read as follows:

“Service under this contract shall commence at 12:01 A.M. on January 1, 1990 and shall continue unless cancelled as provided for in the "Withdrawals of Power and/or Energy" or the "Cancellation or Reduction" provisions until December 31, 2017, subject to earlier termination by the Authority at any time with respect to any or all of the quantities of power and energy provided hereunder on at least thirty (30) days’ prior written notice to Company.”

- 8) Article M - Availability of Energy - Firm and Firm Peaking Hydroelectric Power Service. In the third paragraph, line 1, starting with the words “In the event that...” through “... minimize the impact of such reductions,” on line 10, replace with the following:

“The Authority will have the right to reduce on a pro rata basis the amount of energy provided to Company under Service Tariff No. 42 if such reductions are necessary due to low flow (i.e. hydrologic) conditions at the Authority's Niagara Project hydroelectric generating station. In the event that hydrologic conditions require the Authority to reduce the amount of energy provided to Company, reductions as a percentage of the otherwise required, energy deliveries will be the same for all firm Niagara Project customers. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to Company in later billing periods. The offer of Energy for delivery shall fulfill Authority's obligations for purposes of this Provision whether or not the Energy is taken by Company. The Authority shall provide reasonable notice to Company of any condition or activities that could result, or have resulted, in low flow conditions consistent with the notice provided to other similarly affected customers.”

- 9) This amendment shall be referred to as the “2014 Amendment to the 1990 Hydropower Contract”.

- 10) Continuation of service under this 2014 Amendment to the 1990 Hydropower Contract shall be subject to ultimate approval by the Governor of the State of New York pursuant to Public Authorities Law § 1009. If the Governor disapproves this 2014 Amendment to the 1990 Hydropower Contract, service will cease on the last day of the month following the month during which the Governor disapproved this 2014 Amendment to the 1990 Hydropower Contract. If the Governor takes no action within the time frame provided for in Public Authorities Law § 1009, service will cease on the last day of the month

following the month during which such timeframe expired.

Except as expressly provided in this 2014 Amendment to the 1990 Hydropower Contract, the 1990 Hydropower Contract as modified by the February 14, 2008 Letter Agreement shall remain unchanged and in full force and effect.

This 2014 Amendment to the 1990 Hydropower Contract shall be governed by and construed in accordance with the laws of the State of New York applicable to contracts and to be performed in such state, without regard to conflict of laws principles.

This 2014 Amendment to the 1990 Hydropower Contract may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signature thereto and hereto were upon the same instrument.

Upon approval of the Governor of the State of New York pursuant to Public Authorities Law § 1009, and upon execution by the Chairman of the Authority, this 2014 Amendment to the 1990 Hydropower Contract shall come into full force and effect, provided however that pending such gubernatorial approval and execution this 2014 Amendment to the 1990 Hydropower Contract shall take effect upon the expiration of the 2012 Amendment and continue on a month to month basis.

This 2014 Amendment to the 1990 Hydropower Contract may be amended or modified by written agreement signed by the Authority and the Company.

AGREED:

New York State Electric & Gas Corporation

By: _____

Name: Joseph J. Syta

Title: Vice President, Controller and Treasurer

Date: _____

By: _____

Name: Mark S. Lynch

Title: President

Date: _____

Power Authority of the State of New York

ACCEPTED:

By: _____

Name: John R. Koelmel

Title: Chairman

Date: _____

2014 Amendment to 1990 Hydropower Contract

This 2014 Amendment to 1990 Hydropower Contract, dated this ____ day of _____, 2014 is made between Rochester Gas and Electric Corporation (“Company”) and the Power Authority of the State of New York (“Authority”).

WHEREAS, the Company and the Authority are parties to an agreement dated February 22, 1989 under which the Authority sells certain quantities of hydroelectric power and energy from Authority’s Niagara and St. Lawrence Projects to Company for resale to its rural and residential consumers (the “1990 Hydropower Contract”).

WHEREAS, Authority, New York State Electric & Gas Corporation (“NYSEG”) and Company are also parties to a letter agreement dated February 14, 2008 (“February 14, 2008 Letter Agreement”) which modified Article D - Regulation of Rates and Charges as it pertained to the calculation of the monthly savings realized by the customers of Company and NYSEG from the purchase of Authority hydropower.

WHEREAS, Company and Authority have previously modified and extended the 1990 Hydropower Contract, most recently by the “2012 Amendment to 1990 Hydropower Contract” (the “2012 Amendment”).

WHEREAS, by letter dated June 29, 2011, Authority withdrew all 99 MW of Firm Hydroelectric Power and Energy allocated under Service Tariff No. 41 and terminated service under the 1990 Hydropower Contract with respect to all 99 MW of Firm Hydroelectric Power and Energy, effective August 1, 2011, for use in the Recharge New York Power Program created pursuant to Chapter 60 (Part CC) of the Laws of 2011 (the “Firm Power and Energy Withdrawal/Termination”).

WHEREAS, Company and Authority agree to further modify and extend certain terms of 1990 Hydropower Contract as follows:

- 1) As a result of the Authority’s Firm Power and Energy Withdrawal/Termination, the amount of Firm Hydroelectric Power and Energy allocated to Company under Service Tariff No. 41 is zero (0). The Firm Peaking Power allocation of 35 MW under Service Tariff No. 42 will remain unchanged.
- 2) Article E - Rates. The current text is deleted in its entirety and is replaced with the following text.

“The rates charged by the Authority under this Agreement shall be established In accordance with this Article.

The Authority shall charge and Company shall pay the preference power rates adopted by the Authority on November 15, 2011, as such rates may be revised from time to time. Company waives any and all objections, suits, appeals or other challenges to the preference power rates adopted by the Authority on November 15, 2011, except as otherwise provided for below.

Company waives any challenges to any of the following methodologies and principles used by the Authority to set future preference power rates, numbers (i) through (vii) as set forth in the “January 2003 Report on Hydroelectric Production Rates” as modified by the April 2003 “Staff Analysis of Public Comments and Recommendations”:

- (i) The principles set forth in the March 5, 1986 Settlement Agreement settling *Auer v. Dyson*, No. 81-124 (Sup. Ct. Oswego Co.), *Auer v. Power Authority*, index No. 11999-84 (Sup. Ct. N.Y. Co.) and *Delaware County Electric Cooperative, Inc. v. Power Authority*, 82 Civ. 7256 (S.D.N.Y.) (the “Auer Settlement”).
- (ii) Recovery of capital costs using Trended Original Cost and Original Cost methodologies.
- (iii) Treatment of sales to third parties, including the New York independent System Operator.
- (iv) Allocation of Indirect Overheads.
- (v) Melding of costs of the Niagara Power Project and St. Lawrence-FDR Power Project for ratemaking.
- (vi) Post-employment benefits other than pensions (i.e., retiree health benefits).
- (vii) Rate Stabilization Reserve (RSR) methodology.

In the event the Authority ceases to employ any of the methodologies and principles enumerated above, the Company shall have the right to take any position whatsoever with respect to such methodology or principle, but shall not have the right to challenge any of the remaining methodologies and principles that continue to be employed by the Authority.”

- 3) Article F - Transmission. The current text is deleted in its entirety and is replaced with the following text.

“In accordance with the terms of the existing transmission service agreement, which by its terms will expire on August 31, 2007, Company will cease taking transmission service from Authority and will instead take transmission service under the New York Independent System Operator’s (“NYISO”) Open Access Transmission Tariff. Company agrees to settle any outstanding transmission charges that may apply prior to September 1, 2007 including any subsequent NYISO true up settlements.”

- 4) Article G - Notification. In the contact address for Authority replace “10 Columbus Circle, New York, NY 10019” with 123 Main Street, White Plains, NY 10601”. For Company, delete the current reference in its entirety and replace with the following “Dave Kimiecik, Vice President, Energy Supply, New York State Electric & Gas

Corporation, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224”.

- 5) Article J- Cancellation or Reduction. The following sentence is added at the end of Article J:

Company may also cancel or reduce such service during the period from January 1, 2016 through December 31, 2017, for any reason upon thirty (30) days’ prior written notice to the Authority.

- 6) Article K - Restoration of Withdrawn Power and/or Energy is deleted in its entirety.

- 7) Article L - Term of Service, is revised to read as follows:

“Service under this contract shall commence at 12:01 A.M. on January 1, 1990 and shall continue unless cancelled as provided for in the “Withdrawals of Power and/or Energy” or the “Cancellation or Reduction” provisions until December 31, 2017, subject to earlier termination by the Authority at any time with respect to any or all of the quantities of power and energy provided hereunder on at least thirty (30) days’ prior written notice to Company.”

- 8) Article M - Availability of Energy - Firm and Firm Peaking Hydroelectric Power Service. In the third paragraph, line 1, starting with the words “In the event that...” through “... minimize the impact of such reductions,” on line 10, replace with the following:

“The Authority will have the right to reduce on a pro rata basis the amount of energy provided to Company under Service Tariff No. 42 if such reductions are necessary due to low flow (i.e. hydrologic) conditions at the Authority's Niagara Project hydroelectric generating station. In the event that hydrologic conditions require the Authority to reduce the amount of energy provided to Company, reductions as a percentage of the otherwise required, energy deliveries will be the same for all firm Niagara Project customers. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to Company in later billing periods. The offer of Energy for delivery shall fulfill Authority's obligations for purposes of this Provision whether or not the Energy is taken by Company. The Authority shall provide reasonable notice to Company of any condition or activities that could result, or have resulted, in low flow conditions consistent with the notice provided to other similarly affected customers.”

- 9) This amendment shall be referred to as the “2014 Amendment to the 1990 Hydropower Contract”.

- 10) Continuation of service under this 2014 Amendment to the 1990 Hydropower Contract shall be subject to ultimate approval by the Governor of the State of New York pursuant to Public Authorities Law § 1009. If the Governor disapproves this 2014 Amendment to the 1990 Hydropower Contract, service will cease on the last day of the month following the month during which the Governor disapproved this 2014 Amendment to the 1990 Hydropower Contract. If the Governor takes no action within the time frame provided for in Public Authorities Law § 1009, service will cease on the last day of the month following the month during which such timeframe expired.

Except as expressly provided in this 2014 Amendment to the 1990 Hydropower Contract, the 1990 Hydropower Contract as modified by the February 14, 2008 Letter Agreement shall remain unchanged and in full force and effect.

This 2014 Amendment to the 1990 Hydropower Contract shall be governed by and construed in accordance with the laws of the State of New York applicable to contracts and to be performed in such state, without regard to conflict of laws principles.

This 2014 Amendment to the 1990 Hydropower Contract may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signature thereto and hereto were upon the same instrument.

Upon approval of the Governor of the State of New York pursuant to Public Authorities Law § 1009, and upon execution by the Chairman of the Authority, this 2014 Amendment to the 1990 Hydropower Contract shall come into full force and effect, provided however that pending such gubernatorial approval and execution this 2014 Amendment to the 1990 Hydropower Contract shall take effect upon the expiration of the 2012 Amendment and continue on a month to month basis.

This 2014 Amendment to the 1990 Hydropower Contract may be amended or modified by written agreement signed by the Authority and the Company.

AGREED:

Rochester Gas and Electric Corporation

By: _____

Name: Joseph J. Syta

Title: Vice President, Controller and Treasurer

Date: _____

By: _____

Name: Mark S. Lynch

Title: President

Date: _____

Power Authority of the State of New York

ACCEPTED:

By: _____

Name: John R. Koelmel

Title: Chairman

Date: _____

Procurement (Services) Contracts – Awards
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-A"
October 15, 2014

| <u>Bus Unit/ Plant Site</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|---|---|------------------------------|--|---|--|---|--|---|
| ENTERPRISE SHARED SERVICES - CORP SUPP SERVICES | Q14-5672; 2 awards: 1. FLIGHTSAFETY INTERNATIONAL, INC. Charlotte, NC (HQ) [FlightSafety training will be conducted at facilities in other locations/states] 2. FLYRIGHT HOLDINGS INC. dba FLYRIGHT, INC. Concord, NC (PO#s TBA) | 03/15/15 (on or about) | Provide for flight simulator and other aviation-related pilot training: - recurrent required annual training - initial training, as needed | 03/14/20 | B/S | | | \$164,000* \$81,000* |
| | | | | | | *Note: represents total for up to 5-year term | | |
| ENTERPRISE SHARED SERVICES - CORP SUPP SERVICES | MICHAEL BELLANTONI, INC. White Plains, NY (Q14-5630 ; PO# TBA) | 10/31/14 (on or about) | Provide for lawn and landscape maintenance and snow / ice manage- ment services for the Rappleyea Building | 10/30/19 | B/S | | | \$1,030,000* |
| | | | | | | *Note: represents total for up to 5-year term | | |
| ENTERPRISE SHARED SERVICES - CORP SUPP SERVICES | VALLES VENDIOLA, ♦ LLP Elmhurst, NY (Q14-5691 ; PO# TBA) | 10/16/14 (on or about) | Provide for independent audit services of operating expenses (Common Area Maintenance) of the Rapple- yea Building | 10/15/19 | B/P | | | \$20,000* |
| | | | | | | *Note: represents total for up to 5-year term | | |
| LAW | McCARTER & ENGLISH, LLP New York, NY (4500250091) | 09/18/14 | Provide for legal repre- sentation, advice and counsel in connection with construction litiga- tion matters | 09/17/17 (2-year award with 1-year option to extend) | C/L | \$250,000 | | \$250,000* |
| | | | | | | *Note: represents total for up to 3-year term | | |

♦ **M / WBE:** New York State-certified Minority / Women-owned Business Enterprise (indicated by the ♦ symbol after the Company Name)
1 Award Basis: B= Competitive Bid; S= Sole Source; Si= Single Source; C= Competitive Search
2 Contract Type: P= Personal Service; S= (Non-Personal) Service; C= Construction; E= Equipment; N= Non-Procurement; A= Architectural & Engineering Service; L= Legal Service

Procurement (Services) Contracts – Awards
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-A"
October 15, 2014

| <u>Bus Unit/ Plant Site</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|--|---|-------------------------------------|--|----------------------------|---|--------------------------------------|---|--|
| OPERATIONS - EH&S | Q14-5638; 4 awards: | 10/16/14 (on or about) | Provide for planned and emergency response asbestos/lead/PCB abatement services at Authority facilities throughout the state: | 10/15/19 | B/S | | | \$5,000,000* |
| | 1. ABSCOPE ENVIRONMENTAL, INC. Canastota, NY | | Northern Region | | | | | |
| | 2. BUFFALO ENVIRONMENTAL CONSULTANTS, INC. dba AFI ENVIRONMENTAL Niagara Falls, NY | | Western Region | | | | | |
| | 3. PINNACLE ENVIRONMENTAL CORP. Carlstadt, NJ | | Southeastern Region | | | | | |
| | 4. SCE ENVIRONMENTAL GROUP, INC. Jefferson Township, PA (PO#s TBA) | | Capital/Central Region | | | | | |

*Note: represents aggregate total for up to 5-year term

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Procurement (Services) Contracts – Awards
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-A"
October 15, 2014

| <u>Bus Unit/ Plant Site</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|--|--|-------------------------------------|--|----------------------------|---|---|---|--|
| OPERATIONS - EH&S | Q14-5671; 4 awards: 1. HARTGEN ARCHEOLOGICAL ASSOCIATES, INC. Rensselaer, NY 2. LANDMARK ARCHAEOLOGY, INC. ♦ Altamont, NY 3. RESEARCH FOUNDATION OF SUNY ARCHAEOLOGICAL SURVEY SUNY AB Buffalo, NY 4. RICHARD GRUBB AND ASSOCIATES, INC. Cranbury, NJ (PO#s TBA) | 10/16/14 (on or about) | Provide for cultural resource consulting services related to the investigation and manage- ment of cultural and his- toric resources at various Authority or third-party facilities, per all appli- cable federal, state and/ or local requirements | 10/15/19 | B/P | | | \$1,500,000* |
| | | | | | | *Note: represents aggregate total for up to 5-year term | | |
| OPERATIONS - POWER GEN - NIAGARA | DIVAL SAFETY EQUIPMENT, INC. Buffalo, NY (RFQ 6000150934; PO# TBA) | 10/16/14 (on or about) | Provide for service agreement to maintain portable fire extinguishers at the Niagara Power Project | 10/15/18 | B/S | | | \$30,000* |
| | | | | | | *Note: represents total for up to 4-year term | | |
| OPERATIONS - POWER GEN - 500 MW PLANT | SIRIO SISTEMI ELETTRONICI SPA Prato, Italy (RFQ 6000149112; PO# TBA) | 10/16/14 (on or about) | Provide for I&C support services for 3 Nuovo Pignone gas compressors at the 500 MW Plant | 10/15/19 | B/S | | | \$400,000* |
| | | | | | | *Note: represents total for up to 5-year term | | |

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1 Award Basis: B= Competitive Bid; S= Sole Source; Si= Single Source; C= Competitive Search
2 Contract Type: P= Personal Service; S= (Non-Personal) Service; C= Construction; E= Equipment; N= Non-Procurement; A= Architectural & Engineering Service; L= Legal Service

Procurement (Services) Contracts – Awards
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-A"
October 15, 2014

| <u>Bus Unit/ Plant Site</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|--|---|-------------------------------------|---|----------------------------|---|--------------------------------------|---|--|
| PUBLIC & REGULATORY AFFAIRS - PROJ. DEV. & LICENSING | Q14-5680; 12 awards: 1. ARCADIS OF NEW YORK, INC. White Plains, NY 2. BURNS & MCDONNELL CONSULTANTS, PC Kansas City, MO (HQ) Wallingford, CT (Branch Office) 3. CH2M HILL ENGINEERING, PA Englewood, CO (HQ) New York, NY (Branch Office) 4. ECOLOGY AND ENVIRONMENT ENGINEERING, PC Lancaster, NY 5. ESS GROUP, INC. East Providence, RI 6. GOMEZ AND SULLIVAN ENGINEERS, DPC Utica, NY 7. HENNINGSON, DURHAM & RICHARDSON ARCHITECTURE AND ENGINEERING, PC Omaha, NE (HQ) White Plains, NY (Branch Office) | 11/15/14 (on or about) | Provide for consulting services for licensing and environmental permitting tasks | 11/14/19 | B/P | | | \$5,000,000* |

*Note: represents total for up to 5-year term

[continued on next page]

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1 **Award Basis:** B= Competitive Bid; S= Sole Source; Si= Single Source; C= Competitive Search
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Procurement (Services) Contracts – Awards
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-A"
October 15, 2014

| <u>Bus Unit/ Plant Site</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|--|--|-------------------------------------|---|----------------------------|---|--------------------------------------|---|--|
| | Q14-5680 continued: | | | | | | | |
| | 8. LOUIS BERGER & ASSOCIATES, PC Morristown, NJ (HQ) New York, NY (Branch Office) | | | | | | | |
| | 9. POWER ENGINEERS CONSULTING, PC Hailey, ID (HQ) Freeport, ME (Branch Office) | | | | | | | |
| | 10. TETRA TECH, INC. Pasadena, CA (HQ) Morris Plains, NJ (Branch Office) | | | | | | | |
| | 11. THE CHAZEN COMPANIES Poughkeepsie, NY | | | | | | | |
| | 12. TRC ENVIRONMENTAL CORPORATION Clifton Park, NY (PO#s TBA) | | | | | | | |

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1 **Award Basis:** B= Competitive Bid; S= Sole Source; Si= Single Source; C= Competitive Search

2 **Contract Type:** P= Personal Service; S= (Non-Personal) Service; C= Construction; E= Equipment; N= Non-Procurement; A= Architectural & Engineering Service; L= Legal Service

Procurement (Services) Contracts – Extensions and/or Additional Funding
(For Description of Contracts See "Discussion")

EXHIBIT "2c i-B"
October 15, 2014

| <u>Plant Site/ Bus. Unit</u> | <u>Company Contract #</u> | <u>Start of Contract</u> | <u>Description of Contract</u> | <u>Closing Date</u> | <u>Award Basis¹ Contract Type²</u> | <u>Compensation Limit</u> | <u>Amount Expended To Date</u> | <u>Authorized Expenditures For Life Of Contract</u> |
|--|---|------------------------------|---|---------------------|--|--|--|---|
| LAW | ERNST & YOUNG LLP New York, NY 4500245948 | 04/28/14 | Provide for the services of a third party (plus option to extend for 6 months through 12/31/15) auditor to assist with the management of the Authority's Internal Audit Dept. and to conduct audits & assessments | 06/30/15 | C/P | \$1,653,000 | \$156,982 | \$3,871,600* |
| | | | | | | *Note: includes previously approved total amount of \$1,653,000 + CURRENT REQUEST for \$2,218,600 | | |
| LAW | GIBSON, DUNN & CRUTCHER LLP Los Angeles, CA (HQ) New York, NY (Branch Office) 4500238151 | 10/01/13 | Provide for legal counsel and representation services in connection with certain confidential ongoing matters | 09/30/16 | C/L | \$1,000,000 | \$765,980 | \$2,000,000* |
| | | | | | | *Note: includes originally approved amount of \$500,000 + an additional \$500,000 authorized per the EAPs + CURRENT REQUEST for \$1 million | | |
| OPERATIONS SUPPORT SERVICES - PROJ. MGMT + B-G | BEEBE CONSTRUCTION SERVICES, INC. Utica, NY 4500236532 | 09/25/13 | Provide for site development and construction of a new Security Building at B-G | 12/31/14 | B/C | \$3,671,527 | \$3,080,149 | \$3,671,527* |
| | | | | | | *Note: includes originally approved amount of \$3,620,000 + an additional \$51,527 authorized per the EAPs If required, additional funding will be authorized in accordance with the EAPs. | | |
| OPERATIONS SUPPORT SERVICES - PROJ. MGMT + STL | HYDROPOWER PERFORMANCE ENGINEERING, INC. Toronto, Ontario Canada 4500235703 | 10/08/13 | Perform index testing and analyses of 12 turbine-generator units at STL and develop reports for review and acceptance by NYPA, the IJC and OPG | 10/07/15 | B/P | \$396,730 | \$282,286 | \$396,730* |
| | | | | | | *Note: includes originally approved amount of \$364,560 + an additional \$32,170 authorized per the EAPs If required, additional funding will be authorized in accordance with the EAPs. | | |
| OPERATIONS SUPPORT SERVICES - PROJ. MGMT | NORTHLINE UTILITIES, LLC Au Sable Forks, NY 4500236946 | 10/02/13 | Provide for power supply to the Spillway and new Security Buildings at B-G | 12/31/14 | B/C | \$2,223,818 | \$1,667,898 | \$2,223,818* |
| | | | | | | *Note: includes originally approved amount of \$2,223,818 If required, additional funding will be authorized in accordance with the EAPs. | | |

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October 15, 2104
Exhibit “2d i-A”

BASIC LEASE TERMS
ISKALO TO AUTHORITY

- 1) **Premises:** 3,614 leasable square feet located on the 2nd floor at the Electric Tower, 535 Washington Street, Buffalo, New York 14203
- 2) **Term:** One, five (5) year and two (2) month lease term. Base rent for the first two months of the lease term shall be abated. No extension terms or options.
- 3) **Commencement Date:** Within ninety (90) days following Landlord’s receipt of a fully executed lease document and building permit. Anticipated commencement before year end 2015.
- 4) **Base Rent:** \$75,894.00 annually with a two and a half percent (2.5%) annual escalator.
- 5) **Escalations:** Proportionate share of increases in real estate taxes over a base year of 2015. Proportionate share of increases in operating expenses over a base year of 2015.
- 6) **Utilities:** Landlord to provide utility service to the Premises. Base Rent to include all charges for water, sewer, natural gas and building common area electric during the Base Year. Tenant responsible for its pro rata share of any increase over the Base Year cost for said utility charges for the balance of the term. Premises Electric shall be sub-metered by Landlord.
- 7) **Landlord's Work:** None
- 8) **Broker:** None

President & Chief Executive Officer Report

Gil Quiniones

October 15, 2014

Board of Trustees Meeting

NYPA Overall Performance

September 2014

| Goal | Measure | Year-to-Date 2014 | | | Year 2015 Risk Range |
|------------------------------|--|-------------------|--------|--------|--|
| | | Status | Target | Actual | |
| Maintain Infrastructure | Generation Market Readiness (%) | | 99.40 | 99.54 | <div> <div>Early Warning Threshold</div> <div>Risk Range</div> </div> <p>96% 97% 98% 99%</p> |
| | Transmission System Reliability (%) | | 97.71 | 97.98 | <div> <div>Early Warning Threshold</div> <div>Risk Range</div> </div> <p>80% 85% 90% 95% 100%</p> |
| Financial Management | Debt Coverage (Ratio) | | 3.10 | 3.50* | <div> <div>Early Warning Threshold</div> <div>Risk Range</div> </div> <p>1.50 2.00 2.50 3.00 3.50 4.00 4.50</p> |
| | O&M Budget Performance (\$ Millions) | | 280.8 | 261.8 | <div> <div>Risk Range</div> <div> Year-to-Date Actual Risk Threshold </div> <div>Projected risk ranges to be reported quarterly</div> </div> |
| Energy Services | MMBTU's Saved | | 208.8 | 207.5 | |
| | Energy Efficiency Investment in State Facilities (\$ Millions) | | 39.3 | 48.7 | |
| Workforce Management | Retention (# of Touchpoints) | | 487 | 778* | <div> <div>Corporate Performance</div> <div> <div>Status</div> <div> Meeting or Exceeding Target Below Target Significantly Below Target </div> </div> </div> |
| Safety Leadership | DART Rate (Index) | | 0.78 | 1.34 | |
| Environmental Responsibility | Environmental Incidents (Units) | | 24 | 25 | |

*Results updated for Q3

Stakeholder Outreach

Key announcements:

Fitch revised NYPA outlook to positive

North Country Economic Development Loan Fund

K-Solar program launch

NYC Department of Environmental Protection hydro project development in Cannonville

Various energy efficiency projects completed across the state

Multiple employee and project awards received

Key press events:

Hollingsworth and Vose, Recharge NY

Corning Canton Expansion, Preservation power

Niagara Falls Transportation Authority electric vehicle charging station

Build Smart Innovators Summit and Awards

ALCOA apprenticeship program

Various public speaking engagements

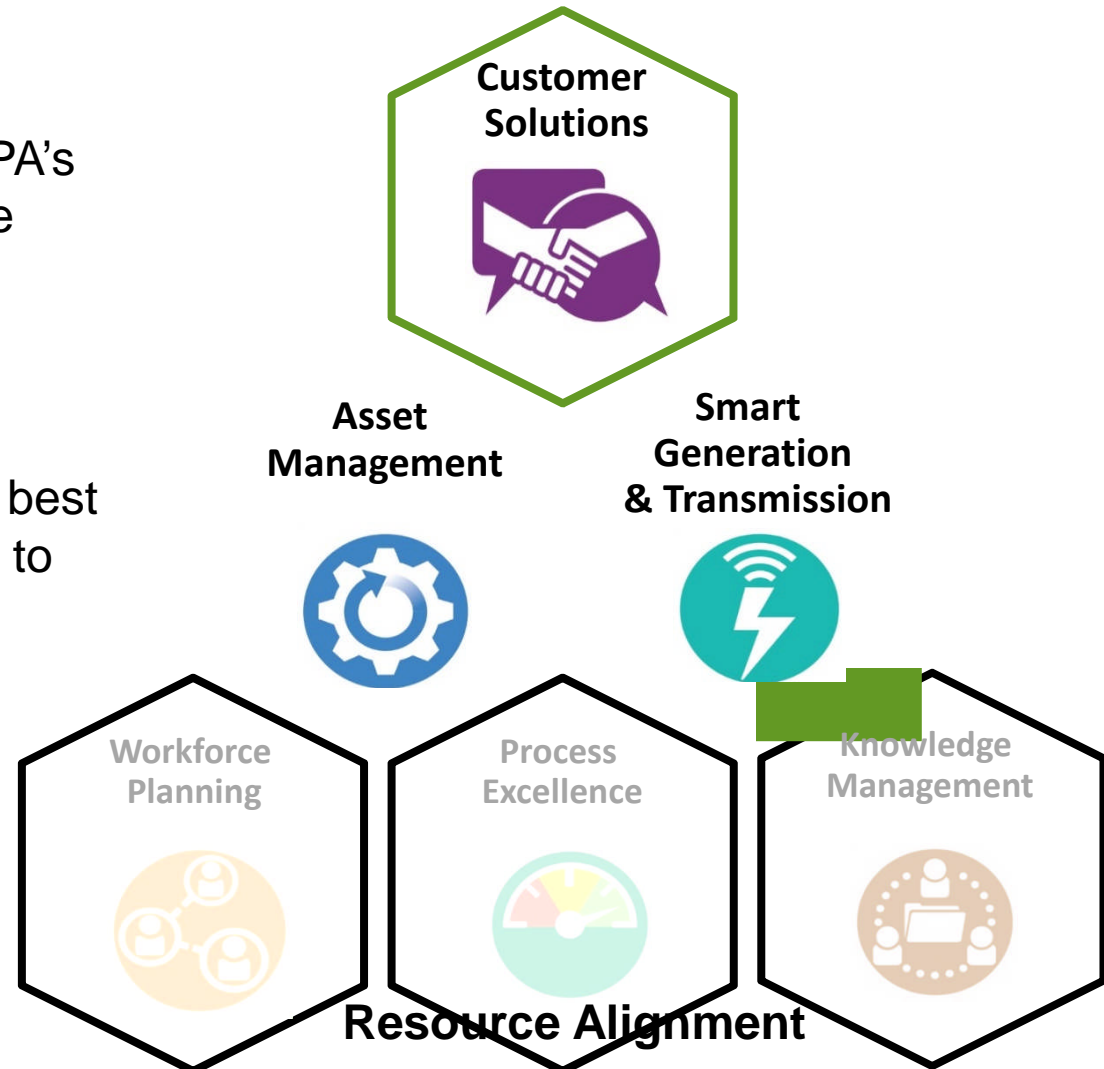
Strategic Initiatives

Customer Empowerment

- Build the *demand* side of NYPA's business to be on par with the *supply* side

Infrastructure Modernization

- Asset Management: Employ best practices, data and analytics to optimize asset performance
- Smart G&T: Increase reliability and resiliency; optimize assets; and integrate renewables and distributed generation





Edward Welz
Chief Operating Officer

TO: NYPA BOARD OF TRUSTEES

FROM: EDWARD WELZ, CHIEF OPERATING OFFICER

DATE: OCTOBER 7, 2014

SUBJECT: MONTHLY REPORT FOR THE BOARD OF TRUSTEES

This report covers performance of the Operations group in September 2014.

Operations

Plant Performance

Systemwide net generation¹ was 2,103,234 MWh (megawatt-hours²) for September which is above the projected net generation of 1,905,166 MWh. For the year, net generation was 19,214,578 MWh which is above the projected target of 18,914,773 MWh.

The fleet availability factor³ was 93.93 percent in September, and was 90.39 percent for the year. Generation Market Readiness factor⁴ was 99.79 percent in September, which is higher than the monthly target of 99.40 percent. Year-to-date Generation Market Readiness factor was at 99.54 percent, which is above the annual target of 99.40 percent.

There were no significant forced outages⁵ in September.

Generation Net Revenue in September was \$17.4 million with a loss of revenue of \$0.01 million. For the year, net revenue was \$314.2 million while revenue loss is \$0.87 million.

Niagara River flows in September were above the historical average and are expected to be above normal levels for the year. St. Lawrence River flows for September were above forecast levels and are expected to be above historical levels for the year.

Transmission Performance

Transmission reliability⁶ in September was 98.39 percent, which was above the target of 98.20 percent. Year-to-date transmission reliability is 97.98 percent, above the target of 97.71 percent.

There were no significant unplanned transmission events in September to report.

Safety

The NYPA DART (Days Away, Restricted or Transferred) Rate for September is 1.56. For the year, the DART Rate is 1.34 compared to the target of 0.78.

The Operations DART Rate for September is 2.35. For the year, the DART Rate is 1.99 compared to the target of 1.08.

There were two lost time incidents in September that met the DART criteria. For the year, there have been 16 injuries that resulted in lost time and met the DART criteria.

Environmental

There was one reportable incident in September.

1. A release of R-22 refrigerant occurred at the Poletti facility which exceeded the NYDEC reportable quantity of one pound.

For the year, there have been 25 incidents. The annual target is 32 incidents.

Life Extension and Modernization Programs

Transmission LEM

T-LEM is a multiyear program that will upgrade the Authority's existing transmission system to maintain availability, increase reliability, and ensure regulatory compliance. The Program encompasses Authority transmission assets in the Central, Northern, and Western Regions. The Program is estimated to cost \$726 million and is comprised of several projects:

- **St. Lawrence Breaker & Relay Replacement:** Trustees authorized funding for Phase 1 in the amount of \$67.8 million (total \$110 million) at the December 2012 meeting.
 - **115kV & 230kV Breakers:** First breaker shipment delivered 6/26/14. Next shipment scheduled for mid-October.
 - **Two New 100MVA Cap Banks:** Cap Banks were delivered 8/28/14.
 - **13.8kV & 480V SWGR:** Three bids received and are being evaluated; post bid addendums issued.

- **SAMAC Cutovers:**
 - **Cap Bank Protection:** CH2M submitted final wiring and underground design, comments provided by NYPA. CH to provide IFC drawings mid-September.
 - **Alcoa Cutover:** Breaker 1702 replaced, testing in progress with plan to energize in September. 1708 outage to begin contingent on Bank 5 outage.
 - **SAMAC SCADA Integration:** Meeting with Engineering held 7/14/14 to discuss responsibilities and strategy for moving forward with integrations. STL CSE adding 1700 bay points to new SCADA master. Siemens on-site week of 9/22 to resolve SICAM issues.
 - **Construction Installation:** O'Connell Electric has mobilized and commenced trenching and conduit installation. Circuit breaker installations in progress.
- **NIA Protective Relay Replacement:** Trustees authorized funding for Phase 1 in the amount of \$25.9 million (total \$52 million) at the December 2012 meeting.
 - **PA 27, 301 & 302:** The upgrade schedule for PA-302 was accelerated to occur between 11/3/14 – 12/5/14 instead of 2015.
 - **NIA DC Distribution Upgrade (CPR 553):** Preliminary design in progress by RCM.
 - **NIA Packard 195, Gardenville 180, and Panel 9NR (CPR 209):** Procurement package sent out for bid; proposals have been received and are being evaluated. Plan is for material delivery date of 1/8/15 in time for a 1st or 2nd Quarter 2015 outage for Packard 195, and Gardenville 180 construction. The replacement of the Packard 194 relay with a 311L is planned for the 3rd quarter 2015.
 - **NIA NR2 (CPR 209):** RG&E reported that current planned location for RG&E's Station 255 will need to be revisited because of property owner issues and is now likely scheduled for construction 3rd quarter 2015.
- **NIA Switchyard LEM:** Trustees authorized funding for Phase 1 in the amount of \$154 million (total \$266.9 million) at the December 2012 meeting.
 - National Grid to begin Packard 195 re-conductoring in September. NYPA to make connections by end of 2014.
 - Award issued for procurement of a replacement 800MVA auto-transformer to ABB. Electrical Design Review meeting conducted.
 - 115kV and 230kV breaker proposals were received. Award of 115 KV breakers issued. RFQ for 230KV breakers reissued due to substantive changes in requirements.
 - 115kV and 230kV switch proposals received 7/10/14 and are under review.
 - Proposals for CT, PT's and Surge Arrestor received and are being evaluated.

- **CEC Switchyard LEM:**
 - Proposals received for the 765kV/345kV circuit breakers; award of the 765kV circuit breakers is pending the October Trustee meeting. Preparation of CEAR in progress for presentation at the Trustee meeting scheduled for October.
- **CEC Auto-Transformer/Reactor Refurbishment:**
 - Reactor 1A and IX completed.
 - ABB has not reached settlement with their insurance carrier for Auto Transformer 1X which was damaged while placing vacuum on April 23. Based on options provided by ABB, NYPA has selected an option to repair/refurbish transformer using existing LTC and core pending outcome of inspection of damage. The LTC is being evaluated and the auto-transformer is in route to ABB's facility in Varennes, Canada.
 - One additional reactor will be refurbished in Fall 2014.
- **Massena Substation Reactor Refurbishment:**
 - Refurbishment work is deferred to 2015.
- **PV-20 Submarine Cable Replacement:**
 - The cable routing plan and ampacity calculations have been accepted by NYPA & VELCO. The cable specification has been reviewed and pending acceptance. CHA advancing NY permitting under SEQRA.
- **BG & CEC Relay Replacements:**
 - The project team continues to design, procure equipment, and install relays.
- **Massena Substation Autotransformer Replacement:**
 - All six remaining auto-transformers have arrived at the Port of Erie.
 - Since the NYISO has indicated that summer line outages should be avoided, installation of the first three auto-transformers has been deferred; revised schedule is being consolidated with input from NYISO.
 - O'Connell Electric has mobilized to prep the area around the failed #2A unit. Unit 2A has been removed and the containment area rehabilitated.
 - The first set of three transformers will arrive October.
- **Tower Painting:**
 - Painting is planned for 110 towers of STL in 2015. Contract award is being processed.

LPGP LEM

The assembly of the third turbine runner was completed and is in transit scheduled to arrive in Baltimore on October 10th. The assembly of the fourth turbine runner is well underway at Mitsubishi Hitachi Power Systems America's (MHPS's) facility located in Japan. The blades for the fifth turbine arrived at MHPS's facility that were fabricated by their sub-contractor, Litostroj, located in Slovenia. The runner assembly will commence in October. The fabrication of the sixth turbine at MHPS's two new facilities is well underway. Japan Steel Works, located in Japan, is fabricating the runner crown and band which are scheduled to be completed in February 2015. Voestalpine, located in Austria, is fabricating the blades which are being machined and are scheduled to be completed in

October. The remaining six runners were released for fabrication to MHPS which will most likely be fabricated at the Litostroj facility located in Slovenia, confirmation is pending.

The third unit outage (Unit 7) commenced on August 4th a week ahead of the new schedule. The unit disassembly and inspections of the draft tube and turbine liner wall were completed. Unforeseen repairs to the stay ring and stay vanes are underway in an expedited fashion in order to maintain the schedule. The new unit control board and static excitation system equipment was installed and the installation of new cables and conduits commenced; the unit's return to service date is March 20, 2015. The fabrication of the first additional spare set shafts was completed and is in transit and is scheduled to arrive in early October as planned. These spare shafts may be installed in Unit 7 pending the inspection of the original shaft which is underway. The fabrication of the second additional set of shafts is nearly completed and additional shafts may be ordered depending on the inspection results of Unit 7 shafts.. The time frame between the future unit outages has been condensed in order to maintain the completion of the LPGP LEM program in 2020 as originally planned.

Technical Compliance – NERC Reliability Standards

Enforcement Actions – Northeast Power Coordinating Council (NPCC)

NYPA has two (2) minimal risk violations being processed pursuant to NYPA's participation in a NERC-sponsored Reliability Assurance Initiative enforcement pilot program. There will not be any penalties associated with these violations.

Internal Investigation of Possible Violations

Since the last report, two (2) new internal investigations were initiated and one (1) investigation was closed. There are currently four (4) open internal investigations.

NPCC Spot Check Audit

On July 29, 2014, NPCC formally notified NYPA that it will be conducting an off-site Spot Check Audit of the PRC-002-NPCC-001 standard for NYPA's Transmission Owner functional registration starting on October 20, 2014. This standard has requirements for the installation, maintenance, and testing of disturbance monitoring equipment. NYPA staff are gathering the evidence required to demonstrate compliance with the standard and will submit it to the NPCC auditor on or before October 20, 2014.

New Bulk Electric System (BES) Definition

As stated in earlier reports, the Federal Energy Regulatory Commission (FERC) approved the new Bulk Electric System (BES) definition and that NYPA has nearly 50 newly identified BES elements that will be subject to the NERC reliability standards in July 2016. In addition, under this new definition, NYPA may be required to register as a Transmission Operator (TOP) and/or a Transmission Planner (TP). NYPA continued its participation in meetings with the NYISO and the other NY Transmission Owners to assess new state-wide functional registration and compliance management impacts and actions pursuant to the new BES definition.

In September, NPCC and NERC approved 75% of NYPA's newly identified BES elements submitted via NERC's *BESnet* software application; the tool NERC developed to identify and monitor new BES assets. The remaining 25% are under review by NPCC. Such information is required of every registered entity in the United States. Related to this requirement, NYPA continues to work closely with Alcoa in the development of a joint exception request to exclude the Moses-Alcoa 115kV transmission lines from the BES.

NYPA staff continued discussions with NY Transmission Owners to reach agreements that clarify the roles and responsibilities for compliance management for the Transmission Owner (TO) standards related to NYPA assets operated and maintained by others. NYPA's discussions with these NY Transmission Owners also focused on reaching agreements, before April 2016, for managing compliance with the Version 5 Critical Infrastructure Protection (CIP) cyber security standards for assets owned by NYPA but that reside in facilities owned by other Transmission Owners.

Critical Infrastructure Protection (CIP) Standards - Version 5

In September, NYPA staff continued to monitor regulatory developments associated with NERC's Critical Infrastructure Protection (CIP) Version 5 reliability standards for cyber security. These new reliability standards will have substantive impacts on NYPA's operations-related cyber security compliance program. In response, a comprehensive CIP Version 5 Compliance Transition Project Plan (Plan) is being developed. The Plan leverages NYPA's existing CIP Version 3 compliance program and includes tasks to expand the program to include the additional Cyber Systems that were identified and classified as 'high' and 'medium' impact Cyber Systems. The Plan will be finalized in September and initiated in October.

In parallel, a Request for Proposal for the physical security modifications for the 'high' and 'medium' impact facilities that are required under the new standards was developed and issued for bid. Pre-bid walk downs of the facilities that will receive the improvements began in September. The results of the bids and the CIP Version 5 transition plan are being used as input to a Capital Expenditure Request that will be presented to the Board of Trustees in 2014. Expenditure estimates for implementation of the revised standards have been included in the Operations budget plan for 2014-2016.

When completed, these efforts will enable NYPA to demonstrate compliance with the new standards by the April 1, 2016 enforcement date.

Lastly, NERC announced the withdrawal of the mandatory survey it intended to release to the industry, as was reported last month, to identify the number of 'low' impact BES Cyber Systems subject to the CIP Version 5 standards.

Physical Security Standard

Recently, FERC directed NERC to develop a new physical security standard (CIP-014-1). It is anticipated that FERC will approve this standard by the end of 2014 and it will become effective six months after approval.

In September, NYPA met with the NYISO to discuss NYPA's plan for assessing the applicability of CIP-014-1 to NYPA's transmission facilities and discuss preliminary results from modeling studies. The NYISO agreed with the preliminary results, which identified five transmission stations/substations that are likely to be subject to other requirements including a vulnerability assessment and a documented security plan that must be reviewed and updated every 30 months. In addition, NYPA is working with the NYISO and NY Transmission Owners to develop a modeling methodology to ensure consistency across New York State in the assessment and identification of transmission facilities applicable under this standard.

NERC Reliability Assurance Initiative

The VP Technical Compliance, R. Crissman, is serving on an RAI Industry Advisory Group, established by NERC, which will provide implementation guidance for this NERC initiative. The objective of the initiative is to establish more risk-based compliance monitoring and enforcement processes for NERC's reliability standards; the implementation is planned to be completed by the end of 2015. Mr. Crissman attended the first meeting of the Advisory Group on September 22. The next meeting is scheduled for October 14.

Energy Resource Management

In September, Energy Resource Management (ERM) bid 2.29 million MWh of NYPA generation into the NYISO markets, netting \$38.0 million in power supplier payments to the Authority. Year-to-date net power supplier payments are \$648.4 million.

Fuel Planning & Operations

In September, NYPA's Fuels Group transacted \$13.6 million in natural gas and oil purchases, compared with \$20.9 million in September 2013. Year-to-date natural gas and oil purchases are \$302.3 million, compared with \$256.5 million at this point in 2013. The total \$45.8 million increase is mainly due to the higher cost of winter fuel and/or fuel consumption at the Astoria Energy II Plant (\$21.5 million), 500-MW Combined Cycle Plant (\$26.5 million), and Richard M. Flynn Power Plant (\$10.4 million), which was offset by a decrease at the Small Clean Power Plants (-\$12.6 million).

Regional Greenhouse Gas Initiative

Auction 25 of the Regional Greenhouse Gas Initiative was held on September 3, 2014. Auction 25 cleared at \$4.88 and NYPA was awarded 1.75 million allowances. This covers the remainder of NYPA's compliance obligation for 2014 and leaves approximately 500,000 allowances available for next year. Since inception, NYPA has purchased nearly 20 million RGGI allowances for a total cost of approximately \$58.7 million, averaging \$2.94 per allowance.

GLOSSARY

¹ **Net Generation** – The energy generated in a given time period by a power plant or group of plants, less the amount used at the plants themselves (station service) or for pumping in a pumped storage facility. Preliminary data in the COO report is provided by Accounting and subject to revision.

² **Megawatt-hour (MWh)** – The amount of electricity needed to light ten thousand 100-watt light bulbs for one hour. A megawatt is equal to 1,000 kilowatts and can power about 800 homes, based on national averages.

³ **Availability Factor** – The Available Hours of a generating unit over the Period Hours (hours in a reporting period when the unit was in an active state). Available Hours are the sum of Service Hours (hours of generation), Reserve Shutdown Hours (hours a unit was not running but was available) and Pump Hours (hours a pumped storage unit was pumping water instead of generating power).

⁴ **Generation Market Readiness Factor** – The availability of generating facilities for bidding into the New York Independent System Operator (NYISO) market. It factors in available hours and forced outage hours that drive the results.

⁵ **Significant Unplanned Generation Events** – Those events (forced or emergency outages of individual generator units) of duration greater than 72 hours, or have a total repair cost of greater than \$75,000, or result in greater than \$50,000 of lost revenues.

⁶ **Transmission Reliability** - A measurement of the impact of forced and scheduled outages on the statewide system's ability to transmit power.

⁷ **Significant Unplanned Transmission Events** – Those events (forced or emergency outages of individual transmission lines) which directly affect the reliability of the state's transmission network, or affect the availability of any component of the state's transmission network for greater than 8 hours, or that have a repair cost greater than \$75,000.

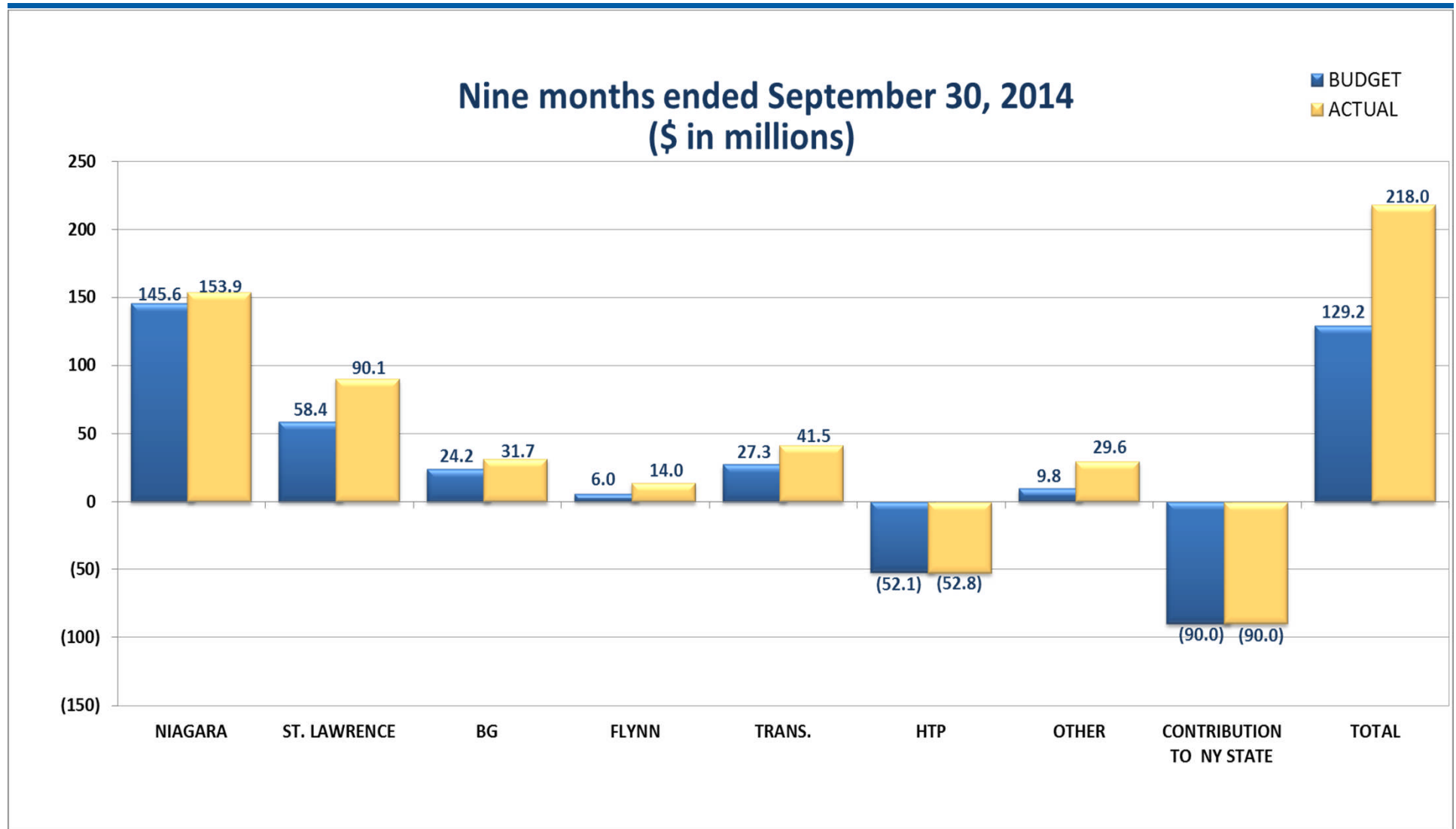
Chief Financial Officer – Summary Report

For the Nine months ended September 30, 2014

Financial Summary

- Net income through September 30, 2014, was \$218.0 million, which was \$88.8 million higher than the budget:
 - Higher margins on market-based sales (\$33.3 million) primarily due to higher market energy prices caused by severe winter weather conditions.
 - Lower O&M (\$19.1 million) and other operating expenses (\$33.4 million) including underruns in non-recurring projects, industrial incentive awards, and the energy efficiency and solar market acceleration programs.
 - Non-operating income was higher by \$7.3 million including a insurance reimbursements related to prior year transformer equipment failures, and the positive impact of a smaller mark-to-market loss on the Authority's investment portfolio due to lower market interest rates.
- Net income for the 3rd quarter was \$8.5 million lower than the budget as market energy prices were lower due to the mild summer weather.
- Projected net income for 2014 is expected to significantly exceed the budget primarily due to the early year positive variances above. Energy prices for the rest of the year are projected to be slightly lower than budget while hydro generation will be higher, resulting in earnings about equal to budgeted levels for the remainder of 2014.

Net Income



New York Power Authority
Recommendations for Western New York Hydropower Allocations

Exhibit "4-A"
October 15, 2014

| Exhibit Number | Company Name | Program | City | County | Base Jobs ⁽¹⁾ | New Jobs | Estimated Capital Investment | New Jobs Avg. Wage & Benefits | Power Requested (kW) | Power Recommended (kW) | Contract Term |
|---------------------------|----------------------------|----------------|-------------|---------------|-------------------------------------|---------------------|---|--|-------------------------------------|---------------------------------------|--------------------------|
| A-1 | Kreher's Sunrise Farm, LLC | RP | Basom | Genesee | 19 | 10 | \$7,000,000 | \$43,500 | 200 | 100 | 7 Years |
| A-2 | Unifrax I LLC (Line #3) | RP | Tonawanda | Erie | 268 | 50 | \$33,000,000 | \$73,100 | 2,700 | 1,900 | 7 Years |
| A-3 | Unifrax I LLC (Line #5) | RP | Tonawanda | Erie | 0 | 25 | \$18,500,000 | \$76,100 | 2,000 | 1,400 | 7 Years |
| Totals | | | | | | 85 | 58,500,000 | | | 3,400 | |

(1) Represents employment at time of application or, in the case of existing customer, the higher of existing employment or the highest contract employment commitment

APPLICATION SUMMARY
Replacement Power

| | |
|---|---|
| Company: | Kreher's Sunrise Farm, LLC |
| Project Location: | Basom |
| County: | Genesee |
| IOU: | National Grid |
| Business Activity: | Organic Egg Producer |
| Project Description: | Proposing to expand operations to meet market demand by constructing three new poultry houses, a pullet house and an additional compost facility. |
| Existing Allocation(s): | 176 kW under RNY Retention. |
| Power Request: | 200 kW |
| Power Recommended: | 100 kW |
| Job Commitment: | |
| Base: | 19 jobs |
| New: | 10 jobs |
| New Jobs/Power Ratio: | 100 jobs/MW |
| New Jobs - Avg. Wage and Benefits: | \$43,500 |
| Capital Investment: | \$7 million |
| Capital Investment/MW: | \$70 million/MW |
| Other ED Incentives: | None |
| Summary: | With egg farms in three locations in WNY, Kreher's Sunrise Farm, LLC ("Kreher's") is one of the largest producers of organic eggs in New York State. This project is sales driven, as a request for greater production from the Wegmans grocery chain has driven this expansion. The project will not only increase business for Kreher's, but will also increase business for the Kreher's local suppliers of organic feed, corn and soybeans, and increase employment levels at Kreher's other facilities in Clarence (Erie County) and Wolcott (Wayne County). |

APPLICATION SUMMARY
Replacement Power

| | |
|---|---|
| Company: | Unifrax I LLC (Line #3) |
| Project Location: | 360 Firetower Drive, Tonawanda |
| County: | Erie |
| IOU: | National Grid |
| Business Activity: | Manufacturer of fiber insulation products for automotive industry. |
| Project Description: | Proposing to construct a 40,000-square-foot building to install a third, additional manufacturing line to increase production and capacity. |
| Existing Allocation(s): | Three allocations of RP totaling 4,955 kW. |
| Power Request: | 2,700 kW |
| Power Recommended: | 1,900 kW |
| Job Commitment: | |
| Base: | 268 jobs |
| New: | 50 jobs |
| New Jobs/Power Ratio: | 26 jobs/MW |
| New Jobs - Avg. Wage and Benefits: | \$73,100 |
| Capital Investment: | \$33 million |
| Capital Investment/MW: | \$17.4 million/MW |
| Other ED Incentives: | Up to \$800,000 in Excelsior Jobs Program support from ESD and PILOT, mortgage and sales tax exemption from the ECIDA. |
| Summary: | Although Tonawanda is home to Unifrax's corporate headquarters, R&D, and the production facility at 360 Firetower Drive, this expansion could be located at its Indiana facility. The Indiana facility produces the raw material for this new production line and elimination of shipping costs makes it a viable option for locating the expansion. A low cost power allocation coupled with additional state and local incentives could help Tonawanda secure this new production line and create 50 new, high-paying jobs. |

APPLICATION SUMMARY
Replacement Power

| | |
|---|--|
| Company: | Unifrax I LLC (Line #5) |
| Project Location: | North Youngman Commerce Center, Tonawanda |
| County: | Erie |
| IOU: | National Grid |
| Business Activity: | Manufacturer of ceramic fiber insulation products for automotive industry. |
| Project Description: | Proposing to construct a new, 82,000-square-foot facility at an industrial park in Tonawanda to produce a new wool insulation product. |
| Existing Allocation(s): | None |
| Power Request: | 2,000 kW |
| Power Recommended: | 1,400 kW |
| Job Commitment: | |
| Base: | 0 jobs |
| New: | 25 jobs |
| New Jobs/Power Ratio: | 18 jobs/MW |
| New Jobs - Avg. Wage and Benefits: | \$76,100 |
| Capital Investment: | \$18.5 million |
| Capital Investment/MW: | \$13.2 million/MW |
| Other ED Incentives: | Up to \$600,000 in Excelsior Jobs Program support from ESD and PILOT, mortgage and sales tax exemptions from the ECIDA. |
| Summary: | With facilities located around the world, Unifrax is proposing to construct a new building to expand its insulation product line offerings. The company is hoping a state and local incentive package, including low cost power, will help secure Tonawanda as the location of this facility and the creation of 25 new, high-paying jobs. |

POWER AUTHORITY

OF THE

STATE OF NEW YORK

30 South Pearl Street
10th Floor
Albany, New York 12207-3425

AGREEMENT FOR THE SALE
OF EXPANSION POWER AND/OR REPLACEMENT POWER
to
KREHER'S SUNRISE FARM, LLC

The POWER AUTHORITY OF THE STATE OF NEW YORK (“Authority”), created pursuant to Chapter 772 of the New York Laws of 1931 and existing under Title I of Article V of the New York Public Authorities Law (“PAL”), having its office and principal place of business at 30 South Pearl Street, 10th Floor, Albany, New York 12207-3425, hereby enters into this Agreement for the Sale of Expansion Power and/or Replacement Power (“Agreement”) with Kreher’s Sunrise Farm, LLC (“Customer”), with offices at 7795 Alleghany Road, Basom, NY 14013. The Authority and the Customer are from time to time referred to in this Agreement as “Party” or collectively as “Parties” and agree follows:

RECITALS

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, Federal Energy Regulatory Commission (“FERC”) Project No. 2216, known as “Expansion Power” (or “EP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, FERC Project No. 2216, known as “Replacement Power” (or “RP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, EP consists of 250 megawatts (“MW”) of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, RP consists of 445 MW of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, the Authority is authorized pursuant to PAL § 1005(13)(a) to award EP and/or RP based on, among other things, the criteria listed in the PAL, including but not limited to an applicant’s long-term commitment to the region as evidenced by the current and planned capital investment; the type and number of jobs supported or created by the allocation; and the state, regional and local economic development strategies and priorities supported by local units of governments in the area in which the recipient’s facilities are located;

WHEREAS, the Customer applied to the Authority for an allocation of hydropower to support operations at a new and/or expanded facility to be constructed and operated by the Customer (defined in Section I of this Agreement as the “Facility”);

WHEREAS, on October 15, 2014, the Authority’s Board of Trustees (“Trustees”) approved a 100 kilowatt (“kW”) allocation of RP to the Customer for a seven (7) year term (defined in Section I of this Agreement as the “Allocation”) to support expanded operations at the Facility as further described in this Agreement;

WHEREAS, on October 15, 2014, the Trustees authorized the Authority to, among other things, take any and all actions and execute and deliver any and all agreements and other documents necessary to effectuate its approval of the Allocation;

WHEREAS, the provision of Electric Service associated with the Allocation is an

unbundled service separate from the transmission and delivery of power and energy to the Customer, and delivery service will be performed by the Customer's local electric utility in accordance with the Utility Tariff;

WHEREAS, the Parties have reached an agreement on the sale of the Allocation to the Customer on the terms and conditions provided for in this Agreement;

WHEREAS, the Authority has complied with requirements of PAL § 1009 which specifies the approval process for certain contracts negotiated by the Authority; and

WHEREAS, the Governor of the State of New York has approved the terms of this Agreement pursuant to PAL § 1009(3).

NOW THEREFORE, in consideration of the mutual covenants herein, the Authority and the Customer agree as follows:

NOW THEREFORE, the Parties hereto agree as follows:

I. Definitions

- A. **Agreement** means this Agreement.
- B. **Allocation** refers to the allocation of EP and/or RP awarded to the Customer as specified in Schedule A.
- C. **Contract Demand** is as defined in Service Tariff No. WNY-1.
- D. **Electric Service** is the Firm Power and Firm Energy associated with the Allocation and sold by the Authority to the Customer in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules.
- E. **Expansion Power** (or **EP**) is 250 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- F. **Facility** means the Customer's facilities as described in Schedule A to this Agreement.
- G. **Firm Power** is as defined in Service Tariff No. WNY-1.
- H. **Firm Energy** is as defined in Service Tariff No. WNY-1.
- I. **FERC** means the Federal Energy Regulatory Commission (or any successor organization).
- J. **FERC License** means the first new license issued by FERC to the Authority for the continued operation and maintenance of the Project, pursuant to Section 15 of the Federal Power Act, which became effective September 1, 2007 after expiration of the Project's original license which became effective in 1957.

- K. **Hydro Projects** is a collective reference to the Project and the Authority's St. Lawrence-FDR Project, FERC Project No. 2000.
- L. **Load Serving Entity** (or **LSE**) means an entity designated by a retail electricity customer (including the Customer) to provide capacity, energy and ancillary services to serve such customer, in compliance with NYISO Tariffs, rules, manuals and procedures.
- M. **NYISO** means the New York Independent System Operator or any successor organization.
- N. **NYISO Tariffs** means the NYISO's Open Access Transmission Tariff or the NYISO's Market Administration and Control Area Services Tariff, as applicable, as such tariffs are modified from time to time, or any successor to such tariffs.
- O. **Project** means the Niagara Power Project, FERC Project No. 2216.
- P. **Replacement Power** (or **RP**) is 445 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- Q. **Rules** are the applicable provisions of Authority's rules and regulations (Chapter X of Title 21 of the Official Compilation of Codes, Rules and Regulations of the State of New York), as may be modified from time to time by the Authority.
- R. **Service Tariff No. WNY-1** means the Authority's Service Tariff No. WNY-1, as may be modified from time to time by the Authority, which contains, among other things, the rate schedule establishing rates and other commercial terms for sale of Electric Service to Customer under this Agreement.
- S. **Schedule A** refers to the Schedule A entitled "Expansion Power and/or Replacement Power Allocations" which is attached to and made part of this Agreement.
- T. **Schedule B** refers to the Schedule B entitled "Expansion Power and/or Replacement Power Commitments" which is attached to and made part of this Agreement.
- U. **Schedule C** refers to the Schedule C entitled "Takedown Schedule" which is attached to and made part of this Agreement.
- V. **Substitute Energy** means energy that the Authority provides at the request of the Customer to replace hydroelectricity that would otherwise have been supplied to the Customer under this Agreement. Unless otherwise agreed upon by the Parties, Substitute Energy refers to energy purchased by the Authority for the Customer from markets administered by the NYISO.
- W. **Taxes** is as defined in Service Tariff No. WNY-1

- X. **Unforced Capacity (or “UCAP”)** means the electric capacity required to be provided by LSEs to serve electric load as defined by the NYISO Tariffs, rules, manuals and procedures.
- Y. **Utility Tariff** means the retail tariff(s) of the Customer’s local electric utility filed and approved by the PSC applicable to the delivery of EP and/or RP.

II. Electric Service

- A. The Authority shall make available Electric Service to enable the Customer to receive the Allocation in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules. The Customer shall not be entitled to receive Electric Service under this Agreement for any EP and/or RP allocation unless such EP and/or RP allocation is identified on Schedule A.
- B. The Authority will provide, and the Customer shall pay for, Electric Service with respect to the Allocation specified on Schedule A. If Schedule C specifies a Takedown Schedule for the Allocation, the Authority will provide, and the Customer shall take and pay for, Electric Service with respect to the Allocation in accordance with such Takedown Schedule.
- C. The Authority shall provide UCAP in amounts necessary to meet the Customer’s NYISO UCAP requirements associated with the Allocation in accordance with the NYISO Tariffs. The Customer shall be responsible to pay the Authority for such UCAP in accordance with Service Tariff No. WNY-1.
- D. The Customer acknowledges and agrees that Customer’s local electric utility shall be responsible for delivering the Allocation to the Facility specified in Schedule A, and that the Authority has no responsibility for delivering the Allocation to the Customer.
- E. The Contract Demand for the Customer’s Allocation may be modified by the Authority if the amount of Firm Power and Firm Energy available for sale as EP or RP from the Project is modified as required to comply with any ruling, order, or decision of any regulatory or judicial body having jurisdiction, including but not limited to FERC. Any such modification will be made on a pro rata basis to all EP and RP customers, as applicable, based on the terms of such ruling, order, or decision.
- F. The Contract Demand may not exceed the Allocation.

III. Rates, Terms and Conditions

- A. Electric Service shall be sold to the Customer based on the rates, terms and conditions provided for in this Agreement, Service Tariff No. WNY-1 and the Rules.
- B. Notwithstanding any provision of this Agreement to the contrary, the power and energy rates for Electric Service shall be subject to increase by Authority at any time upon 30 days prior written notice to Customer if, after consideration by Authority of its legal obligations, the marketability of the output or use of the Project and Authority’s

competitive position with respect to other suppliers, Authority determines in its discretion that increases in rates obtainable from any other Authority customers will not provide revenues, together with other available Authority funds not needed for operation and maintenance expenses, capital expenses, and reserves, sufficient to meet all requirements specified in Authority's bond and note resolutions and covenants with the holders of its financial obligations. Authority shall use its best efforts to inform Customer at the earliest practicable date of its intent to increase the power and energy rates pursuant to this provision. Any rate increase to Customer under this subsection shall be on a non-discriminatory basis as compared to other Authority customers after giving consideration to the factors set forth in the first sentence of this subsection. With respect to any such increase, Authority shall forward to Customer with the notice of increase, an explanation of all reasons for the increase, and shall also identify the sources from which Authority will obtain the total of increased revenues and the bases upon which Authority will allocate the increased revenue requirements among its customers. Any such increase in rates shall remain in effect only so long as Authority determines such increase is necessary to provide revenues for the purposes stated in the preceding sentences.

IV. Expansion Power and/or Replacement Power Commitments

- A. Schedule B sets forth the Customer's specific "Expansion Power and/or Replacement Power Commitments." The commitments agreed to in Schedule B are in addition to any other rights and obligations of the Parties provided for in the Agreement.
- B. The Authority's obligation to provide Electric Service under this Agreement, and the Customer's obligation to take and pay for such Electric Service, are expressly conditioned upon the Customer's timely completion of the commitments described in Schedule B.
- C. In the event of partial completion of the Facility which has resulted in such Facility being partly operational and the partial attainment of the Base Employment Level, the Authority may, upon the Customer's request, provide Electric Service to the Customer in an amount determined by the Authority to fairly correspond to the completed portion of the Facility, provided that the Customer demonstrates that the amount of requested Electric Service is needed to support the operations of the partially completed Facility.
- D. The Customer shall give the Authority not less than ninety (90) days' advance notice in writing of the anticipated date of partial or full completion of the Facility. The Authority will inspect the Facility for the purpose of verifying the completion status of the Facility and notify Customer of the results of the inspection. The Authority will thereafter commence Electric Service within a reasonable time after verification based on applicable operating procedures of the Authority, the Customer's local electric utility and the NYISO.
- E. In the event the Customer fails to complete the Facility by October 15, 2017 (*i.e.*, within three (3) years of the Authority's award of the Allocation), the Allocation, at the option and discretion of the Authority, may be canceled or reduced by the total amount of kilowatts determined by the Authority to fairly correspond to the uncompleted portion of the Facility, provided that in such event, and upon request of the Customer, such date may be extended by the Authority in its sole discretion.

V. Rules and Service Tariff

Service Tariff No. WNY-1, as may be modified or superseded from time to time by the Authority, is hereby incorporated into this Agreement with the same force and effect as if set forth herein at length. In the event of any inconsistencies, conflicts, or differences between the provisions of Service Tariff No. WNY-1 and the Rules, the provisions of Service Tariff No. WNY-1 shall govern. In the event of any inconsistencies, conflicts or differences between the provisions of this Agreement and Service Tariff No. WNY-1, the provisions of this Agreement shall govern.

VI. Transmission and Delivery of Firm Power and Firm Energy; Responsibility for Charges

- A. The Customer shall be responsible complying with all requirements of its local electric utility that are necessary to enable the Customer to receive delivery service for the Allocation. Delivery of the Allocation shall be subject to the Utility Tariff.
- B. The Customer shall be solely responsible for paying its local electric utility for delivery service associated with the Allocation in accordance with the Utility Tariff. Should the Authority incur any charges associated with such delivery service, the Customer shall reimburse the Authority for all such charges.
- C. The Customer understands and acknowledges that delivery of the Allocation will be made over transmission facilities under the control of the NYISO. The Authority will act as the LSE with respect to the NYISO, or arrange for another entity to do so on the Authority's behalf. The Customer agrees and understands that it shall be responsible to the Authority for all costs incurred by the Authority with respect to the Allocation for the services established in the NYISO Tariff, or other applicable tariff ("NYISO Charges"), as set forth in Service Tariff No. WNY-1 or any successor service tariff, regardless of whether such NYISO Charges are transmission-related. Such NYISO Charges shall be in addition to the charges for power and energy.
- D. By entering into this Agreement, the Customer consents to the exchange of information between the Authority and the Customer's local electric utility pertaining to the Customer that the Authority and the local electric utility determine is necessary to provide for the Allocation, sale and delivery of EP and/or RP to the Customer, the proper and efficient implementation of the EP and/or RP programs, billing related to EP and/or RP, and/or the performance of such parties' obligations under any contracts or other arrangements between them relating to such matters.
- E. The provision of Electric Service by the Authority shall be dependent upon the existence of a written agreement or other form of understanding between the Authority and the Customer's local electric utility on terms and conditions that are acceptable to the Authority.
- F. The Customer understands and acknowledges that the Authority may from time to time require the Customer to complete forms, provide documentation, execute consents and provide other information (collectively, "Information") which the Authority determines is necessary for the provision of Electric Service, the delivery of EP and/or RP, billing

related to the EP and/or RP program, the effective and proper administration of the EP and/or RP program, and/or the performance of contracts or other arrangements between the Authority and the Customer's local electric utility. The Customer's failure to provide such Information shall be grounds for the Authority in its sole discretion to withhold or suspend Electric Service to the Customer.

VII. Billing and Billing Methodology

- A. The billing methodology for the Allocation shall be determined on a "load factor sharing" basis in a manner consistent with the Utility Tariff and any agreement between the Authority and the Customer's local electric utility. An alternative basis for billing may be used provided the Parties agree in writing and the local electric utility provides its consent if such consent is deemed necessary.
- B. The Authority will render bills by the 10th business day of the month for charges due for the previous month. Such bills shall include charges for Electric Service, NYISO Charges associated with the Allocation (subject to adjustment consistent with any later NYISO re-billings to the Authority), and other applicable charges.
- C. The Authority may render bills to the Customer electronically.
- D. The Authority and the Customer may agree in writing to an alternative method for the rendering of bills and for the payment of bills, including but not limited to the use of an Authority-established customer self-service web portal.
- E. The Authority will charge and collect from the Customer all Taxes (including local, state and federal taxes) the Authority determines are applicable, unless the Customer furnishes the Authority with proof satisfactory to the Authority that (i) the Customer is exempt from the payment of any such Taxes, and/or (ii) the Authority is not obligated to collect such Taxes from the Customer. If the Authority is not collecting Taxes from the Customer based on the circumstances described in (i) or (ii) above, the Customer shall immediately inform the Authority of any change in circumstances relating to its tax status that would require the Authority to charge and collect such Taxes from the Customer.
- F. Unless otherwise agreed to by the Authority and the Customer in writing, if the Customer fails to pay any bill when due, an interest charge of two percent (2%) of the amount unpaid shall be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent (1 1/2%) of the sum unpaid shall be added on the first day of each succeeding billing period until the amount due, including interest, is paid in full.
- G. Unless otherwise agreed to by the Authority and the Customer in writing, in the event the Customer disputes any item of any bill rendered by Authority, the Customer shall pay such bill in full within the time provided for by this Agreement, and adjustments, if appropriate, will be made thereafter.
- H. If at any time after commencement of Electric Service the Customer fails to make complete and timely payment of any two (2) bills for Electric Service, the Authority shall

have the right to require the Customer to deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit shall be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. If the Customer fails or refuses to provide the deposit within thirty (30) days of a request for such deposit, the Authority may, in its sole discretion, suspend Electric Service to the Customer or terminate this Agreement.

- I. All other provisions with respect to billing are set forth in Service Tariff No. WNY-1 and the Rules.
- J. The rights and remedies provided to the Authority in this Article are in addition to any and all other rights and remedies available to Authority at law or in equity.

VIII. Hydropower Curtailments and Substitute Energy

- A. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of the Authority's firm power customers served by the Authority from the Hydro Projects, curtailments (*i.e.* reductions) in the amount of Firm Power and Firm Energy associated with the Allocation to which the Customer is entitled shall be applied on a *pro rata* basis to all firm power and energy customers served from the Hydro Projects, consistent with Service Tariff No. WNY-1 as applicable.
- B. The Authority shall provide reasonable notice to Customer of any curtailments referenced in Section VIII.A of this Agreement that could impact Customer's Electric Service under this Agreement. Upon written request by the Customer, the Authority will provide Substitute Energy to the Customer to replace the Firm Power and Firm Energy that would otherwise have been supplied pursuant to this Agreement.
- C. For each kilowatt-hour of Substitute Energy supplied by the Authority, the Customer will pay the Authority directly during the billing month: (1) the difference between the market cost of the Substitute Energy and the charge for firm energy as provided for in this Agreement; and (2) any NYISO charges and taxes the Authority incurs in connection with the provision of such Substitute Energy. Billing and payment for Substitute Energy shall be governed by the Billing and Payments provision of the Authority's Rules (Section 454.6) and shall apply directly to the Substitute Energy service supplied to the Customer.
- D. The Parties may enter into a separate agreement to facilitate the provision of Substitute Energy, provided, however, that the provisions of this Agreement shall remain in effect notwithstanding any such separate agreement. The provision of Substitute Energy may be terminated by the Authority or the Customer on fifteen (15) days' prior written notice.

IX. Effectiveness, Term and Termination

- A. This Agreement shall become effective and legally binding on the Parties upon execution of this Agreement by the Authority and the Customer.
- B. Once commenced, Electric Service under the Agreement shall continue until the earliest of: (1) termination by the Customer with respect to its Allocation upon ninety (90) days prior written notice to the Authority; (2) termination by the Authority pursuant to this Agreement, Service Tariff No. WNY-1, or the Rules; or (3) expiration of the Allocation by its own term as specified in Schedule A.
- C. The Customer may exercise a partial termination of the Allocation upon at least thirty (30) days' notice prior written notice to the Authority. The termination shall be effective commencing with the first billing period as defined in Service Tariff No. WNY-1.
- D. The Authority may cancel service under this Agreement or modify the quantities of Firm Power and Firm Energy associated with the Allocation: (1) if such cancellation or modification is required to comply with any final ruling, order or decision of any regulatory or judicial body of competent jurisdiction (including any licensing or re-licensing order or orders of the FERC or its successor agency); or (2) as otherwise provided in this Agreement, Service Tariff No. WNY-1, or the Rules.

X. Additional Allocations

- A. Upon proper application by the Customer, the Authority may in its discretion award additional allocations of EP or RP to the Customer at such rates and on such terms and conditions as the Authority establishes. If the Customer agrees to purchase Electric Service associated with any such additional allocation, the Authority will (i) incorporate any such additional allocations into Schedule A, or in its discretion will produce a supplemental schedule, to reflect any such additional allocations, and (ii) produce a modified Appendix to Schedule B, as the Authority determines to be appropriate. The Authority will furnish the Customer with any such modified Schedule A, supplemental schedule, and/or a modified Appendix to Schedule B, within a reasonable time after commencement of Electric Service for any such additional allocation.
- B. In addition to any requirements imposed by law, the Customer hereby agrees to furnish such documentation and other information as the Authority requests to enable the Authority to evaluate any requests for additional allocations and consider the terms and conditions that should be applicable of any additional allocations.

XI. Notification

- A. Correspondence involving the administration of this Agreement shall be addressed as follows:

To: The Authority

New York Power Authority

123 Main Street
White Plains, New York 10601
Email:
Facsimile: _____
Attention: Manager – Business Power Allocations and Compliance

To: The Customer

Kreher's Sunrise Farm, LLC
7795 Alleghany Road
Basom, NY 14013

Email:
Facsimile:
Attention:

The foregoing notice/notification information pertaining to either Party may be changed by such Party upon notification to the other Party pursuant to Section XI.B of this Agreement.

- B. Except where otherwise herein specifically provided, any notice, communication or request required or authorized by this Agreement by either Party to the other shall be deemed properly given: (1) if sent by U.S. First Class mail addressed to the Party at the address set forth above; (2) if sent by a nationally recognized overnight delivery service, two (2) calendar days after being deposited for delivery to the appropriate address set forth above; (3) if delivered by hand, with written confirmation of receipt; (4) if sent by facsimile to the appropriate fax number as set forth above, with written confirmation of receipt; or (5) if sent by electronic mail to the appropriate address as set forth above, with written confirmation of receipt. Either Party may change the addressee and/or address for correspondence sent to it by giving written notice in accordance with the foregoing.

XII. Applicable Law

This Agreement shall be governed by and construed in accordance with the laws of the State of New York to the extent that such laws are not inconsistent with the FERC License and the Niagara Redevelopment Act (16 USC §§836, 836a).

XIII. Venue

Each Party consents to the exclusive jurisdiction and venue of any state or federal court within or for Albany County, New York, with subject matter jurisdiction for adjudication of any claim, suit, action or any other proceeding in law or equity arising under, or in any way relating to this Agreement.

XIV. Successors and Assigns; Resale of Hydropower

- A. The Customer may not assign or otherwise transfer an interest in this Agreement.

- B. The Customer may not resell or allow any other person to use any quantity of EP and/or RP it has purchased from the Authority under this Agreement.
- C. Electric Service sold to the Customer pursuant to this Agreement may only be used by the Customer at the Facility specified in Schedule A.

XV. Previous Agreements and Communications

- A. This Agreement shall constitute the sole and complete agreement of the Parties hereto with respect to the subject matter hereof, and supersedes all prior negotiations, representations, warranties, commitments, offers, contracts and writings, written or oral, with respect to the subject matter hereof.
- B. Except as otherwise provided in this Agreement, no modification of this Agreement shall be binding upon the Parties hereto or either of them unless such modification is in writing and is signed by a duly authorized officer of each of them.

XVI. Severability and Voidability

- A. If any term or provision of this Agreement shall be invalidated, declared unlawful or ineffective in whole or in part by an order of the FERC or a court of competent jurisdiction, such order shall not be deemed to invalidate the remaining terms or provisions hereof.
- B. Notwithstanding the preceding paragraph, if any provision of this Agreement is rendered void or unenforceable or otherwise modified by a court or agency of competent jurisdiction, the entire Agreement shall, at the option of either Party and only in such circumstances in which such Party's interests are materially and adversely impacted by any such action, be rendered void and unenforceable by such affected Party.

XVII. Waiver

- A. Any waiver at any time by either the Authority or the Customer of their rights with respect to a default or of any other matter arising out of this Agreement shall not be deemed to be a waiver with respect to any other default or matter.
- B. No waiver by either Party of any rights with respect to any matter arising in connection with this Agreement shall be effective unless made in writing and signed by the Party making the waiver.

XVIII. Execution

To facilitate execution, this Agreement may be executed in as many counterparts as may be required, and it shall not be necessary that the signatures of, or on behalf of, each Party, or that the signatures of all persons required to bind any Party, appear on each counterpart; but it shall be sufficient that the signature of, or on behalf of, each Party, or that the signatures of the persons required to bind any Party, appear on one or more of the counterparts. All counterparts shall collectively constitute a single agreement. It shall

not be necessary in making proof of this Agreement to produce or account for more than a number of counterparts containing the respective signatures of, or on behalf of, all of the Parties hereto. The delivery of an executed counterpart of this Agreement by email as a PDF file shall be legal and binding and shall have the same full force and effect as if an original executed counterpart of this Agreement had been delivered.

[SIGNATURES FOLLOW ON NEXT PAGE]

AGREED:

KREHER'S SUNRISE FARM, LLC

By: _____

Title: _____

Date: _____

AGREED:

POWER AUTHORITY OF THE STATE OF NEW YORK

By: _____
John R. Koelmel, Chairman

Date: _____

**SCHEDULE A TO AGREEMENT FOR THE SALE OF EXPANSION POWER AND/OR REPLACEMENT POWER TO
CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER ALLOCATIONS

Customer: Kreher's Sunrise Farms, LLC

| Type of Allocation | Allocation Amount (kW) | Facility | Trustee Approval Date | Expiration Date |
|--------------------|------------------------|--|-----------------------|--|
| Replacement Power | 100 kW | 7795 Alleghany Road Basom, NY 14013 | October 15, 2014 | Seven (7) years from commencement of Electric Service of any portion of this Allocation. |
| | | | | |

**SCHEDULE B TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER COMMITMENTS

I. Employment Commitments

A. Employment Levels

The provision of EP and/or RP to the Customer hereunder is in consideration of, among other things, the Customer's creation and/or maintenance of the employment level set forth in the Appendix of this Schedule (the "Base Employment Level"). Such Base Employment Level shall be the total number of full-time positions held by: (1) individuals who are employed by the Customer at Customer's Facility identified in the Appendix to this Schedule, and (2) individuals who are contractors or who are employed by contractors of the Customer and assigned to the Facility identified in such Appendix (collectively, "Base Level Employees"). The number of Base Level Employees shall not include individuals employed on a part-time basis (less than 35 hours per week); provided, however, that two individuals each working 20 hours per week or more at such Facility shall be counted as one Base Level Employee.

The Base Employment Level shall not be created or maintained by transfers of employees from previously held positions with the Customer or its affiliates within the State of New York, except that the Base Employment Level may be filled by employees of the Customer laid off from other Customer facilities for *bona fide* economic or management reasons.

The Authority may consider a request to change the Base Employment Level based on a claim of increased productivity, increased efficiency or adoption of new technologies or for other appropriate reasons as determined by the Authority. Any such change shall be within Authority's sole discretion.

B. Employment Records and Reports

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority, of the total number of Base Level Employees who are employed at or assigned to the Customer's Facility identified in the Appendix to this Schedule, as reported to the United States Department of Labor (or as reported in such other record as agreed upon by the Authority and the Customer). Such report shall separately identify the individuals who are employed by the Customer, and the individuals who are contractors or who are employed by contractors of the Customer, and shall be certified to be correct by an officer of the Customer, plant manager or such other person authorized by the Customer to prepare and file such report and shall be provided to the Authority on or before the last day of February following the end of the most recent calendar year. The Authority shall have the right to examine and audit on reasonable advance written notice

all non-confidential written and electronic records and data concerning employment levels including, but not limited to, personnel records and summaries held by the Customer and its affiliates relating to employment in New York State.

II. Reductions of Contract Demand

A. Employment Levels

If the year-end monthly average number of employees is less than 90% of the Base Employment Level set forth in this Schedule B, for the subject calendar year, the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount of reduction will be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average monthly employment during the subject calendar year divided by the Base Employment Level. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, the Agreement shall automatically terminate.

B. Power Utilization Levels

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority on or before the last day of February following the end of the most recent calendar year, of the maximum demand utilized each month in the Facility receiving the power covered by the Agreement. If the average of the Customer's six (6) highest Billing Demands (as such term is described in Service Tariff No. WNY-1) for Expansion Power and/or Replacement Power is less than 90% of the Customer's Contract Demand in such calendar year the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount by which the Authority may reduce the Contract Demand shall be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average of the six (6) highest Billing Demands for in such calendar year divided by the Contract Demand. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, this Agreement shall automatically terminate.

C. Capital Investment

The Customer agrees to undertake the capital investment set forth in the Appendix to this Schedule.

Notwithstanding any other provision of the Agreement, the Customer shall provide the Authority with such access to the Facility, and such documentation, as the Authority deems necessary to determine the Customer's compliance with the Customer's obligations provided for in this Schedule B.

D. Notice of Intent to Reduce Contract Demand

In the event that the Authority determines that the Contract Demand will be wholly or partially reduced pursuant to this Schedule, the Authority shall provide the Customer with at least thirty (30) days prior written notice of such reduction, specifying the amount of the reduction of Contract Demand and the reason for the reduction, provided, however, that before making the reduction, the Authority may consider the Customer's scheduled or unscheduled maintenance or Facility upgrading periods when such events temporarily reduce plant employment levels or electrical demand as well as business cycle.

III. Energy Efficiency Audits; Information Requests

Unless otherwise agreed to by the Authority in writing, the Customer shall undergo an energy efficiency audit of its Facility and equipment at which the Allocation is consumed at the Customer's expense at least once during the term of this Agreement but in any event not less than once every five years. The Customer will provide the Authority with a copy of the audit or, at the Authority's option, a report describing the results of the audit, and provide documentation requested by the Authority to verify the implementation of any efficiency measures implemented at the Facility.

The Customer agrees to cooperate to make its Facility available at reasonable times and intervals for energy audits and related assessments that the Authority desires to perform, if any, at the Authority's own expense.

The Customer shall provide information requested by the Authority or its designee in surveys, questionnaires and other information requests relating to energy efficiency and energy-related projects, programs and services.

The Customer may, after consultation with the Authority, exclude from written copies of audits, reports and other information provided to the Authority under this Article trade secrets and other information which if disclosed would harm the competitive position of the Customer.

APPENDIX TO SCHEDULE B

BASE EMPLOYMENT LEVEL

Within three (3) years of commencement of Electric Service, the Customer shall employ at least twenty-nine (29) full-time employees (“Base Employment Level”) at the Facility. The Base Employment Level shall be maintained thereafter for the term of the Allocation in accordance with Article I of Schedule B.

CAPITAL INVESTMENT

The Customer shall make a total capital investment of at least \$7,000,000 to renovate and furnish the Facility (the “Capital Investment”). The Capital Investment for the Facility is expected to consist of the following specific expenditures:

| | |
|---|-------------|
| Building Acquisition, Renovation & Expansion: | \$3,900,000 |
| Additional Poultry Equipment: | \$3,000,000 |
| Compost Equipment: | \$ 100,000 |

| | |
|---|---------------------------|
| <u>Total Capital Investment:</u> | <u>\$7,000,000</u> |
|---|---------------------------|

The Capital Investment shall be made, and the Facility shall be completed and fully operational, no later than October 15, 2017 (*i.e.*, within three (3) years of the date of the Authority’s award of the Allocation). Upon request of the Customer, such date may be extended in the sole discretion of the Authority.

**SCHEDULE C TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

TAKEDOWN SCHEDULE

N/A



POWER AUTHORITY OF THE STATE OF NEW YORK
30 SOUTH PEARL STREET
ALBANY, NY 12207

Schedule of Rates for Sale of Firm Power to Expansion and
Replacement Customers located
In Western New York

Service Tariff No. WNY-1

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Schedule of Rates for Firm Power Service

I. Applicability

To sales of Expansion Power and/or Replacement Power (as defined below) directly to a qualified business Customer (as defined below) for firm power service.

II. Abbreviations and Terms

- kW kilowatt(s)
- kW-mo. kilowatt-month
- kWh kilowatt-hour(s)
- MWh megawatt-hour(s)
- NYISO New York Independent System Operator, Inc. or any successor organization
- PAL New York Public Authorities Law
- OATT Open Access Transmission Tariff

Agreement: An executed “Agreement for the Sale of Expansion and/or Replacement Power and Energy” between the Authority and the Customer (each as defined below).

Annual Adjustment Factor or **AAF**: This term shall have the meaning set forth in Section V herein.

Authority: The Power Authority of the State of New York, a corporate municipal instrumentality and a political subdivision of the State of New York created pursuant to Chapter 772 of the New York Laws of 1931 and existing and operating under Title 1 of Article 5 of the PAL, also known as the “New York Power Authority.”

Customer: A business customer who has received an allocation for Expansion Power and/or Replacement Power from the Authority and who purchases Expansion Power and/or Replacement Power directly from the Authority.

Electric Service: The power and energy provided to the Customer in accordance with the Agreement, this Service Tariff and the Rules.

Expansion Power and/or **Replacement Power**: Firm Power and Firm Energy made available under this Service Tariff by the Authority from the Project for sale to the Customer for business purposes pursuant to PAL § 1005(5) and (13).

Firm Power: Capacity (kW) that is intended to be always available from the Project subject to the curtailment provisions set forth in the Agreement between the Authority and the Customer and this Service Tariff. Firm Power shall not include peaking power.

Firm Energy: Energy (kWh) associated with Firm Power.

Load Serving Entity or **LSE**: This term shall have the meaning set forth in the Agreement.

Load Split Methodology or **LSM**: A load split methodology applicable to a Customer's allocation. It is usually provided for in an agreement between the Authority and the Customer's local electric utility, an agreement between the Authority and the Customer, or an agreement between the Authority, the Customer and the Customer's local electric utility, or such local utility's tariff, regarding the delivery of WNY Firm Power. The load split methodology is often designated as "Load Factor Sharing" or "LFS", "First through the Meter" or "FTM", "First through the Meter Modified" or "FTM Modified", or "Replacement Power 2" or "RP 2".

Project: The Authority's Niagara Power Project, FERC Project No. 2216.

Rate Year or **RY**: The period from July 1 through June 30 starting July 1, 2013, and for any year thereafter.

Rules: The Authority's rules and regulations set forth in 21 NYCRR § 450 *et seq.*, as they may be amended from time to time.

Service Tariff: This Service Tariff No. WNY-1.

Target Rate: This term shall have the meaning set forth in Section III herein.

All other capitalized terms and abbreviations used but not defined herein shall have the same meaning as set forth in the Agreement.

III. Monthly Rates and Charges

A. Expansion Power (EP) and Replacement Power (RP) Base Rates

Beginning on July 1, 2013, there will be a 3-year phase-in to new base rates. The phase-in will be determined by the rate differential between the 2012 EP/RP rates and a "Target Rate." The Target Rate, specified in Section III.A.1. below, is based on the rates determined by the Authority to be applicable in RY 2013 for sales of "preservation power" as that term is defined in PAL § 1005(13). The following Sections III.A.1-4 describe the calculation and implementation of the phase-in.

1. The initial rate point will be established by the EP/RP rates (\$/kW and \$/MWh), determined by mid-April 2012 and made effective on May 1, 2012 in accordance with the Authority's then-applicable EP and RP tariffs. The Target Rate (*i.e.* demand and energy rates) for RY 2013 shall be \$7.99/kW and \$13.66/MWh.
2. The difference between the two rate points is calculated and divided by 3 to correspond with the number of Rate Years over which the phase-in will occur. The resulting quotients (in \$/kW and \$/MWh) are referred to as the "annual increment."
3. The annual increment will be applied to the base rates for the 3-year period of the 2013, 2014 and 2015 Rate Years, which shall be as follows:

RY 2013: July 1, 2013 to June 30, 2014

RY 2014: July 1, 2014 to June 30, 2015

RY 2015: July 1, 2015 to June 30, 2016

The annual rate adjustments normally made effective on May 1, 2013 under then-applicable EP and RP tariffs will be suspended, such that demand and energy rates established in 2012 shall be extended through June 30, 2013.

4. Effective commencing in RY 2013, the Annual Adjustment Factor ("AAF") described in Section V herein, shall be applied as follows:
 - A. For the RY 2013 only, the AAF will be suspended, and the RY 2013 rate increase will be subject only to the annual increment.
 - B. For the RYs 2014 and 2015, the AAF will be applied to the demand and energy rates after the addition of the annual increment to the rates of the previous RY rates. Such AAF will be subject to the terms and limits stated in Section V herein.
 - C. Beginning in RY 2016, the AAF will be applied to the previous RY rates, and the annual increment is no longer applicable.

B. EP and RP Rates no Lower than Rural/Domestic Rate

At all times the applicable base rates for demand and energy determined in accordance with Sections III.A and V of this Service Tariff shall be no lower than the rates charged by the

Authority for the sale of hydroelectricity for the benefit of rural and domestic customers receiving service in accordance with the Niagara Redevelopment Act, 16 U.S.C. § 836(b)(1) and PAL § 1005(5) (the "Rural/Domestic Rate"). This provision shall be implemented as follows: if the base rates, as determined in accordance with Sections III.A and V of this Service Tariff, are lower than the Rural/Domestic Rate on an average \$/MWh basis, each set of rates measured at 80% load factor which is generally regarded as representative for EP and RP Customers, then the base rates determined under Sections III.A and V of this Service Tariff will be revised to make them equal to the Rural/Domestic Rate on an average \$/MWh basis. However, the base rates as so revised will have no effect until such time as these base rates are lower than the Rural/Domestic Rate.

C. Monthly Base Rates Exclude Delivery Service Charges

The monthly base rates set forth in this Section III exclude any applicable costs for delivery services provided by the local electric utility.

D. Minimum Monthly Charge

The minimum monthly charge shall equal the product of the demand charge and the contract demand (as defined herein). Such minimum monthly charge shall be in addition to any NYISO Charges or Taxes (each as defined herein) incurred by the Authority with respect to the Customer's Allocation.

E. Estimated Billing

If the Authority, in its sole discretion, determines that it lacks reliable data on the Customer's actual demand and/or energy usage for a Billing Period during which the Customer receives Electric Service from the Authority, the Authority shall have the right to render a bill to the Customer for such Billing Period based on estimated demand and estimated usage ("Estimated Bill").

For the purpose of calculating a Billing Demand charge for an Estimated Bill, the demand charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated demand (kW) will be calculated based on an average of the Customer's Billing Demand (kW) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated demand (kW) value for the Estimated Bill will equal the Customer's Takedown (kW) amount.
- For Customers whose allocation is subject to a First through the Meter/ FTM, FTM Modified, or RP 2 LSM, the estimated demand (kW) value will equal the Customer's Takedown (kW) amount.

For the purpose of calculating a Billing Energy charge for an Estimated Bill, the energy charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated energy (kWh) will be based on the average of the Customer's Billing Energy (kWh) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated energy value (kWh) will be equal to the Takedown (kW) amount at 70 percent load factor for that Billing Period.

- For Customers whose allocation is subject to a First through the Meter/FTM, FTM Modified, or RP 2 LSM, the estimated energy (kWh) will be equal to the Takedown (kW) amount at 100 percent load factor for that Billing Period.

If data indicating the Customer's actual demand and usage for any Billing Period in which an Estimated Bill was rendered is subsequently provided to the Authority, the Authority will make necessary adjustments to the corresponding Estimated Bill and, as appropriate, render a revised bill (or provide a credit) to the Customer.

The Minimum Monthly Charge provisions of Section III B.D. shall apply to Estimated Bills.

The Authority's discretion to render Estimated Bills is not intended to limit the Authority's rights under the Agreement.

F. Adjustments to Charges

In addition to any other adjustments provided for in this Service Tariff, in any Billing Period, the Authority may make appropriate adjustments to billings and charges to address such matters as billing and payment errors, the receipt of actual, additional, or corrected data concerning Customer energy or demand usage.

G. Billing Period

Any period of approximately thirty (30) days, generally ending with the last day of each calendar month but subject to the billing cycle requirements of the local electric utility in whose service territory the Customer's facilities are located.

H. Billing Demand

The billing demand shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

I. Billing Energy

The billing energy shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

J. Contract Demand

The contract demand of each Customer will be the amount of Expansion Power and/or Replacement Power, not to exceed their Allocation, provided to such Customer by the Authority in accordance with the Agreement.

IV. General Provisions

A. Character of Service

Alternating current; sixty cycles, three-phase.

B. Availability of Energy

1. Subject to Section IV.B.2, the Authority shall provide to the Customer in any billing period Firm Energy associated with Firm Power. The offer of Firm Energy for delivery shall fulfill the Authority's obligations for purposes of this provision whether or not the Firm Energy is taken by the Customer.
2. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of NYPA's Firm Power customers served from the Hydro Projects, hydropower curtailments (*i.e.* reductions) in the amount of Firm Power and Energy to which the Customer is entitled shall be applied on a *pro rata* basis to all Firm Power and Energy customers served from the Hydro Projects. Reductions as a percentage of the otherwise required Firm Power and Energy sales will be the same for all Firm Power and Energy customers served from the Hydro Projects. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to the Customer in later billing periods. The Customer will receive appropriate bill credits as provided under the Rules.

C. Delivery

For the purpose of this Service Tariff, Firm Power and Firm Energy shall be deemed to be offered when the Authority is able to supply Firm Power and Firm Energy to the Authority's designated NYISO load bus. If, despite such offer, there is a failure of delivery caused by the Customer, NYISO or local electric utility, such failure shall not be subject to a billing adjustment pursuant to Section 454.6(d) of the Rules.

D. Adjustment of Rates

To the extent not inconsistent with the Agreement, the rates contained in this Service Tariff may be revised from time to time on not less than thirty (30) days written notice to the Customer.

E. Billing Methodology and Billing

Unless otherwise specified in the Agreement, the following provisions shall apply:

1. The billing methodology to be used to render bills to the Customer related to its Allocation shall be determined in accordance with the Agreement and delivery agreement between the Authority and, as applicable, the Customer or local electric utility or both.

2. **Billing Demand** –The Billing Demand charged by the Authority to each Customer will be the highest 15 or 30-minute integrated demand, as determined by the local utility, during each Billing Period recorded on the Customer’s meter multiplied by a percentage based on the Load Split Methodology provided for in any contract between the Authority and the Customer’s local electric utility, any contract between the Authority and the Customer, or any contract between the Authority, the Customer and the Customer’s local electric utility for delivery of WNY Power. Billing Demand may not exceed the amount of the Contract Demand.
3. **Billing Energy** –The kilowatt-hours charged by the Authority to each Customer will be the total number of kilowatt-hours recorded on the Customer’s meter for the Billing Period multiplied by a percentage based on the methodology provided for in any contract between the Authority and the Customer’s local electric utility for delivery of WNY Power.

F. Payment by Customer to Authority

1. Demand and Energy Charges, Taxes

The Customer shall pay the Authority for Firm Power and Energy during any billing period the higher of either (i) the sum of (a), (b) and (c) below or (ii) the monthly minimum charge as defined herein:

- a. The demand charge per kilowatt for Firm Power specified in this Service Tariff or any modification thereof applied to the Customer’s billing demand (as defined in Section IV.E, above) for the billing period; and
- b. The energy charge per MWh for Firm Energy specified in this Service Tariff or any modification thereof applied to the Customer’s billing energy (as defined in Section IV.E, above) for the billing period; and
- c. A charge representing reimbursement to the Authority for all applicable Taxes incurred by the Authority as a result of providing Expansion Power and/or Replacement Power allocated to the Customer.

2. Transmission Charge

The Customer shall compensate the Authority for all transmission costs incurred by the Authority with respect to the Allocation, including such costs that are charged pursuant to the OATT.

3. NYISO Transmission and Related Charges (“NYISO Charges”)

The Customer shall compensate the Authority for the following NYISO Charges assessed on the Authority for services provided by the NYISO pursuant to its OATT or other tariffs (as the provisions of those tariffs may be amended and in effect from time to time) associated with providing Electric Service to the Customer:

- A. Ancillary Services 1 through 6 and any new ancillary services as may be defined and included in the OATT from time to time;
- B. Marginal losses;

- C. The New York Power Authority Transmission Adjustment Charge ("NTAC");
- D. Congestion costs, less any associated grandfathered Transmission Congestion Contracts ("TCCs") as provided in Attachment K of the OATT;
- E. Any and all other charges, assessments, or other amounts associated with deliveries to Customers or otherwise associated with the Authority's responsibilities as a Load Serving Entity for the Customers that are assessed on the Authority by the NYISO under the provisions of its OATT or under other applicable tariffs; and
- F. Any charges assessed on the Authority with respect to the provision of Electric Service to Customers for facilities needed to maintain reliability and incurred in connection with the NYISO's Comprehensive System Planning Process (or similar reliability-related obligations incurred by the Authority with respect to Electric Service to the Customer), applicable tariffs, or required to be paid by the Authority in accordance with law, regardless of whether such charges are assessed by the NYISO or another third party.

The NYISO Charges, if any, incurred by the Authority on behalf of the Customer, are in addition to the Authority production charges that are charged to the Customer in accordance with other provisions of this Service Tariff.

The method of billing NYISO charges to the Customer will be based on Authority's discretion.

4. Taxes Defined

Taxes shall be any adjustment as the Authority deems necessary to recover from the Customer any taxes, assessments or any other charges mandated by federal, state or local agencies or authorities that are levied on the Authority or that the Authority is required to collect from the Customer if and to the extent such taxes, assessments or charges are not recovered by the Authority pursuant to another provision of this Service Tariff.

5. Substitute Energy

The Customer shall pay for Substitute Energy, if applicable, as specified in the Agreement.

6. Payment Information

Bills computed under this Service Tariff are due and payable by electronic wire transfer in accordance with the Rules. Such wire transfer shall be made to J P Morgan Chase NY, NY / ABA021000021 / NYPA A/C # 008-030383, unless otherwise indicated in writing by the Authority. In the event that there is a dispute on any items of a bill rendered by the Authority, the Customer shall pay such bill in full. If necessary, any adjustments will be made thereafter.

G. Rendition and Payment of Bills

1. The Authority will render bills to the Customer for Electric Service on or before the tenth (10th) business day of the month for charges due for the previous Billing Period. Bills will reflect the amounts due and owing, and are subject to adjustment as provided for in the Agreement, Service Tariff No. WNY-1 and the Rules. Unless otherwise agreed to by the Authority and the Customer in writing, the Authority shall render bills to the Customer electronically.
2. Payment of bills by the Customer shall be due and payable by the Customer within twenty (20) days of the date the Authority renders the bill.
3. Except as otherwise agreed by the Authority in writing, if the Customer fails to pay any bill when due an interest charge of two percent of the amount unpaid will be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent of the sum unpaid shall be added on the first day of each succeeding Billing Period until the amount due, including interest, is paid in full.
4. If at any time after commencement of Electric Service the Customer fails to make complete payment of any two (2) bills for Electric Service when such bills become due pursuant to Agreement, the Authority shall have the right to require that the Customer deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit will be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. The failure or refusal of the Customer to provide the deposit within thirty (30) days of a request for such deposit will be grounds for the Authority in its sole discretion to suspend Electric Service to the Customer or terminate this Agreement.

H. Adjustment of Charges

1. Distribution Losses

The Authority will make appropriate adjustments to compensate for distribution losses of the local electric utility.

I. Conflicts

The Authority's Rules shall apply to the Electric Service provided under this Service Tariff. In the event of any inconsistencies, conflicts or differences between the provisions of this Service Tariff and the Rules, the provisions of this Service Tariff shall govern.

J. Customer Resales Prohibited

The Customer may not resell any quantity of Expansion Power and/or Replacement Power.

V. Annual Adjustment Factor

A. Adjustment of Rates

1. The AAF will be based upon a weighted average of three indices described below. For each new Rate Year, the index value for the latest available calendar year ("Index Value for the Measuring Year") will be compared to the index value for the calendar year immediately preceding the latest available calendar year (the Index Value for the Measuring Year -1"). The change for each index will then be multiplied by the indicated weights. As described in detail below, these products are then summed, producing the AAF. The AAF will be multiplied by the base rate for the current Rate Year to produce the base rates for the new Rate Year, subject to a maximum adjustment of $\pm 5.0\%$ (" $\pm 5\%$ Collar"). Amounts outside the $\pm 5\%$ Collar shall be referred to as the "Excess."

Index 1, "BLS Industrial Power Price" (35% weight): The average of the monthly Producer Price Index for Industrial Electric Power, commodity code number 0543, not seasonally adjusted, as reported by the U.S. Department of Labor, Bureau of Labor Statistics ("BLS") electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 1, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

Index 2, "EIA Average Industrial Power Price" (40% weight): The average weighted annual price (as measured in cents/kWh) for electric sales to the industrial sector in the ten states of CT, MA, ME, NH, NJ, NY, OH, PA, RI and VT ("Selected States") as reported by Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration ("EIA"); U.S. Department of Energy Form EIA-861 Final Data File. For Index 2, the Index Value for the Measuring Year will be the index for the calendar year two years preceding July 1 of the new Rate Year.

Index 3, "BLS Industrial Commodities Price Less Fuel" (25% weight): The monthly average of the Producer Price Index for Industrial Commodities less fuel, commodity code number 03T15M05, not seasonally adjusted, as reported by the U.S. Department of Labor, BLS electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 3, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

2. Annual Adjustment Factor Computation Guide

- Step 1: For each of the three Indices, divide the Index Value for Measuring Year by the Index Value for the Measuring Year-1.
- Step 2: Multiply the ratios determined in Step 1 by percentage weights for each Index. Sum the results to determine the weighted average. This is the AAF.
- Step 3: Commencing RY 2014, modifications to the AAF will be subject to $\pm 5\%$ Collar, as described below.
- a) When the AAF falls outside the $\pm 5\%$ Collar, the Excess will be carried over to the subsequent RY. If the AAF in the subsequent RY is within the $\pm 5\%$ Collar, the current RY Excess will be added to/subtracted from the subsequent Rate Year's AAF, up to the $\pm 5\%$ Collar.

- b) Excesses will continue to accrue without limit and carry over such that they will be added to/subtracted from the AAF in any year where the AAF is within the $\pm 5\%$ Collar.

Step 4: Multiply the current Rate Year base rate by the AAF calculated in Step 2 to determine the new Rate Year base rate.

The foregoing calculation shall be performed by the Authority consistent with the sample presented in Section V.B below.

3. The Authority shall provide the Customer with notice of any adjustment to the current base rate per the above and with all data and calculations necessary to compute such adjustment by June 15th of each year to be effective on July 1 of such year, commencing in 2014. The values of the latest officially published (electronically or otherwise) versions of the indices and data provided by the BLS and EIA as of June 1 shall be used notwithstanding any subsequent revisions to the indices.
4. If during the term of the Agreement any of the three above indices ceases to be available or ceases to be reflective of the relevant factors or of changes which the indices were intended by the Parties to reflect, the Customer and the Authority shall mutually select a substitute Index. The Parties agree to mutually select substitute indices within 90 days, once notified by the other party that the indices are no longer available or no longer reflect the relevant factors or changes with the indices were intended by the Parties to reflect. Should the 90-day period cover a planned July 1 rate change, the current base rates will remain in effect until substitute indices are selected and the adjusted rates based on the substitute indices will be retroactive to the previous July 1. If unable to reach agreement on substitute indices within the 90-day period, the Parties agree to substitute the mathematic average of the PPI—Intermediate Materials, Supplies and Components (BLS Series ID WPUSOP2000) and the PPI-- Finished Goods (BLS Series ID WPUSOP3000) indices for one or more indices that have ceased to be available and shall assume the percentage weighting(s) of the one or more discontinued indices as indicated in Section V.A.1.

B. Sample Computation of the AAF (hypothetical values for July 1, 2014 implementation):

STEP 1

Determine the Index Value for the Measuring Year (MY) and Measuring Year - 1 (MY-1) for Each Index

- Index 1 - Producer Price Index, Industrial Power

| | Measuring Year <u>(2013)</u> | Measuring Year - 1 <u>(2012)</u> |
|------------------|------------------------------------|--|
| January | 171.2 | 167.8 |
| February | 172.8 | 167.6 |
| March | 171.6 | 168.2 |
| April | 173.8 | 168.6 |
| May | 175.1 | 171.6 |
| June | 185.7 | 180.1 |
| July | 186.4 | 182.7 |
| August | 184.7 | 179.2 |
| September | 185.5 | 181.8 |
| October | 175.5 | 170.2 |
| November | 172.2 | 168.8 |
| December | 171.8 | 166.6 |
| Average | 177.2 | 172.8 |
| Ratio of MY/MY-1 | | 1.03 |

- Index 2 – EIA Industrial Rate

| <u>State</u> | <u>Revenues</u> (\$000s) | <u>Sales</u> (MWh) | <u>Avg. Rate</u> (cents/kWh) |
|---------------------------------|-----------------------------|-----------------------|---------------------------------|
| <u>Measuring Year (2012)</u> | | | |
| CT | 590,972 | 6,814,757 | |
| MA | 1,109,723 | 13,053,806 | |
| ME | 328,594 | 4,896,176 | |
| NH | 304,363 | 2,874,495 | |
| NJ | 1,412,665 | 15,687,873 | |
| NY | 2,001,588 | 26,379,314 | |
| OH | 3,695,978 | 78,496,166 | |
| PA | 3,682,192 | 63,413,968 | |
| RI | 152,533 | 1,652,593 | |
| VT | <u>155,903</u> | <u>2,173,679</u> | |
| TOTAL | 13,434,511 | 215,442,827 | 6.24 |
| <u>Measuring Year -1 (2011)</u> | | | |
| CT | 579,153 | 6,678,462 | |
| MA | 1,076,431 | 12,662,192 | |
| ME | 310,521 | 4,626,886 | |
| NH | 298,276 | 2,817,005 | |
| NJ | 1,370,285 | 15,217,237 | |
| NY | 1,891,501 | 24,928,452 | |
| OH | 3,622,058 | 76,926,243 | |
| PA | 3,571,726 | 61,511,549 | |
| RI | 144,144 | 1,561,700 | |
| VT | <u>152,785</u> | <u>2,130,205</u> | |
| TOTAL | 13,016,880 | 209,059,931 | 6.23 |
| Ratio of MY/MY-1 | | | 1.00 |

- Index 3 – Producer Price Index, Industrial Commodities Less Fuel

| | Measuring Year (2013) | Measuring Year -1 (2012) |
|------------------|-----------------------------|--------------------------------|
| January | 190.1 | 187.2 |
| February | 190.9 | 188.0 |
| March | 191.6 | 188.7 |
| April | 192.8 | 189.9 |
| May | 194.7 | 191.8 |
| June | 195.2 | 192.3 |
| July | 195.5 | 192.3 |
| August | 196.0 | 193.1 |
| September | 196.1 | 193.2 |
| October | 196.2 | 193.8 |
| November | 196.6 | 193.7 |
| December | 196.7 | 194.0 |
| Average | 194.4 | 191.5 |
| Ratio of MY/MY-1 | | 1.02 |

STEP 2

Determine AAF by Summing the Weighted Indices

| <u>Index</u> | <u>Ratio of MY to MY-1</u> | <u>Weight</u> | <u>Weighted Factors</u> |
|--------------------------------------|--------------------------------|---------------|-----------------------------|
| PPI Industrial Power | 1.03 | 0.35 | 0.361 |
| EIA Industrial Rate | 1.00 | 0.40 | 0.400 |
| PPI Industrial Commodities less fuel | 1.02 | 0.25 | <u>0.255</u> |
| AAF | | | 1.016 |

STEP 3

Apply Collar of $\pm 5.0\%$ to Determine the Maximum/Minimum AAF.

$-5.0\% < 1.6\% < 5.0\%$; collar does not apply, assuming no cumulative excess.

STEP 4

Apply AAF to Calculate the New Rate Year Base Rate

| | <u>Demand</u> \$/kW-mo. | <u>Energy</u> \$/MWh |
|-----------------------------|----------------------------|-------------------------|
| Current Rate Year Base Rate | 7.56 | 12.91 |
| New Rate Year Base Rate | 7.68 | 13.12 |

POWER AUTHORITY

OF THE

STATE OF NEW YORK

30 South Pearl Street
10th Floor
Albany, New York 12207-3425

AGREEMENT FOR THE SALE
OF EXPANSION POWER AND/OR REPLACEMENT POWER
to
UNIFRAX I LLC

The POWER AUTHORITY OF THE STATE OF NEW YORK (“Authority”), created pursuant to Chapter 772 of the New York Laws of 1931 and existing under Title I of Article V of the New York Public Authorities Law (“PAL”), having its office and principal place of business at 30 South Pearl Street, 10th Floor, Albany, New York 12207-3425, hereby enters into this Agreement for the Sale of Expansion Power and/or Replacement Power (“Agreement”) with Unifrax I LLC (“Customer”), with offices at 600 Riverwalk Parkway, Suite 120, Tonawanda, NY, 14150. The Authority and the Customer are from time to time referred to in this Agreement as “Party” or collectively as “Parties” and agree follows:

RECITALS

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, Federal Energy Regulatory Commission (“FERC”) Project No. 2216, known as “Expansion Power” (or “EP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, the Authority is authorized to sell hydroelectric power produced by the Niagara Power Project, FERC Project No. 2216, known as “Replacement Power” (or “RP”), as further defined in this Agreement, to qualified businesses in New York State in accordance with PAL § 1005(5) and (13);

WHEREAS, EP consists of 250 megawatts (“MW”) of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, RP consists of 445 MW of firm hydroelectric power and associated firm energy produced by the Niagara Power Project;

WHEREAS, the Authority is authorized pursuant to PAL § 1005(13)(a) to award EP and/or RP based on, among other things, the criteria listed in the PAL, including but not limited to an applicant’s long-term commitment to the region as evidenced by the current and planned capital investment; the type and number of jobs supported or created by the allocation; and the state, regional and local economic development strategies and priorities supported by local units of governments in the area in which the recipient’s facilities are located;

WHEREAS, the Customer applied to the Authority for an allocation of hydropower to support operations at a new and/or expanded facility to be constructed and operated by the Customer (defined in Section I of this Agreement as the “Facility”);

WHEREAS, the Customer currently purchases other power allocations from the Authority under other contracts pertaining to other facilities;

WHEREAS, on October 15, 2014, the Authority’s Board of Trustees (“Trustees”) approved a 1,400 kilowatt (“kW”) allocation of RP to the Customer for a seven (7) year term (defined in Section I of this Agreement as the “Allocation”) in connection with the construction and operation of the Facility as further described in this Agreement;

WHEREAS, on October 15, 2014, the Trustees also authorized the Authority to, among other things, take any and all actions and execute and deliver any and all agreements and other documents necessary to effectuate its approval of the Allocation;

WHEREAS, the provision of Electric Service associated with the Allocation is an unbundled service separate from the transmission and delivery of power and energy to the Customer, and delivery service will be performed by the Customer's local electric utility in accordance with the Utility Tariff;

WHEREAS, the Parties have reached an agreement on the sale of the Allocation to the Customer on the terms and conditions provided for in this Agreement;

WHEREAS, the Authority has complied with requirements of PAL § 1009 which specifies the approval process for certain contracts negotiated by the Authority; and

WHEREAS, the Governor of the State of New York has approved the terms of this Agreement pursuant to PAL § 1009(3).

NOW THEREFORE, in consideration of the mutual covenants herein, the Authority and the Customer agree as follows:

NOW THEREFORE, the Parties hereto agree as follows:

I. Definitions

- A. **Agreement** means this Agreement.
- B. **Allocation** refers to the allocation of EP and/or RP awarded to the Customer as specified in Schedule A.
- C. **Contract Demand** is as defined in Service Tariff No. WNY-1.
- D. **Electric Service** is the Firm Power and Firm Energy associated with the Allocation and sold by the Authority to the Customer in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules.
- E. **Expansion Power** (or **EP**) is 250 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- F. **Facility** means the Customer's facilities as described in Schedule A to this Agreement.
- G. **Firm Power** is as defined in Service Tariff No. WNY-1.
- H. **Firm Energy** is as defined in Service Tariff No. WNY-1.
- I. **FERC** means the Federal Energy Regulatory Commission (or any successor organization).

- J. **FERC License** means the first new license issued by FERC to the Authority for the continued operation and maintenance of the Project, pursuant to Section 15 of the Federal Power Act, which became effective September 1, 2007 after expiration of the Project's original license which became effective in 1957.
- K. **Hydro Projects** is a collective reference to the Project and the Authority's St. Lawrence-FDR Project, FERC Project No. 2000.
- L. **Load Serving Entity** (or **LSE**) means an entity designated by a retail electricity customer (including the Customer) to provide capacity, energy and ancillary services to serve such customer, in compliance with NYISO Tariffs, rules, manuals and procedures.
- M. **NYISO** means the New York Independent System Operator or any successor organization.
- N. **NYISO Tariffs** means the NYISO's Open Access Transmission Tariff or the NYISO's Market Administration and Control Area Services Tariff, as applicable, as such tariffs are modified from time to time, or any successor to such tariffs.
- O. **Project** means the Niagara Power Project, FERC Project No. 2216.
- P. **Replacement Power** (or **RP**) is 445 MW of Firm Power and associated Firm Energy from the Project eligible to be allocated by the Authority for sale to businesses pursuant to PAL § 1005(5) and (13).
- Q. **Rules** are the applicable provisions of Authority's rules and regulations (Chapter X of Title 21 of the Official Compilation of Codes, Rules and Regulations of the State of New York), as may be modified from time to time by the Authority.
- R. **Service Tariff No. WNY-1** means the Authority's Service Tariff No. WNY-1, as may be modified from time to time by the Authority, which contains, among other things, the rate schedule establishing rates and other commercial terms for sale of Electric Service to Customer under this Agreement.
- S. **Schedule A** refers to the Schedule A entitled "Expansion Power and/or Replacement Power Allocations" which is attached to and made part of this Agreement.
- T. **Schedule B** refers to the Schedule B entitled "Expansion Power and/or Replacement Power Commitments" which is attached to and made part of this Agreement.
- U. **Schedule C** refers to the Schedule C entitled "Takedown Schedule" which is attached to and made part of this Agreement.
- V. **Substitute Energy** means energy that the Authority provides at the request of the Customer to replace hydroelectricity that would otherwise have been supplied to the Customer under this Agreement. Unless otherwise agreed upon by the Parties, Substitute

Energy refers to energy purchased by the Authority for the Customer from markets administered by the NYISO.

- W. **Taxes** is as defined in Service Tariff No. WNY-1
- X. **Unforced Capacity (or “UCAP”)** means the electric capacity required to be provided by LSEs to serve electric load as defined by the NYISO Tariffs, rules, manuals and procedures.
- Y. **Utility Tariff** means the retail tariff(s) of the Customer’s local electric utility filed and approved by the PSC applicable to the delivery of EP and/or RP.

II. Electric Service

- A. The Authority shall make available Electric Service to enable the Customer to receive the Allocation in accordance with this Agreement, Service Tariff No. WNY-1 and the Rules. The Customer shall not be entitled to receive Electric Service under this Agreement for any EP and/or RP allocation unless such EP and/or RP allocation is identified on Schedule A.
- B. The Authority will provide, and the Customer shall pay for, Electric Service with respect to the Allocation specified on Schedule A. If Schedule C specifies a Takedown Schedule for the Allocation, the Authority will provide, and the Customer shall take and pay for, Electric Service with respect to the Allocation in accordance with such Takedown Schedule.
- C. The Authority shall provide UCAP in amounts necessary to meet the Customer’s NYISO UCAP requirements associated with the Allocation in accordance with the NYISO Tariffs. The Customer shall be responsible to pay the Authority for such UCAP in accordance with Service Tariff No. WNY-1.
- D. The Customer acknowledges and agrees that Customer’s local electric utility shall be responsible for delivering the Allocation to the Facility specified in Schedule A, and that the Authority has no responsibility for delivering the Allocation to the Customer.
- E. The Contract Demand for the Customer’s Allocation may be modified by the Authority if the amount of Firm Power and Firm Energy available for sale as EP or RP from the Project is modified as required to comply with any ruling, order, or decision of any regulatory or judicial body having jurisdiction, including but not limited to FERC. Any such modification will be made on a pro rata basis to all EP and RP customers, as applicable, based on the terms of such ruling, order, or decision.
- F. The Contract Demand may not exceed the Allocation.

III. Rates, Terms and Conditions

- A. Electric Service shall be sold to the Customer based on the rates, terms and conditions provided for in this Agreement, Service Tariff No. WNY-1 and the Rules.
- B. Notwithstanding any provision of this Agreement to the contrary, the power and energy rates for Electric Service shall be subject to increase by Authority at any time upon 30 days prior written notice to Customer if, after consideration by Authority of its legal obligations, the marketability of the output or use of the Project and Authority's competitive position with respect to other suppliers, Authority determines in its discretion that increases in rates obtainable from any other Authority customers will not provide revenues, together with other available Authority funds not needed for operation and maintenance expenses, capital expenses, and reserves, sufficient to meet all requirements specified in Authority's bond and note resolutions and covenants with the holders of its financial obligations. Authority shall use its best efforts to inform Customer at the earliest practicable date of its intent to increase the power and energy rates pursuant to this provision. Any rate increase to Customer under this subsection shall be on a non-discriminatory basis as compared to other Authority customers after giving consideration to the factors set forth in the first sentence of this subsection. With respect to any such increase, Authority shall forward to Customer with the notice of increase, an explanation of all reasons for the increase, and shall also identify the sources from which Authority will obtain the total of increased revenues and the bases upon which Authority will allocate the increased revenue requirements among its customers. Any such increase in rates shall remain in effect only so long as Authority determines such increase is necessary to provide revenues for the purposes stated in the preceding sentences.

IV. Expansion Power and/or Replacement Power Commitments

- A. Schedule B sets forth the Customer's specific "Expansion Power and/or Replacement Power Commitments." The commitments agreed to in Schedule B are in addition to any other rights and obligations of the Parties provided for in the Agreement.
- B. The Authority's obligation to provide Electric Service under this Agreement, and the Customer's obligation to take and pay for such Electric Service, are expressly conditioned upon the Customer's timely completion of the commitments described in Schedule B.
- C. In the event of partial completion of the Facility which has resulted in such Facility being partly operational and the partial attainment of the Base Employment Level, the Authority may, upon the Customer's request, provide Electric Service to the Customer in an amount determined by the Authority to fairly correspond to the completed portion of the Facility, provided that the Customer demonstrates that the amount of requested Electric Service is needed to support the operations of the partially completed Facility.
- D. The Customer shall give the Authority not less than ninety (90) days' advance notice in writing of the anticipated date of partial or full completion of the Facility. The Authority will inspect the Facility for the purpose of verifying the completion status of the Facility and notify Customer of the results of the inspection. The Authority will thereafter

commence Electric Service within a reasonable time after verification based on applicable operating procedures of the Authority, the Customer's local electric utility and the NYISO.

- E. In the event the Customer fails to complete the Facility by October 15, 2017 (*i.e.*, within three (3) years of the Authority's award of the Allocation), the Allocation, at the option and discretion of the Authority, may be canceled or reduced by the total amount of kilowatts determined by the Authority to fairly correspond to the uncompleted portion of the Facility, provided that in such event, and upon request of the Customer, such date may be extended by the Authority in its sole discretion.

V. Rules and Service Tariff

Service Tariff No. WNY-1, as may be modified or superseded from time to time by the Authority, is hereby incorporated into this Agreement with the same force and effect as if set forth herein at length. In the event of any inconsistencies, conflicts, or differences between the provisions of Service Tariff No. WNY-1 and the Rules, the provisions of Service Tariff No. WNY-1 shall govern. In the event of any inconsistencies, conflicts or differences between the provisions of this Agreement and Service Tariff No. WNY-1, the provisions of this Agreement shall govern.

VI. Transmission and Delivery of Firm Power and Firm Energy; Responsibility for Charges

- A. The Customer shall be responsible complying with all requirements of its local electric utility that are necessary to enable the Customer to receive delivery service for the Allocation. Delivery of the Allocation shall be subject to the Utility Tariff.
- B. The Customer shall be solely responsible for paying its local electric utility for delivery service associated with the Allocation in accordance with the Utility Tariff. Should the Authority incur any charges associated with such delivery service, the Customer shall reimburse the Authority for all such charges.
- C. The Customer understands and acknowledges that delivery of the Allocation will be made over transmission facilities under the control of the NYISO. The Authority will act as the LSE with respect to the NYISO, or arrange for another entity to do so on the Authority's behalf. The Customer agrees and understands that it shall be responsible to the Authority for all costs incurred by the Authority with respect to the Allocation for the services established in the NYISO Tariff, or other applicable tariff ("NYISO Charges"), as set forth in Service Tariff No. WNY-1 or any successor service tariff, regardless of whether such NYISO Charges are transmission-related. Such NYISO Charges shall be in addition to the charges for power and energy.
- D. By entering into this Agreement, the Customer consents to the exchange of information between the Authority and the Customer's local electric utility pertaining to the Customer that the Authority and the local electric utility determine is necessary to provide for the Allocation, sale and delivery of EP and/or RP to the Customer, the proper and efficient implementation of the EP and/or RP programs, billing related to EP and/or RP, and/or the performance of such parties' obligations under any contracts or other arrangements between them relating to such matters.

- E. The provision of Electric Service by the Authority shall be dependent upon the existence of a written agreement or other form of understanding between the Authority and the Customer's local electric utility on terms and conditions that are acceptable to the Authority.
- F. The Customer understands and acknowledges that the Authority may from time to time require the Customer to complete forms, provide documentation, execute consents and provide other information (collectively, "Information") which the Authority determines is necessary for the provision of Electric Service, the delivery of EP and/or RP, billing related to the EP and/or RP program, the effective and proper administration of the EP and/or RP program, and/or the performance of contracts or other arrangements between the Authority and the Customer's local electric utility. The Customer's failure to provide such Information shall be grounds for the Authority in its sole discretion to withhold or suspend Electric Service to the Customer.

VII. Billing and Billing Methodology

- A. The billing methodology for the Allocation shall be determined on a "load factor sharing" basis in a manner consistent with the Utility Tariff and any agreement between the Authority and the Customer's local electric utility. An alternative basis for billing may be used provided the Parties agree in writing and the local electric utility provides its consent if such consent is deemed necessary.
- B. The Authority will render bills by the 10th business day of the month for charges due for the previous month. Such bills shall include charges for Electric Service, NYISO Charges associated with the Allocation (subject to adjustment consistent with any later NYISO re-billings to the Authority), and other applicable charges.
- C. The Authority may render bills to the Customer electronically.
- D. The Authority and the Customer may agree in writing to an alternative method for the rendering of bills and for the payment of bills, including but not limited to the use of an Authority-established customer self-service web portal.
- E. The Authority will charge and collect from the Customer all Taxes (including local, state and federal taxes) the Authority determines are applicable, unless the Customer furnishes the Authority with proof satisfactory to the Authority that (i) the Customer is exempt from the payment of any such Taxes, and/or (ii) the Authority is not obligated to collect such Taxes from the Customer. If the Authority is not collecting Taxes from the Customer based on the circumstances described in (i) or (ii) above, the Customer shall immediately inform the Authority of any change in circumstances relating to its tax status that would require the Authority to charge and collect such Taxes from the Customer.
- F. Unless otherwise agreed to by the Authority and the Customer in writing, if the Customer fails to pay any bill when due, an interest charge of two percent (2%) of the amount unpaid shall be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent (1 1/2%) of the sum

unpaid shall be added on the first day of each succeeding billing period until the amount due, including interest, is paid in full.

- G. Unless otherwise agreed to by the Authority and the Customer in writing, in the event the Customer disputes any item of any bill rendered by Authority, the Customer shall pay such bill in full within the time provided for by this Agreement, and adjustments, if appropriate, will be made thereafter.
- H. If at any time after commencement of Electric Service the Customer fails to make complete and timely payment of any two (2) bills for Electric Service, the Authority shall have the right to require the Customer to deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit shall be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. If the Customer fails or refuses to provide the deposit within thirty (30) days of a request for such deposit, the Authority may, in its sole discretion, suspend Electric Service to the Customer or terminate this Agreement.
- I. All other provisions with respect to billing are set forth in Service Tariff No. WNY-1 and the Rules.
- J. The rights and remedies provided to the Authority in this Article are in addition to any and all other rights and remedies available to Authority at law or in equity.

VIII. Hydropower Curtailments and Substitute Energy

- A. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of the Authority's firm power customers served by the Authority from the Hydro Projects, curtailments (*i.e.* reductions) in the amount of Firm Power and Firm Energy associated with the Allocation to which the Customer is entitled shall be applied on a *pro rata* basis to all firm power and energy customers served from the Hydro Projects, consistent with Service Tariff No. WNY-1 as applicable.
- B. The Authority shall provide reasonable notice to Customer of any curtailments referenced in Section VIII.A of this Agreement that could impact Customer's Electric Service under this Agreement. Upon written request by the Customer, the Authority will provide Substitute Energy to the Customer to replace the Firm Power and Firm Energy that would otherwise have been supplied pursuant to this Agreement.
- C. For each kilowatt-hour of Substitute Energy supplied by the Authority, the Customer will pay the Authority directly during the billing month: (1) the difference between the market cost of the Substitute Energy and the charge for firm energy as provided for in this Agreement; and (2) any NYISO charges and taxes the Authority incurs in connection with the provision of such Substitute Energy. Billing and payment for Substitute Energy shall be governed by the Billing and Payments provision of the Authority's Rules

(Section 454.6) and shall apply directly to the Substitute Energy service supplied to the Customer.

- D. The Parties may enter into a separate agreement to facilitate the provision of Substitute Energy, provided, however, that the provisions of this Agreement shall remain in effect notwithstanding any such separate agreement. The provision of Substitute Energy may be terminated by the Authority or the Customer on fifteen (15) days' prior written notice.

IX. Effectiveness, Term and Termination

- A. This Agreement shall become effective and legally binding on the Parties upon execution of this Agreement by the Authority and the Customer.
- B. Once commenced, Electric Service under the Agreement shall continue until the earliest of: (1) termination by the Customer with respect to its Allocation upon ninety (90) days prior written notice to the Authority; (2) termination by the Authority pursuant to this Agreement, Service Tariff No. WNY-1, or the Rules; or (3) expiration of the Allocation by its own term as specified in Schedule A.
- C. The Customer may exercise a partial termination of the Allocation upon at least thirty (30) days' notice prior written notice to the Authority. The termination shall be effective commencing with the first billing period as defined in Service Tariff No. WNY-1.
- D. The Authority may cancel service under this Agreement or modify the quantities of Firm Power and Firm Energy associated with the Allocation: (1) if such cancellation or modification is required to comply with any final ruling, order or decision of any regulatory or judicial body of competent jurisdiction (including any licensing or re-licensing order or orders of the FERC or its successor agency); or (2) as otherwise provided in this Agreement, Service Tariff No. WNY-1, or the Rules.

X. Additional Allocations

- A. Upon proper application by the Customer, the Authority may in its discretion award additional allocations of EP or RP to the Customer at such rates and on such terms and conditions as the Authority establishes. If the Customer agrees to purchase Electric Service associated with any such additional allocation, the Authority will (i) incorporate any such additional allocations into Schedule A, or in its discretion will produce a supplemental schedule, to reflect any such additional allocations, and (ii) produce a modified Appendix to Schedule B, as the Authority determines to be appropriate. The Authority will furnish the Customer with any such modified Schedule A, supplemental schedule, and/or a modified Appendix to Schedule B, within a reasonable time after commencement of Electric Service for any such additional allocation.
- B. In addition to any requirements imposed by law, the Customer hereby agrees to furnish such documentation and other information as the Authority requests to enable the Authority to evaluate any requests for additional allocations and consider the terms and conditions that should be applicable of any additional allocations.

XI. Notification

- A. Correspondence involving the administration of this Agreement shall be addressed as follows:

To: The Authority

New York Power Authority
123 Main Street
White Plains, New York 10601
Email:
Facsimile: _____
Attention: Manager – Business Power Allocations and Compliance

To: The Customer

Unifrax I LLC
600 Riverwalk Parkway, Suite 120
Tonawanda, NY 14150

Email:
Facsimile:
Attention:

The foregoing notice/notification information pertaining to either Party may be changed by such Party upon notification to the other Party pursuant to Section XI.B of this Agreement.

- B. Except where otherwise herein specifically provided, any notice, communication or request required or authorized by this Agreement by either Party to the other shall be deemed properly given: (1) if sent by U.S. First Class mail addressed to the Party at the address set forth above; (2) if sent by a nationally recognized overnight delivery service, two (2) calendar days after being deposited for delivery to the appropriate address set forth above; (3) if delivered by hand, with written confirmation of receipt; (4) if sent by facsimile to the appropriate fax number as set forth above, with written confirmation of receipt; or (5) if sent by electronic mail to the appropriate address as set forth above, with written confirmation of receipt. Either Party may change the addressee and/or address for correspondence sent to it by giving written notice in accordance with the foregoing.

XII. Applicable Law

This Agreement shall be governed by and construed in accordance with the laws of the State of New York to the extent that such laws are not inconsistent with the FERC License and the Niagara Redevelopment Act (16 USC §§836, 836a).

XIII. Venue

Each Party consents to the exclusive jurisdiction and venue of any state or federal court within or for Albany County, New York, with subject matter jurisdiction for adjudication of any claim, suit, action or any other proceeding in law or equity arising under, or in any way relating to this Agreement.

XIV. Successors and Assigns; Resale of Hydropower

- A. The Customer may not assign or otherwise transfer an interest in this Agreement.
- B. The Customer may not resell or allow any other person to use any quantity of EP and/or RP it has purchased from the Authority under this Agreement.
- C. Electric Service sold to the Customer pursuant to this Agreement may only be used by the Customer at the Facility specified in Schedule A.

XV. Previous Agreements and Communications

- A. This Agreement shall constitute the sole and complete agreement of the Parties hereto with respect to the subject matter hereof, and supersedes all prior negotiations, representations, warranties, commitments, offers, contracts and writings, written or oral, with respect to the subject matter hereof.
- B. Except as otherwise provided in this Agreement, no modification of this Agreement shall be binding upon the Parties hereto or either of them unless such modification is in writing and is signed by a duly authorized officer of each of them.

XVI. Severability and Voidability

- A. If any term or provision of this Agreement shall be invalidated, declared unlawful or ineffective in whole or in part by an order of the FERC or a court of competent jurisdiction, such order shall not be deemed to invalidate the remaining terms or provisions hereof.
- B. Notwithstanding the preceding paragraph, if any provision of this Agreement is rendered void or unenforceable or otherwise modified by a court or agency of competent jurisdiction, the entire Agreement shall, at the option of either Party and only in such circumstances in which such Party's interests are materially and adversely impacted by any such action, be rendered void and unenforceable by such affected Party.

XVII. Waiver

- A. Any waiver at any time by either the Authority or the Customer of their rights with respect to a default or of any other matter arising out of this Agreement shall not be deemed to be a waiver with respect to any other default or matter.
- B. No waiver by either Party of any rights with respect to any matter arising in connection

with this Agreement shall be effective unless made in writing and signed by the Party making the waiver.

XVIII. Execution

To facilitate execution, this Agreement may be executed in as many counterparts as may be required, and it shall not be necessary that the signatures of, or on behalf of, each Party, or that the signatures of all persons required to bind any Party, appear on each counterpart; but it shall be sufficient that the signature of, or on behalf of, each Party, or that the signatures of the persons required to bind any Party, appear on one or more of the counterparts. All counterparts shall collectively constitute a single agreement. It shall not be necessary in making proof of this Agreement to produce or account for more than a number of counterparts containing the respective signatures of, or on behalf of, all of the Parties hereto. The delivery of an executed counterpart of this Agreement by email as a PDF file shall be legal and binding and shall have the same full force and effect as if an original executed counterpart of this Agreement had been delivered.

[SIGNATURES FOLLOW ON NEXT PAGE]

AGREED:

UNIFRAX I LLC

By: _____

Title: _____

Date: _____

AGREED:

POWER AUTHORITY OF THE STATE OF NEW YORK

By: _____
John R. Koelmel, Chairman

Date: _____

**SCHEDULE A TO AGREEMENT FOR THE SALE OF EXPANSION POWER AND/OR REPLACEMENT POWER TO
CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER ALLOCATIONS

Customer: Unifrax I LLC

| Type of Allocation | Allocation Amount (kW) | Facility | Trustee Approval Date | Expiration Date |
|--------------------|------------------------|--|-----------------------|--|
| Replacement Power | 1,400 kW | North Youngman Commerce Center Tonawanda, NY 14150 | October 15, 2014 | Seven (7) years from commencement of Electric Service of any portion of this Allocation. |
| | | | | |

**SCHEDULE B TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

EXPANSION POWER AND/OR REPLACEMENT POWER COMMITMENTS

I. Employment Commitments

A. Employment Levels

The provision of EP and/or RP to the Customer hereunder is in consideration of, among other things, the Customer's creation and/or maintenance of the employment level set forth in the Appendix of this Schedule (the "Base Employment Level"). Such Base Employment Level shall be the total number of full-time positions held by: (1) individuals who are employed by the Customer at Customer's Facility identified in the Appendix to this Schedule, and (2) individuals who are contractors or who are employed by contractors of the Customer and assigned to the Facility identified in such Appendix (collectively, "Base Level Employees"). The number of Base Level Employees shall not include individuals employed on a part-time basis (less than 35 hours per week); provided, however, that two individuals each working 20 hours per week or more at such Facility shall be counted as one Base Level Employee.

The Base Employment Level shall not be created or maintained by transfers of employees from previously held positions with the Customer or its affiliates within the State of New York, except that the Base Employment Level may be filled by employees of the Customer laid off from other Customer facilities for *bona fide* economic or management reasons.

The Authority may consider a request to change the Base Employment Level based on a claim of increased productivity, increased efficiency or adoption of new technologies or for other appropriate reasons as determined by the Authority. Any such change shall be within Authority's sole discretion.

B. Employment Records and Reports

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority, of the total number of Base Level Employees who are employed at or assigned to the Customer's Facility identified in the Appendix to this Schedule, as reported to the United States Department of Labor (or as reported in such other record as agreed upon by the Authority and the Customer). Such report shall separately identify the individuals who are employed by the Customer, and the individuals who are contractors or who are employed by contractors of the Customer, and shall be certified to be correct by an officer of the Customer, plant manager or such other person authorized by the Customer to prepare and file such report and shall be provided to the Authority on or before the last day of February following the end of the most recent calendar year. The Authority shall have the right to examine and audit on reasonable advance written notice

all non-confidential written and electronic records and data concerning employment levels including, but not limited to, personnel records and summaries held by the Customer and its affiliates relating to employment in New York State.

II. Reductions of Contract Demand

A. Employment Levels

If the year-end monthly average number of employees is less than 90% of the Base Employment Level set forth in this Schedule B, for the subject calendar year, the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount of reduction will be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average monthly employment during the subject calendar year divided by the Base Employment Level. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, the Agreement shall automatically terminate.

B. Power Utilization Levels

A record shall be kept monthly by the Customer, and provided on a calendar year basis to the Authority on or before the last day of February following the end of the most recent calendar year, of the maximum demand utilized each month in the Facility receiving the power covered by the Agreement. If the average of the Customer's six (6) highest Billing Demands (as such term is described in Service Tariff No. WNY-1) for Expansion Power and/or Replacement Power is less than 90% of the Customer's Contract Demand in such calendar year the Authority may reduce the Contract Demand subject to Article II.D of this Schedule. The maximum amount by which the Authority may reduce the Contract Demand shall be determined by multiplying the Contract Demand by the quantity one minus the quotient of the average of the six (6) highest Billing Demands for in such calendar year divided by the Contract Demand. Any such reduction shall be rounded to the nearest fifty (50) kW. In the event of a reduction of the Contract Demand to zero, this Agreement shall automatically terminate.

C. Capital Investment

The Customer agrees to undertake the capital investment set forth in the Appendix to this Schedule.

Notwithstanding any other provision of the Agreement, the Customer shall provide the Authority with such access to the Facility, and such documentation, as the Authority deems necessary to determine the Customer's compliance with the Customer's obligations provided for in this Schedule B.

D. Notice of Intent to Reduce Contract Demand

In the event that the Authority determines that the Contract Demand will be wholly or partially reduced pursuant to this Schedule, the Authority shall provide the Customer with at least thirty (30) days prior written notice of such reduction, specifying the amount of the reduction of Contract Demand and the reason for the reduction, provided, however, that before making the reduction, the Authority may consider the Customer's scheduled or unscheduled maintenance or Facility upgrading periods when such events temporarily reduce plant employment levels or electrical demand as well as business cycle.

III. Energy Efficiency Audits; Information Requests

Unless otherwise agreed to by the Authority in writing, the Customer shall undergo an energy efficiency audit of its Facility and equipment at which the Allocation is consumed at the Customer's expense at least once during the term of this Agreement but in any event not less than once every five years. The Customer will provide the Authority with a copy of the audit or, at the Authority's option, a report describing the results of the audit, and provide documentation requested by the Authority to verify the implementation of any efficiency measures implemented at the Facility.

The Customer agrees to cooperate to make its Facility available at reasonable times and intervals for energy audits and related assessments that the Authority desires to perform, if any, at the Authority's own expense.

The Customer shall provide information requested by the Authority or its designee in surveys, questionnaires and other information requests relating to energy efficiency and energy-related projects, programs and services.

The Customer may, after consultation with the Authority, exclude from written copies of audits, reports and other information provided to the Authority under this Article trade secrets and other information which if disclosed would harm the competitive position of the Customer.

APPENDIX TO SCHEDULE B

BASE EMPLOYMENT LEVEL

Within three (3) years of commencement of Electric Service, the Customer shall employ at least twenty-five (25) full-time employees (“Base Employment Level”) at the Facility. The Base Employment Level shall be maintained thereafter for the term of the Allocation in accordance with Article I of Schedule B.

CAPITAL INVESTMENT

The Customer shall make a total capital investment of at least \$18,500,000 to renovate and furnish the Facility (the “Capital Investment”). The Capital Investment for the Facility is expected to consist of the following specific expenditures:

| | |
|---|---------------|
| Land Acquisition & Building Construction: | \$ 5,750,000 |
| Compressor/Oven/Batching Equipment: | \$ 12,000,000 |
| Electric Upgrades: | \$ 750,000 |

| | |
|---|----------------------------|
| <u>Total Capital Investment:</u> | <u>\$18,500,000</u> |
|---|----------------------------|

The Capital Investment shall be made, and the Facility shall be completed and fully operational, no later than October 15, 2017 (*i.e.*, within three (3) years of the date of the Authority’s award of the Allocation). Upon request of the Customer, such date may be extended in the sole discretion of the Authority.

**SCHEDULE C TO AGREEMENT FOR THE SALE OF EXPANSION POWER
AND/OR REPLACEMENT POWER TO CUSTOMER**

TAKEDOWN SCHEDULE

N/A



POWER AUTHORITY OF THE STATE OF NEW YORK
30 SOUTH PEARL STREET
ALBANY, NY 12207

Schedule of Rates for Sale of Firm Power to Expansion and
Replacement Customers located
In Western New York

Service Tariff No. WNY-1

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Schedule of Rates for Firm Power Service

I. Applicability

To sales of Expansion Power and/or Replacement Power (as defined below) directly to a qualified business Customer (as defined below) for firm power service.

II. Abbreviations and Terms

- kW kilowatt(s)
- kW-mo. kilowatt-month
- kWh kilowatt-hour(s)
- MWh megawatt-hour(s)
- NYISO New York Independent System Operator, Inc. or any successor organization
- PAL New York Public Authorities Law
- OATT Open Access Transmission Tariff

Agreement: An executed “Agreement for the Sale of Expansion and/or Replacement Power and Energy” between the Authority and the Customer (each as defined below).

Annual Adjustment Factor or **AAF**: This term shall have the meaning set forth in Section V herein.

Authority: The Power Authority of the State of New York, a corporate municipal instrumentality and a political subdivision of the State of New York created pursuant to Chapter 772 of the New York Laws of 1931 and existing and operating under Title 1 of Article 5 of the PAL, also known as the “New York Power Authority.”

Customer: A business customer who has received an allocation for Expansion Power and/or Replacement Power from the Authority and who purchases Expansion Power and/or Replacement Power directly from the Authority.

Electric Service: The power and energy provided to the Customer in accordance with the Agreement, this Service Tariff and the Rules.

Expansion Power and/or **Replacement Power**: Firm Power and Firm Energy made available under this Service Tariff by the Authority from the Project for sale to the Customer for business purposes pursuant to PAL § 1005(5) and (13).

Firm Power: Capacity (kW) that is intended to be always available from the Project subject to the curtailment provisions set forth in the Agreement between the Authority and the Customer and this Service Tariff. Firm Power shall not include peaking power.

Firm Energy: Energy (kWh) associated with Firm Power.

Load Serving Entity or **LSE**: This term shall have the meaning set forth in the Agreement.

Load Split Methodology or **LSM**: A load split methodology applicable to a Customer's allocation. It is usually provided for in an agreement between the Authority and the Customer's local electric utility, an agreement between the Authority and the Customer, or an agreement between the Authority, the Customer and the Customer's local electric utility, or such local utility's tariff, regarding the delivery of WNY Firm Power. The load split methodology is often designated as "Load Factor Sharing" or "LFS", "First through the Meter" or "FTM", "First through the Meter Modified" or "FTM Modified", or "Replacement Power 2" or "RP 2".

Project: The Authority's Niagara Power Project, FERC Project No. 2216.

Rate Year or **RY**: The period from July 1 through June 30 starting July 1, 2013, and for any year thereafter.

Rules: The Authority's rules and regulations set forth in 21 NYCRR § 450 *et seq.*, as they may be amended from time to time.

Service Tariff: This Service Tariff No. WNY-1.

Target Rate: This term shall have the meaning set forth in Section III herein.

All other capitalized terms and abbreviations used but not defined herein shall have the same meaning as set forth in the Agreement.

III. Monthly Rates and Charges

A. Expansion Power (EP) and Replacement Power (RP) Base Rates

Beginning on July 1, 2013, there will be a 3-year phase-in to new base rates. The phase-in will be determined by the rate differential between the 2012 EP/RP rates and a "Target Rate." The Target Rate, specified in Section III.A.1. below, is based on the rates determined by the Authority to be applicable in RY 2013 for sales of "preservation power" as that term is defined in PAL § 1005(13). The following Sections III.A.1-4 describe the calculation and implementation of the phase-in.

1. The initial rate point will be established by the EP/RP rates (\$/kW and \$/MWh), determined by mid-April 2012 and made effective on May 1, 2012 in accordance with the Authority's then-applicable EP and RP tariffs. The Target Rate (*i.e.* demand and energy rates) for RY 2013 shall be \$7.99/kW and \$13.66/MWh.
2. The difference between the two rate points is calculated and divided by 3 to correspond with the number of Rate Years over which the phase-in will occur. The resulting quotients (in \$/kW and \$/MWh) are referred to as the "annual increment."
3. The annual increment will be applied to the base rates for the 3-year period of the 2013, 2014 and 2015 Rate Years, which shall be as follows:

RY 2013: July 1, 2013 to June 30, 2014

RY 2014: July 1, 2014 to June 30, 2015

RY 2015: July 1, 2015 to June 30, 2016

The annual rate adjustments normally made effective on May 1, 2013 under then-applicable EP and RP tariffs will be suspended, such that demand and energy rates established in 2012 shall be extended through June 30, 2013.

4. Effective commencing in RY 2013, the Annual Adjustment Factor ("AAF") described in Section V herein, shall be applied as follows:
 - A. For the RY 2013 only, the AAF will be suspended, and the RY 2013 rate increase will be subject only to the annual increment.
 - B. For the RYs 2014 and 2015, the AAF will be applied to the demand and energy rates after the addition of the annual increment to the rates of the previous RY rates. Such AAF will be subject to the terms and limits stated in Section V herein.
 - C. Beginning in RY 2016, the AAF will be applied to the previous RY rates, and the annual increment is no longer applicable.

B. EP and RP Rates no Lower than Rural/Domestic Rate

At all times the applicable base rates for demand and energy determined in accordance with Sections III.A and V of this Service Tariff shall be no lower than the rates charged by the

Authority for the sale of hydroelectricity for the benefit of rural and domestic customers receiving service in accordance with the Niagara Redevelopment Act, 16 U.S.C. § 836(b)(1) and PAL § 1005(5) (the "Rural/Domestic Rate"). This provision shall be implemented as follows: if the base rates, as determined in accordance with Sections III.A and V of this Service Tariff, are lower than the Rural/Domestic Rate on an average \$/MWh basis, each set of rates measured at 80% load factor which is generally regarded as representative for EP and RP Customers, then the base rates determined under Sections III.A and V of this Service Tariff will be revised to make them equal to the Rural/Domestic Rate on an average \$/MWh basis. However, the base rates as so revised will have no effect until such time as these base rates are lower than the Rural/Domestic Rate.

C. Monthly Base Rates Exclude Delivery Service Charges

The monthly base rates set forth in this Section III exclude any applicable costs for delivery services provided by the local electric utility.

D. Minimum Monthly Charge

The minimum monthly charge shall equal the product of the demand charge and the contract demand (as defined herein). Such minimum monthly charge shall be in addition to any NYISO Charges or Taxes (each as defined herein) incurred by the Authority with respect to the Customer's Allocation.

E. Estimated Billing

If the Authority, in its sole discretion, determines that it lacks reliable data on the Customer's actual demand and/or energy usage for a Billing Period during which the Customer receives Electric Service from the Authority, the Authority shall have the right to render a bill to the Customer for such Billing Period based on estimated demand and estimated usage ("Estimated Bill").

For the purpose of calculating a Billing Demand charge for an Estimated Bill, the demand charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated demand (kW) will be calculated based on an average of the Customer's Billing Demand (kW) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated demand (kW) value for the Estimated Bill will equal the Customer's Takedown (kW) amount.
- For Customers whose allocation is subject to a First through the Meter/ FTM, FTM Modified, or RP 2 LSM, the estimated demand (kW) value will equal the Customer's Takedown (kW) amount.

For the purpose of calculating a Billing Energy charge for an Estimated Bill, the energy charge will be calculated based on the Customer's Load Split Methodology as following:

- For Customers whose allocation is subject to a Load Factor Sharing/LFS LSM, the estimated energy (kWh) will be based on the average of the Customer's Billing Energy (kWh) values for the previous three (3) consecutive Billing Periods. If such historical data is not available, then the estimated energy value (kWh) will be equal to the Takedown (kW) amount at 70 percent load factor for that Billing Period.

- For Customers whose allocation is subject to a First through the Meter/FTM, FTM Modified, or RP 2 LSM, the estimated energy (kWh) will be equal to the Takedown (kW) amount at 100 percent load factor for that Billing Period.

If data indicating the Customer's actual demand and usage for any Billing Period in which an Estimated Bill was rendered is subsequently provided to the Authority, the Authority will make necessary adjustments to the corresponding Estimated Bill and, as appropriate, render a revised bill (or provide a credit) to the Customer.

The Minimum Monthly Charge provisions of Section III B.D. shall apply to Estimated Bills.

The Authority's discretion to render Estimated Bills is not intended to limit the Authority's rights under the Agreement.

F. Adjustments to Charges

In addition to any other adjustments provided for in this Service Tariff, in any Billing Period, the Authority may make appropriate adjustments to billings and charges to address such matters as billing and payment errors, the receipt of actual, additional, or corrected data concerning Customer energy or demand usage.

G. Billing Period

Any period of approximately thirty (30) days, generally ending with the last day of each calendar month but subject to the billing cycle requirements of the local electric utility in whose service territory the Customer's facilities are located.

H. Billing Demand

The billing demand shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

I. Billing Energy

The billing energy shall be determined by applying the applicable billing methodology to total meter readings during the billing period. See Section IV.E, below.

J. Contract Demand

The contract demand of each Customer will be the amount of Expansion Power and/or Replacement Power, not to exceed their Allocation, provided to such Customer by the Authority in accordance with the Agreement.

IV. General Provisions

A. Character of Service

Alternating current; sixty cycles, three-phase.

B. Availability of Energy

1. Subject to Section IV.B.2, the Authority shall provide to the Customer in any billing period Firm Energy associated with Firm Power. The offer of Firm Energy for delivery shall fulfill the Authority's obligations for purposes of this provision whether or not the Firm Energy is taken by the Customer.
2. If, as a result of reduced water flows caused by hydrologic conditions, there is insufficient energy from the Hydro Projects to supply the full power and energy requirements of NYPA's Firm Power customers served from the Hydro Projects, hydropower curtailments (*i.e.* reductions) in the amount of Firm Power and Energy to which the Customer is entitled shall be applied on a *pro rata* basis to all Firm Power and Energy customers served from the Hydro Projects. Reductions as a percentage of the otherwise required Firm Power and Energy sales will be the same for all Firm Power and Energy customers served from the Hydro Projects. The Authority shall be under no obligation to deliver and will not deliver any such curtailed energy to the Customer in later billing periods. The Customer will receive appropriate bill credits as provided under the Rules.

C. Delivery

For the purpose of this Service Tariff, Firm Power and Firm Energy shall be deemed to be offered when the Authority is able to supply Firm Power and Firm Energy to the Authority's designated NYISO load bus. If, despite such offer, there is a failure of delivery caused by the Customer, NYISO or local electric utility, such failure shall not be subject to a billing adjustment pursuant to Section 454.6(d) of the Rules.

D. Adjustment of Rates

To the extent not inconsistent with the Agreement, the rates contained in this Service Tariff may be revised from time to time on not less than thirty (30) days written notice to the Customer.

E. Billing Methodology and Billing

Unless otherwise specified in the Agreement, the following provisions shall apply:

1. The billing methodology to be used to render bills to the Customer related to its Allocation shall be determined in accordance with the Agreement and delivery agreement between the Authority and, as applicable, the Customer or local electric utility or both.

2. **Billing Demand** –The Billing Demand charged by the Authority to each Customer will be the highest 15 or 30-minute integrated demand, as determined by the local utility, during each Billing Period recorded on the Customer’s meter multiplied by a percentage based on the Load Split Methodology provided for in any contract between the Authority and the Customer’s local electric utility, any contract between the Authority and the Customer, or any contract between the Authority, the Customer and the Customer’s local electric utility for delivery of WNY Power. Billing Demand may not exceed the amount of the Contract Demand.
3. **Billing Energy** –The kilowatt-hours charged by the Authority to each Customer will be the total number of kilowatt-hours recorded on the Customer’s meter for the Billing Period multiplied by a percentage based on the methodology provided for in any contract between the Authority and the Customer’s local electric utility for delivery of WNY Power.

F. Payment by Customer to Authority

1. Demand and Energy Charges, Taxes

The Customer shall pay the Authority for Firm Power and Energy during any billing period the higher of either (i) the sum of (a), (b) and (c) below or (ii) the monthly minimum charge as defined herein:

- a. The demand charge per kilowatt for Firm Power specified in this Service Tariff or any modification thereof applied to the Customer’s billing demand (as defined in Section IV.E, above) for the billing period; and
- b. The energy charge per MWh for Firm Energy specified in this Service Tariff or any modification thereof applied to the Customer’s billing energy (as defined in Section IV.E, above) for the billing period; and
- c. A charge representing reimbursement to the Authority for all applicable Taxes incurred by the Authority as a result of providing Expansion Power and/or Replacement Power allocated to the Customer.

2. Transmission Charge

The Customer shall compensate the Authority for all transmission costs incurred by the Authority with respect to the Allocation, including such costs that are charged pursuant to the OATT.

3. NYISO Transmission and Related Charges (“NYISO Charges”)

The Customer shall compensate the Authority for the following NYISO Charges assessed on the Authority for services provided by the NYISO pursuant to its OATT or other tariffs (as the provisions of those tariffs may be amended and in effect from time to time) associated with providing Electric Service to the Customer:

- A. Ancillary Services 1 through 6 and any new ancillary services as may be defined and included in the OATT from time to time;
- B. Marginal losses;

- C. The New York Power Authority Transmission Adjustment Charge ("NTAC");
- D. Congestion costs, less any associated grandfathered Transmission Congestion Contracts ("TCCs") as provided in Attachment K of the OATT;
- E. Any and all other charges, assessments, or other amounts associated with deliveries to Customers or otherwise associated with the Authority's responsibilities as a Load Serving Entity for the Customers that are assessed on the Authority by the NYISO under the provisions of its OATT or under other applicable tariffs; and
- F. Any charges assessed on the Authority with respect to the provision of Electric Service to Customers for facilities needed to maintain reliability and incurred in connection with the NYISO's Comprehensive System Planning Process (or similar reliability-related obligations incurred by the Authority with respect to Electric Service to the Customer), applicable tariffs, or required to be paid by the Authority in accordance with law, regardless of whether such charges are assessed by the NYISO or another third party.

The NYISO Charges, if any, incurred by the Authority on behalf of the Customer, are in addition to the Authority production charges that are charged to the Customer in accordance with other provisions of this Service Tariff.

The method of billing NYISO charges to the Customer will be based on Authority's discretion.

4. Taxes Defined

Taxes shall be any adjustment as the Authority deems necessary to recover from the Customer any taxes, assessments or any other charges mandated by federal, state or local agencies or authorities that are levied on the Authority or that the Authority is required to collect from the Customer if and to the extent such taxes, assessments or charges are not recovered by the Authority pursuant to another provision of this Service Tariff.

5. Substitute Energy

The Customer shall pay for Substitute Energy, if applicable, as specified in the Agreement.

6. Payment Information

Bills computed under this Service Tariff are due and payable by electronic wire transfer in accordance with the Rules. Such wire transfer shall be made to J P Morgan Chase NY, NY / ABA021000021 / NYPA A/C # 008-030383, unless otherwise indicated in writing by the Authority. In the event that there is a dispute on any items of a bill rendered by the Authority, the Customer shall pay such bill in full. If necessary, any adjustments will be made thereafter.

G. Rendition and Payment of Bills

1. The Authority will render bills to the Customer for Electric Service on or before the tenth (10th) business day of the month for charges due for the previous Billing Period. Bills will reflect the amounts due and owing, and are subject to adjustment as provided for in the Agreement, Service Tariff No. WNY-1 and the Rules. Unless otherwise agreed to by the Authority and the Customer in writing, the Authority shall render bills to the Customer electronically.
2. Payment of bills by the Customer shall be due and payable by the Customer within twenty (20) days of the date the Authority renders the bill.
3. Except as otherwise agreed by the Authority in writing, if the Customer fails to pay any bill when due an interest charge of two percent of the amount unpaid will be added thereto as liquidated damages, and thereafter, as further liquidated damages, an additional interest charge of one and one-half percent of the sum unpaid shall be added on the first day of each succeeding Billing Period until the amount due, including interest, is paid in full.
4. If at any time after commencement of Electric Service the Customer fails to make complete payment of any two (2) bills for Electric Service when such bills become due pursuant to Agreement, the Authority shall have the right to require that the Customer deposit with the Authority a sum of money in an amount equal to all charges that would be due under this Agreement for Electric Service for two (2) consecutive calendar months as estimated by the Authority. Such deposit will be deemed security for the payment of unpaid bills and/or other claims of the Authority against the Customer upon termination of Electric Service. The failure or refusal of the Customer to provide the deposit within thirty (30) days of a request for such deposit will be grounds for the Authority in its sole discretion to suspend Electric Service to the Customer or terminate this Agreement.

H. Adjustment of Charges

1. Distribution Losses

The Authority will make appropriate adjustments to compensate for distribution losses of the local electric utility.

I. Conflicts

The Authority's Rules shall apply to the Electric Service provided under this Service Tariff. In the event of any inconsistencies, conflicts or differences between the provisions of this Service Tariff and the Rules, the provisions of this Service Tariff shall govern.

J. Customer Resales Prohibited

The Customer may not resell any quantity of Expansion Power and/or Replacement Power.

V. Annual Adjustment Factor

A. Adjustment of Rates

1. The AAF will be based upon a weighted average of three indices described below. For each new Rate Year, the index value for the latest available calendar year ("Index Value for the Measuring Year") will be compared to the index value for the calendar year immediately preceding the latest available calendar year (the Index Value for the Measuring Year -1"). The change for each index will then be multiplied by the indicated weights. As described in detail below, these products are then summed, producing the AAF. The AAF will be multiplied by the base rate for the current Rate Year to produce the base rates for the new Rate Year, subject to a maximum adjustment of $\pm 5.0\%$ (" $\pm 5\%$ Collar"). Amounts outside the $\pm 5\%$ Collar shall be referred to as the "Excess."

Index 1, "BLS Industrial Power Price" (35% weight): The average of the monthly Producer Price Index for Industrial Electric Power, commodity code number 0543, not seasonally adjusted, as reported by the U.S. Department of Labor, Bureau of Labor Statistics ("BLS") electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 1, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

Index 2, "EIA Average Industrial Power Price" (40% weight): The average weighted annual price (as measured in cents/kWh) for electric sales to the industrial sector in the ten states of CT, MA, ME, NH, NJ, NY, OH, PA, RI and VT ("Selected States") as reported by Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration ("EIA"); U.S. Department of Energy Form EIA-861 Final Data File. For Index 2, the Index Value for the Measuring Year will be the index for the calendar year two years preceding July 1 of the new Rate Year.

Index 3, "BLS Industrial Commodities Price Less Fuel" (25% weight): The monthly average of the Producer Price Index for Industrial Commodities less fuel, commodity code number 03T15M05, not seasonally adjusted, as reported by the U.S. Department of Labor, BLS electronically on its internet site and consistent with its printed publication, "Producer Price Index Detailed Report". For Index 3, the Index Value for the Measuring Year will be the index for the calendar year immediately preceding July 1 of the new Rate Year.

2. Annual Adjustment Factor Computation Guide

- Step 1: For each of the three Indices, divide the Index Value for Measuring Year by the Index Value for the Measuring Year-1.
- Step 2: Multiply the ratios determined in Step 1 by percentage weights for each Index. Sum the results to determine the weighted average. This is the AAF.
- Step 3: Commencing RY 2014, modifications to the AAF will be subject to $\pm 5\%$ Collar, as described below.
- a) When the AAF falls outside the $\pm 5\%$ Collar, the Excess will be carried over to the subsequent RY. If the AAF in the subsequent RY is within the $\pm 5\%$ Collar, the current RY Excess will be added to/subtracted from the subsequent Rate Year's AAF, up to the $\pm 5\%$ Collar.

- b) Excesses will continue to accrue without limit and carry over such that they will be added to/subtracted from the AAF in any year where the AAF is within the $\pm 5\%$ Collar.

Step 4: Multiply the current Rate Year base rate by the AAF calculated in Step 2 to determine the new Rate Year base rate.

The foregoing calculation shall be performed by the Authority consistent with the sample presented in Section V.B below.

3. The Authority shall provide the Customer with notice of any adjustment to the current base rate per the above and with all data and calculations necessary to compute such adjustment by June 15th of each year to be effective on July 1 of such year, commencing in 2014. The values of the latest officially published (electronically or otherwise) versions of the indices and data provided by the BLS and EIA as of June 1 shall be used notwithstanding any subsequent revisions to the indices.
4. If during the term of the Agreement any of the three above indices ceases to be available or ceases to be reflective of the relevant factors or of changes which the indices were intended by the Parties to reflect, the Customer and the Authority shall mutually select a substitute Index. The Parties agree to mutually select substitute indices within 90 days, once notified by the other party that the indices are no longer available or no longer reflect the relevant factors or changes with the indices were intended by the Parties to reflect. Should the 90-day period cover a planned July 1 rate change, the current base rates will remain in effect until substitute indices are selected and the adjusted rates based on the substitute indices will be retroactive to the previous July 1. If unable to reach agreement on substitute indices within the 90-day period, the Parties agree to substitute the mathematic average of the PPI—Intermediate Materials, Supplies and Components (BLS Series ID WPUSOP2000) and the PPI-- Finished Goods (BLS Series ID WPUSOP3000) indices for one or more indices that have ceased to be available and shall assume the percentage weighting(s) of the one or more discontinued indices as indicated in Section V.A.1.

B. Sample Computation of the AAF (hypothetical values for July 1, 2014 implementation):

STEP 1

Determine the Index Value for the Measuring Year (MY) and Measuring Year - 1 (MY-1) for Each Index

- Index 1 - Producer Price Index, Industrial Power

| | Measuring Year <u>(2013)</u> | Measuring Year - 1 <u>(2012)</u> |
|------------------|------------------------------------|--|
| January | 171.2 | 167.8 |
| February | 172.8 | 167.6 |
| March | 171.6 | 168.2 |
| April | 173.8 | 168.6 |
| May | 175.1 | 171.6 |
| June | 185.7 | 180.1 |
| July | 186.4 | 182.7 |
| August | 184.7 | 179.2 |
| September | 185.5 | 181.8 |
| October | 175.5 | 170.2 |
| November | 172.2 | 168.8 |
| December | 171.8 | 166.6 |
| Average | 177.2 | 172.8 |
| Ratio of MY/MY-1 | | 1.03 |

- Index 2 – EIA Industrial Rate

| <u>State</u> | <u>Revenues</u> (\$000s) | <u>Sales</u> (MWh) | <u>Avg. Rate</u> (cents/kWh) |
|---------------------------------|-----------------------------|-----------------------|---------------------------------|
| <u>Measuring Year (2012)</u> | | | |
| CT | 590,972 | 6,814,757 | |
| MA | 1,109,723 | 13,053,806 | |
| ME | 328,594 | 4,896,176 | |
| NH | 304,363 | 2,874,495 | |
| NJ | 1,412,665 | 15,687,873 | |
| NY | 2,001,588 | 26,379,314 | |
| OH | 3,695,978 | 78,496,166 | |
| PA | 3,682,192 | 63,413,968 | |
| RI | 152,533 | 1,652,593 | |
| VT | <u>155,903</u> | <u>2,173,679</u> | |
| TOTAL | 13,434,511 | 215,442,827 | 6.24 |
| <u>Measuring Year -1 (2011)</u> | | | |
| CT | 579,153 | 6,678,462 | |
| MA | 1,076,431 | 12,662,192 | |
| ME | 310,521 | 4,626,886 | |
| NH | 298,276 | 2,817,005 | |
| NJ | 1,370,285 | 15,217,237 | |
| NY | 1,891,501 | 24,928,452 | |
| OH | 3,622,058 | 76,926,243 | |
| PA | 3,571,726 | 61,511,549 | |
| RI | 144,144 | 1,561,700 | |
| VT | <u>152,785</u> | <u>2,130,205</u> | |
| TOTAL | 13,016,880 | 209,059,931 | 6.23 |
| Ratio of MY/MY-1 | | | 1.00 |

- Index 3 – Producer Price Index, Industrial Commodities Less Fuel

| | Measuring Year (2013) | Measuring Year -1 (2012) |
|------------------|-----------------------------|--------------------------------|
| January | 190.1 | 187.2 |
| February | 190.9 | 188.0 |
| March | 191.6 | 188.7 |
| April | 192.8 | 189.9 |
| May | 194.7 | 191.8 |
| June | 195.2 | 192.3 |
| July | 195.5 | 192.3 |
| August | 196.0 | 193.1 |
| September | 196.1 | 193.2 |
| October | 196.2 | 193.8 |
| November | 196.6 | 193.7 |
| December | 196.7 | 194.0 |
| Average | 194.4 | 191.5 |
| Ratio of MY/MY-1 | | 1.02 |

STEP 2

Determine AAF by Summing the Weighted Indices

| <u>Index</u> | <u>Ratio of MY to MY-1</u> | <u>Weight</u> | <u>Weighted Factors</u> |
|--------------------------------------|--------------------------------|---------------|-----------------------------|
| PPI Industrial Power | 1.03 | 0.35 | 0.361 |
| EIA Industrial Rate | 1.00 | 0.40 | 0.400 |
| PPI Industrial Commodities less fuel | 1.02 | 0.25 | <u>0.255</u> |
| AAF | | | 1.016 |

STEP 3

Apply Collar of $\pm 5.0\%$ to Determine the Maximum/Minimum AAF.

$-5.0\% < 1.6\% < 5.0\%$; collar does not apply, assuming no cumulative excess.

STEP 4

Apply AAF to Calculate the New Rate Year Base Rate

| | <u>Demand</u> \$/kW-mo. | <u>Energy</u> \$/MWh |
|-----------------------------|----------------------------|-------------------------|
| Current Rate Year Base Rate | 7.56 | 12.91 |
| New Rate Year Base Rate | 7.68 | 13.12 |

- Cannon Design (“Cannon”) is recommended for Category A (Audits & RCx) in Region 3. Cannon is a full-service architectural/engineering firm, and it will support the Statewide EEP from its headquarters in Grand Island NY. Cannon is currently under contract for turn-key implementation services for the Statewide EEP, and as such, it understands the expected deliverables of the program and NYPA procedures.
- The Daylight Savings Company (“Daylight Savings”) is recommended for Category A (Audits & RCx) services in Region 1. While Daylight Savings’ cost for Category A was higher than that of RCM, Daylight Savings was selected because it provided superior references that documented a wide variety of audits and retro commissioning projects, evidenced strong comprehension of energy baseline measurement requirements and demonstrated extensive measurement and verification experience. Daylight Savings is a sole proprietorship that has extensive experience performing audits and retro commissioning services in Long Island, NYC and the Lower Hudson Valley. Daylight Savings will serve the Statewide EEP from its headquarters in Goshen, NY. While it is new to NYPA’s Energy Efficiency Program, Daylight Savings has extensive experience with NYSERDA’s FlexTech program and LIPA’s prior audit programs.
- Ecosystems / LiRo Energy Group II (“Ecosystems / LiRo”) is recommended for Categories C (Construction Management) and D (Trade Management) in Regions 1 and 3. The Ecosystems / LiRo team is a joint venture that has worked together successfully in the past to provide public-sector energy performance contracting, design, engineering and construction and trade management services. Ecosystem / LiRo’s headquarters is in Syosset, NY, and the team has additional offices in NYC, Rochester and Buffalo. While Ecosystem / LiRo is new to the Statewide EEP, it currently holds a contract with NYPA to support the Governmental Customers Energy Efficiency Program (“GC EEP”) to provide auditing, engineering and design, construction management, construction trade management and turn-key services in the South Eastern New York (“SENY”) service territory. As such, it is familiar with the expected deliverables of the Energy Efficiency Program and NYPA procedures.
- EME Group (“EME”) is recommended for Categories A (Audits & RCx) and B (Design) services in all three regions. EME has been providing energy auditing services since its inception in 1987 and has a wide range of experience with governmental customers and utility sponsored programs. Headquartered in NYC, EME provides audits, retro commissioning, implementation design and construction administration services throughout NYC and Westchester. While new to the Statewide EEP, EME is currently under contract with NYPA in support of the GC EEP for Retro Commissioning, Commissioning, and Design services in the SENY service territory. However, it will be As such, it is familiar the expected deliverables of the Energy Efficiency Program and NYPA procedures.

- Eneractive Solutions (“Eneractive”) is recommended for Category C (Construction Mgmt.) services in Region 1. Eneractive has taken projects from design through complete construction in and around NYC with extensive experience in healthcare, higher education and governmental/institutional facilities. Eneractive is headquartered in Asbury Park, New Jersey with additional offices in Beltsville Maryland and NYC. While new to the Statewide EEP, Eneractive is currently under contract with NYPA for audits and retro commissioning services to support the GC EEP for the SENY service territory. As such, it is familiar with the expected deliverables of the Energy Efficiency Program and NYPA procedures.
- Energy & Resource Solutions (“ERS”) is recommended for Category A (Audits & RCx) services in Region 1. ERS was founded in 1995 to provide energy efficiency audits. While it offers full service implementation, audit and retro commissioning services remain near its core business. ERS has demonstrated its extensive experience with its participation in NYSERDA’s FlexTech and other utility energy efficiency programs. ERS would support the program from its headquarters in North Andover, Massachusetts and offices in Troy, NY and NYC. While new to the Statewide EEP, ERS is currently under contract with NYPA for audits and retro commissioning services to support GC EEP for the SENY service territory. As such, it is familiar with the expected deliverables of the Energy Efficiency Program and NYPA procedures. ERS will be a new contractor under the Statewide EEP.
- The Fulcrum Group (“Fulcrum”) is recommended for Category B (Design) services in Regions 1 & 2. Fulcrum has experience providing retro commissioning, commissioning, energy surveys, audits, design, construction management and energy management services for customers throughout NYS, with emphasis on the south eastern quadrant. Fulcrum has extensive experience serving public and institutional customers, including hospitals, universities and NYC/private schools. Fulcrum will staff this contract from its headquarters in NYC. While new to the Statewide EEP, Fulcrum is currently under contract for Audit, Design and Construction Management services to support the GC EEP for the SENY service territory. As such, it is familiar with the expected deliverables of the Energy Efficiency Program and NYPA procedures.
- Guth DeConzo Consulting Engineers (“Guth DeConzo”) is recommended for Category A (Audit & RCx), Category D (Trade Mgmt.) and Category E (Turn-Key) services in Regions 1, 2 and 3 and for Category C (Construction Mgmt.) services in Region 2. Guth DeConzo began its operations in 1991 by providing mechanical, electrical, and plumbing engineering services. It added an energy division in 2009 to address the growing demand for energy engineering services. Guth DeConzo operates out of its headquarters in Troy New York and its office in NYC. Guth DeConzo is currently under contract for Audit, Design and Construction Management services for both the Statewide EEP and the GC EEP for the SENY service territory. Accordingly, Guth DeConzo understands the expected deliverables of the Energy Efficiency Program and NYPA’s procedures.
- LaBella Associates (“LaBella”) is recommended for Category B (Design) services in Regions 2 and 3. LaBella has been providing commissioning, special inspection,

architectural and engineering services since 1978, and has participated in NYSERDA programs since 2004. LaBella's headquarters is in Rochester, NY, and it has four additional offices located in central and western NYS. LaBella is currently under Authority contract to develop energy master plans for the Cities of Rochester and Syracuse as part of the Five-City Energy Master Plan initiative but will be a new contractor under the Statewide EEP.

- PRES Services ("PRES") is recommended for Categories A (Audit & RCx), C (Construction Mgmt.), D (Trade Mgmt.) and E (Turn-Key Services) in all three Regions. PRES has experience providing audits, retro commissioning, commissioning, design, construction management and trade management across NYS. PRES's headquarters is located in Getzville, with satellite offices in Rochester and Syracuse. PRES currently is under contract for turn-key implementation services for the Statewide EEP, and as such, understands the expected deliverables of the Energy Efficiency Program and NYPA procedures.
- RCM Technologies ("RCM") is recommended for Category C (Construction Mgmt.) services in Region 1. RCM has provided professional engineering services for 40 years. Over the past 20 years, RCM has provided engineering and site support for NYPA's Power Generation departments. RCM will operate out of its headquarters in Parsippany, New Jersey and offices in Pennsauken, New Jersey, NYC and Purchase, New York. While new to the Statewide EEP, RCM is currently under contract with NYPA for audit, design, construction management, and construction trade management services to support the GC EEP to in the SENY service territory. As such, it is familiar with the expected deliverables of the Energy Efficiency Program and NYPA procedures.
- Wendel Energy Services ("Wendel") is recommended for Categories A (Audit and RCx), B (Design), C (Construction Mgmt.) and E (Turn-Key Services) services in Regions 1, 2 and 3. Wendel is a full-service architectural and engineering firm, delivering energy management, engineering, commissioning, retro commissioning and construction management services since 1940 and has participated in many of the Authority's energy efficiency programs and NYSERDA programs since the mid-1990s. Wendel will service the Statewide EEP out of its headquarters in Amherst, New York with an office in Hauppauge, New York. Wendel is currently under contract for audit, design, and construction management to support the GC EEP and Statewide EEP for all of NYS. As such, Wendel understands the expected deliverables and NYPA procedures.

Western NY Power Proceeds Allocation Board

Exhibit "6-A"
October 15, 2014

Applicants Recommended for an Award of Fund Benefits

| Line | Business | City | County | Economic Development Region | Project Description | Project Type | Recommended Award Amount | Total Project Cost | Jobs Retained | Jobs Created |
|---------------|----------------------------------|-----------|---------|-----------------------------|--|-----------------------|--------------------------|--------------------|---------------|--------------|
| 1 | Cobey Inc. | Tonawanda | Erie | Western NY | Create a CNG manufacturing, testing and training process | Business Investment | \$183,950 | \$919,750 | 121 | 32 |
| 2 | Higher One, Inc. | Buffalo | Erie | Western NY | Renovations and equipment purchases to retain a business | Business Investment | \$300,000 | \$1,033,125 | 70 | 36 |
| 3 | The WNY Women's Foundation, Inc. | Sanborn | Niagara | Western NY | Workforce training for at-risk single mothers | Workforce Development | \$100,000 | \$563,862 | - | - |
| Total: | | | | | | | \$583,950 | \$2,516,737 | 191 | 68 |

Total Jobs Created & Retained: 259

Western NY Power Proceeds Allocation Board

Applications Recommended for An Award but Not Transmitted to NYPA

| Line | Business |
|------|-----------------|
| 1 | City Labs, Inc. |

Western NY Power Proceeds Allocation Board Exhibit “C”

Criteria adapted from the Western NY Power Proceeds Allocation Board’s “Procedures for the Review of Applications for Fund Benefits”

1. The extent to which an award of Fund Benefits would be consistent with the strategies and priorities of the Regional Economic Development Council (“REDC”) having responsibility for the region in which an Eligible Project is located.¹ The Western New York Regional Economic Development Council which is responsible for Eligible Projects in Erie and Niagara Counties Strategies & Priorities are:
 - Promote “Smart Growth” by investing in areas that infrastructure already exists and achieves certain goals, such as: preserving historic buildings; reviving downtowns; reviving main streets; investing in existing neighborhoods; and investing in former industrial sites. A project consistent with Smart Growth will also focus on: enhancing walkability; enhancing multiple modes of transportation; connecting disadvantaged communities to employment clusters; spurring mixed-use private investment in existing communities and preserving/enhancing natural lands and or resources.
 - Promote workforce development by increasing diversity in the labor force, developing and cultivating that includes workers with advancement potential, underemployed, unemployed and special population; align education and skills training to job market for current and future industry needs.
 - Foster entrepreneurship and new business formation and growth. Designing a plan that brings new technologies and/or products to the marketplace, increases new start ups in strategic industries and facilitates the commercialization of products that can lead to job growth in the Region.
 - Increase the industry profile of agriculture in WNY by: creating better access to markets; creating new products; creating new more efficient processes; creating strong regional brands; creating programs that promote careers in agriculture.
 - Utilize Western New York’s proximity to Canadian and U.S. population centers to advance economic development in WNY. Bi-national projects will: utilize cross-border planning to create transportation and logistical infrastructure; improve

¹ As provided for in EDL § 189-c(4), criteria 2-15 are adapted from the criteria for eligibility for Expansion Power, Replacement Power and Preservation Power under Public Authorities Law § 1005. The specific criteria identified in PAL § 1005(13)(b)(4)-(5) are relevant to power allocations under these programs but do not have any logical application to allocations of Fund Benefits. Therefore, the Board does not expect to use these criteria to evaluate applications for Fund Benefits. Additionally, in accordance with PAL § 1005(13), criteria 13-15 listed herein will only be used in the case of Eligible Projects which are proposed by Applicants as, and determined by the Board to be, “revitalization” projects.

operational relationships; promote the attractiveness of WNY as a hub for global trade.

- Position the WNY region as a global energy hub through new sources of clean energy, energy efficiency and energy efficient transportation.
- Support growth of advanced manufacturing by making research more available to manufacturers to help them innovate.
- Spur growth in the health and life sciences industry through improved commercialization, recruit high profile research talent and reducing the cost burden of healthcare while improving health outcomes.
- Expand the scope of higher education by increasing accessibility to Higher Education for communities that currently have limited access to educational opportunities; better aligning education with the industry needs and creating support structures for start-ups which will assist start-ups with commercialization, business planning, workforce preparation, facilities, etc.
- Grow visitors and visitor spending by raising the profile of WNY as a national and international destination; connect multiple tourist destinations in WNY; improve the profile of the WNY Gateway to the United States.

For more information on the Western New York Regional Economic Development Council please go to <http://regionalcouncils.ny.gov/content/western-new-york>.

2. The extent to which an award of Fund Benefits would be consistent with the strategies and priorities of the Regional Economic Development Council ("REDC") having responsibility for the region in which an Eligible Project is located.² The Finger Lakes Regional Economic Development Council which is responsible for Eligible Projects in Orleans and Genesee Counties Strategies & Priorities can be found at: <http://regionalcouncils.ny.gov/content/finger-lakes>.
3. The number of jobs that would be created as a result of an award of Fund Benefits.
4. The applicant's long term commitment to the region as evidenced the current and/or planned capital investment in applicant's facilities in the region.
5. The ratio of the number of jobs to be created to the amount of Fund Benefits requested.
6. The types of jobs that would be created, as measured by wage and benefit levels, security and stability of employment.
7. The amount of capital investment, including the type and cost of buildings, equipment and facilities, proposed to be constructed, enlarged or installed.
8. The extent to which an award of Fund Benefits would affect the overall productivity or competitiveness of the applicant and its existing employment.

² As provided for in EDL § 189-c(4), criteria 2-15 are adapted from the criteria for eligibility for Expansion Power, Replacement Power and Preservation Power under Public Authorities Law § 1005. The specific criteria identified in PAL § 1005(13)(b)(4)-(5) are relevant to power allocations under these programs but do not have any logical application to allocations of Fund Benefits. Therefore, the Board does not expect to use these criteria to evaluate applications for Fund Benefits. Additionally, in accordance with PAL § 1005(13), criteria 13-15 listed herein will only be used in the case of Eligible Projects which are proposed by Applicants as, and determined by the Board to be, "revitalization" projects.

9. The extent to which an award of Fund Benefits may result in a competitive disadvantage for other business in the State.
 10. The growth potential of the applicant's facilities and the contribution of economic strength to the area in which the applicant's facilities are or would be located.
 11. The extent of the applicant's willingness to satisfy affirmative action goals.
 12. The extent to which an award of Fund Benefits is consistent with state, regional and local economic development strategies and priorities and supported by local units of government in the area in which the business is located.
 13. The impact of an award of Fund Benefits on the operation of any other facilities of the applicant, and on other businesses within the region.
 14. That the business is likely to close, partially close or relocate resulting in the loss of a substantial number of jobs.
 15. That the applicant is an important employer in the community and efforts to revitalize the business are in long-term interests of both employers and the community.
 16. That a reasonable prospect exists that the proposed award of Fund Benefits will enable the applicant to remain competitive and become profitable and preserve jobs for a substantial period of time.
-
-

**Western New York Economic Development Fund
Recommendation Memo**

Exhibit "D"

| | | | |
|--|---------------------|---------------|------------------|
| Applicant Name: | Cobey Inc. | REDC Region: | Western New York |
| Project Type: | Business Investment | County: | Erie |
| Industry: | Manufacturing | Locality: | Tonawanda |
| Amount Requested: | \$459,875 | Start Date: | 10/1/2014 |
| | | Finish Date: | 1/31/2015 |
| RECOMMENDED OFFER | | | |
| Recommended Total Award: | \$183,950 | | |
| Total Project Cost: | \$919,750 | | |
| % of Project Cost Recommended: | 20% | | |
| REGIONAL IMPACT MEASUREMENTS | | | |
| Number of Jobs Retained: | 121 | | |
| Number of Jobs Created: | 32 | | |
| Average Salary of Jobs: | \$56,750 | | |
| Indirect Jobs Created | | | |
| Other Impact | | | |
| PROJECT DESCRIPTION (adapted from application) | | | |
| As the oil and gas industry has evolved to incorporate more CNG, Cobey, a manufacturer of air and gas equipment, has identified the need to evolve with it. Cobey has identified a gap in the CNG market in NYS, where there are opportunities for the manufacturing, testing and training of CNG equipment. Currently, most WNY companies installing CNG equipment are forced to go to Pennsylvania for the purchase of equipment and for equipment training. Cobey is proposing the creation of a CNG manufacturing, testing and training process here in WNY in concert with NOCO, which holds a large share of the WNY oil and gas industry. | | | |
| OTHER ECONOMIC DEVELOPMENT BENEFITS RECEIVED | | | |
| ESD: Excelsior Tax Credits | TBD | NYPA: | \$ |
| IDA: | \$ | Other: | \$ |
| PREVIOUS STATE ASSISTANCE OFFERED OR PROVIDED | | | |
| TYPE | AMOUNT | STATUS | |
| N/A | N/A | N/A | |
| BASIS FOR RECOMMENDATION | | | |

Purchases of CNG equipment are rapidly rising as companies that rely on heavy trucking are shifting to CNG vehicles. Currently, most WNY companies make the bulk of their CNG equipment purchases outside of NYS. Because manufacturers of this equipment that serve the WNY area are out of State, the training on this equipment also takes place out of State. Cobey is a manufacturer of air and gas compression equipment and they now have the opportunity to evolve their equipment manufacturing process into the manufacturing of CNG equipment to serve the WNY market. Cobey plans to market equipment to all WNY companies looking to transition to CNG, and it already has an agreement with NOCO (one of the biggest diesel suppliers in WNY) to sell NOCO equipment and train their employees on it if Cobey can successfully execute this project. Advanced manufacturing is a priority industry sector in WNY and projects of this nature will foster the continued growth of this industry sector.

It is recommended that the applicant be granted \$183,950 to be disbursed in multiple payments as reimbursements for costs incurred based on milestones such as the following:

- Purchase and installation of machinery and equipment totaling \$895,750, that may include a gas dryer; a twin compressor; a priority fill panel; six above ground storage vessels; and a vehicle upfit to CNG
- Addition of 5 new jobs bringing the company total to 126
- Addition of another 27 new jobs bringing the company total to 153

**Western New York Economic Development Fund
Recommendation Memo**

| | | | |
|--|--|------------------|---------|
| Applicant Name: | Higher One, Inc. | REDC Region: WNY | WNY |
| Project Type: | Retention/Expansion | County: | Erie |
| Industry: | College Assessment Software | Locality: | Buffalo |
| Amount Requested: | \$300,000 | Start Date: | 10/1/14 |
| | | Finish Date: | 3/1/16 |
| RECOMMENDED OFFER | | | |
| Recommended Total Award: | \$300,000 | | |
| Total Project Cost: | \$1,033,125 | | |
| % of Project Cost Recommended: | 29% | | |
| REGIONAL IMPACT MEASUREMENTS | | | |
| Number of Jobs Retained: | 70 | | |
| Number of Jobs Created: | 36 | | |
| Average Salary of Jobs: | \$65,000 | | |
| Indirect Jobs Created | Over 100 Construction jobs | | |
| Other Impact | Would be the anchor tenant in dilapidated downtown building that would be rehabbed and become a mixed use development. | | |
| PROJECT DESCRIPTION (adapted from application) | | | |
| <p>In 2001, Campus Labs (formerly Student Voice) was formed by two SUNY Buffalo students who won a business plan competition for their idea to form this company and develop software to collect information from students that could be used to impact programs and services. Since that time, Campus Labs has evolved from serving one campus to over 650. Campus Labs quickly became the leading platform and service provider for assessment in higher education. Campus Labs provides the only specialized, comprehensive assessment program that combines data collection, reporting, organization, and campus-wide integration.</p> <p>In February of 2012, Campus Labs was acquired by Higher One, Inc., located in New Haven, CT. Higher One is a company that was founded by three Yale students to streamline many critical campus business office processes for colleges and universities. Today, Higher One services over 830 campuses across the country. With this acquisition, the future of Campus Labs' stand alone operation in Buffalo has been in doubt. The two local founders of Campus Labs have informed the regional office that new, more efficient space must be provided in Buffalo for the company to remain in WNY. Higher One owns a building in Connecticut with vacant space that Campus Labs could move right into. The company has identified a \$2M gap because of the cost differential between an acceptable WNY location and CT. A significant NYS incentive is required to compete with the CT location. Campus Labs, in conjunction with McGuire Development, has identified a mostly vacant, underutilized building located at 25 East Huron in Downtown Buffalo. Renovations would add commercial tenants to the streetscape of Washington and East Huron. The six-story manufacturing building constructed in 1919, as well as a former department store and bank built in 1900, would be transformed into a high-tech hub with Campus Labs as the anchor tenant. Both buildings have been named by the City of Buffalo as potential sites to be included in a Washington</p> | | | |

**Western New York Economic Development Fund
Recommendation Memo**

Street historic district within the City.

OTHER ECONOMIC DEVELOPMENT BENEFITS RECEIVED

| | | | |
|-------------------------------|-------|--------|----|
| ESD: \$1,269,990 Excelsior | \$ | NYPA: | \$ |
| IDA: | \$TBD | Other: | \$ |

PREVIOUS STATE ASSISTANCE OFFERED OR PROVIDED

| TYPE | AMOUNT | STATUS |
|-------|-----------|--|
| Grant | \$100,000 | Disbursed 4/25/12. Exceeds compliance. |

BASIS FOR RECOMMENDATION

The story of this Buffalo born and bred cutting edge, high tech company and its continued success is a great testimonial for WNY as a preferred destination for these kinds of companies we are trying to attract. In addition to the direct job creation of 36 and retention of 70 high paying jobs, Campus Labs would be the anchor tenant in a major rehab of a dilapidated building in downtown Buffalo.

ESD has extended a separate offer of \$1,269,990 in Excelsior tax credits to partially close a funding gap identified by the company for building renovations.

In order to ensure the future viability of Campus Labs in Buffalo, we are recommending a \$300,000 WNYPPAB award of Fund Benefits to assist with the purchase of \$1,033,125 of furniture fixtures and equipment ("FF&E") to further close the gap. Specifically, it is recommended that Fund Benefits be disbursed based on milestones such as reimbursement for the purchase of eligible FF&E, and after certain job retention and creation commitments have been satisfied for a certain minimum period.

**Western New York Economic Development Fund
Recommendation Memo**

| | | | |
|--|--|---|----------------|
| Applicant Name: | The WNY Women's Foundation, Inc. | REDC Region: | WNY |
| Project Type: | Workforce Development | County: | Niagara |
| Industry: | Higher Education | Locality: | Sanborn |
| Amount Requested: | \$100,000 | Start Date: | September 2014 |
| | | Finish Date: | August 2015 |
| RECOMMENDED OFFER | | | |
| Recommended Total Award: | \$100,000 | | |
| Total Project Cost: | \$563,862 (Years Two and Three of Program) | | |
| % of Project Cost Recommended: | 18 % | | |
| REGIONAL IMPACT MEASUREMENTS | | | |
| Number of Jobs Retained: | 0 | | |
| Number of Jobs Created: | 0 | | |
| Average Salary of Jobs: | \$40,000 | | |
| Indirect Jobs Created | 2 | | |
| Other Impact | Approximately 100 low income single mothers will be enrolled in the program for academic year fall 2014-spring 2015. | | |
| PROJECT DESCRIPTION (adapted from application) | | | |
| <p>This Project proposes to implement years two and three of a pilot workforce training program for at-risk single mothers (MOMS: From Education to Employment Program) designed by the WNY Women's Foundation, in partnership with Niagara County Community College. In 2010, the WNY Women's Foundation produced its report, Pathways to Progress for the Women & Girls of Western New York. This pilot program targets some of barriers identified in the report that prevent low-income single mothers from attaining the education needed to attain a family-sustaining career. The goal for the program is to create systemic change within our region's colleges and alleviate such barriers to success for single mothers in achieving a degree or certificate leading to a start in a family sustaining career pathway. This pilot program will bridge the gaps between high-demand academic programs, student success and job placement by providing students with an Achievement Coach providing case management; wrap-around supports addressing the most persistent barriers to student achievement and direct access to employers through a Career Coach.</p> <p>Women enrolled in the program will have the option of the following training programs to be provided at Niagara County Community College:</p> | | | |
| | Health | Tourism | |
| Associate Degree Programs | Nursing Radiological Technician Surgical Technician Physical Therapist Asst. | Baking and Pastry Arts Culinary Arts Gaming and Casino Mngmt. Hospitality Management | |

**Western New York Economic Development Fund
Recommendation Memo**

| | | | |
|----------------------------------|--|--|--|
| | Medical Assistant | Tourism and Event Planning Winery Operations | |
| Certificate | Phlebotomy Practical Nursing (LPN) | Baking and Pastry Arts Casino Operations Culinary Skills Event Planning Hospitality Operations Tourism Management Wine and Beverage Mngmt. | |
| Workforce, short-term | Medical Billing/Medical Coding Kidney Dialysis | | |

| | | | |
|---|-----|--------|-----|
| OTHER ECONOMIC DEVELOPMENT BENEFITS RECEIVED | | | |
| ESD: Excelsior/EDF | \$0 | NYPA: | \$0 |
| IDA: | \$0 | Other: | \$0 |

| | | |
|--|---------------|---------------|
| PREVIOUS STATE ASSISTANCE OFFERED OR PROVIDED | | |
| TYPE | AMOUNT | STATUS |
| NA | NA | NA |

| |
|---|
| BASIS FOR RECOMMENDATION |
| <p>The MOMS program seeks to improve educational attainment and improve the skills and workforce readiness of single mothers, many of whom are underemployed in the WNY region. The program will prepare students for careers in targeted industry sectors by providing wrap-around support and case management addressing the most persistent barriers to student achievement. Successful program participants will qualify for jobs with high demand for employees in our region and which pay higher wages. In addition to the direct benefits to women in the program, the pilot will also allow the WNY Women's Foundation to collect data on the impact of the services provided and refine its approach for similar programs that may be implemented at other local colleges.</p> <p>It is recommended that Fund Benefits be used only to pay for (1) the professionals who will provide counseling services to program participants, and (2) supplies and materials needed for the program as set forth in the full Application.</p> <p>Also, it is recommended that Fund Benefits for years two and three be disbursed upon satisfaction of certain milestones, such as confirmation that sufficient funding has been secured from other sources, and other milestones to be determined by the New York Power Authority.</p> |



STRATEGIC INITIATIVE BUSINESS PLAN for

Smart Generation & Transmission

Executive Sponsor
Initiative Owner
Project Manager

Ed Welz
Brad Van Auken
Ricardo DaSilva

Initiative Team

Michael Amicucci, Bohdan Dackow, Alan Ettlinger, Bruce Fardanesh, Gerald Mannarino, Lindsey McCloy, Frank Ronci, Randall Solomon, George Stefopoulos, James Stith

Initiative Start
Initiative End

4th Quarter 2014
4th Quarter 2025

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14 INITIATIVE OVERVIEW

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Smart Generation & Transmission Costs & Benefits Detail, Six Capability Roadmaps Detail and Supporting Papers

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EXECUTIVE SUMMARY

Strategic rationale and drivers of the initiative

To facilitate New York's renewed energy vision to reimagine the grid and to facilitate the increasing pace of industry transformation, NYPA believes that an investment in smart grid technology across their Generation and Transmission infrastructure is an important and necessary step. This ambitious strategic initiative is part of NYPA's Strategic Vision 2014-2019 and is aimed at providing both NYPA and New York State with the most advanced grid in the industry and to ensure that the most modern industry solutions are leveraged to deliver capability in key areas. Ultimately, the investments outlined in this initiative will pave the way for increased benefits to customers by providing the State with a market leading platform for future technologies and services, better management of bulk and distributed renewable generation and storage sources, near-real-time access to information, improved outage management and overall reduced electrical losses and increased system efficiency. In this business plan, we have highlighted the many benefits of this initiative both at a NYPA and NYS level, and combined, these benefits make for a positive investment.

In the context of the New York Energy landscape, the objectives of this initiative align with the Blueprint for Governor Cuomo's Energy Highway ("EH"), issued in 2012 and the 2014 launch of the New York Public Service Commission, Reforming the Energy Vision (REV). The REV initiative aims to ensure that the New York electricity market transforms to accommodate the changing nature of the market, and the actions in this Smart Generation and Transmission roadmap will be entirely complementary of this vision, which states; "The energy industry is in transition. Technological innovation and increasing competitiveness of renewable energy resources, combined with aging infrastructure, extreme weather events, and system security and resiliency needs, are all leading to significant changes in how electric energy is produced, managed and consumed. New York State must lead the way to ensure these trends benefit the State's citizens, whose lives are so directly affected by how electric energy is manufactured, distributed, and managed" - New York State Public Service Commission, 2014.

Indeed, NYPA's Smart Generation and Transmission journey has already begun and a foundation has been built by ongoing work, including Life Extension and Modernization (LEM) Upgrades, Generation Automation Control deployments, sensor deployment continuation, Supervisory Control and Data Acquisition (SCADA) upgrades, etc. This initiative proposes to build on that foundation through the advancement of a progressive R&D schedule and deployment of a number of recommended projects. Through the deployment of advanced components, advanced control methods, sensing and measurement, improved interfaces and support (analytics and big data), and integrated communications, NYPA will achieve its goals to both lead the market and support the transition in the NY state marketplace.

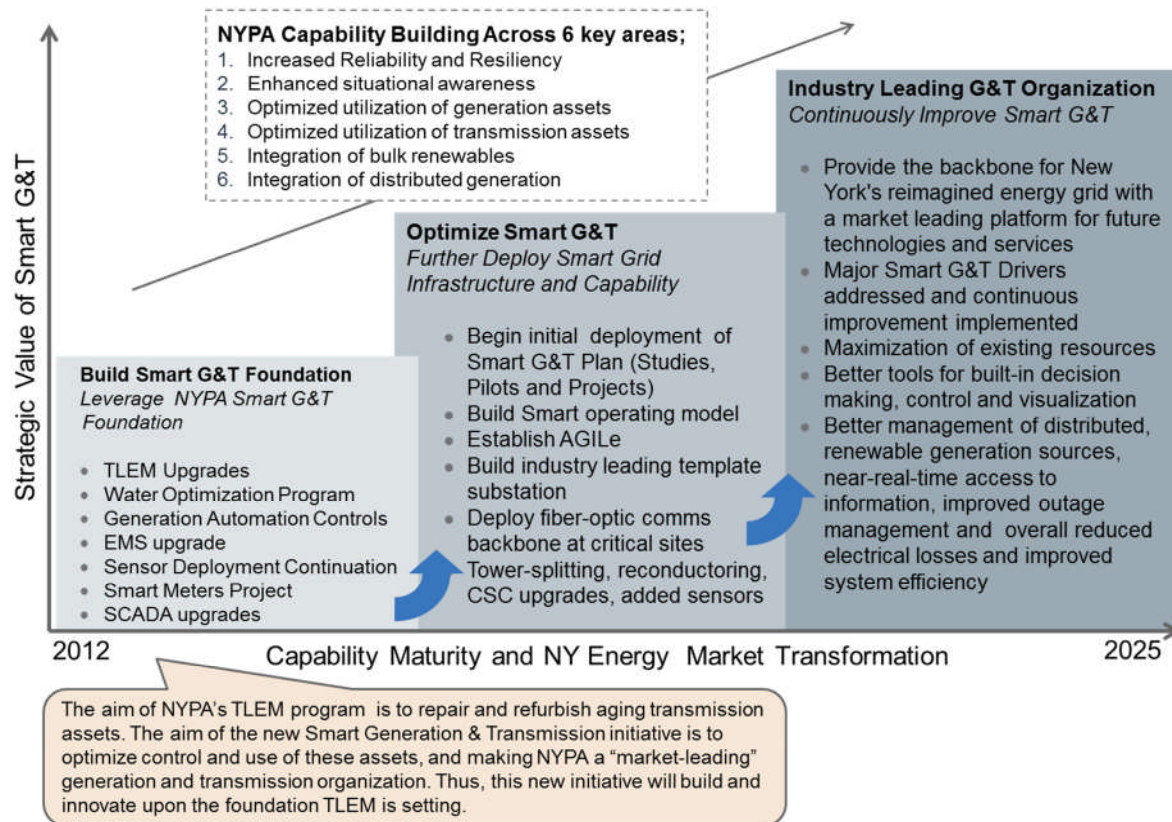
As Figure 1 below outlines, NYPA's smart grid journey will largely fall into three major steps, and as noted in step one, building a smart grid foundation has already begun at NYPA with the Transmission Life Extension and Modernization (TLEM) program, annual research and development schedules, and the proactive and continuous maintenance and improvement programs across the NYPA's grid. Building on this foundation the Smart Generation & Transmission initiative will look to develop capability in a series of areas including;

- Increased reliability and resiliency
 - Advanced transmission monitoring, control and protection systems to decrease likelihood of cascading failures and wide-area blackouts.
 - Robust security measures to reduce likelihood of catastrophic bulk system failures from human-caused and natural disasters.
- Enhanced situational awareness
 - Advanced analytical tools to convert data from grid sensors into insight, leading to wide-area situational awareness and control capabilities.

- Improving operator effectiveness and enhance system protection and restoration.
- Optimize transmission assets
 - Ensure flexibility and efficiency by optimizing the utilization of transmission assets.
 - Reduced congestion and bottlenecks, Reduced costs for operation and maintenance tasks,
 - Reduced risk due to old equipment or necessary downtime, Increased system efficiency.
- Optimize generation assets
 - Automatic controls, predictive maintenance cycles on existing generation facilities to maximize hydro flow and other generation capabilities.
- Integration of bulk renewables
 - Develop bulk renewables to meet environmental policy demands, using intelligent monitoring, climate micro-forecast, protection and control technology, storage tech, and advanced information and operational technology integrated with the underlying assets.
- Integration of distributed generation
 - Ability to manage distributed generation and storage to help balance the intermittency of renewable resources and provide grid support.
 - Advanced system protection to manage intermittency and bidirectional power flow.
 - Advanced energy management system to truly integrate distributed with central resources

NYPA's Smart G&T Journey

Figure 1: NYPA's 2014-2025 Smart Generation & Transmission journey of transformation



Ultimately, this business plan is intended to give customers, regulators and other interested stakeholders a detailed look at how smart generation and transmission will work at NYPA, how NYPA plans to deploy grid technology across its network, and why this approach makes sense for the Authority's customers and the

state as a whole. As the energy market is rapidly changing and the evolution of smart grid technologies is maturing at various speeds, this plan and its underlying assumptions will periodically be reassessed in a formal capacity throughout the life-cycle of the initiative. Such an assurance model will be part of the governance and operating model build of this initiative. In addition, NYPA will ensure that this solution is presented to the other TOs in New York and to the NYISO for review and refinement where necessary. While the plan has identified benefits accruing to NYPA and NYS, there are opportunities for further collaboration and business benefits that will be explored as part of the first phase of implementation analysis. NYPA's aim is to lead the industry in smarter generation and transmission adoption and capabilities, and these external stakeholder considerations will be built into the design and chartering phase of each project of this initiative.

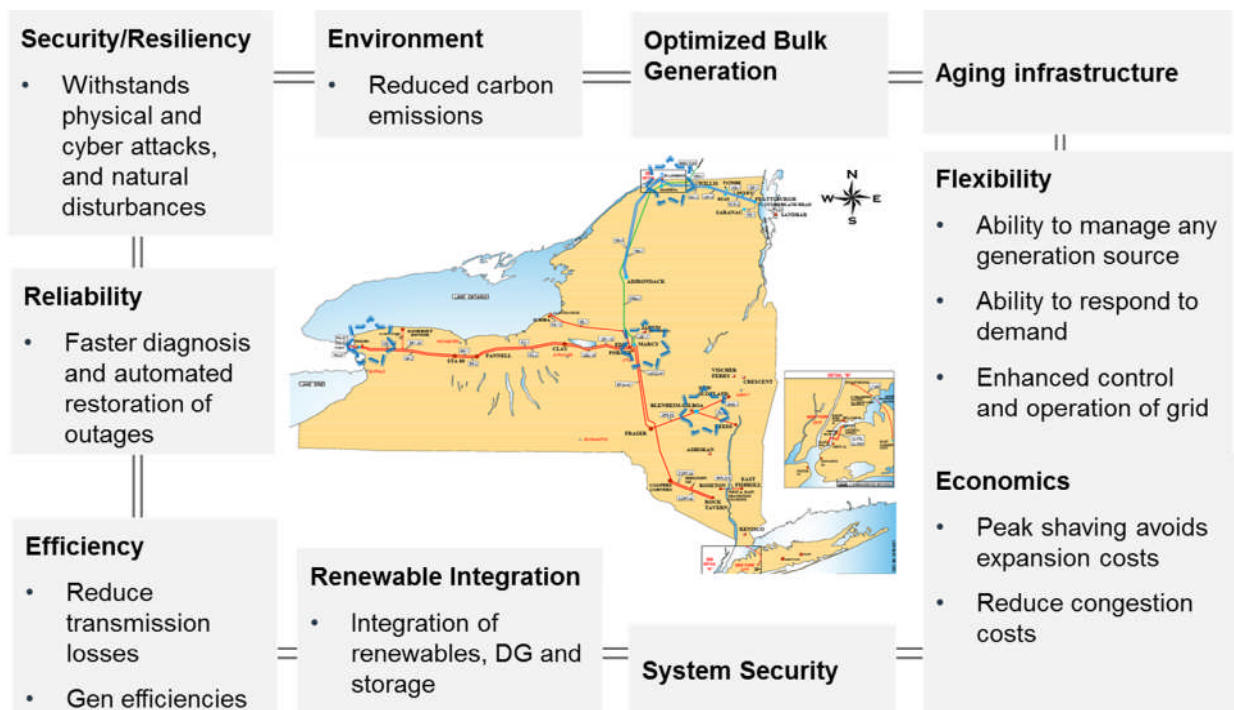
Benefits for New York State

Implementing NYPA's Smart Generation and Transmission initiative will deliver benefits to both NYPA and New York State across a range of financial and non-financial categories. Some of these benefits that smart grid technologies will deliver to the state include;

- Economic development
- Reduced congestion
- Generation savings
- Asset optimization
- Reduced transmission losses
- Integration of renewables
- Ability to support customer choice
- Fuel diversity
- Increased reliability
- Maintaining system security
- Maximizing energy efficiency
- Reducing GHG emissions
- Reliability improvements
- Increased proliferation of renewables
- Enhanced system control
- Increased safety

Indeed by examining the drivers of this initiative, it can be gleaned that the Smart Generation & Transmission capabilities that NYPA plan to deliver will contribute to the solution of many of these, as outlined in Figure 2.

Figure 2: Drivers across the NY state grid influencing NYPA's Smart Generation & Transmission journey



Financial Summary

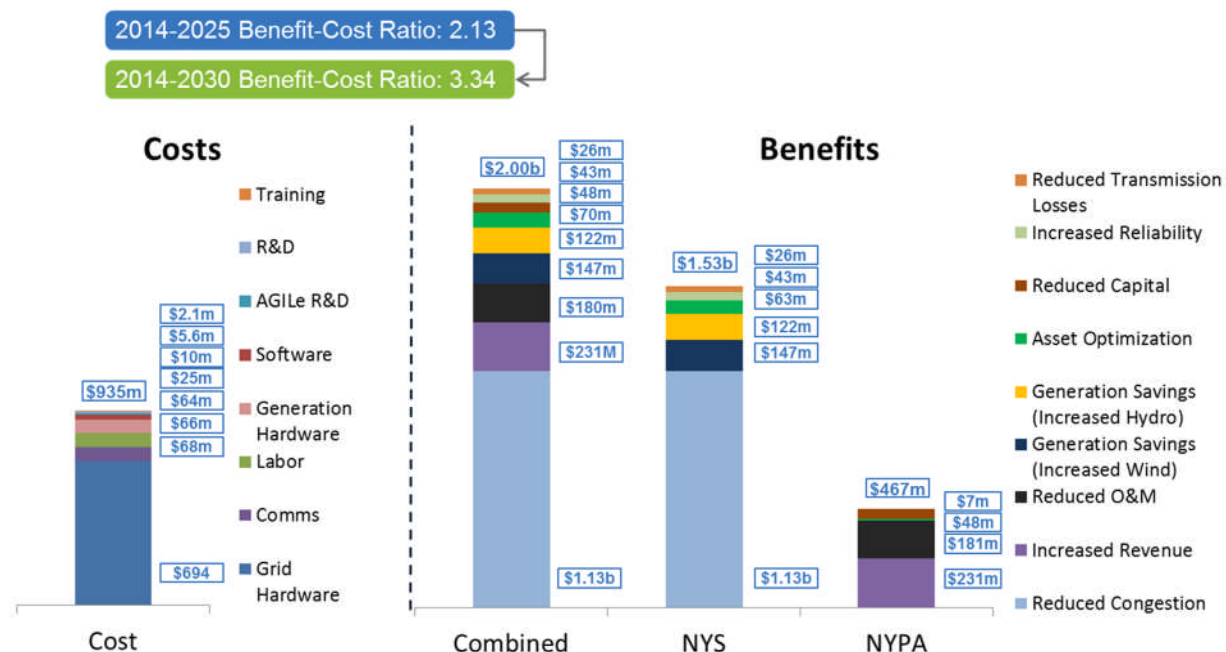
Across the six identified capability areas that NYPA will target, the Smart Generation & Transmission business case analysis shows a positive and improving total benefit-to-cost ratio over time (see Table 1 and Figure 3). While the formal proposed timeline of the initiative's efforts and financial costs will extend from 2014 to 2025 in subsequent sections of this business plan, it is important to note upfront that incremental, ongoing benefits continue to accrue significantly to 2030 and beyond. In both scenarios (to 2025 and 2030), benefit-cost ratios are net positive for NYS and NYPA combined. The lion share of the benefits accrue to NY state, which is in line with NYPA's mission, as well as the drivers and strategic rationale of the initiative as outlined in this document.

Table 1: Initiative Benefit to Cost Ratio to NYPA and NYS combined, by 2025 and by 2030

| Year | Benefit-Cost Ratio | Cost | Benefits (to NYS & NYPA) |
|------|--------------------|---------|--------------------------|
| 2025 | 2.13 | \$0.93b | \$2.00b |
| 2030 | 3.34 | \$0.93b | \$3.12b |

To put this in an external context with other related smart grid investments in the US, the Electric Power Research Institute (EPRI, March, 2011) generally estimated smart grid benefits to be between 2 to 6 times the costs of the investment. According to this and similar studies, smart grid investments are a perfect application of new technologies to reduce costs, transform utility business practices, provide grid control capabilities and provide utility cost savings sufficient to pay interest and principal and even provide some rate relief. The analysis completed in this business plan is consistent with these findings.

Figure 3: Initiative summary benefit-cost breakdown 2014-2025



* This analysis is conservative and does not include a host of other less quantifiable benefit categories for NYPA and NYS such as economic development/ jobs growth, increased security/ safety, reduced GHG Emissions, customer choice etc..

As we look at the six individual capability areas that roll up to the view in Figure 3, we see that benefit-to-cost ratios may vary for each capability because of different operating cost structures, implementation scale and market maturity. One of the first steps post submission of this business plan is to further design and analyze project implementation plans, so financials will be further refined before projects are submitted for approval on an individual basis. That said, there are some common benefit and cost categories that exist across all the initiatives and that are displayed in the summary chart above.

Benefit Categories

Across the six capability areas there are individual benefits, however, many of these can be aggregated into common categories. The table below highlights these major categories.

Figure 4: Major benefit area descriptions

| Benefit Category | Description |
|--------------------------------------|--|
| Reduced Congestion | Reduction in constraints on the economic operation of the power system, such that the marginal price of energy to serve the next increment of load is optimized. |
| Generation Savings (Increased Hydro) | Increased flows of low-cost hydro and ISO revenue from additional hydro resulting from upgrades and enhancements from this initiative |
| Reduced O&M | Reduced operations and maintenance costs, improved reliability and efficiency gains resulting from generation upgrades. |
| Generation Savings (Increased Wind) | Reduced energy costs due to statewide customer fuel-costs savings from enabling additional wind generation. |
| Asset Optimization | Reduction in wear and tear and reduced cost of failure |
| Reduced Capital | Deferred investment (new conductors, new lines, etc.) and other capital savings |
| Reduced Transmission Losses | Reduction in estimated annual cost of T&D losses in NYS |
| Increased Reliability | Reduction in outages that cause overall state energy costs to be higher due to a re-dispatch in real-time and deployment of more expensive generation |
| Increased Revenue | New revenue from increased NYPA hydro flows, CSC and micro-grid pilots |

Cost Categories

Similarly, across all of the capability areas there are individual cost categories, however as with the benefits of the Smart Generation & Transmission initiative many of these can be aggregated into common cost areas. The table below highlights the major areas represented in the Benefit-Cost ratio chart.

Figure 5: Major cost area descriptions

| Cost Category | Description |
|----------------|--|
| Grid Hardware | Tower splitting, STATCOM, CSC upgrades, physical hardware for development system, incremental cost to TLEM, instrumentation and micro-grid pilot installation cost |
| Communications | Fiber optics communications backbone build-out at most critical sites |
| AGILE | Setting the AGILE R&D agenda and directing the studies/activities (AGILE is NYPA's proposed advanced grid innovation laboratory for energy) |
| Labor | Smart grid enterprise architecture, project / implementation plan, smart G&T initiative, project delivery, resources to oversee studies |

High Level Timeline

Across the Smart Generation & Transmission initiatives there are a number of categories of projects that have been identified. In further sections we will detail each of the capability areas and the individual projects, pilots and areas of study that align to these groups. However, in general there are four areas of deployment that exist across the initiative over the next 10-15 years. These can be largely grouped into the following;

- Work that is inflight already and needs to be completed as per schedule
- Projects that can be integrated right away
- Projects that will need to be piloted
- Further R&D Studies and evaluation

In terms of work that is inflight, the \$726 million Transmission Life Extension and Modernization (TLEM) program is a key initial step for creating a smart generation and transmission grid at NYPA as this initiative is replacing and upgrading existing transmission system components that are at the end of service life or at a high risk of failure due to condition.

In addition to the TLEM program, other ongoing efforts include around \$1 million in annual research and development, the proactive and continuous maintenance and improvement of its generating assets with \$1.1 Billion on major bulk generation efficiency/reliability/operational improvements at the Blenheim-Gilboa, St. Lawrence, and Niagara facilities, and is currently implementing a \$470 million upgrade at its Niagara Lewiston Pump Storage Plant over the past several years. Completing the above ongoing projects provides NYPA with the necessary foundation to further build out its Smart Generation & Transmission capabilities.

In late 2014, NYPA will begin its overall Smart Generation & Transmission solution (further outlined in this document), which is meant to innovate incrementally on top the work that has already been done. Figure 6 highlights the high-level initiative deployment timeframe. The roadmap builds upon the early phase Smart Generation & Transmission work already underway, while looking to kick off the majority of the initiative's capability roadmaps by 2015 and implementation by 2016.

Figure 6: High-Level Smart Generation & Transmission Initiative Deployment Timeline



Risks of the initiative

At the highest level, risks associated with the overall initiative and appropriate planned mitigation actions can be grouped into the following key areas:

1. **Resource and Capability Constraints:** Implementing and sustaining smart grid technologies at NYPA will require a host of new skills sets and organizational capability. While this initial roadmap identifies between 40 – 60 new resources that will need to be filled to implement this roadmap, many of these skill-sets are new and unique to this initiative. To mitigate this risk, the initiative will ensure that a holistic operating model and post implementation governance plan is created.
2. **Changes in market conditions:** Changes in wholesale power cost structure, uncertainty over customer market participation, and many other factors can result in considerable uncertainty over estimated returns on smart grid investments. To mitigate this risk, the initiative will track changes in wholesale power cost structure, customer market participation, and many other factors to ensure certainty over estimated returns on smart grid investments.
3. **Inadequate post-implementation strategies:** Many smart grid business plans rely heavily on post-installment benefits (e.g. the implementation of control algorithms). However, program development and implementation details are often not considered until later, resulting in benefits that are often delayed for years. To mitigate this risk, the initiative will ensure adequate post implementation plans and organization structure are developed to track benefits and ensure optimization of new infrastructure.
4. **Vendor Product Maturity:** Many of the Smart Generation & Transmission capability areas in this roadmap will rely on software/IT performance, however, some Grid software/IT capabilities have not been widely deployed and there may be a level a market immaturity across products, adding initiative risk. To mitigate this risk, the initiative will partner with vendors, align products with roadmaps and conduct holistic vendor and market analyses.
5. **Cost Recovery:** A portion of the costs associated with this initiative is expected to be recoverable, but that is not guaranteed and thus poses a risk to the financial prudence and on-time delivery of the projects. To mitigate this risk, the initiative team will partner with Finance to ensure that, whenever possible, adequate cost recovery actions are taken in the planning process for individual projects in this initiative.
6. **Stranded assets:** As grid technologies continue to evolve, old technologies become obsolete, and market conditions change, there is the possibility that certain assets are stranded due to implementation of this initiative. The risk of these scenarios occurring is the key risk “as result” of the initiative rather than “to” the initiative, and will need to be mitigated during implementation. To mitigate this risk, the initiative will ensure that at each stage of product development that the risk of new technology or changing market conditions don’t allow for a stranded asset scenario

It is important to also note that there are several new Strategic Initiatives at NYPA, including Asset Management, Customer Solutions, and Workforce Planning that will have significant interfaces with the Smart Generation & Transmission initiative. Management of dependencies across the NYPA Strategic Vision 2014-2019 will be critical to the success of this initiative.

STRATEGIC RATIONALE

Approach and rationale

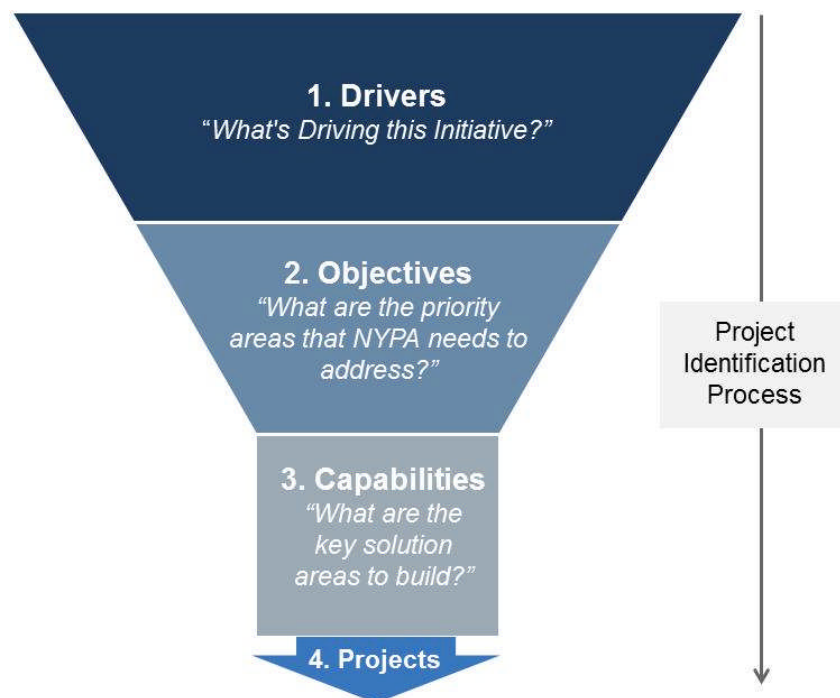
As aforementioned, it is NYPA's ambition to be an industry leading Generation and Transmission organization both in terms of capability and technology. Over the next 10 years this initiative aims to provide the backbone for New York's reimagined energy grid with a market leading platform for future technologies and services.

In the context of New York Energy landscape, the objectives of this initiative align with the Blueprint for Governor Cuomo's Energy Highway ("EH"), issued in 2012, as well as the 2014 launch of the New York Public Service Commission "Reforming the Energy Vision (REV)." The key technology objectives of REV include ensuring system reliability, increasing system resiliency and efficiency, maintaining system security, maximizing energy efficiency and promoting fuel diversity. Aligning to this vision, NYPA will play a key role in helping the State achieve these market reforms, while also addressing some of the pressing needs that exist in NY's energy market including the need to reduce congestion, increase efficiency and provide a flexible resource for managing new generation sources.

Ownership of over 1400 circuit miles of transmission throughout NYS also means that the modernization of its infrastructure to provide NYS with the flexibility it needs to meet this energy transition fits naturally into NYPA's mission and capabilities. This mission includes the stewardship of NYS natural resources, particularly the hydro-power resources of the St. Lawrence River and Niagara Falls, in collaboration with international treaties with Canada. NYPA's mission statement "Power the economic growth and competitiveness of New York State by providing customers with low-cost, clean, reliable power and the innovative energy infrastructure and services they value" is accomplished through NYPA's continuous improvement and modernization programs and by its leadership and collaboration in programs such as the NY Energy Highway initiative, energy efficiency programs, and public/private partnerships.

Aligning to these considerations and working in cross-functional teams, NYPA undertook a 4 step scoping approach (see Figure 7) to identify the most critical projects that the Authority needs to undergo over the next 10-15 years. This process allowed NYPA to examine and benchmark their infrastructure, the markets and the overall initiative from an end-to-end value chain perspective. To that, having identified Smart Generation & Transmission drivers across the marketplace that are driving this initiative (as outlined in the "Benefits to NY State" section) and building on the findings from the strategic planning process undertaken in 2013, NYPA was able to develop a series of objectives.

Figure 7: 4-Step approach to scoping the initiative



Once these objectives were identified, they were grouped into six key capability areas that NYPA will implement over the next 10-15 years (Figure 8). By going through this approach, NYPA was able to identify the most critical work that needs to be implemented by this initiative but also was able to ensure that solutions were designed holistically and in a scalable manner.

Figure 8: Mapping NYPA Smart Generation & Transmission objectives to desired capabilities

| ID | NYPA Smart G&T Initiative Objective | Smart G&T Capability Map |
|----|--|---|
| A | Maintain current reliability given future challenges and improve where possible | Increased reliability & resiliency (A, B, C) |
| B | Repair and replace critical existing assets | |
| C | Ensure efficient compliance to NERC standards in existing and future projects | Enhanced situational awareness (A, B, D, F, G, H) |
| D | Maintain reliability in the face of increasing amounts of intermittent renewable resources and changing customer demands | Optimizing aging transmission assets (B, G) |
| E | Not only save costs for NYPA but for NY state, and support economic growth & business development in NY | |
| F | Optimize the utilization of existing generation resources | Optimizing aging generation assets (B, F) |
| G | Optimize the utilization of existing grid assets | Integration of bulk renewables (D, H, I) |
| H | Accommodate the integration of any type of generation anywhere on the grid, and support for other NY energy initiatives | |
| I | Reduce green-house gas emissions and support NY environmental policy initiatives | Integration of distributed generation (D, H, I) |

Following the above approach, NYPA aims to establish a modern, flexible, and efficient grid that maximizes reliability and resiliency while accommodating increasing amounts of power from clean and distributed generation, reducing congestion and bottlenecks, and enhancing situational awareness and grid control. This initiative will ensure flexibility and efficiency in the face of increasing demands on an aging grid by optimizing the utilization of NYPA's assets. By optimizing both the flow of power through existing and potential new infrastructure and modernizing the maintenance and operation of our transmission assets, we will increase:

- **Flexibility:** a flexible system will be able to accommodate changing load and generation profiles, whether due to increased penetration of renewables or distributed energy resources, energy efficiency, or increased demands on the system in extreme weather events. The system will be operated in real time, incorporating information from devices deployed throughout the network that provide information on current operating condition, operating limits, equipment health, weather conditions, etc., and will ensure minimized congestion through maximized utilization of assets.
- **Efficiency:** the efficient grid will minimize losses throughout the system and deploy capital and labor in the safest and most efficient ways possible. By operating to real time equipment limits, we will continue to reduce bottlenecks, and by examining and planning toward maximized asset utilization, we can reduce losses from over- or under-sizing certain system components. We will explore autonomous maintenance planning and practice to continue to reduce the risk to our employees involved in operating and maintaining the system while reducing downtime required to prevent or correct failures. The seamless integration of distributed energy resources into the grid will also facilitate customer control over their use and enable expanded energy management of buildings and industrial facilities.
- **Modernity:** the modern, or “smart,” future for our transmission assets will incorporate cutting-edge sensing, control, material, design, and maintenance technologies to move toward a self-healing (or, at least, “self-alerting”) grid. We will build upon NYPA's position as a technology, research, and innovation leader in this area and continue to scale our pilot research projects in these areas to full-scale deployment as assets. Where necessary, we will collaborate with institutional research and private sector institutions to develop new technology.

INITIATIVE OVERVIEW

Description of the opportunity

The New York energy market is changing rapidly and is driving a need for industry transformation and requirements to modernize existing infrastructure. The opportunity for NYPA to invest in smart-grid technology across their Generation and Transmission infrastructure is an important step to facilitate this energy transformation. The investments proposed in this initiative will pave the way for increased benefits to customers by providing the State with a market leading platform for future technologies and services, better management of distributed, renewable generation sources, near-real-time access to information, improved outage management and overall reduced electrical losses and increased system efficiency.

Identifying Capability Requirements and Projects

There are many major markets of smart grid technologies, services and products that sit across existing, new and modernized elements of the energy value chain. In addition, there are many working definitions of a Smart Grid and many examples of initiatives under way that could be considered Smart Grid projects. It is also important to note that the definition of a Smart Grid depends on what perspective you are coming from – generation, transmission, or distribution. While there are common elements, and interaction between them, they are at different stages of development and therefore focusing on different challenges and technological solutions. Increasingly however, there are some global similarities emerging in smart grid deployments, and we can broadly say that there may be five steps to realizing a truly intelligent utility:

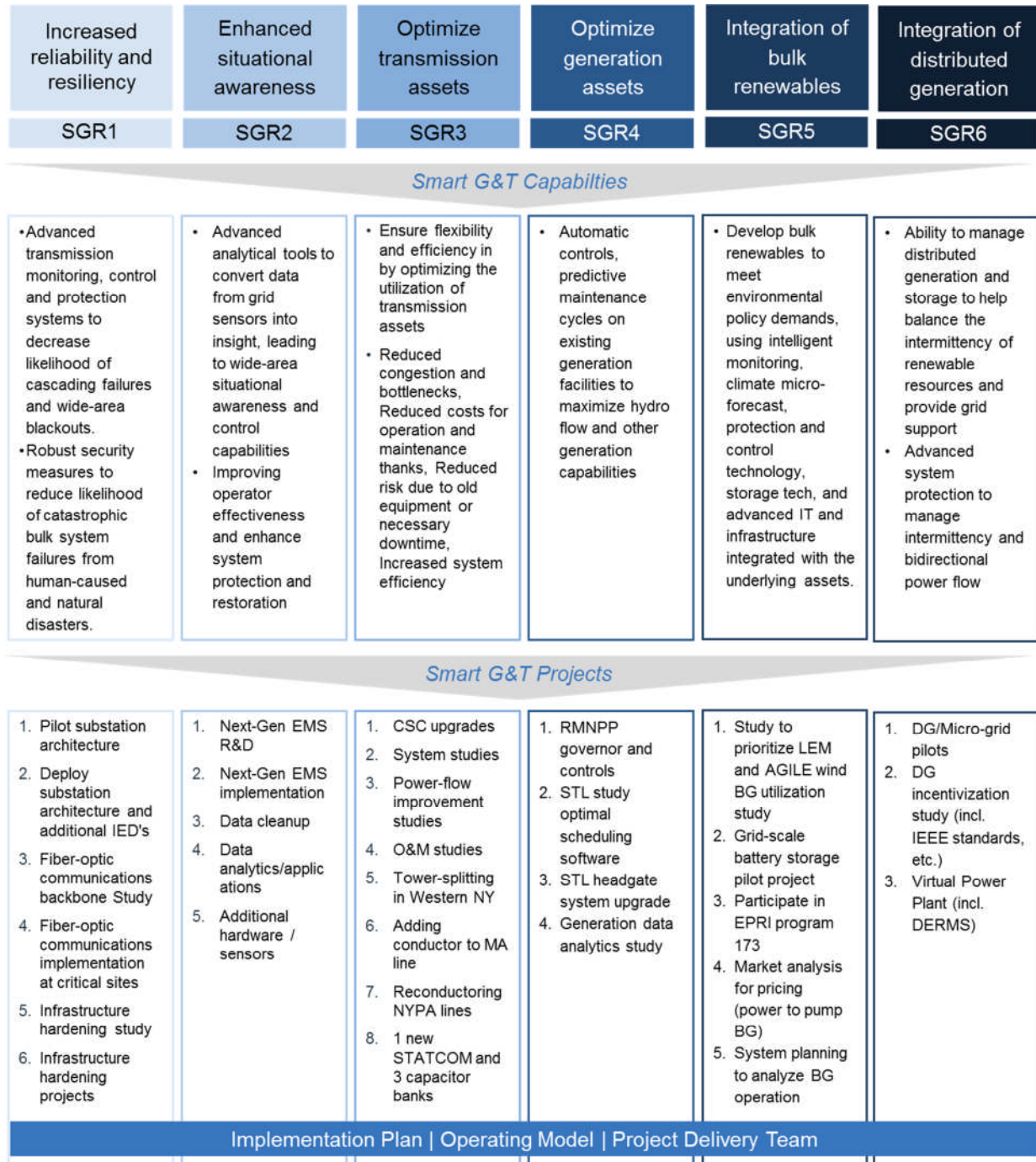
1. Deploying an advanced communications platform
2. Deploying intelligent endpoint devices across the grid
3. Effectively using analytics, software and simulation
4. Rolling out controls and security
5. Ultimately deploying dynamic devices/smart appliances

Within these five areas, NYPA can deploy a whole host of technical solutions that will create a range of benefits for both NYPA and NYS. However, in order to prioritize the most beneficial and cost worthy elements of smart grid technologies and capabilities that exist in the marketplace today and ensure that the investments made by NYPA will be saleable, sustainable and truly address the drivers identified by this initiative, NYPA first identified the capability areas that it needs to build and then identified technical solutions under those areas. This approach will allow NYPA to develop a business and organizational response and well as a technical response to changing market needs. With that said, and as outlined by in the Approach and rationale section, NYPA has identified six key capability areas that projects and ultimately this business plan were designed and centered on. These six capability areas include;

1. Increased reliability & resiliency
2. Enhanced situational awareness
3. Optimized utilization of generation assets
4. Optimized utilization of transmission assets
5. Integration of bulk renewables
6. Integration of distributed generation

In Figure 9 below, each of the capability roadmap area definitions are highlighted as well as the correlating projects in each area.

Figure 9: Summary view of Smart Generation & Transmission capability and project areas

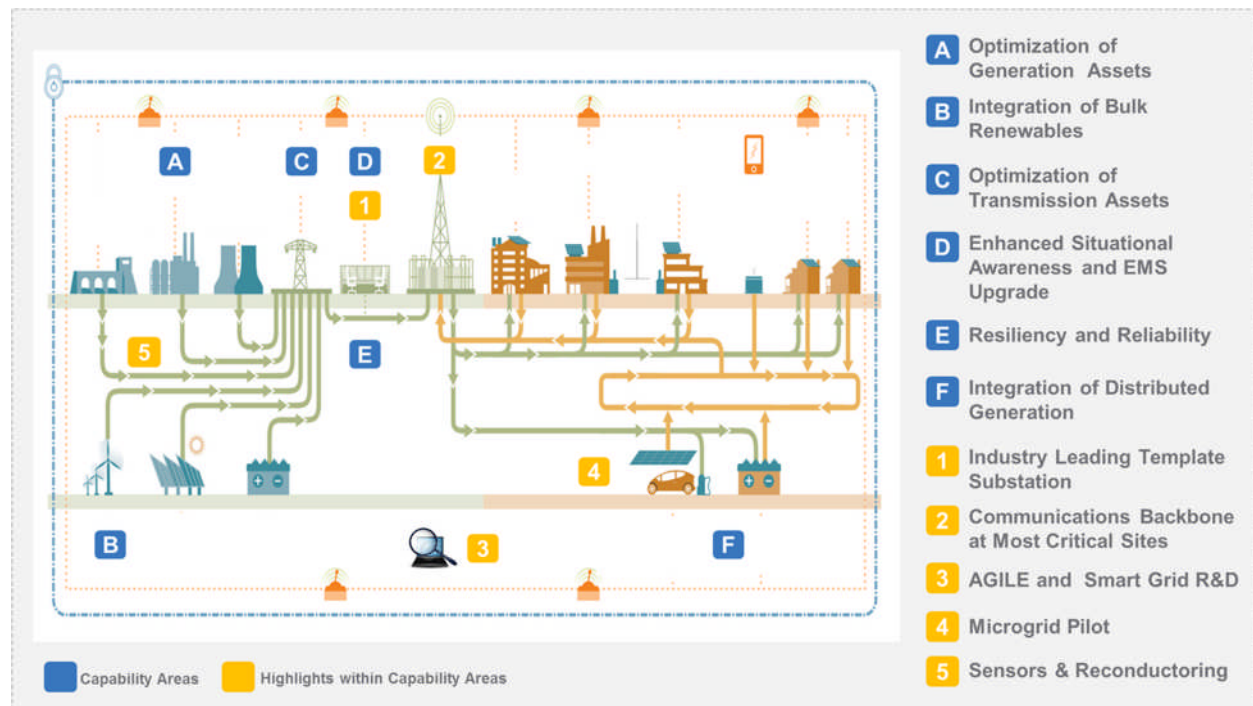


SOLUTION

Proposed solution

NYPAs Smart Generation & Transmission initiative is a holistic deployment of capabilities across the entire value chain. The projects and capabilities identified represent a response to both the challenges facing NYPAs current infrastructure as well as the need to modernize in light of a transformation across the energy sector. Figure 10 below highlights the end to end scope of this initiative mapped onto the existing value chain.

Figure 10: NYPA's end-to-end Smart Generation & Transmission focus areas



While each of the six capability areas identified will have its own discreet roadmap (as detailed in the appendix), below are some of the key objectives they're meant to address;

- Implementation of technologies to improve the flexibility of our system and the efficiency of our maintenance and operations. These include those that have been proven already in the NYPA system - for example, phasor-measurement units (PMU's) or flexible alternating current transmission system (FACTS) devices – and those that have not, such as robotic inspection, new conductor technology, dynamic thermal rating, some of which have been piloted, but not scaled fully.
- Resiliency and reliability projects including the Emergency Energy Control Center (ECC) construction and the MV90 system rebuild. The Emergency ECC will significantly improve the resiliency of NYPA's operations by providing a backup control center offsite with full capabilities in the event that system operations staff could not occupy the ECC at CEC. Presently the project is in the study phase to select the site and define the scope. The second smart grid improvement project for resiliency and reliability is the build out of the MV90 Meter Data collection system which presently resides at the Poletti Admin building. For improved support, and reliability, a second MV90 system will be built and tested in the WPO datacenter with the eventual goal of retiring the system at Poletti.

- System-wide improvements using capital investments in all of our technologies for increasing power flow. The options to be studied range from eliminating unnecessary equipment constraints on power flow (for example, undersized wave guides, current transformers, or connectors) to the construction or purchase of new lines. Following the studies, leveraging and further developing AGILE R&D lab capabilities, we will design a program for investment that will most likely include some combination of reconductoring, dynamic rating, FACTS deployment, or new construction.
- Bulk power storage plants program to provide a valuable benefit to the efficient operation of the electric grid. The goal is to develop advanced modeling techniques that utilize the flexibility of pumped storage, being a generation and demand-response asset, and its numerous capabilities to provide ancillary services, and have a prototype that can eventually be adapted in ISO/RTO system operations and its market software. The analysis and potential enhancements to how pumped storage is utilized will range from the bidding process, to the optimization engine, all the way to prices and settlements.
- The encouragement and incentivization of third party bulk renewable developers to interconnect to the NYPA transmission system. This goal is in line with NYS initiatives for clean power and takes advantage of NYPA's expertise in implementing reliable interconnections as demonstrated with other wind farm developers. NYS currently has approximately 20% generation in the form of bulk renewable (15% hydro, 5% wind and other). The PSC has established a target that approximately 30% energy used (GWH) in NYS by 2015 comes from renewable sources. Grid can operate reliably with a high percentage of bulk and distributed renewable generation. Identify locations in NYS where NYPA's transmission system substations provide good interconnection for additional bulk renewables – such as mapping wind studies with TLEM to prioritize system improvements.

In addition, while Figure 10 above highlights the six key capability areas of focus, within these there are a number of key highlights including the development of an industry leading substation, further build-out of a communications backbone, the development of AGILE and a microgrid pilot.

- **Industry Leading Template Substation:** Develop the use of substation intelligent electronic devices to provide high resolution data on power system equipment condition both for real time operations for enhanced clarity, for improving restoration times following an event by better retrieving data for decision making and for long term trending for asset management. This mainly leverages equipment that will be installed under other programs but needs to be better leveraged by fully realizing the capabilities on board in these devices.
- **Next-generation Energy Management System (EMS):** A system operating architecture is proposed that allows for a comprehensive fully coordinated operation of power systems. This architecture is completely based on sensing and feedback to a central location. Therefore, increased sensors installations and redundant, highly reliable communications links are central staples of such architecture. NYPA will work within its R&D division and with external vendors and organizations as necessary to design and implement the next-generation EMS.
- **Communications backbone at most critical sites:** A significant challenge of integrating Smart Grid technologies, particularly over a wide geographic area for transmission, is for reliable, secure communications systems. Often utilities relied on power line carrier analog communications over the power conductor, direct point to point microwave or third party telephone circuits. As technology has advanced, the required bandwidth has increased significantly, as well as the need for security to ensure reliable system operation and to fully enable the capabilities of the smart IEDs installed at the substations. To enable this NYPA will complete fiber optic programs at its most critical sites.

- **AGILE and Smart G&T R&D:** While the Smart G&T initiative assumes that the physical build of the AGILE R&D lab, as well as the incremental FTE's will be covered under the AGILEe business case, setting the R&D agenda and directing the studies/activities in parallel to AGILE are a significant undertaking in the near term for this initiative. Examples of further studies to conduct include;
 - Next-Gen EMS R&D as detailed above
 - System studies
 - Power-flow improvement studies
 - O&M studies
 - Generation data analytics R&D study
 - Study to prioritize LEM efforts based on increased wind sites
 - Study to prioritize AGILE efforts based on increased wind sites
 - Market analysis for pricing re: purchasing power to pump BG
 - System planning study to analyze new modes of BG operation
 - DG incentivization study
- **Microgrid Pilot:** This initiative will demonstrate a microgrid installation and serve as an example of the benefits that are included in distributed generation technologies. While there are microgrids located within New York State, the uniqueness of the proposed pilot is that NYPA would like to integrate these assets into their internal Virtual Power Plant software. An advanced controller would be installed in order to allow remote monitoring and possibly control. Different control algorithms would be tested to determine optimal ways to benefit customer, the distribution company, and generation/transmission supplier. Testing will also include the ability to enhance resiliency by disconnecting from the grid automatically or remotely, and the ability to send excess power back to the grid.

One of the highest cost and benefit drivers of this initiative is the SGR3 roadmap area – Optimization of Transmission Assets – and so it is important to elaborate on its various components:

- We will undertake a full battery of system studies to determine the best course of action for making system-wide improvements using capital investments in all available technologies for improving power flow. The options to be studied range from eliminating unnecessary equipment constraints on power flow (for example, undersized wave guides, current transformers, or connectors), to the application of energy storage and demand response for system support, to the application of capacitors or other FACTS devices like the Convertible Static Compensator, to the construction or purchase of new lines. We aim to substantially reduce congestion in the system and ensure the system can handle a variety of load and generation profiles while taking care to minimize inefficiencies – the goal is a right-sized, not overbuilt, system. Following the studies, which can leverage or help develop eventual capability for the AGILE lab, we will design a program for investment that will most likely include some combination of reconductoring, dynamic rating, FACTS deployment, or new construction.
- Some preliminary projects have already been identified by NYPA Transmission Planning and Engineering. We plan to complete the tower separation efforts in Western New York and continue to explore ways to improve transmission capability in Northern New York, probably involving the addition of a conductor to the Moses-Adirondack corridor. These efforts will increase the amount of low-cost hydropower we can send from Northern and Western NY. We will also complete networks of dynamic line rating installations where applicable and continue our exploration of advanced ice-phobic conductor materials to reduce downtime during storms. The studies to be commissioned will explore efforts including and beyond these projects both in scope and in geographic region, with a particular eye to continuing to reduce congestion at the most problematic interfaces. The work to upgrade the controls on the Convertible Static Compensator, our FACTS device to reduce congestion at our Marcy substation, will be included as part of this initiative.

- Using results from the system study and examining internal data, whether O&M spending, existing technology, operational considerations etc. we will design frameworks for implementing smart O&M - a framework to prioritize sensor deployment and a framework for testing and implementing advanced maintenance technologies and techniques, which we anticipate will include some combination of live work and autonomous maintenance and data collection. Care will be taken to align installations with TLEM work, when possible, to minimize downtime, and to establish the “innovation pipeline” - a method of evaluating new technologies or approaches and smoothing their transition from research to pilot to full system deployment. To correlate with existing TLEM work, we will commission a final study, whether to be completed internally or by a third party, to ensure that our TLEM work is as modern as it can be and helps to achieve the goals of this initiative.

Solution Design Principles

While the list of capabilities and projects proposed under this initiative is comprehensive and touches many aspects of NYPA’s system, for the entire Smart Generation & Transmission solution, a number of common solution design principles will be applied to ensure designed are scalable, readily compatible with changes in technology and cost effective. Categories of NYPA design principles include;

- **Cyber Security:** Architecture must incorporate the latest cyber security techniques and adhere to NERC CIP (Critical Infrastructure Protection) and other cyber security standards.
- **Scalable Solutions:** The Smart Generation & Transmission infrastructure should allow for the management of hundreds of thousands of endpoint devices and loads.
- **Leverage Industry Protocols:** The infrastructure should leverage open standards and industry best practices, establish repeatable processes and patterns, and provide a template for all demand response solutions
- **Interoperability:** Smart Generation & Transmission technology solutions and requirements should be both vendor and platform independent; “plug and play” architectures should be leveraged as much as possible to allow for the deployment of scalable and interoperable solutions.
- **Top-down approach:** Roadmaps and projects in this initiative will be carried out with the necessary amount of coordination and oversight to ensure a comprehensive and seamless solution. Ample consideration will be given to NYPA’s bottom-up capital budgeting process in the planning of each individual project within the broader solution, so that confirmed projects are funded and executed in a timely manner.

Roll-out plan

The table below represents the delivery categories of each of NYPA's proposed Smart Generation & Transmission Projects. Depending on the categorization, the level of effort will vary across the deployment plan.

Table 2: High-level Smart Generation & Transmission roll-out plan

| Roadmap | Project Name | R&D | Pilot | Implementation |
|---------|---|-----|-------|----------------|
| SGR0 | Initiative implementation plan | | | ● |
| SGR0 | Operating model / Project delivery team set-up | | | ● |
| SGR0 | Smart G&T Enterprise Architecture | | | ● |
| SGR1 | Pilot substation architecture | | ● | |
| SGR1 | Deploy substation architecture and additional IED's | | ● | ● |
| SGR1 | Fiber-optic communications backbone study | ● | | |
| SGR1 | Fiber-optic communications backbone implementation | | ● | ● |
| SGR1 | Infrastructure hardening study | ● | | |
| SGR1 | Infrastructure hardening projects | | | ● |
| SGR2 | Next-Gen EMS R&D | ● | | |
| SGR2 | Next-Gen EMS implementation | | ● | ● |
| SGR2 | Data cleanup | | | ● |
| SGR2 | Data analytics/applications | | | ● |
| SGR2 | Additional hardware/sensors | | | ● |
| SGR3 | CSC upgrades | | | ● |
| SGR3 | System studies | ● | | |
| SGR3 | Power-flow improvement studies | ● | | |
| SGR3 | O&M studies | ● | | |
| SGR3 | Tower splitting at Western NY | | | ● |
| SGR3 | Replacing conductors on MA line | | | ● |
| SGR3 | Adding conductor to MA line | | | ● |
| SGR3 | Reconductoring 20% of NYPA lines | | | ● |
| SGR3 | Additional transmission instrumentation | | | ● |
| SGR3 | Construction of 1 new STATCOM | | | ● |
| SGR3 | 3 new capacitor banks | | | ● |
| SGR4 | RMNPP governor and controls upgrade | | | ● |
| SGR4 | St. Lawrence study optimal scheduling software replacement | | | ● |
| SGR4 | STL headgate system upgrade | | | ● |
| SGR4 | Generation data analytics R&D Study | ● | | |
| SGR5 | Study to prioritize LEM efforts based on wind sites | ● | | |
| SGR5 | Study to prioritize AGILE efforts based on wind sites | ● | | |
| SGR5 | Grid-scale battery storage pilot project | | ● | |
| SGR5 | Participate in EPRI program 173 | ● | | |
| SGR5 | Market analysis for pricing re: purchasing power to pump BG | ● | | |
| SGR5 | System planning study to analyze new modes of BG operation | ● | | |
| SGR6 | DG/Micro-grid pilots | | ● | |
| SGR6 | DG incentivization study (incl. IEEE standards, etc..) | ● | | |
| SGR6 | Virtual Power Plant (incl. DERMS) | | ● | ● |

Suggested business model

In order to deliver an initiative on this scale, a clear and defined initiative operating model will need to be designed. Across all of the capability areas NYPA will need to significantly add not only skill sets but also incremental FTEs. The delivery strategy and sourcing of resources will depend in each case on the solution being developed however at this stage the requirement for an additional 40 to 60 FTE resources has been identified. In all subsequent tables, "Post-2020" indicates final years 2021-2025 of this initiative.

Table 3: Range of anticipated FTE's needed by capability roadmap area, to be ramped between 2014-2025

| ID | Capability | FTE Requirements | Range |
|---|--|------------------|---------------|
| SGR0 | Initiative management | Low | ~2-5 |
| SGR1 | Increased reliability & resiliency | Medium | ~6-8 |
| SGR2 | Enhanced situational awareness | Medium | ~6-8 |
| SGR3 | Optimized utilization of transmission assets | High | ~18-20 |
| SGR4 | Optimized utilization of generation assets | Low | ~3-4 |
| SGR5 | Integration of bulk renewables | Low | ~2-3 |
| SGR6 | Integration of distributed generation | Medium | ~6-8 |
| Total | | | ~40-60 |
| <i>*FTE requirements 2014-2025. FTE ramp rate and overall FTE requirements will depend on project delivery model.</i> | | | |

Table 3 above is a summary of estimated NYPA FTE counts, either reallocated or incrementally hired, that will be needed to roll out the Smart G&T initiative. As the initiative progresses, new incremental resources will need to be absorbed and trained up for new roles. Cumulatively, this adds up to a total range of 40-60 roles, either incremental or reallocated, resulting from the implementation of this initiative and inevitably comprises a significant transformation within NYPA's operational units. The FTE counts above do not include contractors directly associated with implementation projects – those contractor costs however are included in the initiative's costs summarized in the next section.

Incremental FTE's will sit across various domains including engineers, linemen, technicians, data scientists (IT), and business (ERM, R&D). For example;

- Implementation of smart grid technology will require the development of additional skill sets within NYPA's G&T organization. For example, the implementation of advanced transmission line inspection equipment such as robots or unmanned aircraft will require new skills to operate and manage. Through a close link with future asset management data functions, the ability to operate on data-driven recommendations will also need to be developed.
- The deployment of Smart Grid technology and increased use of IEDs for data reporting will require significant increased support for highly skilled engineers and technicians. It should be noted that there can be a steep learning curve associated with deployment of new technologies used in NYPA's core business. These types of systems are a unique skill sets combining power system theory, communications, and computer analysis, which will require internal training, and retention to ensure NYPA has qualified personnel to work on these systems. Skilled engineering personnel will also be required to analyze condition monitoring data to assist operation personnel to make maintenance decisions, and Operations staff will require additional training and resources to be able to utilize these technologies to support the reliable operation of the power system.
- Deployment of these technologies, in a reliable manner unto themselves will require separate development systems to verify the IED and data concentrator functions and capabilities, prior to deployment at a substation. Such a development system will ensure efficient and effective commissioning and operation of these systems in the field, allow of testing of future expansion and upgrades, and provide a training system for end users.

Categories of resources identified by this initiative include a) internal, b) external and c) internal incremental. While category b) and c) above will be new and incremental FTEs, for category a) there will be significant retraining efforts that need to be considered. Overall however there are a number of key next steps to define the future Smart Generation & Transmission delivery model including;

- Design new Smart G&T operating model and detailed organizational sizing requirements
- Identify roles and responsibilities and KPI's

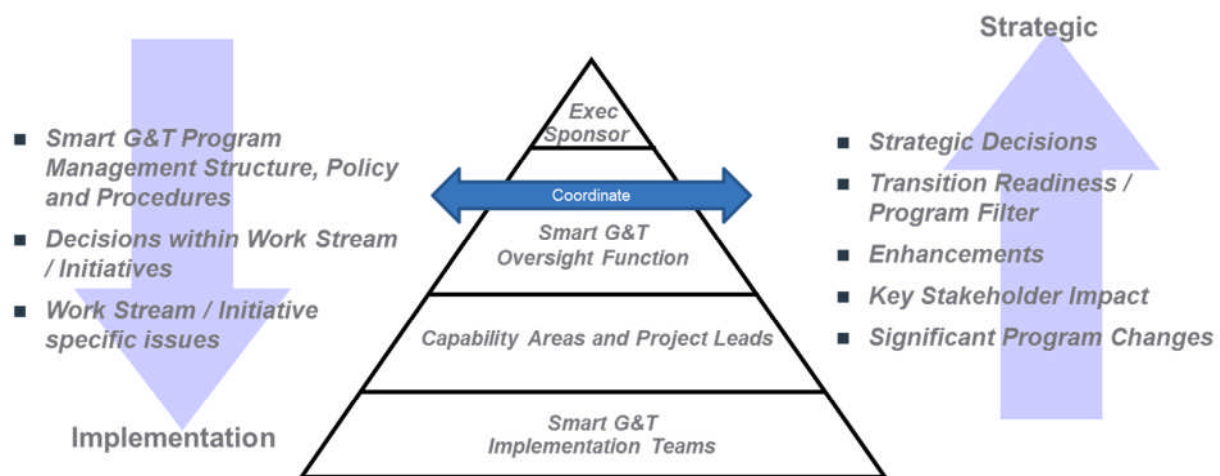
- Implement Smart G&T Governance
- Stabilize operations around identified organizational groups
- Enforce and orchestrate activities

Suggested governance structure

A Smart Generation & Transmission organization is proposed in order to deliver the program of work identified. While the additional resource requirements have been identified at a high-level to date, additional organizational support structures are also being considered. New roles will need to be created in the organization including dedicated levels of responsibility across;

- Executive Sponsor
- Smart Generation & Transmission Oversight Function
- Capability Areas and Project Leads
- Smart Generation & Transmission Implementation Teams

Figure 11: Smart Generation & Transmission Governance Structure (Illustrative)



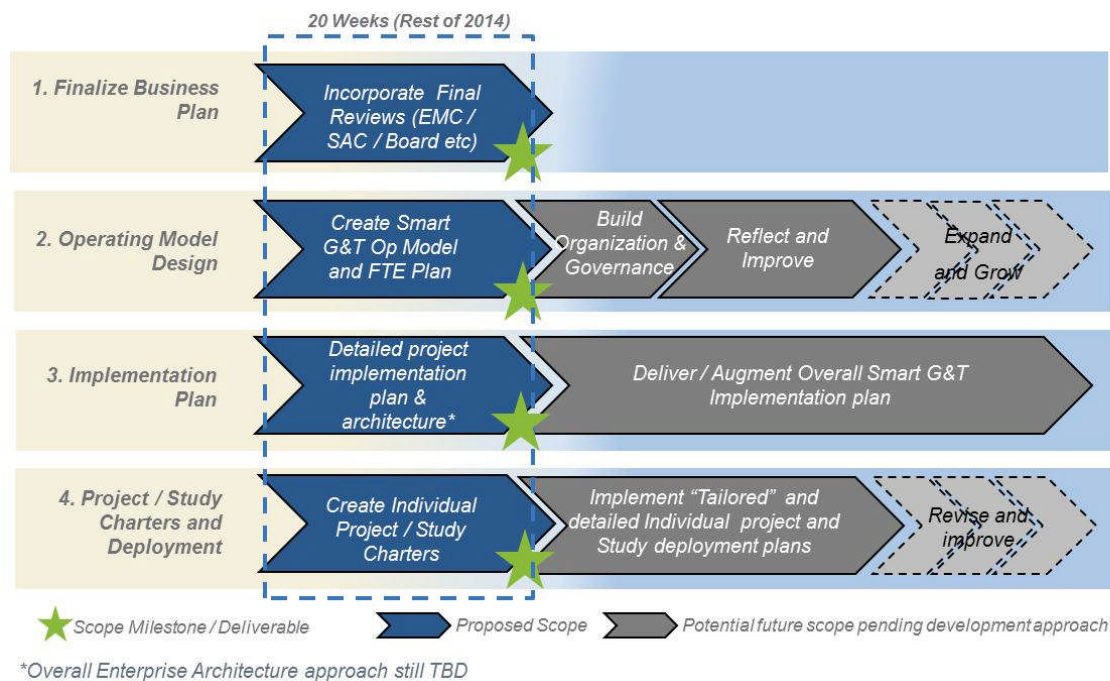
For 2015 NYPA has identified the need to add twelve FTE's to create the Smart Generation & Transmission governance function. This team will be responsible for overseeing the implementation of the organizational structure required to deliver this initiative. While 40-60 FTEs have been identified at this stage for incremental work throughout the initiative years, one of the first tasks for this core team upon board approval of this business plan will be to finalize project implementation plans and understand the ramping of these resources across the initiative. This core team will also be responsible for taking subsequent, detailed project plans and resource requests to the board for approval on a per-project basis. At this stage, a decision will be made on what resources will be embedded to this new team and what resources will be part of the overall transition Smart Generation & Transmission organizations. Throughout the design, a range of Smart Generation & Transmission Operating Model principles will be applied;

- NYPA's Smart Generation & Transmission organization will be designed to efficiently develop and deliver new customer, operational and technology focused capabilities
- New governance structures will enable the type of communication and potential for cooperation with key Smart Generation & Transmission Stakeholders
- The new organization will be conscious of short-term goals, and long-term objectives

- Existing NYPA functions will provide transitional operational support to the business and assist in the transition of these responsibilities to core operations.
- Planned initiatives such as Asset Management and AGILE will provide operational support
- Smart Generation & Transmission will be an evolving organization that is focused on continuous improvement that needs to be agile, resilient, and responsive to iterating.

Initiative Implementation Planning

As part of the next phase of implementation planning, the Smart G&T initiative team will work on four key areas throughout the remainder of 2014. Each of these four areas will ultimately provide the bottom up business case validation, operating model and detailed project plans needed to finalize the initiative. While the first area recommends a continuation of refining this document, the subsequent three workstreams will validate the content proposed here and set forth a delivery structure, as outlined further below.



Operating Model Design

Building on the content in this document, the main purpose of this stream is to create a Smart Generation & Transmission team, operating model, sourcing strategy and overall governance structure to deliver the initiative. It is also to conclude the top-down estimate of resource needs and launch a more detailed bottom-up approach.

Key Activities:

- Develop functional operating model
- Conduct role analysis
- Create the organizational structure and develop organizational staffing plan
 - Smart Generation & Transmission Oversight Function
 - Capability Areas and Project Leads
 - Smart Generation & Transmission Implementation Teams
- Launch Smart Generation & Transmission organization and implement governance

Detailed Implementation Plan

This stream will create an overarching implementation plan and system architecture. The implementation plan will be a detailed project plan that aligns to the top-down Smart Generation & Transmission approach and overall charter development efforts, with milestones, dependencies and project management tools defined.

Key Activities:

- Implementation Plan
- Create end-to-end project plan with deliverables and milestones
- Align individual project charter with end-to-end timeline
- Detailed Project Plans for prioritized projects
- Enterprise Architecture (final scope to be added to this approach)
- System Blueprint
- Technical Requirements analysis (include data model requirements)

Project / Study Charters and Deployment

The purpose of this stream is to create individual project / study charters and definition of the business solution as prerequisites for the funding approval of individual projects. Any business case unknowns should be resolved here (or a plan put in place to resolve them). Detailed project costs and schedule estimates for the entire project should be significantly increased in accuracy. In addition, evaluation and deployment of quick wins will be part of this workstream.

Key Activities:

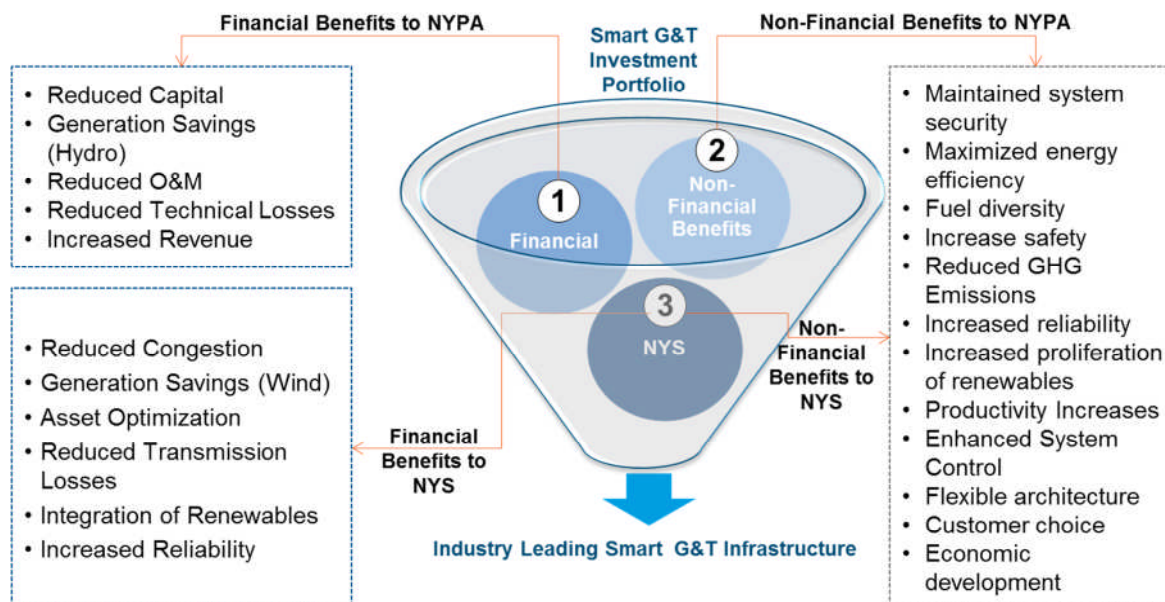
- Complete individual project / study charters
- Project / Study overview (Detailed description and project justification)
- Project scope (Requirements & Deliverables)
- Project / study plan (Timeline and project / study plan including executive milestones)
- Detailed financials (Detailed estimates and funding sources)
- Project organization charter approval (Roles & responsibilities and governance)
- Implement quick wins where applicable

BENEFITS AND REVENUE

High-level benefits description

This section outlines the many benefits that are expected as a result of rolling out this initiative. As Figure 12 below suggests, there are three large buckets of benefits – financial to NYPA, financial to NYS and non-financial – as well as various categories of benefits that fall within those buckets.

Figure 12: Summary of initiative financial and non-financial benefit categories



While financial benefits and the positive benefit-cost ratio form the investment-grade foundation of this business plan, non-financial benefits are equally as important. Below highlights some of the key non-financial benefits listed above:

- **Maintained system security for NYPA** – By following NERC-CIP requirements and design guidelines, this initiative will maintain system security at NYPA in the face of growing new advanced hardware and software installations.
- **Increased safety for NYPA** – By automating as much of grid controls and maintenance as possible, NYPA will reduce the number of man-hours needed to perform often dangerous activities, and thus raise overall safety at NYPA.
- **Higher % penetration of renewables for NYS** – Through efforts such as studies to better facilitate interconnection of bulk wind power sites to NYPA’s system, as well as distributed generation/micro-grid piloting, this initiative will encourage a higher % of bulk and distributed renewable penetration in NY State.
- **Reduced greenhouse gas emissions for NYS** – By efforts such as reducing technical losses on transmission lines, increasing flow of hydro power and higher integration of renewables, this initiative will help NY state reduce greenhouse gas emissions
- **Reliability improvements for NYPA and NYS** – By efforts such as upgrading lines, strengthening transmission capacity, and adding sensor/remote monitoring capabilities, this initiative will help both NYPA and NY state improve system reliability
- **Enhanced system control for NYPA and NYS** – By setting up and proliferating use of advanced monitoring and control capabilities in both generation and transmission assets, NYPA will be able to better manage load and supply throughout its system in real-time.

Table 4 below presents a complete list of the projects under this initiative are mapped to the appropriate benefit categories, both financial and non-financial.

Table 4: Smart Generation & Transmission projects mapped to financial and non-financial benefit categories

| Benefits | | | Smart G&T Projects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|------------------------|-----------------------------|-------------------------------|---|-------------------------------|--|--------------------------------|-----------------------------------|------------------|-----------------------------|-----------------------|-----------------------------|-----------------------------|----------------|--------------------------------|-------------|---------------------|-------------------------------|--|------------------------------------|---|---------------------------------|---------------------------------------|-------------------------------------|---|-----------------------------|--|-------------------------------------|---|---|--|---------------------------------|---|---|----------------------|--|-----------------------------------|---|---|---|---|
| | | | Reliability and Resiliency | | | | Situational Awareness | | | | Optimize Transmission | | | | | | Optimize Generation | | | | Int. of Bul Renewables | | | | Int. of DG | | | | | | | | | | | | | | | | |
| | | | Pilot Substation Architecture | Deploy substation architecture and additional IED's | Communications Backbone Study | Communications Backbone Implementation | Infrastructure Hardening Study | Infrastructure Hardening Projects | Next-Gen EMS R&D | Next-Gen EMS Implementation | Data cleanup | Data analytics/applications | Additional hardware/sensors | System studies | Power-flow improvement studies | O&M studies | CSC Upgrades | Tower Splitting at Western NY | Adding conductor to MA line and replacing MA lines | Reconductoring 20% of NYPA's lines | Additional transmission instrumentation | Installation of one new STATCOM | Construction of 3 new capacitor banks | RMNPP Governor and Controls Upgrade | STL Study Optimal Scheduling Software Replacement | STL Headgate System Upgrade | SCADA/Diversion Flow Measurement Sys Interface | TBD Generation Technology R&D Study | Study to prioritize LEM efforts based on wind sites | Study to prioritize AGILE efforts based on wind sites | Grid-scale battery storage pilot project | Participate in EPRI program 173 | Market analysis for pricing (purchasing power to pump BG) | System planning study to analyze BG operation | DG/Micro-grid pilots | DG incentivization study (incl. IEEE standards, etc) | Virtual Power Plant (incl. DERMS) | | | | |
| Financial | NYPA | Reduced O&M | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | |
| | NYPA | Reduced Capital | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | |
| | NYPA | Asset Optimization | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| | NYPA | Generation Savings (Hydro) | | | | | | | | | | | | | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| | NYPA | Increased Revenue | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | NYPA | Increased Reliability | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| | NYS | Reduced Congestion | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | ● | | | ● | ● | ● | ● | | |
| | NYS | Generation Savings (Wind) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | NYS | Asset Optimization | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| | NYS | Reduced Transmission Losses | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| | NYS | Generation Savings (Hydro) | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Reliability | NYPA / NYS Reliability | Increased Reliability | ● | ● | ● | ● | ● | ● | | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Environmental | NYPA / NYS Envir | Reduced CO2 Emissions | | | | | | | | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| Safety | NYPA | Increased Safety | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Security | NYPA / NYS Security | Reduced Widescale Blackouts | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |

Financial benefits

Table 5 below is a summary of the financial benefits anticipated from rolling out the Smart Generation & Transmission initiative. Subsequent material presents detail on how these benefits were estimated from a bottom-up examination of each roadmap area and potential benefit categories.

Table 5: Summary of projected benefits from implementing the Smart Generation & Transmission initiative

| Benefits to New York State (\$ '000) | | | | | | | | |
|--------------------------------------|-------------|-------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Savings from | | | | | | | | |
| Reduced Congestion | \$ - | \$ - | \$ - | \$ 41,000 | \$ 43,000 | \$ 150,000 | \$ 126,000 | \$ 153,000 |
| Generation Savings (Increased Wind) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 21,000 | \$ 21,000 | \$ 21,000 |
| Asset Optimization | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 9,000 | \$ 9,000 | \$ 9,000 |
| Reduced Transmission Losses | \$ - | \$ - | \$ 1,400 | \$ 1,400 | \$ 1,400 | \$ 3,050 | \$ 3,100 | \$ 3,150 |
| Increased Reliability | \$ - | \$ - | \$ - | \$ 4,100 | \$ 4,300 | \$ 5,000 | \$ 4,200 | \$ 5,100 |
| Generation Savings (Increased Hydro) | \$ - | \$ - | \$ - | \$ - | \$ 5,000 | \$ 9,000 | \$ 18,000 | \$ 18,000 |
| Total (\$ '000) | \$ - | \$ - | \$ 1,400 | \$ 46,500 | \$ 53,700 | \$ 197,050 | \$ 181,300 | \$ 209,250 |

| | |
|-------------------------------------|---------------------|
| Total NYS benefits (\$ '000) | \$ 1,526,200 |
|-------------------------------------|---------------------|

| Cost savings for NYPA (\$ '000) | | | | | | | | |
|---------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Reduced O&M | \$ 1,183 | \$ 1,422 | \$ 13,695 | \$ 18,525 | \$ 17,332 | \$ 20,520 | \$ 21,142 | \$ 17,348 |
| Reduced Capital | \$ - | \$ - | \$ - | \$ 6,000 | \$ - | \$ 6,000 | \$ 6,000 | \$ 6,000 |
| Asset Optimization | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 1,000 | \$ 1,000 | \$ 1,000 |
| Total (\$ '000) | \$ 1,183 | \$ 1,422 | \$ 13,695 | \$ 24,525 | \$ 17,332 | \$ 27,520 | \$ 28,142 | \$ 24,348 |

| Incremental revenue to NYPA (\$ '000) | | | | | | | | |
|---------------------------------------|-------------|-------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Customer revenue | \$ - | \$ - | \$ 969 | \$ 1,938 | \$ 2,907 | \$ 3,876 | \$ 4,845 | \$ 5,814 |
| CSC Revenue | \$ - | \$ - | \$ 11,807 | \$ 11,962 | \$ 12,121 | \$ 12,283 | \$ 12,450 | \$ 12,621 |
| ISO revenue | \$ - | \$ - | \$ - | \$ - | \$ 8,000 | \$ 8,000 | \$ 8,000 | \$ 8,000 |
| Total (\$ '000) | \$ - | \$ - | \$ 12,776 | \$ 13,900 | \$ 23,028 | \$ 24,159 | \$ 25,295 | \$ 26,435 |

| | |
|--|-------------------|
| Total savings & revenue to NYPA (\$ '000) | \$ 466,893 |
|--|-------------------|

Benefit assumptions

The initiative-level benefits summary above was compiled by rolling up estimate calculations by benefit category made within each of the six roadmap areas. The following Table 6 shows which benefit categories were realized in which roadmap areas and provides a high-level description of how those benefits are expected to be realized in that area. For more detailed documentation of the calculations behind each roadmap area's benefit categories, please see appendix items as referenced in each line below.

Table 6: Benefit category detail and assumptions by capability roadmap area

| ID | Roadmap Name | Projects | Benefit Category | Category Detail | # in Appendix Table |
|------|---------------------------------------|--|--------------------------------------|--|---------------------|
| SGR1 | Increase Reliability / Resiliency | <ul style="list-style-type: none"> Pilot Substation Architecture Deploy substation architecture and additional IED's Fiber-optic comms backbone study Fiber-optic comms backbone imp Infrastructure Hardening Study Infrastructure Hardening Projects | Increased Reliability | Reduced congestion costs due to avoided transmission failures | 1 |
| | | | Reduced O&M | Reduced O&M - Maintenance | 2 |
| | | | Reduced O&M | Reduced O&M to NYPA due to improved reliability | 3 |
| | | | Reduced Capital | Reduced Capital - Installation of MA fiber if MA line rebuild proceeds | 4 |
| | | | Reduced Capital | Comms lease savings to NYPA | 5 |
| SGR2 | Enhance Situational Awareness | <ul style="list-style-type: none"> Next-Gen EMS R&D Next-Gen EMS Implementation Data cleanup Data analytics/applications Additional hardware/sensors? | Reduced Congestion | 20% reduction in NYS congestion | 6 |
| | | | Generation Savings (Increased Wind) | Reduced energy costs due to additional 300MW wind savings to NYS | 7 |
| | | | Asset Optimization | Economy (reduction in wear & tear) savings to NYS | 8 |
| | | | Asset Optimization | Safety (equipment damage only) to NYS | 9 |
| | | | Reduced O&M | Economy (O&M reduction) | 10 |
| | | | Reduced Transmission Losses | Efficiency (1% technical loss reduction) savings to NYS | 11 |
| | | | Reduced O&M | FTE O&M savings to NYPA | 12 |
| | | | Asset Optimization | Economy (reduction in wear & tear) savings to NYPA | 13 |
| SGR3 | Optimizing Transmission Assets | <ul style="list-style-type: none"> System studies Power-flow improvement studies O&M studies CSC Upgrades Tower Splitting at Western NY Replacing conductors on MA line Adding third conductor on MA line Additional instrumentation Reconductoring 20% of NYPA's lines Installation of one new STATCOM Construction of 3 new capacitor banks | Generation Savings (Increased Hydro) | Incr flows of low-cost hydro | 14 |
| | | | Increased Revenue | ISO revenue from additional hydro | 15 |
| | | | Increased REvenue | CSC revenue from CSC upgrades | 16 |
| | | | Reduced Congestion | 10% reduced congestion to NYS | 17 |
| | | | Reduced Capital | Capital – investment savings | 18 |
| | | | Reduced Transmission Losses | Reduced transmission line losses | 19 |
| | | | Reduced O&M | O&M – maintenance savings | 20 |
| SGR4 | Optimizing Generation Assets | <ul style="list-style-type: none"> RMNPP Governor and Controls Upgrade St. Lawrence Study Optimal Scheduling Software Replacement STL Headgate System Upgrade TBD Generation Technology R&D Study | Reduced O&M | Reduced maintenance, labor and down-time | 21 |
| SGR5 | Integration of Bulk Renewables | <ul style="list-style-type: none"> Study to prioritize LEM efforts based on increased wind sites Study to prioritize AGILE efforts based on increased wind sites Grid-scale battery storage pilot project Participate in EPRI program 173 Market analysis for pricing re: purchasing power to pump BG System planning study to analyze new modes of BG operation | N/A | Depending on the outcome of the studies, there is potential but as yet unquantified benefits from: - reduced greenhouse gas emissions to NY state - increase to NY state renewable portfolio - additional revenue to NYPA from optimized BG operations and financial savings to NY state from higher wind penetration | N/A |
| SGR6 | Integration of Distributed Generation | <ul style="list-style-type: none"> DG/Micro-grid pilots DG incentivization study (incl. IEEE standards, etc) Virtual Power Plant (incl. DERMS) | Increased Revenue | Revenue from customer based on distributed generation revenue and build / maintenance fees and revenue sharing | 22 |

Confidence level of benefit realization

Across the initiative project portfolio we have identified projects and associated benefits through the employment of assumptions, market knowledge and NYPA specific data points.

While we believe the benefit assumptions are directionally correct and provide a positive state-wide benefit-cost ratio for NYPA to proceed with investment, more work is needed to assess the viability of many of these

projects. For that reason, a lot of studies and R&D work is frontloaded in the initiative. Also, we suggest each project create a charter and implementation plan along with a detailed cost benefit analysis as a next step from this initiative. This staged gate process will ensure that only the viable projects are executed and an accurate benefits tracking process will be followed.

The following represents the overall confidence that the specified revenue and benefits will be realized, using the scale that follows.

Confidence level of benefit realization

Please indicate the overall confidence that the specified revenue benefits will be realized, using the scale specified to the right. Using the specified confidence level, a confidence-adjusted revenue and benefit range is then estimated.

| | |
|----------|-----|
| Benefits | Low |
| Revenue | Low |

| Confidence level | Benefit/revenue realization range |
|------------------|-----------------------------------|
| Very high | +/- 5% of expected benefits |
| High | +/- 10% of expected benefits |
| Medium | +/- 20% of expected benefits |
| Low | +/- 30% of expected benefits |
| Very low | +/- 50% of expected benefits |

| | Low | High |
|---|--------------|-------------|
| Total NYS benefits (\$ '000) | \$ 1,068,340 | \$1,984,060 |
| Total savings and revenue to NYPA (\$ '000) | \$ 326,825 | \$ 606,961 |

Revenue and Cost recovery plan and assumptions (if applicable)

FUNDING FOR THE INITIATIVE

Intended sources of funding

The Smart Generation & Transmission initiative will be funded via a combination of NYPA's O&M and Capital budgets, as well as debt. Several high-cost projects adding up to around \$360 million, including a \$275 million replacement of conductors on the Moses-Adirondack line and a \$41 million Robert Moses governor and controls upgrade, have been proposed in NYPA's long-term capital plans already and specific cost recovery mechanisms have been identified. These and other potential cost recovery avenues for the remaining \$570 million of planned spend are listed below and will be explored as part of this initiative:

- NYPA Transmission Adjustment Charge (NTAC): This tariff allows cost recovery for "replacement in kind" investments, such as the planned project to replace conductors on the Moses-Adirondack line
- NYISO Open Access Transmission Tariff (OATT): This tariff includes the Reliability Facilitation Charge recovery mechanism, as well as the congestion cost recovery mechanism under the Congestion Assessment and Resource Integration Study (CARIS).
- Hydro rate recovery: This mechanism allows cost recovery for certain hydroelectric upgrade investments, such as the planned Robert Moses controls upgrade
- NYISO Transmission Congestion Contracts (TCC): This mechanism allows cost recovery for TCC-related projects such as the planned Convertible Static Compensator (CSC) upgrades

To further illustrate, below is a table of the top ten costly projects in the Smart Generation & Transmission initiative and potential rate recovery mechanisms.

Table 7: Rate recovery potential of top ten highest-cost Smart Generation & Transmission projects

| Roadmap | Project Name | Cost (\$'000) | Cost Recovery Mechanism |
|---------|---|---------------|------------------------------|
| SGR3 | Replace conductors on MA line | \$273,980 | NTAC |
| SGR3 | Reconductoring additional 20% of NYPA lines | \$147,000 | Potential through NYISO-OATT |
| SGR3 | Adding conductor to MA line | \$100,000 | Potential through NYISO-OATT |
| SGR1 | Fiber-optics comms backbone build-out | \$67,790 | Potential through NYISO-OATT |
| SGR3 | Additional transmission instrumentation | \$59,482 | Potential through NYISO-OATT |
| SGR4 | RMNPP governor & controls upgrade | \$41,261 | Hydro-rate recovery |
| SGR3 | Construction of 1 new STATCOM | \$35,000 | Potential through NYISO-OATT |
| SGR3 | 3 new capacitor banks | \$30,000 | Potential through NYISO-OATT |
| SGR4 | STL headgate system upgrade | \$23,230 | Hydro-rate recovery |
| SGR3 | Tower splitting at Western NY | \$16,000 | Potential through NYISO-OATT |
| SGR3 | CSC upgrade | \$15,000 | TCC |

However, it remains to be seen whether these recovery possibilities are fully realized. As a very preliminary estimate for the purposes of this business plan, a two-thirds of the initiative's costs are assumed to be funded by NYPA equity and the rest by debt. The funding breakdown is laid out in Table 8 below. This level of equity-to-debt funding could change depending on cost recovery mechanism, NYPA's overall capex plan and financial market conditions. It should also be noted that timing of a project may be affected if it is going through a regulatory cost recovery process.

Table 8: Initiative funding sources

| Intended total funding sources | | | |
|--------------------------------|----------|-------------------|---------------------|
| Source | Selected | Value (\$ '000) | Percentage of funds |
| Bond issuance | Yes | \$ 311,816 | 33% |
| Cash reserves | Yes | \$ 623,631 | 67% |
| Third-party funds | No | \$ - | 0% |
| Other | No | \$ - | 0% |
| Total | | \$ 935,447 | 100% |

Any values that have been entered for one or more subinitiatives will be automatically included in the table below at the aggregate level.

| Expected annual funding profile | | | | | | | | | |
|----------------------------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|--|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 | |
| Bond proceeds | \$ 919.39 | \$ 5,929 | \$ 32,945 | \$ 50,702 | \$ 61,767 | \$ 55,296 | \$ 37,677 | \$ 13,316 | |
| Third-party funds | | | | | | | | | |
| Total external funds | \$ 919 | \$ 5,929 | \$ 32,945 | \$ 50,702 | \$ 61,767 | \$ 55,296 | \$ 37,677 | \$ 13,316 | |
| Interest payments | | | | | | | | | |
| Debt retirement | | | | | | | | | |
| Other | | | | | | | | | |
| Net external funds impact | \$ 919 | \$ 5,929 | \$ 32,945 | \$ 50,702 | \$ 61,767 | \$ 55,296 | \$ 37,677 | \$ 13,316 | |
| NYPA cash | \$ 1,839 | \$ 11,858 | \$ 65,890 | \$ 101,404 | \$ 123,533 | \$ 110,592 | \$ 75,353 | \$ 26,632 | |
| Total annual cost | \$ 2,758 | \$ 17,787 | \$ 98,835 | \$ 152,106 | \$ 185,300 | \$ 165,888 | \$ 113,030 | \$ 39,949 | |

| | |
|---|-------------------|
| Total external funding (\$ '000) | \$ 311,816 |
| Total NYPA cash (\$ '000) | \$ 623,631 |

Confidence level of external funding

Please indicate the overall confidence that the indicated external funding levels will be realized, using the scale specified to the right. Using the specified confidence level, a confidence-adjusted range of external funding is then estimated.

| | |
|-------------------------|------------|
| Confidence level | Low |
|-------------------------|------------|

| Confidence level | External funding range |
|------------------|-----------------------------|
| Very high | +/- 5% of expected funding |
| High | +/- 10% of expected funding |
| Medium | +/- 20% of expected funding |
| Low | +/- 30% of expected funding |
| Very low | +/- 50% of expected funding |

| | Low | High |
|---|-------------------|-------------------|
| External funding (\$ '000) | \$ 218,271 | \$ 405,360 |
| Residual NYPA cash funds (\$ '000) | \$ 717,176 | \$ 530,087 |

COSTS

Initiative cost (i.e. costs associated with implementing the initiative)

Table 9 below is a summary of financial cost estimates needed to roll out the Smart G&T initiative at NYPA. Subsequent material offer detail on how these cost estimates were derived from a bottom-up examination of each roadmap area and its cost categories. At this early stage, without knowing the exact split of O&M costs between headquarters and sites, half of O&M costs are assumed in one and half in the other.

Table 9: Summary of cost estimates for implementing the Smart Generation & Transmission initiative

| O&M costs - Site (\$ '000) | | | | | | | | |
|----------------------------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Grid Hardware | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Generation Hardware | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Comms | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AGILE | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Labor | \$ 238 | \$ 988 | \$ 2,294 | \$ 2,481 | \$ 2,613 | \$ 2,788 | \$ 2,788 | \$ 2,263 |
| Software | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 5,250 | \$ 250 | \$ 250 |
| R&D | \$ - | \$ 613 | \$ 438 | \$ 175 | \$ 175 | \$ 175 | \$ 175 | \$ 175 |
| Training | \$ - | \$ - | \$ 88 | \$ 28 | \$ 15 | \$ 15 | \$ 15 | \$ 15 |
| Total annual Site O&M | \$ 238 | \$ 1,600 | \$ 2,819 | \$ 2,684 | \$ 2,803 | \$ 8,228 | \$ 3,228 | \$ 2,703 |

| | |
|--|------------------|
| Total initiative Site O&M costs (\$ '000) | \$ 35,110 |
|--|------------------|

| O&M costs Headquarters, Overhead and Other | | | | | | | | |
|--|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Grid Hardware | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Generation Hardware | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Comms | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AGILE | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Labor | \$ 238 | \$ 988 | \$ 2,294 | \$ 2,481 | \$ 2,613 | \$ 2,788 | \$ 2,788 | \$ 2,263 |
| Software | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 5,250 | \$ 250 | \$ 250 |
| R&D | \$ - | \$ 613 | \$ 438 | \$ 175 | \$ 175 | \$ 175 | \$ 175 | \$ 175 |
| Training | \$ - | \$ - | \$ 88 | \$ 28 | \$ 15 | \$ 15 | \$ 15 | \$ 15 |
| Total annual HQ/OH/Other costs | \$ 238 | \$ 1,600 | \$ 2,819 | \$ 2,684 | \$ 2,803 | \$ 8,228 | \$ 3,228 | \$ 2,703 |

| | |
|---|------------------|
| Total HQ/OH/Other initiative costs (\$ '000) | \$ 35,110 |
|---|------------------|

| Capital expenses (\$ '000) | | | | | | | | |
|----------------------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Grid Hardware | \$ 1,100 | \$ 8,690 | \$ 71,663 | \$ 116,713 | \$ 138,338 | \$ 114,638 | \$ 86,658 | \$ 31,270 |
| Generation Hardware | \$ 948 | \$ 2,192 | \$ 7,441 | \$ 12,125 | \$ 10,682 | \$ 11,620 | \$ 9,742 | \$ 1,948 |
| Comms | \$ - | \$ 600 | \$ 6,940 | \$ 12,350 | \$ 25,500 | \$ 18,000 | \$ 5,000 | \$ - |
| AGILE R&D | \$ - | \$ - | \$ 2,000 | \$ 2,000 | \$ 2,000 | \$ 2,000 | \$ 2,000 | \$ - |
| Labor | \$ - | \$ 625 | \$ 1,575 | \$ 1,575 | \$ 1,575 | \$ 1,575 | \$ 1,575 | \$ 1,225 |
| Software | \$ 236 | \$ 1,201 | \$ 2,725 | \$ 1,975 | \$ 1,600 | \$ 1,600 | \$ 1,600 | \$ 100 |
| R&D | \$ - | \$ 425 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Training | \$ - | \$ 854 | \$ 854 | \$ - | \$ - | \$ - | \$ - | \$ - |
| Total annual Capex | \$ 2,283 | \$ 14,587 | \$ 93,198 | \$ 146,738 | \$ 179,695 | \$ 149,433 | \$ 106,575 | \$ 34,544 |

| | |
|--|-------------------|
| Total initiative Capital expenses (\$ '000) | \$ 865,227 |
|--|-------------------|

| | |
|---|-------------------|
| Total initiative costs (\$ '000) | \$ 935,447 |
|---|-------------------|

Initiative cost assumptions

The initiative-level cost estimates summary above was compiled by rolling up calculations by cost category made within each of the six roadmap areas. The following table shows which cost categories were incurred in

which roadmap areas and offers a high-level description of how those costs are expected to be incurred in that area. For more detailed documentation of the calculations behind each roadmap area's cost categories, please see appendix items as referenced in each line below.

Table 10: Cost category detail and assumptions by capability roadmap area

| ID | Roadmap Name | Projects | Cost Category | Category Detail | # in Appendix Table |
|------|---------------------------------------|--|---------------------|--|---------------------|
| SGR0 | Smart G&T Initiative Delivery | <ul style="list-style-type: none"> Smart Grid Enterprise Architecture Project / Implementation Plan Smart G&T Initiative Project Delivery | Labor | Smart G&T Initiative Project Delivery | 23 |
| | | | Labor | Smart Grid Enterprise Architecture | 24 |
| | | | Labor | Project / Implementation Plan | 25 |
| SGR1 | Increase Reliability / Resiliency | <ul style="list-style-type: none"> Pilot Substation Architecture Deploy substation architecture and additional IED's Fiber-optic comms backbone study Fiber-optic comms backbone imp Infrastructure Hardening Study Infrastructure Hardening Projects | Comms | Fiber Optics Comms Backbone Build-Out | 26 |
| | | | Labor | Labor for Smart Substation Architecture and Comms buildout internal and incremental to LEM | 27 |
| | | | Grid Hardware | Physical assets | 28 |
| | | | Grid Hardware | Incremental Cost to TLEM (2.6M) | 29 |
| | | | Software | IT - Redundant MV90 | 30 |
| | | | Comms | Fiber Optics Comms Backbone Preliminary Engineering | 31 |
| | | | Grid Hardware | Physical Hardware for Development system | 32 |
| | | | Labor | 3rd Party Labor to Build Development system | 33 |
| SGR2 | Enhanced Situational Awareness | <ul style="list-style-type: none"> Next-Gen EMS R&D Next-Gen EMS Implementation Data cleanup Data analytics/applications Additional hardware/sensors | Software | Next-gen EMS upgrade/licenses | 34 |
| | | | Labor | Internal support work interface with AGILE | 35 |
| | | | AGILE | AGILE R&D Requirements for next-gen EMS | 36 |
| | | | Software | Transfer and collection of sensor data | 37 |
| | | | Training | Training | 38 |
| SGR3 | Optimizing Transmission Assets | <ul style="list-style-type: none"> System studies Power-flow improvement studies O&M studies CSC Upgrades Tower Splitting at Western NY Replacing conductors on MA line Adding third conductor on MA line Additional instrumentation Reconductoring 20% of NYPA's lines Installation of one new STATCOM Construction of 3 new capacitor banks | Grid Hardware | Physical Assets | 39 |
| | | | Grid Hardware | Physical Assets | 40 |
| | | | Grid Hardware | Physical Assets | 41 |
| | | | Grid Hardware | Instrumentation | 42 |
| | | | Grid Hardware | Physical Assets | 43 |
| | | | Grid Hardware | Physical Assets | 44 |
| | | | Labor | Labor | 45 |
| | | | Grid Hardware | Physical Assets | 46 |
| | | | Grid Hardware | Physical Assets | 47 |
| | | | R&D | R&D | 48 |
| | | | Software | IT | 49 |
| | | | Training | Training | 50 |
| SGR4 | Optimizing Generation Assets | <ul style="list-style-type: none"> RMNPP Governor and Controls Upgrade St. Lawrence Study Optimal Scheduling Software Replacement STL Headgate System Upgrade Generation Data Analytics R&D Study | Generation Hardware | RMNPP Governor and Controls Upgrade | 51 |
| | | | Generation Hardware | STL Headgate System Upgrade | 52 |
| | | | Training | Training | 53 |
| | | | R&D | St. Lawrence Study Optimal Scheduling Software Replacement | 54 |
| | | | R&D | Generation Data Analytics R&D Study | 55 |
| SGR5 | Integration of Bulk Renewables | <ul style="list-style-type: none"> Study to prioritize LEM efforts based on increased wind sites Study to prioritize AGILE efforts based on increased wind sites Grid-scale battery storage pilot project Participate in EPRI program 173 Market analysis for pricing re: purchasing power to pump BG System planning study to analyze new modes of BG operation | R&D | 6 studies to incentivize bulk renewables and optimize BG | 56 |
| | | | Labor | Resources to oversee studies below | 57 |
| | | | Training | Training | 58 |
| SGR6 | Integration of Distributed Generation | <ul style="list-style-type: none"> DG/Micro-grid pilots DG incentivization study (incl. IEEE standards, etc) Virtual Power Plant (incl. DERMS) | Labor | Labor | 59 |
| | | | Grid Hardware | Microgrid Pilot installation | 60 |
| | | | Grid Hardware | Virtual Power Plant | 61 |
| | | | Software | Virtual Power Plant | 62 |
| | | | R&D | Study - optimal placing and sizing for DG | 63 |

Confidence level of costs

The following represents the overall confidence that the cost levels will be met.

Confidence level of initiative and post-implementation costs

Please indicate the overall confidence that the indicated cost levels will be met. Based on the indicated level of confidence, a confident-adjusted range of both initiative and post-implementation costs will be established.

| | |
|------------------|-----|
| Initiative costs | Low |
|------------------|-----|

| Confidence level | Cost range |
|------------------|---------------------------|
| Very high | +/- 5% of expected costs |
| High | +/- 10% of expected costs |
| Medium | +/- 20% of expected costs |
| Low | +/- 30% of expected costs |
| Very low | +/- 50% of expected costs |

| | Low | High |
|----------------------------------|------------|--------------|
| Total initiative costs (\$ '000) | \$ 654,813 | \$ 1,216,081 |

These cost estimates are preliminary at this stage. There are significant R&D activities and studies in the early years of the initiative, which may reduce or increase the size of subsequent efforts beyond what is anticipated today. Also, the cost and effort for many proposed projects will depend on the maturity of various technologies in the next few years. For example, the proposed pursuit of a next generation EMS will highly depend on co-development efforts with vendors. However, the business planning team has made its best effort to be comprehensive in its cost considerations.

IMPACT TO MARKET

Overview of marketing approach

In April of 2014, Governor Andrew M. Cuomo unveiled plans for an energy modernization initiative that will fundamentally transform the way electricity is distributed and used in New York State. Under the Reforming Energy Vision (REV) initiative, utilities will actively manage and coordinate a wide range of distributed resources, or generate electricity from many small energy sources and link them together. While this initiative is primarily focused at distribution level utilities, many of the capability areas and projects identified by this Smart G&T initiative will form a part of an overall effort by the PSC to improve system efficiency, empower customer choice, and encourage greater penetration of clean generation and energy efficiency technologies and practices. This initiative along with the opening of the Green Bank, NY Sun initiative, and future programs will improve the retail and wholesale markets and assure the success of energy efficiency and clean energy programs. NYPA will use this platform of transformation and the drivers addressed in this business plan to launch its Smart G&T to the broader market and to position not only NYPA, but also NYS as a leader in generation and transmission technology adoption and transformation.

NYPA's role in the market

As the owner/operator of three large hydroelectric power generation facilities in NYS, NYPA has the capability and mission to ensure reliable, clean, and affordable power to the people of NYS. This mission includes the stewardship of NYS natural resources, particularly the water resources of the St. Lawrence River and Niagara Falls, in collaboration with international treaties with Canada. With its strong regional control centers controlling 25% of the electric generation capacity in NYS and ownership of over 1400 circuit miles of transmission throughout NYS, the integration of additional power sources in NYS in the form of bulk renewable power such as wind farms and solar photovoltaic farms fits naturally into NYPA's mission and capabilities. NYPA is one of the premier producers of clean bulk power in the US and as result of this initiative aims to be a premier and industry leading generation and transmission utility in the modern grid of the future.

EXTERNAL STAKEHOLDER IMPACT AND MARKETING PLAN

This initiative will improve grid operations in NYS, allowing the state to approach its renewable energy goals and reducing emissions and costs to serve load to customers throughout the system. This initiative will also serve as a model for other NY Transmission Owners who may proceed down similar smart grid paths.

Table 11: Overview of external impacts due to the Smart Generation & Transmission initiative

| External impact overview | | |
|--------------------------|--|-------------------|
| Stakeholder | Description of impact | Impact |
| Customer | Customers will see reduction in energy costs and increase in energy choice in the long term | Positive - Low |
| Distribution Utilities | Utilities will see reduction in wholesale power prices | Positive - Medium |
| NYISO | NYISO will have greater insight over grid conditions and market flexibility | Positive - High |
| Transmission Operators | TO's will have greater insight over grid conditions and control flexibility | Positive - Medium |
| State Agencies | State agencies will see reduction in energy costs and increase in energy choice in the long term | Positive - Low |
| Third Party Agencies | Third party agencies will see reduction in energy costs and increase in energy choice in the long term | Positive - Low |

Description of marketing strategy

NYPA will need to keep external stakeholders, such as NY State, the NY PSC, other transmission operators and utilities, etc., up to date on progress, lessons learned, significant developments and the overall solution. In addition, internally, there will be several actions taken to ensure the initiative becomes a visible and integral part of the NYPA organization.

- Kick-off event for the new Smart Generation & Transmission team. The event could feature a combination of presentations and workshops that would educate and engage team staff around the scope and content of the Smart Generation & Transmission initiative.
- Smart Generation & Transmission internal website, training registration and research material. Milestone and success stories will be shared as the initiative matures.
- Quarterly newsletter, which details current projects, photos of project owners, and lessons learned

DEPENDENCIES & RISKS

Initiative dependencies

- Strong interdependencies exist between this initiative and the Asset Management initiative. The general rule of thumb agreed to by both initiatives is that Smart Generation & Transmission activities scope is centered around the installation of new generation and transmission assets whereas Asset Management activities scope is centered around the O&M and collection, management and use of the data coming out of those assets. For example, the further deployment of advanced grid sensors, combined with a hardened communications network falls under this initiative, but will feed directly into the development of an advanced, analytic maintenance program under Asset Management by providing the required data. Both initiatives will ensure each other is kept abreast of developments so that these interdependencies are managed in the most beneficial way.
- Achieving actionable results from advanced sensor deployment will require the development of an asset management capability to analyze and interpret data. Though this is in the pipeline, care must be taken to make sure the timeline on that effort is not extended so much that the efforts here cannot be operationalized until a much later date.
- The TLEM project must complete replacement of critical and vulnerable assets and lay some basic infrastructure, so this initiative can focus on improvements not required for base system reliability
- This initiative may alter certain TLEM decisions that are ongoing.
- NY Transco, NY Energy Highway, REV and other state-wide initiatives will have dependencies to be managed by this initiative.
- NERC CIP standards represent a significant dependency and risk for all of the Smart G&T technologies. The benefit of taking advantage of the valuable information available in the IEDs must be weighed against the increased resources that will be required to maintain compliance with CIP standards. There may also be additional resources needed to support the regular O&M associated with CIP compliance and changing CIP standards are a risk to impact the end cost of the Smart Grid Systems.

Risks associated with the implementation of this initiative

1. **Resource and Capability Constraints:** Implementing and sustaining smart grid technologies at NYPA will require a host of new skills sets and organizational capability. While this initial roadmap identifies between 40 – 60 new resources that will need to be filled to implement this roadmap, many of these skill-sets are new and unique to this initiative.
2. **Changes in market conditions:** Changes in wholesale power cost structure, uncertainty over customer market participation, and many other factors can result in considerable uncertainty over estimated returns on smart grid investments.
3. **Inadequate post-installment strategies:** Many smart grid business plans rely heavily on post-installment benefits (e.g. the implementation of control algorithms). However, program development and implementation details are often not considered until later, resulting in benefits that are often delayed for years.
4. **Vendor Product Maturity:** Many of the Smart Generation & Transmission capability areas in this roadmap will rely on software/IT performance, however, some Grid software/IT capabilities have not been widely deployed and there may be a level a market immaturity across products, adding initiative risk.
5. **Cost Recovery:** A portion of the costs associated with this initiative is expected to be recoverable, but that is not guaranteed and thus poses a risk to the financial prudence and on-time delivery of the projects
6. **Stranded assets:** As grid technologies continue to evolve, old technologies become obsolete, and market conditions change, there is the possibility that certain assets are stranded due to implementation of this initiative. The risk of these scenarios occurring is the key risk “as result” of the initiative rather than “to” the initiative, and will need to be mitigated during implementation.

In Table 12, there is a listing of these risks and how they plan to be mitigated. Ownership of these risk mitigation actions will be assigned to the Smart Generation & Transmission governance function, which will be established after board approval of this business plan.

Table 12: Overview of potential risks associated with this initiative

| Risk overview | | | |
|---|-------------|-------------|--|
| Description | Probability | Impact | Suggested actions |
| Resource and Capability Constraints | Critical | Significant | Ensure that a holistic operating model and post implementation governance plan is created |
| Changes in market conditions | Medium | High | Track changes in wholesale power cost structure, customer market participation, and many other factors to ensure certainty over estimated returns on smart grid investments. |
| Inadequate post-smart G&T implementation strategies | Critical | Significant | Ensure adequate post implementation plans and organization structure are developed to track benefits and ensure maximization of new infrastructure |
| Vendor Product Maturity | Medium | Low | Partner with vendors, align products with roadmaps and conduct holistic vendor and market analysis |
| Stranded Assets | Low | High | Ensure that at each stage of product development that the risk of new technology or changing market conditions don't allow for a stranded asset scenario |
| Cost Recovery | Medium | Critical | Partner with Finance to ensure that, whenever possible, adequate cost recovery actions are taken in the planning process for individual projects in this initiative. |

Further industry considerations

Looking at the U.S. alone, the utility sector has always been one of the most capital-intensive industries in the country. The electrical power sector invested more than \$90 billion in enhancements to generation and T&D systems in 2012 alone, but in terms of R&D spending as a percentage of revenue, the U.S. electric power sector is second from bottom of all major industries, ranked ahead of only the pulp and paper business. This cocktail of capital intensiveness and low R&D expenditure, coupled with the fact that the largest U.S. utilities are investor-owned (and as such are incentivized to maximize shareholder value in the short term while "maintaining" infrastructure), has created an uncertain market for smart grid investments. NYPA however is in a unique position in this regard and in good stead to take advantage of the significant advances in grid modernization technologies.



Appendix

BENEFITS & COSTS DETAILED ASSUMPTIONS

A1. The following assumptions correspond to the benefits Table 6 and costs Table 9 in the main document.

| # | Benefit/Cost | Assumptions Description |
|----|--------------|---|
| 1 | Benefit | A 1% reliability increase would be a reduction of $8760/100 = 87.6$ hours of less forced outages / non-scheduled outages per year, this would amount to about \$3.5M per year for NY State. This reliability saving occurs when the outage is causing congestion, and the overall state energy costs are higher due to a re-dispatch in real-time and deployment of more expensive generation. This congestion saving is on top of that claimed in this roadmap due to use of sensor data. |
| 2 | Benefit | Reduced relay maintenacnce based on Adirondack substation last PMs in maximo, using the total hours for each PM, and rated the number of hours times the frequency of the PM over the max interval reflected for an annual average number of hours. That number was doubled since the PM does not include travel time, , or the prep/ support time to perform testing. This total umber of hours was then multiplied out for the number of relays at Adirondack as a percentage of the entire NYPA system to calculate the average number of hours spent at NYPA a s a whole, multiplied by \$90/hr. This number should be revised once actual total man hour allocations to regulatory PMs are submitted. This is a low confidence level. |
| 3 | Benefit | Avoided average cost of cleaning up and lost revenue from two 138kv bushing failures at NYPA in 2011 was \$3.4m, assuming avoiding one of these a year in 2016 onward. This has a high confidence as to the accuracy of the numbers which were based on the actuals but may vary based on other equipment failures in different LMBP zones. |
| 4 | Benefit | During a major line rebuild, the cost of installing fiber optic OPGW goes from \$70k / mile to \$10k/mile based on an AEP report. |
| 5 | Benefit | Currently pay about \$1mm, verified with IT |
| 6 | Benefit | Based on data retrieved from the annual NYISO 2013 CARIS (congestion assessment and resource integration study). Projected demand congestion beyond 2012 is provided in the report. Projected TCC payments are calculated using linear extrapolation on the historical data from 2008 to 2012, as shown in the graph below. Due to the fact that paid TCCs provide hedging against congestion benefits to customers can be claimed only on the unhedged congestion potion calculated after subtracting TCC payments from demand congestion. A 20% saving of the unhedged congestion is assumed. -The percent congestion cost reduction estimated here is solely due to "enhanced and coordinated operation and control" of the grid. Other "physical" transmission enhancements will provide further congestion cost reductions. |
| 7 | Benefit | The total estimated statewide customer fuel-costs savings from enabling 300 MW of additional wind generation is assumed to be solely due to "enhanced and coordinated operation and control" of the grid. Other physical transmission enhancements will result in additional fuel cost savings by enabling even more wind generation. Average cost of fossil plant is \$35/MW/hr |
| 8 | Benefit | Estimated annual wear and tear (repairs, etc) cost of \$5 M per utility in NYS. Take credit for 20% of this * 7 utilities = \$ 7 M annually. |
| 9 | Benefit | Cost of missing a piece of equipment, or catastrophic failure |
| 10 | Benefit | Man-hour equivalent of reduced maintenance |
| 11 | Benefit | Estimated annual cost of T&D losses in NYS: (From NYSRDA/EPRI report average system losses of 0.04)* (average system loading of 20,000 MW* 8760 hr * average energy costs of \$20/MW/hr * (taking credit for 1% reduction --0.25) = \$1.4 M. 4) 1000 MW*2000 hr*(Ave CC plant fuel Costs \$35/MW/hr) = \$70M |
| 12 | Benefit | Due to reduction and productivity increase |
| 13 | Benefit | Estimated annual wear and tear (repairs, etc) cost of \$5 M per utility in NYS. Take credit for 20% of this * 7 utilities = \$ 7 M annually. |
| 14 | Benefit | We assume that upgrades and enhancements will provide for the injection of ~700MW additional low cost hydropower throughout the market. Generally used NYPA internal figures (provided by Uzo Enyinna) peg hydropower at about \$3/MWh cheaper than the average LBMP. To be consistent with other roadmap assumptions, we assume an average system price of \$20/MWh and average system loading of 20,000 MW. Phasing in the cheaper power will reduce costs to the state as presented. |
| 15 | Benefit | These figures are based on NYPA internal estimates (provided by Bruce Fardanesh) of revenue curtailment/opportunity cost from not producing as much hydro. |
| 16 | Benefit | Projected revenues for the CSC (variable, depending on TCC revenues from congestion in central zones) as presented for controls upgrade business case. The total 20 year NPV for the project was calculated at \$61.5 million in 2012 dollars. |
| 17 | Benefit | Based on data retrieved from the annual NYISO 2013 CARIS (congestion assessment and resource integration study). |
| 18 | Benefit | We conservatively assume that we can account for ~\$5m/year in deferred investment (new conductors, new lines, etc.) |
| 19 | Benefit | To be consistent with Situational Awareness assumptions, we also assume a conservative reduction in losses at around 1% for the system. |
| 20 | Benefit | As programs begin to phase in, we assume a reduction in maintenance costs (outage time, planned and unplanned maintenance) of around \$2m/year after an increase in maintenance initially. |
| 21 | Benefit | PA assumed equal to cost for now because projects are pre-approved already |

| # | Benefit/Cost | Assumptions Description |
|----|--------------|---|
| 22 | Benefit | - Microgrid pilot will be customer funded, NYPA financed and Energy Efficiency will do the project management (12% mark up for project management fee) - cost of MG will be \$85 million - VPP will take 2 years to complete and savings are TBD - Study will determine potential savings via decrease in system losses via DG installation - TBD |
| 23 | Cost | 2-4 FTE's |
| 24 | Cost | Based on initiative scope and scale |
| 25 | Cost | Based on initiative scope and scale |
| 26 | Cost | • STL North Country Buildout including OPGW on MA • BG to Marcy • NATL Buildout • SENY Interconnect...assuming \$80k/mile and \$10k/mile where line rebuild occurs • Small hydro microwave BG • Y49 Direct Fiber cable replacement |
| 27 | Cost | Smart Substation Architecture and Comms buildout internal and incremental to LEM |
| 28 | Cost | Emergency ECC - Costs based on unknown scope or location, schedule based on CPR1166 which only includes study costs, and does not include construction or lease/ownership costs. Study cost from CPR, the \$5M construction costs based on consultation with Project Mgmt. |
| 29 | Cost | Smart Substation Architecture - The TLEM incremental costs assume roughly 100k cost increase in hardware costs at each station, assuming some new equipment and upgrade of other equipment is required. A 1.3 multiplier was used for the 10year program to be conservative and account for some escalation, and because the details of the system are not known at this time. The incremental cost assumes 1000 hrs additional engineering per site and 2500 in labor. This cost is mainly in programming equipment, construction drawings, field installation, commissioning and testing. Since these systems are new to NYPA, there is a learning curve built in to the costs. |
| 30 | Cost | Redundant MV90 - The MV90 rebuild includes relocation of application to new servers and call stations potentially to WPO servers from the existing POL servers and a backup MV90 system to run on the off site DR server site. Proof of concept testing is planned for 3&4Q 2014 and installation and purchase of new equipment in 2015. |
| 31 | Cost | Initial study and preliminary design |
| 32 | Cost | Smart Substation Architecture - Plan assumes a development test bed system will be built using inhouse engineering for specification, outside labor for furnishing the constructed system. The system hardware costs assume roughly 25 IEDs including relays, meters, monitoring, plus network equipment, HMI and data concentrators. 8 racks/panels are used to permanently mount this equipment and it is assumed to use the existing secondary injection test sets already owned by NYPA OR will utilize the RTDS being purchased by Engineering. Assumes 1.5 FTE for Spec/scoping. Costs basis for the STL SAMAC IEC61850 development system that followed the same construction plan. No proprietary protocols will be used, DNP3 or 61850 will be used to a data concentrator that does not require annual license costs. |
| 33 | Cost | See above |
| 34 | Cost | Purchase and use of next-gen EMS software when developed, assume a fraction of anticipated market price |
| 35 | Cost | Additional internal support work (2 FTE in protection & control, equipment engineering, metering), total 6 additional internal FTE's ramping from now until 2025 |
| 36 | Cost | All R&D costs to be incurred for this roadmap are assumed to be in AGILE. Does not include cost of setting up AGILE however (physical space, systems and 10 operating FTE's), which is in AGILE business plan. |
| 37 | Cost | Adding sensors, communications, collecting data, including back-office IT systems needed |
| 38 | Cost | 6 internal support people will need training. Front-loaded in 2016-2017. 20K\$/FTE... |
| 39 | Cost | - replacing the existing lines/towers on Moses-Adirondack line - based on 2014 RIK cost estimates for replacing MA 1&2 used for Transco - \$273m |
| 40 | Cost | - reconducting additional ~20% of NYPA lines as low estimate - NYPA estimates peg reconducting costs at ~35% total capital cost of building new lines (assumed here to be ~1.5M/mile), so \$525K*280 miles = \$147M |
| 41 | Cost | - adding third conductor to Moses-Adirondack line - based on NYPA R&D and Cost/Scheduling estimates of the cost of adding a 230kv line to existing towers - \$100m |
| 42 | Cost | This includes figures around making all lines dynamic thermal rating capable (using assumption of \$1m/line for 25 lines, estimated by George Stefanopoulos based on historical NYPA work), adding additional line instrumentation (\$45k/substation, 31 substations), and making existing substations 100% "smart" (currently assumed to be ~40% "smart" - remaining 60% x \$45k/substation, by the EPRI methodology - this portion of the costs may be covered in Resiliency roadmap). It also budgets for the installation of 10 more PMUs, at \$125k each, to complete the NYPA PMU network. |
| 43 | Cost | - STATCOM - assuming construction of 1 new STATCOM (\$35M) |
| 44 | Cost | - Capacitor banks - assuming construction of 3 new capacitor banks (\$10M each). These numbers are highly variable and will change based on results of the to-be-commissioned system study. Any solution that does not require extensive line buildup could be much less capital intensive, but if extensive new lines are required for system maintenance, this could increase capital costs substantially. |
| 45 | Cost | Based on our knowledge of FTE constraints due to new PMUs, additional sensor work etc., we're guessing we'd need about 10 more technicians at the sites - this includes ~2 per site for each of our 5 main transmission facilities. For the duration of the physical infrastructure and line sensor installation work, we're assuming around 5-6 additional linemen to avoid reducing the availability of regular line staff. |
| 46 | Cost | - tower splitting at Western New York to alleviate constraints affecting the Niagara Power Project output. Project estimated at \$16 million with a cost estimate range from \$13M to \$20M. Project schedule estimated from 2016 to 2019. |
| 47 | Cost | - CSC Upgrade - \$15 million, assumed when doing analysis to be spent in 2015-2017 |
| 48 | Cost | This cost includes research required around specific technologies or techniques and costs for building frameworks to incorporate them into the NYPA system. R&D costs were based on an estimate of \$175k per year for a new study/program, with 1 or 2 R&D studies/projects per year to be added (one in the first year, two each in subsequent years). Additional \$500k system study is included in 2014-2015. |

| # | Benefit/Cost | Assumptions Description |
|----|--------------|---|
| 49 | Cost | Earmarked but to be decided based on initial studies |
| 50 | Cost | New technologies will require ~\$20k/y/FTE in training for site and headquarters personnel |
| 51 | Cost | Cost primarily based on LPGP LEM. Existing controls and Governor are electromechanical with reduced reliability, high maintenance cost, and minimal monitoring and lack advanced control capabilities. New system significantly improves all to these areas. |
| 52 | Cost | Existing Headgate controls and equipment are obsolete. New controls provide safer remote control and monitoring and faster gate closure in case of emergencies since personnel do not go to headgates. |
| 53 | Cost | With replacement of older technologies with new electronic based systems, some staff need training and development on new technologies. Assuming that 1/3 of mechanical and 1/2 of electrical staff change roles - need classroom and OTJ training for 24 employees. |
| 54 | Cost | Critical software for optimal scheduling of STL - software is obsolete, poorly documented and inflexible. New software will provide updated, flexible, easy to use software for operations. |
| 55 | Cost | NYPA Cost Estimates |
| 56 | Cost | 6 studies at \$175K each |
| 57 | Cost | NYPA staff will need to work with consultants to guide and participate in the research and testing. Staff from Engineering, Operations, R&D, and ERM would be expected to provide support for the studies. |
| 58 | Cost | \$10K/FTE/year |
| 59 | Cost | A small team will run the program, estimated cost is \$800,000/year with two engineers providing project management to the microgrid pilot project, have the project managers available |
| 60 | Cost | NYPA only installs advanced controller. System will be paid for by customer. Customer costs include total project cost of \$85 million over three years (10% the first year, 30% the second year, and 60% the last year) and then an operating and maintenance cost of \$30k annually. We would only pay for study to get initial customer interest, the study will be conducted in 2014 at an expected cost of \$400k. |
| 61 | Cost | Cost to set up hardware of virtual power plant - \$2 million (based off doubling cost for NY Energy Manager – current initiative to aggregate utility data for public entities) |
| 62 | Cost | Cost to set up software of virtual power plant - \$2 million (based off doubling cost for NY Energy Manager – current initiative to aggregate utility data for public entities) |
| 63 | Cost | Incentivization of DG Assets – Cost would be \$200k for study cost, study would be conducted in 2015 |

A2. Breakdown of the benefits and costs of the Smart Generation & Transmission initiative by roadmap area.

| | SGR0 | | SGR1 | | SGR2 | | SGR3 | |
|--------------------------------------|-----------------|-------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|
| Benefits | NYPA | NYS | NYPA | NYS | NYPA | NYS | NYPA | NYS |
| Reduced O&M | \$ - | \$ - | \$ 74,000 | \$ - | \$ 24,000 | \$ - | \$ 15,750 | \$ - |
| Reduced Capital | \$ - | \$ - | \$ 13,000 | \$ - | \$ - | \$ - | \$ 35,000 | \$ - |
| Reduced Congestion | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 694,000 | \$ - | \$ 431,000 |
| Generation Savings (Increased Wind) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 147,000 | \$ - | \$ - |
| Asset Optimization | \$ - | \$ - | \$ - | \$ - | \$ 7,000 | \$ 63,000 | \$ - | \$ - |
| Reduced Transmission Losses | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 12,100 | \$ - | \$ 14,000 |
| Generation Savings (Increased Hydro) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 122,000 |
| Increased Reliability | \$ - | \$ - | \$ - | \$ 43,100 | \$ - | \$ - | \$ - | \$ - |
| Increased Revenue | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 187,728 | \$ - |
| Total | \$ - | \$ - | \$ 87,000 | \$ 43,100 | \$ 31,000 | \$ 916,100 | \$ 238,478 | \$ 567,000 |
| Costs | NYPA | | NYPA | | NYPA | | NYPA | |
| Grid Hardware | \$ - | | \$ 9,190 | | \$ - | | \$ 676,462 | |
| Generation Hardware | \$ - | | \$ - | | \$ - | | \$ - | |
| Comms | \$ - | | \$ 68,390 | | \$ - | | \$ - | |
| AGILE | \$ - | | \$ - | | \$ 10,000 | | \$ - | |
| Labor | \$ 7,075 | | \$ 14,625 | | \$ 10,500 | | \$ 25,725 | |
| Software | \$ - | | \$ 1,000 | | \$ 21,000 | | \$ 1,000 | |
| R&D | \$ - | | \$ - | | \$ - | | \$ 3,600 | |
| Training | \$ - | | \$ - | | \$ 120 | | \$ 300 | |
| Total | \$ 7,075 | | \$ 93,205 | | \$ 41,620 | | \$ 707,087 | |

| | SGR4 | | SGR5 | | SGR6 | |
|--------------------------------------|------------------|-------------|-----------------|-------------|------------------|-------------|
| Benefits | NYPA | NYS | NYPA | NYS | NYPA | NYS |
| Reduced O&M | \$ 66,810 | \$ - | \$ - | \$ - | \$ - | \$ - |
| Reduced Capital | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Reduced Congestion | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Generation Savings (Increased Wind) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Asset Optimization | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Reduced Transmission Losses | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Generation Savings (Increased Hydro) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Increased Reliability | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Increased Revenue | \$ - | \$ - | \$ - | \$ - | \$ 43,605 | \$ - |
| Total | \$ 66,810 | \$ - | \$ - | \$ - | \$ 43,605 | \$ - |
| Costs | NYPA | | NYPA | | NYPA | |
| Grid Hardware | \$ - | | \$ - | | \$ 8,500 | |
| Generation Hardware | \$ 64,491 | | \$ - | | \$ - | |
| Comms | \$ - | | \$ - | | \$ - | |
| AGILE | \$ - | | \$ - | | \$ - | |
| Labor | \$ - | | \$ 875 | | \$ 6,825 | |
| Software | \$ - | | \$ - | | \$ 1,500 | |
| R&D | \$ 611 | | \$ 1,050 | | \$ 250 | |
| Training | \$ 1,708 | | \$ 50 | | \$ - | |
| Total | \$ 66,810 | | \$ 1,975 | | \$ 17,075 | |

Smart G&T Capability Roadmap Detail

SGR1: Increased Reliability & Resiliency

Capability Manager: Frank Ronci

CAPABILITY VISION / STRATEGIC RATIONALE

Reliability of the grid can be defined as the capability to provide continuous service to grid-connected users of electricity at constant (within known tolerances) frequency and voltage in face of normal or expected system contingencies. Resiliency of the grid on the other hand can be defined as the capability to withstand extreme events or disturbances. The fast restoration of service upon loss of load is an important component of reliability and resiliency.

The rationale behind this capability is to ensure uninterrupted service to customers. The level of reliability and resiliency is very much dependent on investments in infrastructure and the return on those investments which are a combination of both financial returns as well as maintaining the best possible level of reliable, available transmission and generation. The challenge is to attain maximum outcome with reasonable or minimum investments.

Two key components of the roadmap is to further develop the use of substation intelligent electronic devices to provide high resolution data on power system equipment condition both for real time operations for enhanced clarity, for improving restoration times following an event by better retrieving data for decision making and for long term trending for asset management. This mainly leverages equipment that will be installed under other programs but needs to be better leveraged by fully realizing the capabilities on board in these devices. Secondly, in order to facilitate the IED data back to various users, as well as to ensure highly reliable data communications information flow, a utility owned communications backbone should be built out. In large part this is an expansion of the existing project to upgrade portions of NYPA's point to point digital microwave. By connecting the dots with additional microwave and fibre optic cables, NYPA can ensure its reliable operation of the power system and its smart grid technologies that NYPA is investing in.

SOLUTION

- Current State
 - Transmission Life Extension and Modernization (TLEM) core driver is reliability. In order to maintain the high degree of reliability the NYPA system has realized through today, TLEM is replacing and upgrading existing transmission system components that are at the end of service life or at a high risk of failure due to condition. Replacement of components prior to a catastrophic failure, minimizes outage times, and prevents real time disturbances that pose a risk to the power system as a whole. TLEM is replacing major equipment such as power transformers, circuit breakers and reinforcing structures, as well as replacing electromechanical controls with modern microprocessor based protection, control, metering, indication and communication equipment.
 - The traditional substation design included a Remote Terminal Unit (RTU) which was a device that was wired to many electro mechanical components to receive status contacts or basic analog information with communications capabilities to remote that information back to a control center. Today, the meters, protection relays, annunciators, breaker monitors, controllers, commonly referred to an IED (intelligent electronic devices) are themselves RTUs. Each device is capable of reporting back a wide variety of data about the health of the power system component it's designed to monitor/measure/protect as well as the health of the device itself. By enabling the advanced monitoring features within each of these devices and retrieving the data for use by operations, engineering, and asset management personnel will increase system reliability by better monitoring the status of the power system, enable engineering personnel to make predictive maintenance decisions rather than

interval based, and enable asset management personnel to make maintenance and replacement more informed, analytic decisions based on field data.

- The solution project plan is to develop a test bed development system as Phase 1 which will allow engineering staff to design and test a smart substation in an offline environment. This process will serve to implement an optimized design, with most of the bugs and issues identified and addressed in an offline environment. The development system will also be used for the life of the production systems as a test bed for new software updates, patches, additional equipment and allow engineers to troubleshoot a problem that may arise. The Phase 2 will be the phased implementation of smart grid architecture within the Transmission LEM, RM controls upgrade, and other ongoing projects.
- Capability gap analysis
 - A significant challenge of integrating Smart Grid technologies, particularly over a wide geographic area for transmission, is for reliable, secure communications systems. Often utilities relied on power line carrier analog communications over the power conductor, direct point to point microwave or third party telephone circuits. As technology has advanced, the require bandwidth has increased significantly, and the need for security to ensure reliable system operation, to fully enable the capabilities of the smart IEDs installed at the substations,
- Activities to address gap
 - Some of the technologies installed at NYPA sites are proven for their core purpose and have in some applications been expanded to provide data to a station RTU. For example the new Astoria 345kV substation, the STL Moses SAMAC project, and the Ryan, Duley and Patnode substations. In order to properly design and select the appropriate devices into a standard substation architecture, a development system will be built in an offline environment to verify the system functionality, interoperability and reliability. The solution should be multivendor using open protocols to ensure future compatibility, expandability and competitiveness for future upgrades. The build out of the development system will also promote the design process to open the door to expanded functions and capabilities not fully realized in the conceptual stage.
 - No R&D is necessary for the build out of NYPA's communication infrastructure. The technology is proven and smaller scale projects have been completed at NYPA. Other utilities have implemented a similar architecture for their transmission backbones which is a benchmark for a project at NYPA. Further preliminary engineering and cost estimates are required.
- Resiliency – Storm Hardening Report Coordination
 - A Quanta prepared report on Storm Hardening and System Resiliency was commissioned following the major storm events that hit all of NYS. Although the report confirmed many of NYPA's assets are well positioned, the report identifies many traditional infrastructure improvements that will further improve the NYPA transmission system and generation assets to perform reliably during another major weather event. These infrastructure improvements are critical to the resiliency of the power system and NYPA's assets. These improvements, along with TLEM investments can be coupled with Smart G&T projects to take advantage of outages, and minimize cost. For example, the MA1&2 line study and potential rebuild would provide an optimal vehicle for Smart Grid Communications. This recommended action and its costs and benefits is captured in the SGR3 roadmap of this

business plan. During a major line rebuild, the estimated cost based on an AEP report of installing fiber optic OPGW goes from \$70k / mile to \$10k/mile. This recommended action and its cost are captured in this SGR1 roadmap along with the other fiber-optic build-outs, while its benefits are shared between the SGR1 and the SGR3 roadmap. A rebuild or major replacement of the Moses-Adirondack lines may also be a significant opportunity to install advanced transmission line sensors for dynamic line ratings, and remote monitoring. These additional recommended actions and costs and benefits are captured in the SGR3 roadmap of this business plan. To maintain and improve system resiliency, it is recommended to implement the Quanta Report recommendations as outlined above, incorporating Smart G&T technologies within the project scope.

Emergency Energy Control Center (ECC) and Rebuild of MV90 Meter Data Systems

- Additional resiliency and reliability projects that are in the early planning stages at NYPA include the emergency ECC construction and the MV90 system rebuild. The emergency ECC will significantly improve the resiliency of NYPA's operations by providing a backup control center offsite with full capabilities in the event that system operations staff could not occupy the ECC at CEC. Presently the project is in the study phase to select the site and define the scope. The second smart grid improvement project for resiliency and reliability is the build out of the MV90 Meter Data collection system which presently resides at the Poletti Administration building. For improved support and reliability, a second MV90 system will be built and tested in the WPO datacenter with the eventual goal of retiring the system at Poletti. The project will also replicate the MV90 hardware and software at the Disaster Recovery offsite datacenter with all other IT functionality required for business continuity. This project is in the planning and kickoff stages, expected to be implemented in 2015. The rebuild of the system will maintain the historic reliability, and reduce O&M activities by centralizing the application. Additionally the MV90 Servers that operate at ECC, used for daily Scheduling and Settlements with the NYISO, will be duplicated in the WPO data center to improve reliability and resiliency.

FUNDING

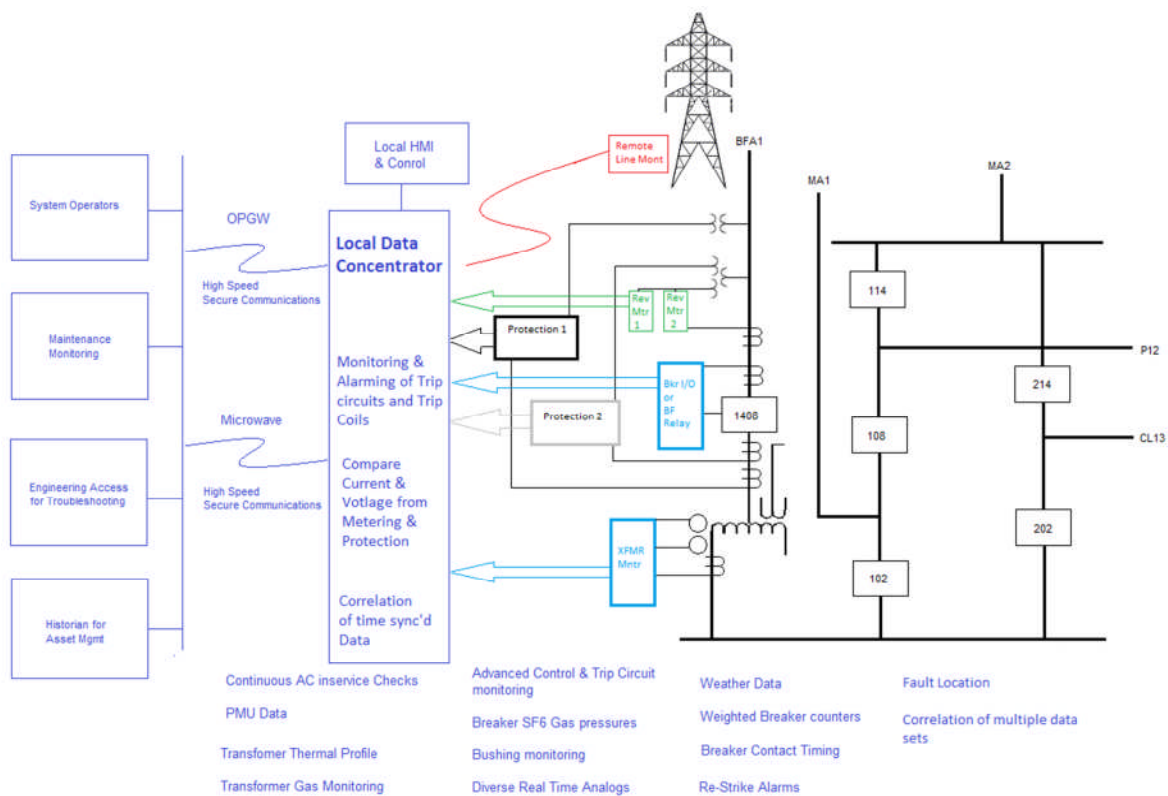
- A large portion of the baseline equipment needed for this roadmap will be procured, designed and installed under T-LEM, deploying IEDs throughout the transmission system. More advanced engineering development and deployment of enabling technologies as stipulated under this roadmap will require additional capital funding, and will also require O&M funding for personnel to maintain, perform upkeep and utilize the systems by analyzing the output data.
- The microwave upgrade program replaced many of the analog microwave sites with digital microwave providing high speed, large bandwidth secure communications between many NYPA Northern region sites. Additional funding will be required to further build out digital microwave to the remaining locations and to implement direct fiber between the most critical sites based on cost/benefit analysis. Strong consideration should be given to include such projects during major physical upgrades of transmission lines such as reconductoring when installing OPGW would be more cost effective.

BENEFITS, COSTS & RESOURCES

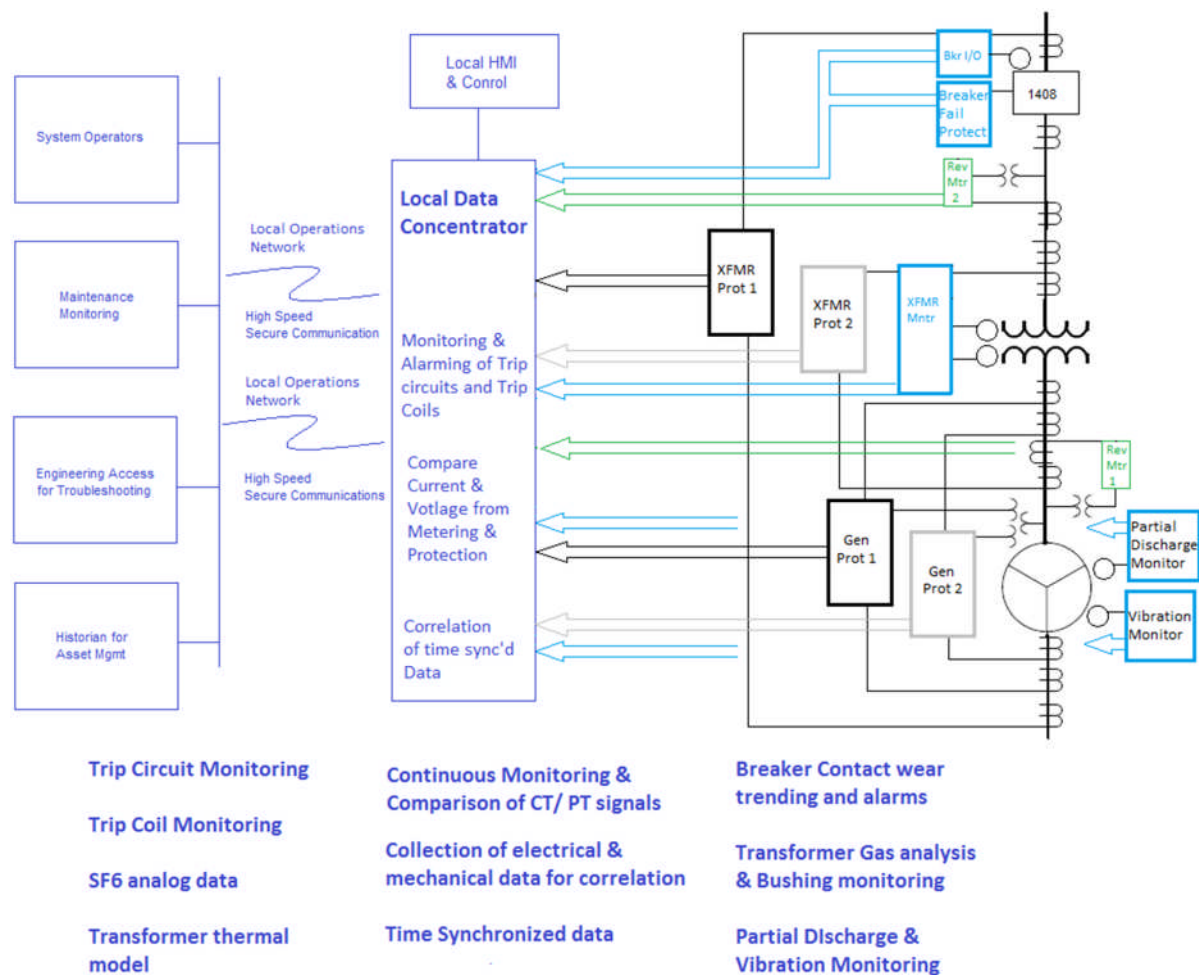
BENEFITS OVERVIEW

- Bushing monitoring – online to predict failures
- Transformer monitoring of thermal model

- The above two benefits are dependent on effective use of monitoring data by efforts conducted under the Asset Management Strategic Initiative
- Circuit breaker wear monitoring using current weighted operation counters to determine when maintenance is required either more or less frequent than the time based maintenance intervals based on actual breaker contact wear, SF6 condition, and restrikes.
- Continuous AC in-service measurement comparison between IEDs to take advantage of NERC condition based maintenance intervals.
- Continuous monitoring of breaker trip coils in addition to trip circuit DC power to take advantage of NERC condition based monitoring.
- Centralize data concentrator improves analysis for synchronized event analysis and long term data profiling.
- Ability to quickly retrieve event data following a system disturbance to analyze fault records within minutes/hours rather than deploying personnel to a substation days later to retrieve relay records.
- NYPA owned communications
 - Longer life expectancy vs a telecom owned system
 - Higher reliability and response is within NYPA control for any problem
 - Better security for critical assets
 - Future expandability with neighboring utilities (example the NIA-BECK link utilized for a more reliable channel for the Packard to Beck tie and Mountain microwave via SONET)



Smart Grid Transmission Substation Architecture



Smart Grid Generation Station Architecture

EXAMPLE COSTS & RESOURCES

Online Continuous Bushing Monitoring

Although some online bushing monitoring systems exist today, they are often less reliable as stand alone systems since they are not monitored and many rely on an alarm to attract an operators attention to a potential problem. Many other factors such as load profile, temperature and humidity data can have influence on the bushing capacitance readings which may cause false alarms making the systems less reliable and thus less are deployed. The desire of having many data sets available at the station data concentrator would combine this information readily available in other smart grid IEDs, providing synchronized data that could be analyzed by engineering and operations personnel and may be able to catch a transformer bushing before it fails catastrophically. The benefit of this smart IED upgrade, as mentioned previously, will depend on effective use of the data by Asset Management Strategic Initiative efforts.

The benefit of such a system can be evaluated first from a system reliability standpoint and a personnel safety standpoint which cannot be represented in a dollar figure. For this analysis, the two example SPP Generator Step Up transformers (70MVA FA rated 138/13.8kV rated) were selected. Both transformers separately experienced a 138kV bushing failure in Jan 2011 at Harlem River 1 and in June of 2011 at Hellgate

1. In both cases the bushing failed catastrophically, causing a large fire and extensive damage. The cleanup, lost generation energy payments, and replacement equipment, engineering and construction labor costs were collected for the two events. The costs are summarized below:

| | | | |
|-----|------------|------------------------|----------------|
| HR1 | O&M | \$ 1,059,175.39 | |
| | CAP | \$ 1,940,397.00 | |
| | Energy | \$ 747,709.00 | 56 day outage |
| | ICAP | | |
| | Total | \$ 3,747,281.39 | |
| HG1 | O&M | \$ 328,595.04 | |
| | CAP | \$ 1,794,149.00 | |
| | Energy | \$ 970,550.00 | 176 day outage |
| | ICAP | | |
| | Total | \$ 3,093,294.04 | |
| | Total Cost | \$ 6,840,575.43 | |
| | Average | \$ 3,420,287.72 | |

It should be noted that the capital an O&M and the capital costs are actuals, and the energy revenues are based on the Harlem River 2 and Hellgate 2 unit runtimes and bid prices during the same time period the adjacent unit was in forced outage. This assumes the adjacent unit would be bid the same, with the same gas prices, and same “market opportunity”. At the time of this report the ICAP losses are not yet available to the author.

It should be noted that the average cost of a GSU failure due to a bushing failure is \$3.4M, the potential unplanned risk avoided by developing advanced monitoring system that will enable Operations and Engineering staff to track data that could remove a major asset for more offline testing to diagnose a problem that may lead to a similar failure. It should be noted that similar GSU bushing failures have recently occurred at Niagara RM3 and RM5 GSUs, which should be analyzed further to determine similar cost data. Also worth noting is the system reliability impact, since Con Edison the local Transmission System Operator, relies on these SCPP units for fast load pickup to ensure their own system reliability. The HR1 failure occurred in January of 2011 and was in forced outage until June 2011. Hellgate 1 was in a forced outage from June 2011 through July 2011, impacting summer peak system reliability.

Continuous AC and Trip Coil Monitoring For Protection Systems

Protection system testing is required under NPCC and NERC enforceable reliability standards, which require either regular maintenance testing of protection assemblies for

1. "Calibration" which verifies the protection assemblies will operate per the specified set point
2. "Functional Testing" which verifies the hardwired inputs, outputs, auxiliary tripping devices, lockouts and wiring is connected to ensure a trip will be executed by the protection system once a relay operates
3. "Breaker Trip Testing" which verifies the trip bus when picked up will actually operate and trip the breaker
4. "AC In-service" testing is designed to verify that the protection system is measuring the appropriate current and voltage signals while the protected element is energized, verifying the instrument transformers are provided the correct signals to the relay.

Current NERC PRC standards requires utilities to perform the above testing within specific time intervals, or allows utilities who have implemented continuously monitored systems to forego time based maintenance since the same signals are continuously monitored, automatically rather than manually and alert operations personnel when there is a problem. Most of the Protection maintenance programs are rooted in the original electro-mechanical devices which did not have the built in diagnostics or ability to alert an operator when there was a problem that may cause the relay to not operate correctly, and therefore required manual intervention to verify by manual testing and perform maintenance adjustments.

As NYPA replaces the older protection systems with microprocessor based protection relays, many onboard diagnostics are utilized to improve individual device reliability and there is the opportunity to deploy continuous monitoring with the additional communication protocols available in the protection relays. Continuous AC monitoring can be implemented by having each relay provide current and voltage information to the station data concentrator which would perform a comparison of each relay's measured values versus the metering system, also reporting the same current and voltage values as an independent accurate reference. In normal conditions, the system would only see a small percent error difference between the systems, and for example should a PT fuse blow, the system would detect the large different between the measured devices and alert an operator. The operator or engineer could then pull up additional information to remotely troubleshoot and validate the alarm and deploy the appropriate maintenance staff to correct the problem.

The benefit is four fold:

Improved System Reliability:

Since interval maintenance occurs at the time of the report, once every six (6) years, there is one day in six year opportunity for maintenance staff to find a problem that may have existed since just after the prior maintenance. By continuously monitoring protection systems, operations and maintenance staff will be alerted immediately when a problem is detected and can repair immediately, rather than catching it within the next six years.

Maximize Labor Resources:

Electromechanical protection systems typically had a service life or 30-40 years or more when regularly maintained. Microprocessor based protection has a much shorter lifespan and will require more frequent replacement, but less frequent maintenance and testing. Therefore, with continuous monitoring systems, skilled maintenance staff can be deployed to systems when there is actually a problem, freeing up there time to perform more regular replacements, and more advanced testing. The cost benefit example was taken at Adirondack substation which typically requires 1600 hours of testing over the 6 year maintenance interval, to satisfy the regulatory PMS, based on the past Maximo work orders. This does not include travel time, or preparation time, only the actual hours spent maintaining the systems.

Decreased Outage Time: Fewer scheduled outages for protection system testing would be required, and the likelihood of a mis-operation due to personnel testing errors would be minimized with automatic, continuous monitoring systems.

Regulatory Compliance: Under a continuously monitored system, no time based maintenance is required, which eliminates much of the overhead required to provide supporting documentation for compliance audits. Additional benefits include the reduced likelihood that a maintenance interval is missed, or an outage cannot be scheduled risking noncompliance with NERC standard which can result in fines.

Case Study Example – NIA 345kV Circuit Breaker Loss of SF6 pressure

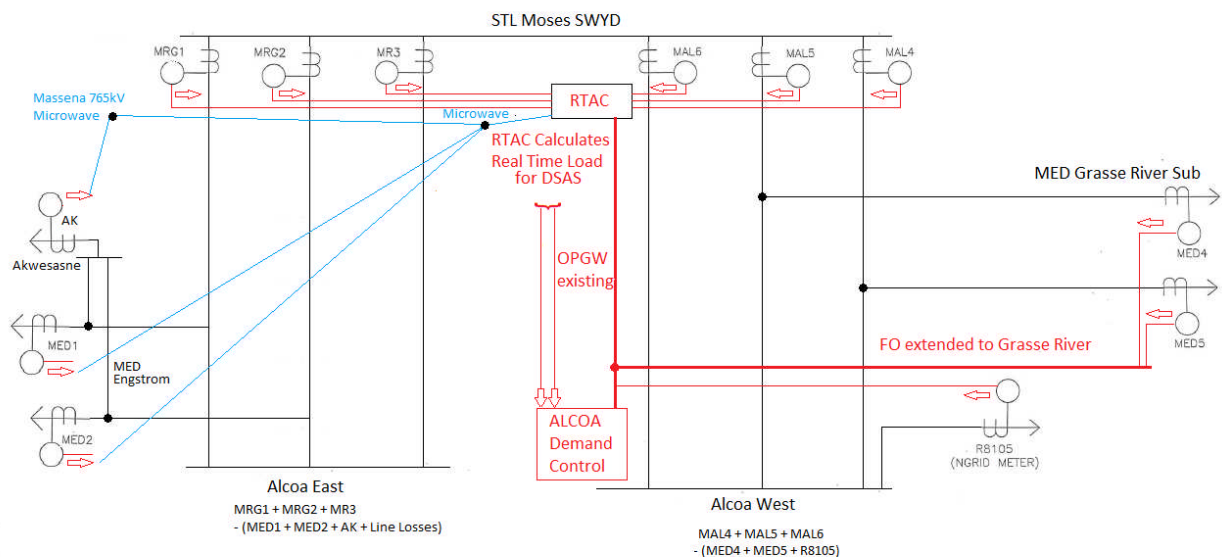
On February 1 2010 there was a major system emergency declared by the NYISO in response to eight 345kV circuit breakers opening without a clearly determined cause in the Niagara switchyard. The root cause was found to be that during switching of station service power, an automatic throw over scheme did not operate correctly and 480V auxiliary power was lost to the circuit breakers in the Niagara switchyard. The SF6 gas breakers rely on auxiliary powered heaters to maintain correct internal pressure in the circuit breaker tanks, and due to the cold temperatures, began to lose pressure until they reached the trip point. A major alarm was received in the control room which required operations personnel to travel to the switchyard to investigate manually. The major alarm is a summary alarm which does not give additional clarity to the remote operator. The first 345kV breaker opened 20mins later and the remaining 345kV breakers continued to open for 28 mins. This caused the NYISO to declare an alert state and system emergency until the Niagara Switchyard was finally restored. Although the efforts of Niagara Operations personnel was commendable in the quick resolution of the problem and restoration of the switchyard, valuable time was spent traveling to the switchyard and then looking through manually looking through targets and annunciators in the switchyard. The advantage of Smart Grid Substation Architecture presented above, would provide the Operators in the Control Room the ability to immediately drill down in the SCADA displays from the “major/minor alarm” resolution level, to viewing the actual gas pressures in the breakers, auxiliary power in each breaker, and detailed station service substation information. Smart G&T architecture will allow the operations and engineering staff the ability to quickly navigate remotely to the IEDs installed in the substations, and gather information critical to decision making in real time. This enhanced situation awareness, and enhanced troubleshooting capability will improve reliability and resiliency by better enabling skilled staff to make decisions based on the data available.

Utility Communications Backbone Network

The benefits of a NYPA owned communications backbones can be realized both in the saved maintenance costs, and capital replacements costs for outside telecom vendors, as secondly in the future resiliency for changing NERC CIP standards to ensure NYPA’s compliance for the substation IEDs described above. The installation of a microwave and direct fiber communications link will permit the secure flow of data for both operations, maintenance, asset management and engineering personnel. It will also permit the further deployment of current differential protection systems that rely on direct digital communications channels more reliably protect transmission lines, with better security during system disturbances.

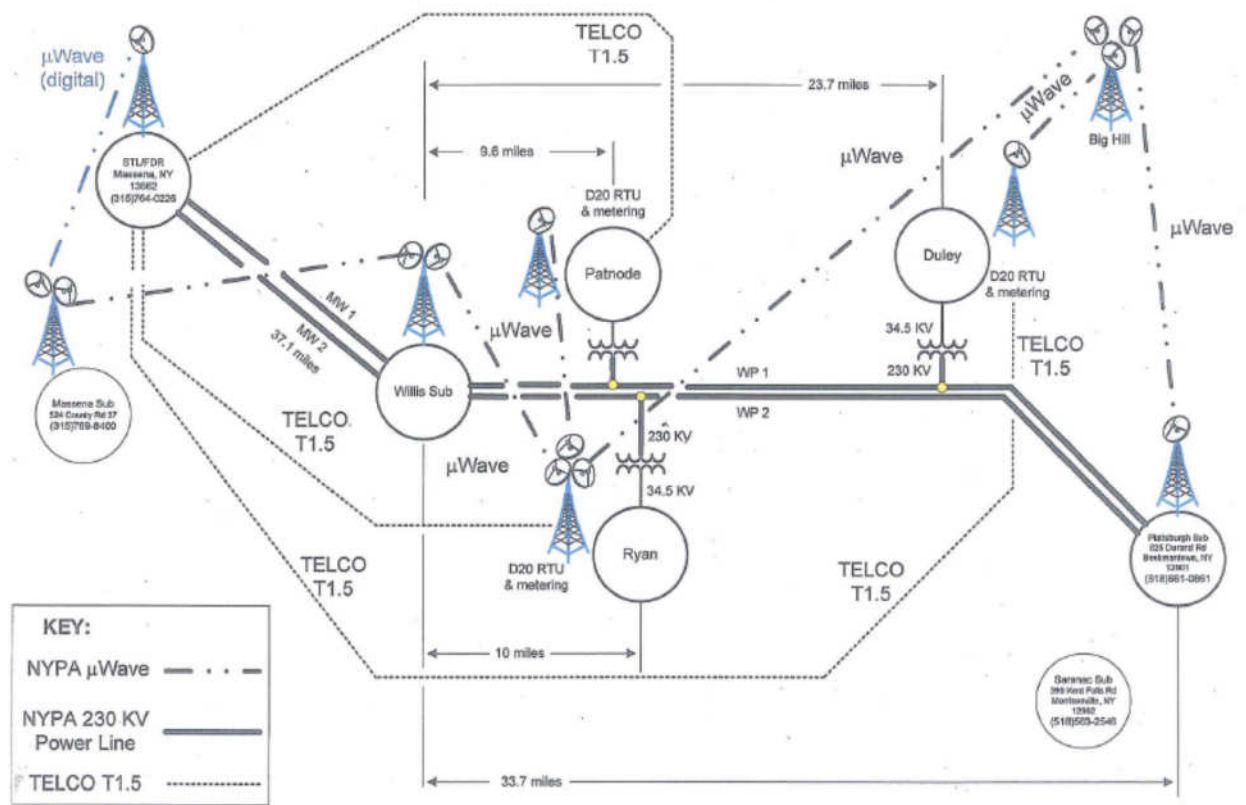
A template project which yielded significant benefits by improving reliability of the monitoring systems was the fiber build out at the NYPA Moses, Alcoa and MED Engstrom substations. A joint project between NYPA and Alcoa, replaced the static line of the MAL6 line with a new Optical ground wire (OPGW) equipped with fiber optics connecting Moses and Alcoa West for protection communications. The fiber has been expanded to include Special Protection systems, and SCADA RTU polling. The benefit of this dedicated communications link was realized when Alcoa, a major NYPA customer entered into the NYISO Demand Side Ancillary Service

Market, (DSAS) which required NYPA's support to provide revenue meter quality data in real time to allow Alcoa to provide feedback for their 6 second base point to the NYISO. Metering systems were upgraded for real time communications; however the total measurement of the Alcoa West load is comprised of 3 meters at Moses, 2 meters at MED Engstrom, and one meter at Alcoa. In order to provide communications between all 6 meters and the RTAC data concentrator, fiber optic cables were extended from the NYPA/ALCOA MAL fiber, to Engstrom creating a small fiber backbone that provided secure, high speed reliable polling of all 6 meters in three separate locations in real time. Although it was not deployed, a similar benefit was realized in order to collect data for the Alcoa East (Reynolds) plant by using the NYPA microwave from Moses to Massena to Akwesasne in order to collect meter data with minimal additional equipment. The demonstrated benefit of the utility own communications backbone infrastructure is the flexibility and ability to quickly adapt to customer needs and power system requirements to deploy new systems/ capabilities.



Example of Rapid Deployment of Smart Grid for Customer Demand Side Participation using existing Utility owned Communications Infrastructure

Example of Digital Communications Network as Cornerstone of Smart Grid Deployment



Existing Northern Region Communications Backbone

IMPACT ON MARKET

Increased reliability will positively impact NYPA market operations seen in the potential reduction of unplanned outages due to equipment failures resulting in reduced generation revenue for energy and capacity payments as well as transmission revenues. Often equipment failures are lengthy, resulting in negative impact to planned revenue streams, and negatively impact O&M and unplanned Capital budgets to cover the cost of cleanup, repairs, restoration and replacement of the failed equipment.

ORGANIZATIONAL IMPACT

- The deployment of Smart Grid technology and increased use of IEDs for data reporting will require significant increased support by highly skilled engineers and technicians. It should be noted that there can be a steep learning curve associated with the deployment of new technologies used in NYPA's core business. These types of systems are a unique skill sets combining power system theory, communications, and computer analysis, which would require internal training, and retention to ensure NYPA has qualified personnel to work on these systems. Skilled engineering personnel will also be required to analyze condition monitoring data to assist operation personnel to make maintenance decisions, and Operations staff would require additional training and

resources to be able to utilize these technologies to support the reliable operation of the power system.

- Deployment of these technologies will require separate development systems to verify the IED and data concentrator functions and capabilities, prior to deployment at a substation. Such a development system will ensure efficient and effective commissioning and operation of these systems in the field, allow of testing of future expansion and upgrades, and provide a training system for end users.

EXTERNAL STAKEHOLDER IMPACT

- Development of Smart Grid technologies will be more efficiently and effectively deployed by NYPA's collaboration and participation in industry working groups to learn from other utilities experiences and provide the benefits of NYPA's own learning curve.

DEPENDENCIES & RISKS

- Strong interdependencies exist between this roadmap and the Visualization and Situational awareness roadmap. A significant part of reliability and resiliency will be seen through the increased deployment of synchro-phasors, however to avoid duplication, a detailed explanation can be found in the V&SA roadmap.
- Strong interdependencies exist between this roadmap and the Asset Management initiative. The deployment of station data concentrators, combined with a hardened communications network will feed directly into the development of an advanced, analytic Asset Management program by providing the required data.
- NERC CIP standards represent a significant dependency and risk for all of the Smart G&T technologies. The benefit of taking advantage of the valuable information available in the IEDs must be weighed against the increased resources that will be required to maintain compliance with CIP standards. There may also be additional resources needed to support the regular O&M associated with CIP compliance and changing CIP standards are a risk to impact the end cost of the Smart Grid Systems.

Smart G&T Capability Roadmap Detail

SGR2: Enhanced Situational Awareness

Capability Manager: Bruce Fardanesh

CAPABILITY VISION / STRATEGIC RATIONALE

Operating the power grid in an optimized fashion by developing and utilizing more advanced tools and techniques and moving in the direction of enhanced, fully-coordinated and automated grid controls. The requirements are: higher quality measurements (PMUs), robust and redundant communications links with low latencies (dedicated system-wide fiber backbone), advanced computational and analytical tools (Next-Gen EMS and DMS suite of Apps) as well as high performance computing capabilities (parallel and super-computing).

The rationale behind this capability is safe, reliable, efficient, and economical operation of power systems. This capability can be developed and demonstrated using today's technologies within a 3-4 year time frame and can evolve into even more advanced capabilities.

SOLUTION

- NYPA/NYISO PMU and PDC hardware and Communications network —Very relevant to this capability; feeds the synchrophasor data into this capability
- SAMAC- St Law 61850 based Relay upgrade – Very relevant to this capability -- facilitates protection- and control-related command and control
- CSC Controls Upgrade – Relevant to this capability – Acts as an actuator for the control of 345 kV voltage at Marcy substation as well as control of power flows on two transmission lines exiting Marcy.
- In addition to collecting the data, this solution involves the integration of sensor data with other NYPA data, processed through algorithms and then visualized/alarmed to the various operating personnel
- In the utility industry in general, the current Controls of the grid are not fully coordinated. Relies heavily on operator experience, response, and interventions. Too slow to respond in case of fast cascading contingencies. The narrative in the Appendix details the solution envisioned.

Capability gap analysis

- Highly reliable redundant and dedicated (potentially NYPA owned) communication networks
- System-wide synchronized measurements for robust and fast state and topology feedback
- Determination of appropriate response rates of closed control loops
- Development, testing and implementation of more intelligent system protection schemes (such as Adaptive Reclosure of Transmission Lines—A separate write-up is available for this) for enhanced transient stability of the system.
- Faster computation capability to approach real-time optimization, coordination and control
- System/equipment model identification and validation tools
- Faster algorithms for system topology and state estimation
- Parallel algorithms and faster computers

Activities to address gap:

- A combination of proven technology and R&D is required here. Some existing tools need to be moved to beta testing and demonstration on actual systems.

BENEFITS

- 20% reduction in NYS congestion
- Reduced energy costs due to additional 300 MW wind savings to NYS
- Economy (reduction in wear & tear) savings to NYS
- Safety (equipment damage only) to NYS
- Economy (O&M reduction)
- Efficiency (1% technical transmission loss reduction) savings to NYS
- FTE O&M savings to NYPA

FUNDING

- Since this capability can be developed utilizing AGILE as the platform, the slated funding for this lab would provide for an adequate start. It is envisioned that this development will be done in partnership with one of the large EMS vendors (ABB, GE-ALSTOM, Siemens and others), EPRI and other partners with an appropriate level of cofunding. The funding mechanism(s) for the fiber backbone needs to be determined.

COSTS & RESOURCES

- Once developed, this capability is envisioned to deliver a commercial or at least a pre-commercial product that can be marketed. The cost of a new EMS system today could be in \$10 to \$20 million range. Permanent on-going costs will be the routine maintenance costs of a typical EMS system (0.5 M to 1.0 M annually).

RISKS

Potential Risks:

- 1) Ability to partner with other entities such as a major EMS vendor and their willingness to eventually develop a commercial product.
- 2) Finding and hiring the right work force with the necessary skills for the AGILE lab.
- 3) Need for continued installation of additional PMUs or other Phasor data providing IEDs in NYS.
- 4) Ability to get time-synchronized system topology info (breaker and disconnect switch status)
- 5) Ensure cooperation from other NY TOs and the NYISO for funding, design, and installation of the fiber optics backbone in NYS.

SRG2 Enhanced Situational Awareness – Further Reference Material

A Comprehensive Power System Operations and Control Structure-- Sensing, Feedback, and Automation

B. Fardanesh

A system operating architecture is proposed that allows for a comprehensive fully coordinated operation of power systems. This architecture is completely based on sensing and feedback to a central location. Therefore, redundant, highly reliable communications links are the central staple of such architecture.

At each generating station or substation, the sensed data are categorized into system electrical quantities, i.e., system voltage and current phasors and breaker status (synchronized measurements) from all IEDs (Relays, DFRs, PMUs, Metering, SCADA, RTUs, and PQ Monitors conforming to IEC61850, IEEE 37-118, IEC61970), as well as all other measurements (which may be dubbed mechanical or equipment monitoring measurements), such as all equipment temperature values (as well as ambient), pressures, transmission line sags, dissolved gas in oil levels, rotation related quantities (vibration, air-gap, etc.), leakage currents, battery monitoring system, PT, CT, equipment response rates, hydro plant head, available water levels, etc., etc.

Local redundant data-bases exist at the local level to store and archive this data. All data will be Common Information Model (CIM) compatible. Cross-correlating application software will continually monitor the health of the equipment and provide operating guidance vis-à-vis the power system operating conditions and generate local and remote alarms when problems do arise. System harmonics and unbalances in conjunction with the mechanical type measurements can help identify system problems. Trending of various quantities will provide advanced warning to the system operator to take remedial and corrective actions. For example, if a disconnect switch is not properly closed in one of the three phases and is introducing a high resistance in that phase, the data from the corresponding heat sensor and the potential unbalance in the system voltages and currents in the vicinity of that disconnect switch may be correlated to detect and pinpoint the source of the problem. As another example, if a critical piece of equipment trips due to a sudden internal failure or a severe contingency occurs, the knowledge of the thermal capability and status of all in service equipment plus the information about the voltage profile in the area will enable the correlation and analysis computer programs to immediately advise the system operator on the immediate actions to be taken to manage MW flows and maintain appropriate voltage levels. Such a system would be extremely helpful to the system operators in coping with emergencies, determining the operating state to go to right after an emergency, and ultimately restoring the system to a normal state, given the situation at hand.

The data from all substations and generating stations will be available over a secure communications backbone at all locations. Authorized access can be issued to various users such as operators, engineering, etc. This communications backbone may be utilized for transmitting the necessary information to the operations/control center.

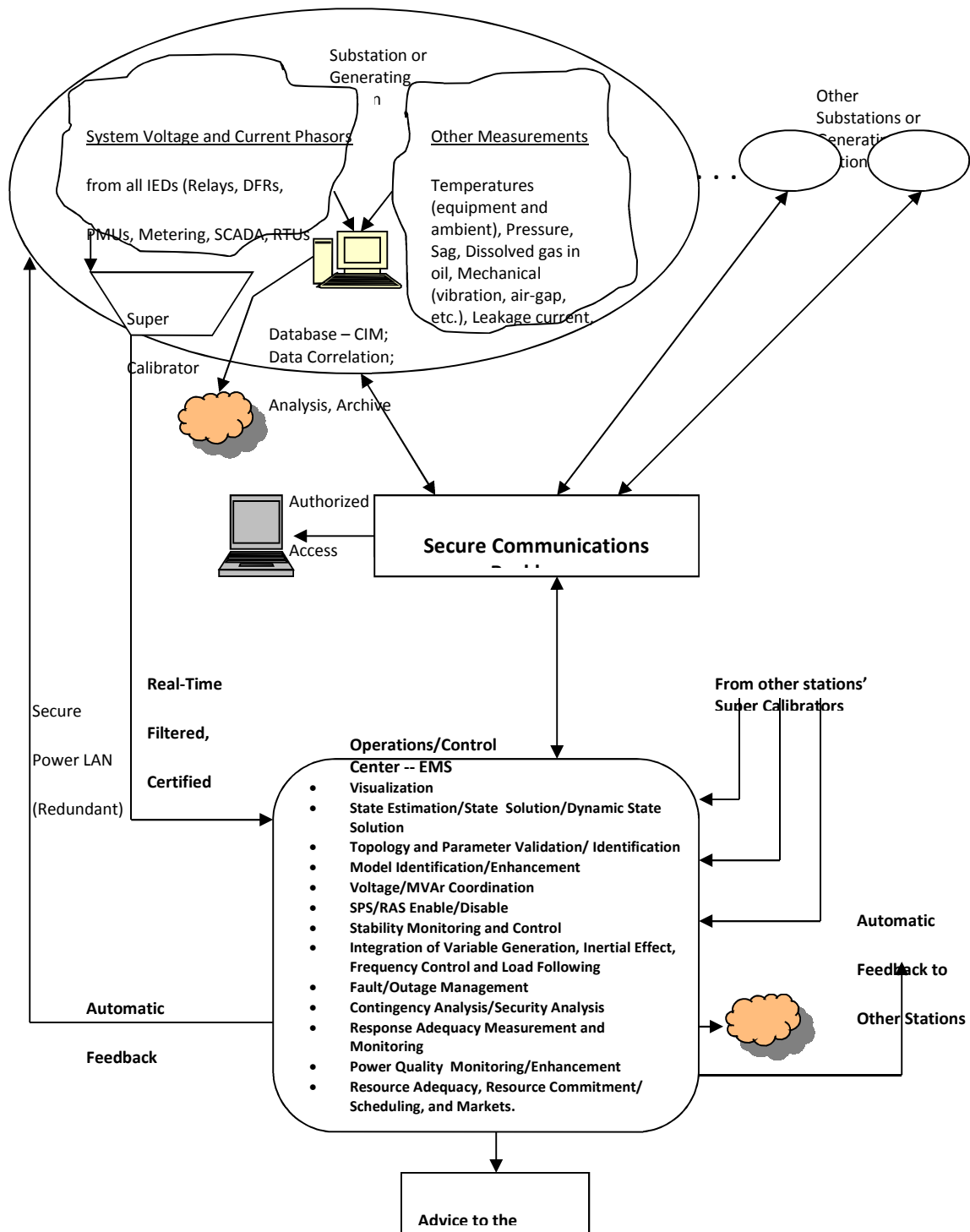
For faster, real-time applications, it is desirable to have a dedicated broad-band communications network--preferably fiber physically owned by the utility such as shield (or ground) wire embedded fiber--linking all HV substations and generating stations to the operations/control center. It would be preferred to implement a "super calibrator" at each site to locally filter the data at each site and provide validated trustable data for transmission to the operations/control center. The super calibrator is a local state estimator that will utilize redundant data and detailed local substation models to identify corrupt data and to ensure the quality and accuracy of the transmitted data. This will considerably increase the confidence level on the data received at the operations/control center and provide the state solver/estimator with highly trustable data.

Once sufficient, synchronized, trustable data (including breaker status or network topology data) with adequate sampling rates are available at the operations/control center, the state solver/estimator, the backbone of all EMS applications can run with a superior performance and as frequently as needed perhaps in the sub-second even cycles time-frame. A centralized system topology and parameter estimation and validation can also be performed if necessary. It is of importance to note that it is possible to perform a direct one-shot (non-iterative) “state solution” as opposed to traditional iterative state estimation, if adequate trustable synchronized data is available at the EMS. Also, contingency ranking and security analysis, both from rotor-angle dynamics and voltage stability points of view, can be done very fast and effectively, providing an optimum action plan to the system operator both under normal and emergency conditions.

It is understood that the visualization and situational awareness, on a wide-area basis, is a natural by-product of such capabilities at the operations/control center.

A distinct example of the benefits of this operating architecture is the coordinated voltage/MVAR control in a control area. Based on sensitivity analysis, the control area may be sub-divided into a number of zones where the voltage profile is most responsive to a designated set of controls. Both during the normal and emergency situations, the sensed voltages are monitored and corrective and/or optimizing actions will be computed (based on a defined set of criteria for the system) and the system operator will be advised on the appropriate actions to be taken. The computations will take into account the desired objective (such as maximizing power flow over a corridor, for example) and the power system topology and equipment availability to determine the best course of action. The recommended actions can be in the form of generator AVR set-points, on-off status of fixed shunt compensation devices, Load Tap Changer settings, as well as the set points for the dynamic voltage control devices such as SVCs, STATCOMs, and synchronous condensers.

Numerous other examples of advantageous utilization of this sensing and feedback based operating structure can be cited. In the immediate future, the development should focus on providing valuable and timely advice to the system operator. In the long run, as confidence is built, some of these actions may be performed automatically via direct feedback from the operations/control center. Ultimately, such closed –loop automated capabilities will be indispensable for operating power systems more reliably, safely, and efficiently, especially in dealing with fast power system phenomenon. This envisioned robust design should however gracefully degrade to a sub-optimal operating regime upon its or its components’ failure without jeopardizing system integrity and reliability.



Smart G&T Capability Roadmap Detail

SGR3: Optimizing the Utilization of Transmission Assets

Capability Manager: Alan Ettlinger

CAPABILITY VISION / STRATEGIC RATIONALE

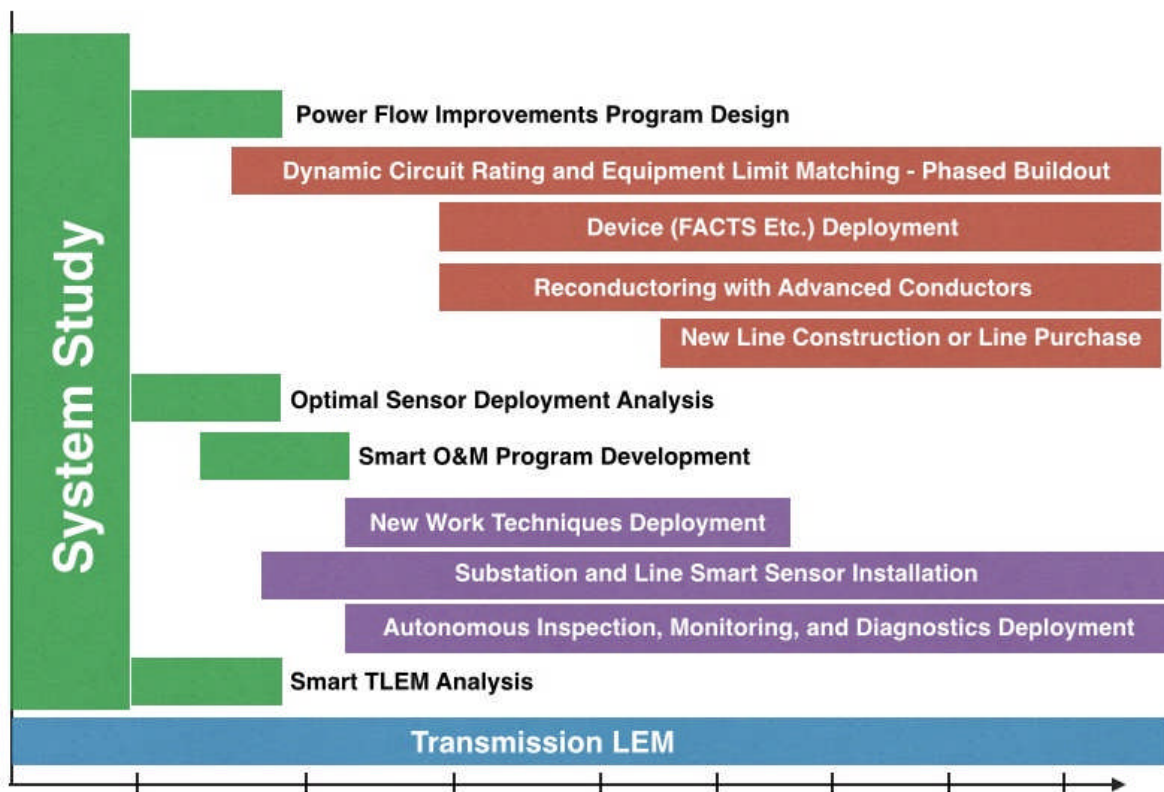
This roadmap supports establishing a modern, flexible, and efficient grid that maximizes reliability and resiliency while accommodating increasing amounts of power from clean and distributed generation, reducing congestion and bottlenecks, and enhancing situational awareness and grid control. Under the auspices of this initiative, flexibility will be ensured and efficiency provided in the face of increasing demands on an aging grid by optimizing the utilization of our assets. By optimizing both the flow of power through existing and potential new infrastructure and modernizing the maintenance and operation of our transmission assets, we will increase:

- Flexibility: a flexible system will be able to accommodate changing load and generation profiles, whether due to increased penetration of renewables or distributed energy resources, energy efficiency, or increased demands on the system in extreme weather events. The system will be operated in real time, incorporating information from devices deployed throughout the network that provide information on current operating condition, operating limits, equipment health, weather conditions, etc., and will ensure minimized congestion through maximized utilization of assets.
- Efficiency: the efficient grid will minimize losses throughout the system and deploy capital and labor in the safest and most efficient ways possible. By operating to real time equipment limits, NYPA and NYS will continue to reduce bottlenecks, and by examining and planning toward maximized asset utilization, we can reduce losses from over- or under-sizing certain system components. This effort will explore autonomous maintenance planning and practices to continue to reduce the risk to our employees involved in operating and maintaining the system while reducing downtime required to prevent or correct failures.
- Modernity: the modern, or “smart,” future for our transmission assets will incorporate cutting-edge sensing, control, material, design, and maintenance technologies to move toward a self-healing (or, at least, “self-alerting”) grid. This effort will build upon NYPA’s position as a technology, research, and innovation leader in this area and continue to scale our pilot research projects in these areas to full-scale deployment as assets. Where necessary, NYPA will collaborate with institutional research and private sector institutions to develop new technology and simulate its impact on the grid using the capabilities to be developed in the proposed Advanced Grid Innovation Lab (AGILe).

SOLUTION

- Current State
 - o Vast amounts of work, from around \$1 million annual research and development work in this area to the \$725 million Transmission Life Extension and Modernization (TLEM) program, are currently being undertaken in this area.
 - o System constraints, whether due to equipment age, system bottlenecks, or changing generation profiles, will continue to impact our operations.
- Capability gap analysis
 - o Frameworks for taking new technologies from research to pilot to asset should be developed to ensure optimal system planning.
 - o Data-driven operations and maintenance will require the buildout of more sensing and communication infrastructure.
 - o Though system constraints are generally known, we have not identified the best way to deploy all of the technologies at our disposal (FACTS, new lines, advanced control techniques, dynamic rating, etc.) to best address problems in the entire system.
- Activities to address gap

- This initiative will study and implement technologies that have both been proven already in the NYPA system (for example, PMUs or FACTS devices) and those that have not (robotic inspection, new conductor technology, dynamic thermal rating, some of which have been piloted, but not scaled fully) to improve the flexibility of the transmission system and the efficiency of maintenance and operations.
- This initiative will undertake a full battery of system studies to determine the best course of action for making system-wide improvements using capital investments in all related technologies for increasing power flow. The options to be studied range from eliminating unnecessary equipment constraints on power flow (for example, undersized wave guides, current transformers, or connectors) to the construction or purchase of new lines. Following the studies, which can leverage or help develop eventual capability for the AGILE lab, program will be signed for investment that will most likely include some combination of reconductoring, dynamic rating, FACTS deployment, or new construction.
- Using results from the system study and examining internal data, whether O&M spending, existing technology, operational considerations etc. design frameworks will be developed for implementing smart O&M - a framework to prioritize sensor deployment and a framework for testing and implementing advanced maintenance technologies and techniques, which we anticipate will include some combination of live work and autonomous maintenance and data collection. Care will be taken to align installations with TLEM work, when possible, to minimize downtime, and to establish the “innovation pipeline” - a method of evaluating new technologies or approaches and smoothing their transition from research to pilot to full system deployment.
- To correlate with existing TLEM work, a final study will be commissioned, whether to be completed internally or by a third party, to ensure that our TLEM work is as modern as it can be and helps to achieve the goals of this initiative.



BENEFITS

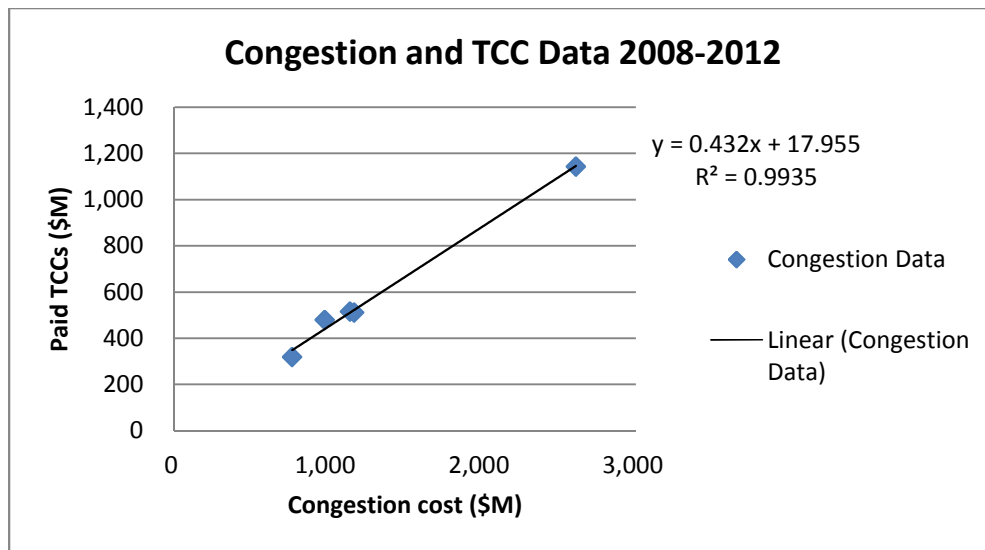
- Reduced congestion and bottlenecks, improving NYPA's ability to move low-cost and clean power throughout the state. Estimates of current congestion costs can be found in the annual NYISO congestion assessment and resource integration study¹
- Reduced costs for operation and maintenance thanks to autonomous techniques
- Reduced risk due to old equipment or necessary downtime
- Increased system flexibility and resiliency in the face of changing generation, consumption, and climate events
- Increased system efficiency
- Industry leadership

Congestion reduction analysis is presented in the table below based on data retrieved from the annual NYISO 2013 congestion assessment and resource integration study². Projected demand congestion beyond 2012 is provided in the report. Projected TCC payments are calculated using linear extrapolation on the historical data from 2008 to 2012, as shown in the graph below. Due to the fact that paid TCCs provide hedging against congestion benefits to customers can be claimed only on the unhedged congestion portion calculated after subtracting TCC payments from demand congestion. A 10% saving of the unhedged congestion is assumed, totaling \$276 million of financial benefits from 2017 to 2022.

| | Year | Demand congestion for total NYCA (\$M) | TCC Payments (\$M) | Unhedged Congestion (\$M) | Potential Customer Savings (\$M) |
|-----------------|------|--|--------------------|---------------------------|----------------------------------|
| Historical Data | 2008 | 2,611 | 1,143 | 1,468 | |
| | 2009 | 977 | 480 | 497 | |
| | 2010 | 1,141 | 515 | 626 | |
| | 2011 | 1,169 | 511 | 658 | |
| | 2012 | 765 | 319 | 446 | |
| Projected Data | 2013 | 643 | 296 | 347 | |
| | 2014 | 673 | 309 | 364 | |
| | 2015 | 749 | 342 | 407 | |
| | 2016 | 634 | 292 | 342 | |
| | 2017 | 757 | 345 | 412 | 41 |
| | 2018 | 784 | 357 | 427 | 43 |
| | 2019 | 906 | 409 | 497 | 50 |
| | 2020 | 771 | 351 | 420 | 42 |
| | 2021 | 929 | 419 | 510 | 51 |
| | 2022 | 907 | 410 | 497 | 50 |
| | | | | | 276 |

¹ NYISO 2013 Congestion Assessment and Resource Integration Study (p. 34), available online at http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_espwg_iprf/meeting_materials/2013-08-12/2013%20CARIS%20Draft%20Report%20%20rev.pdf.

² Ibid



FUNDING

Since much of the initiative focuses on continuing to develop technology that may or may not be commercially ready at this time, significant opportunities for co-funding or research partnerships exist. A target is to achieve between 5 and 10% of annual funding from external sources, whether from institutional research organizations or collaboration with other utilities or private entities, or other governmental sources of funding.

COSTS & RESOURCES

Detailed in the initiative backup Excel spreadsheet.

ORGANIZATIONAL IMPACT

- Implementation of smart grid technology will require the development of additional skill sets within NYPA's G&T organization. Through a close link with future asset management data analytics functions, the ability to interpret and act on data-driven recommendations will need to be developed within the organization. The new technologies will also have a different life cycle than traditional transmission technologies, so developing ability to troubleshoot and manage these new devices will be critical.
- New FTEs will need to be added to the NYPA workforce to facilitate development, implementation, and ongoing operation and maintenance of the proposed projects. We assume that 3 new engineers will be needed at an annual cost of \$150,000 (including compensation and benefits). Based on our knowledge of FTE constraints due to maintenance and compliance requirements of new PMUs, additional sensors, other intelligent electronic devices etc., we're estimating we would need about 10 more technicians at the sites – this includes ~2 per site for each of our 5 main transmission facilities (Niagara, St. Lawrence, Blenheim-Gilboa, CEC, SENY), which will be added gradually as 2 per year from 2016 to 2020. Each technician a cost of \$100,000 is assumed. For the duration of the physical infrastructure and line sensor installation work, we're assuming around 5-6 additional linemen to avoid reducing the availability of regular line maintenance staff for regular maintenance tasks. An estimated cost of \$120,000 per lineman is used. We are assuming that any

FTEs required to implement and maintain communications networks, etc. are being captured in the other roadmaps.

EXTERNAL STAKEHOLDER IMPACT

- This capability will improve grid operations in NYS, allowing the state to approach its renewable energy goals and reducing emissions and costs to serve load to customers throughout the system.
- This capability will also serve as a model for other NY Transmission Owners who may proceed down similar smart grid paths.

DEPENDENCIES & RISKS

- Achieving actionable results from advanced sensor deployment will require the development of an asset management capability to analyze and interpret data. Though this is in the pipeline, care must be taken to make sure the timeline on that effort is not extended so much that the efforts here cannot be operationalized until a much later date.
- Transmission LEM must complete replacement of critical and vulnerable assets and lay some basic infrastructure, so this initiative can focus on improvements not required for base system reliability.
- NY Transco could have an impact on any major new construction funding.

Smart G&T Capability Roadmap Detail

SGR4: Optimizing Generation Assets

Capability Manager: Bohdan Dackow

CAPABILITY VISION / STRATEGIC RATIONALE

- NYPA's bulk generation fleet runs optimally while maintaining the capability to respond to a wide range of system conditions, including, load/generation variability caused by intermittent bulk renewables (i.e. wind, solar, etc.) by:
 - the continuous optimization of water utilizing advanced water optimization algorithms
 - supplying required regulating and reserve capability
 - providing bulk energy storage capabilities to capture excess generation from intermittent bulk renewables through existing pumped storage facilities (i.e. LPGP, BG)
 - Working with all stakeholders in New York, initiate market changes that recognize and properly value bulk energy storage capacity.

CURRENT STATE

- As New York continues to implement Smart Grid technologies at the distribution and transmission levels, NYPA's bulk generation fleet must be prepared to rapidly adapt to the changes.
- At this time, the industry is focused on the high impact areas of transmission and distribution, and not yet evaluating bulk generation. With New York taking a leadership role, this initiative is being proactive and looking at its bulk generation fleet to determine what proactive steps, if any, can be taken to establish New York State as the leader in Smart Grid as it relates to bulk generation.
- With no established definition of Smart Generation, NYPA has made a thorough review of what its bulk generation fleets role can be with Smart Grid and identified two roles for its bulk generation:
 - the ability to quickly and efficiently respond to rapidly changing system conditions (e.g. a large thunderstorm moves through Western New York shutting down 300MW of wind generation)
 - the ability to store excess energy to support the expansion of intermittent bulk renewable generation (e.g. absorbing 300MW of excess wind, or hydro at 3AM)
- Looking at these two roles and the current state of the NYPA generation fleet, NYPA is well prepared to meet these two roles through:
 - The highly flexible nature of NYPA's existing hydro facilities allows these assets to have a substantial surplus of regulation and reserve capability that can be made available quickly and efficiently to the grid as the penetration of bulk renewables increases.
 - The use of NYPA's two large pump storage facilities:
 - BG with 12 GWh
 - LPGP with 4 – 6 GWh
- NYPA has been proactively and continuously maintaining and improving its generating assets to ensure high efficiency and flexibility which fully supports this initiative. Over the last several years NYPA has spent over \$1.1 Billion on major bulk generation efficiency/reliability/operational improvements at its Blenheim-Gilboa, St. Lawrence, and Niagara facilities, and is currently implementing a \$470 million upgrade at its Niagara Lewiston Pump Storage Plant. These improvements (see Table 1) that have been or are being completed, fully support the two goals of flexibility and energy storage.
- Current Status of Smart Technologies at NYPA Bulk Generation Facilities – Table 1

| Plant | Unit Controls | Governor | AVR/Static Exciter | Water Optimization | Regulation & Reserves | Hydro Turbine Efficiency |
|-------|---------------|----------|--------------------|--------------------|-----------------------|--------------------------|
|-------|---------------|----------|--------------------|--------------------|-----------------------|--------------------------|

| | | | | | | |
|-------|------------------|------------------|-------------|------------------|------------------|-----|
| RMNPP | Planning | Planning | Yes | Yes ² | Yes | Yes |
| LPGP | In Progress | In Progress | In Progress | Yes ² | Yes | Yes |
| BG | No | Yes | Yes | N/A | Yes | Yes |
| STL | Yes | Yes | Yes | Yes ² | Yes | Yes |
| 500 | Yes | Yes | Yes | N/A | Yes ¹ | N/A |
| Flynn | Yes | Yes | Yes | N/A | No | N/A |
| SCPP | Yes ² | Yes ² | Yes | N/A | No | N/A |

¹ Technical capability for regulation is in place, but currently not utilized since system reliability/operational requirements and market/economic conditions do not warrant its use at present

² Technology is already in place but is being upgraded and/or further enhanced

- The major areas and technologies that support the flexible operation of the fleet and the stated goals of this initiative are:
- **Unit Controls** – the use of microprocessor (i.e. PLC or DCS) based control systems provides highly reliable systems that are highly flexible. PLC's were originally developed for the auto industry as a means to quickly modify assembly lines. Prior to PLCs, manufacturers would have to shut down their assembly lines for long outages to allow for the rewiring of their controls. With the advent of PLCs, all of the changes are made through software requiring little to sometimes no outages. This same flexibility allows rapid changes to generator controls.
- **Governor** – prior to the use of microprocessors, generators were controlled with 'dumb' mechanical systems comprised of springs, fly balls, and levers that could only control load and speed. With the application of microprocessors to governors, intelligence could be incorporated to the design. While a mechanical governor would only try to control speed, even when detrimental to the stability of the system, modern governors are smart enough to know when they should not blindly control speed and instead hold back to help stabilize the grid.
- **AVR/Static Exciter** – the use of modern power electronics and microprocessors have enabled the use of advanced control algorithms (i.e. Power System Stabilizer – PSS) that are now able to help stabilize the grid during transient events. Prior to this the system was 'dumb' in that it could only maintain voltage and was unable to determine if something detrimental was happening on the grid. Also, the use of smart controls ensures that machines are better protected and prevent them from being operated outside of their limits.
- **Water Optimization** – using computer algorithms that include stochastic forecasts, determine how best to convert available water to megawatts, while obtaining maximum revenue and while complying with international treaty.
- **Regulation & Reserves** – receive real time (seconds) signals from the NYISO across secure and reliable communication links that continuously change the generator fleets output so as to maintain the continuous balance between load and generation
- **Hydro Turbine Efficiency** – using advanced hydraulic modeling and computer modeling, designing turbines with optimum efficiency for specified head and flow
- **In Progress Projects:**
 - **RMNPP Controls** (CPR-524) – Unit Controls, Governor, AVR/Static Exciter, Regulation & Reserves, and Hydro Turbine Efficiency – replace the existing mechanical governor and electromechanical controls with new microprocessor based controls. This project was started in early 2014 with expected completion in 2022.

- **STL Optimization (CPR-880)** – Water Optimization – replace the existing water/generation optimization program with a new version utilizing current programming technologies providing improved program performance. This project was started in 2014 and is expected to be completed in 2015.
 - **NIA Optimization** – Water Optimization – enhances the existing water/generation optimization program to also utilize energy pricing to optimize generation. Expected completion 2014.
 - **NIA Diversion Control** – Water Optimization – improves the control algorithm to improve the automatic control of water and generation usage between the Moses and LPGP facility. Currently NYPA uses Flow3D CFD software to simulate flow at Niagara/LPGP. There are ongoing EPRI projects looking to evaluate and improve upon Niagara/LPGP flow measurements and flow simulations so as to optimize the operational performance at Niagara/LPGP. Some of the preliminary EPRI reports generated, along with a demonstration of a simulation package with optimizing algorithms indicates that there could be an opportunity to improve flow control and operational efficiency.
 - **SCPP Controls (CPR-1075)** – Unit Controls, Regulation & Reserves – replace the controls at all seven SCPP sites with the latest microprocessor based controls. It was started in 2013 and is scheduled for completion in 2018.
 - **LPGP LEM (CPR-555)** – Unit Controls, Governor, AVR/Static Exciter, Regulation & Reserves, and Hydro Turbine Efficiency – replace all major plant equipment including new high efficiency turbines, microprocessor based unit / governor controls and static exciters. The project was started in 2010 and is scheduled for completion in 2020.
- Capability gap analysis
 - As summarized in the Current Status table, the entire NYPA bulk generation fleet is, or is in the process of being upgraded, effectively meeting the stated goals of this initiative. (The one exception to this is BG controls, which is not currently planned for upgrade and is not an impediment to the Smart G&T initiative).

BENEFITS

- Bulk power storage plants provide a valuable benefit to the efficient operation of the electric grid. National Renewable Energy Laboratory (NREL) and Power Systems Engineering Research Center (PSERC) are collaborating on a project to better model pumped storage (as well as eventually other large-volume energy storage resources) in day-ahead and real-time markets. The goal is develop advanced modeling techniques that utilize the flexibility of pumped storage, being a generation and demand-response asset, and its numerous capabilities to provide ancillary services, and have a prototype that can eventually be adapted in ISO/RTO system operations and its market software. The analysis and potential enhancements to how pumped storage is utilized will range from the bidding process, to the optimization engine, all the way to prices and settlements. The team is setting up an advisory board made up of experts from industry on current pumped storage bidding procedures, current utilization of pumped storage in ISO markets, and current settlements procedures for pumped storage. The advisory board will contain members of most of the ISOs in the U.S. as well as numerous utilities or owner/operators of pumped storage facilities.
- The 1200 MW Blenheim-Gilboa (BG) pump storage power plant has the ability to ‘store’ 12 GWh of energy that can be supplied to the system at 1000 MW for 12 hours. The difficulty of

fully realizing this valuable resource is under current market conditions the energy required to pump the water must be purchased at wholesale LBMP rates and also sold at wholesale LBMP rates; the difference between lower (Off-Peak) LBMP rates for pumping and higher (On-Peak) LBMP rates for generating is typically too small to make its use economically feasible.

- The break-even point for BG is at approximately 70%; for example if power was purchased at \$36/MWh for pumping, power would need to be sold, at a minimum, at \$52/MWh to break-even, which does not include any additional O&M costs associated with more frequent operation.

DEPENDENCIES & RISKS

- Although NYPA has bulk energy storage capabilities, existing NYISO market rules do not recognize this valuable asset by providing any cost recovery mechanism limiting its utilization. Until the value of large scale energy storage is recognized (e.g. as an ancillary service), it will remain underutilized.
- The definition of Smart Grid itself, by its very nature is dependent on a fully integrated and logically communicated and controlled system that requires coordinated effort and dependent operation amongst all Smart Grid related activities.
- All stakeholders, including NYPA uncontrolled external entities must be coordinated to ensure success. One possible solution is to form a centrally organized committee made up of all entities to ensure a coordinated and organized plan of Smart Grid implementation going forward. To avoid the appearance of any conflict of interests, it is recommended that the NYISO lead such a committee.
- Timeframes for all stated activities have been provided within the body of this report.

Smart G&T Capability Roadmap Detail

SGR5: Integration of Bulk Renewables

Capability Manager: Gerald Mannarino

CAPABILITY VISION / STRATEGIC RATIONALE

As the owner/operator of three large hydroelectric power generation facilities in NYS NYPA has the capability and mission to ensure reliable, clean, and affordable power to the people of NYS. This mission includes the stewardship of NYS natural resources, particularly the water resources of the St. Lawrence River and Niagara Falls, in collaboration with international treaties with Canada. NYPA's mission statement says:

Power the economic growth and competitiveness of New York State by providing customers with low-cost, clean, reliable power and the innovative energy infrastructure and services they value.

This mission is accomplished through NYPA's continuous improvement and modernization programs and by its leadership and collaboration in programs such as the NY Energy Highway initiative, energy efficiency programs, and public/private partnerships.

With its strong regional control centers controlling 25% of the electric generation capacity in NYS and ownership of over 1400 circuit miles of transmission throughout NYS, the integration of additional power sources in NYS in the form of bulk renewable power such as wind farms and solar photovoltaic farms fits naturally into NYPA's mission and capabilities.

Constraints in the transmission system limit the flow of power from the North and Western regions of NYS to the South and East high load centers. At this time the bulk of the wind farm developments are in the North and West regions of NYS. With NYC and LI representing 50% of the NYS load but 63% of the generation is upstate where transmission constraints cause high prices to downstate customers.

Therefore, this roadmap identifies the following target:

- *Encourage and incent third party bulk renewable developers to interconnect to the NYPA transmission system. This goal is in line with NYS initiatives for clean power and takes advantage of NYPA's expertise in implementing reliable interconnections as demonstrated with other wind farm developers. NYS currently has approximately 20% generation in the form of bulk renewable (15% hydro, 5% wind and other). NYS PSC has established a target that approximately 30% energy used (GWH) in NYS by 2015 comes from renewable sources. Grid can operate reliably with a high percentage of bulk and distributed renewable generation. Identify locations in NYS where NYPA's transmission system substations provide good interconnection for additional bulk – such as mapping wind studies with T-LEM to prioritize system improvements.*

With roughly 80% of NYPA's generation capacity in the form of bulk renewable, NYPA is exceptionally positioned within any overall state targets for renewable generation sources. NYPA's B-G Power Project Pumped-Storage hydro facility with 1160MW capacity also provides significant storage capability but is currently utilized as a peaking plant. This roadmap identifies the following target:

- *Develop studies (electrical system, market pricing, operational) and analyze options for increased utilization of B-G as a storage facility with more frequent generation. Additional generation from B-G will result in additional revenue for NYPA and will bring NYS closer to its target of 30% of electricity usage from renewable resources.*
- *The analysis should include options for bilateral agreements with Nuclear plants and/or wind developers in order to avoid market pricing for the pumping costs. This would incorporate large amounts of energy storage that can provide dynamic response and energy shifting capabilities to mitigate the intermittency, ramping, and dump power issues associated with renewable generation.*

The addition of such new power sources must take into consideration the efficiencies that NYPA has built into its hydroelectric power stations for optimal use of water, transmission capability, power delivery to areas where it's needed most, and for the overall benefit to NYS and NYPA's customers.

SOLUTION

NYPA is one of the premier producers of clean bulk power in the US. NYPA owns and operates three (3) large hydro facilities with capability of approximately 4600 MW and four (4) smaller hydro projects with approximately 25MW capability. The total hydro generation of 4450MW represents roughly 80% of NYPA's overall generation resource and 25% of NYS as a whole. Included in the generation capability is approximately 1160 MW from the pumped-storage facility at the BG Power Project. Following is a list of NYPA's bulk renewable generation sources).

| Facility | Units | Unit Capability | Avg Availability Average Plant Availability (% of hours available to produce power/8760availability | MW |
|---|-------|-----------------|---|---------------|
| Niagara Robert Moses Power Project and LPGP | 13 | 225 | 89.2 | 2675 (w/LPGP) |
| St. Lawrence FDR Project | 16 | 55 | 90.1 | 800 |
| Blenheim-Gilboa | 4 | 290 | 86.5 | 1160 |
| Small Hydro | 12 | various | 59.4 | 23 |
| | | | | |
| | | | | |
| | | | | |

In addition to its own bulk renewable generation resources, NYPA has integrated bulk renewables from independent wind farm developers. These include:

Noble Environmental (Ryan & Duley Substation):

Noble Environmental Power is a leading wind energy company and owns four wind farms in North country New York. These four project sites produce about 385 megawatts, enough energy to power about 110,000 homes. The four (4) sites and their capacities are:

- Altona, Clinton County, 97.5 MW wind farm consists 65 GE 1.5 MW turbines
- Chateaugay, Franklin, County, 106.5 MW wind farm consists 71 GE 1.5 MW turbines
- Clinton, Clinton County, 100.5 MW wind farm consists 67 GE 1.5 MW turbines
- Ellenburg, Clinton County, 81 MW wind farm consists 54 GE 1.5 MW turbines.

Interfaces to the NYPA bulk electric system are at:

- Altona wind farm tie in to NYPA transmission system at Duley Substation and Ellenburg,
- Clinton and Chateaugay wind farms tie in to NYPA transmission via Ryan Substation.

Horizon/Marble River Wind farm (Patnode)

Marble River has installed a wind-power electric generating project in the towns of Clinton and Ellenburg in Clinton County, NY. The projects include a total of 72 turbines, comprised Vestas V112 wind turbines with generating capacity of 3.0 MW each. The two (2) sites and their capacities are:

- 56 turbines installed in Town Clinton, 168MW
- 16 turbines installed in town of Ellenburg, 48MW.

The wind farm is capable of producing up to 216 MW of power. These two wind farms tie in to NYPA 230KV transmission line at Patnode substation.

With their interconnections to the Northern Region transmission system, the wind farms receive generation control settings from NYPA's SCADA system at the STL-FDR Power Project.

The interconnections to NYPA's transmission system are coordinated within many NYPA departments. The technical requirements are detailed in NYPA interconnection agreements and the Design Basis Documents established by NYPA Engineering. The Design Basis establishes requirements for interconnection, addresses safety issues, and reliability and resilience for the interconnection. Flexibility is built into the Design Basis so that appropriate options for interconnection can be considered.

Communication and Control of the Wind Farms

Ryan, Duley and Patnode substation are monitored and controlled by STL control room. NYISO uses ECC, SCADA and NYPA local wind farm Remote Terminal Units (RTUs) to pass curtailment flag and load base-points to wind farm control centers.

RTU and data collection and transfer equipment has been installed at each substation to collect instantaneous data to be telemetered to the STL control center. The Local RTU interface with STL SCADA is via two redundant communication circuits. The primary communication link utilizes microwave and secondary communication link uses AT&T T1 frame relay circuit. Smart RTUs support multiple substation protocols that allow easier interface to smart digital Primary and Secondary protection Intelligent Electronic Devices (IEDs) such as Breaker protection, Line protection, Transformer protection, revenue meters etc. Multiple communication ports in the RTU eliminate hardwired I/O connection in RTUs and allow easier interfacing to smart substation sub systems such as Automatic Transfer Switches (ATS), propane generator, digital transducers etc. providing overall situational awareness of the substation and the windfarm.

NYPA measures, via RTU, net power flows including MW and MVAR, MWHR and loss profile data to and from the Marble River Wind farm at the point of interconnection. NYPA also provides wind farm metering and substation quantities in analog and digital form to wind farm over fiber link to their Wind farm Energy management system. Wind farm also provide gross MW and MVAR quantities at each generator terminal.

Microwave Communication System

New digital Microwave towers and communication equipment has been installed in these substations to interface with the existing NYPA digital microwave system. The new microwave system at Duley interfaces with Big Hill microwave Tower. Patnode interfaces with Ryan Tower and Ryan Tower interfaces with Willis substation Tower. The microwave back bone is from Plattsburg to Willis to Massena to Moses substation. Digital Microwave system provides critical and reliable communication path for Line/substation protection and remote substation operation.

Capability gap analysis And Activities to Address Gap (What else is needed?)

Overall, six (6) studies, to be funded by NYPA, are identified for this roadmap.

Target 1: Promote interconnection to NYPA transmission system by third party bulk renewable developers:

NYPA has demonstrated its capability to interconnect and integrate new wind farm facilities as is seen by its connections in Northern NY. This target is largely driven by developers and market conditions. As long as wind farm developers are willing to exploit wind resources and/or solar or other bulk renewables NYPA will be able to accommodate the developers. NYPA's Engineering Design Basis document provides details to developers regarding NYPA's interconnection requirements. NYPA is also in the midst of its multi-year Transmission Life Extension Modernization (T-LEM) projects that will upgrade all of its substations. This will further strengthen NYPA's capability to support additional generation sources upstate. As a multi-year project it may be possible for NYPA to consider wind and solar studies to determine and prioritize the ordering of the substations upgrades to those areas more beneficial to developers of renewables.

In the "2013 Special Reliability Assessment" report issued by NERC in November 2013 with California ISO (CAISO), NERC reports on specific areas to address integration of bulk renewable, these include:

- Reactive Power Control
- Active Power Control
- Inertia and Frequency Response
- Steady-State, Short-Circuit, and Dynamic Generic Model Development
- The recommendations from NERC and CAISO include development of standards, standard designs for reactive power control, flexibility in ramping, and frequency response capabilities. **Utilize transmission studies to determine where constraints are in the transmission system and overlap with wind studies identifying high wind locations in order to prioritize T-LEM upgrades to provide interconnection into the NYPA transmission system where developers want to build;**
- Fund studies on Grid-scale battery storage pilot projects;
- Fund studies and simulation of hypothetical integration of more renewables to prioritize R&D (Agile), the basis for the studies could come from the NERC/CAISO report;
- Negotiate power purchase agreements with bulk renewable developers;
- Regularly review and maintain design basis document and update it to account for new technologies and support for the system capabilities identified in the NERC/CAISO report;

Target 2: Study development of BG as a storage facility for higher utilization and stabilizing variable generation sources:

In the winter months of 2013 – 2014 the BG facility was called in to frequent generation mode due to extremely harsh winter weather resulting from a Polar Vortex. During the January to March period, BG revenue were 5 times budgeted (\$3,649,000 budgeted vs \$14,645,000 actual). The reason was due to high

market prices due to fuel gas shortages that outweighed the cost of pumping BG. Therefore to utilize BG more effectively for increased revenue the following activities are needed:

- Participate in EPRI Program 173, generation and wind/solar studies and modeling is researched;
- Fund studies for market analysis for bilateral agreements vs market pricing for purchasing power to pump BG;
- System Planning studies to analyze new modes of BG operation such as storage control and regulation;
- Continue to participate in NREL – PSERC study;
 - The PSERC project develops new models and algorithms to effectively integrate energy storage technologies within existing energy management systems and market management systems.

Negotiations with a base loaded plant that can reliably provide low cost power to B-G should be explored. Other options include direct transfers from NYPA plants such as Niagara, purchasing power from plants that are financially troubled, or consideration for building new transmission to interconnect directly into regions/zones where BG could sell into more expensive markets.

Another study area for exploration could be development of another generating unit/plant at BG. This unit could be a small unit fueled by the existing reservoir. The unit would be a generator only that would not have the operational and market constraints of the BG plant. The additional unit(s) could provide voltage and frequency support as identified in the NERC/CAISO report as well as additional generation capacity. Environmental impact and geological components would need to be included in the study.

General Commentary

NYPA has demonstrated experience of its capability to integrate bulk renewable generation resources into the power grid through its own hydroelectric projects as well as with its interconnections with 3rd party wind farm developers.

The majority of wind farm sites in NYS are located in the northern and western regions of the state. These are lower load areas compared with the south eastern portions of the state. The excess of the wind farm capacity upstate and the limitations of the transmission system to deliver power to the lower portions of the state due to system constraints and delivery losses on long-haul transmission lines limits suitability for additional wind power sites upstate.

Excess capacity upstate is resulting in NYPA's major hydro resources (arguably the largest and cleanest bulk renewables) to back off generation and thereby its utilization of water from Niagara Falls and the St. Lawrence River. This reduction in generation could result in less efficient operation of existing clean facilities and higher costs to consumers as higher cost generators are dispatched.

NYPA can use its Transmission Planning and Engineering resources to enhance its transmission planning and siting programs to determine where the capacity is needed and the identification of any transmission constraints that should be addressed to ensure efficient delivery. A concept of "build it where it's needed" as opposed to "build it and they will come" is needed.

Improvements to the transmission system so that power from upstate can be delivered downstate without impact to NYPA existing hydroelectric generation should be considered. Projects to update the transmission system through the T-LEM program and NY Energy Highway are important and should address the constraints issue and allow flexibility for a variety of generation sources.

Other areas for possible solutions

Increase transmission capacity or energy storage or aggregated Demand Response programs.

Weather forecasting models, particularly for wind and solar forecasting, are needed to determine proper placement for these renewable sources. With improved forecasting for wind or large solar projects better integration into the markets will result. NYISO has a wind forecasting initiative and NYPA is supporting them on the early stages of a solar forecasting model.

On a more distributed level, that could support the transmission level, is the use of smart inverters for solar or wind power plants. Inverters can work to support voltage or frequency on the grid and may offer functionality to support transmission.

New generating facilities and likely new substations will require expansion of NYPA's communication circuits. Upstate regions utilize a new digital microwave system for their primary communication and T1 for secondary communication paths. An opportunity to begin development of a fully NYPA owned and dedicated communication system using existing rights of way and transmission towers should be explored as part of the modernization efforts.

Timelines

- Studies can begin in 2015 and would be expected to take 1 – 2 years;
- NYS Installed Reserve Margin (IRM) is at 17%
- NYISO projections are that generation will be ahead of load through 2019;
- Generation will match load 2019-2020;
- New generation will be needed by 2021 to stay ahead of the load growth;
- Actively pursue BG option for more utilization of BG generation
- Complete operation system studies
- Negotiate pre-purchase agreements at 50% discount to historic average market prices
- Complete this combination option (1 & 2) by 2019 in order to support load growth;

BENEFITS

Target 1: Encourage third party bulk renewable developers

Promote interconnection to NYPA transmission system by third party bulk renewable developers:For this target area, NYPA has demonstrated its capability by integrating several wind farms into NYPA's Northern Region substations and SCADA system and EMS.

NYPA has demonstrated experience of its capability to integrate bulk renewable generation resources into the power grid through its own hydroelectric projects as well as with its interconnections with 3rd party wind farm developers. Several 3rd party wind farms have been interconnected into NYPA's Northern Region substations and SCADA system and EMS.

This target becomes primarily an initiative to support NYS goals for increased clean power sources such as wind and solar. In 2013, use of renewable in NYS was 22%, the NYS PSC target for 2015 is 30%. The benefits would be intangible to NYPA such as continuing leadership in "green" power and stewardship of the natural resources of NYS which links with the mission statement.

By increasing generation from BG based on the Target 2 outcome then the additional generation will add to the renewable usage target to benefit NYS.

Target 2: Utilization of BG as storage for higher utilization and stabilizing variable generation sources:

In the winter months of 2013 – 2014 the BG facility was called in to frequent generation mode due to extremely harsh winter weather resulting from a Polar Vortex. During the January to March period, BG revenue were 5 times budgeted (\$3,649,000 budgeted vs \$14,645,000 actual) since gas supplies were restricted and BG was

needed to generate. The reason was due to high market prices that compensated for the cost of pumping BG. The project for modeling pumped-storage hydro by PSERC for better utilization should be able to provide quantitative results that could be applied to B-G operation.

Additional benefits include:

- Increased revenue
- stabilizing and reducing wholesale electricity prices
- increasing the spread of renewable energy- reducing the need to expand electricity transmission
- Increased usage of renewable power to help meet the NYS goal of 30%
- improving grid operations
- enhanced bulk energy storage compared to conventional batteries
- Higher utilization of plant capacity (probable increase in O&M)

Based on meeting of 7/31/2014 financials are to be removed from this roadmap.

Assumptions:

Market Price to sell BG generation: \$36.00/MWh

Price to buy energy to pump BG: \$18.00/MWh

BG generates 8 hours per day

BG does not generate on weekends (generates 365 – 2*52): 261 days

Plant efficiency 69% (Pump = 1.42 * Gen)

Increase in renewable generation value is based on 2013 NYISO Gold Book using 2012 year end totals and the generation values in the tables below. It is assumed that the BG generation will displace Coal.

| Gen | Gross Gen MWh/yr | Gross Gen Rev | Gross Pump MWh/yr | Net Gen MWh/yr | Net Revenue | Increase to % NYS renewable generation |
|------|------------------|-----------------|-------------------|----------------|-----------------|--|
| 250 | 522,000 | \$18,792,000.00 | 741,240 | (219,240) | \$5,449,680.00 | n/c |
| 500 | 1,044,000 | \$37,584,000.00 | 1,482,480 | (438,480) | \$10,899,360.00 | 0.5 |
| 750 | 1,566,000 | \$56,376,000.00 | 2,223,720 | (657,720) | \$16,349,040.00 | 1.0 |
| 1000 | 2,088,000 | \$75,168,000.00 | 2,964,960 | (876,960) | \$21,798,720.00 | 1.25 |

Budgeted Net Revenue for BG in 2013 was \$5,050,000.

Using the 500MW Generation estimate NYPA would have \$18,899,360 Net Revenue which is an incremental benefit of approximately \$5.8M.

FUNDING

Funding for this effort would come from NYPA general funds and budgeted annually as needed for research efforts. NYPA already participates in several EPRI research efforts and can provide additional funding for targeted collaboration projects.

As developers and projects are identified to support then capital funding requests would be budgeted.

Additional funding could be developed in partnership with developers.

COSTS & RESOURCES

Initial costs for this effort would include budgeted dollars as well as labor resources to fund the studies as well as NYPA staff to work with the research partners and consultants.

Normal NYPA procurement processes would be followed.

IMPACT ON MARKET

If the studies prove that reliable pre-purchase agreements can be contracted with power producers then the added generation from BG can result in stabilizing and reducing wholesale electricity prices.

As wind power and/or solar expand into the NYS market BG provides a stabilizing factor for the intermittency of variable generation sources.

BG provides large bulk energy storage compared to conventional batteries and other sources that are still immature technologies.

Results from the studies could lead to additional benefit to NYS such as:

- Meet NYS and Federal requirements for clean power in the renewable portfolio
- More availability of clean power, reducing greenhouse gas emissions.
- Identify new renewable resources and how they can be integrated into the NYS grid
- Brings down cost of clean power
- Can retire older fossil plants
- Creation of permanent jobs to operate and maintain the plant
- More jobs during the construction phase

ORGANIZATIONAL IMPACT

Target 1: Encourage third party bulk renewable developers

NYPA has experience with working with bulk renewable developers in the Northern Region and their interconnections into NYPA substations and to the SCADA and EMS. Any project with a bulk renewable developer would follow normal NYPA project management procedures.

Target 2: Utilization of BG as storage for higher utilization

NYPA has operated the B-G facility more frequently in the past under when market pricing has been favorable for generation over pumping. Therefore the organizational impact should be minimal.

EXTERNAL STAKEHOLDER IMPACT

As BG is better utilized as a generation source NYS would be able to encourage more wind, solar, and other renewable sources since BG could provide a stabilizing force in the market with its reliable hydro supply.

Additional impact to stakeholders includes:

- increasing the spread of renewable energy- reducing the need to expand electricity transmission
- Increased usage of renewable power to help meet the NYS goal of 30%
- improving grid operations
- More availability of clean power
- Impact to day-ahead and real-time market pricing

DEPENDENCIES & RISKS

- Identify dependencies between activities
- A high-level risk overview, specifying probability and severity of key risks, risk owners and action plans.
- Determine timeframes for the activities

Target 1: Encourage third party bulk renewable developers

The risk is the continued viability of adding bulk renewables into the NY system. Transmission constraints need to be addressed. Another factor is general economic conditions and tax incentives so that developers and investors would want to continue to build renewable power sources in NYS.

Target 2: Utilization of BG as storage for higher utilization

At this time tariffs and market prices are not favorable to warrant running B-G generation more frequently. As seen in the first quarter with the actual revenue at approximately 5x the projected revenue for B-G, a significant benefit for NYPA is available. However, without pre-purchase agreements or significant differential in pricing between buy and sell (>30% needed) it won't make sense to run B-G more frequently.

Smart G&T Capability Roadmap Detail

SGR6: Integration of Distributed Generation

Capability Manager: Randy Solomon

CAPABILITY VISION / STRATEGIC RATIONALE

Today's energy system is transitioning dramatically. The current macrogrid, made up of large scale power plants generating bulk electricity to be transmitted to substations and then distributed to end users is evolving into a more complex, smarter system. A growing market for end user participation via on-site generation is enabling the development of renewable technologies, small scale power plants and local energy networks. This end user effort is contributing to the need for a holistic approach to the next generation grid, where end user generation will be tied into the macrogrid to benefit the overall system.

As the nation's largest public utility and a leader in innovation, NYPA has the opportunity to aid in the development and integration of distributed generation technologies. With this goal in mind we present the following vision:

1. *Play a leading role in incentivizing the installation of DG assets.*
2. *Provide a control center platform to seamlessly tie in existing and future distributed generation assets for better control and stability of the overall system.*
3. *Demonstrate the benefits and feasibility of local energy networks.*

SOLUTION

Play a leading role in incentivizing the installation of DG assets

- Leverage expertise to help mold industry standards
- Currently standards for interconnecting distributed generation (IEEE1547) are under development. NYPA can expend resources to assist in developing these standards in a way that we can detail how we would be able to communicate with the asset. In addition, the Public Service Commission (PSC) is revising some of their regulations in order to better facilitate the installation of distributed generation technologies. We have been active in the committee meetings in order to aid in the development of less restrictive PSC regulations.
- Provide funding for select distributed generation (DG) assets based on optimizing our transmission assets

Optimal placement and sizing of DG assets can decrease system losses and reduce power congestion. A study will be proposed to look at ideal locations for DG assets at customer locations. While this is commonly utilized on the distribution side, there may be some implications for power loss reduction via the integration of DG assets along the transmission lines.

NYPA aims to provide a control center platform to seamlessly tie in existing and future distributed generation for better control and stability of the overall system.

- Implement a Virtual Power Plant and DG data monitoring software

A Virtual Power Plant (VPP) is a controller which utilizes real time data from a cluster of distributed generation assets. The VPP will have built in control modules to ensure all generation sources are running optimally and maximizing economic payback. Savings will be derived from demand response, ancillary services, grid energy curtailment, real time power purchasing, etc. In addition, data will be archived so any irregular behaviors of generation sources will be identified and remediated. Additional data such as weather information and wind information will allow for VPP forecasting. This information will also be tied into our smart generation and transmission controller to optimize DG assets, prioritize clean energy, enable black start of power stations, and enable more accurate power planning/purchasing.

Demonstrate the benefits and feasibility of local energy networks

- Demonstrate a microgrid installation to serve as an example of the benefits that are included in distributed generation technologies

There are microgrids located within New York State, but the uniqueness of the proposed pilot is that we would like to integrate these assets into our internal Virtual Power Plant software. An advanced controller would be installed in order to allow remote monitoring and possibly control. Different control algorithms would be tested to determine optimal ways to benefit customer, distribution company, and generation/transmission supplier.

Current State

- 1) Incentivization of DG
 - a) IEEE in process of developing DG interconnection standards (1547)
 - b) Currently no geographic map of where DG placement would be optimized
- 2) Implement Virtual Power Plant
 - a) Currently no hardware/software support for DG assets
 - b) NYPA currently has programs to monitor customer usage via smart meters, the capabilities are deficient for what we need but it can act as a template for data center implementation
 - c) Currently do not have the proper technology at DG sites to communicate with VPP
- 3) DG/Micro-grid pilots
 - a) Internal MG&DG program established to install one (1) upstate and one (1) downstate CHP/MG project

Capability gap analysis

- 1) Incentivization of DG
 - a) Participate in IEEE 1547 standards
 - b) Optimize placement of DG
- 2) Build 'Virtual Power Plant'
 - a) Install Hardware, and design software system
 - b) Data centralization and visualization
 - c) Enhanced Load Management
 - d) Integrate with existing DG control systems
 - e) Integrate weather information
 - f) Integrate with NYPA power planning/purchasing systems
- 3) DG/Micro-grid pilots

Activities to address gap

- 1) Incentivization of DG
 - a) NYPA to send resources to IEEE 1547 meetings to aid in establishing standards for DG interconnection
 - b) Hire a contractor to perform study
- 2) Build 'Virtual Power Plant'
 - a) Install Hardware, and design software system
 - b) Data centralization and visualization
 - c) Enhanced Load Management
 - d) Integrate with existing DG control systems
 - e) Integrate weather information
 - f) Integrate with NYPA power planning/purchasing systems
- 3) DG/Micro-grid pilots

BENEFITS

Quantifiable cost savings were derived from the following methodologies

- 1) Incentivization of DG – No quantifiable cost savings at this point.

- 2) Build 'Virtual Power Plant' – Monetary savings via demand response for customer. Possible savings if we plan to set up shared saving agreements. Additional savings can be acquired via building, maintaining, and controlling the DG asset.
- 3) DG/Micro-grid pilots – Revenue is based on our Energy Efficiency Division project management fee. It is assumed that we will be implementing the project for the customer and potentially financing it, but the customer will cover the implementation cost and receive the savings.

Qualitative savings

- 1) Incentivization of DG
 - a) Enable market penetration of clean, renewable energy technologies.
 - b) Increase resiliency via distributed generation as backup power.
- 2) Build 'Virtual Power Plant'
 - a) Coordinate emergency response plans via customer DG assets for when the macrogrid goes down.
 - b) Optimize power purchasing due to enhanced forecasting to lower customer energy costs and increase NYPA's flexibility in the energy market.
 - c) Real time monitoring of PLM and other demand response programs.
 - d) Reinforcing current infrastructure without building additional structures.
- 3) DG/Micro-grid pilots
 - a) Demonstrate the viability and benefits of microgrids to spur private capital investments in microgrids.

FUNDING

- 1) Incentivization of DG – Assumed no outside funding
- 2) Build 'Virtual Power Plant' – Assumed no outside funding
- 3) DG/Micro-grid pilots - Customer will fund DG/Microgrid, NYPA will pay for initial study to spark customer interest. NYPA will provide project management services for installation.

COSTS & RESOURCES

- 1) Incentivization of DG
 - a) Study Cost – \$250K
 - b) Human resources required are available within NYPA
- 2) Build 'Virtual Power Plant'
 - a) Startup funding - \$5M for Hardware/Software
 - b) Ongoing funding – 6-8 FTE – \$1,500,000k/yr.
- 3) DG/Micro-grid pilots
 - a) Human resources required are available

IMPACT ON MARKET

- 1) Stimulate Distributed Generation projects within New York State.
- 2) Allow for market penetration of microgrids.
- 3) Create a new revenue stream via new business models (I.e. build, own, operate, and maintain DG assets on customer property).
- 4) Create platform for DG controls for our customer and NYPA
 - a) If PSC changes regulations, customer DG assets can assist the macrogrid by exporting energy produced.
- 5) Optimize power purchasing due to enhanced forecasting to lower customer energy costs and increase NYPA's flexibility in the energy market.

- 6) Real time monitoring of Peak Load Management and other demand response programs.

ORGANIZATIONAL IMPACT

- Additional staff required to support overall DG effort

EXTERNAL STAKEHOLDER IMPACT

New York State

- Lower energy costs for NYPA customers
 - More diversified portfolio of generation sources
- Reduce GHG emissions
- Reduce Source EUI
- Increased grid resiliency

Investor Owned Utilities

- Platform for next generation smart distribution grid
 - Potential to partner with NYPA and customers to utilize generation data in distribution planning

Customers

- Easy way to tie in existing and proposed DG Assets
- DG assets will increase in savings amount via NYPA control system

DEPENDENCIES & RISKS

- Integration needed with other NYPA initiatives (Customer Energy Solutions & Build Smart, NY Energy Manager) and NYPA departments (IT, Economic Development, Power Purchasing, Operations, & Energy Efficiency)
- Risk Review
 - Cyber security required
 - Economic – medium
 - Safety – medium
- Currently regulatory barriers
- Economic feasibility of distributed generation technologies in varying applications
- Customer commitment
- Market penetration of distributed generation technologies
- Risks of using new cutting edge technology



STRATEGIC INITIATIVE BUSINESS PLAN for

Asset Management

Executive Sponsor
Initiative Owner
Project Manager

Bob Lurie
Joe Kessler
Alan Ettlinger

Initiative Team

Carlos Alvarez, Lenny Caputo, Carl Courant,
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Katie O'Toole, Donahue Scott

Initiative Start
Initiative End

4th Quarter 2014
4th Quarter 2025

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EXECUTIVE SUMMARY

Strategic Rationale and Drivers of the Initiative

The New York Power Authority's (NYPA's) generation and transmission (G&T) infrastructure is the foundation from which low cost, clean, reliable electricity is provided to customers in New York State (NYS). The effective management of these assets, in the form of investment and maintenance, is critical to ensuring that NYPA's G&T infrastructure remains in good health and that NYPA can continue to provide a reliable, low cost service to customers. Over the past 70 years NYPA has demonstrated clear capabilities in the management of its assets in the face of changing industry conditions and to meet requirements from the Governor's office to deliver infrastructure projects to support secure power supply in NYS.

As the energy industry enters a period of transformation, with the deployment of new G&T technologies as well as the emergence of new customer consumption patterns, the demands on NYPA's assets are set to change yet again and this will have a corresponding impact on the investment needs of both existing and new assets. It will require a new framework for asset management to ensure NYPA has greater understanding and visibility of the assets installed on its system to allow informed decisions to be made with respect to the allocation of investments required to manage its portfolio of G&T infrastructure. An approach that supports targeted asset management will also increase in importance given that much of NYPA's G&T infrastructure dates to the 1950s and will require significant investment to enable continued operation. This was a key driver of the New York Energy Highway Blueprint and efficient investment in G&T assets will be critical to ensure the continued provision of low cost, clean reliable power to customers in NYS.

The proposed solution

NYPA is proposing to develop and implement an asset management approach aligned to the provisions of the internationally recognized asset management standards, International Standards Organization (ISO) 55000. The ISO 55000 standards provide guidelines for cross-industry, best practice for asset management and takes a holistic approach that encompasses traditional considerations associated with the value chain for managing assets alongside life cycle planning, asset financial / operational performance, and risk profiling. The ISO 55000 provisions will comprise the backbone of NYPA's asset management approach and will be complemented by projects that effectively encompass people, process, technology and data considerations.

The vision for asset management at NYPA comprises three major phases. The first is foundational and focuses on ensuring the key tenets of a strong asset management approach are in place including accurate data, a defined organizational structure and responsibilities, skilled resources and enhanced awareness of asset management across the organization. From this foundation, the approach will be optimized and eventually transformed to allow NYPA to become a best-in-class asset management organization which is able to effectively 'plug and play' new assets into the approach. It will take time to move to this vision but, where NYPA is able to do this, it will place NYPA in a strong position to continue to efficiently operate and maintain its assets even where new challenges arise.

To effectively attain the outcomes envisaged under foundation, optimization and transformation the following four work streams are being proposed as part of this initiative.

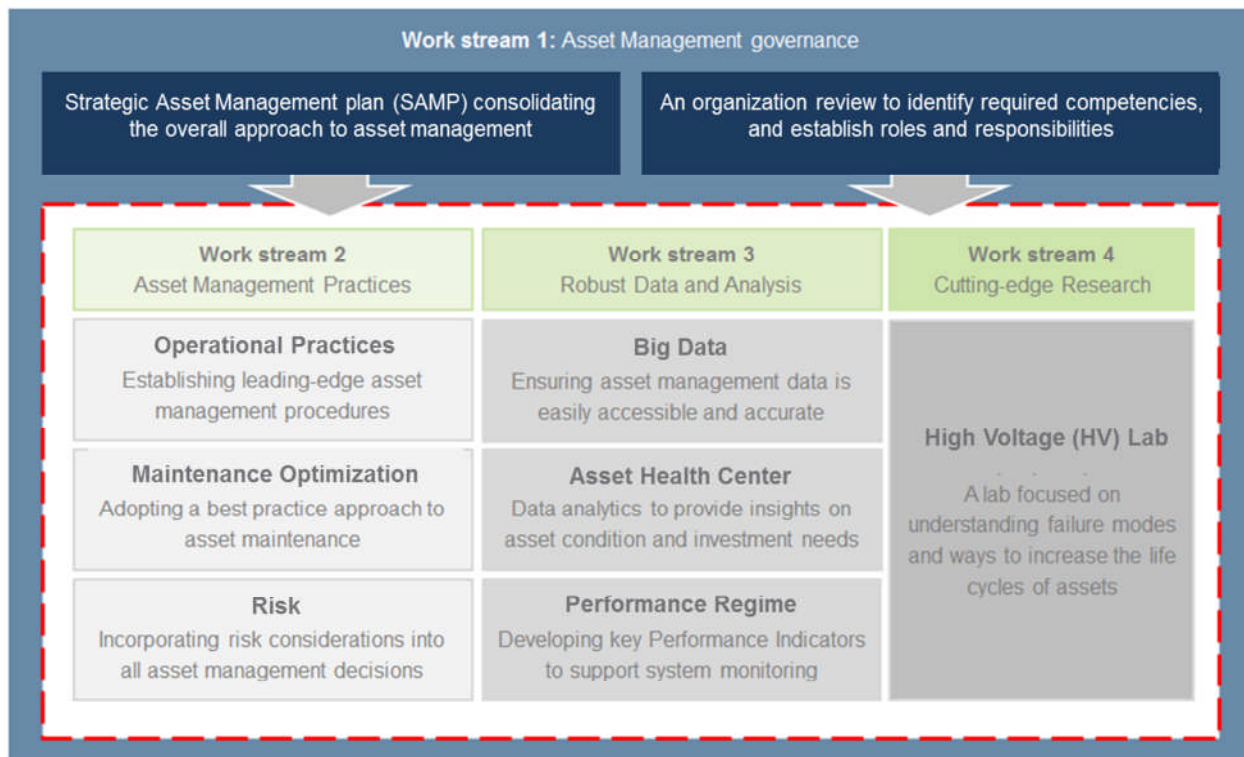
- The first focuses on the establishment of a clear framework of governance for the initiative including a Strategic Asset Management Plan (SAMP) and organizational structure that clearly defines objectives of the asset management initiative as well as allocating roles and responsibilities.
- The second focuses on the development of a set of consistent practices to govern asset management at NYPA. This specifically involves a work stream incorporating the delivery of an optimized maintenance program as well as considerations of risk within all asset management decisions.
- The third focuses on securing robust data and analysis to support asset management decisions. This will require the establishment of asset management systems with accurate and easily accessible

data as well as a health center that supports effective monitoring and diagnostics. It will be supported by Key Performance Indicators (KPIs) to monitor asset performance and the asset management initiative.

- The fourth focuses on establishing a world class research and development laboratory for applied research and testing for high voltage (HV) assets to enable NYPA to take a leading role in HV innovation that will help to minimize degradation and optimizes asset life.

Figure 1 below provides an overview of the way these projects will fit together.

Figure 1: Overview of the projects that comprise the asset management initiative



The long term goal of this asset management strategic initiative is to enable and maintain a flexible process that will allow NYPA to readily adapt to the future, changing operating world. This flexible process will allow NYPA to continue to manage existing assets, have a framework in place for new assets, and will enable the potential expansion of NYPA's role of asset management with its customers through additional customer services and enhanced energy services projects. With a strong asset management process in place, NYPA can ensure optimal condition of its assets and resources so as to support reliable, flexible, and efficient generation and transmission of low cost energy.

This is the ideal time for NYPA to undertake an initiative and invest in its asset management processes as NYPA is currently involved with several in-flight projects. These projects include, but are not limited to, Life Extension and Modernization Programs (Generation and Transmission), major equipment overhauls, System Hardening and Storm Resiliency, and various Data Collection and Analysis Projects currently being worked on by Research and Technological Development such as infrared monitoring, dynamic rating of transmission lines and development of expert systems.

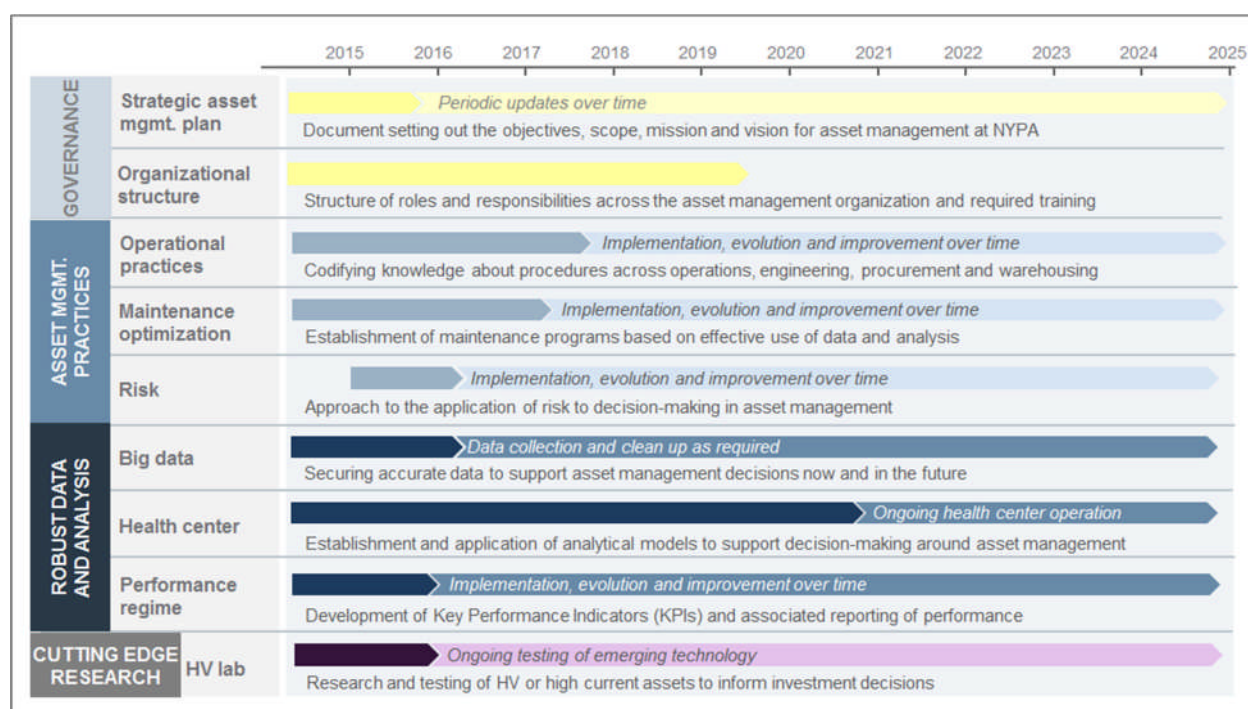
To ensure the success of this initiative as well as the other strategic initiatives being evaluated, the dependencies from and on one another must be clearly understood.

- The Smart Grid and Transmission Initiative that includes the modernization of the transmission grid and the development and implementation of Smart Grid technologies, is complemented by the asset management process. New equipment that will be required to modernize the grid would be new NYPA assets and, as such, will be operated and maintained under the auspices of the asset management initiative. Additional data will also be attained with respect to the operation of G&T assets which will help to inform decisions about asset investment.
- There are clear interdependencies with the workforce planning initiative which is developing processes to support identification of skills and capabilities needed across the organization and will help asset management to identify and recruit additional staff to support the initiative.
- There will be close interactions with the Process Efficiency initiative, the main goal of which is to combine or enhance ongoing efforts to standardize and formalize business process functions across all business units, to ensure that NYPA remains a sustainable, efficient, and flexible organization.
- Knowledge Management will also interact with asset management as the skills and capabilities to maintain assets will need to maintain pace with changing responsibilities and new technologies.
- There may be some interactions with the customer solutions initiative where new assets are deployed at customer sites and the asset management approach is extended to these facilities.

High Level Timeline

Figure 2 below presents a high level timeline for the initiative; illustrating the four work streams that comprise the asset management initiative and the way that these will be implemented over time.

Figure 2: High level timeline for the asset management initiative



Benefits for New York State (for a detailed breakdown of benefits, see table in Benefits section)

The revised asset management approach proposed through this initiative will support greater understanding of and visibility around the condition of G&T assets installed on NYPA's system. An improved understanding of system condition will, in turn, support the delivery of a range of both qualitative and quantitative benefits. The quantitative benefits will be linked to:

- A reduction in maintenance costs as a result of predictive analytics and maintenance.
- A rationalized asset inventory which will reduce warehousing needs and associated costs.
- Reduced asset failures which will improve fixed asset utilization.

There are also a number of qualitative benefits that it is not possible to fully quantify including improved workplace condition, enhanced sustainability, increased financial control and improved customer satisfaction. However, the costs of implementing the initiative are not insubstantial and therefore the benefits attained need to be considered in the context of the costs incurred. The team has calculated a range of benefits using benchmarking figures that reflect the experience of over 20 utilities in the application of an asset management approaches that are aligned to the principles of ISO 55000.

Figure 3: Initiative Cost-Benefit Analysis 2014-2020

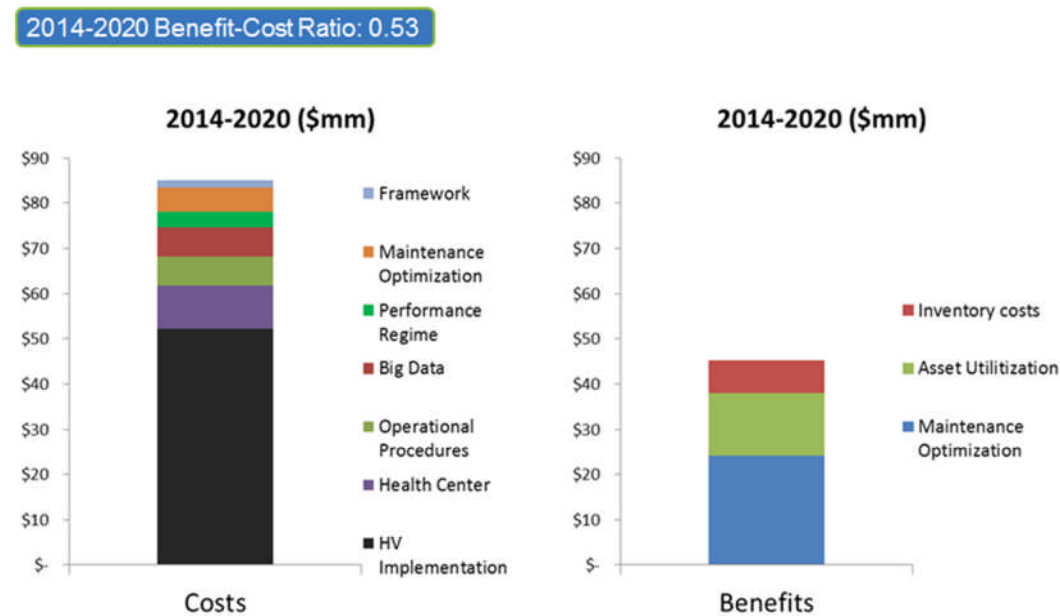
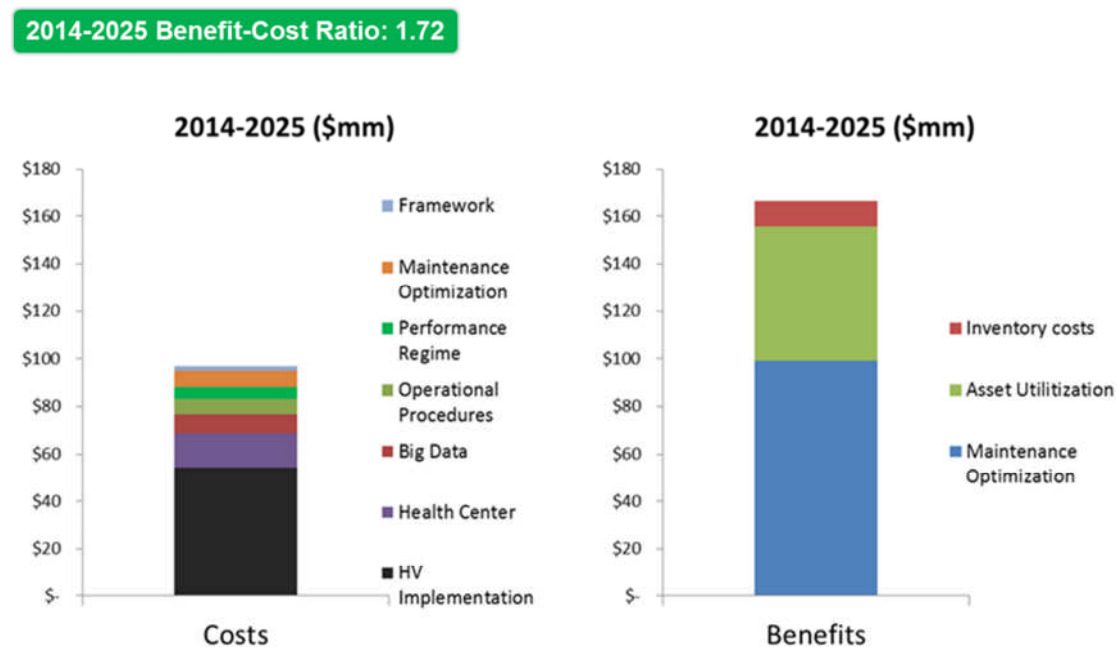


Figure 4: Initiative Cost-Benefit Analysis 2014-2025



Although over the shorter term (2014-2020) the cost-benefit ratio is negative this is largely due to the fact that benefits from the initiative will not immediately accrue. In this respect, benefits will only accrue once the suite of asset management projects proposed as part of this initiative has been fully implemented starting from 2018. Even from this point, the cost-benefit analysis presented below assumes that benefits will take time to ramp up; with 25% of overall benefits accruing in 2018, 50% in 2019 and 100% of potential benefits from 2024 onwards. The stepped release of benefits is largely aligned to NYPA's current 10 year asset management maintenance cycle. Even using these conservative assumptions, over the longer term there are clear financial benefits associated with implementation of the initiative; demonstrated by a cost-benefit ratio of 1.72. When coupled with the qualitative benefits identified above, as well as the understanding that this initiative will provide a strong foundation for the implementation of the remaining elements of the Strategic Vision, this provides a clear rationale for implementation of the initiative. The initiative will start in late 2014 / early 2015 with the development of an Asset Management Framework. It is then expected that the remaining six projects will kick off in 2015 and 2016, depending on agreed phasing as outlined during the framework project. Like any major transformation program, the Asset Management initiative will not necessarily deliver material benefits as soon as implementation commences. Based on benchmarking and historical examples, it is expected that benefits will start to be delivered somewhere between years three and four of the initiative – in this case from 2018 onwards. These benefits will be staggered based on the degree of asset management maturity exhibited by the business, achieving expected levels from approximately 2022 onwards.

Risk of the Initiative

As with any project or initiative there are risks associated with the delivery of benefits envisioned as part of the asset management initiative. It is important that the asset management organization has clarity regarding the main risks that could arise with respect to the delivery of benefits under this initiative and that they have in place mitigating plans to (a) reduce the risk of these outcomes occurring and (b) reduce the impact these risks would have if they were to emerge. The following list provides an overview of the key high level risks associated with this initiative and the actions that will be taken to mitigate the probability and impact.

- **Cultural change:** This initiative will require significant cultural change across NYPA and particularly in the Operations department in terms of the approach that is taken to asset management. If staff have difficulty understanding the need to change their approach to asset management or are unable to embed changes within their day-to-day working lives, this will significantly deplete the benefits that could be attained from the initiative. To address this risk, it will be critical to effectively engage with key staff across the organization from the outset of the initiative and on an ongoing basis. This will be complemented by an extensive program of change management to demonstrate the case for change and the benefits that will be attained from the initiative. It will also provide opportunities for staff to influence the direction of the initiative.
- **Resourcing:** For this initiative to be a success, it will be critical to recruit staff with the required skills and competencies to support asset management on an ongoing basis which could be challenging given the demand for and availability of these types of skills in the market. This underscores the importance of commencing the organizational assessment early to identify skills and capabilities required to support the initiative and implementing a strategy to secure these staff. A targeted program of training will complement these activities by addressing any skills gaps that may still remain.
- **Perception of benefit accrual:** It may take time for benefits from the initiative to accrue and this could lead to questions about the credibility of the initiative. To address this, it will be critical to take forward active engagement with internal and external stakeholders to manage their expectations on this. The use and regular reporting of KPIs will also provide regular updates on the status of the initiative.

STRATEGIC RATIONALE

Business Strategy and Rationale

The management of generation and transmission (G&T) assets has been an integral element of NYPA's operational model for many years. NYPA's focus on the efficient operation and maintenance of G&T assets has helped to secure the delivery of low cost, clean, reliable power to customers. However, transformational changes that are taking place in the energy industry will require a different operating model that moves NYPA from simply managing assets to a proactive asset management organization so as to ensure NYPA continues to provide these benefits to customers.

As Figure 5 illustrates, there are a combination of factors that are changing the demands on NYPA's G&T assets. Greater diversity in the fuel mix, including a higher penetration of distributed generation, requires more cyclic operation of NYPA's generation assets which has led to changing, and in some cases increased maintenance needs. Increased deployment of distributed generation and renewable assets

Figure 5: Drivers of the asset management initiative



places additional demands on transmission infrastructure which may change the maintenance needs of NYPA's geographically distributed system.

These challenges are compounded by changing customer consumption. A range of drivers, including cost, sustainability and reliability, are raising customer awareness and engagement on energy issues which has led to an increase in the range of services offered in areas such as energy efficiency, demand response and on-site generation. These new services are contributing to increasingly complex consumption patterns and two-way energy flows that place new demands on G&T assets. Customer expectations for system reliability continue to increase and, while NYPA has an impeccable reliability record, recent events such as Hurricanes Sandy and Irene, show that NYPA must be increasingly mindful of

the risks that more severe weather events pose to the health and reliability of its assets. Reliability risks also arise as a result of cyber security issues and both of these impacts need to be considered as part of the design of any asset management approach.

Market conditions could complicate the asset management landscape further still. For example, NYS utilities may adopt a collaborative approach toward asset investment such as the Transco initiative which focuses on greater operational coordination. In addition, as NYPA becomes increasingly customer-focused and more assets are deployed at customer facilities, NYPA may have to assume a greater role in managing demand-side assets. NYPA is also accountable to external regulatory authorities and standards in a number of areas, from reliability to cybersecurity to environmental impact which are likely to continue to evolve.

In addition to the external drivers illustrated in Figure 5 a significant internal driver of this initiative is the aging profile of NYPA's G&T assets. The age and condition of NYPA infrastructure has contributed to a number of recent asset failures that have caused unplanned outages on the NYPA system. This includes

failures of the Blenheim-Gilboa Unit 2 Generator Step-Up (GSU) Transformer, the Hellgate 1 GSU, the Harlem River 1 GSU, the Niagara transformer bushing and the turbine rotor at St Lawrence. These incidents suggest that significant investment will be needed either in the form of maintenance or replacement of assets to modernize the network. NYPA has spent \$2million over the last three years on these unplanned equipment failures. Therefore, transforming the way assets are managed will hopefully prevent these kinds of failures in the future while both delivering cost and reliability benefits to NYPA and its customers.

Work in this area has already begun with the transmission and generation Life Extension and Modernization (LEM) programs as well as other large investment projects. However, it is not only aging assets that can experience failure. Some assets simply fail before they should and therefore any asset management approach must provide clear understanding of the health of NYPA's overall portfolio of assets, to ensure that there is visibility surrounding the location and scale of investment that will deliver the most value. The potential for asset failure during all stages of the asset life cycle also underscores the need to establish effective disaster recovery programs, particularly for new assets such as the proposed, new asset health center.

All of these issues are set within the context that NYPA must provide clarity around its decisions to a number of external stakeholders, including its customers, the NYS government, Public Service Commission, and citizens of NYS, who want to ensure value for money in the delivery of power and energy services. This creates challenges for NYPA in demonstrating that investment into the management of its assets is both economic and efficient.

Given the revolution taking place in the market and the new demands this will create for G&T assets, it is essential that NYPA establish an enterprise-wide, consistently applied, data-led asset management approach. This will support a holistic understanding of NYPA's portfolio of assets and provide visibility on investment and maintenance needs thereby reducing forced downtime. It will also secure alignment and compliance with new and emerging industry standards. This will also ensure that NYPA's approach to asset management is flexible enough to maintain continued, strong operational performance in an uncertain future.

Table 1: Alignment with strategic goals

| Strategic goal | Type and Degree of impact | Description of impact |
|---|---------------------------|---|
| Financial Effectiveness: Maximizing the financial capacity of NYPA to make capital investments that help achieve NYPA goals | Positive - high | An asset management approach that utilizes consistent processes and accurate data to assess the health of assets will optimize asset investment. The greater utilization of asset management metrics and dashboards will improve transparency around the effectiveness of NYPA capital and operating (O&M) spending. |
| Operational Effectiveness: Maximize the efficiency, reliability and flexibility of NYPA assets and organization | Positive – high | Improved transparency about the health of assets will support preventative / predictive maintenance programs that will lead to maintenance optimization, reduce the potential for asset failure and will improve G&T reliability. A structured asset management organization with consistent practices and defined roles and responsibilities will also improve organizational and operational flexibility. |
| Value From Energy: Maximizing the benefit / minimizing the negative impact of each unit of energy delivered to the state / customer | Positive – high | As the initiative becomes increasingly mature, NYPA will be able to reach more informed decisions about investment in and maintenance of its assets. In turn, this will allow NYPA to provide long term rate stability to customers through a consistent and well defined capital and O&M investment strategy. |

Table 2: Alignment with key values

| Values | Degree of impact | Description of impact |
|------------------------------|-------------------|---|
| Sustainability | Positive – medium | A better understanding of the maintenance and investment needs of NYPA assets will ensure continued operation of G&T assets at the most economic cost and minimized environmental impact. |
| Safety | Positive – high | Effective asset management will reduce the potential for asset failure and have a corresponding positive impact on safety |
| Compliance | Positive – medium | Clear consistent asset management practices will ensure an agreed process is adopted and reduce the potential for non-compliance. However, consideration needs to be given to compliance with the National Electric Reliability Corporation in the context of the greater collection, communication and storage of asset data and analysis. More effectively, organized and stored information and clear processes may streamline compliance and reporting efforts. |
| Environmental responsibility | Positive – low | Establishment of a dedicated HV and / or HC research lab and the health center will support NYPA in identifying more efficient and environmentally responsible approaches to asset operation. The improved reliability of assets will also reduce the potential for asset failure and thereby reduce the possibility of corresponding environmental impacts. |
| Employee Development | Positive – high | The establishment of an asset management organization with defined roles and responsibilities and a formal training curriculum will provide opportunities for employee development and assist in knowledge capture and transfer. |
| NYS energy plan | Positive – medium | A clear and universally adopted asset management program is a foundation for the continued provision of low cost, reliable power to customers in NYS. |

Description of Legal Authority

Maintenance of NYPA's physical assets is a key component to achieving NYPA's mission of providing clean, low-cost and reliable energy consistent. NYPA's broad grant of authority in this area is derived from the state's policy declaration of "the need for obtaining and maintaining a continuous and adequate supply of dependable electric power", Public Authorities Law (PAL) Section 1001. The state's grant of powers and duties to NYPA are set forth in PAL Sec. 1005, which includes many references to the maintenance and management of generation and transmission assets.

INITIATIVE OVERVIEW

Description of the Opportunity

Much of NYPA's G&T infrastructure dates to the 1950s. These assets are aging and their effective management is an integral element of NYPA's day-to-day operation. Focus in this area has been increased as a result of the implementation of the Transmission Life Extension and Modernization (TLEM) and Lewiston Pump Generating Plant (LPGP) programs which are specifically targeted to repairing and rebuilding some of NYPA's aging transmission and generation assets to extend their lifetimes. Investment under the LEMs and the future replacement / upgrade programs could be significantly optimized where NYPA implements a process-based asset management approach that enables NYPA to attain a better understanding of the health of its assets in place on the system, and target investment where it will add the most value.

At NYPA, the approach toward managing assets has gradually evolved in a piecemeal manner and therefore key elements are not consistent. For example, processes for managing assets vary by geography and on a site-by-site basis leading to differences across NYPA in maintenance and operational planning methods. Linked to this, there are challenges to the adoption of a consistent approach for assessing asset condition and making informed asset investment decisions which reduce transparency about respective maintenance requirements of assets across the system. In addition, asset databases are not uniformly used across NYPA and differences in interpretation of data fields has led to inaccuracies with the data collected in these systems. Both of these constraints on current data availability reduce the opportunities for NYPA to move toward an approach that supports predictive decision-making with respect to the maintenance of assets. Combined, all of these factors are leading to difficulties in developing and implementing objective, robust cases for investment decisions about the management of existing assets.

Adopting an asset management approach that is consistently applied on an enterprise-wide basis will help to address many of these issues. The establishment of a suite of asset management processes built on existing practices, which are universally applied and consistently understood, will ensure asset-related decisions are based on a uniform and justifiable set of criteria. This will be complemented by improvements in the availability and accuracy of asset management data that supports targeted analysis to provide improved visibility with respect to the assets that are currently in place. Greater understanding of NYPA assets will enable decisions to be made based on key indicators of asset health related to performance, risk and value as well as cost. In addition, clarity regarding respective roles and responsibilities across the asset management organization will ensure there is accountability for key activities and efficiency in the way these key tasks are completed. Each of these components of the approach will be refined over time to help NYPA move toward a culture of continuous improvement with respect to asset management.

By establishing an approach that builds on all of these components and aligns to internationally recognized standards, NYPA will be well positioned to become a best-in-class asset management organization. This best practice-based approach will provide a robust foundation for the transformation of NYPA as envisioned in the NYPA strategic vision. It will ensure that NYPA has full visibility for the investment needs of its assets and allow informed decisions so as to ensure they are effectively maintained. In turn, this will ensure the continued reliable operation of NYPA infrastructure which will support full roll out of the Smart G&T initiative as well as the expansion of services to customers under the customer solutions initiative.

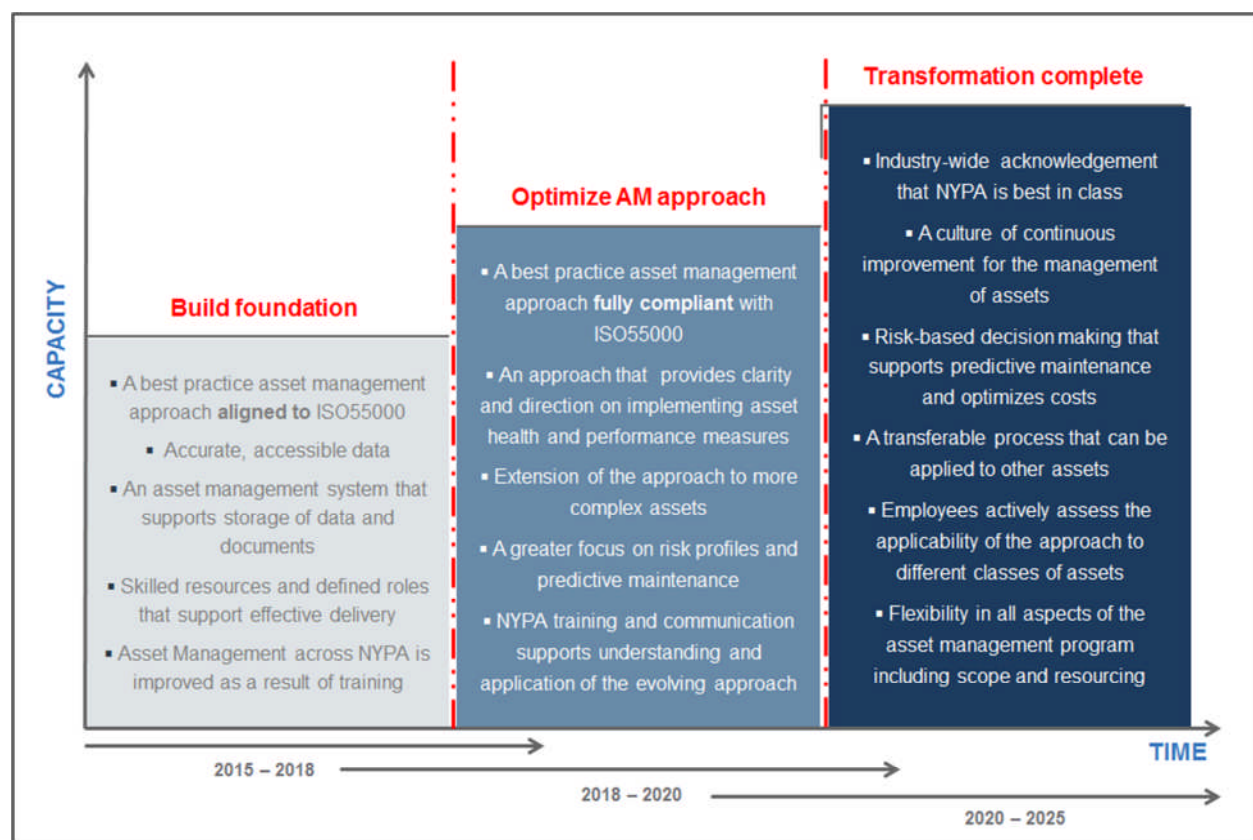
A key challenge to the effective implementation of an approach such as this is to effectively embed the cultural change required to support full adoption of the approach. This will require a full and effective top-down change management approach that focuses on communicating the changes that are taking place from the outset of implementing the new structure.

Initiative Vision (Desired Outcome)

The primary objective of this initiative is to implement an enterprise-wide asset management program that monitors and maintains NYPA assets and enables informed investment decisions to be made based on performance, risk, cost and value to customers. Given the uncertainty around the way that generation and consumption patterns will evolve as well as the impact this could have on NYPA's G&T assets, the program will need to have sufficient flexibility to accommodate a range of future operating environments.

It will take time to establish a fully functional program that transforms asset management at NYPA and positions the organization as an industry leader in this area. To navigate the process toward transformation of NYPA's asset management approach this initiative has been separated into three distinct phases with targeted outcomes related to each phase. This phased process is illustrated below in Figure 6 and discussed in more detail in the following section.

Figure 6: Vision for the asset management initiative



- **Foundation (2015-2018):** The foundation phase will implement the key building blocks from which the initiative will be constructed and is arguably the most important stage of the initiative. In the absence of robust foundations, it will be difficult to attain asset management excellence. The key outcome for this stage will be establishment of a strategic enterprise-wide asset management approach aligned to recognized industry standards that supports consistent practices at all stages of the asset management life-cycle. The approach will be supported by accurate, accessible data to enable informed, cost effective decisions and support robust rate case filings. The asset management organization will be comprised of skilled resources and have defined roles to support effective delivery, helping to increase awareness and integration of asset management processes across NYPA. Asset management considerations will be an integral part of decisions that are made across NYPA.
- **Optimization (2018-2020):** The optimization phase represents an opportunity to consolidate NYPA progress during foundation. During this phase, NYPA will become fully compliant with internationally recognized asset management standards and its approach will evolve to represent best practice within the industry. There will be full clarity about the 'health' of critical assets which will translate into a targeted maintenance approach that helps to optimize asset life and costs by predicting maintenance needs given the performance of assets over time and their risk profile. Awareness of asset management practices will be high and continually reinforced, at all levels of the organization which will facilitate a full assessment of the potential to extend the approach to more complex assets across NYPA. Data will be used predictively to reach decisions on maintenance activities and asset replacement.
- **Transformation (2020-2025):** During the final phase of the initiative, the transformation of NYPA's asset management function will be demonstrated via the optimization of asset costs, performance, risk and value. NYPA will have adopted a culture of continuous improvement and flexibility and assumed the position of industry leader in the application of internationally recognized asset management standards. Other utilities will look to NYPA for best-in-class guidance in this area. All employees across the organization will actively apply asset management principles and will be able to integrate new assets within the approach via 'plug and play' provisions.

Critical to the delivery of desired outcomes during each of these phases is the ability to support effective cultural change within the organization. This includes the need for effective communication to ensure that employees at all levels across NYPA understand the new asset management approach and effectively adopt its provisions in their day-to-day working lives. Effectively implementing this cultural change is a key challenge for the initiative and one that should be met head on with targeted training and change management initiatives.

Initiative Scope

NYPA is proposing to develop and implement an approach aligned to the provisions of the internationally recognized asset management standards International Standards Organization (ISO) 55000. The ISO 55000 standards provide guidelines for cross-industry, best practice for asset management and takes a holistic approach that encompasses traditional considerations associated with the value chain for managing assets alongside life cycle planning, asset financial / operational performance, and risk profiling. The ISO 55000 provisions will comprise the backbone of the asset management approach and will be complemented by projects that effectively encompass people, process, technology and data considerations.

There are six key decision processes that fall within the ISO 55000 framework and these will form the scope of the asset management initiative.

- **Life cycle strategy:** Relates to the whole lifecycle from planning / designing an asset through to its ultimate retirement. Incorporates considerations of capacity planning, asset replacement strategies and optimal asset life cycle ownership costs.
- **Investment management:** Relates to the risk-based approach used to effectively secure value from capital spending. Includes issues around investment cost benefit and value analysis, spending optimization, budget forecasting integration as well as performance monitoring and corrective action.
- **Maintenance optimization:** Relates to the targeting of spending to support continued economic and effective operation of assets. It includes issues around risk profile development and analysis, asset performance monitoring and repair / replacement strategies.
- **Standards:** Relates to the agreed principles that guide decisions about asset management. This includes planning criteria, design standards, construction specifications and material specification.
- **Resourcing strategy:** Relates to the approach that is taken to secure the staff to support deployment of the asset management approach. Includes core skills and competencies definition, retention strategies, internal / external resource balancing and contracting mechanism decisions.
- **Performance management:** Relates to the development and implementation of key metrics that provide insight about how well assets are operating. Includes considerations of reliability, asset performance, process efficiencies and asset management system improvement.

The scope of the initiative will also include the development of a Strategic Asset Management Program (SAMP) that will be implemented to support alignment with ISO 55000. Development of the SAMP will be the first step that the team will take in the roll out of this strategic asset management approach. The focus of this work will be to establish a documented SAMP that defines the asset management objectives and scope including how these relate to corporate objectives and the approach toward stakeholder engagement. The SAMP will be governed by a number of key principles that run through the NYPA strategy including risk mitigation, sustainability and safety. The SAMP will provide guidance to the completion of an ISO 55000 assessment which will demonstrate the strengths and weaknesses of NYPA's current asset management approach and indicate those areas that need to be prioritized to meet the transformational vision NYPA has set out. In turn, this will help NYPA to further develop the scope of the asset management projects presented within this business plan. An overview of asset management and this initiative will be provided to senior management to support a top-down infiltration into the organization.

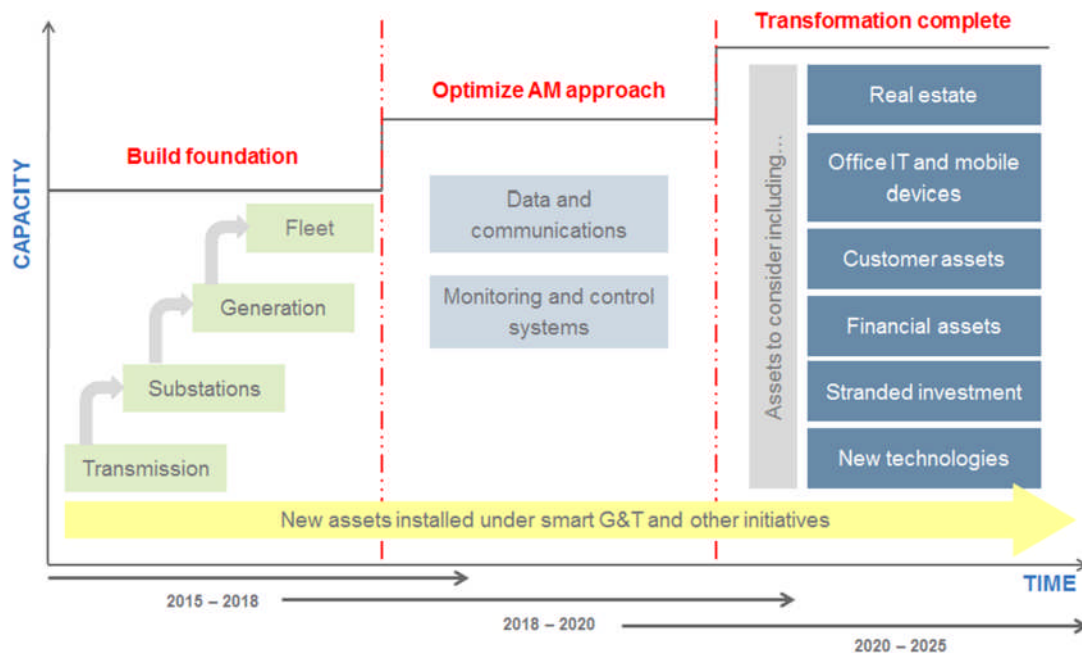
Application of the Initiative

Another factor determining the scope of the initiative is the classes of assets to which the initiative will be applied. Figure 7 illustrates the proposed approach to the application of the initiative.

The scope of the initiative will initially remain focused on the G&T infrastructure that has traditionally been incorporated within NYPA's asset management approach e.g. transmission lines, substations and generation assets. However, as the initiative evolves consideration will be given to potentially extending the approach to new classes of assets including the NYPA fleet e.g. pool cars, field vehicles, marine vessels, airplane, etc. Additionally, toward the end of the foundation phase, an assessment will be completed to determine whether the approach should also be extended to data, communications, monitoring and control assets.

As the transformation phase approaches, greater consideration will be given to the potential of further extending the approach to non-traditional assets such as real estate, customer assets, financial assets and office IT; the latter will complement application of the approach to operations IT systems during optimization. Decisions about the assets to be included during transformation will be made once there is greater clarity about the benefits that could be attained from application of the enterprise-wide asset management approach to G&T infrastructure and there is a better understanding of the impact that this type of approach could have on new classes of assets. However, the initiative is being developed cognizant of the need to maintain flexibility in the approach so as not to preclude its extension to new assets in the future.

Figure 7: Application of the initiative to asset classes



Consequence of Maintaining Status Quo

The approach toward managing assets currently employed at NYPA has helped to ensure continued efficient operation of NYPA's G&T assets but there is significant room for improvement by utilizing advanced diagnostics and predictive techniques that are becoming increasingly wide-spread across various industries. A number of existing projects have been initiated to improve the management of assets at NYPA including the Maximo system upgrade and the Transmission and LPGP LEM programs. However, while these efforts will position NYPA to more effectively manage assets into the future, they do not take a strategic approach and as a result are not fully enabling a transition from a reactive to a proactive asset management approach. They comprise just part of the wider solution required to move NYPA toward the position of a best practice asset management organization.

Under the status quo NYPA would continue to deliver secure, clean, reliable power to customers across NYS but it may not be possible to optimize asset management costs and therefore support the effective delivery of low cost power. A variety of factors contribute to this:

- **Consistency of processes:** There are differences in the approach to managing assets across sites at NYPA and across each stage of the asset life cycle. While there is some consideration of risk and asset criticality within existing investment and maintenance decisions, it is not formalized and therefore is not treated in the same way by all groups. This leads to inconsistencies in analyzing options related to the management of assets and could mean resulting decisions do not maximize value from investment.
- **Data availability and integrity:** Data related to asset condition and performance is critical to making informed decisions about required investment in the future. NYPA presently has access to significant amounts of asset data, but there is limited clarity across the business about what data is available as well as concerns about the integrity of the data currently in place. In some cases even though data is collected it is not used to the fullest extent to make effective asset management decisions. Additionally, multiple systems are sometimes used to collect similar types of data, which may lead to suboptimal decisions as a result of reduced transparency about asset health and investment needs. Without accessible and accurate data, and an enterprise-wide approach that values and incorporates it, NYPA cannot implement predictive analytical approaches to leverage ongoing deployment of smart sensors and analytical tools

and will continue to experience problems of stranded research and investment in such systems. Responsibility for data needs to be clarified and formalized.

- **Resources and governance:** At present, resources for managing assets at NYPA are constrained and there are difficulties in securing staff with required asset management expertise. In addition, there is no formal governance structure in place in the form of designated roles and responsibilities that clearly indicate where accountability for given activities, assets or data lies. This creates challenges for the implementation of an effective asset management approach as well as a lack of clarity about who has responsibility for the approach.

As the industry revolutionizes and the demands on NYPA's G&T assets change, these issues will only be exacerbated. The asset management approach will need to be flexible to emerging generation and consumption patterns, providing transparency, through the use of metrics, on system performance and asset health to support the delivery of required upgrades to those assets that are critical to continued reliable power supplies. In the absence of this flexibility, long term costs associated with the management of NYPA assets will most likely be higher and these costs will ultimately be passed onto NYPA customers.

Considered Alternatives

The key alternative that has been considered is to continue the current maintenance management practices at NYPA. However, as NYPA assets age, operating conditions change and new technologies emerge, it is critical to deploy an enterprise-wide asset management approach that provides visibility on the health of the assets deployed on the system to support an informed investment strategy. No alternative asset management approaches were considered as part of this initiative given that ISO 55000 is an internationally recognized standard for asset management and many utilities are in the process of aligning their approach to the requirements of this standard.

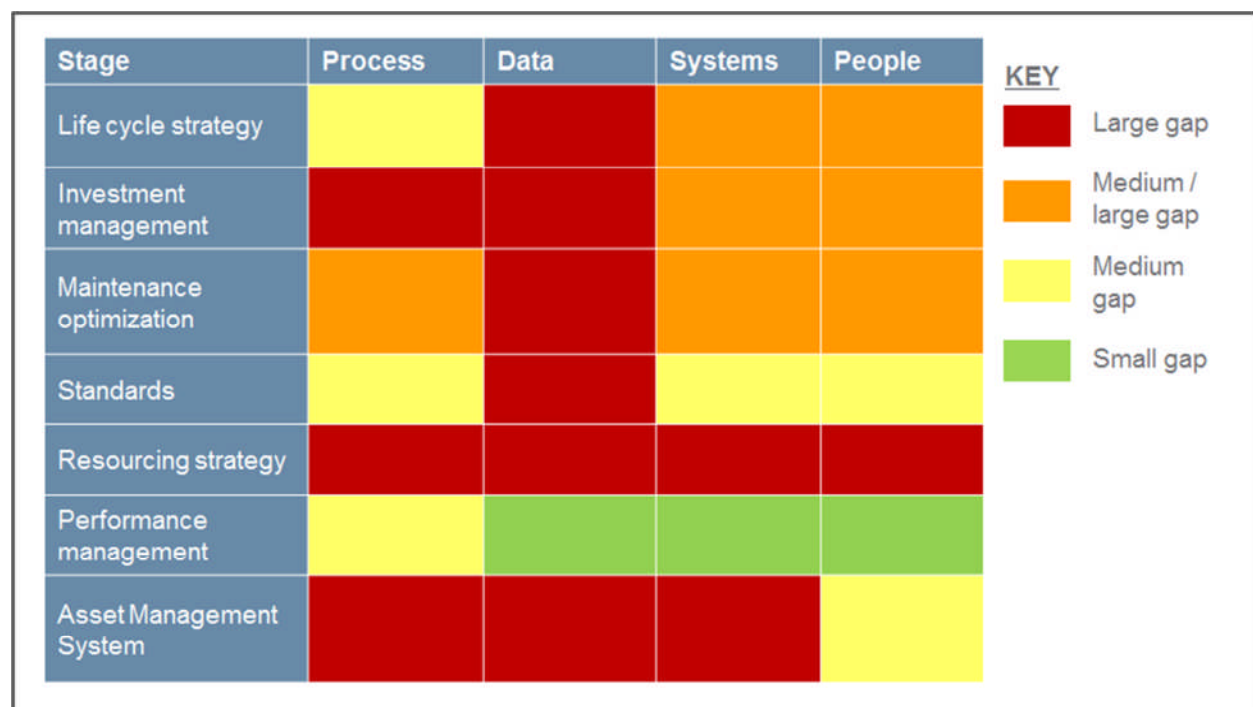
SOLUTION

Proposed Solution

Through this initiative, NYPA is proposing to implement an enterprise-wide asset management approach that draws heavily upon the principles of life cycle planning, asset financial / operational performance, and risk profiling embodied within the internationally recognized ISO 55000 standards. While some spending is required under this initiative, the primary focus of the initiative is to develop a clear, cohesive strategic program that will ensure the consistent application of data, processes and resources to make sound asset management decisions that will deliver financial and non-financial benefits.

The transition to an approach aligned to the ISO 55000 standards requires a clear understanding of current NYPA capabilities in this area as compared with the capabilities required to deliver the asset management vision set out in this document. Performing such an assessment, will allow gaps in current capabilities to be identified and enable the team to prioritize the work needed to establish the foundations of a best-practice asset management organization that is aligned to ISO 55000. To understand, at a high level, the differences between current NYPA capabilities as compared with ISO 55000 requirements, the team developed a matrix to compare each of the six key decision processes outlined within ISO 55000 against key structural indicators related to process, data, systems and people. The resulting heat map that was produced is illustrated in Figure 8 below.

Figure 8: Current and future state gap analysis



The heat map represented above in Figure 6 illustrates that there are currently some large gaps in NYPA's current capabilities and that a targeted program of work will be required to establish a strong asset management foundation that is aligned to the provisions of ISO 55000 and comprises the following elements:

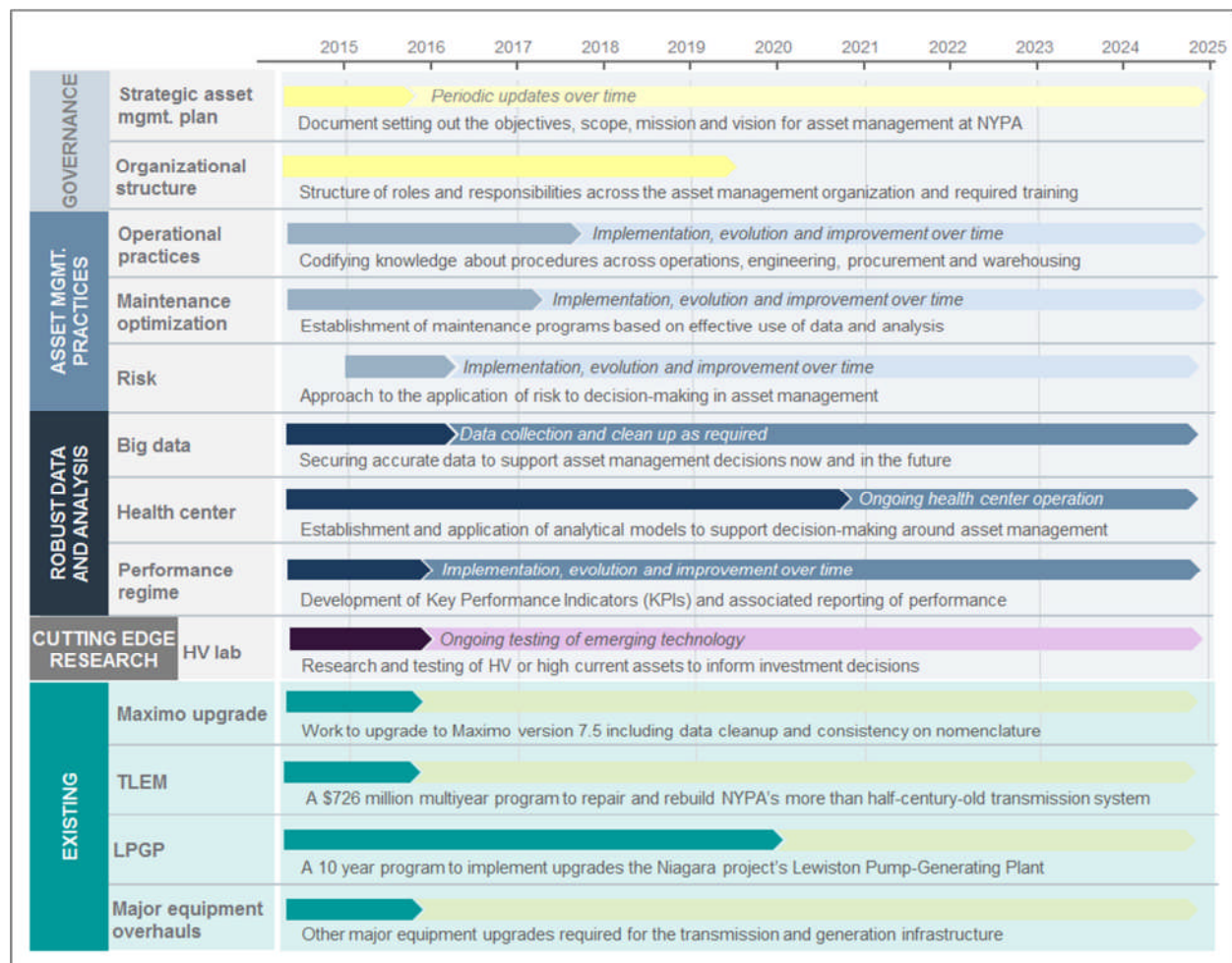
- **Asset management governance:** This work stream comprises two key elements. The first is the establishment of a SAMP which will effectively govern asset management at NYPA and support the transition to ISO 55000. The second is the implementation of a supporting governance structure for the

asset management organization. This will require an assessment of workforce needs now and in the future and the establishment of an organizational structure to provide clarity about asset management roles and responsibilities.

- **Asset management practices:** This work stream will focus upon establishing and securing the adoption of practices that support leading-edge asset management, with a specific focus on optimizing maintenance procedures and incorporating considerations of risk into decision-making.
- **Robust data and analysis:** Accurate data is a critical input required to make decisions at all stages of the asset life cycle and this work stream will focus on ensuring data is both easily accessible and accurate. It will be complemented by an asset health center that will carry out data analytics to provide insights on asset condition and investment needs on both a routine and emergent basis. Performance metrics will also be established to support ongoing system monitoring for making decisions about where additional spending may be required.
- **Cutting-edge research:** Revolution in the power industry is leading to developments in technology and improved understanding of the hardware and software that will optimize asset life. This work stream will support further progress in technology development through the establishment of a High Voltage (HV) lab focused on understanding failure modes and ways to increase the life cycles of assets. At present, there are a limited number of labs that are performing this function. This work stream will also deliver benefits to NYS as a result of the dissemination of findings from the lab to other utilities.

Figure 9 below presents the roadmap of projects that are being proposed alongside the existing efforts being taken forward in asset management.

Figure 9: Asset management roadmap



This figure illustrates the timeframes associated with the implementation of the four work streams and eight corresponding projects that comprise the asset management initiative as well as the way that these work streams compare to the existing projects that are being taken forward by the asset management group. Consideration will also need to be given to the interactions between the asset management initiative and the other strategic initiatives that are being progressed to deliver in line with the expectations set out in the Strategic Vision 2014. These are discussed in more detail in the dependencies section.

The following sections of this business plan provide more detail regarding the asset management projects that NYPA is proposing as part of this initiative.

WORK STREAM 1: Asset management governance

Critical to the implementation of the asset management initiative is a strong governance framework that provides clarity with respect to the drivers and objectives of the program as well as the roles and responsibilities of the respective members of the asset management organization.

A key tool in providing a clear, universally understood governance structure is the SAMP which consolidates the overall approach to asset management. This document will not only ensure that all members of the asset management organization understand and are brought into the approach but will also provide transparency to the rest of NYPA about the context for and objectives of the asset management program. The SAMP will comprise the following elements.

- **The overarching approach to asset management:** Includes a definition of NYPA corporate objectives and how these specifically translate into the need for a strategic asset management approach. It will also reference the policy statement for asset management as well as the scope and objectives of the asset management program.
- **Stakeholder management:** Includes a definition of the stakeholders that will be affected by the asset management system, their expectations and the method that will be used to engage them.
- **A gap analysis:** This will be used to determine what the mismatch or gaps are and where they exist. This analysis will be used as input for senior management review and also used for continuous improvement of asset management.
- **Asset Management plans:** Includes an asset management roadmap setting out activities that will be implemented and resources that will be applied to support delivery against the defined objectives.

The overarching asset management plan presented in the SAMP will provide reference to the projects that will be taken forward to support the foundations of the revised NYPA asset management approach. From this, it will be possible to further refine the scope and detail of the asset management projects detailed in this business plan.

Developing and agreeing on the SAMP will be the first step to progress the asset management initiative following NYPA Board of Trustees approval. It will be a critical tool to provide overall guidance to the development of the program and to inform the direction of the asset management projects outlined in this business plan. Developing an integrated strategic planning framework and associated processes will ensure that NYPA adopts a consistent approach to developing work initiatives and costs across different asset groups to a level of rigor appropriate to the criticality of the different asset types.

The SAMP will provide an overarching framework within which the asset management organization, including respective roles and responsibilities. The transition to an asset management organization that operates in line with the principles of ISO 55000 will only be fully successful where there is clarity about respective roles, responsibilities and accountabilities across both the asset management organization and NYPA more broadly. To achieve this outcome, the team will complete a review of the asset management organization and determine the organizational structure required to achieve NYPA's asset management goals, clearly defining key roles and associated responsibilities. The effective completion of this organizational review will take into

account the proposed activities to be carried out in each of the other asset management work streams and bring together a coordinated view in terms of resources, skills and capabilities needed to secure delivery in line with the agreed vision. A critical consideration within the design of the organization will be to secure flexibility across the asset management organization to build in the capability to adapt to emerging conditions and continue to effectively deliver in line with the asset management vision. There are clear linkages between this work stream and the focus of the workforce planning strategic initiative which are discussed in more detail in the dependencies section.

Table 3 below provides an overview of the scope for each of the activities that will be completed under this work stream and the expected benefits that will be attained.

Table 3: Focus of assessment and expected results from the asset management governance work stream

| Project | Areas for assessment | Expected benefits / results |
|------------------------|---|--|
| SAMP | <ul style="list-style-type: none"> Objectives, mission, vision and goals of asset management at NYPA Guiding principles for asset management at NYPA Assessment of strengths and weaknesses compared to ISO 55000 Roadmap for implementation of the asset management projects | <ul style="list-style-type: none"> Full understanding across NYPA about the objectives of the asset management initiative / organization A governance approach that is grounded in clear defensible guiding principles A prioritized approach to implementing the asset management projects based on current strengths and weaknesses |
| Organization structure | <ul style="list-style-type: none"> Current and future role requirements Capability needs now and in the future Assessment of current skills and capabilities Asset management training needs Formalizing roles and responsibilities Linking of roles to the performance progress reports (PPRs) | <ul style="list-style-type: none"> Clarity about where accountability for the delivery of key outcomes lies Understanding of current and future resource needs and a strategy for delivery Flexibility in the asset management organization and resourcing |

When this work stream is fully and effectively delivered, it will ensure that there is clarity, both within and outside of the asset management team, about the objectives and guiding principles of the asset management initiative as well as an understanding of where responsibilities for delivery lies. Combined with an effective strategy for securing required resources with the necessary skills and capabilities to effectively complete key tasks, this will support effective delivery of desired outcomes.

As the initiative moves from foundation to optimization and then transformation, the asset management organization will become increasingly mature with better definition of roles and responsibilities which are universally understood across NYPA. The link between Personal Performance Reviews (PPRs) and asset management roles will help to identify potential performance issues and support the development of improvement plans focused on addressing capability needs. Effective forecasting of skill and capability needs will support organizational flexibility by allowing NYPA to quickly identify gaps in resourcing and implement strategies to secure required staff to support key asset management outcomes.

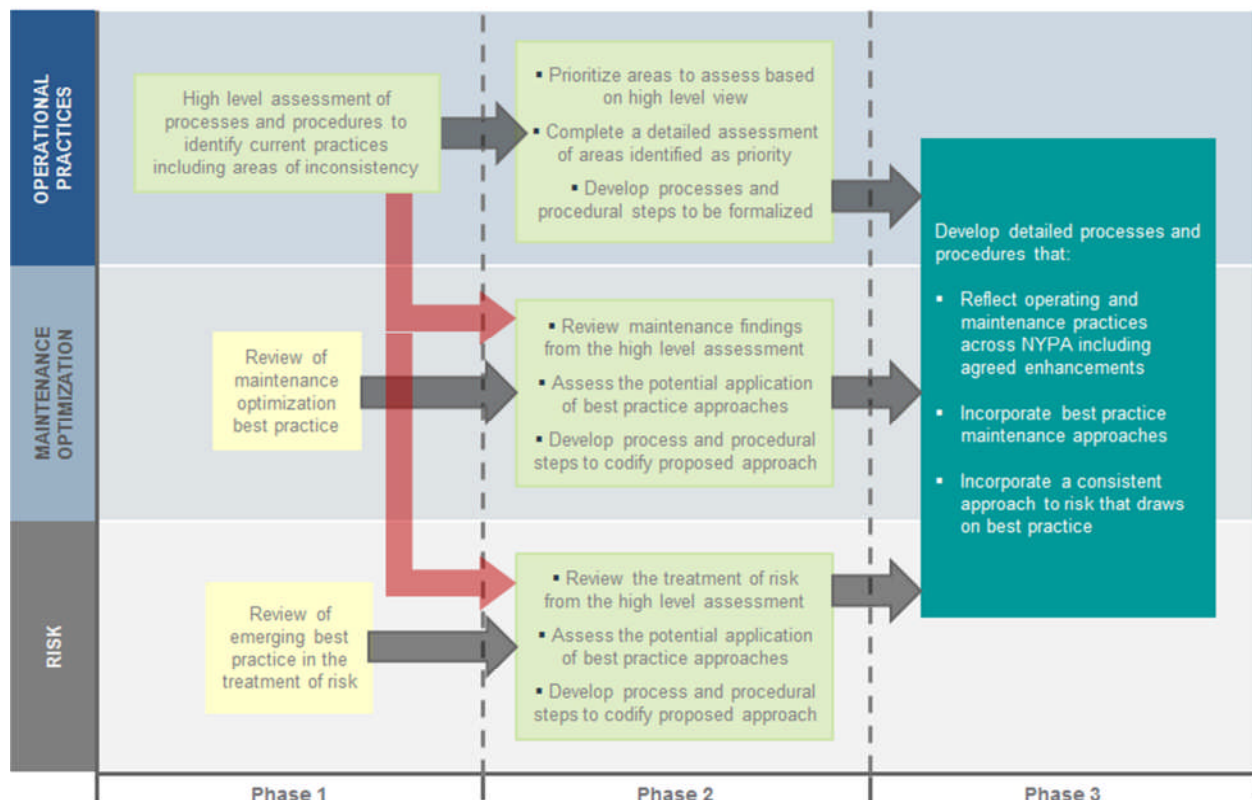
WORK STREAM 2: Asset management practices

Asset management practices include the processes, procedures, job plans and work plans that provide a blueprint for effectively operating and maintaining assets. Where these are standardized and universally applied, it will ensure consistency in the approach toward asset management. This work stream will focus on

establishing a suite of practices that secure consistency in the NYPA asset management approach as well as helping NYPA make the transition toward the principles of ISO 55000 by optimizing maintenance and incorporating risk.

Figure 10 below provides an overview of the three projects that comprise this work stream. It illustrates the clear overlaps between the three projects and highlights the close interactions that will need to be accommodated in the development and implementation of these projects.

Figure 10: The asset management practices work stream



As illustrated in Figure 10 a first step in moving toward a set of consistent practices is to understand the current processes, procedures, job plans and work plans that are in place including an identification of gaps and inconsistencies across the various NYPA sites. This will allow the team to prioritize a more detailed assessment of current operational practices. It will also guide the focus of the maintenance optimization and risk projects. Best practice benchmarking is another key input to all three projects, allowing NYPA to leverage lessons learned by other utilities to support the development of consistent operational practices that facilitate the transition to an asset management organization governed by the principles of ISO 55000. At present there are a significant volume of practices in place in the form of processes, procedures, job plans and work plans and therefore the process of fully assessing and then unifying these practices will be a significant undertaking.

Critical to the success of these projects will be ongoing engagement with NYPA staff that have key roles in developing and applying these practices. This will ensure that the asset management team can draw on the significant institutional knowledge these individuals have about the practices that are currently deployed. To ensure that these key stakeholders are engaged and brought into the new approaches that are developed, they should be regularly consulted about the proposed approach being taken, with their feedback fully considered and addressed. During phase 3 of the work stream, outlined in Figure 10, engagement will need

to be extended to a broader group of NYPA staff to ensure there is universal understanding of the approach that will be taken and that this leads to consistent application. At the end of phase 3, when the revised practices are fully rolled out, staff will need access to ongoing support about how best to implement the approach and to answer difficult implementation questions.

While there are significant interactions between the projects and they share a similar overall objective of developing a suite of asset management practices for which governance, oversight and execution is consistently applied across NYPA, these are distinct projects with defined areas of focus and desired outcomes. Table 4 below provides an overview of the individual characteristics of each of these projects including the areas of focus that they will have and the desired outcomes they will facilitate.

Table 4: Focus of assessment and expected results from the asset management practices work stream

| Project | Areas for assessment | Expected benefits / results |
|--------------------------|---|--|
| Operational procedures | Current practices related to: <ul style="list-style-type: none"> Operations Maintenance Engineering Configuration management Procurement and Warehousing and materials | <ul style="list-style-type: none"> Codified knowledge about NYPA practices within NYPA documentation Full and universal understanding of NYPA practices Consistent application of the practices across all NYPA sites |
| Maintenance optimization | <ul style="list-style-type: none"> Potential to move from frequency-based to condition / predictive maintenance Use of real-time data to support predictive, risk-based maintenance Use of Failure Mode Effects Analysis to support maintenance prioritization Approaches to warehousing / resourcing | <ul style="list-style-type: none"> Establishment of an enterprise-wide maintenance program that is consistently applied across all NYPA sites A defensible maintenance strategy in a heightened compliance environment Best practice maintenance program that incorporate considerations of risk Ongoing safe operation of NYPA assets |
| Risk | <ul style="list-style-type: none"> Application of risk to support asset management decisions, in line with the ISO 5500 approach Development of asset risk profiles Tolerances and thresholds to be applied to considerations of risk | <ul style="list-style-type: none"> A clear process to integrate risk into asset management decisions at all stages of the asset life cycle Delivery of improved customer value using risk based asset management |

The combined effect of these projects will be to move NYPA toward the asset management visionary state.

- **During foundation:** This work stream will help NYPA to identify gaps in the existing asset management practices to establish a best practice enterprise-wide approach that incorporates risk and is aligned to ISO 55000 provisions. The adoption of a standardized suite of asset management practices will support a consistent approach at all stages of the asset life-cycle that incorporates considerations of risk and supports the transition toward optimization of NYPA's maintenance program.
- **During optimization:** This work stream will help NYPA transition to a best practice asset management organization that is fully compliant with ISO 55000 and consistently applied across the organization. A consistent approach to risk profiling will provide full clarity about asset health and enable a predictive maintenance program that helps to support increased asset life and optimize investments.
- **During transformation:** This work stream will help move NYPA toward a culture of continuous improvement for asset management practices, incorporating examples of best practice and lessons

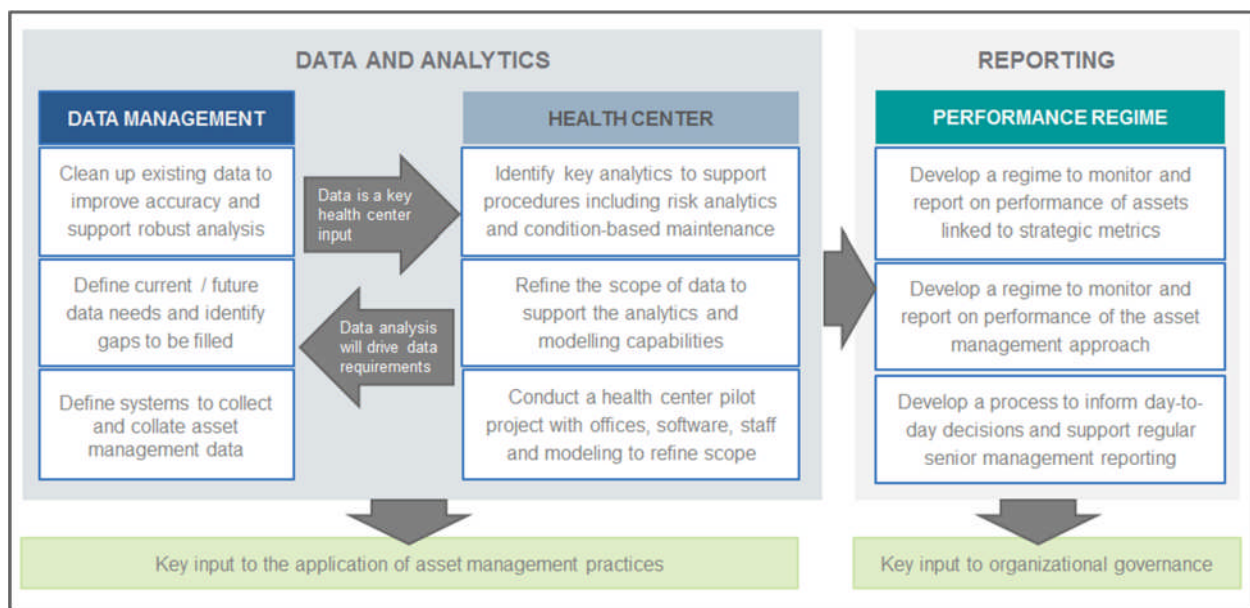
learned from industry leaders. Decisions on investment and maintenance will be based on risk profiles that support predictive maintenance of assets.

WORK STREAM 3: Robust data and analysis

The foundation of any best practice asset management approach is accurate and reliable data that will enable sound operational, investment and maintenance decisions. This work stream focuses on assessing the completeness and accuracy of existing data sources, generating or compiling data where it is not currently captured, implementing arrangements to support analysis of data needed for investment decisions and monitoring performance to identify priorities for investment.

The two key elements of the work stream include (1) data and analytics and (2) reporting. An overview of each of these elements is provided in Figure 11 below.

Figure 11: The robust data and analysis work stream



The data management project is focused on ensuring that the asset management organization has access to required information to support informed decisions about investment and maintenance as well as providing assurances that the data is both accurate and easily accessible. Systems exist throughout NYPA to collect data on installed equipment and operations. The data management project will build upon ongoing data cleanup work and involve a full survey of existing systems to ensure that the static and dynamic data they hold is accurate, complete and available. A range of systems will be included within this survey such as the advanced acoustic and infrared systems used to monitor transformers as well as process data systems like PI which are used at the thermal plants. Accurate data is a key input to making informed decisions about asset management but it needs to be effectively analyzed and manipulated to provide meaningful direction to the decisions that are ultimately made.

The asset health center will form the backbone of the analytical infrastructure required to support asset management. The center will comprise the analytical tools and staff required to interpret data and create useful recommendations to assist in asset management decision-making. The approach will be modeled on that of other utilities who have implemented monitoring and diagnostics frameworks in collaboration with the Electric Power Research Institute (EPRI) and will allow NYPA to develop the analytical capabilities required to quantify asset health and risk based on real-time and historical information.

The asset health center will be staffed with personnel that understand the key information needed to support the ISO 55000 compliant organization including both data and analytics that will provide clarity on asset investment and maintenance needs. The recruitment and development of staff with the skills and capabilities to effectively analyze and interpret asset management data will be critical to the success of the health center. Also critical to the success of the health center will be the selection and customization of appropriate software to perform the analysis required. As the technology in this space continues to evolve, health center staff will collaborate closely with equipment manufacturers, EPRI, and other utilities to ensure that the systems selected and models developed to monitor equipment health remain industry-leading and enable proactive asset management decision-making.

The teams responsible for data management and the health center will work closely together and have significant interactions with the other asset management projects to ensure data is available in the required format to support required decisions. As part of the development of these projects, it will be critical to agree where responsibility lies for decisions required on the basis of asset management insights attained from the data analytics. The hardware required to generate data that is not currently being collected will be installed under the Smart G&T initiative and is expected to include anything from smarter permanent sensors to robotic inspectors.

The remaining project that comprises this work stream is focused on the development of Key Performance Indicators (KPIs) that monitor both asset performance and functioning of the asset management initiative. Insights on the performance of assets as well as the performance of the initiative will help to identify where additional investment or corrective action may be needed to fully deliver against the asset management vision. The agreed KPIs will form the basis of a reporting tool that will allow day-to-day decisions to be made with respect to the management of assets and what, if any, corrective actions may be required. A version of the reporting tool will also be provided to senior management on a regular basis to keep them informed of progress with respect to the asset management initiative and the health of assets installed on the network.

The significant volume of additional data that will be captured and analyzed as part of this initiative is likely to lead to some challenges in terms of data management. To mitigate any potential issues in this area, it will be critical to establish governance, oversight and execution of activities associated with data management.

Table 5 below provides an overview of the individual characteristics of each of these projects including the areas of focus that they will have and the desired outcomes they will facilitate.

Table 5: Focus of assessment and expected results from the robust data and analysis work stream

| Project | Areas for assessment | Expected benefits / results |
|-----------------|---|---|
| Data management | <ul style="list-style-type: none"> G&T data needs now and in the future System needs for the collection and centralization of data Approach toward data clean up and ongoing maintenance of accurate data Governance arrangements for data collection and storage | <ul style="list-style-type: none"> Universal access to key data sources Consistent use of data across NYPA Confidence in the accuracy of data Use of data as the basis for justifying key asset management decisions Clarity about responsibilities in data collection and storage |

| | | |
|--------------------|---|---|
| Health center | <ul style="list-style-type: none"> Analytical models required to support asset management practices across the life cycle Integration of output information into asset management practices Software and hardware needs to support required asset modelling and analysis Scope and timing of a pilot / testing for the health center Staffing / training for the health center Areas where NYPA aspirations exceed the capability of available technologies | <ul style="list-style-type: none"> Provision of accurate, timely and targeted information based on a variety of real-time and static inputs Analytic and predictive capabilities enable proactive planning and operation Enhanced visibility of key indicators related to system operation Defensible information to support decisions Collaboration with research entities, other utilities, and private sector organizations on the next generation of asset health analytics and indicators |
| Performance regime | <ul style="list-style-type: none"> Scope and detail of key performance indicators (KPIs) related to (a) organization and asset performance (b) performance of the asset management initiative and (c) benchmarking of the performance of NYPA staff Links between the KPIs and strategic NYPA metrics Optimal reporting approach to NYPA senior management including the process to flag emerging concerns | <ul style="list-style-type: none"> Insights into the performance of assets and the asset management initiative at all levels of the organization A clear understanding of how the asset management initiative contributes to high level strategic metrics A defined escalation process for any issues related to implementation and ongoing operation of the initiative |

The combined effect of these projects will be to move NYPA toward the asset management visionary state.

- **During foundation:** The work stream will support the collection of accurate, accessible data to inform targeted, cost effective decisions for in-scope assets and support robust rate case filings and cost-of-service. Part of this work will be focused upon continuing the clean-up of existing data sources to provide confidence in the accuracy and reliability of the data upon which decisions are based. A dedicated asset management system(s) will support storage of data and software will be secured to facilitate required modelling / analysis to attain information that helps to direct investment and maintenance decisions. There will be clarity about performance of assets and the resources required to maintain the assets over time across all levels of the organization and decisions on corrective action can be made and taken based on the insights provided by the KPIs.
- **During optimization:** As the asset management initiative is extended to more complex assets, new data will be collected and stored within dedicated systems. There will be a high degree of accuracy of data saved within systems and the culture at NYPA will have shifted toward data-led decision making. The scope of the health center and the KPIs will also be extended to incorporate modeling and analytics related to new assets. NYPA will have in place a best practice approach to data analytics that provides valuable insights to other utilities about how to prioritize investment and maintenance that is applied consistently across NYPA's asset base.
- **During transformation:** NYPA will periodically consider the potential to extend application of the initiative to new, innovative assets and will carry out targeted data analytics to understand benefits that could be attained from this broader application. There will be continued emphasis on securing the integrity of data and streamlining analytics to ensure the rationale for decisions is easy to explain to observers e.g. NYPA colleagues and regulators. NYPA will be universally recognized by other utilities as the model for data capture, analytics and reporting related to asset management, regularly receiving requests to share lessons learned via presentations at industry events.

WORK STREAM 4: Cutting-edge research

The volume of energy industry innovation has increased markedly in recent years. The increased deployment of renewable and decentralized generation combined with new patterns of customer consumption is placing new demands on generation and transmission assets. This has spurred innovation on the asset infrastructure side to identify ways to better accommodate new forms of generation and patterns of consumption in the most efficient way. Emerging technology will support 'smarter' operation and maintenance of NYPA's assets to secure cost efficiencies and deliver value for customers. NYPA wants to play a key role in the development and subsequent deployment of these types of emerging technologies.

This work stream is proposing to establish a world class research and development laboratory that is focused upon applied research and testing for high voltage (HV) or high current assets. The HV Lab will provide the ability to understand failure modes and as a result ways to increase the life cycle of our assets. Preliminary investigations identify that there are very few existing HV facilities that provide this capability and therefore the work stream will enable NYPA to take a leading role with respect to HV innovation, providing insights on asset operation that minimizes degradation and optimizes asset life. Establishing a NYPA HV Lab will enable NYPA to engage in cutting-edge research that will deliver resulting benefits to NYS as well as providing benefits to colleges and universities across the state.

The focus of lab research would be in the following areas.

- Condition monitoring of generation, transmission and distribution assets;
- Development of operational models to explore ways of reducing degradation of asset performance or asset failure; and
- Exploration of the use of solid / liquid electrical insulators and thermal conductors to reduce losses.

The HV lab will allow NYPA to support applied research in these areas, test emerging technologies and operational models to better understand their applicability to NYPA and evaluate the potential benefits they could deliver with respect to effective operation and maintenance of NYPA assets. In turn, the results from this research will help to strengthen investment planning. NYPA will better understand the impact of

deploying certain technologies and techniques which will support development of more robust business cases related to new investments that are based on empirical data and analysis attained from testing. The ability to utilize the results of tests completed by the HV lab will be enhanced by the advanced data and analytical capabilities that are developed through the work stream on robust data and analysis. Establishment of a HV lab will also provide indirect benefits to NYS by placing NYPA in a position of leadership with respect to emerging asset management techniques which, in turn, is likely to lead to job creation in NYS.

It is recognized that work is being taken forward by universities and industries in this area. To maximize the contribution that NYPA makes to discussions about emerging techniques and technologies that could enhance asset management, this project will explore options to collaborate with other educational facilities or businesses. Not only will this enable NYPA to coordinate work in this area but will also ensure that the results of the research that is completed are effectively shared. In the spirit of sharing the results more broadly across NYS, NYPA will also explore the potential to run short courses and seminars regarding high voltage engineering to stimulate discussions and disseminate key lessons learned.

Table 6 below provides an overview of the characteristics of the HV lab including the areas that will be assessed in establishing the lab and the desired outcomes the lab will facilitate. Other advanced technology projects for managing assets may be included in this work stream as they are identified.

Table 6: Focus of assessment and expected results from the cutting-edge research work stream

| Project | Areas for assessment | Expected benefits / results |
|-----------------------|--|--|
| Cutting-edge research | <ul style="list-style-type: none"> Focus areas for research and testing of HV or high current assets Effective integration of lab results with investment decisions Collaboration with other utilities and educational facilities | <ul style="list-style-type: none"> Understanding of potential benefits from deployment of emerging technologies Effective deployment of technologies to improve HV reliability Informed business case for investment in new technologies which will optimize costs and deliver value to customers |

Roll-out Plan

Following approval of the initiative by the Board, a first step will be to begin to develop the SAMP. This document will contain the objectives, scope, mission and vision for asset management at NYPA as well as guiding principles that will support delivery in line with desired outcomes. The SAMP will demonstrate the way that the projects presented in this business plan align to the guiding principles of the initiative and will be the roadmap for delivery of the asset management vision. It will represent an objective source of information for the asset management team as well as interested staff members that are impacted by the change in approach to asset management. The SAMP will be a 'living' document that is updated regularly to reflect changes to the approach that have been agreed upon, particularly with respect to the four work streams outlined in the previous section. This will maintain transparency across the organization and support universal understanding of the approach.

Once the SAMP has been developed and agreed, further work will be taken forward to obtain a full and detailed understanding of the strengths and weaknesses of the current asset management approach at NYPA as compared with the ISO 55000 principles. This assessment will identify the gaps in the current NYPA approach to asset management and provide valuable guidance on the areas of the initiative that need to be prioritized. This will provide critical information to shape the projects that have been agreed reflecting on those areas that should be prioritized to address the gaps, strengths and weaknesses identified.

Once there is clarity about and agreement on the form that the SAMP will take including the implications that this will have in terms of the roll out of the projects detailed in this business plan, additional recruitment of

required resources will take place. The team will work closely with the workforce planning initiative to draw on the agreed processes developed as part of this linked strategic initiative and to identify the training needs of the newly recruited asset management staff. As the initiative is more widely rolled out across the organization, consideration will also need to be given to change management activities to effectively embed the new approach to asset management across NYPA. This is discussed further in the section on organizational impact.

Suggested Business Model

A critical component of this initiative will be the establishment of a fully staffed asset management organization responsible for developing and adopting a cohesive SAMP that incorporates all of the projects proposed within this business plan. Governance of the asset management organization as well as the respective roles and responsibilities of the team will be determined through the asset management governance work stream discussed in the preceding section. An initial estimate of resourcing needs suggests that additional Full Time Equivalents (FTEs) will be required to support the projects presented in this business plan. These may comprise existing NYPA employees that are redeployed to the identified positions or may necessitate recruitment to secure additional staff. This will be explored once there is greater clarity with respect to the skill and capability needs of the asset management organization.

Ideally, the full complement of FTEs required to staff the asset management organization would be recruited into the open team positions immediately but the team recognizes that the skills and capabilities of these resources are likely to be in demand within the industry. Therefore, in the short-term external consultancy and / or contractor support will be needed in the form of asset management subject matter experts (SMEs). This will have three key purposes.

- Firstly, it will help to ensure that the team has access to the critical knowledge and capabilities needed to guide the development of a robust foundation for asset management. The SMEs will not only be able to draw on the theory that underpins asset management and the application of the ISO 55000 principles but will also draw on their experience in the practical application of these principles.
- Second, it will support the delivery of on-the-job training for the asset management team, building their skills and capabilities by learning from consultants that have worked on industry-leading asset management programs.
- Third, it will allow the initiative to be kicked off immediately after receipt of approval from the Board utilizing knowledgeable staff to support the establishment of robust asset management foundations.

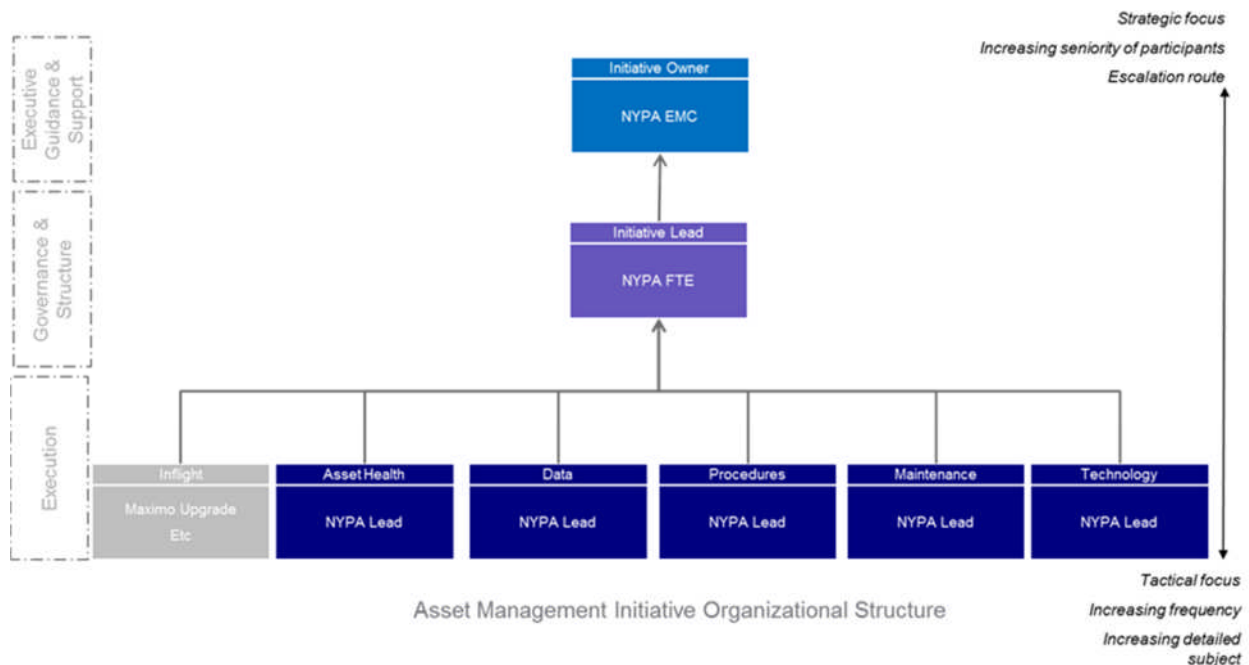
A longer term objective of this initiative is to develop subject matter expertise in-house. Building internal capability related to the development and application of a robust asset management approach will place NYPA in a strong position to effectively maintain the program over time. This will be supported by the effective use of consultants with asset management subject matter expertise to provide on-the-job training as well as the development of a comprehensive training program that will help staff to develop their asset management skills and capabilities.

An enterprise-wide awareness and understanding of the revised asset management approach will also be critical to make sure that staff across NYPA, appreciate the value of the SAMP as well as the implications that this change in approach will have for their work. Benchmarking has identified that critical importance should be attached to change management when implementing a new asset management approach. This includes behavior and cultural change on the part of all staff across NYPA will be necessary to embed the new SAMP. For this reason, as part of this initiative a targeted change management program will be rolled out focused on identifying influential stakeholders across NYPA, communicating key messages about the changes set to take place and encouraging their input in developing the approach to asset management.

Suggested Governance Structure

During the Foundation stage, the asset management organization will be located within the Operations department. Over time, as the initiative matures, consideration will be given to the potential to include additional asset classes within the asset management strategy. At this point, an assessment may need to be completed to determine whether the asset management organization should remain within Operations or whether it would be better to relocate the group. A suggested initiative organization structure is shown in Figure 12.

Figure 12: Initiative organization structure



A key work stream within this initiative is focused on developing a governance structure for the asset management organization which will be achieved via the development of the SAMP and associated roles and responsibilities of the various members of staff recruited to support this initiative. The governance structure will also need to consider interactions that the initiative will have with other departments across NYPA, e.g. IT and procurement, and what this will mean in terms of broader changes to roles and responsibilities. Following the ISO 55000 current state assessment, discussions around governance of the asset management initiative will be progressed as a priority to ensure that there is clarity about respective roles and responsibilities. This will allow the team to draw on the findings of the ISO 55000 assessment to make decisions about the areas of the asset management approach that should be prioritized including the roles and responsibilities needed to support this work. In the interim period, the work required to progress the asset management initiative will be taken forward by the existing asset management office.

Dependencies

There are multiple dependencies and linkages between the asset management initiative and the other strategic initiatives which are currently in various stages of development / implementation. The exact nature of these dependencies will only be fully apparent once all the initiatives are fully scoped and in the process of being implemented. However, in the interim, it will be critical that asset management remains joined up with these initiatives to ensure that any links are fully understood and addressed to avoid any overlaps or contradictions. Table 7 provides an overview of the key interactions that are foreseen between the initiatives.

Table 7: Dependencies between asset management and the other strategic initiatives

| Initiative | Degree of impact | Description | Approach |
|--------------------|------------------|--|--|
| Smart G&T | High | <ul style="list-style-type: none"> Smart G&T is proposing a series of projects focused on deploying smart grid hardware Smart grid hardware will provide valuable new information about NYPA's G&T assets Smart G&T data will be a key input to the asset management approach. This business plan assumes that additional hardware to capture this data will not be required. Smart G&T projects may increase the number or types of assets to be managed Asset management practices, especially those that incorporate predictive analytics, will drive requirements for new asset data and infrastructure to be provided by Smart G&T | The collection, storage and analysis of data will need to be explored to secure a clear delineation of responsibilities. Any new assets will be deployed and managed using asset management practices, where applicable. |
| Customer Solutions | Medium | <ul style="list-style-type: none"> A clear asset management approach will help to support rate clarity and stability An enhanced asset management approach will improve the reliability of service delivered to customers Greater visibility of asset health will enable faster response to customer requests for bespoke services During transformation the asset management approach may be extended to customer assets | Engagement with the customer solutions initiative to identify emerging interactions in terms of the proposed suite of services that will be offered. |
| Workforce Planning | High | <ul style="list-style-type: none"> Key tools being developed to support effective workforce planning will be valuable to establish the asset management organization e.g. the skills assessment and forecasting tools Workforce planning may be able to support processes to effectively recruit a number of new staff to support agreed projects Targeted training of staff that work in the asset management organization will be needed | Coordination to understand and apply workforce planning processes / templates |
| Process Excellence | Medium | <ul style="list-style-type: none"> Asset management will be setting up new practices Process excellence could provide guidance to effectively set up the practices Process excellence could use asset management as one of its initial practices for assessment | Coordination with the process excellence team to understand the scope for support and ways to attain ongoing guidance |

| | | | |
|----------------------|--------|--|--|
| Knowledge Management | Medium | <ul style="list-style-type: none"> Knowledge Management is proposing to implement a search engine that will improve access to knowledge saved on shared drives Knowledge management will facilitate the informal transfer of knowledge via communities of practice and expertise location These tools will help to establish an enterprise-wide asset management approach that is universally understood and consistently applied | Engagement with knowledge management to ensure asset management systems are compatible with the enterprise search tool and that asset management is considered for community of practice discussions, and that personnel have and maintain the right level of knowledge to implement asset management. |
|----------------------|--------|--|--|

In addition to the strategic initiatives that are being taken forward as part of the transformation of NYPA in line with the 2014 Strategic Vision, a number of projects are being progressed by the asset management office which will need to be effectively integrated within this revised asset management approach.

- NYPA is currently in the process of upgrading its Maximo asset management system. This upgrade will provide a tool to support the transition to ISO 55000 and a life cycle approach to asset management as it will provide a repository to house a significant proportion of asset management data. This will support an enterprise-wide asset management approach. Maximo also allows an integrated approach for both short and long term planning as well as controlling inventory, purchasing and condition based maintenance implementation.
- NYPA is currently implementing a TLEM and LPGP program which are focused on upgrading NYPA's aging G&T infrastructure. The expenditure associated with these programs is significant and therefore they represent ideal opportunities, to view capital expenditure decisions from the asset lifecycle lens. Opportunities will exist during their implementation to build on the foundational elements of technology, data, people, and processes.

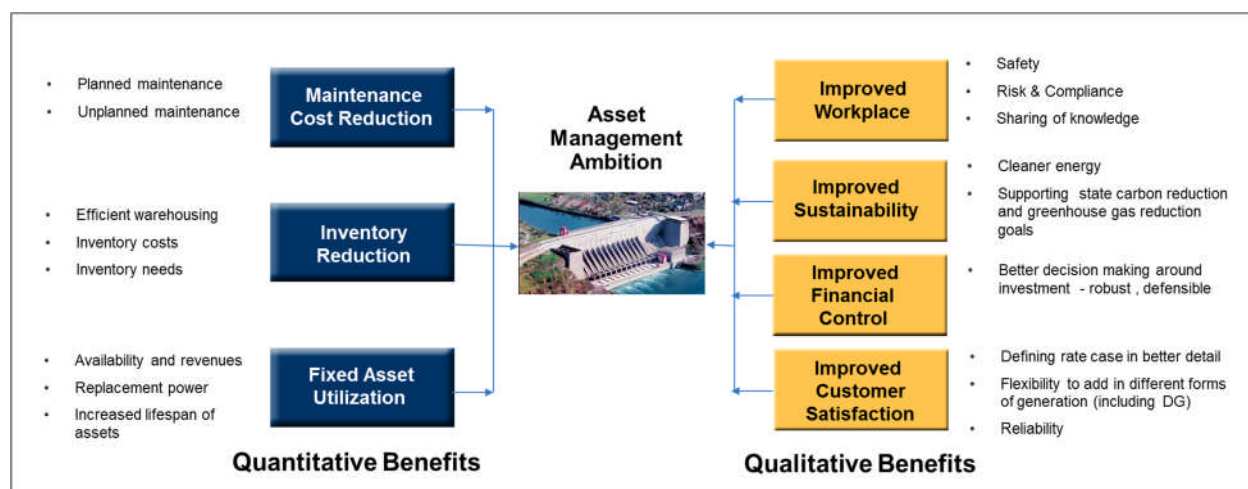
BENEFITS AND REVENUE

High-level Benefit Description

The overarching benefit of this initiative is that it will support the continued effective management of NYPA's G&T assets and ensure that the organization is able to continue to deliver clean, low cost and reliable electricity to customers across NYS. The continued efficient and reliable operation of NYPA's G&T assets is also a critical foundation required to support implementation of the Smart G&T and customer solutions strategic initiatives.

Some of these benefits can be quantified by reference to the reduction in costs that NYPA will incur over time while others are difficult to measure objectively and therefore need to be considered from a qualitative perspective. Figure 12 below provides an overview of both the qualitative and quantitative benefits that are anticipated to accrue from this initiative.

Figure 13: An overview of quantitative and qualitative benefits



As outlined in figure 12 above, there are a range of quantitative benefits that can be considered to fall within three key categories.

- **Maintenance cost reduction:** The use of data analytics to enable a broader understanding of asset performance, cost, risk and value will allow NYPA to make the transition toward predictive analytics and optimize spending on both planned and unplanned maintenance.
- **Inventory reduction:** A rationalized inventory based on long term asset maintenance and replacement planning will reduce warehousing needs and associated costs.
- **Fixed asset utilization:** Greater visibility of asset performance and associated risks will reduce asset failures as well as the need to enter spot wholesale markets to secure replacement power to fulfill customer contracts. More intelligent operation of infrastructure recognizing potential risks will also help to increase the lifespan of NYPA assets.

In addition to these quantitative benefits, there are also qualitative benefits which need to be taken into account in assessing the asset management initiative. These include:

- **Improved workplace:** A greater understanding of the G&T assets installed on NYPA's system will help to reduce asset failures with a corresponding impact on safety at NYPA. Improved consideration and enhanced visibility of risk will also help to improve compliance with regulatory requirements including, amongst others, the NERC Critical Infrastructure Protection (CIP) standards. In addition, the process of codifying asset management practices will help to facilitate effective knowledge sharing and transfer within NYPA as well as supporting ongoing on-the-job training.
- **Improved sustainability:** An overarching benefit of the initiative is that it will support continued effective operation of NYPA's G&T assets and help to avoid potential catastrophic failures. In addition, the greater use of system data will provide clarity about the demands that new generation and consumption technologies will place on NYPA assets. This will allow informed asset investment decisions required to support deployment of clean energy and energy services.
- **Improved financial control:** Clear asset management practices and greater use of data will ensure that all asset management decisions are reached on the same basis using a consistent approach. This will improve the credibility and robustness of decision making, enhancing the defensibility of investment.

- **Improved customer satisfaction:** Greater understanding of NYPA assets and clarity about longer term asset investment needs will support a consistent and well defined spending program which will help to secure long term rate stability for customers. In addition, greater knowledge of the risk associated with NYPA assets will provide insights around the capability of our assets to support additional generation and customer assets which will enhance responsiveness to requests for customized service from customers. Both factors will improve overall customer satisfaction.

Table 8 below presents a complete list of the projects under this initiative are mapped to the appropriate benefit categories, both financial and non-financial.

Table 8: Overview of Projects and benefits that accrue

| Benefits | | Projects | | | | | | | | |
|--------------|--------------------------------|-----------|------------------------|--------------------------|------|----------|---------------|--------------------|--------|------------|
| | | Framework | Operational Procedures | Maintenance Optimization | Risk | Big Data | Health Centre | Performance Regime | HV Lab | Org Design |
| Quantitative | Maintenance cost reduction | • | • | • | • | • | • | • | • | • |
| | Inventory reduction | • | • | • | | • | | • | | • |
| | Fixed asset utilization | • | • | • | | • | • | • | • | • |
| Qualitative | Improved workplace | • | • | • | • | | | • | | • |
| | Greater sustainability | • | • | • | | | • | • | | • |
| | Improved financial control | • | • | | | • | | • | | • |
| | Improved customer satisfaction | • | • | | | | | • | | • |

Financial benefits

Table 9 below is a summary of the financial benefits anticipated from rolling out the Asset Management initiative. Subsequent material presents detail on how these benefits were estimated.

Table 9: Summary of projected benefits from implementing the Asset Management initiatives

| Cost savings for NYPA (\$ '000) | | | | | | | | | |
|---------------------------------|-------------|-------------|-------------|-------------|---------------------|----------------------|----------------------|----------------------|--|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 | |
| Maintenance Optimization | \$ - | \$ - | \$ - | \$ - | \$ 4,162,500 | \$ 8,325,000 | \$ 11,655,000 | \$ 14,985,000 | |
| Inventory costs | \$ - | \$ - | \$ - | \$ - | \$ 2,610,000 | \$ 2,610,000 | \$ 2,088,000 | \$ 626,400 | |
| Total (\$ '000) | \$ - | \$ - | \$ - | \$ - | \$ 6,772,500 | \$ 10,935,000 | \$ 13,743,000 | \$ 15,611,400 | |

| Incremental revenue (\$ '000) | | | | | | | | | |
|-------------------------------|-------------|-------------|-------------|-------------|---------------------|---------------------|---------------------|---------------------|--|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 | |
| Asset Utilization | \$ - | \$ - | \$ - | \$ - | \$ 2,385,000 | \$ 4,770,000 | \$ 6,678,000 | \$ 8,586,000 | |
| Total (\$ '000) | \$ - | \$ - | \$ - | \$ - | \$ 2,385,000 | \$ 4,770,000 | \$ 6,678,000 | \$ 8,586,000 | |

| | |
|---|-----------------------|
| Total NYPA savings & revenue (\$ '000) | \$ 166,270,500 |
|---|-----------------------|

Benefit Assumptions

Financial benefits associated with initiatives of this type are traditionally difficult to quantify at the business planning phase. In order identify some indicative numbers at this stage we have relied heavily on benchmarking against other organizations that have implemented similar Asset Management strategies as well as vendors who typically operate in the Asset Management optimization space.

Table 10: Benefit category detail and assumptions by capability roadmap area

| Benefit Category | Benefit Detail | Assumptions |
|--------------------------|--|--|
| Maintenance Optimization | Reduction in labor costs | labor cost of 15% (range based on IBM assessment of multiple utilities and Scottish Power program (10-20 percent average) average maintainance costs for NYPA over last 3 years is \$111 million |
| Inventory costs | Reduced inventory value and carrying costs | 12% reduction in inventory costs IBM assessment of inventory costs savings associated with initiatives of this type for other utilities ranging 5%-20% average inventory costs over last three years of \$87mm |
| Asset Utilitization | increased revenues through capacity | 1% additional availability in capacity based on a range provided by IBM for similar initiatives undertaken at 20+ other organizations IBM range was 2% to 5% but because of uncertainty in market prices and the fact that some of NYPA's hydro generation facilities are rarely running to capacity anyway, it is felt that we should be prudent in our estimates) Average revenue over the last 3 years is \$954 million |

Confidence level of benefit realization

Across the initiative project portfolio we have identified projects and associated benefits through the employment of assumptions, market knowledge and NYPA specific data points.

While the numbers for initiative costs have a higher confidence level attached than the benefits at this stage, we believe the assumptions are both directionally correct and provide a positive benefit-cost ratio for NYPA to proceed with investment.

To ensure that we are not overestimating benefits, we have taken a conservative approach to their value – not just in the assumptions developed but also in the staggered release of those benefits over time. This is particularly important given NYPA’s current 10-year annual cycle for the maintenance of assets.

The following represents the overall confidence that the specified revenue and benefits will be realized, using the scale that follows.

| Confidence level | Benefit/revenue realization range |
|------------------|-----------------------------------|
| Very high | +/- 5% of expected benefits |
| High | +/- 10% of expected benefits |
| Medium | +/- 20% of expected benefits |
| Low | +/- 30% of expected benefits |
| Very low | +/- 50% of expected benefits |

| | | |
|----------------------------------|----------------|----------------|
| NYS Benefits | Low | |
| NYPA Savings & Revenue | Low | |
| | Low | High |
| Total NYS Benefits (\$'000)** | \$ - | \$ - |
| NYPA Savings & Revenue (\$ '000) | \$ 116,389,350 | \$ 216,151,650 |

***Note: We have not identified any direct quantitative benefits for NYS as part of this initiative. Qualitative benefits have been identified and are addressed in the external stakeholder and marketing section of this document.*

FUNDING FOR THE INITIATIVE

Intended Sources of Funding

The Asset Management initiative will be funded via a combination of NYPA's O&M and Capital budgets, as well as debt. As the initiative matures, it is anticipated that benefits such as decreased O&M spending and prolonged asset life will offset a significant portion of initiative costs in the long-term. Much of the initiative's costs and benefits will ultimately be shared with NYPA customers through existing rate structures.

NYPA has engaged EPRI to provide advice on the implementation of the High Voltage Lab. Among the open items are collaboration opportunities (educational and business), management and governance structure and extent of the lab's capabilities. Ultimate financing and cost recovery will be finalized once these matters are determined and will include some combination of NYPA investment and investment from external partners.

Table 11: Funding sources

| Intended total funding sources | | | | |
|--------------------------------|----------|----|-------------------|---------------------|
| Source | Selected | | Value (\$ '000) | Percentage of funds |
| Bond issuance | Yes | \$ | 32,266,733 | 33% |
| Cash reserves | Yes | \$ | 64,533,467 | 67% |
| Third-party funds | No | \$ | - | 0% |
| Other | No | \$ | - | 0% |
| Total | | \$ | 96,800,200 | 100% |

Any values that have been entered for one or more subinitiatives will be automatically included in the table below at the aggregate level.

| Expected annual funding profile | | | | | | | | | |
|----------------------------------|-------------------|---------------------|----------------------|----------------------|---------------------|---------------------|---------------------|---------------------|--|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 | |
| Bond proceeds | \$ 178,367 | \$ 3,296,700 | \$ 11,066,667 | \$ 10,758,333 | \$ 1,100,000 | \$ 1,216,667 | \$ 775,000 | \$ 775,000 | |
| Third-party funds | | | | | | | | | |
| Total external funds | \$ 178,367 | \$ 3,296,700 | \$ 11,066,667 | \$ 10,758,333 | \$ 1,100,000 | \$ 1,216,667 | \$ 775,000 | \$ 775,000 | |
| Interest payments | | | | | | | | | |
| Debt retirement | | | | | | | | | |
| Other | | | | | | | | | |
| Net external funds impact | \$ 178,367 | \$ 3,296,700 | \$ 11,066,667 | \$ 10,758,333 | \$ 1,100,000 | \$ 1,216,667 | \$ 775,000 | \$ 775,000 | |
| NYPA cash | \$ 356,733 | \$ 6,593,400 | \$ 22,133,333 | \$ 21,516,667 | \$ 2,200,000 | \$ 2,433,333 | \$ 1,550,000 | \$ 1,550,000 | |
| Total annual cost | \$ 535,100 | \$ 9,890,100 | \$ 33,200,000 | \$ 32,275,000 | \$ 3,300,000 | \$ 3,650,000 | \$ 2,325,000 | \$ 2,325,000 | |

| | |
|---|----------------------|
| Total external funding (\$ '000) | \$ 32,266,733 |
| Total NYPA cash (\$ '000) | \$ 64,533,467 |

Confidence level of external funding

Please indicate the overall confidence that the indicated external funding levels will be realized, using the scale specified to the right. Using the specified confidence level, a confidence-adjusted range of external funding is then estimated.

| | |
|------------------|------------|
| Confidence level | Low |
|------------------|------------|

| Confidence level | External funding range | |
|------------------|-----------------------------|--|
| Very high | +/- 5% of expected funding | |
| High | +/- 10% of expected funding | |
| Medium | +/- 20% of expected funding | |
| Low | +/- 30% of expected funding | |
| Very low | +/- 50% of expected funding | |

| | Low | High |
|------------------------------------|---------------|---------------|
| External funding (\$ '000) | \$ 22,586,713 | \$ 41,946,753 |
| Residual NYPA cash funds (\$ '000) | \$ 74,213,487 | \$ 54,853,447 |

COSTS AND RESOURCES

Initiative Cost and Resources

Table 12: Costs and Resources

| O&M expenses (\$ '000) | | | | | | | | |
|--------------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Framework | \$ 450,100 | \$ 990,100 | \$ 100,000 | \$ 100,000 | \$ - | \$ - | \$ - | \$ - |
| Operational Procedures | \$ - | \$ 2,150,000 | \$ 2,150,000 | \$ 2,150,000 | \$ - | \$ - | \$ - | \$ - |
| Maintenance Optimization | \$ - | \$ 1,750,000 | \$ 1,675,000 | \$ 950,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 |
| Big Data | \$ - | \$ 1,875,000 | \$ 975,000 | \$ 775,000 | \$ 250,000 | \$ 250,000 | \$ 250,000 | \$ 250,000 |
| Health Center | \$ - | \$ 425,000 | \$ 600,000 | \$ 1,025,000 | \$ 1,025,000 | \$ 1,375,000 | \$ 1,050,000 | \$ 1,050,000 |
| Performance Regime | \$ - | \$ 700,000 | \$ 350,000 | \$ 325,000 | \$ 325,000 | \$ 325,000 | \$ 325,000 | \$ 325,000 |
| HV Implementation | \$ - | \$ 350,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 | \$ 350,000 |
| Total annual O&M expenses | \$ 450,100 | \$ 8,240,100 | \$ 6,200,000 | \$ 5,675,000 | \$ 2,300,000 | \$ 2,650,000 | \$ 2,325,000 | \$ 2,325,000 |

| | |
|---|----------------------|
| Total O&M expenses (\$ '000) | \$ 39,465,200 |
|---|----------------------|

| Capital expenses (\$ '000) | | | | | | | | |
|----------------------------|------------------|---------------------|----------------------|----------------------|---------------------|---------------------|-------------|-------------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Framework | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Operational Procedures | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Maintenance Optimization | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Big Data | \$ - | \$ 400,000 | \$ 1,000,000 | \$ 600,000 | \$ - | \$ - | \$ - | \$ - |
| Health Center | \$ 50,000 | \$ - | \$ 1,000,000 | \$ 1,000,000 | \$ 1,000,000 | \$ 1,000,000 | \$ - | \$ - |
| Performance Regime | \$ - | \$ 1,000,000 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| HV Implementation | \$ 35,000 | \$ 250,000 | \$ 25,000,000 | \$ 25,000,000 | \$ - | \$ - | \$ - | \$ - |
| Total annual Capex | \$ 85,000 | \$ 1,650,000 | \$ 27,000,000 | \$ 26,600,000 | \$ 1,000,000 | \$ 1,000,000 | \$ - | \$ - |

| | |
|--|----------------------|
| Total initiative Capital expenses (\$ '000) | \$ 57,335,000 |
|--|----------------------|

| | |
|---|----------------------|
| Total initiative costs (\$ '000) | \$ 96,800,200 |
|---|----------------------|

| Resources (FTE) | | | | | | | | |
|--------------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
| Framework | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operational Procedures | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 |
| Maintenance Optimization | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Big Data | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 |
| Health Center | 0 | 1 | 2 | 5 | 5 | 7 | 6 | 6 |
| Performance Regime | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HV Implementation | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Total annual FTE | 2 | 14 | 13 | 16 | 10 | 12 | 11 | 11 |

Initiative Cost Assumptions

Costs for this initiative have been derived through a combination of:

- Internal and external resource estimates based on cross initiative rates
- Working with industry vendors who have provided indicative cost estimates for the projects outlined in the business plan
- Benchmarking against other utilities such as Duke Energy, Con Edison, Scottish Power and Puget Sound Energy who have undertaken similar initiatives - readjusting costs based on comparable sizes

IMPACT TO MARKET

Overview of Marketing Approach

This initiative is primarily focused on establishing internally-focused enterprise-wide provisions that optimize the management of NYPA assets. While the focus is on internal arrangements, the initiative is expected to have impacts on NYPA customers and the services that NYPA offers in the following areas.

- **Optimized customer costs:** Adopting an asset management approach that effectively and consistently utilizes data to understand asset health and risk will allow NYPA to maximize the life of its assets and optimize maintenance costs. Initially, the team anticipates that the implementation of an asset management approach that provides greater visibility on asset health will likely lead to increased costs as asset performance, risk and value become more visible and this highlights the need for asset investment / replacement. However, as NYPA moves into the optimized phase of the initiative, these investments will begin to pay off and the approach will deliver longer-term efficiencies to customers in the form of optimized capital investment and maintenance costs. Costs will also be reduced through the development of consistent practices that enable staff to focus on tasks that add value and thereby improve efficiency. Over the longer term both of these elements will contribute to the continued delivery of high quality services to customers at low cost.
- **Improved reliability:** A more sophisticated asset management approach that uses asset health to determine required maintenance will support the transition from a traditional 'run to failure' approach, to preventative or predictive maintenance programs. This will ensure investment is targeted and costs optimized as well as helping NYPA to avoid unplanned transmission and generation outages. Even where forced outages take place, the improved understanding that NYPA has of its assets, from accurate data and robust analysis, will secure faster equipment restoration. This enhanced reliability will translate into improved quality of supply for NYPA customers and will increase the value they receive from NYPA services.
- **Greater responsiveness to customer service requests:** Improved understanding of asset condition and criticality will support greater transparency about the ability to accommodate additional / altered system loads. In turn, this will enable NYPA to explore the potential to offer more sophisticated services that deliver in line with customer needs. Easier access to data to allow NYPA to more quickly understand the capacity to deliver certain services will improve responsiveness and enhance NYPA's credibility in the customer services area.

Each of these areas will help to further delivery of low-cost, clean, reliable power as well as the innovative energy infrastructure and services NYPA customers' value.

ORGANIZATIONAL IMPACT

Overall Degree of Change

This initiative will fundamentally change NYPA's approach toward asset management and move the organization toward the principles contained in ISO 55000 which focus on the value chain for managing assets alongside considerations of life cycle planning cost, performance and risk. The approach will provide greater transparency about asset health and allow investment to be targeted to those areas in which it will deliver most value to customers. Resulting changes across the organization will accrue in three key areas.

- **Capabilities:** The skills and competencies of staff within the asset management organization will need to change to reflect the new approach. An exact understanding of the required skills and capabilities of these personnel will be attained during the completion of work stream 1 related to governance of the asset management approach. However, at a high level, it is anticipated that additional staff with an understanding of ISO 55000, advanced data collection and analytics capabilities and experience of HV lab testing will be beneficial to the implementation of this initiative. In addition, there may be some change of capabilities required in terms of staff in other departments that support this initiative, particularly IT. As part of the organizational review, impacts on this department, and others, will need to be fully considered and addressed.
- **Culture change during foundation:** Full adoption of the initiative during the Foundation phase will require a mindset change on the part of many staff involved in asset management that have used the existing approach for a significant period of time. It is likely that it will take time for these members of the Operations organization to fully buy into the revised approach particularly given that the benefits of a risk based asset management approach will take time to accrue. In light of these issues, it will be important for the team to be able to clearly and robustly explain the rationale for the change and point to the benefits that will ultimately be delivered as a result of this initiative. Where possible, the team should also be able to highlight best practice examples where other utilities have implemented these principles and attained benefits.
- **Change management to embed the approach:** Under the principles of ISO 55000, there is a desire to move to an enterprise-wide asset management approach that straddles the entire organization. This will emphasize the importance of proactive engagement with staff across NYPA to increase their awareness and understanding of this initiative. This engagement should take a variety of forms, drawing on the shorter term communications events related to the strategic vision, as well as opportunities such as the communities of practice that will be taken forward by knowledge management. This will not only allow the asset management team to proactively communicate progress made on the implementation of the initiative but also seek feedback from staff across NYPA around areas that could be amended or improved. It will also support greater awareness across the organization with respect to the new asset management approach.

Table 13: Internal impact

| Internal impact overview | | | | | | |
|-----------------------------------|---|--|--|--|--|-----------------|
| Business Unit | Description of impact | | | | | Impact |
| Operations/ Transmission | Improving the operational performance of the organization by moving to an Enterprise-wide AM approach, which will require NYPA to undergo a culture change. A big driver of the AM changes are the new international requirements described in the ISO 55000. | | | | | Positive - High |
| Economic Dev. & Energy Efficiency | While there is no immediate impact to Economic Development and Energy Efficiency (EE), there could be | | | | | Positive - Low |

| | | |
|-----------------------------|---|-------------------|
| | potential involvement in the future. If NYPA decides to develop contracts with its customers to maintain their assets that would be a huge impact to the way EE does business right now. This would involve a culture change in the way NYPA conducts business with its customers and ensuring that the right skill set to maintain customer assets resides within EE. | |
| Business Services | <p>The Business Services Unit will be impacted by:</p> <ol style="list-style-type: none"> 1. The HV lab - interacting with the university and establishing NYPA's role in its development. 2. Culture changes involved with the enterprise-wide AM approach - Staffing the Health Center and AM office with the right skill sets, training all NYPA employees on the new AM approach, and standardizing AM processes /procedures / maintenance practices across NYPA. 3. Customer Assets - If NYPA decides to take on maintaining customer assets in the future that will be a huge change in the way NYPA does business with its customers. 4. Cyber Assets - If NYPA decides to take on maintaining cyber, software or hardware assets, compliance and cyber security will need to get involved in the AM process | Positive - High |
| Information Technology (IT) | While there is no immediate impact to IT, in the future cyber, hardware and software assets could fall under the AM program. In that respect NYPA will need people who have a skillset in data recovery. | Positive - Medium |

EXTERNAL STAKEHOLDER IMPACT AND MARKETING PLAN

The proposed HV lab, the most externally-oriented component of this initiative, will provide benefits in the form of increased high voltage research and education ability for state universities, creation of jobs in high voltage research, education and practice, and increased ability for public and private sector collaboration on high voltage equipment testing and certification. In addition to contributing to the body of knowledge around the design, implementation, operation, and maintenance of power system equipment at rated voltages, NYPA can benefit from the presence of the facility by validating equipment, increasing knowledge around failure modes and optimal operation, training existing staff, and developing a pipeline for future staff in these areas.

Table 14: External impact overview

| External impact overview | | | |
|-----------------------------|--|-------------------|--|
| Stakeholder | Description of impact | Impact | Suggested action |
| Customer | Better asset management planning will increase reliability for the customers. A clear asset management approach will also help to support rate clarity and stability. | Positive - Low | Work closely with the Customers Solutions initiative to identify new, proposed services that will be offered. |
| Distribution Utilities | Better asset management planning will likely reduce outage times making generation and transmission more reliable in turn making distribution utilities more reliable. | Positive - Low | Work closely with distribution utilities such as Con Ed and National Grid so that planned and forced outages are clearly communicated to mitigate generation and distribution issues across NYS. |
| NYISO | Through better asset management planning, the number of planned and/or forced outages and associated durations will likely be reduced, in turn reducing the length of the outage requests to the NYISO. | Positive - Medium | Work closely with the NYISO to ensure that outages required for equipment maintenance / replacement are properly planned and that the number of forced outages is reduced. |
| Transmission Operators (TO) | In close collaboration with the Smart Generation & Transmission (G&T) initiative, the asset management Health Center will utilize data from technological devices installed on NYPA's transmission equipment. More access to and better use of such data could minimize planned and/or forced outages. | Positive - Low | Work closely with the Smart G&T initiative to have a clear understanding of available data from our transmission systems which can be used to support other TOs. |

Description of Marketing Strategy

The primary impact of this initiative will be internally focused on improving the operational performance of the organization. However, the agreed vision for the asset management initiative positions NYPA as an industry leader in this space in the transformational phase. Achieving this outcome will require external discussion of the approach that NYPA has taken, the benefits that are achieved and the lessons that have been learned. The team will therefore establish a program of industry events, including presentations and seminars as well as participation in articles for industry journals to discuss the approach that has been taken to asset management at NYPA and the outcomes that have been delivered. Consideration will need to be

given to the appropriate timing of this work in light of progress made and best practice examples that can be shared with industry colleagues.

RISKS AND ASSUMPTIONS

Risks to the delivery of outcomes anticipated

There are a multitude of potential risks that could affect the benefits delivered by the asset management initiative. The most significant of these relates to the cultural change that needs to take place within NYPA for the new asset management approach to become fully embedded. In many cases, asset managers across the organization have adopted the same informal asset management approaches for many decades and have observed the successful continued operation of NYPA assets. It is likely that significant change management efforts will be required to demonstrate the benefits of moving to an enterprise-wide asset management approach that is aligned with the principles of ISO 55000. Indeed, benchmarking has indicated that critical importance should be attached to change management when implementing a new asset management approach given that the benefits of an enterprise-wide program will only be fully realized where it is universally adopted.

This issue needs to be considered alongside other key high level risks that could threaten the delivery of benefits envisaged under this initiative. In each case, a suggested action needs to be identified to mitigate the potential effect of these risks in the event that they do emerge. The table below provides an overview of these risks alongside the potential impact they could have and suggested mitigating actions.

Table 15: Risks

| Category | Description | Probability | Impact | Suggested actions |
|-----------------|---|-------------|--------|--|
| Cultural change | During foundation operations staff that have worked for decades under the existing asset management approach may not understand the need for change or may be unable to transition to the new approach | High | High | <ul style="list-style-type: none"> Engagement with key staff immediately following Board approval to seek their views Extensive program of change management Assess best practice examples Link PPRs to asset management |
| Cultural change | During transformation other departments responsible for assets that have not traditionally been included in a formal asset management program may not fully understand the need for change and / or may be unable to transition to the new approach | High | Medium | <ul style="list-style-type: none"> Extensive program of NYPA-wide change management Use of KPIs from the performance regime to measure and demonstrate benefits of an enterprise-wide approach Identify best practice case studies that demonstrate benefits achieved by others |

| | | | | |
|-----------------------|---|--------|--------|--|
| Resourcing | NYPA is unable to secure required resources to support full implementation of the initiative due to the scarcity of required skills and capabilities | Medium | High | <ul style="list-style-type: none"> • Prioritize development of the organizational structure to enable recruitment to start • Engage the workforce planning team to develop a targeted recruitment / retention program • Develop targeted training to address any skills gaps identified |
| Observer perceptions | It may take time for benefits from implementation of the initiative to accrue leading to concerns, internally and externally, that the approach is not delivering in line with expectations | Medium | High | <ul style="list-style-type: none"> • Initiate a full program of internal and external engagement to manage expectations on benefit accrual • Identify case studies that demonstrate trends in the accrual of benefits under ISO 55000 |
| Misinformed decisions | During roll out of the initiative asset management decisions may be taken which are then shown to be flawed which could impact the credibility of the approach | Medium | High | <ul style="list-style-type: none"> • Full staff training on new practices and data analysis • Full review of decisions made that is periodically revisited to monitor outcomes delivered • Reference to lessons learned from best practice case studies in initiative roll out |
| NERC CIP concerns | The increased collection and transfer of data could lead to greater risks associated with cyber security incidents | Medium | Medium | <ul style="list-style-type: none"> • Maintain engagement with the compliance team • Implement appropriate measures to protect data |
| Data ownership | Lack of clarity about the ownership of data and systems within the asset management organization could lead to inconsistencies or discrepancies in the data | Medium | Medium | <ul style="list-style-type: none"> • Develop a clear governance structure and defined roles and responsibilities for the asset management organization • Provide training to all members of the asset management organization on data ownership and roles and responsibilities. |



October Trustee Meeting

Customer Solutions Initiative

Progress Summary

October 15, 2014

Agenda

- The Challenge
- The Opportunity
- The Vision
- The Approach
- Key Next Steps

The Challenge

- General
 - Customers are seeking **cost savings**
 - **Capital projects** are their top priority
 - However, they're interested in a **wide range of services**
 - Customers desire **ease of use, responsiveness, and technical** capability
- Specific to NYPA
 - Customers are **confused** about NYPA's offerings
 - Customers view NYPA's **processes as lengthy** and bureaucratic
 - Customers perceive NYPA's **pricing** of capital projects as more expensive than average

“Setting up a new vendor is a complicated process, so if we could buy multiple services from NYPA that would make things easier. We’ve been pleased with NYPA services thus far, so we would expect these other services to be at that high level as well.”

Source: Market Intelligence Report conducted for NYPA, July and August, 2014

The Opportunity

- Customers view **NYPA as trustworthy**, responsive, and knowledgeable
- NYPA's capital project implementation abilities **match the needs of customers**
- NYPA's ability to provide easy access to multiple vendors matches customers' desire for a **wide range of services**
- Customers are **open to partnering** with NYPA on new energy projects
- NYPA can address customers' concerns by **realigning its service functions and processes, and marketing its offerings more clearly**

“This ‘economic potential’ is valued at \$100.9 billion in net benefits (in 2012 dollars). The ‘achievable potential’ (in New York State), a subset of the economic potential, is valued at \$30 billion in net benefits (in 2012 dollars). ‘Achievable potential’ represents the cost effective energy efficiency potential given current market barriers related to technologies, spending, energy efficiency goals, and policies.”

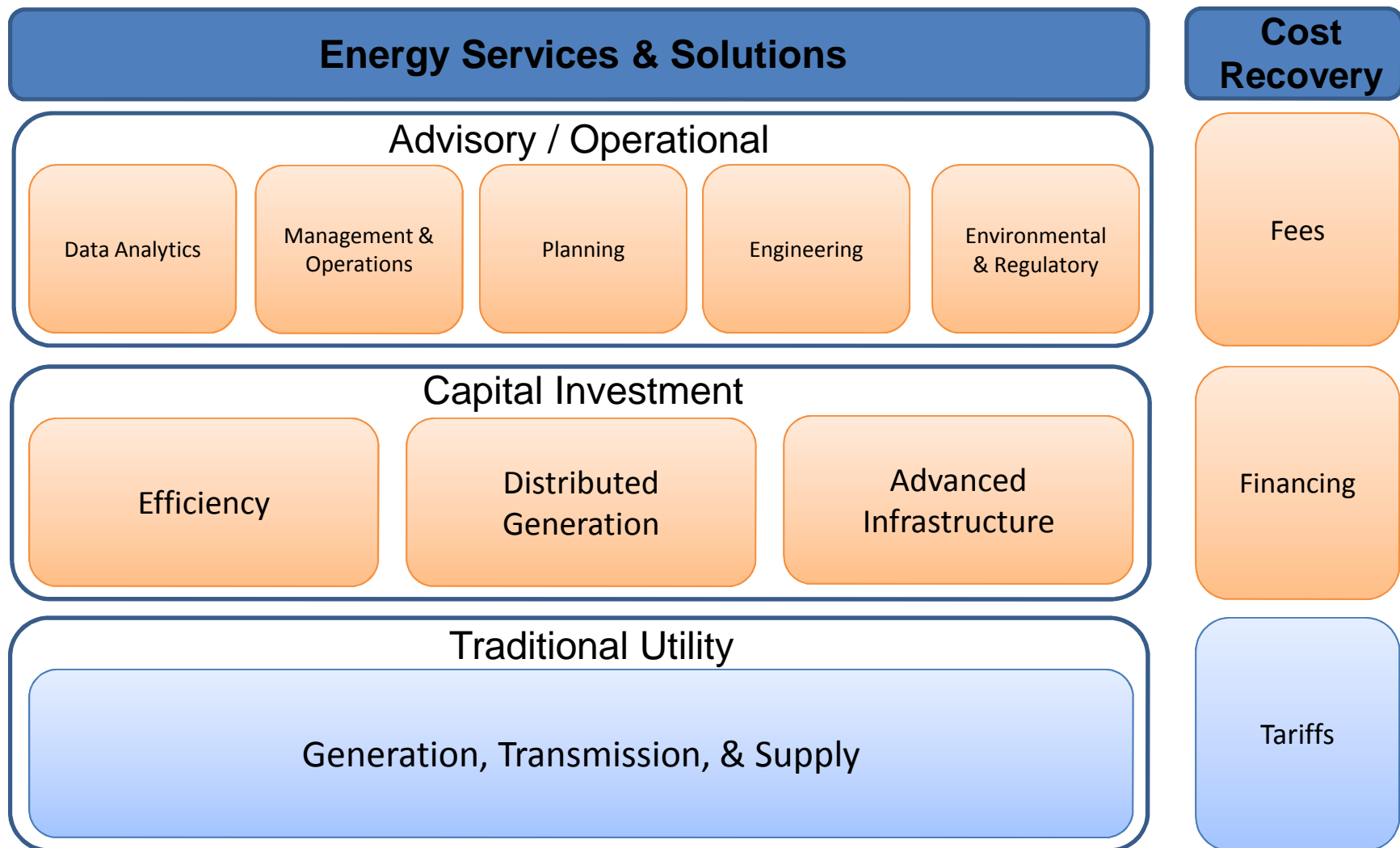
Source: Market Intelligence Report conducted for NYPA, July and August, 2014

The Vision

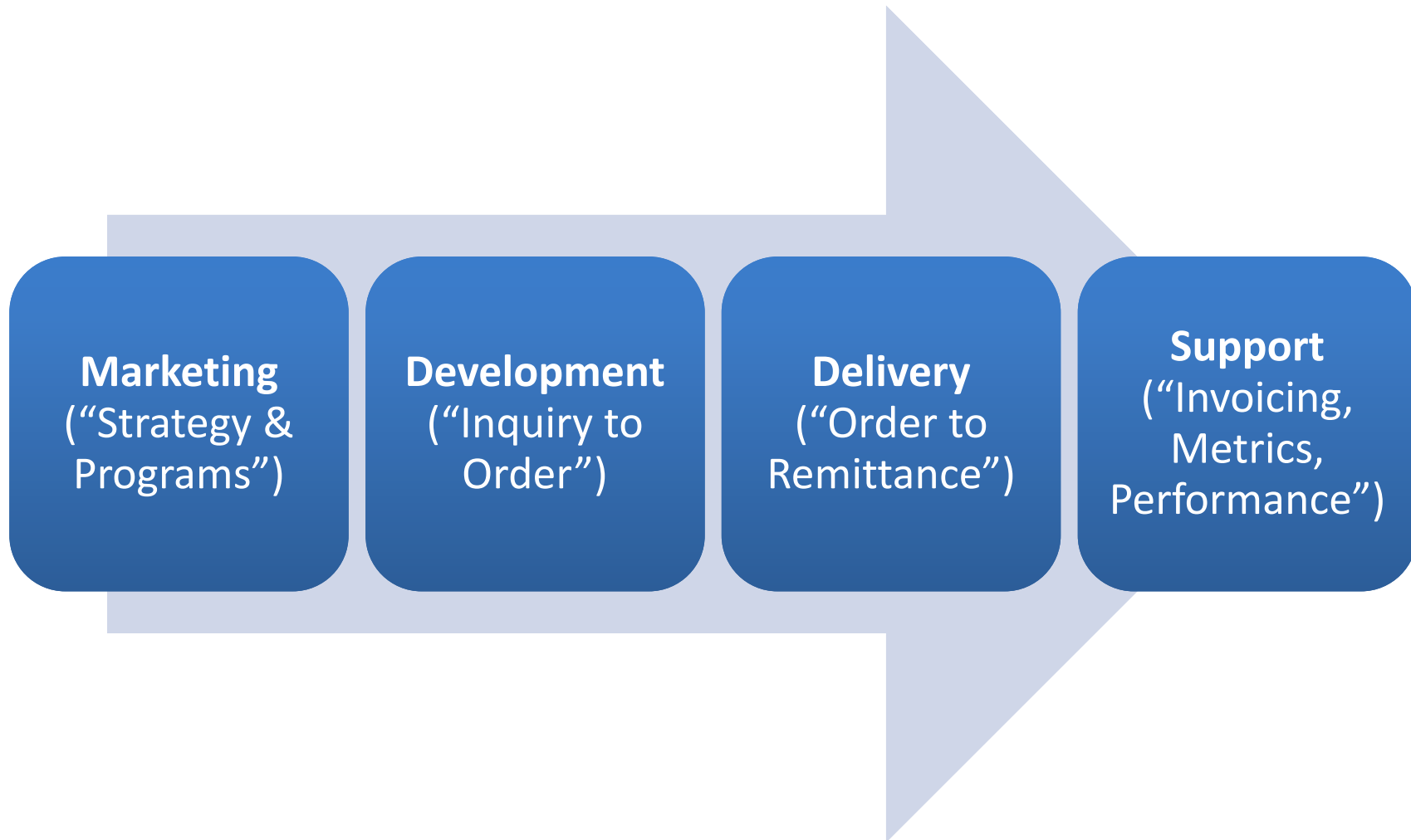
- Customer Energy Solutions – Start up!
- Goals
 - **Build the “demand” side of NYPA’s business** to be on par with the “supply” side of NYPA’s business
 - Become and remain our customers’ **trusted energy advisor**
 - Serve as a **marketplace** for accessing energy services
 - Internally coordinate and externally present **“one NYPA”** with fully integrated service offerings
 - **Proactively** address the energy needs of our customers
 - **Recover costs** on a net CES basis
- Core Ideology

NYPA will deliver results, value, and satisfaction for customers

The Approach: Customer's Future View of NYPA



The Approach: NYPA's Internal "Supply Chain" Functions

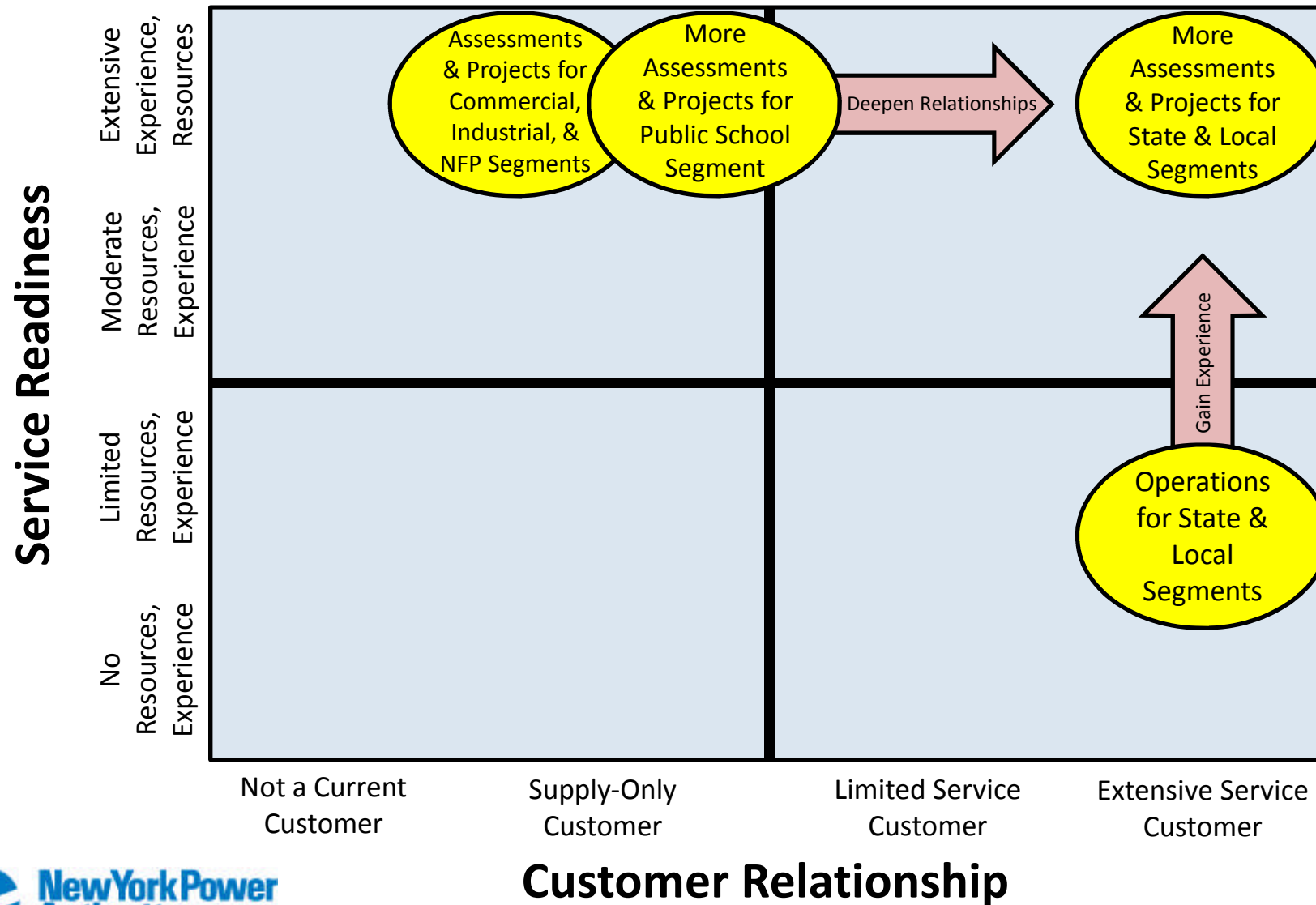


The Approach: Customer Segmentation

| Public | | | |
|---------|-------|-------|---------|
| Federal | State | Local | Schools |

| Private | | | |
|------------|------------|----------------|-------------|
| Commercial | Industrial | Not-for-Profit | Residential |

The Approach: Priority Service & Customer Matches



Key Next Steps

- **Business Plan** integrates CES functions with current and future programs / initiatives
 - Other Strategic Initiatives
 - State Policy – Reforming the Energy Vision (REV)
 - Customer Programs (EE INC, K-Solar, BuildSmart NY, NY Energy Manager)
- Begin **CES functional alignment** with customer engagement
- Establish the **near-term and long-term budget** to support services expansion

Key Next Steps: Phased Implementation

| | 2014 | | 2015 | | | | 2016 | | | | 2017 | | | | 2018 | | | |
|---------------------------------|---|--|---|----|---|----|--|----|----|----|------|----|---|----|------|----|--------------|----|
| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| CES Group | Establish CES functions & leadership, & integrate existing services / programs | | Staff up key CES functions | | | | | | | | | | | | | | | |
| Consulting Assistance | Procure assistance with needs and options for IT, financing, contracting, and cost accounting | | | | Provide ongoing support for key functions (e.g., marketing) | | | | | | | | | | | | | |
| Internal Support | Identify internal support needs | | Establish dedicated CES resources in key support groups | | Implement new cost allocation methodology | | | | | | | | | | | | | |
| Capital Expenditure | | | | | Integrate / upgrade / expand IT systems | | | | | | | | Assess needs | | | | Assess needs | |
| Services & Customers | | Adjust existing services' flexibility, delivery methods, & areas of focus, & offer to existing State and Local customers | | | | | Roll out Operations suite for existing State and Local customers | | | | | | Roll out full service cycle for select Commercial, Industrial, NFP, and Public School customers | | | | | |