Niagara Mohawk Power Corporation
d/b/a National Grid

PROCEEDING ON MOTION OF THE COMMISSION AS TO THE RATES, CHARGES, RULES AND REGULATIONS OF NIAGARA MOHAWK POWER CORPORATION FOR ELECTRIC AND GAS SERVICE

Testimony and Exhibits of:

Electric Infrastructure and Operations Panel
  Exhibit __ (EIOP-19), pp 1 – 173:
  January 2012 Capital Investment Plan

Book 29

April 2012

Submitted to:
New York State Public Service Commission
Case 12-E-____
Case 12-G-____

Submitted by:
Niagara Mohawk Power Corporation

Exhibit __ (EIOP-19)

Workpaper:

Annual Transmission and Distribution Capital Investment Plan
Submitted January 31, 2012

TRANSMISSION AND DISTRIBUTION CAPITAL INVESTMENT PLAN

CASE 10-E-0050

This document has been redacted for Critical Energy Infrastructure Information (CEII). 1/30/2012

PREPARED FOR:

THE STATE OF NEW YORK PUBLIC SERVICE COMMISSION

THREE EMPIRE STATE PLAZA

ALBANY, NY 12223

JANUARY 31, 2012

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I. Executive Summary

Niagara Mohawk Power Corporation d/b/a National Grid ("Niagara Mohawk" or the "Company") submits its Five Year Capital Investment Plan (the "Plan") in compliance with the New York Public Service Commission ("PSC" or the "Commission") Order issued on January 24, 2011 in Case 10-E-0050.[1] The Plan submitted here relates to fiscal years 2013 to 2017 (FY13 to FY17).[2] The Company has submitted previous multi-year Capital Investment Plans to the Commission on October 22, 2007, and in January 2009, 2010 and 2011. The investment levels set forth in the Plan, which are summarized by system in Table I-1 below, reflect the capital investment levels approved in the Company's recent electric rate case for FY12, and our present estimate of investment levels needed from FY13 to FY17 in order for the Company to fulfill its obligation to provide safe and adequate service at reasonable cost to our 1.6 million customers located in 450 cities and towns across the 25,000 square miles of our service territory.

Table I-1
Capital Investment Plan by System ($millions)

[redacted]						
Transmission	132.0	145.0	160.0	165.0	170.0	772.0
Sub-transmission	46.0	50.0	54.0	58.0	63.0	271.0
Distribution	244.0	255.0	265.0	275.0	282.0	1,321.0
Total	**422.0**	**450.0**	**479.0**	**498.0**	**515.0**	**2,364.0**

National Grid's vision is to be the foremost electric company, delivering unparalleled safety, reliability and efficiency, mitigating total energy costs and minimizing energy volatility, all of which are vital to the well being of our customers and communities. We are committed to being an innovative leader in energy efficiency and management and to safeguarding our global environment for future generations. Our commitment to safety, reliability and efficiency is paramount, and is the bedrock for all that we do today and will remain as a foundation for all that we do in the future. The vision statement is well aligned with the Commission's objectives of assuring safe and adequate electric

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[1] Case 10-E-0050, *Proceeding on the Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation for Electric Service*, Order Establishing Rates for Electric Service, issued and effective January 24, 2011 ("Rate Case Order"). The Rate Case Order adopted the terms of a Stipulation and Agreement on Certain Matters Relating to Capital Investment and Operating & Maintenance Spending (dated September 15, 2010), in which the Company agreed to continue to submit periodic reports as provided in Case 06-M-0878, *Joint Petition of National Grid PLC and KeySpan Corporation for Approval of Stock Acquisition and Other Regulatory Authorizations,* and specifically, the August 15, 2008 Order Concerning Transmission and Distribution Capital Investment Plan in that case ("August 15 Order"). The August 15 Order directs the Company to annually file an updated five-year investment plan.

[2] The period FY13 to FY17 covers April 1, 2012 - March 31, 2017.

service for customers and New York State's ambitious energy policy goals. However, the Company can only deliver on its vision with support from the Commission.

The total, five-year investment presented here is similar to the total five-year investment plan presented in the January 2011 Capital Investment Plan and continues to balance the need to constrain infrastructure cost while simultaneously mitigating some of the significant risks on the system. While this Plan represents the Company's present priorities, the Company continuously reviews the Plan relative to current risks and information, and will revise the plan as required to provide safe and adequate service at reasonable cost to customers.

I A. Capital Investment Plan Summary

The Company manages its capital investment plan by system and by spending rationale. A view of planned investments segmented by system is presented in Table I-1 above, while a view of planned investments segmented by spending rationale summarized below.

Investment by Spending Rationale

The Company classifies its capital projects into five spending rationales based on the primary investment driver: (A) Statutory or Regulatory; (B) Damage/Failure; (C) System Capacity and Performance; (D) Asset Condition; or (E) Non-infrastructure.

Statutory or Regulatory

Statutory or Regulatory projects are required to respond to, or comply with statutory or regulatory mandates. These include those expenditures needed to ensure the minimum compliance with the requirements of the North American Electric Reliability Corporation ("NERC"), Northeast Power Coordinating Council ("NPCC"), New York State Reliability Council ("NYSRC"), the Occupational Safety and Health Administration ("OSHA"), and the PSC. It also includes expenditures that are part of the Company's regulatory, governmental or contractual obligations, such as responding to new service requests, transformer and meter purchases and installations, outdoor lighting requests and service, and facility relocations related to public works projects. With some exceptions, the scope and timing of work in this rationale is generally defined by others.

Damage/Failure

Damage/Failure projects are required to replace failed or damaged equipment and to restore the electric system to its original configuration and capability following equipment damage or failure. Damage may be caused by storms, vehicle accidents, vandalism or unplanned/other deterioration, among other causes. The Damage/Failure spending rationale is typically a mandatory spending rationale of work that is non-discretionary in terms of scope and timing. The Damage/Failure budget also includes the cost of purchasing strategic spares to respond to equipment failures.

System Capacity and Performance

System Capacity and Performance projects are required to ensure the electric network has sufficient capacity, resiliency, or operability to meet the growing and/or shifting demands of the system and our customers. Projects in this spending rationale are intended to reduce degradation of equipment service lives due to thermal stress, to improve performance of facilities where design standards have changed over time, and to provide appropriate degrees of system configuration flexibility to limit adverse reliability impacts of contingencies. In addition to accommodating load growth, the expenditures in this rationale are used to install new equipment such as capacitor banks to maintain the requisite power quality required by customers and reclosers that limit the customer impact associated with an interruption. It also includes investment to improve performance of the network such as the reconfiguration of feeders and the installation of feeder ties.

Asset Condition
Asset Condition projects are required to reduce the likelihood and consequences of failures of transmission and distribution assets, such as replacing system elements like overhead lines, underground cable or substation equipment. During the previous ten years, the Company adopted an Asset Management approach that relied on a holistic, longer-view assessment of assets and asset systems to inform capital-investment decisions. As part of this approach, the Company conducted assessments of major asset classes such as circuit breakers or subsets of asset classes such as a circuit breaker manufactured by a particular vendor. The assessments focused on the identification of specific susceptibilities for assets and asset systems and the development of potential remedies. In light of current economic conditions, however, the Company presents a modified approach in this Plan that reduces near-term capital costs. The result is greater reliance on the purchase of spare equipment to replace damaged equipment that may fail in service for certain elements of the transmission and distribution system. The modified approach also calls for a more targeted replacement of assets based on their condition versus wholesale replacement based on "end of useful life" criteria, especially for transmission line refurbishment projects. This approach will result in lower capital investment in the near term, but may present adverse impacts on reliability and safety performance as compared to higher investment levels in the long term. Closer monitoring of system performance as it relates to asset condition causes will be necessary.

Non-Infrastructure
Non-Infrastructure projects are ones that do not fit into one of the foregoing categories, but which are necessary to run the electric system. Examples in this rationale include substation physical security, radio system upgrades and the purchase of test equipment.

Investment by spending rationale for fiscal years FY13 to FY17 is provided in Table I-2, and Figures I-1 and I-2.

Table I-2
Investment by Spending Rationale ($ millions)

Statutory or Regulatory	222.4	222.8	197.1	174.6	173.1	989.9
Damage/Failure	43.7	44.4	40.8	41.2	42.8	212.9
System Capacity and Performance	64.2	74.4	79.5	103.3	112.0	433.3
Asset Condition	85.5	103.7	155.8	173.5	182.1	700.6
Non-Infrastructure	6.2	4.7	5.9	5.4	5.1	27.3
Total	**422.0**	**450.0**	**479.0**	**498.0**	**515.0**	**2,364.0**

Figure I-1
Investment by Spending Rationale

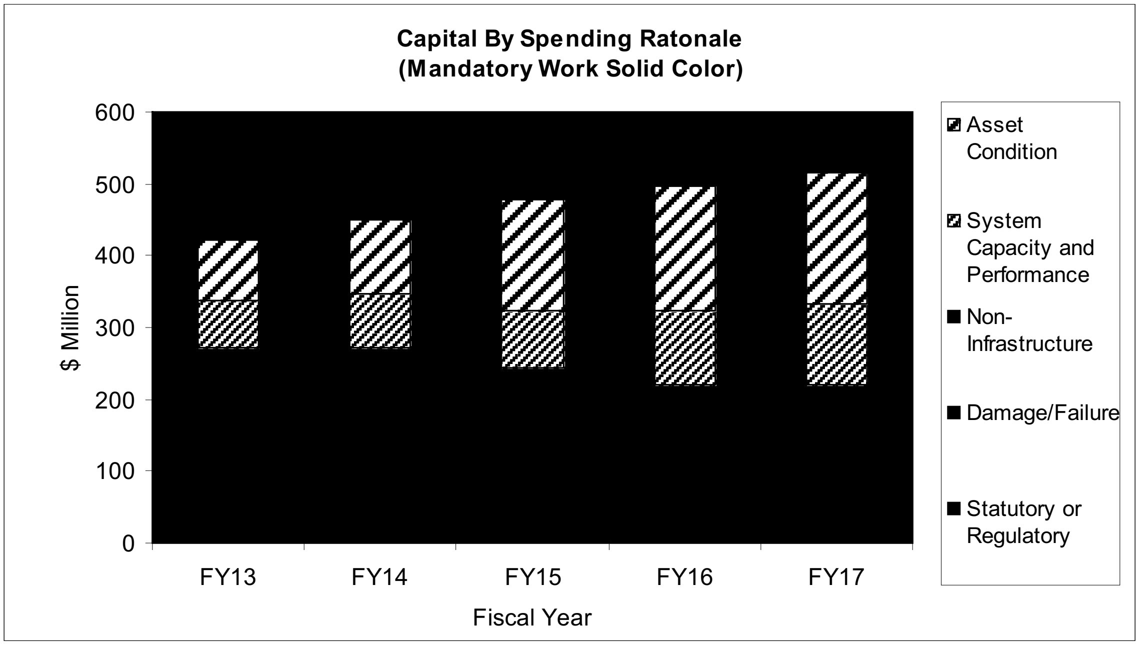
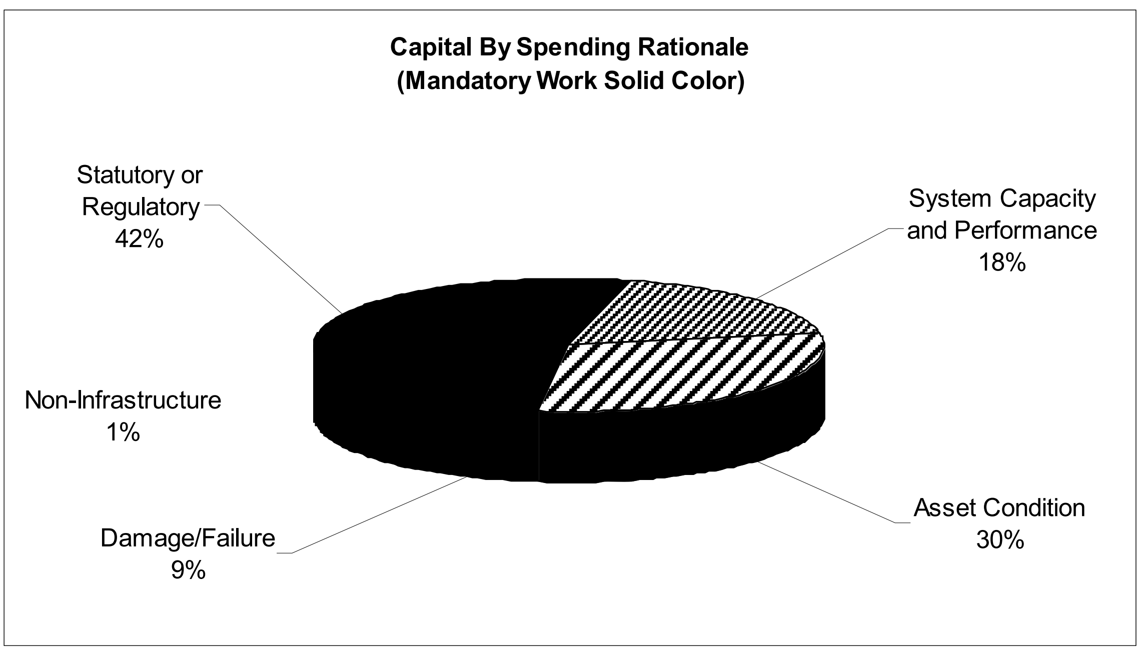


Figure I-2
Investment by Spending Rationale



Note – Figure I-2 relates to total five year projected spend for fiscal years FY13 to FY17.

Mandatory versus Discretionary Spending

Investments in the Statutory or Regulatory Requirements and Damage/Failure spending rationales are considered mandatory; while work in the System Capacity and Performance, Asset Condition and Non-Infrastructure rationales is more discretionary.

As indicated in Figure I-2, 51 percent ($1,202.8 million) of the planned infrastructure investment in the FY13 to FY17 period is in the Statutory or Regulatory and Damage/Failure spending rationales. This work is required to address items that are mandatory and non-discretionary in terms of timing. Examples of investments in these categories include [redacted] capital work done to repair a portion of a distribution feeder damaged in a storm event; and the extension of service to new customers. This work could not be deferred for long periods without potentially violating mandatory reliability standards, degrading near-term service reliability to existing customers or delaying service to new customers.

The System Capacity and Performance spending rationale accounts for approximately 18 percent ($433.3 million) of the total investment in the Plan, and includes investments to ensure substations and feeders can reliably supply customer load within system design criteria. Examples of investments in this rationale include planned expansions and network upgrades to accommodate load growth associated with the Luther Forest industrial park expansion.

The Asset Condition portion of the Plan represents nearly 30 percent ($700.6 million) of total planned investment for the FY13 to FY17 period. Programs in this rationale aim to mitigate future risks and consequences of potential failures caused by deteriorated assets. An example of a program in this spending rationale is the rebuilding of the Gardenville Station, which is a 230/115kV complex south of the Buffalo area.

Deferring capital investment on projects in the System Capacity and Performance, and Asset Condition, categories would likely lead to increasing failure rates (increasing costs in the Damage/Failure spending rationale) and reduced service reliability for customers over time.

Mandatory spending varies by system: 35 percent for transmission, 38 percent for sub-transmission and 63 percent for the distribution system. Mandatory spending by system is included in the Investment by System section below.

I B. Investment by System

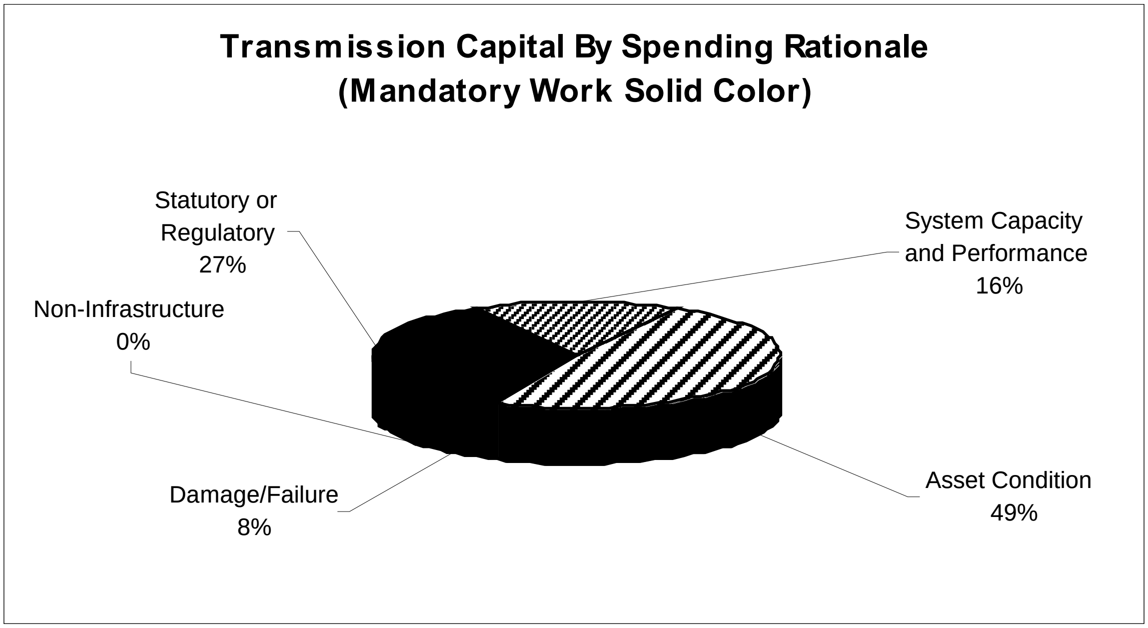
Following is a summary of planned investment by system. Chapters II, III and IV detail the transmission, sub-transmission and distribution system spending, respectively.

Transmission System Summary
The transmission system consists of approximately 6,000 miles of transmission line, 313 transmission substations, more than 500 large power transformers and over 700 circuit breakers at operating voltages above 69kV. Over the five year period covered by this Plan, the Company expects to invest approximately $772 million on the transmission system, as shown in Table I-4 below. Of this investment, 35% ($271.4 million) is required for mandatory projects in the Statutory or Regulatory and Damage/Failure categories and a further 65% ($499 million) is required to replace existing assets to maintain the reliability of the system. It should be noted that the Statutory or Regulatory spending rationale has a significant downward trend due to the completion of specific major projects. However, spend may increase significantly if NERC approves a pending measure to classify certain transmission assets above 100kV as Bulk Electric System as described in Chapter II.

Table I-4
Transmission System Capital Expenditure by Spending Rationale ($millions)

[redacted]						
Statutory or Regulatory	63.6	68.5	46.9	18.3	13.3	210.6
Damage/Failure	13.8	14.7	10.6	10.5	11.1	60.8
System Capacity and Performance	13.0	13.3	17.0	38.4	45.6	127.2
Asset Condition	40.2	48.6	85.4	97.8	99.9	371.8
Non-Infrastructure	1.5	0.0	0.1	0.1	0.0	1.6
Total	**132.0**	**145.0**	**160.0**	**165.0**	**170.0**	**772.0**

Figure I-3
Transmission System Mandatory Investment



Sub-Transmission System Summary

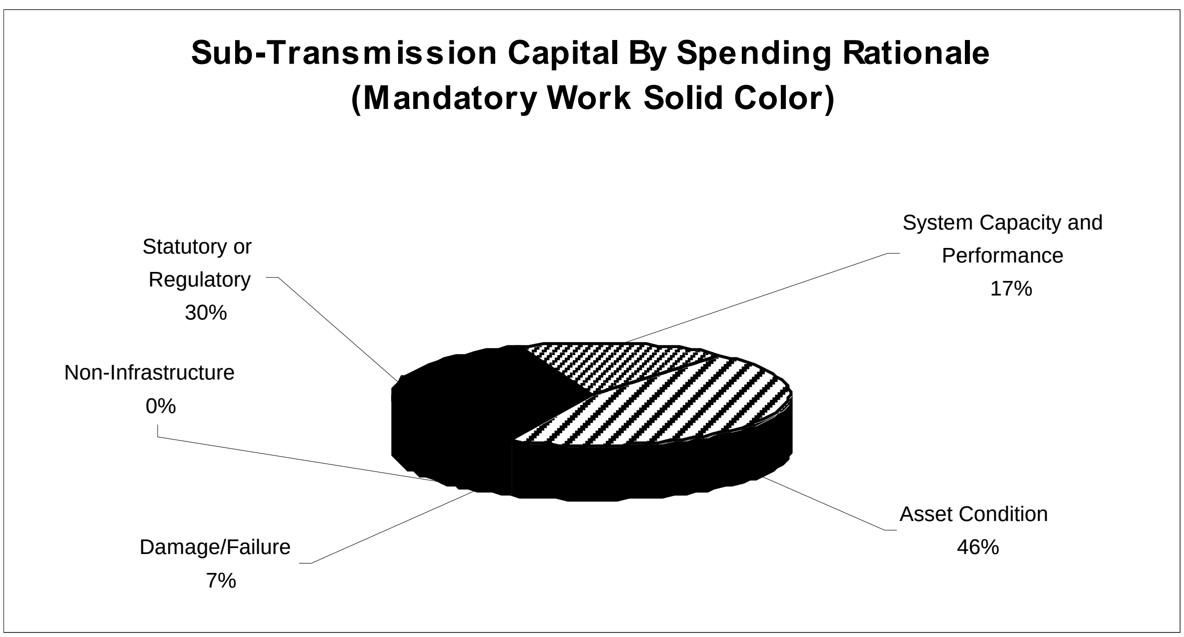
The sub-transmission system comprises approximately 4,240 miles of lines including: 290 miles of 69kV, 365 miles of 46kV, 2,332 miles of 34.5kV, 1,050 miles of 23kV and 200 miles of lines below 23kV. Over the five year period covered by this Plan, the Company expects to invest approximately $271 million on the sub-transmission system, as shown in Table I-5 below.

Table I-5
Sub-Transmission System Capital Expenditure by Spending Rationale ($millions)

Statutory or Regulatory	17.6	16.7	15.1	16.5	16.5	82.4
Damage/Failure	4.0	3.6	3.8	3.9	4.1	19.5
System Capacity and Performance	8.2	9.0	9.0	9.7	10.1	46.0
Asset Condition	16.1	20.6	26.1	27.9	32.4	123.2
Total	**46.0**	**50.0**	**54.0**	**58.0**	**63.0**	**271.0**

This five year Plan envisions significant expenditures on the sub-transmission system in the areas of asset condition and system capacity and performance.

Figure I-4
Sub-transmission System Mandatory Investment



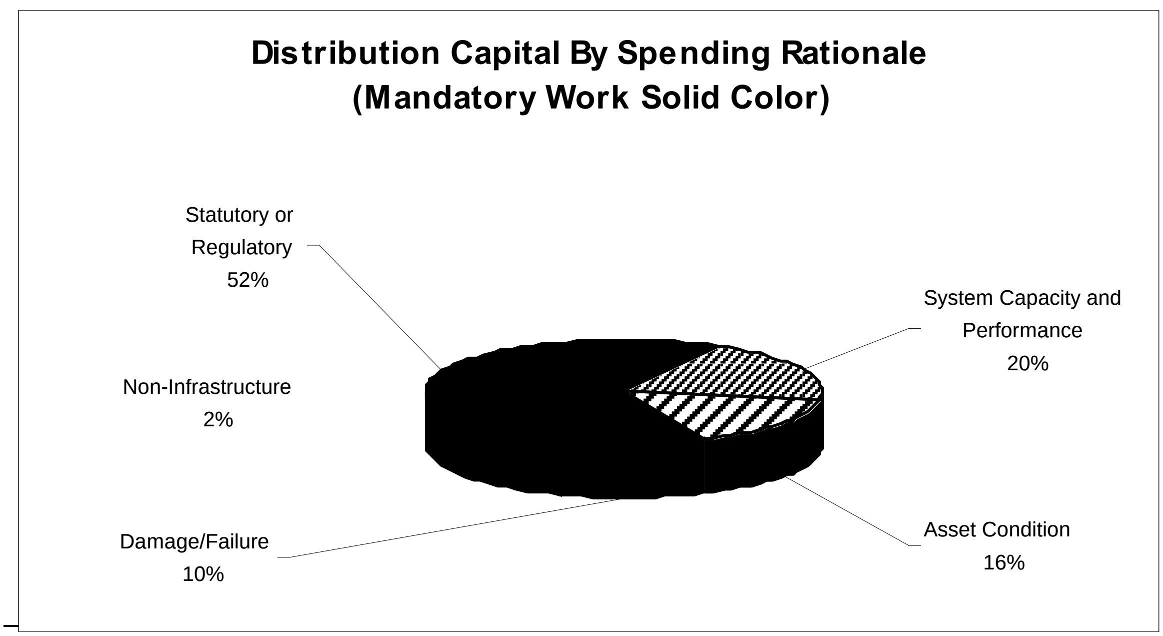
Distribution System Summary
The Company's distribution system comprises lines and substations typically operating at 15kV and below. There are nearly 36,000 miles of overhead primary wire and nearly 7,500 miles of underground primary cable on the system supplying approximately 412,774 overhead, padmount and underground transformers. Additionally, there are almost 424 substations providing service to the Company's 1.6 million electric customers.[3] The current five year plan for distribution is represented in Table I-6.

Table I-6
Distribution System Capital Expenditure by Spending Rationale ($millions)

Statutory or Regulatory	141.1	137.6	135.1	139.8	143.3	697.0
Damage/Failure	25.9	26.1	26.4	26.7	27.5	132.6
System Capacity and Performance	43.1	52.1	53.4	55.3	56.2	260.1
Asset Condition	29.2	34.5	44.3	47.8	49.8	205.7
Non-Infrastructure	4.7	4.7	5.8	5.3	5.1	25.7
Total	**244.0**	**255.0**	**265.0**	**275.0**	**282.0**	**1,321.0**

This Plan envisions the majority of investment in the distribution system will be in the Statutory or Regulatory Requirements spending rationale.

Figure I-5
Distribution System Mandatory Investment



[3] The distribution system data was taken December 6, 2011 from National Grid Asset Information Website located at http://usinfonet/sites/asset_info/Pages/AssetStatistics.aspx.

I C. Performance Against Investment Commitment

As a condition of the KeySpan merger approval, the Company committed to invest $1.47 billion in its transmission and distribution infrastructure over the period calendar years 2007 - 2011.[4] As shown in Table I-7, the Company's cumulative investment from January 1, 2007 through to December 31, 2011 is approximately $1.67 billion, exceeding the commitment by $197.5 million.

Table I-7
$1.47 Billion Investment Commitment Comparison ($millions)

Actual	270.0	322.8	313.1	420.1	341.3	1,667.4
Commitment	255.0	272.2	299.6	324.4	318.7	1,469.9
Difference	15.0	50.6	13.5	95.7	22.6	197.5

[4] Case 06-M-0878, *Joint Petition of National Grid PLC and KeySpan Corporation for Approval of Stock Acquisition and Other Regulatory Authorizations*, Order Authorizing Acquisition Subject to Conditions and Making Some Revenue Requirement Determinations for KeySpan Energy Delivery New York and KeySpan Energy Delivery Long Island (issued and effective September 17, 2007), pp. 108-110, 149-151.

I D. Opportunities and Challenges

In developing and implementing the Plan presented here, the Company has made and will continue to make adjustments to reduce costs and maximize opportunities for greater efficiency, consistent with the provision of safe and adequate service to customers. Among the opportunities and significant challenges facing the Company and its customers over the period covered by this five year Plan are:

- Changing regulatory or compliance requirements requiring increased or different investments (e.g., changes in the definition of Bulk Electric System that may result in increased investment requirements, or accelerated remediation requirements resulting from NERC actions).
- Increased penetration of large-scale renewable resources and the transmission infrastructure needs to deliver those resources;
- Development and application of technical, regulatory, and customer engagement processes to promote non-wires alternative solutions to traditional transmission and distribution infrastructure investments;
- New environmental, regulatory or other influences that affect the existing generation supply portfolio in the region, and which may require electric delivery infrastructure solutions to address;
- Improved end-to-end project management processes;
- Challenges related to implementing targeted asset replacement of assets whose overall condition are becoming degraded and are well beyond their typical asset life, including increased operations and maintenance spending and service reliability issues;
- The expansion of advanced grid applications will provide an opportunity to improve the performance of the system and thereby improve customer satisfaction.

Bill Impacts
Recognizing the foregoing challenges and opportunities, current economic and financial conditions, and PSC concerns, the Company developed this five year Plan which reflects the level of investment necessary to meet customer needs in the near term. The Company prepared a simplified analysis to estimate the revenue requirement effects in fiscal years 2014, 2015 and 2016 associated with the proposed capital investment levels included here, as well as an estimate of the associated per kWh impact of the resulting revenue requirement on a residential SC1 customer. For a typical residential SC1 customer, the allocated per kWh cost resulting from the investment levels included in the Plan would be $0.00236/kWh in FY2014; $0.00429/kWh in FY2015; and $0.00635/kWh in FY2016. Details of the simplified analysis are included in Exhibit 4 of this filing.

I E. Developing the Capital Investment Plan

The Capital Investment Plan is based on the Company's current assessment of the minimum needs of the electric delivery system over the Plan period. The investments described in this Plan will enable the Company to provide customers with safe and adequate electric service at a reasonable cost, meet our regulatory requirements, address load growth/migration, and replace equipment that is damaged or that fails. The investment levels in the Plan do not reflect costs of investments that may be needed to implement or accommodate new public policy initiatives, new regulatory requirements, technological developments, or the integration of renewable technologies that are not explicitly covered in the Plan.

In order to optimize the Plan budget and resources, a risk score is assigned to each project. The project risk score is generated by a project decision support matrix that assigns a risk score based upon the estimated probability and consequence of a particular system event occurring. The project risk score takes into account key performance areas, such as safety, reliability and environmental considerations, while also accounting for criticality of the project.

Mandatory programs and projects (i.e., Statutory or Regulatory and Damage/Failure spending rationales) known at this time are included in the Plan. Such programs and projects include NERC bulk electric system and NPCC bulk power system requirements,[5] new customer and generator connections, regulatory commitments, public requirements that necessitate relocation or removal of facilities, safety and environmental compliance, and system integrity projects such as response to damage/failure and storms.

Once the mandatory budget level has been established, programs and projects in the other categories (i.e., System Capacity and Performance and Asset Condition spending categories) are reviewed for inclusion into the Plan. Inclusion/exclusion for any given project is based on several different factors including, but not limited to: project in-progress status, risk score, scalability, and resource availability. In addition, when it can be accomplished, the bundling of work and/or projects is analyzed to optimize the total cost and outage planning. From an overall perspective, the Company's objective is to arrive at a five year capital budget that is the optimal balance in terms of making the investments necessary to maintain the performance of the system for customers, while also ensuring cost-effective use of available resources, particularly during these challenging economic conditions.

The Plan budget is developed in a manner that is consistent with, and influenced by, the programs and initiatives being implemented as a result of the management audit in Case 08-E-0827. Those programs and initiatives will continue to mature and improve with time, resulting in further improvements in the capital planning and delivery processes for the benefit of customers. In addition, because of the time horizon over which the Company must budget its infrastructure investments, there are inevitable changes in budgets and project estimates over time. Such changes may be due to changes in

[5] Investment levels presented in the Plan do not reflect any costs that may result from FERC's recent change in the definition of the Bulk Electric System. See Chapter VI for details.

project scope, changing material or resource costs, changing customer needs, or a more refined estimate based on where the project is in its development.

Cost estimates for projects that are already in-process, or are soon to be in-process, generally have +/- 10% cost estimates. Other projects at earlier stages in the project evolution process, and the budgets for those projects, are accordingly less refined and are more susceptible to changes in scope and budget. The projects in the Company's portfolio are continuously reviewed for changes in assumptions, constraints, as well as project delays, accelerations, weather impacts, outage coordination, permitting/licensing/agency approvals, and system operations, performance, safety, and customer driven needs that arise; and is updated accordingly throughout the year.

The Company includes certain Reserve line items in its Capital Investment Plan to allocate funds for projects whose scope and timing have not yet been determined. In such cases, historical trends are used to develop the appropriate reserve levels. As specific project details become available, emergent projects are added to the Plan with funding drawn from the reserve funds. The majority of emergent projects are the result of in-year occurrences in mandatory project categories such as damaged or failed equipment, customer or generator requirements or regulatory mandates. Reserve funds are also established for high priority risk score projects that may arise in response to unforeseen system reliability or loading concerns. The Company tracks and manages budgetary reserves and emergent work as part of its investment planning and current-year spending management processes, and reports that information quarterly to Staff.

With respect to delivery of the investment Plan, the Company uses different approaches to account for the differences in scope and character of Transmission and Distribution construction. With respect to the Transmission portion of the Company's investment plan, the Company will supplement its internal workforce with competitively procured contractor resources. On the Distribution side, the Company's internal workforce will continue to be primarily supplemented by the Company's Distribution Alliance contractor (Harlan) and competitively procured contractor resources.

The Company's risk-based approach to selecting projects and programs for inclusion in the Plan, coupled with its efforts to improve cost estimating and implement performance metrics that include substantial financial consequences, results in a capital investment budget that meets the needs of customers at the lowest reasonable cost.

I F. Organization of this Filing

The remainder of this Plan provides detail on the programs and projects that comprise the Five Year Capital Investment Plan as well as greater detail on opportunities and challenges associated with this Plan. The document is segmented into the following chapters:

Chapter II - Transmission System

Chapter III - Sub-Transmission System

Chapter IV - Distribution System

Chapter V - Investment By Transmission Study Area

Chapter VI - Opportunities and Challenges

Chapter VII - Exhibits

Chapter II Transmission System

The transmission system consists of approximately 6,000 miles of transmission line, 313 transmission substations, more than 500 large power transformers, and over 700 circuit breakers at operating voltages above 69kV. The Company expects to invest approximately $772 million on the transmission system over the next five years as shown in Table II-1 below.

Table II-1
Transmission System Capital Investment by Spending Rationale ($millions)

Statutory/ Regulatory	63.6	68.5	46.9	18.3	13.3	210.6
Damage/ Failure	13.8	14.7	10.6	10.5	11.1	60.8
Non-Infrastructure	1.5	0.0	0.05	0.05	0.0	1.6
System Cap /Perform	12.9	13.3	17.0	38.4	45.6	127.2
Asset Condition	40.2	48.6	85.4	97.8	99.9	371.8
Total	**132.0**	**145.0**	**160.0**	**165.0**	**170.0**	**772.0**

The level of investment on the transmission system presented in this Plan is reduced from the levels shown in the 2011 Plan by $10 million. This reduction is the result of multiple factors, including: re-phasing/deferring program spend based on economic and financial considerations, the move from an EPC type model to be delivered by the Regional Delivery Venture (RDV) to a to a project-by-project bidding process, and the gathering of more recent system and customer needs information. These steps are driven by the Company's efforts to improve how it plans and delivers its capital plan, and are influenced by programs and initiatives being implemented in connection with the management audit performed in Case 08-E-0827.

The Company has documented the condition and performance issues for different asset populations, most recently in the Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011. The Company's investment in the past ten years has slowed the decline in reliability performance due to asset condition issues and, as a result, reliability performance has improved in some areas. The Company is committed to maintaining safe and adequate service to customers, and the investment levels presented here are necessary to provide such service over the next 5 years.

The remainder of the chapter briefly describes major capital investment programs that comprise a significant portion of the Company's overall five-year capital investment Plan. The descriptions are segregated by spending rationale (e.g., Statutory or Regulatory, Damage/Failure). Specific asset condition and performance issues are described in further detail in the annual Report on the Condition of Physical Elements of Transmission and Distribution Systems filing to the PSC (Case 06-M-0878), most recently filed on October 1, 2011. Each section describes the drivers for capital investment programs and the projected customer benefits along with a description of significant changes between the February 7, 2011 Capital Investment Plan and this filing.

A. Statutory or Regulatory Strategies and Programs

Statutory or Regulatory work includes capital expenditures required to respond to, or comply with statutory or regulatory mandates. These include expenditures needed to ensure minimum compliance with the requirements of the North American Electric Reliability Corporation ("NERC"), Northeast Power Coordinating Council ("NPCC"), New York State Reliability Council ("NYSRC"), the Occupational Safety and Health Administration ("OSHA"), National Electrical Safety Code ("NESC") and the New York Public Service Commission. It also includes expenditures that are part of the Company's regulatory, governmental or contractual obligations, such as responding to new customer service requests, transformer and meter purchases and installations, outdoor lighting requests and service, and facility relocations related to public works projects. For the most part, the scope and timing of this work is generally defined by others and is non-discretionary for the Company.

With regard to regulatory mandates, NERC has approved a new definition of the Bulk Electric System (BES) to which their standards will apply. This definition was formulated in response to FERC Order 743-A. NERC intends to file this new definition with FERC by January 25, 2012. It is not clear at this time whether FERC will accept this new definition as it has been developed by NERC and the Industry, remand it back to NERC for additional changes, or take some other action. Based on the current, new definition, National Grid estimates that 216 additional 115kV lines will be considered part of the BES. The implementation timeline proposed by NERC for entities to become compliant with the new definition is 24 months.

While the development of this definition is nearly complete, it is difficult to determine what changes will be necessary to comply with the NERC standards in the future. National Grid believes the new BES definition may require some capital projects that are currently in the CIP to be advanced as well as addition of some new capital projects implemented to maintain compliance. In some cases new capital projects are only required when one looks at the combination of the new BES definition and the new, Transmission Planning Standard TPL-001-2 that has also been submitted to FERC for approval. In addition, if the NERC Alert on Facility Ratings is applied to the newly defined BES circuits, then capital expenditures in the amount of $75 million dollars are expected to be needed. While the conductor clearance strategy discussed later in this chapter includes plans to address all of these circuits, the timing of review and mitigation would be advanced if the NERC Alert needs to be applied to a new BES definition.

Due to this uncertainty, in this submission of the Capital Investment Plan, National Grid has not reflected capital investment requirements to comply with anticipated requirements. Rather, the Company intends to wait until the requirements are determined and then identify the needed investments to comply. At this time, National

Grid has estimated approximately $50 million dollars over a ten year period starting FY13 in the plan will be needed to address NERC Transmission Planning Standards (TPL).

Northeast Region Reinforcement

This major program consists of reinforcements of the transmission system in the Saratoga and Glens Falls area of the Company's Northeast Region. It is necessitated by current thermal and voltage needs and area load growth in the Northeast Region. It is also impacted by the proposed Luther Forest Technology Campus ("LFTC"). Currently, there are a number of major projects each with a total forecasted spending level of $2 million or more under this program during the period covered by this Plan[1], including:

- Installation of a new Eastover Road (formerly Turner Road) 230/115kV substation near where the existing Rotterdam-Bear Swamp 230kV line crosses the existing Mohican-North Troy #3 line and the Battenkill-North Troy #10 115kV lines. This station would serve as a primary source to those 115kV lines serving the east side of the Northeast Region. (Project #s C31326 - $20.9m & C31419 - $5.8m)
- Installation of a new 115kV line parallel to the existing Spier Falls to Rotterdam #1 & #2 circuits. This line would reinforce the west side of the 115kV system that serves the Northeast Region. An Article VII application has been submitted for approval to construct this line under the title "Spier Falls to Rotterdam New 115kV Transmission Project." (Project # C31418 - $53.5m)
- Rebuild the Mohican-Battenkill #3 and #15 lines between Mohican and Battenkill substations and reconductor 14.2 miles of the #15. This project requires an Article VII application, which the Company intends to submit by spring 2011. (Project # C34528 - $30.2m)
- Installation of reactive compensation at distribution and transmission substations in the Northeast Region. (Project # C35773 – $2.2m)
- In addition, studies indicate that reconductoring of 22.9 miles of existing 115 kV lines in the Northeast Region is required.

The timing of some facets of this program (including the reconductoring of existing lines, and reactive compensation) depends on the actual load growth for the Northeast Region (Saratoga and Global Foundries) during the next 1-10 years. Other projects in the program are needed absent additional load growth to relieve exposure to existing performance issues in the area. These include the new Spier-Rotterdam lines, Eastover Road Station, and rebuilding the Mohican-Battenkill 115 kV lines.

Drivers:

The transmission system serving the Northeast Region is currently exposed to post-contingency thermal overloads during summer peak periods, including inadequate

[1] The dollars shown for projects below within this program are the spending forecasted for the project within the term of this 5 year Plan (FY13-FY17), not the total capital cost for the projects. The same is true for all projects listed with dollars in this Plan.

thermal capacity with respect to the three Rotterdam 230/115kV transformers and the Spier-Rotterdam #1/#2 115kV double circuit. These conditions present a need to simultaneously relieve 115kV thermal overloads which affect the transmission supply to the Northeast Region and to add bulk-power transformation capacity.

As discussed in the 2009 Asset Condition Report[2] and the Eastern NY Reinforcement Project Report[3], Global Foundries' (GF) commitment to build a chip-manufacturing plant at the Luther Forest Technology Campus (LFTC) site results in projected load growth within the Northeast Region that will exacerbate transmission system performance issues.

The Company's ten-year forecast for the area projects a growth rate of just under 1% for loads within all of Eastern NY. However, a forecast specific to the northeast region that reflects higher residential growth and anticipated ancillary loads based on economic development following the addition of Global Foundries projects a growth rate of approximately 2.5% over the next five years. The Company has phased the program over several years, so that it has the ability to defer, re-phase or eliminate certain load growth dependent elements of the program as discussed above.

Customer Benefits:

The transmission reinforcement plan will resolve existing thermal and voltage problems that are expected to be exacerbated from projected load growth in the Northeast Region. More specifically, the three existing 230/115 kV transformers at Rotterdam and Spier-Rotterdam #1/#2, which are primary components of the transmission supply for the Northeast Region, already exceed their ratings for certain contingency conditions. Without improvements being made to the transmission facilities in this area, the development of the LFTC could be jeopardized. Load shedding on the order of hundreds of MWs would be necessary to relieve projected overloads without the new Spier-Rotterdam and Eastover Road projects.

In addition, the transmission reinforcement program will reduce dependence on local generation for reliability of service within the region. Without local generation available during the summer periods, the Spier-Rotterdam 115 kV circuits will be exposed to single contingency overloads until the local generation is returned to service. This in turn could require load shedding at or near LFTC for relief. This situation will be resolved with the addition of the new Spier-Rotterdam line, Eastover Road Substation and Mohican-Battenkill reconductoring – the latter projects being part of this program because of current transmission performance needs rather than future load growth.

2011 to 2012 Variance:

The primary variance between the 2011 and the 2012 Capital Investment Plans (CIP) results from reduced investment associated with the Eastover Road substation. Additional analysis spurred by feedback from DPS staff examined alternatives to a

[2] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2009, pgs. II-17 to II-18.
[3] Report to DPS: Eastern NY Reinforcement Project – Associated Bulk Transformation Needs and Solution Assessment, November 3, 2011. The investments shown for Eastover Road in the latter DPS report included spending prior to FY13 whereas the investments shown in this five year Plan exclude spending prior to FY13.

standard two-transformer bank Eastover Road substation layout. This analysis determined that the new Eastover Road substation with a ring bus layout and a single 230/115kV bank was still superior to other solutions that did not involve the addition of Eastover Road substation. However, the reduced scale of the initial Eastover Road substation layout allows for initial CAPEX savings while still allowing for expansion of the substation to two banks as warranted by future load growth in the area. The latter need is expected to occur beyond the time frame of this five year Plan.

Table II-2
Transmission – Northeast Region Reinforcement
Program Variance ($millions)

2011	19.5	50.1	52.1	19.8	5.7	-	147.2
2012	-	41.9	44.4	24.3	8.6	9.0	128.1

Substation Compliance Upgrades

This program relates to the need to upgrade the Clay 115kV (C28705) and Porter 115kV (C28686) substations to meet recently applicable NPCC criteria. The applicability of the NPCC criteria to these two stations has been confirmed by the New York ISO; therefore, investments are required to comply with the relevant NPCC requirements.[4]

Drivers:

In accordance with NPCC criteria adopted in April 2007, testing of major substations across New York State was performed by the NYISO. The results indicate that Clay and Porter 115 kV substations as facilities that are required to be brought into compliance with specific NPCC design, protection and operation requirements.

Customer Benefits:

In addition to compliance with NPCC and NYSRC requirements, the benefits of completing these projects are reductions in system vulnerability to certain severe contingencies identified in system studies. Customers throughout central New York will benefit from reduced vulnerability of the transmission system to such contingencies.

2011 to 2012 Variance:

The scope of work for the Clay 115kV project has become better defined as the project moved through preliminary engineering into final design and more accurate estimates were established.

In 2010, the project at Porter was re-phased and broken out into 115 and 230kV portions. A breaker-and-a-half configuration was initially proposed, but further analysis determined that a 115kV straight bus design could be utilized by rebuilding in place. A

[4] This program was discussed in more detail in Appendix 1, Attachment 4 of the April 21, 2009 Petition to Defer Electric Transmission & Distribution Investment Costs (Case 07-E-1533).

straight bus design will require less total bus work to be installed and will avoid the need to expand the substation yard to accommodate a breaker-and-a-half configuration. Thus, considerable CAPEX savings will be realized. The current construction sequence has the project completing the 115kV work by FY16 prior to the 230kV work. The 230kV work is expected to be completed beyond the time frame of this five year Plan.

Table II-3
Transmission – Substation Compliance Upgrades
Program Variance ($millions)

[redacted]							
2011	15.6	18.2	21.0	9.0	8.1	-	71.9
2012	-	13.9	22.2	12.3	0.8	0.0	49.3

Conductor Clearance Strategy

On October 7, 2010 a NERC Alert (Recommendation to Industry: Consideration of Actual Field Conditions in Determination of Facility Ratings) was issued stating that:

> "NERC and the Regional Entities have become aware of discrepancies between the design and actual field conditions of transmission facilities, including transmission conductors. These discrepancies may be both significant and widespread, with the potential to result in discrepancies in line ratings. The terms "transmission facilities" and "transmission lines" as used herein include generator tie lines, radial lines and interconnection facilities."

All recipients of the NERC Alert were required to review their current Facility Ratings Methodology for their solely and jointly owned transmission lines to verify that the methodology used to determine facility ratings is based on actual field conditions. The Company believes our current program will be sufficient to address NERC's concern on this issue. However, as more information is reviewed by NERC, they could impose further requirements on the industry.

In response to this alert, strategy SG163 (Conductor Clearance Program for the A-10 Bulk System) was approved on June 30, 2011. This presently impacts about 65 transmission circuits in New York including most 345 kV and 230 kV lines, as well as a number of 115 kV transmission lines. This program is expected to be completed by the end of FY13.

The conductor clearance correction program will increase the clearance of certain overhead conductors to address locations that may not meet clearance standards prescribed by the National Electrical Safety Code (NESC) under certain loading conditions. The need for greater clearances has been identified as a result of an ongoing Aerial Laser Survey (ALS), also known as LiDAR for Light Detection and Ranging, being conducted on the transmission system. Clearances are in the process of being measured with aerial surveys providing an accuracy which was previously available by ground inspection only.

The code requirements vary depending on when the transmission line went into service. Clearance projects will be prioritized based upon NERC requirements. This is also expected to enhance public safety by assuring appropriate codes are met.

Drivers:

The primary driver for this work is the October 7, 2010 NERC Alert referred to above as well as the safety of both the public and Company personnel as they work and travel under the overhead lines. The NESC sets required conductor clearances of overhead lines from the ground and other ground based objects. The NERC Alert places a reliability driver on a portion of this work. This program assures that transmission lines meet the governing National Electrical Safety Code (NESC) under which they were constructed by improving ground to conductor clearances in substandard spans. This follows standard industry practice and a Public Service Commission Order (Case 04-M-0159, effective January 5, 2005) that the Company shall adhere to the NESC.

Customer Benefits:

While safety events caused by substandard clearance conductors are rare, their consequences can be very serious and are difficult to quantify. Application of the NESC criteria provides a reasonable means to manage the issue and mitigate the risk from such events.

2011 and 2012 Variance:

The Company has focused solely on conductor clearance issues on bulk power lines in response to the NERC Alert in FY12 and FY13 which has lead to a reduction in our planned investments in FY13 and FY14 from the prior Plan under Strategy SG029 (Overhead Line Ground Clearance Improvements). Clearance projects under SG029 will resume in FY14.

Table II-4
Transmission – Conductor Clearance Strategy
Program Variance ($millions)

2011	9.2	10.6	10.0	15.0	15.0	-	59.8
2012	-	5.9	7.3	15.4	15.0	15.0	58.6

BES 100kV Brightline

Investments in FY13 and beyond will potentially be impacted by NERC plans to implement a program to redefine circuits rated at 100kV such that they will become part of the Bulk Energy System (BES). Once this definition is officially issued, the industry will have a limited time to bring these circuits into conformance with NERC requirement. The definition is likely to be officially issued sometime in 2012. However, because the definition is not yet firm, the Company has not entered specific line items into the plan related to this definition change. The implementation plan submitted by NERC includes a two year period for all NERC registered entities to bring those elements of the transmission system, now brought into the BES per the new "definition," into compliance with all the mandatory, NERC standards.

There are four main areas where that the Company has identified potential impacts to its investment plans due to the bright line definition.

- One aspect of meeting the proposed criteria would be to undergo a program similar to Conductor Clearance Strategy (SG163) on the circuits not formerly included in the A-10 bulk circuit list but are on the new BES list (estimated to be over 200 additional circuits at this time). The current 5 year and 15 year Plans assume implementation of such a program over a 5-10 year period, instead of a 2-3 year period, due to logistic implementation constraints. The conductor clearance program is in the capital investment plan at $75 million over 8 years. Adoption of the NERC rule would require implementation of the 8 year program in 2 years to 115kV spans with inadequate clearances to this new regulation (unless the Company can obtain an agreement from NPCC and NERC for a longer implementation timeline)

- The new NERC definition in combination with the new NERC stricter planning criteria would impose such criteria on a larger set of facilities. This is expected to increase capital costs in the range of $50 million over 10 years; however, more specific cost estimates are difficult at this point until both the new BES definition and new NERC Transmission Planning standards are approved by FERC.

- The new NERC definition in combination with the NPCC/NERC Regional Standard, PRC-002-NPCC-01— Disturbance Monitoring, would require disturbance monitoring equipment to be installed to cover all of the newly defined BES elements. Any regionally approved standards that are submitted to NERC and FERC for approval are subject to the NERC definition of Bulk Electric System and not the Region's definition. This change has an impact of approximately $10 Million over the next 4 years; again, more specific cost estimates are difficult at this point until the new BES definition is approved by FERC. In addition the Company will be working with NPCC to identify if there are any opportunities for modifying the Regionally-approved standard to be specifically applicable to NPCC's defined Bulk equipment. However, this change would need to be submitted to NERC and FERC for their subsequent approval in order for that change to be effective.

- New Cyber Security standards version 4 (and Version 5) in combination with the BES definition will impact facilities that are expected to be in conformance with the CIP standards. The new CIP standards now require facilities that are critical in deriving Interconnection Reliability Operating Limits (IROLs), that have Special Protection Schemes that could impact an IROL, and that have a high number of lines connected to the substation(version 5 only) to be included. These changes in conjunction with the new BES definition is expected to add 23 additional facilities to the list of those that must meet CIP. The impact of this change is estimated in the range of $4 to 6Million over the next two years; however, more specific cost estimates are difficult at this point until both the new Cyber standard(s) and new BES definition are approved by FERC.

Drivers:

The primary driver for the redefinition of the BES proposed by NERC was FERC Order No. 743 issued in November of 2010. This order expressed a desire to improve clarity, reduce ambiguity, and establish consistency in the definition of the BES and in its application across regions of the country. The use of a 100kV threshold in the new definition is intended make the line of demarcation between the BES and non-BES system “brighter” and easier to manage, and is expected to improve the reliability of the BES.

Customer Benefits:

The redefinition of BES using the lower voltage of 100kV will enlarge the portion of the total system to which BES planning criteria are applied. This broader application of such criteria is expected to improve the reliability and security of that portion of the system to which it is extended. Because extension of the BES will bring its demarcation closer to customers, the reliability of customer service will improve to the degree that such reliability is affected by the reliability of the BES portion of the system. Because the extension of the BES will require some additional investments, rate base and customer electricity bills will also be impacted accordingly.

Remote Terminal Unit Replacement Strategy

The ongoing Remote Terminal Unit (“RTU”) Strategy (C03772) involves replacing obsolete monitoring and control equipment with current and fully functional equipment.[5] There are currently approximately 550 operating RTUs under the Company’s control, of which 158 transmission and distribution units are being replaced under this program.[6]

NERC Recommendation 28, released in response to the August 2003 blackout, requires the use of, among other things, more modern, time-synchronized data recorders. Many in-service RTUs do not satisfy this requirement; and obsolete RTUs will not work with the modern Energy Management Systems (“EMS”) the Company expects to implement.

To date, 104 of the 158 RTU replacements have been completed. Another 38 have completed engineering and are awaiting installation; and 25 still need to be scoped.

Drivers:

The RTUs are being replaced under this program for the following reasons:

- The target RTUs do not meet the criteria outlined in NERC Recommendation 28,[7] which places the Company at risk for being unable to provide synchronized system data during a system emergency.

[5] The Remote Terminal Unit Strategy (SG 002) was included as Exhibit 20 in Volume 5 of 9 of the September 17, 2007 Transmission and Distribution Capital Investment Plan, Case 06-M-0878.
[6] Some of the proposed RTU replacements are in generator owned facilities, not just National Grid substations.
[7] North American Electric Reliability Council (NERC) “Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations,” April 5, 2004 Page-162

- The target RTUs and equipment are obsolete and in most cases no longer supported by the manufacturer. Replacement parts are either difficult to obtain or unavailable.[8] Failure of an RTU may be un-repairable, requiring a complete unplanned replacement on short notice. This situation could occur when data from the failing RTU is most critical, such as during system events, resulting in reduced reliability performance.
- Test equipment is obsolete and cannot be readily obtained or maintained. The PC based test equipment required for maintenance was acquired in the early 1990s and uses a DOS software platform. Both the RTUs and test sets utilize the M9000s communication protocol. This protocol is the legacy protocol of the original Energy Management System ("EMS") and cannot be upgraded to be compatible with the planned EMS system replacement.
- The target RTUs are not suitable for future integration of new substation devices and technology. The equipment does not have and cannot be modified to provide the capabilities required for modern supervisory control and data acquisition.[9] This type of functionality is becoming standard to meet current reliability needs.

Customer Benefits:

The new RTUs will provide more timely and reliable data than their predecessors. In the event of a system disturbance, accurate data received in a timely manner is a necessity in the customer restoration process. Data received from the new RTUs will quickly identify key devices that have failed or have been affected by the event. The data will expedite isolation of the problem, reduce the duration of the outage and in some cases avoid expansion of the outage to other system components.

Furthermore, if obsolete RTUs are not replaced, they will not be able to communicate with the new Energy Management System which would then prevent the required modern supervisory control and data acquisition of the transmission system from taking place. This type of functionality is required to meet the reliability needs of customers.

2011 to 2012 Variance:

Generally the targeted RTU replacements have been delayed due to both the difficulty in outage scheduling and the length of time necessary to install the digital communication circuitry needed for the new RTUs. Between 2006 and 2010 the Company has invested $13.8 million on the replacement of obsolete RTU equipment. The average cost per installation is $147,000 for a transmission RTU. The project is now expected to be completed in FY13. Final engineering on the remaining 25 is in process.

Table II-5
Transmission – Remote Terminal Unit Replacement Strategy
Program Variance ($millions)

2011	2.3	3.9	3.3	3.3	0.5	-	13.3
2012	-	3.9	0.0	0.0	0.0	0.0	3.9

[8] SG002 – Revised Asset Replacement Strategy for RTUs, October 31, 2005.
[9] SG002 – Revised Asset Replacement Strategy for RTUs, October 31, 2005.

NYISO Interconnection Meter Investment Program

There are approximately 230 NYISO reportable points in New York State for which National Grid is the metering authority. These reportable points include generation points and transmission tie line points between zone and sub-zones in the NYISO that are required to settle commodity charges between market participants. The meter authority is responsible for meter accuracy and the transmission of meter data in accordance with the NYISO meter standards, tariff and Transmission Owners agreement. Metering authority responsibilities also include the calibration, repair, and maintenance of the metering circuits at these points. Documentation and reporting of compliance concerning the performance of these responsibilities is also required, and to be made available on request by the NYISO or other market participants. These requirements are mandates and are specified in the NYISO Revenue Metering Requirements Manual (Manual 25) and the NYISO Control Center Policies and Procedures Manual that National Grid is bound to follow based on our Transmission Owner Agreement with the NYISO.

Drivers:

Compliance with the NYISO's requirement for revenue grade metering circuits at all ISO reportable points.

Customer Benefits:

The use of revenue grade meters at zone and sub-zone points is necessary for settlement purposes as to not adversely affect the competitive energy market, which is highly dependent on accurate and timely information for success.

2011 to 2012 Variance:

A sanction paper with updated cost estimates was completed in November 2011. This project was not presented in detail in the 2011 Plan.

Table II-6
Transmission – Interconnection Meter Investment Program
Program Variance ($millions)

[redacted]							
2011	0.5	0.0	0.0	0.0	0.0	-	0.5
2012	-	5.1	3.2	0.0	0.0	0.0	8.3

B. Damage/Failure Strategies and Programs

Damage/Failure category projects are those capital expenditures required to replace failed or damaged equipment and to restore the electric system to its original configuration and capability following equipment damage or failure. Damage may be caused by storms, vehicle accidents, vandalism or other deterioration. The Company views the Damage/Failure category as a mandatory category of work that is non-discretionary in terms of scope and timing.

The Damage/Failure investment levels are based on historical actual costs. Most distribution damage/failure occurrences are single structure events and are handled under blanket projects. Individual work orders are used to capture small value, relatively high volume work that is of standard construction and scope, short duration, and limited to a maximum of $100,000.

Inspection Projects

The goal of this program (C26923) is to replace those damaged or failed components on the transmission overhead line system identified during field inspections (five-year foot patrols).

Drivers:

These programs assure that both steel tower and wood pole transmission lines meet the governing NESC standards by replacing hardware, wood poles, and structure components that no longer meet the governing code requirements. This follows standard industry practice and the Commission's 2005 Safety Order in Case 04-M-0159. Since this work is required to meet governing NESC standards the program could equally be categorized as Statutory or Regulatory. Historically, this program has always been categorized as Damage/Failure and the Company recognizes both rationales as mandatory spend.

Customer Benefits:

This program enhances public safety by assuring that damaged or failed transmission overhead line components are replaced and continue to meet the governing National Electrical Safety Code under which they were built. Replacement of damaged and failed components discovered during inspection also promotes reliable service performance.

2011 to 2012 Variance:

Spending levels during the last two years were lower than originally projected due to implementation and preliminary engineering lead times.

Table II-7
Transmission – New York Inspection Projects
Program Variance ($millions)

2011	1.9	1.4	1.4	1.4	1.4	-	7.5
2012	-	1.1	1.1	1.1	1.1	1.1	5.6

Wood Pole Management

This program (C11640) assures that transmission lines meet the governing NESC under which they were constructed by replacing wood poles and wooden structures that no longer meet the governing code requirements due to damage or failure of the pole or structure. As with the New York Inspection Projects, described previously, since this work is required to meet governing NESC standards, the program could equally be categorized as Statutory or Regulatory. Historically, this program has always been categorized as Damage/Failure and the Company recognizes both rationales as mandatory spend.

Drivers:

As discussed in the Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, wood poles that are either priority rejects or reject poles (as classified following a wood pole ground line inspection and treatment performed on behalf of the Company by Osmose Utilities Services Inc, of Buffalo, NY) as well as those damaged by woodpecker or insect activity will be replaced. The ground line inspection and treatment of wood poles is performed approximately every 10 years. These inspections are in addition to the 5 year foot patrol which is required under the Commission's 2005 Safety Order in Case 04-M-0159.

The wood poles targeted through this initiative are deemed to be beyond restoration by either re-treatment or placement of some form of additional pole support, usually at the ground line. Similarly, "reject equivalent" refers to deteriorated wood poles from such things as wood pecker damage, insect damage, or rotting and, therefore, these poles are included in the Wood Pole Management Program.

Reject and priority reject poles generally do not meet NESC requirements. In a limited number of cases when an extra margin of safety was added into the design, some of this margin may still be available before failing to meet the Code. However, this usually provides only a limited amount of extra time to replace the damaged or deteriorated wood pole(s) or structures before potential failure.

Customer Benefits:

Customers will benefit from the maintenance of the appropriate public safety level by assuring that transmission wood structures continue to meet the governing Code. In addition to the public safety benefit, unplanned failures of wood poles or structures can reduce service reliability, and may reduce overall system integrity making the transmission system vulnerable to widespread disruption.

2011 to 2012 Variance:

Spending levels are expected to remain consistent compared to the prior plan.

Table II-8
Transmission – Wood Pole Management
Program Variance ($millions)

2011	5.8	2.1	2.7	1.4	1.5	-	13.5
2012	-	5.2	2.7	1.4	1.4	1.4	12.2

C. System Capacity and Performance Strategies and Programs

System Capacity and Performance projects are required to ensure that the electric network has sufficient capacity to meet the growing and/or shifting demands of our customers. Projects in this category are intended to reduce degradation of equipment service lives due to thermal stress and to provide appropriate degrees of system configuration flexibility to limit adverse reliability impacts of large contingencies. In addition to accommodating load growth, the expenditures in this category are used to install new equipment such as capacitor banks to maintain the requisite power quality.

Reliability Criteria Compliance

This program involves significant capital expenditure over the next five years and beyond to construct major reinforcements of the 115kV transmission systems in western New York, including the Southwest and Genesee regions that extend from the Buffalo area east to Mortimer Station and south to the Pennsylvania border. This strategy will strengthen the transmission network and ensure adherence to reliability standards. It will also correct existing asset condition, safety, and environmental concerns resulting in improved reliability of several circuits.

The Company's program to remediate these potential reliability problems comprises the following major components (costs shown are for the period covered by this Plan):

- Constructing a new 345/115kV station near Homer Hill Station tying into the Homer City-Stolle 345kV line #37 and the Gardenville-Homer Hill 115kV lines #151 and #152 to support area voltage (C24015 and C24016) - $36.8m.
- Re-conductoring 6 miles of the Falconer-Warren 115kV #171 circuit to prevent the circuit from being opened by FirstEnergy due to their loading concerns (C24017) - $5.4m.
- Converting a 10.5 mile 69kV circuit between Mortimer and Golah stations to 115kV to prevent low voltage conditions (C24629, C24630, C24631) - $27.8m.

- Installing a 27 MVAR capacitor bank at Batavia to boost area voltage (C31478) - $3.6m.

Drivers:

Studies of the 115kV and 230kV transmission systems were conducted for the Frontier, Southwest and Genesee regions of western New York, to determine compliance with applicable reliability standards. Studies which were initially performed in 2007 and then reconfirmed in 2008 and 2010 evaluated the system for existing load levels up to a 15 year forecasted load level. Included within each of these evaluations was testing of both N-1 and N-1-1 design criteria, ensuring compliance with NERC TPL Standards, NPCC Directory #1, NYSRC Reliability Rules and the Company's Transmission Planning Guide (TGP 28). These standards require the entire transmission system to meet N-0 and N-1 voltage, thermal and stability criteria as well as the bulk power system and long lead time items to meet the same criteria for N-1-1 conditions. Several reliability criteria issues for the area were discovered under various study conditions. Issues included voltage problems around Homer Hill and Dunkirk (N-0, N-1, N-1-1), and voltage problems around Batavia, Brockport and Golah (N-1).

In the Southwest Region, multiple reinforcement projects are required to correct all N-1 conditions. In addition to the problems in the Homer Hill area, bus faults at Dunkirk will create low voltage problems on the circuits between Dunkirk and Falconer. For the Genesee Region, several voltage related problems were found in the Batavia and Golah areas. For bus faults at Lockport, voltage problems develop in the Batavia area. Thermal concerns were also present on one of the circuits between Lockport and Batavia. At Golah, an outage of the circuit between Mortimer and Golah (N-1) would result in Golah being fed radially from Batavia. This in turn would cause low voltage levels at Golah (below 80 percent). This contingency can also be caused by bus faults at Mortimer and Golah.

Timing of the work planned for this area, and the remainder of the service area, can be affected by closure of generation supply due to environmental or other regulatory issues.

Customer Benefits:

Customers will benefit from this program in several ways, including:

- Exposure to service interruptions, including load shedding, in the event that certain key contingencies which may occur would be reduced significantly. Generation that currently must be run at times to ensure voltage support and stability will no longer be required for these purposes, avoiding future costs of dispatching the generation out of NYISO merit order.
- Circuits that are normally open, which provide a backup source to loads in the Homer Hill area will be operated normally closed, reducing the frequency and length of outages for certain contingencies.
- Some capability to accommodate new or expanding load will be added to the system.

2011 to 2012 Variance:

The major reason for the variance in this Plan relates to investment in FY17 which is the largest spend amount within the period of the Plan and occurs during a year not part of the previous Plan. The construction of the Southwest Station amounts to $27.6m of the total spending ($46.6m) in FY17. The significant investment in the last year of this Plan reflects decisions to defer investments in order to reduce their overall costs.

Table II-9
Transmission – Reliability Criteria Compliance
Program Variance ($millions)

[redacted]							
2011	2.9	2.4	1.8	4.4	21.1	-	32.6
2012	-	0.1	3.4	7.4	20.9	46.6	78.5

The Company has recently become aware that there may be a need to advance the Southwest projects to an even earlier timeframe. In doing so the Company will need to analyze how it can expedite the projects, and that analysis will identify the change in spend profile for these transmission projects and the impact on the overall Plan. In the event that acceleration of the investment is needed, the Company will revise the capital investment plan reflected in its next rate case.

Other System Capacity & Performance

There are currently four separate projects with investment levels greater than $2 million each included in the Other System Capacity and Performance program. The largest item is the Syracuse area re-conductoring program.

Syracuse Area Re-Conductoring

This program (CNYPL28, $16.3m) reinforces the transmission system in and around the Syracuse area. These reinforcements are necessary to respond to a system capacity and performance need caused by load growth in the area over the period of time between 2010 and 2015. Without this program, the 115kV system will be exposed to thermal overloads during contingency conditions.

The program scope includes the following projects:

- Re-conductor two separate sections of the Clay–Teall 115kV Line #10. The sections targeted for re-conductoring are 6.75 miles, and 6.08 miles. This project is required for compliance with mandatory NERC standards.
- Re-conductor 10.24 miles of Clay–Dewitt 115kV Line #3. This project is required for compliance with mandatory NERC standards.
- Re-conductor 0.92 miles of the Geres Lock – Solvay 115kV Line #2. This project is required to conform to relevant planning criteria.
-

Drivers:

Studies of the 115kV and 345kV transmission systems were conducted for the Central region of central New York, which extends from Elbridge Substation in the West to Oneida Station in the East, to determine whether the systems comply with reliability standards. These studies were performed in 2008, and then reconfirmed in 2010, and evaluated the system for existing load levels up to a 15 year forecasted load level.

Included within both of these evaluations were testing to comply with NERC TPL Standards, NPCC Regional Reliability Reference Directory #1, NYSRC Reliability Rules and the Company's Transmission Planning Guide (TGP 28). These standards require the entire transmission system to meet voltage, thermal, and stability criteria.

Several reliability criteria issues for the area were discovered under study conditions. Issues include thermal overloads on 115kV circuits in the Central Region.

Customer Benefits:

Customers will benefit from this program in several ways, including:

- Their exposure to service interruptions, some resulting from load shedding, in the event that certain key contingencies were to occur will be reduced significantly.
- Some capability to accommodate new or expanding load will be added to the system.

2011 to 2012 Variance:

The 2011 CIP projections reflect updated understanding of area system needs over 2010's Plan. The program is progressing as expected. Thus there is little variance.

Table II-10
Transmission – Syracuse Area Reconductoring
Program Variance ($millions)

2011	0.1	0.2	0.2	2.0	13.0	-	15.5
2012	-	0.2	0.2	2.0	13.0	.9	16.3

D. Asset Condition

Asset Condition expenditures are those investments required to reduce the likelihood and consequence of the failures of transmission and distribution assets, such as replacing system elements like overhead lines, underground cable or substation equipment. During the previous ten years, the Company adopted an Asset Management approach that relied on a holistic, longer-view assessment of assets and asset systems to inform capital-investment decisions. As part of this approach, the Company conducted assessments of major asset classes such as circuit breakers or subsets of asset classes such as a circuit breaker manufactured by a particular vendor. These assessments focused on the identification of specific susceptibilities for assets and asset systems and the development of potential remedies.

In light of current economic conditions, however, the Company presents a modified approach in this Plan that reduces near-term capital costs. The result is greater reliance on the purchase of spare equipment to replace damaged equipment that may fail in service for certain elements of the transmission and distribution system. The modified approach calls for a more targeted replacement of assets based on their condition versus wholesale replacement based on "end of useful life" criteria, especially for transmission line refurbishment projects. This approach will result in lower capital investment in the near term, but may present adverse impacts on reliability and safety performance as compared to higher investment levels. Closer monitoring of system performance as it relates to asset condition causes will be necessary. For overhead lines specifically, the Plan seeks to achieve compliance with NESC requirements, and will attempt to implement the recommendation from Staff's recent rate case testimony to refurbish overhead transmission line facilities that are in unacceptably severe deteriorated condition (i.e. Niagara Mohawk's defined Level 1, Level 2 and Level 3 conditions), as opposed to entire lines, unless a compelling justification can be provided for the full refurbishment. Any overhead line proposed for a refurbishment will undergo a field inspection by qualified transmission line engineers and will usually be supported by comprehensive aerial inspection using stabilized video cameras. As part of the conceptual engineering process, refurbishment options will be thoroughly evaluated on a case-by-case basis and starting in calendar year 2012, the engineering economics of various options such as a complete reconductoring versus a life extension will be reviewed. In addition, longer term impacts such as a greater number of visits to the same right-of-way, multiple site establishment costs, increased susceptibility to storm damage, additional permitting and licensing costs, greater levels of environmental impact, and more disturbance to property abutters, among other things will be evaluated to determine if it is most economical scope of work for the benefit of customers. Therefore, in the longer term, a more holistic approach to the management of overhead line condition issues may be more appropriate and cost effective.

Further detail on specific asset condition programs and projects is given below.

3A/3B Tower Strategy

The 3A/3B Towers program was established following a 2003 tower failure which resulted from an extreme longitudinal wind load generated by a storm. Phase I of the program (completed in January 2009) was the replacement of 139 transmission towers that were in service at road and other public crossings and that support the Edic-New Scotland #14 345kV line. The remaining Type 3A and 3B towers on this line will need to undergo periodic climbing inspections to confirm the integrity of the structures.[10] There are four other 345kV lines that use these same types of towers. They are the 345kV New Scotland–Leeds #93 and #94 lines, Athens-Pleasant Valley #91 and Leeds–Pleasant Valley #92 lines. As of 2010, these lines have not experienced any tower

[10] The 3A/3B Tower Strategy (SG 032) was included as Exhibit 21 in Volume 6 of 9 of the September 17, 2007 Transmission Capital Investment Plan, Case 06-M-0878.

failures. Only the 3A and 3B towers that pose significant safety concerns (i.e., near public roads, railways, or navigable waterways) were replaced on the Edic-New Scotland 14 line. For public safety reasons, a similar program addressing public crossings for the remaining four lines is proposed. The two projects included within this program are: Leeds - Pleasant Valley #91/#92 tower reinforcement (C08017) and New Scotland – Leeds #93/#94 tower reinforcement (C07918).

Drivers:

This investment is needed because failures of tower types 3A and 3B have already occurred on the Edic-New Scotland #14 line. In October 2003, Structure 347, a type 3A design tower, failed. Two previous failures occurred on type 3B design towers, Structure 3 in 1977 and Structure 66 in 1992 (adjacent towers 63, 64, 65, 67, and 68 were also damaged by the collapsed tower). Phase II will address the four remaining lines after Transmission Planning reviews future load needs associated with them. When the study is completed, the likelihood for a system upgrade beyond what is proposed to address the design deficiencies will be better understood.

Customer Benefits:

Public safety is the primary driver of this program. In addition to the safety benefit, the program promotes reliability by reducing the risk of thermal constraints, system instability and widespread cascading failure of the transmission system that could result from the loss of key circuits following a tower failure.

The towers targeted under this program are those 3A/3B towers:

- adjacent to road crossings
- adjacent to railroad crossings
- adjacent to navigable waterways
- towers at transmission line crossings, and
- replaced to reduce excessive cascading potential

2011 to 2012 Variance:

The Company and the NYISO are reviewing the future load needs associated with the 345kV New Scotland–Leeds #93 and #94 lines, Athens-Pleasant Valley #91, and Leeds–Pleasant Valley #92 lines by June 2011. Because of the current system planning uncertainty and as a result of the objective to reduce capital investment levels, the Company has deferred commencement of Phase II of this project. Any structure failure occurring during this deferral period will be managed through the Damage / Failure budget using temporary structures or wood replacement structures.

In order to re-assess the potential risk of individual structures to extreme longitudinal wind loadings, a repeat meteorological wind study was completed in calendar year 2011. The study evaluates 55 years of wind data and this information will be used once the project is restarted.

Table II-11
Transmission – 3A/3B Tower Strategy
Program Variance ($millions)

2011	.04	.03	0.0	0.1	6.1	-	6.3
2012	-	0.0	0.0	0.0	0.0	0.0	0.0

Relay Replacement Strategy

Protective relays are maintained in accordance with Company substation maintenance standards and NERC or NPCC requirements, where applicable. Overall the population of approximately 4,000 relay packages remains adequate but approximately 6% of the population requires investment based on their condition, performance or obsolescence. The program will commence by replacing the worst 6% of the relays over the next eight years. Beyond that, studies and pilot programs will be initiated to explore the most efficient and cost effective approach to addressing the remaining population. The long-term objective is to have an asset management approach that allows a more commoditized approach to relay replacement. This approach will be necessary for modern microprocessor relays that are expected to have only 15 to 20 year asset lives.

Strategy SG157 (C34690), approved in late 2010, identifies relay replacement candidates based on historical performance (relay models from the same manufacturer with known performance issues) or obsolescence where parts and technical support are no longer available. The sanctioned scope included the replacement of about 245 high priority relay packages, 18 communication packages and 7 control houses over the next six years[11], however, to reduce the costs of the Plan, the replacement period has been extended a further two years. The conceptual funding level (-25%/+50%) for this project is expected to be $55 million. This project represents the first phase of the multi-year "NY protection and control replacement" project. Specific projects are being engineered and will be sanctioned in due course. As a result of deferral of $125 million associated with the substation rebuild program beyond the five-year period of this Plan in 2011, the Company will be reevaluating whether the scope of the relay replacement program should be revised.

Drivers:

This strategy ensures that reliable protective relay systems are in place to preserve the integrity and stability of the transmission system following a fault. This strategy is needed now because properly functioning protective relays are essential for rapid isolation of faults on the system thus protecting customers from potential outages and protecting equipment from damage.

Customer Benefits:

Properly functioning elements of relay protection schemes limit the extent and duration of outages. Further, the protection system is designed to protect high value assets

[11] For the list of specific relays, sites and timescales please refer to Strategy paper SG157

against failure in the event of system anomalies thereby reducing the potential investment needed to recover from an event. The primary benefit of this strategy will be to maintain the reliability performance of the system and customer satisfaction as known poor performing relay families are replaced with modern microprocessor based relays.

The new microprocessor based relays will also yield additional operational data that was not previously available, allowing better analysis of system failures to prevent reoccurrences which will improve overall system performance for the benefit of customers. With the availability of real time data, future applications can be developed such that more of the transmission system can be automated and designed to respond automatically to system events. The speed of data acquisition and analysis also present system operators with a better understanding of system anomalies and recommendations for remedial actions. For example, distance-to-fault data (DTF) can identify fault location with greater accuracy than currently possible. Accurate DTF data has the potential to reduce O&M costs since less effort will be required to patrol overhead lines after a fault. In addition, this data will be brought back to the control center for use by operations and engineering personnel to ensure the root causes of faults are identified to prevent recurrences.

2011 to 2012 Variance:

The difference between the 2011 and 2012 Plans is due to the project being re-phased for inclusion in the Plan as poorly performing relay protection presents an unacceptable risk to the reliable operation of the system.

Table II-12
Transmission Relay Replacement Strategy
Program Variance ($millions)

2011	0.7	3.7	5.1	5.6	5.5	-	20.6
2012	-	1.3	8.6	11.4	14.7	16.9	52.9

U Series Relay Strategy

The Westinghouse U series line of relays was introduced in the early to mid 1970s and production and support for these relays ceased in the mid 1980s. Westinghouse U series relays are installed on a number of important 345kV lines. The replacement of these relays with new technology presents significant advantages such as enhanced reliability, improved protection schemes and the ability to record operational data for system performance analysis. There were four different projects within this program including replacing relays at the Oswego, Elbridge, Lafayette, Rotterdam, New Scotland, Leeds and Edic Stations (C05150, C24661, C24662 and C24663 respectively).

Drivers:

Replacement parts and support for the Westinghouse U Series Relays are no longer available making continued maintenance of these devices difficult. Spare parts removed from previously replaced units have been depleted, and procurement of spare parts from outside sources is not an option.

An un-repairable U Series Relay could be out-of-service for an extended period of time before a replacement relay can be installed. This situation could leave the bulk power transmission line with a single system of protection for a prolonged period of time. Any period greater than 24 hours requires an analysis of the system to be carried out with the likely result that the circuit will have to be taken out of service or a constraint placed on the system to minimize the impact of a single protection failure outside the local area.

Customer Benefits:

This program will improve the overall reliability of the protection system. The replacement relays will have the capability of providing fault and operational data which is currently not available. This data can be used in the future when it comes to analyzing and improving the system as a whole. Both of these factors will promote reliable customer service.

2011 to 2012 Variance:

The U Series Relay replacement strategy (SG012) has been reassessed following delays and cost increases in delivering the program. Given there are only eight U Series relay packages remaining and the objective to lower the overall costs of the Plan, the ongoing replacement at Rotterdam on the E205-E line will be completed in FY13 as will the relays at, LaFayette (LN17), Elbridge (LN17) and Oswego (LN17). Leeds (LN92 & LN301), Edic (LN FE-1), and New Scotland (LN1) relays will be replaced.

Table II-13
Transmission – U Series Relay Strategy
Program Variance ($millions)

2011	1.7	0.1	0.0	0.0	0.0	0.0	1.8
2012	-	3.2	0.0	0.0	1.5	1.5	6.2

Flying Ground Strategy

There are a number of flying ground switches manufactured by Haefely Trench and Delta Star currently being utilized as transformer protection devices that are no longer considered a suitable method of fault clearance. Their operation introduces additional bolted faults on the 115kV transmission system to clear transformer faults at remote stations. Their operation creates a potential hazard to personnel, and may lead to additional transformer failures. As such, Strategy Paper SG124 was approved in September 2009 to replace all seventeen flying ground switches that are in service in the Western Division, as well as two flying ground switches at Trinity Station in the Albany area with new circuit switchers.

Drivers:

This project (C33613) was driven by the need to improve reliability, ensure the safety of personnel and prevent damage to equipment. Existing flying ground switches are deteriorated and require replacement. The flying ground switches were installed in the mid to late 1950s and over time their operating speed has decreased because of worn linkages and other mechanical components. Due to this wear, there is a higher probability of equipment mis-operations or even inability to operate the equipment. A significant delay in clearing a fault may lead to customer interruptions as a consequence. In addition, slow clearance of faults could also result in significant equipment damage, potential safety issues and longer customer outages. Replacing the flying ground switches with new circuit switchers will provide both switching and fault interrupting capabilities.

Customer Benefits:

Replacing flying ground switches with circuit switchers would meet modern protection requirements and provide both switching and interrupting capabilities. Installation of these capabilities would contribute to the overall maintenance of system reliability which benefits customers in terms of security and quality of service by isolating faults to individual stations rather than interrupting entire transmission lines. In addition to reliability benefits, there would be safety improvements for site personnel through this program.

2011 to 2012 Variance:

This project was approved in November 2009 but due to the prevailing economic situation and the objective to reduce short-term capital investment, the project was postponed. However, given the safety and reduced equipment risk benefits that result from removal of the flying ground switches, the Company reestablished this program in FY12.

Table II-14
Transmission Flying Ground Strategy
Program Variance ($millions)

2011	0.0	0.0	0.3	1.0	2.0	-	3.3
2012	-	0.2	0.9	1.4	0.0	0.0	2.4

Substation Battery Replacement

Battery and charger systems are critical components that are needed to ensure substation operational capability during both normal and abnormal system conditions. The intent of the Battery Replacement Strategy (C33847) is to replace battery and charger systems that are 20 years old. The 20 year limit is based on industry best practice and Company experience in managing battery systems.

Drivers:

Battery and charger systems are critical components that are needed to ensure substation operational capability during both normal and abnormal system conditions. A long term Battery Replacement Strategy Paper was approved by the Company in 2009. Battery systems will now have a planned replacement schedule or as condition warrants based on periodic testing. Not adopting a planned replacement approach for battery systems may, in the longer term, lead to failures of interrupting devices to trip in the event of a fault and extended fault duration on the power system with the consequential possibility of system instability. Common end of life failure modes are positive grid corrosion and electrolyte dilution. These failure modes are inherent in the design, inevitable and irreversible.[12]

Customer Benefits:

This program provides for the proactive replacement of battery systems at end of their expected life based on industry data and Company experience, minimizing the risk of battery system failure. A battery system that does not perform adequately could result in serious reliability consequences, including over-tripping of the system for a fault, thus impacting customers.

2011 to 2012 Variance:

This is a recurring program that will replace station batteries and chargers that are over 20 years old or as condition dictates. The program is proceeding as expected with no major variances expected.

Table II-15
Transmission – Substation Battery Replacement
Program Variance ($millions)

2011	0.6	0.6	0.6	0.6	0.6	-	3.0
2012	-	0.6	0.6	0.6	0.6	0.6	3.0

Shield Wire Replacement Strategy

This program concerns the replacement of shield wire on 115 kV transmission lines. The overhead assets targeted by this program are referenced in the 2011 Asset Condition report[13]. Four remaining projects within this program remain; the Huntley–-Gardenville 38-39 project (C28676), the Gardenville-Buffalo 145-146 project (CC28683) which is

[12] David Linden and Thomas B Reddy, Handbook of Batteries, McGraw-Hill, New York, 2002
[13] Report on the Condition of Physical Elements of Transmission and Distribution Systems, 06-M-0878, October 1, 2011, pg. II-21.

also scheduled for conductor testing to determine if a more comprehensive project is needed, Gardenville-Depew 54 (C28706) and the Clay-Dewitt 3 (C28709) project[14].

Drivers:

A significant driver of this strategy is enhanced reliability of the transmission system. Shield wire serves as a grounding element deflecting the lightning strikes away from energized conductors and conveying it to ground without permitting flashover to occur. A well grounded shield wire system significantly reduces the likelihood of an outage due to a lightning strike.

In addition to lightning protection, the shield wire provides critical structural support against imbalance caused by heavy wind, conductor drop or failure, splice failure, localized wind shear, ice loading and other related elements.[15] These imbalances occur more often than originally suspected and as long as the shield wire system is intact, they can go unnoticed. An intact shield wire will help minimize structural related outages. Safety is also a major factor in the shield wire strategy. A dropped shield wire that goes unnoticed (no outage) creates a public safety concern if the line remains energized.

Customer Benefits:

The Shield Wire program targets reliability improvements of the 115kV transmission system. There will also be a benefit in the improvement in the performance of each circuit. Even those shield wire failures that do not result in an unplanned outage generally require a scheduled outage for repairs. Consequently, the reliability of the circuit suffers, as does service to customers.

2011 to 2012 Variance:

Capital spending commenced in FY10 on the LaFarge project (C38125) which will be finished by January 2012. Mountain-Lockport (C28681) and Huntley-Lockport (C28707) shield wire replacement projects are underway. The next project to be completed will be Huntley-Gardenville (C28676).

Additional lines that have been identified as shield wire candidates are Gardenville-Buffalo River, Gardenville-Depew and, all of which are in the preliminary design phase.
The difference between the two Plans below is largely due to a drop off of the $7.6m already spent in FY12 on shield wire projects. Also, some shield wire projects have been absorbed into the asset condition based Overhead Line Refurbishment program such as Gardenville-Homer Hill 151 and 152 (southern portion) and Lockport-Mortimer 111.

[14] The Clay-Dewitt 3 line is being studied in the near future for system capacity needs as part of the Syracuse Area Reconductoring project described above. If the line is identified for reconductoring the shield wire will be replaced as part of that project.
[15] The Company will consider the installation of Optical Ground wire (OPGW) during replacement of shield wire where cost beneficial.

Table II-16
Transmission – Shield Wire Replacement Strategy
Program Variance ($million)

2011	7.6	4.9	0.6	2.0	0	-	15.1
2012	-	2.4	2.6	0.0	0.0	0.0	5.0

Steel Tower Strategy

This program (C21693) addresses steel towers whose condition no longer meets the governing code requirements.

Drivers:

Pursuant to the 2005 Safety Order (Case 04-M-0159), the Company is required to assure its transmission lines meet the governing NESC under which they were built. The order instructed the Company to replace wood poles and steel structures that no longer meet the governing code requirements. There are 20,325 steel structures (17,448 towers and 2,877 poles) in service across the service territory.

At the time the Steel Tower Strategy was written, four failures of steel structures were attributable to poor condition and since the Strategy was written, another two failures occurred as described in the 2011 Asset Condition Report. The deteriorated condition of certain steel tower facilities raises safety and reliability concerns, particularly with the towers on the 115kV transmission system.

Customer Benefits:

Outside of the indirect reliability benefits, public safety is the main benefit of the Steel Tower Strategy. Replacing deteriorated structures, especially those adjacent to roads, railroads, and navigable waterways, enhances public safety. Not all deteriorating towers need to be replaced, however. If the structures with "sound rust" are painted using a quality priming system and finishing coat, it is reasonable to expect that life could be extended by an additional 10 years which reduces the cost impact to customers.

2011 to 2012 Variance:

The South Oswego – Lighthouse Hill project is the last remaining project in this strategy. The work on this project commenced in FY12. A condition assessment is scheduled for FY17 for the Mountain-Lockport 103 (T1620) and Beck-Lockport 104 (T1060) lines. In addition, steel structures will be assessed in conjunction with line refurbishment projects.

Table II-17
Transmission – Steel Tower Strategy
Program Variance ($million)

2011	4.1	7.7	0.0	0.0	0.0	-	11.8
2012	-	0.3	.0.0	0.0	0.0	0.0	0.3

Substation Rebuilds

The majority of the 313 transmission substations are in satisfactory condition however, in some limited circumstances, investment is recommended to rebuild substations whose overall condition has deteriorated to the point that wholesale refurbishment is required. In these circumstances, a standard substation design layout will typically be utilized to provide greater operational flexibility and increase reliability for customers served in the area. Where substation rebuilds are proposed, creative and innovative solutions and improvements, such as re-configurations of the layout, will be evaluated.

There were eight stations being studied for either upgrades or rebuilds to better meet the current and future needs of customers on the transmission system: Gardenville, Dunkirk, Rome, Rotterdam, Lockport, Lighthouse Hill, Huntley and Oneida.

The investment profile for substation rebuilds has been re-phased to reduce costs in the Plan, and reflect DPS Staff concerns that each of these eight projects will require fairly complex retrofits and changeovers of existing facilities. The Company has re-phased the projects to allocate additional time and resources to plan and design the projects and to provide a greater opportunity to consider and develop alternative approaches, consistent with Staff's recommendation in the Company's recent electric rate case. As a result, only the Gardenville and Rome stations are now proposed for rebuild during the FY13 – FY17 period along with Phase 1 of the Oneida rebuild to facilitate the replacement of a metal-clad substation. At the remaining sites the Company will only replace those assets that cannot be repaired economically. Although a more coordinated, integrated approach is more consistent with long-term sustainability of the system, the ad hoc "fix on fail" approach results in lower capital costs in the short term.

Drivers:

Gardenville and Rome been identified as having asset condition or configuration issues that warrant a major station rebuild or upgrade.[16] Included with the station name is the forecasted spend amount within this Plan.

[16] See "Report on the Condition of Physical Elements of Transmission and Distribution Systems," October 1, 2008, Exhibit 2, p. V-66 (Upstate NY Asset Health Report for Transmission. at p. 62, section 6.8.2) and "Report on the Condition of Physical Elements of Transmission and Distribution Systems," October 1, 2009, Page III-68 through III-77.

Gardenville (C05156 & C30084) $68.0m

Gardenville is a 230/115kV station south of Buffalo that has two 115kV stations in close proximity that are referred to respectively as New Gardenville and Old Gardenville, and which both serve over 750MW of regional load. New Gardenville was built between 1959 and 1969 and has asset condition issues such as faulty control cables, deteriorated foundations and many disconnects which have deteriorated beyond repair. Old Gardenville, built in the 1930s, feeds regional load via eleven 115kV lines. The station has serious asset condition issues including, but not limited to, control cable, breaker, disconnect and foundation problems. The station has had no major updates since it was built. There have been a number of misoperations that can be directly attributed to control cable issues in the past several years alone.

A project has been initiated to address these issues. A new breaker-and-a-half 115kV station is to be built between the two existing stations to replace them. A new 115kV switchyard will be constructed in the western section of the site and there will be rerouting of approximately seventeen 115kV lines for the project to eliminate the current “criss-cross” arrangement outside of the station and eliminate line to ground clearance issues. Project sanction is expected in winter of 2013 after the completion of preliminary engineering.

Rome (C03778 and C34983) $9.5m

The Rome station was constructed in the early 1920s. It has received several reconfigurations over the years with the current 115kV to 13.2kV dual bus built in the early 1970s. The 115kV system at the Rome Station experiences periods of low voltage particularly if the tie-breaker is opened. Station property near the north bus section has been under environmental remediation the past several years due to a former coke plant that was located on the site. Assets located on the North yard will be relocated away from this remediation site.

There are multiple asset condition issues affecting the station noted in the 2011 Asset Condition Report. A Strategy paper proposing a station rebuild was sanctioned in October 2010 and preliminary engineering was completed in the fall of 2010 with sanction expected for June 2011. Project completion is targeted for spring of 2015.

Oneida (C37876) $3m

Oneida is a 115 kV – 13.8 kV substation located in Verona, NY. The original station was constructed in the 1940s. The substation includes two LTC power transformers, eight 115 kV circuit breakers, one 115 kV capacitor bank with circuit switcher, and a metal-clad switchgear with seven 13.8 kV feeders.

The physical and electrical layout of the 115 kV yard makes it difficult to maintain or repair equipment. Outages to maintain the 115 kV breakers are difficult since a line outage is required. The two 1959 Federal Pacific Equipment circuit breakers are candidates for replacement due to maintenance issues and a lack of replacement parts. Spare parts are also no longer available for 13.8 kV breakers and the metal-clad switchgear is in poor condition. The lines to Rome and Yahnundasis are difficult to get out due to voltage support issues and taking the R40 line out requires a customer outage. The vertical phase configuration of the East/West 115kV busses is a concern from a maintenance standpoint as the configuration makes tasks such as disconnect repair or replacement difficult due to problems maintaining safe working clearances. Additional switching necessary for safe working clearance for workers weakens the system under certain contingencies. The # 3 and # 4 transformers do not have 115kV "high side" circuit breaking devices resulting in clearing the 115 kV bus for operation of the transformer or feeder backup protection. A majority of the 115 kV structure foundations are failing and need repair or replacement.

One of the 115 kV circuit breakers is a 1961 vintage Westinghouse GM-6B. This breaker model has a complex arcing chamber and has on multiple occasions seen high resistance forming in the contacts. These breakers are being replaced on a system wide basis (see circuit breaker replacement strategy).

The 13.8kV switchgear is a 1965 vintage Allis Chalmers and the arc chutes are asbestos. Tubing on the circuit breakers has failed resulting in the circuit breakers not being able to interrupt parallel load current. Parts for the circuit breakers are no longer available. The switchgear building is rusting, with settling making it difficult to open some of the switchgear doors and rack and draw out the circuit breakers. In order to replace the # 3 transformer after failure, some of the bus duct was removed and replaced with cables. These cables were installed as an emergency repair. There are no facilities to adequately support or protect these cables.

Conceptual engineering for the Oneida Station rebuild was completed in May 2010. The Phase One work was returned to conceptual engineering for a change of scope in the metal-clad design and sanctioned in September 2011. Phase One construction is scheduled for completion in FY13 and the 115kV yard rebuild that is Phase Two is scheduled to start after FY16.

Rotterdam (C34850) $0.1m

Rotterdam is a large station with 230kV, 115kV, 69kV, 34.5kV and 13.2kV sections spread out over multiple tiers on a hillside. The 230kV yard is the main source for Schenectady, Saratoga and Warren counties. Rotterdam is supplied from the Porter Lines #30 and #31 and from Bear Swamp on the E205 line to Massachusetts. As discussed in the 2011 Asset Condition Report, the 230kV yard has had performance issues and there have been three (R23, R24 and R84) catastrophic failures of Federal Pacific Electric RHE breakers. Two of the three 230kV auto transformers #7 and #8 have a higher than normal failure likelihood due to their design; specifically due to "T" beam heating and static electrification. There has also been an issue with capacitor bank #4 tripping off line on differential protection if capacitor bank #3 is put into service while capacitor bank #4 is on line.[17]

The 115kV circuit breakers at Rotterdam are a mixture of Westinghouse, McGraw Edison, Allis-Chalmers, General Electric, and ABB. The disconnect switches are deteriorated and many have had problems in the past with breaking or not operating correctly. The original 115kV yard has multiple foundation problems with listing pads

[17] Report on the Condition of Physical Elements of Transmission and Distribution Systems," October 1, 2009, Page III-73 and III-74.

and crumbling foundations especially some of the tower supports. The containment pit around the single phase transformers of TB#4 have collapsed in sections. The 115kV yard has inadequate thermal performance with respect to the existing transmission system in the Capital/Northeast Region, which will be exacerbated by the addition of Global Foundries (Luther Forest) and projected load growth. This will worsen with time as Global Foundries is connected to the Northeast Region transmission system and as the load grows as projected.

Given the uncertainty over the 230kV station and the necessity to reduce capital investment to minimize Plan costs, the Company has postponed both the 230kV and 115kV rebuilds at Rotterdam. Any asset issues that arise will now be managed through the normal damage / failure process.

Dunkirk (C05155) $0.25m

Dunkirk is a 230/115kV station located south of Buffalo, connected to 522MW of generation owned by NRG. The Company retains ownership of most of the 230kV and 115kV switch yard; however, the controls are located in the generation control room owned by NRG. This station has recently experienced several 230kV misoperations due to control cable issues as detailed in the 2010 Asset Condition report. Complete replacement of control cables is not possible due to space constraints in shared areas. In addition, portions of the station may require significant modification to conform to NPCC requirements.

A project was completed in September 2010 to install a new cable trench in the 230kV yard. Control cables deemed “faulty” can then be replaced using these new facilities. A thorough conceptual engineering analysis to construct a new control house and completely separate assets in this station has been finished. Other equipment at Dunkirk, such as disconnects and PTs (potential transformers), will be replaced during a separate project to install a second bus tie.

Lockport (C35464) $0m

Lockport is a 115kV transmission station with thirteen 115kV transmission lines tying through the East and West bus sections. This station is critical to the 115kV system operations of Western New York. The overall condition of the station yard and control room is poor. As discussed in the 2011 Asset Condition report, work is required on control cable duct banks, breaker operators, steel structures and concrete foundations that are deteriorated significantly. In addition, support column and breaker foundations are in a deteriorated condition and need to be repaired with several potentially needing full replacements.[18] The control room building is also in very poor condition with increasing costs to maintain the original roof and the brickwork.

There are two new 115kV SF6 breakers at Lockport, while the remaining 115kV oil filled BZ0 breakers show exterior corrosion and oil leaks. Three of the 115kV oil breakers have hydraulic mechanism leaks common to the BZO style breakers and failures of hydraulic system components have been increasing. Each of the BZO breakers also has

[18] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878 October 1, 2009, Page III-74 to III-76.

bushing potential devices which have been another source of failure. Ongoing maintenance of the breakers is addressing the oil leaks.

Given the number of transmission lines at the Lockport Station and the deteriorated conditions of the structures and controls that support them, a station rebuild is proposed to prevent future outages caused by equipment failures.

Further work at the Lockport Station has been deferred in order to manage and reduce capital investment. However, delaying the rebuild maintains current risks associated with the asset condition issues noted above.

Huntley (C11496) $0

National Grid has started the process to investigate Huntley substation asset condition needs. Among the needs are: permanent capacitor banks at the Huntley 115 kV bus to replace the mobile banks currently there; improved grounding in the switchyard; removal of all National Grid controls, batteries and communications equipment from inside the Huntley Generating Station to a control house in the yard (both 115kV & 230kV); adding a second station service supply; refurbishing the existing oil circuit breakers; replacing the potential transformers; installing new CCVTs for 115 kV and 230 kV relaying; and refurbishing the 230 kV cable pumping plant.

While conceptual engineering was completed in 2011, no further work is planned at Huntley in the Plan period in order to reduce and manage short-term capital investment. However, delaying rebuild of the Huntley station maintains the current risks associated with having National Grid assets located in separately owned control rooms, such as misoperation, inconsistent maintenance and uncontrolled conditions and access.

Lighthouse Hill (C31662) $1.5m

This facility is a significant switching station with two 115kV buses and seven transmission lines connecting to the station, allowing power to flow from the Oswego generating complex to the Watertown area in the north and Clay Station in Syracuse.

Seven OCBs are located 200 feet from the Salmon River located about 70 feet below the yard elevation. The station is located a mile up-stream of the New York State Wildlife Fish Hatchery. Although the risk is low, any significant oil spill in the station would have a detrimental environmental impact. Even at 70 feet above the river level there is also the risk of a flooding event at the station given its proximity to the river. In addition, the disconnect switches are in a very poor condition.

Another significant issue at Lighthouse Hill is that the land is owned by Brookfield Power and operated as a shared facility under a contractual agreement. The lack of direct access to Brookfield's control room at Lighthouse Hill is not ideal as it limits the Company's control over the housing conditions for the battery and relay systems. The Company has controls on the first floor of the control house which is immediately adjacent and downstream of Brookfield's hydroelectric dam. An uncontrolled release from the dam could flood the control room area. Flooding in the area occurred as recently as October 1, 2010 due to a rain event.

Options considered in a conceptual engineering analysis include a new substation located about 1.5 miles west adjacent to Tar Hill Road in the clearing on land already owned in fee by the Company. This will eliminate the risks of oil contamination to the Salmon River and reduce the likelihood of station flooding.

While conceptual engineering is complete, no further work is planned at Lighthouse Hill in the Plan period in order to reduce and manage short-term capital investment. However, delaying the rebuild of the station maintains the risks associated with having National Grid assets located in separately owned control rooms such as mis-operation, inconsistent maintenance and uncontrolled conditions and access.

Customer Benefits:

The planned replacement of these stations reduces the likelihood of an in-service failure which can lead to long-term interruptions of the transmission system as well as significant customer outages.

2011 to 2012 Variance:

Apart from Oneida Phase 1, Gardenville and Rome, all of the previously recommended station rebuilds have been deferred as the Company evaluates additional options for addressing the needs at the other stations. Where substation rebuilds are proposed, the Company will seek creative and innovative solutions and improvements (such as re-configurations of the layout) that are cost effective. The Company is still examining the impact of this decision to defer the rebuilds on the relay and circuit breaker replacement strategies (i.e., relays and circuit breakers that would have been replaced as part of a substation rebuild will need to be considered on a stand alone basis).

Table II-18
Transmission – Substation Rebuilds
Program Variance ($millions)

2011	4.0	9.3	25.3	26.8	18.6	-	84.0
2012	-	6.4	7.9	23.5	24.2	17.0	78.9

Overhead Line Refurbishment Program

Over the next five years the Company will refurbish a number of overhead lines based on their condition. During this period we will continue to work towards developing an overhead line refurbishment approach that to the greatest extent possible addresses only the most deteriorated condition equipment. This modified approach to SG080 only considers refurbishing an entire line when the conductor requires replacement. In general, as part of conceptual engineering, conductor testing will determine whether or not the conductor tensile strength fails to meet appropriate NESC heavy loading requirements. There is a risk that a number of the identified lines in our overhead line refurbishment program will fall within this category as conductor testing is pursued over the upcoming year. When possible, shield wire testing will also be performed.

For overhead lines with acceptable conductor strength, this program will assure that transmission lines meet the minimum governing NESC under which they were built. This will be accomplished through the replacement of deteriorating structures and line components that no longer structurally or electrical adhere to the governing NESC.

The costs projected for lines prior to the completion of the conceptual engineering process are cursory in nature. As part of conceptual engineering process, the line will be field evaluated and refurbishment options more thoroughly evaluated on case-by-case basis. In calendar 2012, the value of various options (e.g., complete reconductoring versus a life extension) will be reviewed; however, cost estimates may continue to differ due to unforeseen circumstances, such as additional swamp matting needs due to weather conditions or environmental requirements.

In order to reduce costs during the period of this five-year Plan, the Company is implementing an approach recommended by DPS Staff in the Company's recent rate case to refurbish only those overhead transmission line facilities that are in unacceptably deteriorated condition (i.e. Niagara Mohawk's defined Level 1, Level 2 and Level 3 condition). Although this approach allows for reduced investment amounts in the five years covered by this Plan, the approach must be evaluated against longer term issues such as a greater number of visits to the same right-of-way, multiple site establishment costs, increased susceptibility to storm damage, additional permitting and licensing costs, greater levels of environmental impact, and more disturbance to abutters, among other things to evaluate the most economical solution for the benefit of customers. Therefore, for certain overhead line condition projects, a larger work scope to replace assets that are deteriorated, yet serviceable, may be more appropriate and cost effective.

This Plan is based on the assumption that issues identified during routine foot patrols (Level 1, 2 or 3 issues) will be addressed through the Damage / Failure programs. Where we suspect a systemic problem, an engineering inspection and an aerial comprehensive survey will be initiated. Any issues arising from these condition assessments will be addressed through this overhead line refurbishment program.

Drivers:

The Company has over 6,000 circuit miles of transmission overhead lines and many of these overhead line assets are approaching, and some are beyond, the end of their anticipated lives. The program will ensure the Company's transmission lines meet the minimum requirements of the governing code under which they were built as required by the Commission's 2005 Safety Order (Case 04-M-0159).

Customer Benefits:

This program promotes safety and reliability by assuring transmission lines meet the governing NESC under which they were built by replacing deteriorating structures and line components that no longer structurally or electrically conform to the Code.

2011 to 2012 Variance:

The Company has re-phased much of the overhead line refurbishment to address cost concerns and feedback from DPS staff and the implementation of targeted asset replacement. Overhead line equipment failures will be managed through the Damage / Failure budget and any Level 1, 2 or 3 issues identified during foot patrols will also be addressed through the Damage / Failure budget.

Table II-19
Transmission – Overhead Line Refurbishment Program
Program Variance ($millions)

2011	17.0	19.0	21.3	61.2	70.9	-	189.4
2012	-	23.2	27.8	46.3	56.9	68.2	222.4

Transformer Replacement Strategy (C31656)

Power transformers are managed through routine visual inspection, annual dissolved gas analysis ("DGA") and electrical testing where required. Transformers with tap-changers are also maintained in accordance with our substation maintenance standards. In the next five years the investment plan is to replace three transformers with anomalous DGA results that have been or are expected to be confirmed as in poor condition through electrical testing.

With the previous exceptions, this Plan utilizes a replace on fail approach with failures managed through the use of strategic spares. In this context, failure means either DGA results that suggest an immediate need for replacement or actual physical / electrical failure. Over the next five years, a process has been initiated to ensure sufficient strategic spares are available to cover the probability of failure for the majority of the fleet. The costs for purchasing these spares are currently included within the Plan in project C39883 within the Asset Condition spending rationale. Furthermore, project C31656 within the Damage Failure spending rationale includes funding for any needed emergency replacements between FY14 – FY17 of the Plan.

Drivers:

In the current Plan period, the purchase of a spare transformer for the Harper Substation is planned since none currently exist and each transformer is in a deteriorated condition with obsolete parts that are not stocked by OEM or after market manufacturers. The purchase of a spare transformer is an interim measure until a system study can be performed to determine a long term plan for Harper and the remaining 4kV stations in the Niagara Falls area.

Transformer LTC TRF 3 at Greenbush (C31663) is a 57 years old 115-34.5kV transformer and DGA results indicate it has had an internal flashover with elevated acetylene along with active connection heating and possible partial discharging generating hot metal gases of ethylene, methane, ethane, and hydrogen. It has issues with the high side bushings, which are GE type U bushings, and silicon carbide surge arrestors which should be replaced. Power factor testing indicates high deterioration of the insulation between the high side and low side windings with lesser deterioration between the windings and the tank. A project to replace this transformer was sanctioned in September 2011 with a new transformer expected to be ordered by February 2012.

A transformer at Vail Mills underwent condition assessment in 2011 to confirm the need for replacement as indicated by DGA results which show signs of discharging in the main tank possibly caused by corona or occasional arcs. There is currently no system spare for this transformer.

The Company will be revisiting a long term transformer replacement strategy much like it has in place for oil circuit breakers. Transformers on the 'watch list' have a higher than average probability of failure and could therefore fail in-service. The 'watch list' will be used to identify candidates for replacement that will be further evaluated by subject matter experts within the Company for inclusion within the program.

Customer Benefits:

The failure of an average 17MVA sized transformer could lead to a loss of power for approximately 17,000 residential customers. The prolonged time needed for restoration (either through the installation of a spare or a mobile sub) can translate into millions of customer minutes interrupted.

2011 to 2012 Variance:

The Company will, in the short-term, adopt a 'replace on fail' approach for transformers where failure includes DGA results that suggest immediate replacement is necessary or where actual failure takes place. The budgeted amount in this program will fund the removal, delivery and installation costs and the replacement unit will be funded through the Station Failures-Budgetary Reserve line item. Although this approach provides the lowest short-term capital investment costs it increases the risk of service interruptions for customers. Thus, while in the short-term the increased risk of transformer failure can be managed through deployment of strategic spares, in the longer-term, a more proactive and less reactive approach to transformer replacement is recommended to manage the overall population.

Table II-20
Transmission – Transformer Replacement Strategy
Program Variance ($millions)

2011	6.6	5.4	3.2	3.0	3.0	-	21.2
2012	-	4.9	0.8	0.0	0.0	0.0	5.7

Circuit Breaker Replacement Strategy (C37882)

The circuit breaker population is managed through ongoing inspection and maintenance activity along with routine preventative maintenance activities and electrical testing. In general, the circuit breaker population continues to be adequate for our needs; however, there are a number of obsolete circuit breakers that require investment. During the Plan, obsolete oil circuit breakers will be replaced with modern equivalent circuit breakers.

Typically, these breakers will be replaced with circuit breakers employing SF6 gas as an arc interrupting medium. SF6 will be employed until a replacement arc interrupting gas with a lower global warming potential is developed.

The strategy paper SG158 proposes the replacement of three 345kV, nine 230kV and seventy-five 115kV large volume oil circuit breakers on the transmission system over a ten year period. However, in order to reduce capital investment costs of the period of the Plan, the Company has slowed its plans for circuit breaker replacement.

Drivers:

There are 726 circuit breakers installed on the transmission system. Of these, 368 are large oil volume types. Based on asset condition and performance, 180 of these large volume oil circuit breakers are classified as high replacement priorities. The majority of the 87 circuit breakers addressed in this strategy were installed between 1948 and 1969, are in poor condition or are the last remaining members of problematic families. The remaining high replacement priority oil circuit breakers on the system were either planned for replacement as part of station rebuild requirements or planning needs such as increased short circuit duty or load growth. Due to the deferral and re-phasing of planned investment, several of these projects have been postponed and a reassessment of replacement priorities is needed. There is an increasing trend of problems associated with the large volume oil circuit breaker population. Common problems include:

- Oil leaks, air leaks, bushing hot spots, high power factors and poor insulation
- Failures of: pressure valves, hoses, gauges, motors, compressors, pulleys, o-rings, control cables, trip coils, close coils, lift rods and contacts

The following circuit breaker types are ranked the highest priority for replacement;

Allis Chalmers Type BZO – The operating mechanisms in this family of breakers, manufactured in the 1950s through 1980s, are showing an increase in accumulator pump and O-ring failures. Design changes and changes in component manufacture over the years require different replacement parts for various vintages and these parts are difficult to obtain. Mechanism wear has resulted in reduced levels of reliability, increased maintenance costs and a number of failures. There are currently 109 Allis Chalmers Type BZO circuit breakers installed on the system.

Westinghouse GM - Test results from this family of breakers indicate contact timing problems and questionable insulation integrity. There are currently 38 Westinghouse GM circuit breakers installed on the system.

General Electric Type FK – There have been problems with bushing oil leaks and lift rods issues due to moisture ingress with these circuit breakers. In addition, lead paint is prevalent in this family of breakers. There are currently 115 General Electric Type FK circuit breakers installed on the system.

Due to the key function carried out by circuit breakers, particularly for fault clearance, they cannot be allowed to become unreliable, and should be replaced. The average age of the Company's oil circuit breakers is 44 years. Approximately two percent are greater than 60 years old and 59 percent of the total population is between 40 and 59 years old. The typical expected life for oil circuit breakers is 45 years.

Examples of recent Oil Circuit Breaker failures in the past year include:

- 2011: Cortland Station; WE GO-3A oil circuit breaker R30
- 2011: Geres Lock Switching Station; ABB 121PM oil circuit breaker R80
- 2011; Porter Station; AC BZO oil circuit breaker R100

Customer Benefits:

The planned replacement of circuit breakers reduces the likelihood of an in-service failure which can lead to long-term interruptions of the transmission system as well as significant customer outages. This circuit breaker replacement strategy promotes reliability of the transmission network in terms of CAIDI and SAIFI performance.

2011 to 2012 Variance:

Based on economic conditions and concerns, and consistent with some of the objectives of the management audit, the Company has re-phased circuit breaker replacement investment over 10 years rather than the 5 years originally reflected in 2010. Although the re-phasing plan reduces initial investment levels and resulting rate pressure, it increases the risk of failure, especially during fault clearance requirements, which could impact reliability performance.

The deferral of certain substation rebuilds (discussed above) will add additional high replacement priority circuit breakers to this program. Maintaining the replacement rate (average 9 per year) as currently planned will add a further 10 years to the program making this a 20 year program.

Table II-21
Transmission – Circuit Breaker Replacement Strategy
Program Variance ($millions)

2011	0.9	1.6	6.0	6.0	6.0	-	20.5
2012	-	0.4	2.5	3.5	4.5	6.0	16.9

Other Asset Condition

The other asset condition classification includes all of the smaller, typically lower cost, capital investment projects that do not fit within any of the longer-term major programs. There are approximately 40 individual projects within the Other Asset Condition category; the largest of these projects are associated with underground cables, surge arrestors and Problem Identification Worksheets. Total planned investment in the Transmission -- Other Asset Condition category for the Plan period, and comparison to the amounts included in last year's capital investment plan, are shown in the table below.

Table II-22
Transmission – Other Asset Condition
Program Variance ($millions)

2011	6.7	4.0	1.7	1.1	2.0	-	15.5
2012	-	2.9	2.9	2.5	2.8	1.0	12.3

Underground Cables (Multiple Projects)

Drivers:

Included under this classification are improvements to the underground cable system. Although the number and circuit miles of transmission underground cables is low, these cables are an important part of the overall electrical system. Projects in the Plan for the underground system include an upgrade to the aging Rochester and Temple pumping plants (C39846 and CNYX26 respectively), improved reliability to the Albany area underground system (C11318), and improved alarming and tripping schemes (C30528, C30530, C30531, C30532, and C36219). Although these projects are relatively small, they are critical components to maintain a safe and reliable electrical system and minimize any environmental risks.

Customer Benefits:

The improvements described not only provide improved safety and reliability to the underground cable system, but they also minimize environmental risks. Faults experienced on an underground cable can take weeks to locate and repair. Many of the cables are operated by pressurized oil systems and proper maintenance is essential to avoid potential leaks.

2011 to 2012 Variance:

These projects are progressing as expected with some minor schedule changes.

Table II-23
Transmission – Underground Cables (Multiple Projects)
Program Variance ($millions)

2011	0.9	1.1	0.3	0.1	1.0	-	3.4
2012	-	1.4	1.7	.7	0.0	0.0	2.8

Problem Identification Worksheets (PIWs)

The Company employs a process called "Problem Identification Worksheets" to document faults and defects with in-service substation and overhead line equipment that are identified either through normal maintenance activities (often called 'follow-up' work) or through inspection routines (often called 'trouble' work). Typically, the issues identified through the PIW process cannot be corrected immediately and require investigation, engineering analysis and solution design. These activities and the solutions proposed often lead to low cost capital projects to replace or refurbish items of equipment.

Drivers:

Historically, issues identified during inspection or maintenance were added to the capital plan in outer years to avoid reprioritizing other planned projects. In FY10 a budgetary line for PIWs was introduced to recognize that a number of high priority, low cost, capital projects will inevitably arise during the year and these should be undertaken to address found-on-inspection issues. PIWs typically require some degree of investigation and engineering to identify a solution. PIWs are also used to identify and correct transmission overhead line components that no longer meet minimum NESC requirements. This work is over-and-above that required during normal I&M activities and is likely to increase over the Plan period as a result of overall capital investment reductions.

Issues arising from PIWs are prioritized and engineering solutions for the highest priority are developed within year. Utilizing this approach, the Company can make progress on low cost capital investments that might otherwise be lost in the capital plan.

Customer Benefit:

The Problem Identification Work (PIW) approach followed by the Company benefits customers and the overall health of the system. PIWs identify important issues and work that are high priority, but the work does not usually fall into the scope of ongoing strategies, and are not yet damage / failures. PIWs help identify trends throughout the system and give the Company feedback on how better to manage the system as a whole.

2011 to 2012 Variance:

This line item was first added to the 2010 Plan to capture the costs of capital replacement projects that are identified during inspection or maintenance. The investment levels in FY13 to FY17 have been held at the same levels as the 2011 Plan; however, PIW driven projects are likely to increase over the Plan period as a result of other capital investment reductions.

Table II-23
Transmission – Problem Identification Worksheets
Program Variance ($millions)

2011	1.5	1.0	1.0	1.0	1.0	-	5.5
2012	-	0.0	1.0	1.0	1.0	1.0	4.1

E. Non-infrastructure

In addition to the direct spending on its electric network, the Company also invests a portion of its budget in systems, tools, and general plant. The “non infrastructure” category of investment is for capital expenditures that do not fit into one of the foregoing categories, but which are necessary to run the electric system. Work in this category is for physical security work at substations. The total 5-year non-infrastructure investment for transmission is $1.6m.

Transmission - Physical Security

This program (C34224) provides for implementation of state-of-the-art security measures to deter and/or detect unauthorized access to fifteen bulk power substations. The security measures are intended to deter intrusion by the obviousness of the measures such as camera installations and card readers, while at the same time providing technology to detect and report intrusions to a 24 x 7 security control center.

Examples of proposed security measures are as follows:

- Deployment of card reader technologies at select locations at targeted substations
- State-of-the-art video capabilities connected to remotely monitored cameras
- Remote control of certain lights to illuminate the area in case of intrusion
- 24 x 7 monitoring of select facilities by a security control center

These measures will enhance physical security at targeted substations. There is also one stand alone project within this program for the Porter substation (C36192).

It should also be noted that the installation of additional security measures at larger non-bulk power stations will be investigated and a plan implemented in FY13, two years in advance of the original budget plan which shows spend in FY15 and FY16 under project CNYAS86. Funding in FY13 will be addressed as emergent work.

Drivers:

This program is driven by the need for additional physical security measures at certain substations to mitigate break-ins and the increasing risk that unauthorized access will lead to injury or death of a trespasser who comes in contact with energized equipment.[19] Reducing and detecting unauthorized access also reduces risk of vandalism and damage to electric system equipment.

The substations included in this project are already in compliance with the relevant NERC critical infrastructure protection (CIP) requirements, including CIP-006-1a “Physical Security of Critical Cyber Assets.” CIP-006-1a calls for “six walled” security around critical cyber assets. For these substations, the six walls usually refer to the

[19] The Company and the Director of Utility Security at the Department of Public Service have discussed the need to enhance physical security at certain substations in light of an increase in unauthorized substation access incidents nationwide.

control house where the cyber assets are contained, and security measures under CIP-006-1a include card readers and cameras to monitor ingress and egress points for the control house.

This Strategy will provide physical security measures which are not addressed in the cyber security project mentioned above.

Customer Benefits:

Deterring and detecting unauthorized access to certain substations would result in:

- Avoided or reduced physical and personal injury to unauthorized third parties as well as Company personnel at the substations
- Reduced potential for service interruptions or equipment damage/loss from vandalism or theft

2011 to 2012 Variance:

This program was re-phased in 2011 as the Company aims to accelerate the installation of physical security measures.

Table II-24
Transmission – Physical Security
Program Variance ($millions)

2011	6.0	3.0	0.0	0.0	0.0	-	9.0
2012	-	1.5	0.0	0.0	0.0	0.0	1.5

III. Sub-Transmission System

The sub-transmission system comprises approximately 4,237 miles of lines including: 290 miles of 69kV, 365 miles of 46kV, 2332 miles of 34.5kV, 1050 miles of 23kV and 200 miles of lines below 23kV. Over the five-year period covered by this Plan, the Company expects to invest approximately $271 million on the sub-transmission system, as shown in Table III-1 below.

Table III-1
Sub-Transmission System Capital Expenditure by Spending Rationale ($millions)

Statutory or Regulatory	17.6	16.7	15.1	16.5	16.5	82.4
Damage/Failure	4.0	3.6	3.8	3.9	4.1	19.5
System Capacity and Performance	8.2	9.0	9.0	9.7	10.1	46.0
Asset Condition	16.1	20.6	26.1	27.9	32.4	123.2
Total	46.0	50.0	54.0	58.0	63.0	271.0

III A. Statutory or Regulatory

Statutory or Regulatory investment levels are based primarily on a review of historical blanket spending and forecasted spending on known specific work. These estimates reflect consideration given to inflation, estimates of materials, labor, indirect cost, market sector analysis, overall economic conditions and historical activity.

Variances in planned program spending between the 2012 Plan and the 2011 Plan are also discussed below.

Table III-2
Statutory or Regulatory
Variance Summary ($millions)

Blankets	2011	0.7	0.7	0.8	0.8	0.8	-	3.9
	2012	-	0.7	0.7	0.8	0.8	0.8	3.8
Specific Projects	2011	1.3	0.2	0.7	1.9	0.2	-	4.2
	2012	-	3.4	3.3	3.4	4.7	4.7	19.4
Inspection and Maintenance	2011	10.0	10.9	11.5	11.0	6.0	-	49.5
	2012	-	13.4	12.7	11.0	11.0	11.0	59.1
Total	2011	12.0	11.9	12.9	13.7	6.9	-	57.5
	2012	-	17.6	16.7	15.1	16.5	16.5	82.4

Aside from blanket and program projects, there is one specific project identified under this spending rationale that has forecasted spending in excess of $1 million in any single fiscal year:

- Project C34722, DOTR NYS Route 28 White Lake - McKeever Substation (Moose River) Transmission Line: This project provides for the mandatory relocation of 6 miles of 46kV overhead sub-transmission facilities along Route 28 in the towns of Forestport and Webb to facilitate a NYSDOT.

Inspection and Maintenance

Under this program, the Company performs visual inspections on all overhead and underground distribution assets once every five years. Each inspection identifies and categorizes all necessary repairs, or asset replacements, against a standard and in terms of criticality to improve customer reliability in compliance with the Commission's Safety Order in Case 04-M-0159.[1]

In addition, the following types of inspections are conducted by the Company:

- Aerial assessments of sub-transmission lines on an annual basis, and
- Infra-red inspection of sub-transmission lines on a three year schedule.

The Company also performs annual elevated voltage testing per the Commission's Safety Order on all facilities that are capable of conducting electricity and are publicly accessible.

Drivers:
The Company implements the Inspection and Maintenance program in accordance with the Commission's directives in Case 04-M-0159.

The 2011 Asset Condition Report details the application of the Inspection and Maintenance program to sub-transmission assets.[2]

Customer Benefits:
This program is designed to ensure the Company fulfills its obligation to provide safe and adequate service by inspecting it facilities and repairing safety and reliability issues identified in a timely fashion.

[1] Case 04-M-0159, Proceeding on Motion of the Commission to Examine the Safety of Electric Transmission and Distribution Systems, Order Adopting Changes in the Electric Safety Standards (issued and effective Dec. 15, 2008) ("Safety Order").
[2] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, page II-87.

2011 to 2012 Variance:
Current investment forecasts are based on actual expenditures incurred under the Inspection and Maintenance program and an expectation that the number of defects found in future year inspections will decrease as the inspection cycle repeats.

Table III-3
Inspection and Maintenance
Program Variance ($millions)

2011	10.0	11.0	11.5	11.0	6.0	-	49.5
2012	-	13.4	12.7	11.0	11.0	11.0	59.1

Steel Towers

There are approximately 3,790 steel towers on the sub-transmission system,[3] the majority of which are 60-90 years old. Above ground inspection of towers and associated equipment is coordinated through the Inspection and Maintenance Program, which also identifies towers that require further engineering analysis.

Drivers:
Corrosion is the natural life limiting failure mechanism for towers. Replacement is called for when it is more economic to replace the entire tower than to replace or perform welding repairs to a number of steel members. Alternatively, replacement may be necessary when it is no longer safe to work on the tower.

Customer Benefits:
Maintaining Reliability by preventing tower failures which may result in customer interruptions is the key driver for this program.

2011 to 2012 Variance:
The projected program investment is shown in the table below.

Table III-4
Steel Tower
Program Variance ($millions)

2011	0.9	1.8	1.8	1.8	1.8	-	8.0
2012	-	1.8	1.8	1.8	1.8	1.8	8.8

3 Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, page II-80.

III B. Damage/Failure

The Damage/Failure investment level for the sub-transmission system is primarily based on historical actual costs for such work. Where condition renders the asset unable to perform its intended electrical or mechanical function on the delivery system, the Company initiates the timely replacement of such asset under the Damage/Failure spending rationale. Comparison of the sub-transmission Damage/Failure investment levels from the 2011 Plan and the 2012 Plan are set forth in Table III-5 below.

2011 to 2012 Variance:
The variance between the 2011 Plan and this year's Plan is based on recent historical spending.

Table III-5
Damage/Failure
Variance Summary ($millions)

2011	3.5	2.9	3.1	3.1	3.2	-	15.8
2012	-	4.0	3.6	3.8	3.9	4.1	19.5

III C. System Capacity and Performance

The projected investment for sub-transmission work in the system capacity and performance spending rationale over the Plan period is shown in the table below. The majority of investment in FY12 and FY13 is associated with specific projects while later year investment levels are based on historical spending levels and forecasted growth in peak demand.

2011 to 2012 Variance:
The projected program investment is shown in the table below.

Table III-6
System Capacity and Performance
Variance Summary ($millions)

2011	3.9	7.5	9.8	9.3	10.6	-	41.1
2012	-	8.2	9.0	9.0	9.7	10.1	46.0

Capacity Planning

Drivers:
An annual review of the sub-transmission system, including substation and circuit loading, is performed to review equipment utilization. The reviews take into account both normal equipment loading and Load at Risk following an N-1 contingency. Forecasted load additions are applied to historical data and the system is analyzed to determine where and when constraints are expected to develop. Recommendations for system reconfiguration or system infrastructure development are created as part of this annual review to ensure load can be served during peak demand periods and is documented in the Annual Capacity Plan.

The normal loading assessment identifies load relief plans for facilities that are projected to exceed 100 percent of normal capability (i.e., maximum peak loading allowed assuming no system contingencies). The projects from these reviews are intended to be in-service during the year the load limit is forecasted to occur. In general, load growth within the service area has averaged 1 percent over the past 10 years, and that modest growth rate is expected to continue at a similar level for the next 10 years. However, individual areas within the service area are forecasted to grow at varying rates.

In addition to the normal loading review, the Company has instituted planning criteria for Load at Risk following an N-1 contingency that sets MW and MWHr interruption exposure thresholds ("MWHr Violations") for various supply and feeder contingencies for the purpose of setting a standard for minimum electrical system performance. These thresholds are applied in conjunction with other criteria—such as maintaining acceptable delivery voltage and observing equipment capacity ratings—to ensure the system operates in a reliable manner while managing risk of customer interruptions to an acceptable level. MWHr thresholds have been identified for three specific contingencies. For loss of a single substation supply line, a maximum interruption load limit of 20MW and/or 240MWHr is specified, assuming that the line can be returned to service within 12 hours. For loss of a single substation power transformer, a maximum interruption load limit of 10MW and/or 240MWHr is specified, assuming that the transformer can either be replaced or a mobile unit installed within 24 hours. Analysis of the interruptions under this criteria assume that any and all practical means are used to return load to service including use of mobile transformers and field switching via other area supply lines and/or area feeder ties. MWHr analysis recognizes the approximate times required to install mobile/back-up equipment as well as stepped field switching, i.e. moving load from the adjoining in-service station with feeder ties, that will be used to pick up customers experiencing an interruption, to a second adjoining station in order to increase the capability of the feeder ties.

Customer Benefits:
The benefit to customers of completing the work identified in capacity planning studies includes less exposure to service interruptions due to overloaded cables and transformers. In addition, the implementation of projects to mitigate MWHr Violations will reduce the likelihood that an unacceptable number of customers will be without service for extended periods due to supply, substation equipment or feeder contingencies.

2011 to 2012 Variance:
The projected investment is shown in the table below show a modest increase year on year to account for forecasted load growth and inflation.

Table III-7
Capacity Planning
Program Variance ($millions)

[redacted]								
Specific Projects	2011	1.5	3.8	4.0	4.9	4.4	-	18.5
	2012	-	4.4	4.5	5.2	5.7	6.1	25.9
Load Relief Blankets	2011	0.1	0.1	0.1	0.1	0.1	-	0.6
	2012	-	0.1	0.1	0.1	0.1	0.1	0.6
Total	2011	1.6	3.9	4.1	5.0	4.5	-	19.1
	2012	-	4.5	4.6	5.3	5.8	6.3	26.4

The following specific projects are estimated to have spending in excess of $1 million in any fiscal year:

- Project C28892, Buffalo 23kV Reconductor - Huntley. This project will replace the 1H, 2H, 3H and 13H cables from Sawyer Station to Buffalo Station 24. These cables have exceeded summer normal ratings in the past and may exceed emergency ratings for loss of one cable.
- Project C28893, Buffalo 23kV Reconductor - Huntley 2. This project will replace cable 11H from Sawyer Station to Buffalo Station 52. This cable has exceeded summer normal ratings in the past and may exceed emergency ratings for the loss of one of the other three supply cables.
- Project C28903, Buffalo 23kV Reconductor - Kensington 2. This project will replace the 10K cable from Kensington Terminal Station to Buffalo Station #28, the 11K and 12K cables from Kensington Terminal Station to Buffalo Station #32 and the 15K cable from Kensington Terminal Station to Buffalo Station #27. These circuits currently exceed emergency ratings for the loss of one cable.
- Project C28894, Buffalo 23kV Reconductor - Kensington. This project will replace the 21K, 22K, 23K and 33K cables from the Kensington Terminal Station to Buffalo Station #53. These circuits currently exceed emergency ratings for the loss of one cable.

Sub-Transmission Automation

In a continuing effort to modernize the grid the Sub-Transmission Automation Strategy encompasses advanced distribution automation methodologies as well as SCADA for reclosers, fault locators, and switches; and the interface of distribution automation enabled line devices with substation feeder breakers. It also encompasses the communication of these devices with each other and to central operations centers and database warehouses. The Company often refers to such devices and communications technology as Advanced Grid Applications.

Drivers:
Following the success of pilot automation installations in 2008 and 2009, which verified the capability of advanced distribution automation enabled equipment, the Company recognized the additional benefit of identifying projects where the installation of modernized switching schemes would provide increased reliability to the sub-transmission system.

The number of Advanced Grid Application switches per circuit or installation will vary depending on the number of substations the circuit supplies, the desired segmentation of the line, and the configuration of the supply system. Many of the automation schemes are unique in nature and are developed considering an analysis of expected costs and benefits.

Customer Benefits:
Distribution lines or substations not equipped with automated sectionalizing or throw over schemes may be subject to extended service interruptions as Operations personnel must travel to the field locations to perform switching. This program provides an opportunity to continue to modernize the grid for the benefit of customers by reducing the number of customer interruptions that result from a given contingency and the time required to reconfigure the system to restore service to as many customers as possible while a faulted section of the system is being repaired.

2011 to 2012 Variance:
The projected investment is shown in the table below and the current forecast is based on individual project estimates through FY15 and an expectation to continue this program throughout the plan horizon. The prioritization of projects and the timing of their implementation will be based on the performance of the various individual circuits.

Table III-8
Sub-Transmission Automation
Program Variance ($millions)

2011	1.4	1.8	2.6	2.9	3.0	-	11.7
2012	-	2.0	3.7	2.9	3.0	3.0	14.6

The following specific project will exceed $1 million:

- Project C35866, DA - NC Sub-Transmission Auto Lines 21/23/26. This project provides for sub-transmission automation in the form of sectionalizing via automatic remotely operated isolating switches on the Nicholville-Malone 34.5kV sub-transmission loops (Lines 21, 23 and 26).

III D. Asset Condition

Planned asset condition investment levels for the sub-transmission system, and comparison to investment levels from last year's Plan, are shown in Table III-9.

2011 to 2012 Variance:
The lower level of forecasted spending for asset condition replacement is due to a lower forecasted spending for major line refurbishment projects. This reduction is partially offset by increased spending the inspection and maintenance program (which is part of the Statutory/Mandatory spending rationale). Additionally, replacement of several cable circuits are accounted for in the System Capacity and Performance spending rationale since the replacements also provide needed capacity increases.

Table III-9
Asset Condition
Variance Summary ($millions)

2011	24.5	30.6	32.3	38.9	51.2	-	177.5
2012	-	16.1	20.6	26.1	27.9	32.4	123.2

Aside from blanket and program related projects, there is one specific project identified under this spending rationale that exceeds $1 million in any fiscal year:

- Project Candidate, Randall Road New Substation Install and Remove Sub-transmission Lines. Remove 34.5kV line from Ballston to Randall Road.

Overhead Line

Various projects are in place to refurbish or replace sub-transmission overhead assets to ensure the system continues to perform in a safe and reliable manner. This includes pole replacement in addition to the work generated via the Inspection and Maintenance program discussed in the Statutory or Regulatory spending rationale.

Drivers:
Although spending is categorized by spending rationale, all drivers are considered in determining the optimum project solution. Reliability and condition are the main drivers for these projects. Historically, the number of reliability events that are initiated on the sub-transmission system is low; however these events can result in a significant number of customers being interrupted where the lines are radial.

Physical condition of the sub-transmission system is being assessed through the Inspection and Maintenance program, helicopter surveys and by local engineering reviews and 'walk downs'.

Customer Benefits:
Refurbishment and replacement of sub-transmission system components can have a significant impact on regional CAIDI/SAIFI and Customer Minutes Interrupted (CMI) since they typically supply distribution stations.

2011 to 2012 Variance:
The projected investment is shown in the table below. Existing identified work under this program will be continued. This program will be phased out and transitioned to the Inspection and Maintenance program.

Table III-10
Overhead Line
Program Variance ($millions)

2011	16.4	9.5	5.3	-	-	-	31.2
2012	-	7.7	9.5	0.1	-	-	17.3

The following specific projects have forecasted spending that exceeds $1 million in any fiscal year:

- Project C16236, Gloversville-Canajoharie #6 Refurbishment. Refurbish 69kV line including pole replacement as needed and replacement of deteriorated shield wire.
- Project C33180, Hartfield-South Dow 859 Refurbishment. Refurbish 34.5kV line including pole replacement as needed and replacement of deteriorated conductors.
- Project C33182, Amsterdam-Rotterdam 3/4 Relocation. Relocate ¾ mile of Double Circuit 69kV to avoid wetland.
- Project C33294, Hartfield-Ashville 854 Refurbishment. Refurbish 34.5kV line including pole replacement as needed.
- Project C34462, Youngstown-Sanborn 403 Refurbishment. Refurbish 34.5kV line including pole replacement as needed and replacement of small copper conductors.

Underground Cable

Various projects are in place to refurbish or replace sub-transmission underground assets to ensure the system continues to perform in a safe and reliable manner.

Drivers:
Failures of individual sub-transmission cables do not typically impact customer reliability since the portions of the system where they are utilized are generally networked. However, because these systems are located below ground and are out of sight, failures of underground sub-transmission cables can be difficult to locate and time-consuming to repair leaving the system at risk

As noted in the 2011 Asset Condition Report, there are approximately 1,100 miles of sub-transmission underground cable. Approximately one-half are more than 47 years old and one-third are more than 60 years old. The sub-transmission underground cable asset replacement program replaces cables that are in poor condition, have had a history of failure or of a type known to have performance issues. Given the time required to design and plan large scale cable replacement projects it is advisable to begin a replacement program.

Customer Benefits:
Through a proactive approach, cable replacement projects reduce the likelihood of cable failures, and resulting exposure to the risk of extended outages.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The decreased levels of sub-transmission underground cable funding reflects recognition of the complexity of the underground cable replacement work and the high concentration of work required in the Western Division resulting in resource and outage constraints.

Table III-11
Underground Cable
Program Variance ($millions)

2011	5.2	6.8	4.7	7.3	8.0		32.0
2012	-	2.1	1.9	3.2	2.9	1.4	11.6

Not represented in the investment forecasts in the table above are four cable replacement projects C28892, Buffalo 23kV Reconductor - Huntley; C28893, Buffalo 23kV Reconductor - Huntley2; C28903, Buffalo 23kV Reconductor - Kens2; and C28894, Buffalo 23kV Reconductor - Kensington. These planned projects are included in the forecasts for spending in the System Capacity and Performance Spending Rationale, in the Capacity Planning program, because they were also driven by loading issues.

Metal-Clad Switchgear

Deteriorated metal-clad switchgear can be prone to water and animal ingress which leads to failures from moisture, dust or animals. Visual surveys will detect such degradation, but cannot identify surface tracking where hidden behind metal enclosures. Identification of these concerns is more likely with electro-acoustic detection techniques. By using sensors to detect anomalous sound (acoustic) waves or electric signals in the metal-clad switchgear, it is possible to identify equipment condition concerns before failure. An initial review using this technique identified a number of locations for further action as part of this strategy.

For each substation, an analysis will be conducted to determine if direct replacement is the best course of action or if an alternate means of supplying the load will be constructed.

Drivers:
Metal-clad switchgear installed prior to 1970 have several factors that can lead to component failure. Electrical insulation voids were more prevalent in earlier vintage switchgear. Higher temperatures due to poor ventilation systems can degrade lubrication in moving parts such as breaker mechanisms; and, gaskets and caulking deteriorate over time leading to ingress of moisture.

Customer Benefits:
The impact of each metal-clad switchgear event on local customers is usually substantial, with nearly 3,000 customers interrupted for over three hours per event. This program would reduce the risk of such events and provide significant benefit to the affected customers.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The capital forecast reflects a prioritized replacement schedule for switchgear replacement based on condition assessment data and analysis.

Table III-12
Metal-Clad Switchgear
Program Variance ($millions)

2011	3.7	2.6	-	-	-	-	6.3
2012	-	4.3	6.2	-	-	-	10.4

The following specific projects are forecasted to have spending in excess of $1 million in any fiscal year:

- Project C25139, Replace 13.8kV Metal-Clad Switchgear at Oneida Substation. Replace metal-clad substation at Oneida substation with new metal-clad switchgear.
- Project C36104, Ash Street Replace Metal-Clad. Replace 12kV metal-clad substation at Ash Street substation with new open-air bus station.

Additional metal-clad switchgear replacement projects are listed in Chapter IV for distribution substations.

<u>Pilot Wire</u>

Various projects call for the replacement of metallic pilot wire schemes used to protect sub-transmission underground cables. Due to the complexity of these networks, communication aided protection schemes are required.

Drivers:
There have been several pilot wire failures over the last several years which have caused protection mis-operation and increased the risk of customer interruptions due to loss of supply to distribution substations. Typically, when a pilot wire scheme is not able to operate as designed, the line protection reverts to a non-directional over-current scheme. On a networked system, this may be lead to “over-tripping”, i.e. more elements of the system are de-energized than necessary to isolate a fault, possibly resulting in electrically isolating a distribution system resulting in customer interruptions.

Customer Benefits:
Engineering and construction costs should be reduced for planned work instead of a damage/failure replacement. In addition, replacement of the pilot wire schemes with modern protective relays will minimize the risk of relay mis-operations causing customer interruptions.

2011 to 2012 Variance:
The projected investment is shown in the table below and is based on specific project estimates.

Table III-13
Pilot Wire
Program Variance ($millions)

2011	0.9	1.8	1.8	1.8	1.8	-	8.0
2012	-	0.3	1.1	0.9	-	-	2.3

IV. Distribution System

The Company's distribution system comprises lines and substations typically operating at 15kV and below. There are nearly 36,000 miles of overhead primary wire and nearly 7,500 miles of underground primary cable on the system supplying approximately 412,774 overhead, padmount and underground transformers. Additionally, there are almost 424 substations providing service to the Company's 1.6 million electric customers.[1] The current five-year plan for distribution is represented in Table IV-1.

Table IV-1
Distribution System Capital Expenditure by Spending Rationale ($millions)

Statutory or Regulatory	141.1	137.6	135.1	139.8	143.3	697.0
Damage/Failure	25.9	26.1	26.4	26.7	27.5	132.6
System Capacity and Performance	43.1	52.1	53.4	55.3	56.2	260.1
Asset Condition	29.2	34.5	44.3	47.8	49.8	205.7
Non-Infrastructure	4.7	4.7	5.8	5.3	5.1	25.7
Total	**244.0**	**255.0**	**265.0**	**275.0**	**282.0**	**1321.0**

[1] The distribution system data was taken December 6, 2011 from National Grid Asset Information Website located at http://usinfonet/sites/asset_info/Pages/AssetStatistics.aspx.

IV A. Statutory or Regulatory

Statutory or Regulatory investment levels are based primarily on review of historical blanket spending and forecasted spending on known specific work. These estimates reflect consideration given to inflation, estimates of materials, labor, indirect cost, market sector analysis, overall economic conditions and historical activity.

The variance between the 2011 Plan and this year's Plan for blanket spending is based largely on spending trends during the recent economic downturn and an expectation of a slow recovery. This is most notable in the new business residential and new business commercial blankets. The planned spending in this rationale forecasted in the 2012 Plan and the 2011 Plan are set forth below.

Table IV-2
Statutory or Regulatory
Variance Summary ($millions)

Blankets	2011	85.5	90.5	95.3	101.3	105.2	-	477.9
	2012	-	87.0	91.3	96.6	100.9	104.2	480.0
Specific Projects	2011	18.6	11.2	10.6	11.2	11.4	-	62.9
	2012	-	17.4	17.2	17.8	18.3	18.5	89.2
Inspection and Maintenance	2011	29.0	25.1	22.1	20.0	18.5	-	114.6
	2012	-	36.7	29.2	20.6	20.6	20.6	127.8
Total	2011	133.8	128.2	129.4	134.1	136.6	-	662.2
	2012	-	141.1	137.6	135.1	139.8	143.3	697.0

<u>Blanket Programs</u>

The distribution Statutory or Regulatory blankets include items such as New Business Residential, New Business Commercial, Outdoor Lighting, Public Requirements, Transformer Purchase and Installation, Meter Purchase and Installation, Third Party Attachments, and Land Rights. Exhibit 3 shows the detailed investment for all blankets in this rationale. Blankets are described in more detail below:

Transformer Purchase
Transformers are purchased and are shipped to locations within the Company where these items are put into stores.

New Business Residential
Installation of new overhead or underground services to residential customers, reconnections as well as miscellaneous equipment related to providing or upgrading services based on customer requests. Project spending can also include costs for the extension of distribution feeders directly related to providing service to a new residential customer or development; and actual spending is net of any CIAC contribution.

New Business Commercial
Installation of new services to commercial customers, reconnections as well as miscellaneous equipment related to providing or upgrading services based on customer requests. Project spending can also include costs for the extension of distribution feeders directly related to providing service to a new residential customer or development; and actual spending is net of any CIAC contribution.

Public Requirements
Overhead and underground facilities relocations resulting from bridge or roadway rebuilds, expansions, or relocations;

Municipality requests to relocate overhead facilities underground;

Other public authorities requesting or performing work that requires equipment or facilities to be relocated.

Public Outdoor Lighting
Installation and removal of street lighting or private area lighting and related equipment.

Inspection and Maintenance

In this program, the Company performs visual inspections on all overhead and underground distribution assets once every five years. Each inspection identifies and categorizes all necessary repairs, or asset replacements, against a standard and in terms of criticality to improve customer reliability in compliance with the Commission's Safety Order in Case 04-M-0159.[2]

The Company also performs annual elevated voltage testing per the Commission's Safety Order on all facilities that are capable of conducting electricity and are publicly accessible, such as street lights. The Inspection and Maintenance program was expanded to absorb and/or replace asset replacements that were previously included in prior programs such as: feeder hardening, manholes and vaults, oil fused cutouts, wood poles, miscellaneous overhead and miscellaneous underground.

2011 to 2012 Variance:
Current investment forecasts are based on actual expenditures being incurred with the on-going Inspection and Maintenance program and an expectation that the number of defects found in future year inspections will decrease as the inspection cycle repeats.

Table IV-3
Inspection and Maintenance
Program Variance ($millions)

2011	29.0	25.1	22.1	20.0	18.5	-	114.6
2012	-	36.7	29.2	20.6	20.6	20.6	127.8

Mercury Vapor Street Light Replacement

This program has been discontinued after further analysis in response to considerations raised in Case 10-E-0050.[3]

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[2] Case 04-M-0159, Proceeding on Motion of the Commission to Examine the Safety of Electric Transmission and Distribution Systems, Order Adopting Changes in the Electric Safety Standards (issued and effective Dec. 15, 2008) ("Safety Order").
[3] Case 10-E-0050, In the Matter Of Niagara Mohawk Power Corporation d/b/a National Grid, Prepared Testimony of Staff Infrastructure Panel, page 118.

IV B. Damage/Failure

The Damage/Failure investment level for the distribution system is primarily based on historical actual costs for such work. Where condition renders the asset unable to perform its intended electrical or mechanical function on the delivery system, the Company initiates the timely replacement of such asset under the Damage/Failure spending rationale. Comparison of the distribution Damage/Failure investment levels from the 2011 Plan and the 2012 Plan are set forth in Table IV-5 below.

2011 to 2012 Variance:
Spending in the damage failure category is forecasted higher than in last year's plan based on a combination of work associated with addressing damage that occurred during recent substation flooding and the current rate of spending in this reactionary category. Work initiated in response to last year's flooding events is forecasted in FY13 through FY15.

Table IV-4
Damage/Failure
Variance Summary ($millions)

2011	22.0	23.0	23.8	24.8	25.3	-	118.9
2012	-	25.9	26.1	26.4	26.7	27.5	132.6

Aside from blanket and program related projects, there is one specific project identified under this spending rationale that exceeds $1 million in any fiscal year:

- Project Candidate, New Florida Station (and Related Line Work). This project provides for the installation of a new 69-13.2kV station and feeder extensions to replace Amsterdam Station which was heavily damaged during flooding in August and September 2011.

IV C. System Capacity and Performance

The projected investment for distribution work in the system capacity and performance spending rationale over the Plan period is shown in Table IV-6 below. The majority of the investment in FY13 and FY14 is for specific projects while later year investment levels are based on historical spending levels.

2011 to 2012 Variance:
The forecasted investment levels represent the cash flow of specific projects in the early years of the plan and an expectation that capacity increases of similar magnitude will be required throughout the plan based on forecasted load growth.

Table IV-5
System Capacity and Performance
Variance Summary ($millions)

2011	43.5	50.7	54.9	54.5	54.9	-	258.4
2012	-	43.1	52.1	53.4	55.3	56.2	260.1

Aside from blanket and program related projects, the following specific projects are proposed under this spending rationale and exceed $1 million in any fiscal year:

- Project C36188, East Malloy Substation Second Transformer Addition. This project provides for the resolution of MWHr Violations for contingency loss of the existing substation transformer.
- Project C33636, Buffalo Albany Flying Grounds Switch Replacement. This project provides for the removal of Flying Ground Switches as a power transformer protection method and replaces them with Circuit Switchers.
- Project CD0016, Albany Network Study Construction. This project installs approximately 9,700 feet of secondary cable, installs manhole ring busses and cable limiters.
- Project CD0187, Spier-Rotterdam Project Distribution Relocations. This project relocates various distribution feeders to allow the construction of a new 115 kV line from Spier to Rotterdam due to load increases in the Northeast area.
- Project Candidate, East Malloy Low Side Substation Equipment. This project provides for the 15kV station equipment associated with project C36188.
- Project Candidate, Fly Road Low Side Feeder Getaways. This project provides for the distribution line work associated with the expansion of Fly Road (PPM 13999, 09252).

Capacity Planning

Drivers:
An annual review of the distribution system, including substation and feeder loading, is performed to review equipment utilization. The reviews take into account both normal equipment loading and Load at Risk following an N-1 contingency. Forecasted load additions are applied to historical data and the system is analyzed to determine where and when constraints are expected to develop. Recommendations for system reconfiguration or system infrastructure development are created as part of this annual review to ensure load can be served during peak demand periods and is documented in the Annual Capacity Plan.

The normal loading assessment identifies load relief plans for facilities that are projected to exceed 100 percent of normal capability (i.e., maximum peak loading allowed assuming no system contingencies). The projects from these reviews are intended to be in-service during the year the load limit is forecasted to occur. In general, load growth within the service area has averaged 1 percent over the past 10 years, and a modest growth rate is expected to continue for the next 10 years. However, individual areas within the service area that are forecasted to grow at varying rates.

In addition to the normal loading review, the Company has instituted planning criteria for Load at Risk following an N-1 contingency that sets MW and MWHr interruption exposure thresholds ("MWHr Violations") for various supply and feeder contingencies for the purpose of setting a standard for minimum electrical system performance. These thresholds are applied in conjunction with other criteria - such as maintaining acceptable delivery voltage and observing equipment capacity ratings - to ensure the system operates in a reliable manner while managing risk of customer interruptions to an acceptable level. MWHr thresholds have been identified for three specific contingencies. For loss of a single substation supply line, a maximum interruption load limit of 20MW and/or 240MWHr is specified, assuming that the line can be returned to service within 12 hours. For loss of a single substation power transformer, a maximum interruption load limit of 10MW and/or 240MWHr is specified, assuming that the transformer can either be replaced or a mobile unit installed within 24 hours. Finally, for loss of any single distribution feeder element, a maximum interruption of 16MWHr is specified. Analysis of the interruptions under this criteria assume that any and all practical means are used to return load to service including use of mobile transformers and field switching via other area supply lines and/or area feeder ties. MWHr analysis recognizes the approximate times required to install mobile/back-up equipment as well as stepped field switching, i.e. moving load from the adjoining in-service station with feeder ties, that will be used to pick up customers experiencing an interruption, to a second adjoining station in order to increase the capability of the feeder ties.

The Annual Capacity plan reviews loading on over 2,000 feeders and more than 400 substations and results in numerous upgrade projects that range in scope from switching load between feeders and/or substations to new lines or substations.

Customer Benefits:
The benefit to customers of completing the work identified in capacity planning studies includes less exposure to service interruptions due to overloaded cables and transformers. In addition, the implementation of projects to mitigate MWHr Violations will

reduce the likelihood that an unacceptable number of customers will be without service for extended periods due to supply, substation equipment or feeder contingencies.

2011 to 2012 Variance:
The projected investment is shown in the table below and slightly increasing spend is forecasted year on year to account for forecasted load growth and inflation.

Table IV-6
Capacity Planning
Program Variance ($millions)

Specific Projects	2011	14.5	15.4	16.1	19.7	20.2	-	85.9
	2012	-	15.3	22.5	22.4	21.3	21.3	102.9
Load Relief Blankets	2011	1.4	1.5	1.6	1.6	1.7	-	7.8
	2012	-	1.5	1.6	1.6	1.7	1.7	8.1
Total	2011	15.9	16.9	17.6	21.4	21.9	-	93.7
	2012	-	16.8	24.1	24.1	23.0	23.1	111.0

The following specific projects are forecasted with planned spending in excess of $1 million in any fiscal year:

- Project C28831, North Syracuse Area Capacity Increase. This project provides for the installation of a new 115/13.8kV substation to relieve area transformers and distribution feeders that are projected to exceed their thermal ratings by CY2012.
- Project C28929, Frankhauser New Station - Line Work. Line work associated with project C36520 described above.
- Project C29186, Station 214 - Second Transformer Addition. This project will resolve the existing loading above summer normal rating of the existing transformer.
- Project C29187, Station 214 New F21466/67. Line work associated with Project C29186 to provide relief to stations and feeders in the vicinity of Station 214.
- Project C30506, North Syracuse Area Substation Getaways. This project provides for the installation of distribution feeder getaways in support of Project C28831, described above.
- Project C32495, Paloma Substation Second Transformer Addition. This project provides for a second substation transformer and switchgear. The existing transformer is projected to exceed its summer normal rating in 2015 and also has existing MWHr Violations.
- Project C32496, Harris Substation Second Transformer Addition. This project will resolve loading above summer normal ratings of the Milton Ave. Station transformer in 2014 as well as MWHr criteria violations for contingency loss of the existing Harris Ave. substation transformer.

- Project C32497, Duguid Substation Second Transformer Addition. This project will address MWHr Violations for contingency loss of the existing substation transformer at the Duguid Station.
- Project C32503, Starr Road Substation Second Transformer Addition. This project provides for the resolution of an MWHr Violations of the existing Starr Road Station transformer.
- Project C32597, Ogden Brook Substation - Install 15kV Metal Clad. This project provides for the installation of a second switchgear, capacitor banks and new feeder. This project will resolve loading above summer normal rating of the existing substation transformer, MWHr criteria violations and distribution feeder loading issues. There is an associated transmission substation transformer project, C34783.
- Project C35270, Install Second Transformer - Inman Road Substation. This project will address MWHr Violations for contingency loss of the existing substation transformer.
- Project C36056, Military Road 210 - Second Transformer Addition. This project provides for the resolution of MWHr Violations for contingency loss of the existing substation transformer.
- Project C36059, Shawnee Road 76 - Second Transformer Addition. This project provides for the resolution of MWHr Violations for contingency loss of the existing substation transformer.
- Project C36185, Bridge Street Substation Second Transformer Addition. This project provides for the resolution of MWHr Violations for contingency loss of the existing substation transformer.
- Project C36502, Buffalo Station 56 Upgrade Four Transformers. This project replaces four 23-4.16kV transformers with larger transformers to address loading above summer normal ratings.
- Project C36520, Frankhauser Area New Station - Substation Work. Transmission component of a new distribution substation to address loading above summer normal ratings and transformer contingency exposure.
- Project C36639, Buffalo Station 139 - Replace Transformers. This project provides for the replacement of the two existing Buffalo Station 139 Substation transformers, which are overloaded on contingency loss of one transformer.
- Project C36644, Buffalo Station 55 - Replace Transformers. This project provides for the replacement of the two existing Buffalo Station 55 Substation transformers, which are overloaded on contingency loss of one transformer.
- Project C36857, Sanborn Substation Rebuild (D-Sub). Substation rebuild project due to thermal issues related to an 8 MVA expansion request of an industrial customer in Sanborn, NY, as well as contingency issues.
- Project C36985, North Syracuse Area Substation. This project provides for the transformer work in support of Project C28831, described above.
- Project Candidate, Randall Road New Substation. This portion of the project is for a new 15kV switchgear and capacitor bank at a new 115-13.2 kV station. This and associated projects will resolve loading above summer normal rating of

the existing substation transformer, MWHr criteria violations and distribution feeder loading issues.

- Project Candidate, Sodemann Road New Substation. This portion of the project is for a new 15kV switchgear and capacitor bank at a new 115-13.2 kV station. This and associated projects will resolve loading above summer normal rating of the existing substation transformer, MWHr criteria violations and distribution feeder loading issues.
- Project Candidate, South Livingston Load Relief Substation. This project installs a new 115-13.2kV station to address loading above summer normal ratings at two stations and on the sub-transmission system in the southern part of Livingston County.
- Project Candidate, South Livingston Load Relief Distribution Line. Line work associated with Project Candidate, above.

Heavily Loaded Line Transformer

The distribution line transformer strategy endeavors to mitigate outage/failure risks due to overloading of distribution service transformers. Transformer loading is reviewed annually via reports generated from the customer use information within the Geographical Information System (GIS). Transformers with calculated demands exceeding load limits specified in the applicable Construction Standard are identified and investigated in the field.

Heavily loaded units are to be systematically removed from the system over the next fifteen years. Replacement levels may be adjusted based on changes to loading levels, the condition of the population and budget constraints.

Drivers:
There are approximately 250 transformer failures per year due to overloading which affect approximately 3,700 customers annually. Proactive management of equipment loading through annual review has prevented overloaded transformers from becoming a significant system performance problem.

Customer Benefits:
The main benefit of this strategy is that asset utilization will be maximized by maintaining units in service until such point that replacement is required as identified through recurring loading reviews or visual and operational inspection, recognizing that transformer life expectancy is predominantly affected by loading and environmental factors rather than age. Implementation of this strategy will ensure the sustainability of this asset class over time and maintain its relatively minor impact on overall system reliability and customer satisfaction.

2011 to 2012 Variance:
The projected investment is shown in the table below.

Table IV-7
Heavily Loaded Line Transformer
Program Variance ($millions)

2011	3.7	3.0	3.2	3.6	3.7	-	17.1
2012	-	3.0	3.2	3.6	3.7	3.9	17.3

Remote Terminal Unit (RTU)

This strategy covers the addition of Remote Terminal Units (RTUs) and related infrastructure at substations presently lacking remote monitoring and control capabilities. RTUs in substations communicate with the EMS (Energy Management Systems) and provide the means to leverage substation data that provide operational intelligence and significantly reduce response time to abnormal conditions through real time monitoring and control.

There is also a significant investment in replacing outdated RTUs based on their asset condition. That investment is documented in the Asset Condition spending rationale section, and in Chapter II in the Statutory and Regulatory spending rationale section.

Drivers:
RTUs will allow for remote operation and management of the system at these stations providing benefits in contingency response and recovery and thus improving performance and reliability. In addition, RTUs are key components of automation and modernization of the Company's infrastructure.

Customer Benefits:
This strategy provides the means to leverage operational intelligence and significantly reduce response time to abnormal conditions through real time monitoring and control. The strategy also enables the distribution automation, sub-transmission automation, and future modernization strategies which will improve service to customers. When used to monitor and control the distribution feeder breakers and associated feeder equipment, RTUs and EMS facilitate the isolation of faulted equipment and the time required to reconfigure the distribution system to re-energize customers in non faulted segments of the distribution system. This switching flexibility improves the expected average customer outage duration (CAIDI) when compared with a similar feeder that is not equipped with these facilities.

2011 to 2012 Variance:
The projected investment is shown in the table below. The variance below is based a levelized expansion program year on year.

Table IV-8
Remote Terminal Unit
Program Variance ($millions)

2011	2.9	2.8	4.4	4.4	4.4	-	18.9
2012	-	2.8	2.8	2.7	2.7	2.7	13.5

Line Recloser Application

The recloser application strategy is designed to support reliability performance through the installation of line reclosers on overhead distribution lines. Since 2006 approximately 970 line reclosers have been installed in accordance with the recloser application strategy. New recloser locations that produce additional reliability benefit are becoming difficult to identify and the program is expected to come to a close after FY13. The Company has begun evaluating options to enhance the benefits of these devices along with alternative sectionalizing equipment as it continuously modernizes the distribution system. Over 900 of these new line reclosers have communication capabilities that can provide real time information and remote control and are capable of integration with future advanced grid applications.

Drivers:
The primary driver for this program is reliability improvement. Additional line reclosers reduce the number of customers that are impacted during a contingency along a radial distribution feeder.

Customer Benefits:
The installation of radial line reclosers has a positive impact on the Company's SAIFI performance by reducing the number of customer interruptions. Further benefits can be realized to the extent that these devices provide remote monitoring and control and provide a platform for future automation schemes.

2011 to 2012 Variance:
The strategy will be ending in FY13.

Table IV-9
Line Recloser Application
Program Variance ($millions)

2011	6.0	6.0	8.0	8.0	8.0	-	36.0
2012	-	3.5	0.1	0.0	0.0	0.0	3.6

Engineering Reliability Review

An Engineering Reliability Review (ERR) can be completed for any feeder experiencing reliability problems or any localized pocket of poor performance. ERR's are often performed on those feeders defined as Worst Performing Feeders ("WPF") as described in the Electric Service Reliability Report, filed annually in accordance with Case 90-E-1119. The scope of an ERR is typically a:

- Review of one year and multi-year historical reliability data for current issues and trends.
- Review of recently completed and/or future planned work which is expected to impact reliability.
- Review the need for the installation of radial and/or loop scheme reclosers.
- Review for additional line fuses to improve the sectionalization of the feeder.
- Comprehensive review of the coordination of protective devices to ensure proper operation.
- Review for equipment in poor condition.
- Review of heavily loaded equipment.
- Review for other feeder improvements such as fault indicators, feeder ties, capacitor banks, load balancing, additional switches and reconductoring (overhead and/or underground).

Drivers:
The ERR recommendations are utilized as a basis to improve the reliability on the circuits experiencing recent poor reliability performance.

Customer Benefits:
The ERR program will improve customer reliability in areas in which performance has been substandard.

2011 to 2012 Variance:
Projects associated with the ERR program are reactionary and are identified as reliability concerns arise. As such, specific projects are only identified in the early years of the plan and future spending is maintained in a targeted budget reserve.

Table IV-10
Engineering Reliability Review
Program Variance ($millions)

2011	4.1	4.1	4.1	4.1	4.1	-	20.3
2012	-	5.9	3.8	3.5	3.5	3.5	20.2

Pockets of Poor Performance

The analysis performed to address reliability concerns in small pockets along a feeder has been incorporated into the Engineering Reliability Review program, and this program will be discontinued.

Table IV-11
Pockets of Poor Performance
Program Variance ($millions)

2011	0.6	0.7	0.8	0.8	0.9	-	3.8
2012	-	-	-	-	-	-	-

Overhead Distribution Fusing

Various projects are in place which will maintain customer reliability through the installation of fuses on overhead distribution lines. Fuses are installed to isolate permanent faults on the distribution system. Ideally, these fuses are installed at locations which limit the interruption to the fewest number of customers as possible. Proper fuse application will limit the duration of the interruption by isolating the fault to a smaller area and reducing the time required to find the fault.

Drivers:
Fuses isolate the faulted area of a feeder and thereby interrupt the smallest practical number of customers. Outage restoration time may also be reduced since fusing will split the overhead circuit into smaller segments of the distribution system that requires patrolling to locate the cause of an unplanned customer interruption.

Customer Benefits:
These projects will result in a reduction in the number of customer interruptions and will help the Company to continue to meet its service quality metrics.

2011 to 2012 Variance:
The Company has actively been installing fuses on its Worst Performing feeders as part of ERR evaluations. This program expands the scope of feeders being reviewed for increased fusing opportunities across the service territory. The projected investment is shown in the table below. This program was not included in the 2011 CIP.

Table IV-12
Overhead Distribution Fusing
Program Variance ($millions)

2011	-	-	-	-	-	-	-
2012	-	1.8	1.8	1.8	1.8	1.8	9.0

Arc Flash Mediation - 480V Spot Networks

This strategy intends to install primary and secondary isolation devices in spot network systems to mitigate arc flash hazard levels within 480V spot network systems.

Drivers:
The recently published 2012 National Electric Safety Code requires that an arc hazard analysis be completed on the 480V spot networks operated by the Company. The Company's analysis indicates that the potential incident energy for various faults scenarios on a spot network could exceed the rating of current personal protective equipment. To ensure worker safety, new work methods will need to be employed. These work methods may require significant switching and customer outages for routine maintenance. The Company will be implementing these work methods immediately and is investigating engineering controls such as the addition of isolating switches on both the primary and secondary side of its 330 spot network protectors.

Customer Benefits:
Installation of primary and secondary isolation equipment will facilitate emergency and routine maintenance without interruption of service to the customer.

2011 to 2012 Variance:
The projected investment is shown in the table below. This program was not included in the 2011 CIP.

Table IV-13
Arc Flash Mediation - 480V Spot Networks Program Variance ($millions)

2011	-	-	-	-	-	-	-
2012	-	0.2	4.0	4.0	4.0	4.0	16.2

Advanced Grid Applications

Advanced Grid Applications (AGA) can be defined as the application of real-time monitoring, advanced sensing, communications, analytics, and control, enabling the dynamic flow of secure, reliable, and efficient data and energy to accommodate customer choice, existing and new forms of energy delivery and use, from generation source to end-user. These advanced devices and systems, deployed on the distribution system, are commonly referred to as Smart Grid technology, although the Company has been applying devices with this technology for years. To date approximately 50% of the distribution substations have remote monitoring and control capabilities and this percentage is expected to continue to increase as the Company has a program to install new RTUs in substations without them. In addition, RTUs are generally incorporated in the scopes of projects driven by capacity additions or major asset replacement. New protection schemes utilize microprocessor relays in place of electo-mechanical relays which provide communication capability to retrieve records for analysis and information on the system. On the distribution feeders beyond the substation fence through the line recloser application program and a few distribution automation pilot projects, hundreds of new line reclosers and several line switches have been placed in service that are providing remote information and control capabilities. As technology continues to advance, the Company expects to apply advanced grid applications increasingly in the future to meet existing planning guidelines and regulatory performance requirements.

The following are examples of Advanced Grid Applications that may be employed by the Company:

Advanced Distribution Automation - Advanced distribution automation will provide increased information to monitor the operation of the system, improve reliability due to expected smaller/shorter permanent interruptions and reduce switching times due to remote operation of automated switches. These improvements enable more efficient use of existing system capacity and more timely investments in new system capacity when addressing outage exposure defined as a concern in system planning guidelines.

Advanced Capacitor Control - New distribution feeder capacitor control capability is expected to reduce system losses due to both peak and average power factor improvement and lower system peak demand due to a flatter circuit voltage profile. This will enable a potential delay in system upgrades due to normal and contingency loading violations. In addition, enhanced system voltage control is expected to reduce occasions when system voltage performance is problematic to customers (ex. low voltage that might impact customer equipment performance). Initial application will utilize device local control strategies with communications utilized for system voltage performance monitoring and operator control on demand.

Advanced Grid Monitoring - System monitors applied at critical distribution locations (capacity bottlenecks, distributed generation sources, electric vehicle charging installations, etc.) will provide more (time stamped) data to monitor the operation/loading of system equipment and to support first the evaluation and ultimately the widespread integration of Distributed Resources interconnections. As important, the additional data will also support more timely investment in system upgrades due to normal and contingency loading violations.

Advanced Grid Applications Project Portfolio Development

National Grid has developed a planning approach to be followed when considering the use of Advanced Grid Applications within specific portions of its distribution system. As such, with the selection of a candidate location (group of feeders and/or substations), specific project scope and cost estimates can be developed. However, performance metrics and benefits monitoring of actual installations are still required and will ultimately feed into and refine our expansion strategy and modernization priorities.

In order to move the Advanced Grid Applications (AGA) forward in a consistent manner, guidelines for the application of the grid modernization approaches are being developed. Collectively these guidelines are being referred to as a “reference model” which will direct the planning and installation of AGA across the system.

The reference model will define standard approaches to be used when installing AGA devices, a few examples are listed below:

- Guidelines on the planning analysis to be completed
- Peak load and/or number of customers between automated switches
- Standard capacitor bank size and control settings
- Guidelines on feeder and transformer monitor installation

Additionally the reference model will provide guidance on the “standard” distribution feeder to be built including:

- Number of customers served
- Peak design loading
- Types of construction and wire size
- Guidelines on capacitor bank locations (distances between banks, allowable voltage rise, etc.)
- Guidelines on the installation of stepdown banks and line regulators
- Number and location of automated switches

It is expected that the adoption of this reference model will apply mainly to new construction and/or areas undergoing significant rebuilding. The reference model will be a living document being updated as we learn more about how our system operates via the enhanced monitoring and control AGA will deliver as well as adding new technologies into the model as they become available.

Developing a plan to expand the use of AGA across the system is another key element required to efficiently leverage the grid modernization process. The current thinking on this subject is to use the new grid monitoring data combined with reference model guidelines, feeder asset data, reliability statistics and other internal and external data to build a ranking model for all feeders across the system. This ranking model would identify feeders and/or groups of feeders with characteristics that indicate the potential for significant benefit when AGA technology is installed. The creation of this model is heavily dependent on the monitoring and performance data to be collected after the initial installations of the different AGA technologies. Similar to the reference model description, this ranking model will be a living application changing as new and/or better information becomes available.

Drivers:
There are numerous drivers leading to an increasing focus on Advanced Grid Applications:

- Regulatory/government direction which can be very specific and targeted. For example, the American Recovery and Reinvestment Act 0f 2009 (ARRA) offered grants for Smart Grid research projects or pilots. There are generally targeted areas as well with items like incentives for developers of Photovoltaic Generation facilities, expectation of increased application of Demand Side Management and/or Demand Response programs, and incentives for use of new technologies such as Plug in Electric Vehicles.
- The evolution of external standards promulgated by FERC, NERC, NPCC, NYISO, etc.
- Efficiency, reliability, and an increasing availability of the advanced grid technologies themselves, especially communications systems. The cost benefit of increased use of technology in lieu of traditional T&D system expansion is expected to become more favorable.
- Greater understanding of the benefits that Advanced Grid Applications deliver to our customers over the current methods of service and system design. Ultimately, it will be the ability of Advanced Grid Applications to economically solve system problems and meet customer service expectations that will determine the pace of their adoption and whether or not the Company executes deployment in volume.

Customer Benefits:
Increasing the use of AGA technologies on the T&D system is expected to deliver significant benefits to customers, including:

- Enable more sophisticated control systems
- Improve Reliability and Operational efficiency
- Release system capacity
- Promote the connection of more renewable resources such as electric vehicles (EV) and distributed generation

These AGA technologies are expected to result in an improvement in service quality for customers. This item has no direct regulatory impact but the projected reliability improvements will aid in meeting future service quality targets.

2011 to 2012 Variance:
The projected investment is shown in the table below. This program was not funded in the 2011 CIP.

Table IV-14
Advanced Grid Applications
Program Variance ($millions)

2011	-	-	-	-	-	-	-
2012	-	-	5.0	5.0	5.0	5.0	20.0

The scope and schedule of this project is still under conceptual review and is not yet a line item in the Plan. The Company is currently managing this item by evaluating funding shifts within the Plan considering reserves, and program placeholders for reactionary reliability issues such as Engineering Reliability Review.

The following specific projects will exceed $1 million in any fiscal year:

- Project Candidate, AGA, Clifton Park Area. This project will include approximately twelve 13.2kV feeders from multiple substations serving between 22,000 to 25,000 customers and approximately 80 MW of load. Approximately 60 advanced distribution automation switches and 50 advanced capacitor banks will be installed along with a small number of both feeder and transformer monitors. This project is expected to improve feeder reliability, power factor and voltage performance within the scope of the project. This location was identified due to the expected availability of a high bandwidth communications system being installed as part of the NY-ISO Capacitor Project.

IV D. Asset Condition

Planned asset condition investment levels for the distribution system, and comparison to investment levels from last year's Plan, are shown in the table below.

Table IV-15
Asset Condition
Variance ($millions)

2011	29.3	37.6	42.3	47.1	53.4	-	209.7
2012	-	29.2	34.5	44.3	47.8	49.8	205.7

Aside from blanket and program related projects, there is one specific project identified under this spending rationale that exceeds $1 million in any fiscal year:

- Project Candidate, Steamburg Rebuild - Rebuild existing 35.4-4.8kV station with new transformer, regulators, feeder breakers and associated equipment.

Underground Cable

Various projects are in place to refurbish and/or replace distribution underground assets to ensure the system continues to perform in a safe and reliable manner. Distribution cable replacement opportunities are being aligned with other projects such as Buffalo Substation rebuild projects and load relief projects.

Drivers:
Typically, underground cables are the third highest contributor of deteriorated equipment to CAIDI and SAIFI.

Customer Benefits:
Through a proactive approach, cable replacement projects reduce the likelihood and consequences of cable failures.

2011 to 2012 Variance:
The projected investment is shown in the table below. The spending has been modified based on recent experience.

Table IV-16
Primary Underground Cable
Variance ($millions)

2011	3.4	5.1	5.7	6.6	7.0	-	27.8
2012	-	5.4	2.5	3.4	4.5	4.5	20.2

Network

Underground networks are highly interconnected systems that typically serve city center areas due to their high reliability when they perform as originally designed. However, they also represent an aging infrastructure that requires monitoring, maintenance and replacements to maintain reliability.

The underground network program targets the maintenance, monitoring and installation/replacement of limiters, transformers, protectors, secondary cables and miscellaneous network assets. Asset replacement work for this program has been transitioned to the Inspection and Maintenance program. A new strategy is under development.

Drivers:
When major incidents do occur, restoration can be very lengthy and costly to repair.

Customer Benefits:
The approach to managing underground networks is one of prevention and proactive intervention. In general, when network failures do occur they typically require lengthy restoration efforts due to location and feasibility of repairing/replacing equipment and with unexpected civil work. Planned replacement of underground assets will reduce the risk of extended interruptions for customers served by underground networks.

2011 to 2012 Variance:
The network asset replacement work has been transitioned to the Inspection and Maintenance program. Additional work may be identified through an on-going Arc Hazard Analysis study, a revised strategy, and studies of specific networks. There is a significant amount of System Capacity and Performance work scheduled on the Albany network that is described under that spending rationale.

Table IV-17
Network
Program Variance ($millions)

2011	3.0	2.4	1.2	1.2	1.2	-	8.8
2012	-	0.9	-	-	-	-	0.9

Conductor Replacement

Various projects are planned which will replace “small” (< #2 AWG) copper, copperweld, amerductor and aluminum conductor.

The Company stopped installing #4 and smaller copper primary wire sometime prior to 1953. This makes the small wire population at least 58 years old (some of the oldest overhead energized equipment in service on the distribution system).

Drivers:
In the course of this 50+ year service life, the average conductor will have lost some of its tensile strength due to loading conditions and elongation during splicing following emergency service restoration. This loss of tensile strength increases the likelihood of conductor breakage during an interruption which involves physical contact with the conductor. Interruptions involving broken conductors typically result in longer service restoration times. With each successive interruption the ability to restore service quickly is deteriorated. This loss of tensile strength is especially significant during a storm situation where the wind and/or ice/snow loading on the conductor will be higher than during clear conditions. These projects will systematically identify and replace the small wire.

Customer Benefits:
Replacing the “small wire” population will improve customer level reliability by reducing the frequency and duration of localized interruptions.

Replacement will also improve voltage performance, especially on those circuits having in excess of two miles of conductor.

2011 to 2012 Variance:
The projected investment is shown in the table below. These projects were not funded in the 2011 CIP.

Table IV-18
Conductor Replacement
Program Variance ($millions)

2011	-	-	-	-	-	-	-
2012	-	0.9	-	1.5	1.5	0.5	4.4

Buffalo Streetlight Cable Replacement

This program will restore underground streetlight service by replacing streetlight cables and conduit, and removing temporary overhead conductors.

Drivers:
A program to replace deteriorated street light cable in the Buffalo area is being developed to address repetitive incidents of elevated voltage as determined through periodic testing as defined under electric operating procedure NG-EOP G016. The underground street light cable system located in the Buffalo metropolitan area is comprised of a variety of electrical cables and electrical wiring configurations that have been in service for more than 50 years. Recently, Elevated Voltage Testing has identified stray voltage incident rates that are from 2 to 20 times the rates measured in other areas in the Company's service territory.

Analyses have determined the primary driver for the elevated voltages in the area is due to the deteriorated physical condition of the street light cable. Spot repairs have only marginally remedied the incidence rates. Current incident rates in 8 of the 11 zones in Buffalo have experienced inconsistent results following each repair cycle since 2009. In consideration of the root cause, a pilot was conducted to replace cable on a portion of a poor performing street light circuit. Following completion of the pilot project, test results revealed no incidents of elevated voltage. Based on the success of the pilot, a program is being developed to replace street light cable circuits in Buffalo.

Customer Benefits:
This work will provide more reliable street light service and reduce the incidence of elevated voltages in the Buffalo area.

2011 to 2012 Variance:
The program expects to spend \$2.5M annually to replace approximately 14% of the existing street light cable over a 10 year period. The projected investment is shown in the table below. These projects were not funded in the 2011 CIP.

Table IV-19
Buffalo Streetlight Cable Replacement
Program Variance (\$millions)

2011	-	-	-	-	-	-	-
2012	-	2.5	2.5	2.5	2.5	2.5	12.5

<u>Substation Asset Condition Programs</u>

Substation assets frequently have long lead times and require significant projects in terms of cost, complexity and project duration for replacement or refurbishment. Consequently, it is often more efficient as well as cost effective to review an entire substation. Further, where there are asset issues which indicate replacement as an option, the Company reviews planning and capacity requirements to ensure alternative solutions are evaluated such as system reconfiguration to retire a substation. Hence, the asset strategies coordinate with system planning in order to develop an integrated system plan.[4]

[4] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2010, pg. III-119.

<u>Substation Power Transformers</u>

Power transformers are large capital items with long lead times. Their performance can have a significant impact on reliability and system capacity. Condition data and condition assessment are the key drivers for identifying replacement candidates. Replacements are prioritized through a risk analysis which includes feedback from operations personnel. The distribution element covers transformers which are identified as replacement candidates through the test and assessment procedure. A 'Watch List' of candidate transformers has been identified and recorded in the Asset Condition Report.[5]

Drivers:
As noted in the 2011 Asset Condition Report, there are approximately 779 power transformers plus 21 spares with primary voltages 69kV and below.[6] Each unit is given a condition code based on individual transformer test and assessment data, manufacture/design and available operating history.[7] Higher codes relate to transformers which may have anomalous condition; units with a higher code are subject to more frequent monitoring and assessment, and are candidates for replacement on the Watch List.

Customer Benefits:
The impact of power transformer failure events on customers is historically substantial. By proactively replacing poor condition units there will be direct benefits to customers in reduced impact of power transformers on performance.

2011 to 2012 Variance:
The projected program investment is shown in the table below. Through on-going review of the distribution substation transformer fleet, new problems are identified. The resulting replacement costs and related annual investment will vary based on the size of the transformer to be replaced.

Table IV-20
Substation Power Transformers
Program Variance ($millions)

2011	1.3	1.8	1.4	1.4	1.4	-	7.3
2012	-	3.8	1.9	1.0	1.0	2.8	10.5

The capital investment plan in Exhibit 3 shows the current list of transformers expected to be replaced within the next five years.

[5] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, pages II-116 to II-117.
[6] Id, pg. II-112.
[7] Id, pg. II-113.

Indoor Substations

The purpose of this strategy is to replace, retrofit, or retire the twenty-four remaining indoor distribution substations. The indoor substations were built in the 1920s through the 1940s. These substations have inherent safety risks due to design and equipment condition. Sixteen of these indoor substations remain to be rebuilt in the City of Buffalo and five are in Niagara Falls. The remaining three substations are located in Syracuse, Gloversville and Troy. In addition to future work, the Plan includes three indoor substations under construction (Buffalo Stations #29, #43, and #52). Details of the asset condition issues and key drivers are outlined in the asset condition report.[8]

Drivers:
These indoor substations are obsolete. Their outmoded design does not meet currently accepted safety practices, equipment and protection schemes are becoming unreliable in their function of interrupting faults, and in general the condition of equipment shows signs of deterioration.

Customer Benefits:
Under normal conditions, failure of obsolete indoor substation equipment could result in sustained customer interruptions until some type of replacement is installed. Equipment outages can result in increased operation and loading on parallel equipment. Indoor substations typically supply urban environments, including critical loads such as police, fire and hospitals. This program mitigates the risk for a long-term, sustained, customer interruptions occurring in these urban areas.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The spending has been modified based on lessons learned regarding scheduling, the availability of resources and further development of the plan for each substation.

Table IV-21
Indoor Substations
Program Variance ($millions)

2011	7.2	15.5	16.1	15.8	19.3	-	73.8
2012	-	9.3	5.1	8.0	3.6	5.8	31.8

Three on-going indoor substation projects are expected to exceed $1 million in any fiscal year: Buffalo Stations #29, #43 and #52. Four, proposed indoor substation projects are expected to exceed $1 million in any fiscal year: Buffalo Stations #27, #37 and #59, and Brighton substation. Other substations will be initiated during the plan. Buffalo substation work is retrofit. Brighton substation is expected to be retired after the load is converted and transferred onto the Rock Cut #286 substation, which will be expanded with a second transformer and metal-clad switchgear.

Sub-transmission system line work related to this strategy is included in Chapter 3.

[8] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, pg. II-109.

Metal-Clad Switchgear

Deteriorated metal-clad switchgear can be prone to water and animal ingress which leads to failures from moisture, dust or animals. Visual surveys will detect such degradation, but cannot identify surface tracking where hidden behind metal enclosures. Identification of these concerns is more likely with electro-acoustic detection techniques. By using sensors to detect anomalous sound (acoustic) waves or electric signals in the metal-clad switchgear, it is possible to identify equipment condition concerns before failure. An initial review using this technique identified a number of locations for further action as part of this strategy.[9]

For each substation, an analysis will be conducted to determine if direct replacement is the best course of action or if an alternate means of supplying the load will be constructed.

Drivers:
Metal-clad switchgear installed prior to 1970 have several factors that can lead to component failure. Electrical insulation voids were more prevalent in earlier vintage switchgear. Higher temperatures due to poor ventilation systems can degrade lubrication in moving parts such as breaker mechanisms; and, gaskets and caulking deteriorate over time leading to ingress of moisture.

Customer Benefits:
The impact of each metal-clad switchgear event on local customers is usually substantial, with nearly 3,000 customers interrupted for over three hours per event. This program would reduce the risk of such events and provide significant benefit to the affected customers.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The capital forecast reflects new condition assessment data and analysis which helped identify and prioritize replacement candidates. Multiple stations are in progress with a program in progress to prioritize additional stations.

Table IV-22
Metal-Clad Switchgear
Program Variance ($millions)

2011	1.6	1.8	2.8	3.8	3.5	-	13.4
2012	-	1.1	2.0	5.2	3.9	4.1	16.4

There is separate funding shown in Chapter III for the sub-transmission system.

[9] Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, pg. II-111.

The following specific projects will exceed $1 million in any fiscal year:

- Project C32296, Altamont Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project C32298, Market Hill Substation Replace Metal-Clad Switchgear. This project provides for a new substation located near Maple Ave in the Town of Amsterdam to replace the existing Market Hill Substation.
- Project C17952, Emmet Street Substation Replace Transformer Bank 1 and Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project C36213, Chrisler Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Union Street 376 Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Johnson Road Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Pinebush Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Hopkins 253 Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Whitesboro 632 Substation Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new position metal-clad switchgear.
- Project Candidate, Henry Street Station 316 Replace Metal-Clad Switchgear. This project provides for the replacement of the existing metal-clad switchgear with new metal-clad switchgear.

Substation Circuit Breakers and Reclosers

As noted in the annual asset condition report,[10] certain types, or families, of breakers have been specifically identified for replacement in the next ten years. Breaker families are typically older, obsolete units that are less safe or less reliable. Certain breaker families that are targeted for replacement contain parts that must be custom machined or units that contain asbestos in the interrupting systems and require extra precautions during maintenance, refurbishment and overhaul.

Drivers:
The approach for breaker condition coding was based on engineering judgment and experience which was supported by discussion with local Operations personnel. The units are prioritized for replacement based on the condition coding; units in poorer condition are given a higher score. Many of these breakers are obsolete.

Aged units have been specifically identified for replacement because they are difficult to repair due to the lack of available spare parts. Likewise, unreliable units have been identified for replacement since their replacement would reduce the number of customer interruptions.

Customer Benefits:
Several of the targeted breaker families present opportunities to reduce hazards associated with safety and the environment (i.e. oil and asbestos).

2011 to 2012 Variance:
The projected program investment is shown in the table below. Replacements will be addressed programmatically and identified through the Asset Condition Report. The recent identification for replacement of 115kV breakers that are FERC designated as distribution assets resulted in the FY14 and FY15 variance to last year's plan. The majority of 115kV breaker replacements can be found in Chapter II related to the transmission system.

Table IV-23
Circuit Breakers and Reclosers
Program Variance ($millions)

2011	2.3	3.0	4.5	6.0	6.8	-	22.6
2012	-	3.0	6.5	7.0	6.8	6.8	30.0

10 Report on the Condition of Physical Elements of Transmission and Distribution Systems, Case 06-M-0878, October 1, 2011, page II-118.

Substation Batteries and Related

This program mirrors the Transmission Substation Batteries and Chargers program. Battery and charger systems are critical components that are needed to ensure substation operational capability during both normal and abnormal system conditions. The intent of this program is to replace battery and charger systems that are 20 years old. The 20 year limit is based on industry best practice and experience in managing battery systems. This program work is coordinated with other asset replacement programs where appropriate.

Currently, there are over 200 substation batteries in service. To bring all battery systems to less than twenty years old within ten years would require a replacement rate of approximately nine per year.

Individual battery problems may arise at any time during Visual and Operational inspections or periodic testing. Problems identified through these methods are addressed under the Damage/Failure spending rationale.

Drivers:
Failure of batteries and charger systems may result in substation protective relays and/or circuit breakers not operating as designed.

Customer Benefits:
This can result in additional customers being interrupted as back-up relay schemes at remote substations will have to isolate a fault. It may also result in equipment damage if a fault is not cleared in a timely fashion. Interruptions related to battery incidents are uncommon at this time as the replacement program is working as desired.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The budget has been reduced because significant progress has been made in replacing batteries that are 20 years or over.

Table IV-24
Substation Battery and Related
Program Variance ($millions)

2011	1.1	1.1	1.1	1.1	1.1	-	5.5
2012	-	1.1	1.1	1.1	0.9	0.9	5.0

Mobile Substation

Mobile substations are key elements for ensuring continued reliability and supporting the system during serious incidents. This program was listed under the System Capacity and Performance spending rationale in the 2011 CIP.

Drivers:
In order to improve the management of the mobile substation fleet, the Company conducted a review which considered system requirements, the amount of mobile usage, and the uniqueness of the individual unit to better understand the condition of all members of the fleet and their associated risks. Highly utilized units may present a risk if they are not properly maintained or refurbished. Further, uniquely configured units or very highly utilized units in which there is only one available unit on the system, present some risk since they may not be available for an emergency due to utilization elsewhere. Based on the review, mobile substation protection upgrades, rewinds and replacement units were recommended.

Customer Benefits:
A mobile substation or transformer is the quickest method for restoring service to customers when an outage occurs in a substation, typically occurring within sixteen to twenty-four hours. By refurbishing, upgrading, replacing and purchasing new mobile substations, as necessary, via system reviews and condition assessments, the risk of extended customer outages will be significantly reduced. In addition, properly addressing the needs of the mobile fleet will allow us to schedule maintenance for substation transformers in a timely manner since they are one of the most valuable assets on the system. Lastly, having an adequate number of mobile substations on hand will promote the completion of new construction projects on-time and on-budget.

2011 to 2012 Variance:
The projected investment is shown in the table below. The revised plan is based on identified work related to the strategy.

Table IV-25
Mobile Substation
Program Variance ($millions)

2011	1.0	2.0	2.0	2.0	2.0	-	9.1
2012	-	1.7	1.0	1.1	1.1	-	4.8

Within this program, there is one specific project identified that exceeds $1 million in any fiscal year:

- Project Candidate, New NY Mobile Substation 69-13.8x4.8x4.16kV - A highly utilized mobile substation has been identified in the eastern region of New York as a new system requirement to sustain our emergency and maintenance needs by providing additional coverage for 30 substations.

Circuit Switcher

Strategy paper SG 062v2 “S&C Type G and Mark II Circuit Switcher Replacement”, approved Nov 2010, addresses the eighty-three problematic S&C Type G and Mark II circuit switchers on the Northeast Transmission network in both New York and New England. This program was not listed in the 2011 CIP.

Drivers:
In 2000, S&C announced that parts specific to the Type G and Mark II circuit switcher models would no longer be manufactured and support for these models would be limited. While these switches were relatively reliable at that time, since 2003 they have begun to exhibit problems. At present, there are limited options for repairing any problems that occur on these switches as spare parts and support formerly offered from S&C are no longer available. No other manufacturers fabricate or supply these parts.

Customer Benefits:
Replacement of obsolete, deteriorated and problematic circuit switchers will lead to improved reliability performance providing our customers with improved service. Planned replacement offers the lowest lifetime cost approach for customers.

2011 to 2012 Variance:
This program is new to the Plan.

Table IV-26
Circuit Switcher
Program Variance ($millions)

2011	-	-	-	-	-	-	-
2012	-	-	2.0	1.0	-	5.0	8.0

Remote Terminal Unit Replacement

Work in this program relates to distribution assets identified as part of the Transmission - Remote Terminal Unit Replacement strategy in the Statutory or Regulatory Requirements section of Chapter II.

There is also significant investment in installing upgraded distribution Remote Terminal Unit (RTU) equipment as documented in the System Capacity and Performance spending rationale section.

2011 to 2012 Variance:
The projected program investment is shown in the table below. The allotted stations requiring RTU replacements under this strategy are near completion.

Table IV-27
Remote Terminal Unit Replacement
Program Variance ($millions)

2011	1.8	1.8	2.0	2.2	2.2	-	10.0
2012	-	2.2	0.5	-	-	-	2.7

Department of Energy (DOE) Smart Grid Investment Grant Program

The Company is participating in the New York State Capacitor and Phasor Measurement Project which originated through a NYISO funding application to the US DoE's Smart Grid Investment Grant ("SGIG") program. The SGIG program is supported by the American Recovery and Reinvestment Act of 2009 ("ARRA") which has a stated goal of improving the economy by investing funds as soon as possible in worthwhile Smart Grid research projects or pilots.

On August 6, 2009, the NYISO submitted a proposal to the DOE in response to its Smart Grid Investment Grant Program. The Smart Grid Proposal provides that the NYISO, as the awardee and the recipient of funds, and the Transmission Owners, as sub-awardees and sub-recipients, will (i) install a system of phasor measurement units and related devices and (ii) implement a statewide capacitor program, as specified in detail in the Smart Grid Proposal.

Effective July 1, 2010, the Company entered into an agreement with NYISO to deploy 286MVAr of capacitor banks and phasor measurement units ("PMU") at twelve (12) substations. The agreement provides for a 50% reimbursement of the Company's $19M investment by DOE with the remaining 50% to be recovered through traditional means.

Internally, the project comprises two parts, the distribution and sub-transmission system capacitor bank deployments and the transmission system phasor measurement unit deployments. The transmission system portion of project is addressed in Chapter II. The capacitor portion of the project is also discussed in Chapter III.

Capacitor Installations
The current scope of the capacitor project is to install 286MVAr of reactive support in eastern New York as close as possible to study-based locations identified by the NYISO to minimize transmission line losses associated with cross state transfers. Conceptual engineering has been completed, identifying 322 distribution and sub-transmission system capacitor locations, including 278 on distribution lines and five on distribution substation equipment.

Design engineering and procurement are near complete. Installation of the capacitor banks will primarily take place throughout 2012.

Drivers:
The primary drivers of this project are regulatory in nature and can be separated into two groups: 1) current federal investment and smart grid policies and 2) current state renewable energies policy.

Investment and Smart Grid Policy - Federal policy centers on an investment policy (ARRA) with a directed smart grid program. Formally termed the Electricity Delivery and Energy Reliability ("EDER") Program, it is funded at $4.5 billion and primarily intended to create jobs while accelerating smart grid investment to advance the energy independence goals of EISA. Attachment A lists detailed goals of the ARRA, EDER, and EISA programs.

Renewable Energy Policy - NYISO's application specifically points to needs based on the current New York State Renewable Portfolio Standard as approved by the Public

Service Commission. The NYISO notes that because " ... renewable resources are by their nature intermittent and have varying locations, increasing their integration into the electric system will require close monitoring and control of system dynamics." The Project will enhance the NYISO's ability to continue to monitor the operation of the New York power grid in a reliable manner as increasing numbers of renewable resources are brought online. The capacitor project itself is expected to improve transfer capability, reduce system losses, improve voltage control, and free up dynamic reactive supply from rotating generators for use during system contingencies and significantly improve the reliability of the New York bulk power system.

Customer Benefits:
While this project is regulatory driven, capacitor installation is in-line with the drivers of the transmission system Northeast Region Reinforcement Project.[11] The project calls for capacitor installations to address inadequate thermal performance and improve reliability in the transmission system. While this project is not directed at specific inadequate thermal issues, capacitors will improve the overall thermal performance of the system. This project will result in reliability improvement through improved transmission system voltage profile, increased generator MVAr reserve, and increased interface transfer limits.

[11] "Northeast Region Reinforcement Project" SG097 - Projects C18250, C18253, CNYX39, and CNYPL6.

IV E. Non-Infrastructure

This spending rationale includes items that do not fit into the previous four categories but are necessary for the operation of the distribution system. They include capitalized tools such as micro-processor based relay test equipment and SF6 gas handling carts. In addition, radio system expansion and upgrade projects across the system are included in this spending rationale.

Drivers:
Specialized tools are required by Operations personnel to perform equipment maintenance and complete capital projects. Radio communication systems upgrades and replacements are necessary for real time communications while performing switching and for other operational needs.

Customer Benefits:
The proper tools allow Operations personnel to work safely and efficiently thus reducing overall costs. Radio communications promote personnel safety by allowing the control centers to direct Operations personnel during field switching. In addition, timely communications allow a coordinated response to interruptions thereby limiting customer interruption durations.

2011 to 2012 Variance:
The projected investment is shown in the table below.

Table IV-28
Non-Infrastructure
Variance ($millions)

2011	4.4	4.5	4.6	4.7	4.8	-	22.9
2012	-	4.7	4.7	5.8	5.3	5.1	25.7

V. Investment by Transmission Study Area

For regional analysis, the Company's service territory is divided into eight transmission study areas as shown below. Within the eight transmission study areas, the sub-transmission and distribution networks are further subdivided into 43 distribution study areas.

For each transmission study area, major projects[1] are listed by system and by spending rationale. Descriptions of the projects can be found listed by system in Chapters II, III and IV above. The projects are also listed by spending rationale in Exhibits 1, 2 and 3.

Figure III-1
Transmission Study Regions

[redacted]

[1] For this discussion, major projects are those that exceed $1,000,000 in any fiscal year in the five year capital investment plan.

V A. Northeast

Area Summary

Key drivers behind the transmission and distribution capacity projects in the Northeast transmission study include the following:

- Load growth associated with the Luther Forest industrial load and the general area distribution load growth that is stimulated by the economic impact of the Luther Forest development during the period from 2012-2019. In particular, increased capacity is required to avoid 115kV line and 230kV/115kV transformer overloads and to support adequate system post-contingency voltage levels.

- New distribution stations at Sodemann Road and Randall Road.

A major driver of asset condition work in the area is replacement of metalclad switchgear at three (3) stations.

Area Description

The Northeast transmission study area serves approximately 144,200 customers. The study area extends approximately 90 miles north along the western border of Vermont, from Cambridge in the south to Westport in the north, and extends approximately 45 miles to the west at its widest point to Indian Lake. The area incorporates the southeastern section of the Adirondack State Park. Much of the area load is concentrated in the southern portion of the study area, along Interstate I-87 and US Route 9, particularly in the Towns of Ballston Spa, Saratoga Springs and Glen Falls. Some of the areas offer summer recreation and see a spike in load during the summer months.

The 115kV system runs primarily in a north-south direction on both sides of Lake George. There is a single radial line, east of Lake George, which runs north from Whitehall substation, which extends to the NYSEG system and also continues north to the Port Henry substation. The western 115kV radial line extends from the Spier Falls substation to the North Creek substation in the Adirondack State Park. There is an extensive 34.5kV system in the northwestern section of the study area supplying smaller towns along interstate I-87 and Route 28.

In the Northeast transmission study area there is one distribution study area, also called Northeast. The Northeast distribution study area has a total of 111 distribution feeders that supply customers in this area. There are eighty-seven 13.2kV feeders, with twenty-five being supplied from 34.5-13.2kV transformers, and the rest supplied by 115-13.2kV transformers; Thirty-five 34.5kV sub-transmission lines that supply the distribution step down transformers in the area; Ten 4.8kV feeders with six supplied by 34.5-4.8kV transformers; and Fourteen 4.16kV feeders all supplied by 34.5-4.16kV transformers.

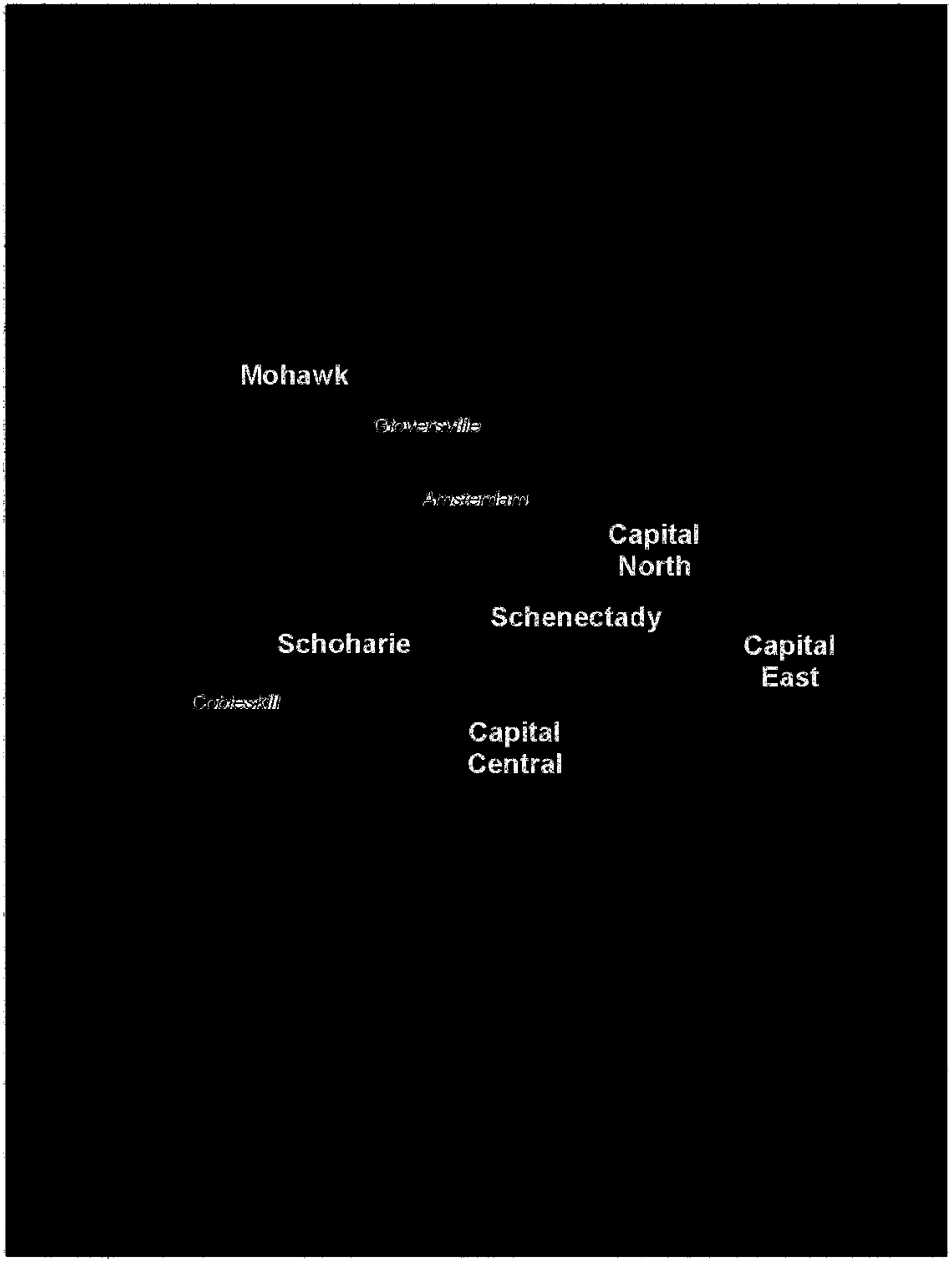
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-1
Northeast Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	AC Other	Sub-t	Capital North	11888 Randall Rd - New station - Inst/Rem sub-T lines	PPM 11888
	Oil Circuit Breaker Strategy	Tran	None	NY Oil Circuit Breaker Replacements	C37882
	Overhead Line Refurbishment Program - Asset Condition	Tran	None	Spier-West 9 Refurbishment T5770 ACR	C21694
				Ticonderoga 2-3 T5810-T5830 ACR	C39521
				Ticonderoga 2-3 T5810-T5830 SXR2	C39487
	Relay Replacement Strategy	Tran	None	Relay Replacement Stratgey	C34690
	Substation Metal-Clad Switchgear	Dist	Capital North	13342 Johnson Rd - Replace Metalclad Gear	PPM 13342
			Northeast	13341 Union St 376 - Replace Metalclad Gear	PPM 13341
				17828 Henry Street Station 316 - Replace Metalclad	PPM 17828
	Substation Power Transformer	Dist	Northeast	17807 Indian Lake - Replace Transformers	PPM 17807
Damage/Failure	D/F Other	Tran	None	NY Priority Replace Priority 4 Transformers	C31656
	Woodpole Strategy	Tran	None	Wood Pole Management - NY	C11640
Statutory or Regulatory	Northeast Region Reinforcement	Tran	None	Eastover (was Turner) Road New Line Taps - Part of NERR	C31419
				Eastover Road New 230-115 kV Station (Part of NERR)	C31326
				Mohican Battenkill #15 Rebuild Reconductor	C34528
				Reactive Comp Prog in NE Region NRRP	C35773
				Reconductoring 115kV NE Region NRRP	C35771
				Spier Rotterdam New Line - Line 302, 1, and tap	C31418
	RTU Strategy	Tran	None	RTU Replacements NERC, EMS, Obsolescence	C03772
System Capacity & Performance	Capacity Planning	Dist	Capital North	09229 Wolf Rd. 34452 UG Cable Replacement	C36470
				11886 Randall Rd - New station - M/C S/G & Cap Bank	PPM 11886
			Northeast	04989 Ogden Brook- install 13.2 kV s/gear	C32597
				11943 Sodeman Rd - New station - dist getaways, reconductoring, etc.	PPM 11943
	SC&P Other	Dist	Northeast	11318 Spier-Rotterdam Project - Dist relocations	CD0187

V B. Capital and Hudson Valley



Area Summary

Key drivers behind the transmission capacity related projects in this transmission study area include the following:

- Load growth in the area, and in the adjacent Northeast study area, will trigger potential post-contingency overloads of several 115kV lines and also the Rotterdam #7 230-115kV autotransformer. Some of these may occur at 2011 summer load levels, and others develop over the next 5-10 years as the load increases.
- Fault current levels have increased, requiring the replacement of overdutied breakers at two stations.
- Load growth will also cause post contingency voltages to drop below planning criteria levels at certain locations; timing depends on where and how quickly the load grows.

Key sub-transmission and distribution drivers include the following:

- DeLaet's Landing is a proposed Underground Commercial Development (UCD) in the City of Rensselaer with a full build out of 19MW. The developer has requested service for an initial phase which represents 2MW.
- Projects such as the Florida substation to replace Amsterdam station damaged in the August/September 2011 floods.

Area Description

The Capital and Hudson Valley study area is connected to the Utica Rome study area in the west, the New England system in the east, and the Central Hudson Gas and Electric (CHG&E) and Consolidated Edison (ConEd) systems in the south. The transmission system consists primarily of 115kV and 345kV transmission lines. There are also several 230kV lines emanating from Rotterdam Substation. The Capital and Hudson Valley study area is the east end of the Central-East interface, which is a major interface that carries power from central NY to eastern NY. [redacted]

National Grid has three 345-115kV transformers in the region; two at New Scotland and one at Reynolds Road. There are three existing and one planned 230-115kV transformers at Rotterdam. In addition, Con Ed has one 345-115kV transformer at Pleasant Valley and CHG&E has one 345-115kV transformer at Hurley Ave. Station, all of which have impacts on the National Grid system.

Within the Capital and Hudson Valley study area, there are six distribution study areas: Capital-Central, Capital-East, Capital-North, Mohawk, Schenectady and Schoharie.

The Capital-Central study area serves approximately 88,400 customers. The study area encompasses the greater Albany area, including a mixture of commercial customers heavily concentrated in downtown Albany, and industrial and residential customers spread across downtown to the suburban areas. The primary distribution system in Capital-Central is predominantly 13.2kV with pockets of 4.16kV primarily in the City of Albany and 4.8kV south of the City of Albany. Most 4kV distribution substations are supplied from the local 34.5kV sub-transmission system, whereas most 13.2kV distribution substations are supplied from the local 115kV transmission system.

The Capital-East study area serves approximately 88,200 customers. The study area is located east of the Hudson River, with the center approximately adjacent to Albany. This area extends approximately from Valley Falls in the north to Tivoli in the south. The larger load concentrations are in the cities of Rensselaer and Troy and in the towns along US Route 9. There is a 345kV source into the area at Reynolds Road substation and a 115kV corridor running in a north-south direction supplying approximately 90% of the distribution load in the area. There is also a 34.5kV sub-transmission system in the central area with the 115kV sources from Greenbush, North Troy, Hudson and Hoosick substations. In addition, there is scattered generation on the 34.5kV system in the area.

The Capital-North study area serves approximately 80,900 customers. The study area encompasses the suburban area north of the City of Albany, including a mixture of industrial, commercial and residential customers throughout Colonie, Cohoes, Watervliet, Clifton Park, Halfmoon, Waterford, Niskayuna, and Ballston. The primary distribution system in Capital-North is predominantly 13.2kV with a few pockets of 4.16kV in the Newtonville area and 4.8kV in the Town of Ballston. All 4kV distribution substations are supplied from the 34.5kV sub-transmission system, whereas most 13.2kV distribution substations are supplied from the 115kV transmission system. Maplewood and Patroon substations are the main sources for the 34.5kV sub-transmission system in this area, which is operated in loop configuration. Along with these facilities, a group of hydro and cogeneration power plants located along the Mohawk River [redacted] form the backbone of the local 34.5kV sub-transmission system. In addition to supplying power to all 4kV and a few 13.2kV distribution substations, the 34.5kV sub-transmission system serves several industrial customers such as Mohawk Paper, Honeywell, Norlite, and Cascade Tissue. Major distribution customers in this area include the Albany International Airport, which is supplied by feeders from Forts Ferry, Sand Creek, Wolf Road, and Inman Road substations.

The Mohawk study area serves approximately 55,600 customers. The study area includes the city of Amsterdam and the rural areas west of the city. This area is comprised of mostly residential customers and farms with some commercial and industrial customers located in areas such as the City of Amsterdam, Gloversville, Johnstown, Northville, and Canajoharie. The primary distribution system in Mohawk is predominantly 13.2kV with areas of 4.16kV (Gloversville and Johnstown areas) and 4.8kV (Canajoharie). Most 4kV distribution substations are supplied from the 23kV and 69kV sub-transmission system, whereas most 13.2kV distribution substations are supplied from the 115kV transmission system.

The Schenectady study area serves approximately 58,100 customers. The study area is defined by the region that includes the City of Schenectady and the surrounding suburban areas. This area includes a mixture of industrial, commercial and residential customers spread across downtown to suburban areas such as Niskayuna, Glenville, and Rotterdam. The primary distribution system in Schenectady area is predominantly 13.2kV with a few pockets of 4.16kV (Schenectady, Scotia and Rotterdam areas). All 4kV distribution substations are supplied from the local 34.5kV sub-transmission system, whereas most 13.2kV distribution substations are supplied from the local 115kV transmission system. In addition, the downtown areas of Schenectady are served by a general network that is supplied by the Front Street Substation. Rotterdam, Woodlawn and Rosa Rd. are the main sources for the local 34.5kV sub-transmission system, which is operated in loop configuration.

The Schoharie study area serves approximately 21,500 customers. The study area is defined by the region west and south of Schenectady that include towns and villages along the I-88 and Rt. 20 corridors such as Delanson, Schoharie, Cobleskill, Schenevus, and Sharon Springs. This area is mostly rural comprised mainly of residential customers and farms with few commercial and industrial customers. The primary distribution system in Schoharie is predominantly 13.2kV with areas of 4.8kV (Cobleskill, Worcester, and Schenevus areas). Most distribution substations in this region are supplied from the local 23kV and 69kV sub-transmission system. Marshville and Rotterdam are the main sources for the local 69kV sub-transmission system which is operated in loop configuration. The 69kV sub-transmission system supplies power to both 4kV and 13.2kV distribution substations, besides a few industrial and commercial customers, such as Guilford Mills and SUNY Cobleskill. The existing 23kV sub-transmission system in Schoharie, which supplies power to East Worcester, Worcester, and Schenevus substations, is operated in radial configuration from Summit substation.

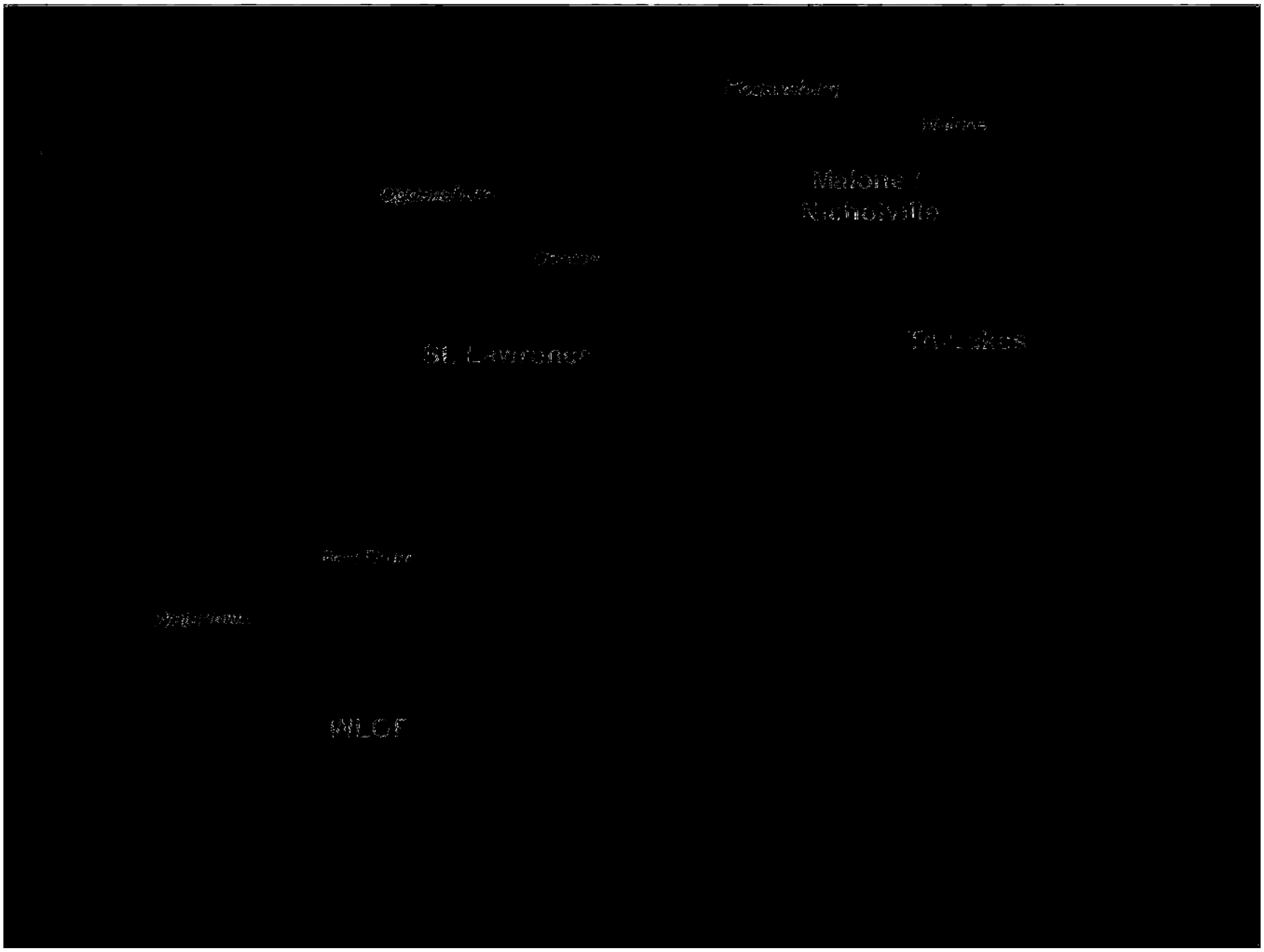
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-2
Capital and Hudson Valley Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Cable Replacement	Dist	Capital Central	09224 Riverside 28855 UG Cable Replacemen	C36468
			Capital East Hudso	09220 Liberty St. UG Cable Replacement	C36469
	Substation Metal-Clad Switchgear	Dist	Schenectady	05846 Emmet St - Repl TB1 and mclad	C17952
				09244 Chrisler Metal Clad Replacement	C36213
	Sub-T Overhead Line	Sub-t	Mohawk	05275 Amsterdam-Rotterdam 3/4 Relocation	C33182
				05948 Gloversville - Canaj. #6 Refurbish	C16236
	Transformer Replacement Program	Tran	None	Greenbush - Replace TB3	C31663
	U-Series Relay Strategy	Tran	None	Leeds - Replace U Series Relays	C24663
Damage/Failure	D/F Other	Dist	Mohawk	17430 New Florida Station	PPM 17430
System Capacity & Performance	SC&P Other	Dist	Capital Central	05256 Albany Network Study Construction	CD0016
		Tran	None	Eastern NY 115kV Capacitor Additions	CNYPL7
				Replace overdutied 115kV breakers at Maplewood- CNYPL25	C39863

V C. Northern



Area Summary

Key drivers behind the transmission capacity related projects in this study area include the following:

- Refurbishment of several transmission lines.
- The interconnection of several wind generation projects.

Key sub-transmission and distribution drivers include the following:

- Sub-transmission automation installations on Lines 21/23/26.

A potential major driver for the area is the North Country Power Authority (NCPA) takeover of the electrical system in portions of St. Lawrence and Franklin Counties.

Area Description

The Northern transmission study area includes the 115kV transmission facilities in the Northern Region and the northeast portion of the Mohawk Valley Region.

The backbone of the 115kV Northern area system runs from National Grid ALCOA substation to Boonville substation. The major substations along the 115kV transmission corridor are Browns Falls, Colton, Dennison and Taylorville.

The Jefferson/Lewis county area is bounded by the #5 – #6 Lighthouse Hill-Black River lines to the west and the #5 – #6 Boonville-Taylorville lines to the east. The Ogdensburg-Gouverneur area is served by the #7 Colton-Battle Hill, #8 Colton-McIntyre and the #13 ALCOA-North Ogdensburg 115kV lines. The #1 – #2 Taylorville-Black River lines and the #3 Black River-Coffeen support the load in the Watertown area. The Thousand Island region is served by the #4 Coffeen-Thousand Island 115kV radial line. The Colton-Malone #3, Malone-Lake Colby #5, and Willis-Malone #1 (NYPA) 115kV lines serves the Tri Lakes region. The Akwesasne #21 115kV Tap served from the Reynolds/GM #1 (NYPA) 115kV line supplies part of the Nicholville - Malone area.

Within the Northern study area, there are four distribution study areas: Nicholville-Malone, St. Lawrence, Tri-Lakes and WLOF (Watertown, Lowville and Old Forge). The Nicholville - Malone study area serves approximately 18,500 customers. There are total of twenty seven feeders (twenty 4.8kV and seven 13.2kV feeders) in the study area. The distribution substations are primarily supplied from the 34.5kV system with exception of Malone 13.2kV and Akwesasne 4.8kV substations that are served by the 115kV system. The main supplies for the 34.5kV sub-transmission system are Akwesasne, Malone, and Nicholville substations. It is operated as a radial system due to loading issues although the system is constructed as a loop design. There are also two hydroelectric facilities connected to the system[redacted]

The St. Lawrence area serves approximately 44,100 customers. There are twenty-six 4.8kV feeders and thirty 13.2kV feeders in the study area. The distribution substations are supplied from 23kV and 34.5kV sub-transmission lines with exception of four substations, Corning, Higley, North Gouverneur and Ogdensburg substations that are served from the 115kV system. The main supplies for the 23kV sub-transmission system are Balmat, Little River, McIntyre, Mine Rd. and Norfolk substations. Brown Falls substation is the main supply for the 34.5kV sub-transmission system.

The Tri Lakes area serves approximately 11,300 customers. There are twenty nine 4.8kV, two 2.4kV feeders and six 13.2kV feeders in the study area. Most of the distribution substations are supplied from the 46kV sub-transmission system with the exception of Lake Colby and Ray Brook substations that are served from the 115kV system. The supply for 46kV sub-transmission system in the area is Lake Colby substation. There are two municipal electric companies supplied via the 46kV sub-transmission in the Tri-Lakes area, Lake Placid and Tupper Lake.

The WLOF area serves approximately 81,300 customers with a peak load of 253MW. The study area has thirty six 4.8kV feeders and thirty nine 13.2kV feeders. The distribution substations are primarily supplied from the 23kV and 46kV sub-transmission system with the exception of a few substations that are served from the 115kV system. The main sources to the 23kV sub-transmission system are Black River, Coffeen, Indian River, North Carthage and Taylorville substations. The main supply for the 46kV sub-transmission system is Boonville substation.

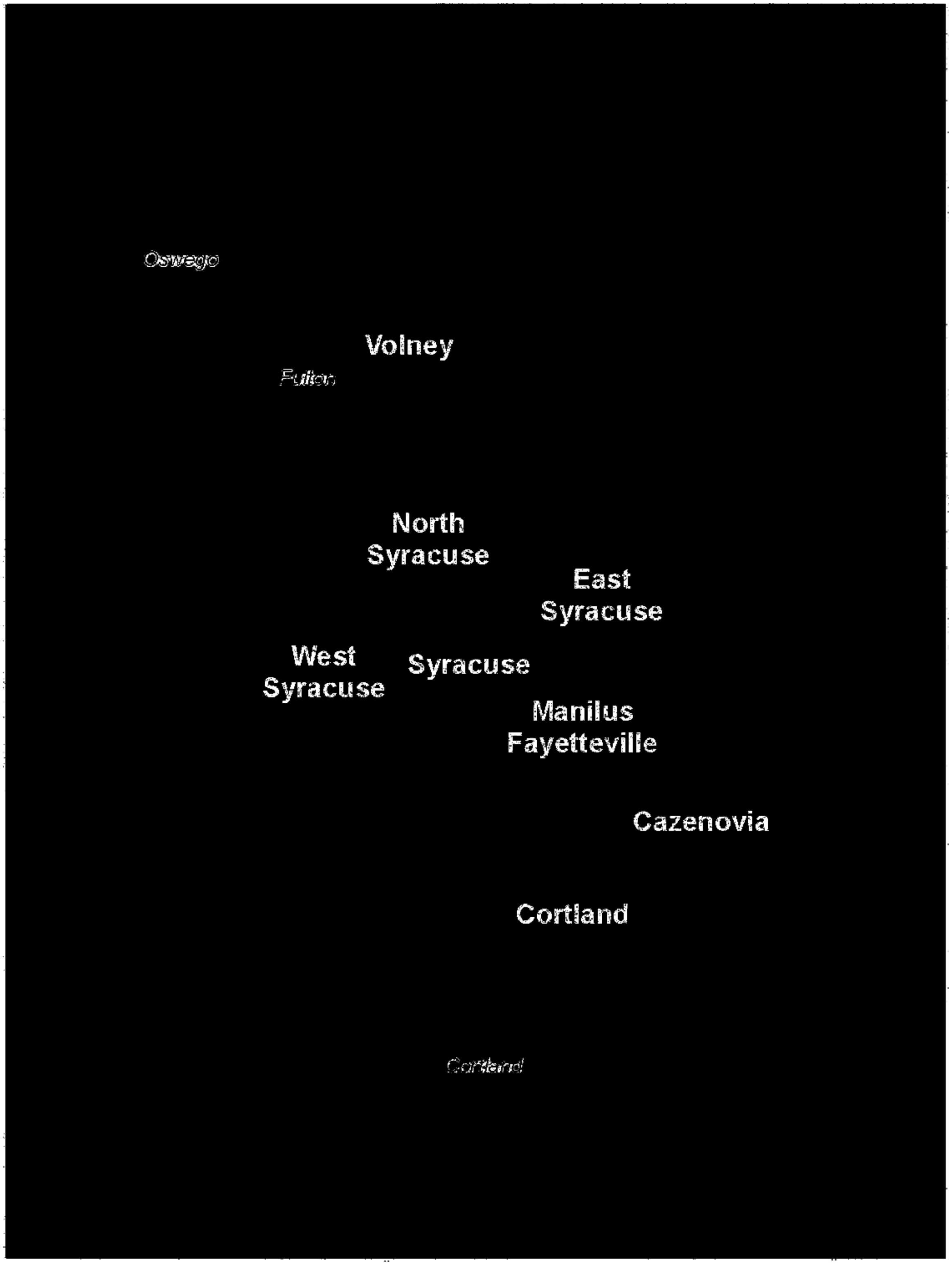
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-3
Northern Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Overhead Line Refurbishment P	Tran	None	Taylorville - Boonville 5-6 T3320-T3330 ACR	C27437
				Taylorville-Moshier 7, T3340 LER - Central Div.	C24361
Statutory or Regula	Generation	Tran	None	Cape Vincent Wind-RTU/Metering/Relay upgrades	CNYX60
				Clayton Wind-Loop in, Loop-out	CNYX70
				Clayton Wind-RTU/Metering/Relay upgrades	CNYX71
				St Lawrence Wind-RTU/Metering/Relay upgrades	CNYX56
				Tug Hill Wind-RTU/Metering/Relay upgrades	CNYX62
Statutory or Regulatory	Public Requirements	Sub-t	WLOF	05769 DOTR NYSRt28 White Lk-McKeever SubT	C34722
System Capacity & Performance	Overhead Line Refurbishment Program - System Capacity & Performance	Tran	None	Browns Falls-Taylorville 3-4 ACR	C24359
				Coffeen-Lighthouse Hill 5, T2120 ACR	C24360
	Sub-T Automation	Sub-t	Malone/Nicholville	09214 DA - NC SubT Auto. Lines 21/23/26	C35866

V D. Syracuse Oswego Cortland



Area Summary

The drivers behind the transmission capacity related projects in the Syracuse Oswego Cortland (SOC) study area are:

- Area load has, over time, reached levels that result in potential post-contingency overloading of one of the Clay 345-115kV autotransformers, as well as three 115kV circuits in the Syracuse area.
- Fault current levels have been identified in excess of the interrupting capability of breakers at six different substations in the area.
- [redacted]

Key sub-transmission and distribution drivers include the following:

- Load growth in the Syracuse University and the North Syracuse areas are major drivers of distribution capacity work.
- The condition of the Ash St. substation is an asset condition driver.

Area Description

The SOC study area includes the 345kV and 115kV transmission facilities in the Central Region and all of the 115kV and above transmission facilities around the Oswego Complex area, including the 345kV Scriba and Volney stations.

The SOC area is bordered by Elbridge substation in the West, Cortland substation in the South, Oneida substation in the East, and Clay substation in the North. The major substations in the area include [redacted] This area also includes some of the assets stretching between Mortimer and Elbridge.

Within the SOC study area, there are eight distribution study areas: Cazenovia, Cortland, East Syracuse, Manilus-Fayetteville, North Syracuse, Syracuse, Volney and West Syracuse.

The Cazenovia study area serves approximately 6,500 customers. The study area is a very rural region, with the Village of Cazenovia and the Cazenovia Industrial Park being the only large loads. The distribution system consists of one 34.5-13.2kV, and four 34.5-4.8kV substations. The only physical constraint is Cazenovia Lake and the residential load which is spread around the Cazenovia Lake.

The Cortland study area serves approximately 32,800 customers. The study area is defined by the region that includes the City of Cortland and the surrounding towns and villages. It is located in central New York between Syracuse and Binghamton. The primary distribution system voltages in Cortland are 13.2kV and 4.8kV. Most of the area is fed from a 34.5kV sub-transmission system supplied out of the Cortland and Labrador substations.

The East Syracuse study area serves approximately 16,000 customers. The study area is an industrial suburb of the City of Syracuse. The distribution system consists of one 115-34.5kV, three 115-13.2kV and three 34.5-4.8kV substations. The transmission supply is adequate and the only physical barriers are Interstate 690 and Interstate 481 going through the area. Customers are served via fifteen 13.2kV feeders and eleven 4.8kV feeders.

The Manlius Fayetteville study area serves approximately 22,400 customers. The study area is a residential suburb of Syracuse. The distribution system consists of one 115-34.5kV, four 115-13.2kV and one 34.5-4.8kV substation. Most new load additions to the area are residential developments.

The North Syracuse study area serves approximately 65,800 customers. The study area is the northern suburb of the City of Syracuse. It has experienced the majority of the new housing which has been built in the Syracuse metropolitan area. The distribution system consists of one 115-34.5kV, eight 115-13.2kV and five 34.5-4.8kV stations. The physical barriers in the North Syracuse area are the two interstates highways, I-81 and I-90.

The Syracuse study area serves approximately 58,100 customers. The study area is made up of the City of Syracuse in central New York as well as the Village of Skaneateles about 20 miles southwest of the city. The primary distribution system voltages in Syracuse are 13.2kV and 4.16kV. There is also a 12kV network fed out of Ash St. substation. Most of the area is fed from a 34.5kV sub transmission system supplied by Ash St, Elbridge, Solvay, Teall Ave., and Tilden substations. There is also some 13.2kV fed directly from the 115kV transmission system.

The Volney study area serves approximately 53,800 customers. The study area includes the cities of Oswego and Fulton. The distribution system consists of four 115-34.5kV, seven 115-13.2kV, five 34.5-13.2kV and nine 34.5-5kV substations. A physical barrier in this area is the Oswego River, which is also a canal.

The West Syracuse study area serves approximately 21,000 customers. The study area is a suburb west of the City of Syracuse. The distribution system consists of one 115-34.5kV, two 115-13.2kV, three 34.5-5kV substations and five 5kV substations.

Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-4
Syracuse Oswego Cortland Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Shieldwire Strategy	Tran	None	Shieldwire: Clay-Dewitt 3 - Central Div.	C28709
	Substation Indoor	Dist	Syracuse	11877 Rock Cut #286 2nd Tranf and Metalclad	PPM 11877
	Substation Metal-Clad Switchgear	Dist	North Syracuse	13345 Hopkins 253 - Replace Metalclad Gear	PPM 13345
		Sub-t	Syracuse	04587 Ash Street-Replace Metal Clad Sub	C36104
	U-Series Relay Strategy	Tran	None	LN17 - Replace Type U Series Relays	C24661
Damage/Failure	D/F Other	Tran	None	Grooms Rd-Forts F 13 T6360 Gravel P	C38382
Statutory or Regulatory	Clay Station Rebuild	Tran	None	Clay Station Line Project	C32539
	Generation	Tran	None	Green Power-Cody Rd-RTU,metering	CNYX69
	[redacted]	Tran	None	[redacted]	C28705
System Capacity & Performance	Capacity Planning	Dist	Cortland	04904 NC Starr Rd. Second Xfrm	C32503
			East Syracuse	09236 Bridge St. Second Transformer	C36185
			Manlius/Fayetteville	04748 Duguid Second Transformer	C32497
			North Syracuse	04895 N Syracuse Capacity Inc	C28831
				06243 N Syracuse Sub Getaways	C30506
				06978 North Syracuse Substation DxT	C36985
			West Syracuse	04812 Harris Second Transformer	C32496
	SC&P Other	Dist	East Syracuse	09250 East Malloy- feeders and getaways	C36188
				13866 East Malloy- low side sub equipment	PPM 13866
				14031 Fly Rd Low side feeders/getaways	PPM 14031
		Tran	None	Replace overdutied 115kV breakers at Central and Mohawk Valley	CNYPL26
				Syracuse Area Reconductoring	CNYPL28
				Upgrade Breakers at Scriba Sub - Central Division	C28708
				Westzel Rd. Substation T-Line	C36983

[redacted]

V E. Utica Rome

[redacted]

Area Summary

The drivers behind the transmission capacity related projects in this study area are:

- [redacted]
- Other issues found in this area are addressed by operational solutions.

The drivers behind the sub-transmission and distribution projects in this study area are:

- Replacement of metalclad switchgear at Onieda.

Area Description

The Utica Rome transmission study area includes the 115kV and above transmission system with the northern boundaries at Boonville and Lighthouse Hill substations, west at Oneida, and east at Inghams substation.

Within the Utica Rome study area, there are four distribution study areas: Oneida, Rome, Utica and WLOF (Watertown, Lowville and Old Forge).

The Oneida study area serves approximately 21,200 customers. The study area includes the City of Oneida and the Village of Canastota. In the City of Oneida the Oneida Hospital has dual distribution supplies. Across the street from the hospital is the H.P.Hood Dairy Products Inc. facility which represents 4MVA of the load and also has dual distribution supplies. The Village of Canastota which is located in western section of the Oneida area has several large commercial and industrial customers including Canastota Industrial Park, Owl Wire and Cable, Inc and Die Molding Inc. A geographic constraint is the distance to other substations and the lack of feeder ties. There have been improvements to feeder ties between the Oneida and Peterboro substations. Developing these ties was challenging due to the New York State Thruway (Interstate 90), which is located between the two substations.

The Rome area serves approximately 27,500 customers. There are thirty 4.8kV feeders and seventeen 13.2kV feeders in the study area. All distribution substations are supplied from the 115kV system. As a result there are no sub-transmission lines in the area.

The Utica study area serves approximately 91,100 customers. The study area includes the City of Utica. The distribution system consist of four 115-46kV, ten 115-13.2kV, four 46-13.2kV and seven 46- 5kV substations.

The WLOF-MV (Watertown, Lowville and Old Forge - Mohawk Valley) study area serves approximately 81,300 customers. There are thirty-six 4.8kV feeders and thirty nine 13.2kV feeders. The distribution substations are primarily supplied from the 23kV and 46kV sub-transmission system with the exception of a few substations served by the 115kV system. The main sources to the 23kV sub-transmission system are Black River, Coffeen, Indian River, North Carthage and Taylorville substations. The main supply for the 46kV sub-transmission system is Boonville substation.

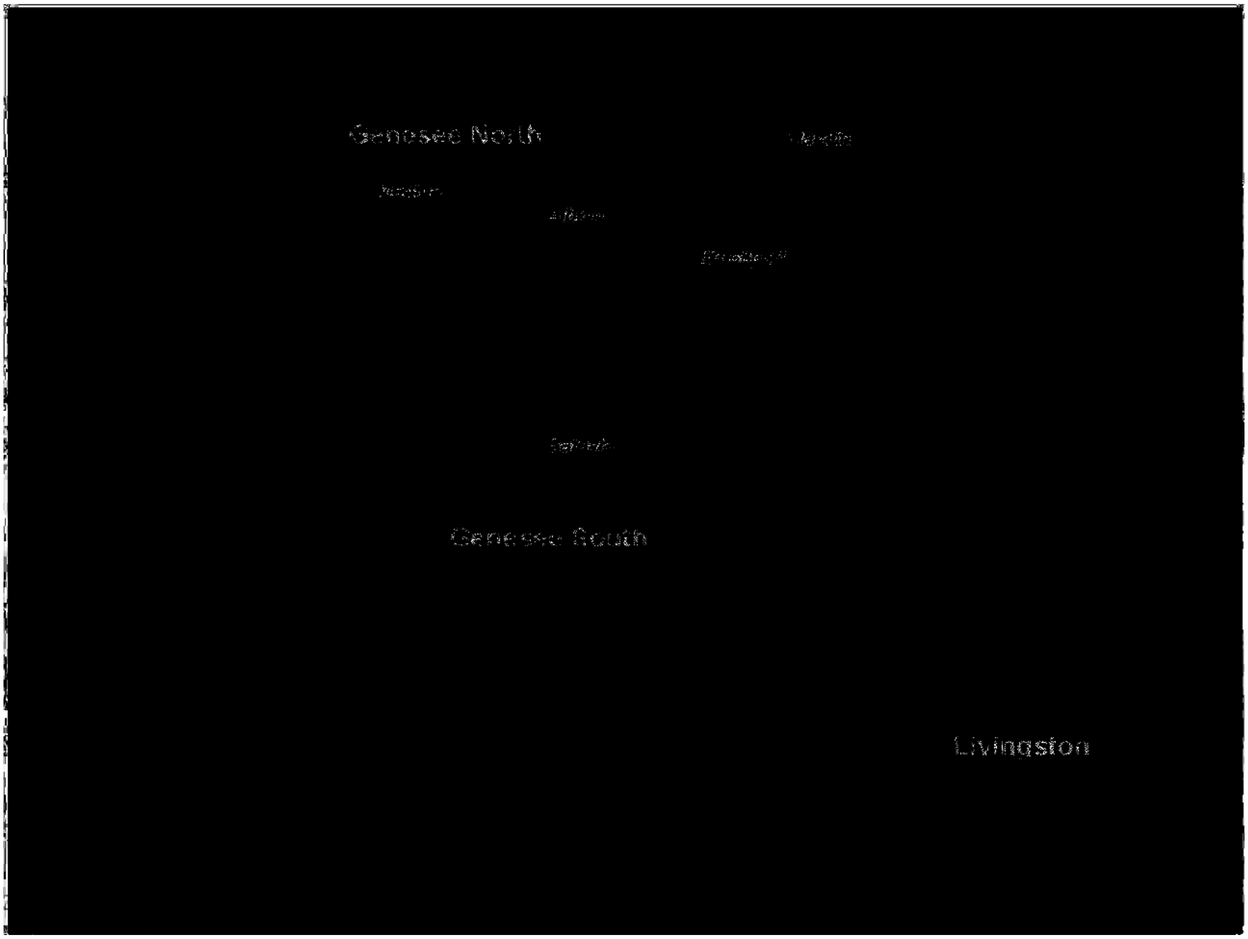
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-5
Utica Rome Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Cable Replacement	Dist	Utica	09226 Utica UG Cable Replacement	C36446
	Overhead Line Refurbishment Program - Asset Condition	Tran	None	Boonville - Rome #3	CNYAS54
				Porter Rotterdam 31, T4210 ACR	C30890
	Substation Metal-Clad Switchgear	Sub-t	Oneida	05059 Replace/Relocate 13.8kV SG @Oneida	C25139
	Substation Power Transformer	Dist	Utica	17806 Rock City Station 623 - Transformer Replacement	PPM17806
	Substation Rebuild	Tran	None	LightHH 115kV Yard Repl & cntrl hse	C31662
				Rome 115 kV Station	C03778
Statutory or Regulatory	[redacted]	Tran	None	[redacted]	C28686

V F. Genesee



Area Summary

Key transmission projects in the Genesee study area have the following drivers:

- Low post-contingency voltages in the area in general and at Golah in particular for current load levels.
- Low post-contingency voltages developing in the 2015 to 2025 time frame in the Batavia and Brockport areas as a result of load growth.
- Heavy post-contingency conductor loadings in the Batavia Station (existing loads), on the Lockport-Batavia #107 line (load growth, 2015) and on the Mortimer-Hook Rd. #1 line (load growth, 2025).

Key sub-transmission and distribution drivers include the following:

- Capacity issues are being addressed with the south Livingston Station projects.

Area Description

The Genesee transmission study area includes National Grid assets within NYISO Zone B. The area includes assets as far west as Lockport and as far east as Mortimer. The system consists of several 115kV circuits between Lockport and Mortimer stations. Three circuits go directly from Lockport to Mortimer, three circuits go from Lockport to Batavia and several circuits in series connect Batavia and Golah. Today one 115kV line and one 69kV line travel between Mortimer and Golah.

Two 345kV circuits owned by NYPA travel parallel to this area from Niagara to Rochester. [redacted]

[redacted]

This area also includes some of the assets stretching between Mortimer in the Western Region and Elbridge in the Central Region.

Within the Genesee study area, there are three distribution study areas: Genesee North, Genesee South and Livingston.

The Genesee North study area serves approximately 44,300 customers. There are a total of 51 distribution feeders that supply customers in this area. There are twenty 13.2kV feeders, with four being supplied from 34.5-13.2kV transformers, and the rest are fed from 115-13.2kV transformers. The thirty one 4.8kV feeders are all fed from 34.5-4.8kV transformers. There are ten 34.5kV sub-transmission lines that supply the distribution step down transformers in the area.

The Genesee South study serves approximately 37,100 customers. The study area is defined by the region that includes the City of Batavia and the surrounding towns and villages. It is located east of Buffalo and southwest of the City of Rochester. The primary distribution system voltages in Genesee South are 13.2kV and 4.8kV. Most of the 13.2kV system is fed from the area 115kV transmission system. The rest of the 13.2kV system, as well as the 4.8kV system, are fed from a 34.5kV sub-transmission system supplied out of the North Akron, Batavia, North Leroy, and Oakfield substations. There are several customers supplied directly from the sub-transmission system.

The Livingston study area serves approximately 21,700 customers. The study area is made up of Livingston County which is south of Rochester and east of Batavia. The primary distribution system voltages in Livingston are 13.2kV and 4.8kV. Most of the area is fed from a 34.5kV sub-transmission system supplied out of the Golah and North Lakeville substations. There is also one 13.2kV station fed directly from the 115kV and some 69kV sub-transmission in the area.

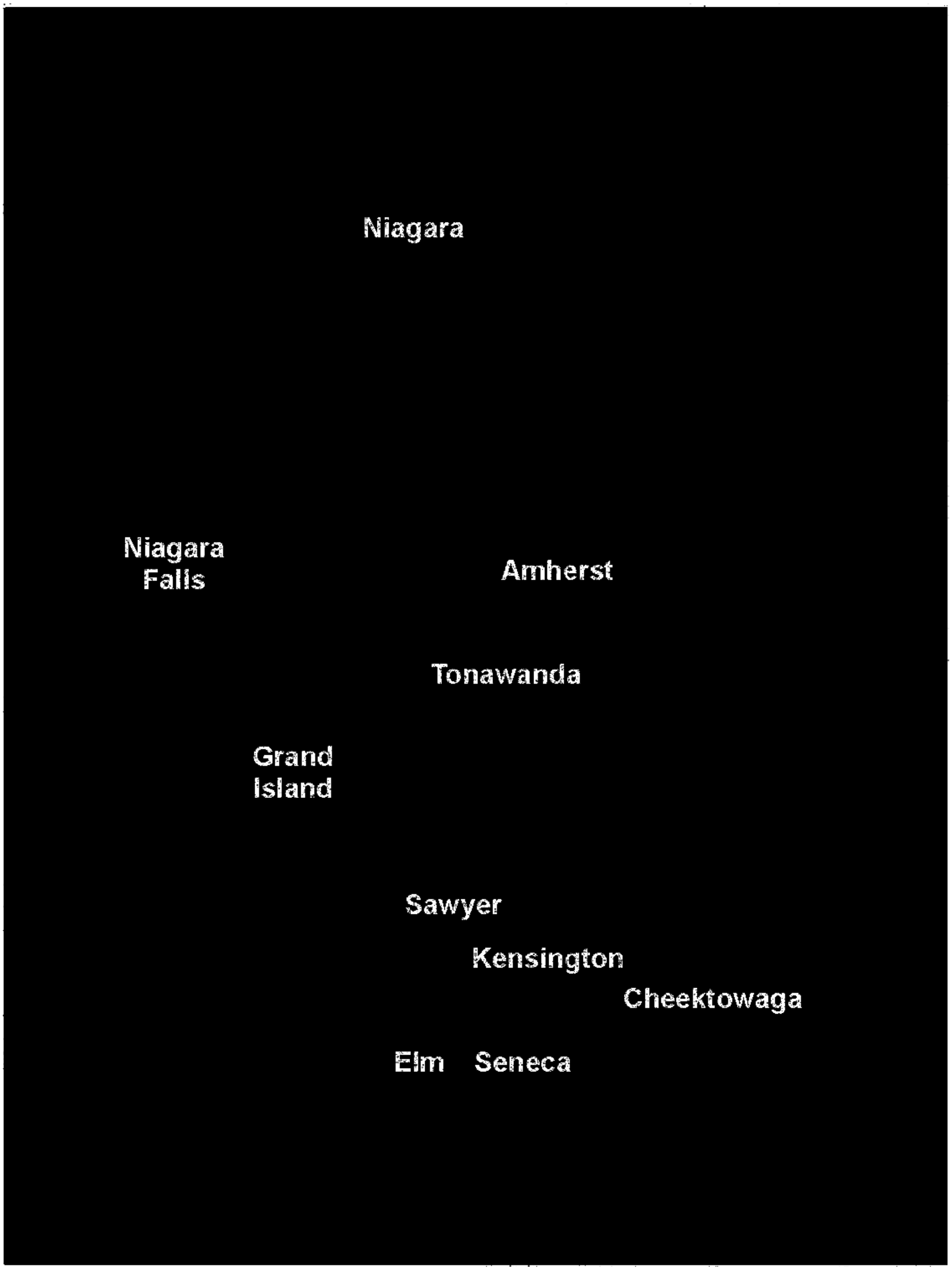
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-6
Genesee Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Overhead Line Refurbishment Program - Asset Condition	Tran	None	Alabama - Telegraph 115 & 111 Tap Refurbishment T1530-1	C33014
				Lockport-Batavia 112, T1510 ACR	C03422
				Lockport-Bativa 108 Refurb	C27431
				Lockport-Mortimer 111 T1530 ACR	C03417
Statutory or Regulatory	Generation	Tran	None	Alabama Ledge Wind-RTU/Metering/Relay upgrades	CNYX64
System Capacity & Performance	Capacity Planning	Dist	Livingston	13245 South Livingston Relief - Station Work	PPM 13245
				13246 South Livingston relief - DLine work	PPM 13246
	Reliability Criteria Compliance	Tran	None	Batavia Second 115 kV Cap Bank	C31478
				Conversion of #109 to 115 kV	C24629
				Golah work for #109 conversion	C24631
				Mortimer work for #109 conversion	C24630

V G. Frontier


Niagara
Niagara
Falls
Amherst
Tonawanda
Grand
Island
Sawyer
Kensington
Cheektowaga
Elm
Seneca

Area Summary

The principal drivers for transmission projects in this area, from a capacity and asset condition perspective, are:

- Low post-contingency voltages at Huntley and Gardenville.
- [redacted].
- High post-contingency autotransformer loadings on the 230-115kV banks at Gardenville.
- High post-contingency 115kV line loadings on lines extending south and east from Niagara, Packard, and Gardenville.
- The proposed rebuild of Old Gardenville Station to address station configuration issues as well as asset condition issues and the replacement of obsolete relays. The project is currently in preliminary engineering with major construction anticipated to commence in FY14.

Key sub-transmission and distribution drivers include the following:

- Reliability issues and load growth in the Amherst area. There is approximately 10MVA of new load identified in the area. The new Frankhauser Substation will alleviate these issues.
- Load growth of 5 - 10MW associated with the new Buffalo Niagara Medical Campus will be served by Elm Street substation.
- Area loading requiring the upgrade of multiple Buffalo area substations, including Buffalo Station 56 and Buffalo Station 214.
- Indoor substations are an asset condition issue and there are several replacement projects in progress.

Area Description

The Frontier transmission study area includes assets within NYISO Zone A. The area includes assets as far east as Lockport, the Niagara and Buffalo areas and the system stretching south to Gardenville. [redacted]

Within the Frontier study area there are ten distribution study areas: Amherst, Cheektowaga, Elm, Grand Island, Kensington, Niagara, Niagara Falls, Sawyer, Seneca and Tonawanda.

The Amherst study area serves approximately 58,900 customers. The study area is located east of Tonawanda and Niagara, and north of the City of Buffalo and encompasses the towns of Amherst, Pendleton, Wheatfield, Wilson and Lewiston. The Erie Canal divides the study area and may present challenges in creating new feeder ties and recommended supply expansion. The primary distribution system in Amherst is predominantly 13.2kV and 4.16kV, with Buffalo Station 138 supplying two 4.8kV distribution feeders. The area substations are supplied by the 115kV transmission system with the exception of Buffalo Station 58 and Buffalo Station 124, which are supplied by 34.5kV sub-transmission lines originating from Youngman Terminal Station and Buffalo Station 67, which is supplied by the 34.5kV sub-transmission lines originating from Walden substation.

The Cheektowaga study area serves approximately 8,000 customers. The area is located east of the City of Buffalo. There are several stations in this area that are supplied by 115kV transmission lines. Walden is the largest and has two transformers that serve the 34.5kV sub-transmission system. Dale Rd. Substation is 115-13.2kV, while Buffalo substations 61 and 154 are 115 - 4.16kV. The remaining substations in the area are 34.5-4.8kV or 34.5-4.16kV. Buffalo Substation 146 has a 34.5 - 4.8kV and a 34.5 - 13.2kV transformer.

The Elm study area serves approximately 1,700 customers and is part of the City of Buffalo. It contains the downtown area as well as surrounding urban areas with a mix of residential, commercial and industrial loads. Elm Street Substation is a 230-23kV station that supplies the Buffalo network as well as the sub-transmission supply to several distribution stations. The Buffalo network has approximately 120MW of load. Most of the load is served by a low voltage AC general network which is supplied by multiple paralleled transformers with multiple 23kV supply cables thus providing very high reliability.

The Grand Island study area serves approximately 8,000 customers. The study area is made up of Grand Island which is between the City of Buffalo and Niagara Falls. It is primarily suburban and rural residential with areas of commercial and industrial parks. There are two National Grid substations supplied from 115kV lines with distribution feeders at 13.2kV.

The Kensington study area serves approximately 37,100 customers. There are eighty 4.16kV feeders, all fed from thirty eight 23-4.16kV transformers and nineteen 23kV sub-transmission lines. The Kensington Substation has four 115-23kV transformers, and provides the supply to the 23kV sub-transmission system. This substation is located in the City of Buffalo and the study area contains significant amounts of underground distribution mainlines and overhead laterals. The Kenmore Terminal Station supplies several smaller commercial customers and the South Campus of the SUNY at Buffalo.

The Niagara study area serves approximately 12,400 customers. The study area encompasses the towns of Lewiston, Porter, and Wilson. The study area is bordered to the west by Niagara River, to the North by Lake Ontario, and to the south by Power Reservoir. Area distribution is served primarily at 4.8kV and supplied by a 34.5kV sub-transmission network. The 34.5kV sub-transmission network operates in a loop system that is supplied by both Mountain and Sanborn 115-34.5kV substations. Swann Road supplies a significant portion of this area and is 115-13.2kV.

The Niagara Falls study area serves approximately 38,700 customers. The study area is bordered to the north, south, and west by the Niagara River. The Power Reservoir also borders the area to the north, east of the Niagara River. Interstate 190 runs from the north to the south along the eastern section of the study area. The CSX Railroad runs from the east to the west along the northern section of the area. The Niagara Falls International Airport lies east of the city. These boundaries limit feeder ties and distribution supply expansion in the area. The area is supplied primarily by the 115kV transmission system, however, a 12kV sub-transmission system is supplied by Harper and Gibson substations. Distribution load is served by 13.2kV, 4.8kV, and 4.16kV circuits.

The Sawyer study area serves approximately 62,500 customers. The study area contains portions of the City of Buffalo and the Town of Tonawanda. There are 164 4.16kV feeders supplying the area which are supplied by 33 23kV supply cables and multiple, paralleled transformers.

The Seneca study area serves approximately 48,400 customers. The study area is the southeast section of Buffalo. It is served primarily from the Seneca Terminal Station which has four 115-23kV transformers and serves 25 supply lines at 23kV. The majority of the distribution substations are served by four supply cables and have four 23-4.16kV transformers. As throughout the City of Buffalo, almost all distribution load is served at 4.16kV.

The Tonawanda study area serves approximately 41,300 customers. The study area encompasses the City of North Tonawanda as well as a portion of the City and Town of Tonawanda. Bordering the western section of the area is the Niagara River. Ellicott Creek flows parallel to Tonawanda Creek in the northern part of the town of Tonawanda, with a confluence just east of the Niagara River. These creeks flow through the central part of the area from east to west. The eastern section of the area is bordered by the Town of Amherst and forming the southern border is the Village of Kenmore and the City of Buffalo. The area is served primarily by the 115kV transmission system and the 23kV sub-transmission system. Distribution voltage is served primarily by 4.16kV feeders.

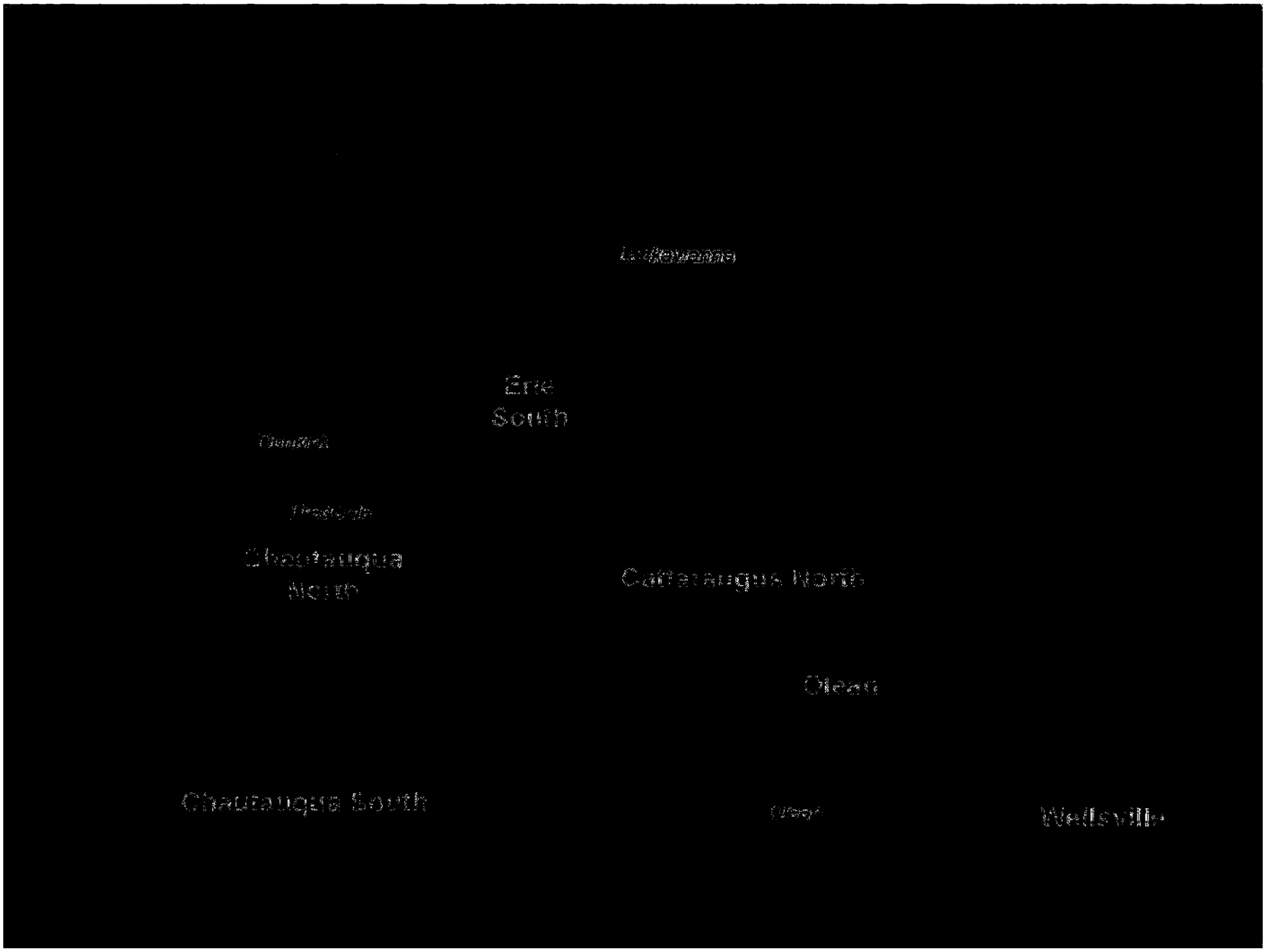
Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-7
Frontier Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	Buffalo Street Light	Dist	None	18022 Buffalo Street Light Cable Replacement	PPM 18022
	Overhead Line Refurbishment Program - Asset Condition	Tran	None	Gard-Dun 141-142 T1260-70 ACR Senec	C34193
				Gardenville Lines 180-182, T1660-T1780 ACR	C27436
	Shieldwire Strategy	Tran	None	Shieldwire: Gardenville-Buffalo 145-146	C28683
	Substation Indoor	Dist	Kensington	04654 Buffalo Station 27 Rebuild - Sta	C33473
				04657 Buffalo Station 31 Rebuild - Sub	PPM 04657
				05411 Buffalo Station 27 Rebuild - Line	C33476
				05419 Buffalo Station 31 Rebuild - Line	PPM 05419
			Sawyer	04635 Buffalo Indoor Sub. #29 Refurb.	C06722
				04637 Buffalo Indoor Sub. #52 Refurb.	C25659
				04663 Buffalo Station 37 Rebuild - Sub	C33474
				05430 Buffalo Station 37 Rebuild - Line	C33477
			Seneca	04670 Buffalo Station 59 Rebuild - Sub	C33475
				05434 Buffalo Station 41 Rebuild - Line	PPM 05434
	Substation Power Transformer	Dist	Amherst	17805 Station 124 - Almeda Ave Transformer Replacement	PPM 17805
	Substation Rebuild	Tran	None	Gardenville - Rebuild Line Location	C30084
				Gardenville 115kV Station Rebuild	C05156
	Sub-T Overhead Line	Sub-t	Niagara	06971 Youngstown-Sanborn 403 Refurbish	C34462
System Capacity & Performance	Capacity Planning	Dist	Amherst	04792 Frankhauser New Station - T Sub Work	C36520
				05920 Frankhauser New Station - Line Work	C28929
				09273 Shawnee Road 76 (DSub)	C36059
			Niagara	06981 Sanborn Substation Rebuild (D-Sub)	C36857
			Niagara Falls	09263 Military Road 210 - Install TB#2	C36056
			Sawyer	09239 Buffalo Sta 56- upgrade 4 Xfmrs	C36502
			Tonawanda	05139 Station 214 - Install TB2	C29186
				06675 Station 214 - New F21466/67	C29187
		Sub-t	Kensington	05380 Buffalo 23kV Reconductor - Kens2	C28903
				05381 Buffalo 23kV Reconductor - Kensing.	C28894
			Sawyer	05378 Buffalo 23kV Reconductor - Huntley	C28892
				05379 Buffalo 23kV Reconductor - Huntley2	C28893
	SC&P Other	Tran	None	Upgrade Niagara-Packard #195	C29945

V H. Southwest



Area Summary

The driver behind the transmission capacity related projects in the Southwest study area is:

- A wide range of contingencies can result in voltages well below criteria at various locations in this study area. The vulnerability of the area to these voltage issues is significantly amplified if certain key generators are not operating.

Key sub-transmission and distribution drivers include the following:

- The 34.5kV sub-transmission system that consists of several very long loops that traverse through rugged territory.

- Asset condition issues at Steamburg station.

Area Description

The Southwest transmission study area includes the system as far north as Gardenville [redacted]

Within the Southwest study area, there are six distribution study areas: Cattaraugus – North, Chautauqua - North, Chautauqua – South, Erie - South, Olean and Wellsville.

The North Cattaraugus study area serves approximately 14,700 customers. There are seven 13.2kV feeders, five of which are fed via two-115-13.2kV transformers at the Valley substation. The remaining two-13.2kV feeders are fed from 34.5-13.2kV transformers at the Price Corners and Reservoir substations. There are also twenty 4.8kV feeders, all supplied by 34.5-4.8kV transformers at various area substations. There are seven 34.5kV sub-transmission lines that provide supply for the 34.5-4.8kV transformers and a minimal number of industrial customers that are supplied directly from the 34.5kV system. There are several NYSEG substations and municipal electric departments supplied from the 34.5kV system.

The North Chautauqua study area serves approximately 26,100 customers. There are ten 4.8kV feeders, which are all fed from 34.5-4.8kV transformers. There are also twenty 13.2kV distribution feeders with all but one fed by 115-13.2kV transformers at various substations in the area. One 13.2kV feeder is supplied by a 34.5-13.2kV transformer at the West Portland substation. There are also eight 34.5kV sub-transmission lines which provide the supply to the 34.5-4.8kV step-down transformers in the area.

The Chautauqua South study area serves approximately 17,000. Customers are supplied by twenty 4.8kV delta feeders, which are all fed from 34.5-4.8kV transformers. There are four 13.2kV feeders with three fed by the Baker Street 115-13.2kV transformer and one fed by the French Creek 34.5-13.2kV transformer. There are five 34.5kV sub-transmission lines that are supplied from Hartsfield and South Dow 115kV substations.

The Erie South study area serves approximately 36,800 customers. The study area includes the Buffalo outer harbor area and those areas south of the City of Buffalo with approximately half the feeders served at 13.2kV. The 115kV system supplies the 13.2kV stations. The rest of the feeders operate at 4.8kV or 4.16kV.

The Olean study area serves approximately 18,700 customers. There are twenty distribution feeders that provide service to area customers. There are eight 4.8kV feeders supplied by 34.5-4.8kV transformers at various stations. Eleven of the area's twelve 13.2kV feeders are fed from 115-13.2kV transformers. The remaining single feeder is served from a 34.5-13.2kV transformer at the Vandalia substation.

The Wellsville study area serves approximately 4,400 customers. This study area is a small rural region located near the Pennsylvania border and is supplied by the 115/34.5kV Andover and Nile substations. There are two 34.5kV supply lines in the area. Load is served by 5 substations serving nine 4.8kV feeders.

Major Project Table

The following table identifies major projects by spending rationale for this study area.

Table V-8
Southwest Major Projects

Spending Rationale	Progam	System	Distribution Study Area	Project Name	Project #
Asset Condition	AC Other	Dist	Cattaraugus North	13273 Steamburg Rebuilt	PPM 13273
	Overhead Line Refurbishment Program - Asset Condition	Tran	None	Falconer-HH 153-154, T1160-T1170 ACR	C27422
				Gardenville -HH 151-152, T1950-T1280-S ACR	C27425
				Gardenville-Dunkirk 141-142 T1260-1270 ACR	C03389
				Homer Hill Bennett Rd 157, T1340 ACR	C27429
	Sub-T Overhead Line	Sub-t	Chautauqua North	05976 Hartfield-S. Dow 859 Refurbish	C33180
			Chautauqua South	05975 Hartfield-Ashvile 854 Refurbish	C33294
Statutory or Regulatory	Generation	Tran	None	Ball Hill-Metering/RTU/Relay Upgrades	CNYX75
				Everpower Allegany - Substation	CNYX79
				New Grange Wind-RTU/Metering/Relay upgrades	CNYX66
				Ripley-Westfield - Substation	CNYX77
System Capacity & Performance	Capacity Planning	Dist	Erie South	09234 Bflo Sta 139 - Replace Transformers	C36639
				09235 Bflo Sta 55 - Replace Transformers	C36644
	Reliability Criteria Compliance	Tran	None	Construct Southwest Sta (line work)	C24016
				Construct Southwest Station, part of SG075	C24015
				Dunkirk Second Bus Tie- Line, part of SG075	C31460
				Dunkirk Second Bus Tie- Station, part of SG075	C31459
				Homer Hill 115kV Capacitor Banks, Part of SG075	C31457
				Reconductoring of line #171	C24017

VI. Opportunities and Challenges

National Grid has determined that the projects described in this Plan are necessary and appropriate to ensure safe and adequate service to customers at reasonable cost over the Plan period. However, the Company continually evaluates the appropriateness of investments in light of prevailing circumstances, and adjusts its investment plans as necessary. The Company is also working on improvements to its planning processes to include greater opportunities through system efficiency, customer actions, and other initiatives. Nevertheless, the Company still faces several challenges to implementation of the Plan. This chapter discusses some of the specific opportunities and challenges associated with the Company's Capital Investment Plan.

Billing Impact

The Company is always mindful that its investment decisions have revenue requirement effects that directly impact customers. Therefore, in making investment decisions, the Company attempts to reduce overall costs while maintaining the safety and adequacy of the service it provides. In preparing this Plan, the Company prepared a simplified analysis to estimate the revenue requirement effects in fiscal years 2014, 2015 and 2016 associated with the proposed capital investment levels included here, as well as an estimate of the associated per kWh impact of the resulting revenue requirement on a residential SC1 customer. For a typical residential SC1 customer, the allocated per kWh cost resulting from the investment levels included in the Plan would be $0.00236/kWh in FY2014; $0.00429/kWh in 2015; and $0.00635/kWh in 2016. Details of the simplified analysis are included in Exhibit 4 of this filing.

Renewable Portfolio Standards

The growth in renewable energy sources, including wind, solar, and biofuels may require additional upgrade and reinforcement of the delivery system to support geographically diverse generation. Among the strategic initiatives of the Cuomo Administration are the promotion of renewable energy projects and an expedited siting process. Implementation of such initiatives may provide opportunities to improve overall system performance and risk management; however, new proposals for renewable generation could affect system planning and change the investment plan moving forward as facilities must be built or upgraded to connect these sources.

Research, Development and Demonstration

National Grid invests in Research, Development and Demonstration ("RD&D") initiatives to support strategic objectives to better meet customer needs as identified in the Fifteen-Year Plan. RD&D efforts currently underway include investigating methods for providing EMS functionality with less capital investment. In addition, National Grid is participating in several projects to enhance the safety of the work force and the public in the areas of arc flash and stray voltage protection. Further, National Grid submitted two proposals to NYSERDA PON 1913 and won awards on each. These were for the assessment of a microgrid powered by renewables and the analysis of challenges related to incorporation of IEC61850 standardized networked communications into the distribution system.

Smart Grid Investment Grant

The Company is participating in the New York State Capacitor and Phasor Measurement Project which originated through a NYISO funding application to the US DOE's Smart Grid Investment Grant ("SGIG") program. The SGIG program is supported by the American Recovery and Reinvestment Act of 2009 ("ARRA") which has a stated goal of improving the economy by investing funds as soon as possible (by end of 2012) in worthwhile Smart Grid research projects or pilots. With DOE approval of the NYISO application for funding, the New York Transmission Owners, including National Grid, signed agreements becoming official sub-awardees in April 2010. The sub-awardee agreements anticipate a TO scope or work period of Q4 2010 to early Q1 2013 (calendar years) in line with ARRA requirements. NYISO's official start date was July 1, 2010.

The current scope of the capacitor project is to install 286MVAr of reactive support in eastern New York as close as possible to study-based locations identified by the NYISO to minimize transmission line losses associated with cross state transfers. National Grid will work within an overall budget of $17 million. Conceptual engineering has been completed, identifying 328 capacitor locations, including 280 distribution line, 43 sub-transmission line, and 5 substation capacitor banks. During 2011, design engineering and procurement were scheduled to be completed. Installation of the capacitor banks will primarily take place throughout 2012.

National Grid has also applied, in collaboration with NYISO and the other Transmission Owners in the state, for federal funding to cover up to 50 percent of the cost of deployments for up to Twelve Phasor Measurement Units (PMU) that can provide a visualization of transmission system stability. These units will be installed with new RTU installations.

Demand Side Management (DSM)

In addition to its on-going DSM programs and the recently approved customer usage information pilot program, the Company is undertaking other initiatives to evaluate options for meeting customer needs while reducing traditional transmission and distribution investments. Developing and implementing cost-effective energy efficiency measures is sound public policy that should be aggressively pursued. National Grid’s energy efficiency program efforts assist customers in managing their energy costs, help address the State’s climate change mitigation goals, and contribute to effective maintenance and management of the transmission and distribution system.

As part of its most recent rate case proceeding, the Company committed to work collaboratively with the Pace Energy and Climate Center (Pace) and the Natural Resources Defense Council (NRDC) to evaluate the potential for using non-wires alternatives (e.g., DSM and distributed resources) to reduce or defer the need for transmission and distribution investment, with the aim of developing pilot program proposals that can test concepts.[1]

End-to-End Project Management Process

As part of its commitment to continuous improvement and in response to the 2009 Niagara Mohawk Management Audit Recommendations, the Company is undertaking a comprehensive End to End (E2E) Project Management Process, with the goal of improving the Company's ability to deliver the Capital Investment Plan's portfolio of projects on time, on scope, and on budget. The E2E process will be guided by internal and external audit findings and information developed as part of the comprehensive evaluation, which the Company is undertaking. Among the elements included in the E2E process are:

- Centralized estimating function to drive accuracy through the use of standardized tools, processes and procedures (with the goal of achieving +/- 10% estimating accuracy at Final Engineering). Status - Established and staffed the Estimating Center of Excellence as a centralized estimating department to manage the estimating function. Operating procedures are being defined, roles have been established and system tools to manage the process are being upgraded.
- A combined Transmission and Distribution Project Management Playbook to ensure standardization of process and procedures, thereby streamlining process steps consistent with project complexity. Status - The combined T&D playbook has been developed and continues to evolve as a dynamic management tool. Playbook development was supported by a comprehensive training program provided to the key stakeholders. Supporting procedures are in development and additional improvements are being managed by a committee of senior leaders.
- A common Work Breakdown Structure across Transmission and Distribution to improve project planning, material procurement, scheduling and performance monitoring. Status - Common Work Breakdown Structures have been developed and implemented utilizing the Primavera P6 Scheduling tool. Projects are being converted to the new system and a process to manage the schedule development has been established.
- Improved Quality Control that addresses specific issues that drive project performance. Status – the Quality Control program actively reviews and audits project performance as required.

The deliverables resulting from this implementation will serve as an enabling tool to accomplish both the desired capital investment project performance results and institutionalize the necessary sustaining capabilities.

New York State Transmission Assessment and Reliability Study

[1] Case 10-E-0050, *Order Establishing Rates for Electric Service*, Proceeding on Motion of he Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation for Electric Service (issued and effective January 24, 2011), pp. 66-67.

National Grid is an active participant in the New York State Transmission Assessment and Reliability Study ("STARS"), a joint study of the New York bulk power system being conducted by the state's transmission owners. The study, being undertaken with the full knowledge and support of the NYISO, is expected to fully complement the NYISO's Comprehensive Planning Process, as it addresses many of issues facing the state's network, including:

- assessment of existing and projected transmission asset conditions through 2030 with estimates of current and future investment needs for the maintenance of a reliable energy infrastructure;
- evaluation of the needs to replace, refurbish or expand the system to meet the state's anticipated future energy needs;
- consideration of the most effective use of existing rights-of-way to mitigate both environmental and community impacts;
- consideration of cost effective, modern technologies, and
- evaluation of ways to enhance the integration of renewable energy resources.

Its objective is to develop a thorough assessment of the transmission system, develop long-term reliability and economic upgrade strategies and to propose a long-range road-map for coordinated investment across the state's power system.

To accomplish this objective, the study has been segmented into three phases. The study completed its Phase I analysis early in 2010 and is now well along in Phase II. The Phase I analysis focus was on identifying if there was a need for additional transfer capability to meet state-wide Loss of Load Expectation (LOLE) criteria with the existing transmission system. The Phase II portion of the study is focusing on identifying the most suitable and cost effective transmission alternatives to meet the previously determined additional transfer capability while considering aged infrastructure and integration of renewable resources. The economic analyses currently underway are factoring in production cost savings, capacity benefits, environmental benefits and load payment savings. It is expected that at the end of Phase II that a set of economic transmission projects could be presented to stakeholders and potentially be submitted by NYISO to the Eastern Interconnection Planning Collaborative study for the twenty year out case (i.e. 2030). The third phase of the study will focus on additional sensitivity analyses and assessments such as factoring in the State's Climate Action Plan. Upon completion of the study, the NY Transmission Owners are anticipating working with the NYISO and Stakeholders on identifying the most appropriate means of moving those economically and reliability justified projects forward.

While the overall STARS plan is a long term, 20 year plan, there may be components that could be beneficial to the state to be implemented sooner should conditions change. For example, existing transmission infrastructure needs can change dramatically when large, existing generating facilities are retired. The retirement of a large base load generation source requires that other generation sources be dispatched in its place. This shift in the pattern of dispatch produces a different pattern of flows and stresses on the transmission delivery system and may introduce reliability needs not otherwise identified. One solution to the reliability need may be transmission reinforcements to accommodate the new pattern of flows could be needed within a short timeframe. This situation, for example, is possible should downstate generation sources that currently feed the heavy load center of Metropolitan New York City retire.

In addition if state or federal policies are enacted that focus on development and delivery of upstate renewable resources, then transmission reinforcements could also be needed in the near term.

So while, the STARS study outlines a long term view, it is possible that some components or even all of the transmission components identified the Phase II portion of the study could be introduced in the near term should external factors change.

Commodity Price Increases/Inflation

As the Commission required in the September 17, 2007 Order, National Grid has reviewed the expenditures included in the 2012 Plan in light of continued variation in construction and equipment costs. In the event inflation in construction costs exceeds this estimate, the Company's budget would be too low and the project schedules would require re-evaluation.

For Distribution, an annual inflation rate of two percent was applied to the fiscal year periods FY13 through FY17. Other specific adjustments include an average three-and-a-half percent inflation increase to blanket program expenditures.

For Transmission and Sub-Transmission, an annual inflation rate of two percent was applied to the fiscal year periods FY13 through FY17. Inflation is accounted for in the negative reserve. This amount balances the anticipated increases in material costs expected for electrical equipment over the period of the Plan with expectations regarding labor costs going forward.

Availability of Construction Resources

With respect to the transmission portion of the Company's investment Plan, the Company will supplement its internal workforce with competitively procured contractor resources, and is developing a model to pre-qualify vendors in order to facilitate future contracting and improve resource certainty. On the distribution side, the Company's internal workforce will continue to be supplemented by the Company's Distribution Alliance contractor (Harlan) and other competitively procured contractors.

Increasing Lead Times

While equipment lead times have improved, items such as power transformers, CCVTs, breakers, switches and other complex larger equipment, may continue to encounter longer lead times within the period of the Plan. Longer lead times present increased challenges in managing project schedules and budgets. Increased lead times are driven by many factors, including: (i) rapid growth and increasing demand for equipment in developing nations, (ii) cost and availability of raw commodity materials, (iii) increased national demand from growth and in response to extreme weather conditions and events, and (iv) increased asset replacement initiatives within the electric utility industry.

To attempt to mitigate this risk, National Grid has established commercially negotiated agreements with preferred vendors based upon their deliverability, cost, and quality.

Changes in Customer Load or Generator Patterns

Delivery customers and generators may impact the investment Plan in many ways. For example, existing customer load growth in specific areas, such as in the Capital Region, leads to the need for greater delivery capacity over time. In addition, residential and commercial/industrial customers move to new locations from older locations, requiring construction of new facilities even absent corresponding overall load growth (load migration). End use customers, as well as generators, can also request interconnections for new service, which also impacts the Company's investment plans. Likewise, capital plans can be significantly affected as a result of generator retirements, which may result in needs for reinforcements to the transmission system. Finally, government agencies may require relocation of facilities to enable public projects such as road widening.

In recent history, upstate New York has experienced declining industrial load while residential load has been growing. Typically, these patterns have not occurred in the same area. For example, city centers have been losing businesses and residences while suburban areas have grown with new residences and commercial industries. In this situation, the Company may have older equipment in the urban area that is realizing less load, while it is simultaneously required to add new facilities to serve new or greater loads in the suburban areas. Nevertheless, because the older equipment is still needed to serve existing load, there may be condition issues that require repair or replacement for safety, environmental or reliability reasons. Thus, National Grid may need to invest in both new facilities and existing ones to enable reliable service to customers even in cases where overall load may not be growing.

Other challenges arise when potential customers representing significant new load indicate intentions to locate in the Company's service area. Because of the long lead times associated with much of the Company's infrastructure investments, significant amounts of advanced planning and engineering is needed in such circumstances. Large new loads may also be expected to bring significant load from ancillary businesses and new residential development as jobs are created. If the anticipated customer fails to locate in the area, the Company must adjust its investment plans. Similar infrastructure planning issues arise in connection with potential development of new generation. Thus, National Grid may have a forecast for new generator or customer interconnections that may not materialize.

Likewise, the adequacy of existing transmission infrastructure can change dramatically when existing generating facilities are retired. The timeline for generators to formally notify the state about retirement is short. Even for large units, only 180 days of notification is required. The shift in the pattern of system flows and associated stresses that result from unit retirements requires needed reinforcements to be identified in a short period of time. Future projects may need to be advanced or new projects may need to be created as a result.

Finally, National Grid plays an important role in meeting public requirements work for the State and municipalities. Government agencies request that National Grid relocate or re-construct equipment to allow public requirements work to proceed. The capital investment plan includes estimates for this type of work based upon historical experience. The capital investment Plan will be affected if the agencies substantially reduce or expand their public requirements work from historic levels.

The Company's Plan makes assumptions regarding customer activity and uses planning, forecasting, and disciplined processes to lessen the fluctuations in investment from customer-related changes. However, the Company recognizes that it must adapt to changing circumstances. Thus, the Company approves Programs that consist of multiple projects which allow us to manage the overall capital expenditure plans over the business plan period.

Governmental and Other Approvals

Nearly every capital project requires some level of approval from one or more government agencies or other third parties. In the Adirondacks, the Department of Environmental Conservation and Adirondack Park Authority are pivotal in approving any construction. Overhead line construction in the public right of way requires permits from local municipalities and/or the Department of Transportation ("DOT"). Obtaining private land, whether for a substation or off road line work (involved in most transmission and sub-transmission projects) requires the Company to purchase land and/or private rights of way from landowners. Local town and village planning boards play a pivotal role in the placement of overhead and underground facilities. Many projects include any number of these approvals from agencies and/or other third parties which can create hurdles to the project schedule and cost. To mitigate this risk, the Company has established a permitting and licensing team with focused expertise in this area.

To obtain the necessary approvals of government agencies and third parties, the scope and configuration of projects often must be changed. This can delay investments and increase costs. To mitigate the risk of these delays and cost increases, the Company actively works with stakeholders to ensure that the scope of projects is communicated as early as possible and any contentious issues are raised early in the process.

Transmission Outage Scheduling

National Grid does not have the final authority to approve outages on elements identified as both "controlled" and "secured" by the NYSIO. The Company must coordinate those outages through the NYISO process, which can affect the timing of transmission upgrades that require outages for work to be performed safely. The NYISO may not approve transmission line outages due to conflicts with work on other transmission facilities, including those of other transmission owners, impacts on generators or impacts on grid congestion. The Company is investigating ways to mitigate the risk of not obtaining outage approval. In addition, as the Company's asset replacement programs increase in number, careful planning is required to ensure that there are not an excessive number of system components simultaneously scheduled for construction work in the same general area to ensure that the system is not limited in its capability to provide service to our customers.

Planning Criteria

National Grid conducts its transmission planning studies to comply with the following standards and criteria as applicable:

- NERC Standards TPL-001, TPL-002, TPL-003 and TPL-004, effective November 2009.
- NPCC Regional Reliability Reference Directory #1 – Design and Operation of the Bulk Power System – Northeast Power Coordinating Council (NPCC), dated December 2009.
- New York State Reliability Council (NYSRC) Reliability Rules for Operating and Planning the New York State Power System, dated December 4, 2009.
- National Grid Transmission Planning Guide, (TGP28), Issue date: November 2010.

Compliance with the NERC, NPCC and NYSRC requirements is mandatory, and penalties may be imposed on the Company for failure to comply. In addition to these external requirements, the Company's TGP28 provides a comprehensive guide for the Company's planning studies. Changes in requirements and planning criteria could impact how the Company approaches system planning and evaluates infrastructure investment needs.

Although the projects presented in this Plan reflect the Company's assessment of the investments needed to provide safe and adequate service to customers at the lowest reasonable cost, the Company nevertheless is committed to continued dialogue with DPS Staff on planning issues, and the identification of approaches that can be mutually acceptable.

New Requirements from Evolving Technical Standards

Changing technical standards can also impose unanticipated costs on the capital Plan. For example, as discussed in Chapter II, there is a risk that as a result of changes enacted by FERC to the definition of Bulk Electric System (to include all bulk power facilities operating over 100kV),[2] additional investment may be required to ensure compliance with newly mandated requirements. However, at this stage, no allowance has been made within the draft Business Plan for these investments and the potential investment requirements from such changes are therefore not included in the Capital Investment Plan forecasts.

In addition, although the Company believes that the capital investment provisions for maintaining statutory Conductor Clearances are adequate, there is a risk that the timescales for remediation may be compressed, as a result of the NERC Alert concerning facility ratings, issued on October 7, 2010 and updated on November 30, 2010.[3]

<u>Advanced Grid Applications</u>

The Company will look for opportunities to modernize the transmission, sub-transmission and distribution systems through advanced grid applications. Advanced grid applications include the use of advanced devices and systems to increase system information flow and enable more sophisticated control systems. For example, the installation of advanced equipment can be used to implement distribution automation, capacitor controls and system monitoring. These applications may provide a more economical system solutions including: maintaining reliability, reducing peak load, maintaining system voltage and more efficient use of existing capacity. Advanced grid applications may also support the integration of new technologies such as distributed generation, plug-in electric vehicles and advanced customer metering. A discussion of the Advanced Grid Application program can be found in Chapter IV, in the System Capacity and Performance section.

The implementation of advanced grid applications on the distribution system will be dependent on the ability to develop Company guidelines and on external drivers. As outlined below in Chapter IV, the Company is currently developing grid modernization guidelines to effectively deploy advanced equipment and evaluate it impact. External drivers include regulatory/government incentives related to advanced technologies such as plug-in electric vehicles; the evolution of standards related to advanced applications; and the evolution of the equipment itself, especially related communications systems. As advanced grid applications are implemented, the Company will gain a greater understanding of its ability to economically solve system problems and meet customer expectations.

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[2] *Revision to Electric Reliability Organization Definition of Bulk Electric System*, Final Rule, 18 CFR Part 40, 133 FERC ¶61,150 (Nov, 18, 2010).

[3] NERC Alert: Recommendation to Industry—Consideration of Actual Field Conditions in Determination of Facility Ratings (Oct. 7, 2010).

This document has been redacted for Critical Energy Infrastructure Information (CEII). 1/29/2012

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
Asset Condition	Battery Strategy	Battery Replacement Strategy Co. 36 TxT	C33847	$613,000	$613,000	$613,000	$613,000	$613,000	$3,065,000
	Battery Strategy Total			$613,000	$613,000	$613,000	$613,000	$613,000	$3,065,000
	Flying Ground Strategy	Buffalo/AlbanyFlyingGroundsSwitcRpl	C33613	$200,000	$856,000	$1,367,000	$0	$0	$2,423,000
	Flying Ground Strategy Total			$200,000	$856,000	$1,367,000	$0	$0	$2,423,000
	Oil Circuit Breaker Strate	NY Oil Circuit Breaker Replacements	C37882	$400,000	$2,500,000	$3,500,000	$4,500,000	$6,000,000	$16,900,000
	Oil Circuit Breaker Strategy Total			$400,000	$2,500,000	$3,500,000	$4,500,000	$6,000,000	$16,900,000
	Other Asset Condition	ALCOA - Add Annunciator	C19934	$50,000	$0	$0	$0	$0	$50,000
		Alps #188 Obsolete Circuit Switcher	C28304	$704,000	$0	$0	$0	$0	$704,000
		BuffaloSta 64-Rpl LN182 RFL Tone Eq	C31950	$504,780	$0	$0	$0	$0	$504,780
		Elm Terminal Station - HPFF Alarms	C30528	$35,000	$55,000	$0	$0	$0	$90,000
		Gardenville Station - HPFF Alarms	C30530	$35,000	$55,000	$0	$0	$0	$90,000
		Harper Station	C37203	$50,000	$650,000	$0	$0	$0	$700,000
		Higley-Repl Fuses w/Ckt Switcher	C34664	$0	$0	$25,000	$655,000	$0	$680,000
		Huntley Station - HPFF Alarms	C30531	$35,000	$55,000	$0	$0	$0	$90,000
		Inman Rd - Install Circuit Switcher	C30765	$60,760	$0	$0	$0	$0	$60,760
		Mallory Road Ground Protection	C37408	$23,000	$0	$0	$0	$0	$23,000
		OswegoPumpHouseAlarmsPIW012-2005	C36219	$32,000	$0	$0	$0	$0	$32,000
		PIW/Emergent Projects	CNYX72	$100,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$4,100,000
		Porter Replace 11 GE 230kV RF2 Discs	C20912	$445,000	$0	$0	$0	$0	$445,000
		Replace NG ALCOA 115 kV Breakers	C30545	$702,000	$0	$0	$0	$0	$702,000
		Rochester - Generator & HPFF Alarms	C30532	$35,000	$55,000	$0	$0	$0	$90,000
		Rochester Pump - LPFF Trip Scheme	C29946	$50,000	$420,000	$0	$0	$0	$470,000
		Rochester UG Pumping Plant	C39846	$120,000	$540,000	$540,000	$0	$0	$1,200,000
		Rochester UG Pumping Plant	C15988	$0	$100,000	$900,000	$200,000	$0	$1,200,000
		Sleight-Auburn 3 T2560 Avian Mitigt	C39165	$0	$25,000	$0	$0	$0	$25,000
		Temple Pressuring Plant	CNYX26	$0	$24,000	$61,000	$940,000	$0	$1,025,000
	Other Asset Condition Total			$2,981,540	$2,979,000	$2,526,000	$2,795,000	$1,000,000	$12,281,540
	Overhead Line Refurbish	Alabama - Telegraph 115 & 111 Tap Refurbishment T1530-1	C33014	$50,000	$250,000	$900,000	$4,500,000	$0	$5,700,000
		Bethlehem - Albany 18 T5070 ACR	CNYAS71	$0	$65,000	$11,000	$11,000	$450,000	$537,000
		Boonville - Porter [1]-2 [T4020]-T4030 ACR	CNYAS48	$0	$0	$0	$75,000	$100,000	$175,000
		Boonville - Rome #3	CNYAS54	$0	$75,000	$100,000	$500,000	$9,100,000	$9,775,000
		Colton-BF 1-2 T3140-T3150 ACR	C36164	$0	$0	$0	$50,000	$50,000	$100,000
		Falconer-HH 153-154, T1160-T1170 ACR	C27422	$50,000	$200,000	$1,500,000	$6,500,000	$6,000,000	$14,250,000
		Gard-Dun 141-142 T1260-70 ACR Senec	C34193	$50,000	$50,000	$1,000,000	$0	$0	$1,100,000
		Gardenville -HH 151-152, T1950-T1280-S ACR	C27425	$25,000	$100,000	$330,000	$1,230,000	$15,000,000	$16,685,000
		Gardenville Lines 180-182, T1660-T1780 ACR	C27436	$47,000	$50,000	$1,200,000	$7,500,000	$6,000,000	$14,797,000
		Gardenville-Dunkirk 141-142 T1260-1270 ACR	C03389	$500,000	$1,000,000	$14,000,000	$14,000,000	$0	$29,500,000
		Gardenville-Homer Hill 151-152, T1950-T1280 N ACR - Weste	C04718	$264,000	$0	$0	$0	$0	$264,000
		Homer Hill Bennett Rd 157, T1340 ACR	C27429	$50,000	$400,000	$6,500,000	$6,500,000	$0	$13,450,000
		Lockport-Batavia 112, T1510 ACR	C03422	$50,000	$50,000	$200,000	$200,000	$1,000,000	$1,500,000
		Lockport-Bativa 108 Refurb	C27431	$25,000	$25,000	$25,000	$50,000	$1,450,000	$1,575,000
		Lockport-Mortimer 111 T1530 ACR	C03417	$19,410,000	$19,780,000	$4,004,000	$0	$0	$43,194,000
		Mortimer - Pannell Road #24 &25	CNYAS65	$0	$0	$50,000	$50,000	$500,000	$600,000
		Packard - Gardenville 180-182 T1660-T1780 (Frontier Portion	CNYAS11-2	$0	$0	$50,000	$95,000	$250,000	$395,000
		Packard-Urban 181 T1850 STR	CNYAS116	$0	$0	$0	$0	$50,000	$50,000
		Pannell-Geneva 4-4A, T1860 ACR	C30889	$0	$0	$50,000	$100,000	$500,000	$650,000
		Porter Rotterdam 31, T4210 ACR	C30890	$300,000	$2,500,000	$9,000,000	$9,500,000	$9,500,000	$30,800,000
		Rotterdam - Bear Swamp E205 T5630 ACR	CNYAS76	$0	$0	$0	$0	$85,000	$85,000
		Spier-West 9 Refurbishment T5770 ACR	C21694	$50,000	$65,000	$65,000	$330,000	$6,000,000	$6,510,000
		Taylorville - Boonville 5-6 T3320-T3330 ACR	C27437	$100,000	$600,000	$4,200,000	$4,200,000	$0	$9,100,000
		Taylorville-Moshier 7, T3340 LER - Central Div.	C24361	$600,000	$2,500,000	$3,000,000	$0	$0	$6,100,000
		Terminal - Schuyler 7 T4260 ACR	CNYAS112	$0	$0	$0	$0	$65,000	$65,000
		Ticonderoga 2-3 T5810-T5830 ACR	C39521	$15,000	$100,000	$150,000	$1,500,000	$12,000,000	$13,765,000
		Ticonderoga 2-3 T5810-T5830 SXR2	C39487	$1,600,000	$0	$0	$0	$0	$1,600,000
		Warrensburg - Scofield Road 10 T5880 ACR	CNYAS50	$0	$0	$0	$0	$70,000	$70,000
	Overhead Line Refurbishment Program - Asset Condition Total			$23,186,000	$27,810,000	$46,335,000	$56,891,000	$68,170,000	$222,392,000
	Relay Replacement Strat	Relay Replacement Stratgey	C34690	$1,280,000	$8,632,000	$11,445,000	$14,739,000	$16,880,000	$52,976,000
	Relay Replacement Strategy Total			$1,280,000	$8,632,000	$11,445,000	$14,739,000	$16,880,000	$52,976,000

Exhibit 1 - 2012 Transmission Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
	Reserve - Asset Conditio	Capital Reserve - Asset Condition	CNYX31AC	($5,713,330)	($6,154,592)	($3,889,121)	($7,441,808)	($11,343,165)	($34,542,016)
	Reserve - Asset Condition Total			($5,713,330)	($6,154,592)	($3,889,121)	($7,441,808)	($11,343,165)	($34,542,016)
	Shieldwire Strategy	Shieldwire: Clay-Dewitt 3 - Central Div.	C28709	$1,000,000	$0	$0	$0	$0	$1,000,000
		Shieldwire: Gardenville-Buffalo 145-146	C28683	$1,001,300	$2,136,000	$0	$0	$0	$3,137,300
		Shieldwire: Huntley-Gardenville 38-39 - Western Div.	C28676	$341,500	$0	$0	$0	$0	$341,500
		Shieldwire: Gardenville-Depew 54	C28706	$50,000	$510,000	$0	$0	$0	$560,000
	Shieldwire Strategy Total			$2,392,800	$2,646,000	$0	$0	$0	$5,038,800
	Steel Tower Strategy	Lockport 103- 104, T1620-T106 STR	C27432	$50,000	$0	$0	$0	$50,000	$100,000
		S. Oswego Lighthouse Hill Circuits	C21693	$289,997	$0	$0	$0	$0	$289,997
	Steel Tower Strategy Total			$339,997	$0	$0	$0	$50,000	$389,997
	Substation Rebuild	Dunkirk Rebuild	C05155	$0	$0	$0	$0	$250,000	$250,000
		Gardenville - Rebuild Line Location	C30084	$170,000	$653,000	$2,199,000	$2,199,000	$3,317,000	$8,538,000
		Gardenville 115kV Station Rebuild	C05156	$1,000,000	$4,000,000	$20,000,000	$22,000,000	$12,000,000	$59,000,000
		LightHH 115kV Yard Repl & cntrl hse	C31662	$0	$0	$0	$0	$1,500,000	$1,500,000
		N. Leroy Rebuild Station	C29180	$178,000	$0	$0	$0	$0	$178,000
		Rome 115 kV Station	C03778	$4,765,000	$2,780,000	$1,216,000	$0	$0	$8,761,000
		Rome Rebuild Line Portion	C34983	$240,000	$421,000	$55,000	$0	$0	$716,000
	Substation Rebuild Total			$6,353,000	$7,854,000	$23,470,000	$24,199,000	$17,067,000	$78,943,000
	Transformer Replacemer	Greenbush - Replace TB3	C31663	$2,120,000	$0	$0	$0	$0	$2,120,000
		NY SpareTransformers	C39883	$2,059,000	$0	$0	$0	$0	$2,059,000
		Oneida Transformer Replacement # 4	C37876	$750,000	$820,000	$0	$0	$0	$1,570,000
	Transformer Replacement Program Total			$4,929,000	$820,000	$0	$0	$0	$5,749,000
	U-Series Relay Strategy	Edic FE1 - Replace U Series Relays	C24662	$240,000	$0	$0	$365,000	$396,365	$1,001,365
		Leeds - Replace U Series Relays	C24663	$0	$0	$0	$1,104,000	$1,104,081	$2,208,081
		LN17 - Replace Type U Series Relays	C24661	$2,803,000	$0	$0	$0	$0	$2,803,000
		Rotterdam-Repl E205 U Series Relays	C05150	$162,320	$0	$0	$0	$0	$162,320
	U-Series Relay Strategy Total			$3,205,320	$0	$0	$1,469,000	$1,500,446	$6,174,766
Asset Condition Total				$40,167,327	$48,555,408	$85,366,879	$97,764,192	$99,937,281	$371,791,087
Damage Failures	NY Inspections	NY Inspection Projects - Capital	C26923	$1,116,000	$1,116,000	$1,116,000	$1,116,000	$1,116,000	$5,580,000
	NY Inspections Total			$1,116,000	$1,116,000	$1,116,000	$1,116,000	$1,116,000	$5,580,000
	Other Damage Failure	Beck-Mountain-Lockport 103-104 T1620-T1060 D/F	C40504	$145,000	$0	$0	$0	$0	$145,000
		Bethlehem Station #21	C41010	$208,000	$0	$0	$0	$0	$208,000
		Curtis St - Repl LN 10 & 13 Relays	C29320	$20,000	$0	$0	$0	$0	$20,000
		Gardn-Depew 54 T1230 Str 23-25 DF	C39207	$78,000	$0	$0	$0	$0	$78,000
		Geres Lock Sub - Repl 14 115kV Disc	C28324	$311,000	$0	$0	$0	$0	$311,000
		Grooms Rd-Forts F 13 T6360 Gravel P	C38382	$100,000	$1,400,000	$60,000	$0	$0	$1,560,000
		Line Failure Reserve	C03278	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
		Mohawk River Crossing D-F	C41086	$180,000	$0	$0	$0	$0	$180,000
		N Gouvnr-Battle Hill 8 T3290 Switch	C35355	$157,075	$0	$0	$0	$0	$157,075
		NY Priority Replace Priority 4 Transformers	C31656	$0	$3,000,000	$3,000,000	$3,000,000	$3,600,000	$12,600,000
		Oneida - TB#3 Failure	C22391	$0	$500,000	$0	$0	$0	$500,000
		Packard - Urban 181 T1850 Str. 409 D-F	C41163	$100,000	$0	$0	$0	$0	$100,000
		Packard-Gardenville 182 T1780 Str 87	C40784	$120,000	$0	$0	$0	$0	$120,000
		Station Failure Reserve	C03792	$5,244,000	$4,750,000	$4,750,000	$4,750,000	$4,750,000	$24,244,000
		T1060 X0045 Retired Olin Tap D/F	C38884	$46,000	$223,000	$0	$0	$0	$269,000
		T3030 - T6180 Switch Replacements	C35384	$190,660	$0	$0	$0	$0	$190,660
		TiconderogaSub Line Bypass	C39484	$20,000	$516,000	$0	$0	$0	$536,000
		TiconderogaSubPIWReplace115kVSwitch	C37108	$20,000	$254,000	$0	$0	$0	$274,000
		Trinity UG CP D/F	C40364	$20,000	$0	$0	$0	$0	$20,000
		Yahnudasis T4160-T4300 D-F Struc	C38162	$200,000	$0	$0	$0	$0	$200,000
	Other Damage Failure Total			$7,409,735	$10,893,000	$8,060,000	$8,000,000	$8,600,000	$42,962,735
	Woodpole Strategy	Wood Pole Management - NY	C11640	$5,238,100	$2,706,996	$1,433,000	$1,433,000	$1,433,000	$12,244,096
	Woodpole Strategy Total			$5,238,100	$2,706,996	$1,433,000	$1,433,000	$1,433,000	$12,244,096
Damage Failures Total				$13,763,835	$14,715,996	$10,609,000	$10,549,000	$11,149,000	$60,786,831
Non - Infrastructure	Physical Security	NY Physical Security 15BulkStations	C34224	$1,500,000	$0	$0	$0	$0	$1,500,000
		Physical Security Strategy	CNYAS86	$0	$0	$50,000	$50,000	$0	$100,000
	Physical Security Total			$1,500,000	$0	$50,000	$50,000	$0	$1,600,000
Non - Infrastructure Total				$1,500,000	$0	$50,000	$50,000	$0	$1,600,000

Exhibit 1 - 2012 Transmission Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
Statutory Regulatory	Clay Station Rebuild	Clay Station Line Project	C32539	$582,000	$1,253,000	$0	$0	$0	$1,835,000
	Clay Station Rebuild Total			$582,000	$1,253,000	$0	$0	$0	$1,835,000
	Clearance Strategy	Adams-Packard 187 T1010 &Taps CCR	C34927	$0	$10,000	$0	$0	$0	$10,000
		Adams-Packard 188 T1020 &Taps CCR	C34928	$0	$10,000	$0	$0	$0	$10,000
		Athens-PV 91 T4320 CCR	C40463	$10,000	$0	$0	$0	$0	$10,000
		Bethlehem-Albany 18 T5070 CCR	C34967	$0	$10,000	$0	$0	$0	$10,000
		Boonville - Porter #1 (CCR)	C39344	$70,000	$0	$0	$0	$0	$70,000
		Boonville-Porter 2 T4030 CCR	C40683	$10,000	$0	$0	$0	$0	$10,000
		Clay-General Electric 14 T2750 CCR	C41645	$5,000	$0	$0	$0	$0	$5,000
		Dunkirk-South Ripley 68 T1110 CCR	C34912	$0	$10,000	$0	$0	$0	$10,000
		Gardenville-Buff Rvr, 145 &146, T210-220 CCR	C31155	$0	$10,000	$0	$0	$0	$10,000
		Gardnvl-Beth149-150 T1190-T1200 CCR	C34957	$0	$10,000	$0	$0	$0	$10,000
		Geres Lock-Solvay 2 T2270 &Taps CCR	C34971	$0	$10,000	$0	$0	$0	$10,000
		Golah-Lakville 116 T1320 & Taps CCR	C34954	$0	$10,000	$0	$0	$0	$10,000
		Greenbush Stephentown 993, T5190 CCR	C31132	$0	$10,000	$0	$0	$0	$10,000
		Hartfield-Moons 159 T1330 &Taps CCR	C34926	$0	$10,000	$0	$0	$0	$10,000
		Homer H-Dugan Rd 155 T1350&Taps CCR	C34962	$0	$10,000	$0	$0	$0	$10,000
		Hudson Pleasant Valley 12, T5330 CCR	C31145	$0	$10,000	$0	$0	$0	$10,000
		Lighthouse Hill - Clay #7 (CCR)	C39322	$70,000	$0	$0	$0	$0	$70,000
		Lockport-Bativa, 107, T1490 CCR	C31149	$0	$10,000	$351,200	$0	$0	$361,200
		Meco Rotterdam 10, T5390 CCR	C31134	$0	$10,000	$0	$0	$0	$10,000
		Mortimer Elbridge 2, T1570 CCR	C31135	$0	$10,000	$0	$0	$0	$10,000
		Mortimer Golah 110, T1580 CCR	C31150	$0	$10,000	$0	$0	$0	$10,000
		Mortimer Pannell, 24&25, T1590-T1600 CCR	C31148	$0	$10,000	$0	$0	$0	$10,000
		Mortimer Quaker 23, T1610 CCR	C31146	$0	$10,000	$0	$0	$0	$10,000
		Mountain-Lockpt 103 T1620 &Taps CCR	C34955	$0	$10,000	$0	$0	$0	$10,000
		New Scotland-Bethlehem 4 T5460 CCR	C34910	$0	$10,000	$0	$0	$0	$10,000
		New Scotlnd-Albany 8 T5980&Taps CCR	C34959	$0	$10,000	$0	$0	$0	$10,000
		Niagara Lockport 101, T1690 CCR	C31151	$0	$10,000	$0	$0	$0	$10,000
		Niagara Lockport 102, T1700 CCR	C31152	$0	$10,000	$0	$0	$0	$10,000
		Nine Mile One-Scriba 9 T2370 CCR	C40329	$10,000	$0	$0	$0	$0	$10,000
		NS-Feura Bush 9 T5500 &Taps CCR	C34966	$0	$10,000	$0	$0	$0	$10,000
		NS-Long Lane T5470 &Taps CCR	C34968	$0	$10,000	$0	$0	$0	$10,000
		Oneida-Porter 7 T4150 CCR	C41366	$5,000	$0	$0	$0	$0	$5,000
		Packard-Huntley 130, T1820 CCR	C31154	$0	$10,000	$0	$0	$0	$10,000
		Reynolds Rd-New Scotld 13 T5560 CCR	C34964	$0	$10,000	$0	$0	$0	$10,000
		Rotterdam Altamont 17, T5620 CCR	C31131	$0	$10,000	$0	$0	$0	$10,000
		Rotterdam-New Scotland 13 T5680 CCR	C34963	$0	$10,000	$0	$0	$0	$10,000
		Transmission Tower Clearances	C03256	$5,800,000	$7,000,000	$15,000,000	$15,000,000	$15,000,000	$57,800,000
		Valley Sta 44-Isshua 158 T1900 CCR	C34965	$0	$10,000	$0	$0	$0	$10,000
	Clearance Strategy Total			$5,980,000	$7,300,000	$15,351,200	$15,000,000	$15,000,000	$58,631,200
	Generation	Alabama Ledge Wind-Loop in, Loop-out	CNYX63	$0	$290,000	$245,000	$0	$0	$535,000
		Alabama Ledge Wind-Loop in, Loop-out Reimburseable portio	CNYX63R	$0	($290,000)	($245,000)	$0	$0	($535,000)
		Alabama Ledge Wind-RTU/Metering/Relay upgrades	CNYX64	$0	$490,000	$1,092,000	$260,000	$0	$1,842,000
		Alabama Ledge Wind-RTU/Metering/Relay upgrades-Reimbur	CNYX64R	$0	($490,000)	($1,092,000)	($260,000)	$0	($1,842,000)
		[redacted]	CNYX83	$675,000	$0	$0	$0	$0	$675,000
		[redacted]	CNYX83R	($675,000)	$0	$0	$0	$0	($675,000)
		Ball Hill- Loop in, Loop out	CNYX74	$150,000	$700,000	$484,000	$140,700	$0	$1,474,700
		Ball Hill- Loop in, Loop out Reimbursable Portion	CNYX74R	($150,000)	($700,000)	($484,000)	($140,700)	$0	($1,474,700)
		Ball Hill-Metering/RTU/Relay Upgrades	CNYX75	$150,000	$6,386,400	$5,159,500	$1,709,900	$0	$13,405,800
		Ball Hill-Metering/RTU/Relay Upgrades Reimbursable Portion	CNYX75R	($150,000)	($6,386,400)	($5,159,500)	($1,709,900)	$0	($13,405,800)
		Cape Vincent Wind-RTU/Metering/Relay upgrades	CNYX60	$75,000	$2,730,000	$0	$0	$0	$2,805,000
		Cape Vincent Wind-RTU/Metering/Relay upgrades-Reimbursa	CNYX60R	($75,000)	($2,730,000)	$0	$0	$0	($2,805,000)
		Clayton Wind-Loop in, Loop-out	CNYX70	$350,000	$2,000,000	$0	$0	$0	$2,350,000
		Clayton Wind-Loop in, Loop-out Reimburseable portion	CNYX70R	($350,000)	($2,000,000)	$0	$0	$0	($2,350,000)
		Clayton Wind-RTU/Metering/Relay upgrades	CNYX71	$320,000	$1,000,000	$0	$0	$0	$1,320,000
		Clayton Wind-RTU/Metering/Relay upgrades-Reimbursable pc	CNYX71R	($320,000)	($1,000,000)	$0	$0	$0	($1,320,000)
		EDGE - Line Relocation	CNYX82	$5,200,000	$0	$0	$0	$0	$5,200,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		EDGE - Line Relocation, Reimburable Portion	CNYX82R	($5,200,000)	$0	$0	$0	$0	($5,200,000)
		Everpower Allegany - line tap	CNYX78	$100,000	$800,000	$500,000	$100,000	$0	$1,500,000
		Everpower Allegany - Substation	CNYX79	$250,000	$3,000,000	$2,500,000	$50,000	$0	$5,800,000
		Everpower Allegany - Substation- Reimbursable Portion	CNYX79R	($250,000)	($3,000,000)	($2,500,000)	($50,000)	$0	($5,800,000)
		Everpower Allegany -line tap Reimbursable Portion	CNYX78R	($100,000)	($800,000)	($500,000)	($100,000)	$0	($1,500,000)
		Green Power-Cody Rd-loop in,loop out	CNYX68	$0	$0	$310,000	$229,000	$0	$539,000
			CNYX68R	$0	$0	($310,000)	($229,000)	$0	($539,000)
		Green Power-Cody Rd-RTU,metering	CNYX69	$0	$0	$1,100,000	$520,000	$0	$1,620,000
			CNYX69R	$0	$0	($1,100,000)	($520,000)	$0	($1,620,000)
		New Grange Wind-Loop in, Loop-out	CNYX65	$0	$530,000	$500,000	$0	$0	$1,030,000
		New Grange Wind-Loop in, Loop-out Reimburseable portion	CNYX65R	$0	($530,000)	($500,000)	$0	$0	($1,030,000)
		New Grange Wind-RTU/Metering/Relay upgrades	CNYX66	$0	$670,000	$1,830,000	$400,000	$0	$2,900,000
		New Grange Wind-RTU/Metering/Relay upgrades-Reimbursab	CNYX66R	$0	($670,000)	($1,830,000)	($400,000)	$0	($2,900,000)
		Nine Mile 2 Uprate	C39171	$166,000	$21,000	$139,000	$0	$0	$326,000
			C39171R	($166,000)	($21,000)	($139,000)	$0	$0	($326,000)
		Ripley-Westfield - loop in,loop out	CNYX81	$210,000	$500,000	$500,000	$0	$0	$1,210,000
		Ripley-Westfield - Substation	CNYX77	$250,000	$5,000,000	$2,200,000	$100,000	$0	$7,550,000
		Ripley-Westfield - Substation- Reimbursable Portion	CNYX77R	($250,000)	($5,000,000)	($2,200,000)	($100,000)	$0	($7,550,000)
		Ripley-Westfield -loop in,loop out Reimbursable Portion	CNYX81R	($210,000)	($500,000)	($500,000)	$0	$0	($1,210,000)
		St Lawrence Wind-Loop in, Loop-out	CNYX55	$100,000	$900,000	$0	$0	$0	$1,000,000
		St Lawrence Wind-Loop in, Loop-out Reimburseable Portion	CNYX55R	($100,000)	($900,000)	$0	$0	$0	($1,000,000)
		St Lawrence Wind-RTU/Metering/Relay upgrades	CNYX56	$600,000	$1,600,000	$0	$0	$0	$2,200,000
		St Lawrence Wind-RTU/Metering/Relay upgrades-Reimbursab	CNYX56R	($600,000)	($1,600,000)	$0	$0	$0	($2,200,000)
		Tug Hill Wind-Loop in, Loop-out	CNYX61	$0	$241,500	$324,000	$20,200	$0	$585,700
		Tug Hill Wind-Loop in, Loop-out Reimburseable portion	CNYX61R	$0	($241,500)	($324,000)	($20,200)	$0	($585,700)
		Tug Hill Wind-RTU/Metering/Relay upgrades	CNYX62	$0	$564,500	$1,083,000	$211,000	$0	$1,858,500
		Tug Hill Wind-RTU/Metering/Relay upgrades-Reimbursable po	CNYX62R	$0	($564,500)	($1,083,000)	($211,000)	$0	($1,858,500)
		WestHill Wind -Loop in-loop out	CNYX49	$100,000	$372,500	$0	$0	$0	$472,500
		WestHill Wind -Loop in-loop out Reimbursable Portion	CNYX49R	($100,000)	($372,500)	$0	$0	$0	($472,500)
		WestHill Wind -RTU/metering	CNYX50	$70,000	$600,000	$0	$0	$0	$670,000
		WestHill Wind-RTU/metering Reimbursable Portion	CNYX50R	($70,000)	($600,000)	$0	$0	$0	($670,000)
	Generation Total			$0	$0	$0	$0	$0	$0
	Northeast Region Reinfo	Eastover (was Turner) Road New Line Taps - Part of NERR	C31419	$252,000	$5,000,000	$550,000	$0	$0	$5,802,000
		Eastover Road New 230-115 kV Station (Part of NERR)	C31326	$2,500,228	$13,995,958	$4,460,097	$0	$0	$20,956,283
		Mohican Battenkill #15 Rebuild Reconductor	C34528	$1,812,000	$8,004,840	$16,506,960	$3,852,000	$0	$30,175,800
		Reactive Comp Prog in NE Region NRRP	C35773	$0	$200,000	$1,800,000	$0	$200,000	$2,200,000
		Reconductoring 115kV NE Region NRRP	C35771	$0	$1,000,000	$1,000,000	$4,700,000	$8,800,000	$15,500,000
		Spier Rotterdam New Line - Line 302, 1, and tap	C31418	$37,310,000	$16,180,000	$0	$0	$0	$53,490,000
		Sta Work to Suppt New Spier-Rtdm	C40346	$22,000	$0	$0	$0	$0	$22,000
	Northeast Region Reinforcement Total			$41,896,228	$44,380,798	$24,317,057	$8,552,000	$9,000,000	$128,146,083
	Other Statutory Regulato	FAA Obstruction Lighting/Marking	C27954	$500,000	$0	$0	$0	$0	$500,000
			C40703	$45,000	$0	$0	$0	$0	$45,000
			C40704	$75,000	$0	$0	$0	$0	$75,000
		Hudson River Crossing Permit	C41449	$530,000	$0	$0	$0	$0	$530,000
		Interconnection Meter Investment Prgm Co 36 (NYISO)	C35267	$5,119,700	$3,210,300	$0	$0	$0	$8,330,000
		Roblin Steel - Roberts Rd. 163 Removal	C41352	$50,000	$0	$0	$0	$0	$50,000
	Other Statutory Regulatory Total			$6,319,700	$3,210,300	$0	$0	$0	$9,530,000
	Reserve - Statutory Regu	Capital Reserve - Statutory Regulatory	CNYX31SR	($9,047,993)	($9,877,259)	($5,075,986)	($6,090,874)	($10,698,931)	($40,791,042)
	Reserve - Statutory Regulatory Total			($9,047,993)	($9,877,259)	($5,075,986)	($6,090,874)	($10,698,931)	($40,791,042)
	RTU Strategy	RTU Replacements NERC, EMS, Obsolescence	C03772	$3,900,180	$0	$0	$0	$0	$3,900,180
	RTU Strategy Total			$3,900,180	$0	$0	$0	$0	$3,900,180
	Station BPS Upgrade	[redacted]	C28686	$1,128,000	$11,092,000	$10,093,000	$811,000	$0	$23,124,000
			C37670	$156,000	$0	$0	$0	$0	$156,000
			C28705	$12,700,000	$11,100,000	$2,250,000	$0	$0	$26,050,000
	Station BPS Upgrade Total			$13,984,000	$22,192,000	$12,343,000	$811,000	$0	$49,330,000
Statutory Regulatory Total				$63,614,115	$68,458,839	$46,935,271	$18,272,126	$13,301,069	$210,581,421
System Capacity & Perfo	Load	Frankhauser New Station - T Line Wo	C30744	$299,880	$379,652	$0	$0	$0	$679,532
		Frankhauser New Station - T Sub Wor	C34427	$0	$120,000	$0	$0	$0	$120,000

Exhibit 1 - 2012 Transmission Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
	Load Total			$299,880	$499,652	$0	$0	$0	$799,532
	Other Syst Capacity & Pe	115 kV capacitor banks at Huntley	C37522	$979,400	$72,100	$0	$0	$0	$1,051,500
		BP76 Relay Upgrade	C39382	$450,000	$0	$0	$0	$0	$450,000
		Colton BrownsFalls 1 Load Brk Attch	C34546	$213,500	$0	$0	$0	$0	$213,500
		East Watertown – Sectionalizing	C35013	$0	$0	$0	$0	$95,000	$95,000
		Eastern NY 115kV Capacitor Additions	CNYPL7	$100,000	$2,000,000	$0	$0	$0	$2,100,000
		Fourth Elm 230-23kV Bank (N-1-1)	CNYPL14	$0	$0	$0	$0	$110,408	$110,408
		Fourth Sawyer 230-23kV Bank (N-1-1)	CNYPL13	$0	$0	$0	$0	$110,408	$110,408
		Inghams Station Revitalization	CNYPL3	$0	$0	$0	$0	$110,408	$110,408
		Installation of 115 kV Mobile Substation connection at Bremen	CNYPL11-5	$0	$0	$0	$0	$40,000	$40,000
		Lowville Automated 115 kV Switches	C32259	$178,710	$0	$0	$0	$0	$178,710
		New Buffalo Station 42 T-Line	C40943	$25,000	$436,000	$605,000	$0	$0	$1,066,000
		New Buffalo Station 42 T-Sub	C40944	$25,000	$724,000	$983,000	$0	$0	$1,732,000
		Ogden Brook 115kV CS and Bus SW	C36026	$241,900	$0	$0	$0	$0	$241,900
		Replace overdutied 115kV breakers at Central and Mohawk V	CNYPL26	$990,000	$2,300,000	$1,980,000	$1,580,000	$3,422,650	$10,272,650
		Replace overdutied 115kV breakers at Maplewood- CNYPL25	C39863	$1,818,000	$0	$0	$0	$0	$1,818,000
		Syracuse Area Reconductoring	CNYPL28	$200,000	$200,000	$2,000,000	$13,000,000	$927,428	$16,327,428
		Trinity UG Pumphouse	C11318	$100,000	$900,000	$200,000	$0	$0	$1,200,000
		TRV Mitigation-NY	C36071	$385,740	$0	$0	$0	$0	$385,740
		Upgrade Breakers at Scriba Sub - Central Division	C28708	$1,236,150	$0	$0	$0	$0	$1,236,150
		Upgrade Niagara-Packard #195	C29945	$1,169,000	$2,494,000	$1,100,000	$0	$0	$4,763,000
		Westzel Rd. Substation T-Line	C36983	$50,000	$1,560,000	$60,000	$0	$0	$1,670,000
	Other Syst Capacity & Performance Total			$8,162,400	$10,686,100	$6,928,000	$14,580,000	$4,816,303	$45,172,803
	Overhead Line Refurbish	Browns Falls-Taylorville 3-4 ACR	C24359	$250,000	$250,000	$3,500,000	$5,800,000	$0	$9,800,000
		Coffeen-Lighthouse Hill 5, T2120 ACR	C24360	$5,267,000	$130,000	$0	$0	$0	$5,397,000
	Overhead Line Refurbishment Program - System Capacity & Performance Total			$5,517,000	$380,000	$3,500,000	$5,800,000	$0	$15,197,000
	Reliability Criteria Compli	Batavia Second 115 kV Cap Bank	C31478	$50,000	$432,000	$3,003,000	$100,000	$0	$3,585,000
		Construct Southwest Sta (line work)	C24016	$0	$0	$500,000	$2,000,000	$1,656,121	$4,156,121
		Construct Southwest Station, part of SG075	C24015	$0	$0	$544,000	$4,500,000	$27,602,020	$32,646,020
		Conversion of #109 to 115 kV	C24629	$0	$500,000	$1,500,000	$6,000,000	$9,086,585	$17,086,585
		Dunkirk Second Bus Tie- Line, part of SG075	C31460	$0	$0	$0	$55,000	$1,246,507	$1,301,507
		Dunkirk Second Bus Tie- Station, part of SG075	C31459	$0	$0	$0	$150,000	$1,183,575	$1,333,575
		Golah work for #109 conversion	C24631	$0	$750,000	$625,000	$2,000,000	$2,522,825	$5,897,825
		Homer Hill 115kV Capacitor Banks, Part of SG075	C31457	$57,100	$1,204,000	$0	$0	$0	$1,261,100
		Mortimer work for #109 conversion	C24630	$0	$500,000	$680,000	$2,000,000	$1,662,746	$4,842,746
		Reconductor portions of 54 and 181, part of SG075	C31463	$0	$0	$85,000	$100,000	$0	$185,000
		Reconductoring of line #171	C24017	$0	$0	$500,000	$4,000,000	$883,265	$5,383,265
		Second 115kV bus tie at Lockport, part of SG075	C31482	$0	$0	$0	$0	$778,000	$778,000
		Upgrade Batavia South 115 kV Bus	C31479	$25,000	$0	$0	$0	$0	$25,000
	Reliability Criteria Compliance Total			$132,100	$3,386,000	$7,437,000	$20,905,000	$46,621,644	$78,481,744
	Reserve - System Capac	Capital Reserve - System Capacity & Performance	CNYX31SCP	($1,156,657)	($1,681,995)	($826,150)	($2,920,319)	($5,825,298)	($12,410,418)
	Reserve - System Capacity & Performance Total			($1,156,657)	($1,681,995)	($826,150)	($2,920,319)	($5,825,298)	($12,410,418)
System Capacity & Performance Total				$12,954,723	$13,269,757	$17,038,850	$38,364,681	$45,612,649	$127,240,661
Grand Total				$132,000,000	$145,000,000	$160,000,000	$165,000,000	$170,000,000	$772,000,000

Exhibit 2 - 2012 Sub-Transmission Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
Statutory/Regulatory	Blanket	05559 CNY Sub Trans-Line New Business	CNC071	$185,000	$193,000	$202,000	$211,000	$220,000	$1,011,000
		05560 CNY Sub Trans-Line Public Require	CNC072	$77,000	$80,000	$83,000	$86,000	$89,000	$415,000
		05851 ENY Sub Trans-Line New Business	CNE071	$59,000	$62,000	$65,000	$68,000	$71,000	$325,000
		05852 ENY Sub Trans-Line Public Require	CNE072	$105,000	$109,000	$114,000	$118,000	$122,000	$568,000
		06364 NY CentraláSub T Line Third Party	CNC078	$24,000	$25,000	$26,000	$27,000	$28,000	$130,000
		06366 NY EastáSub T Line Third Party	CNE078	$24,000	$25,000	$26,000	$27,000	$28,000	$130,000
		06370 NY WestáSub T Line Third Party	CNW078	$24,000	$25,000	$26,000	$27,000	$28,000	$130,000
		06960 WNY Sub Trans-Line New Business	CNW071	$130,000	$136,000	$143,000	$149,000	$155,000	$713,000
		06961 WNY Sub Trans-Line Public Require	CNW072	$61,000	$63,000	$66,000	$68,000	$71,000	$329,000
	Blanket Total			$689,000	$718,000	$751,000	$781,000	$812,000	$3,751,000
	Inspection & Maintenanc	06001 I&M - NC Sub-T Line Work From Insp	C26166	$3,666,000	$3,833,000	$3,667,000	$3,667,000	$3,667,000	$18,500,000
		06004 I&M - NE Sub-T Line Work From Insp	C26165	$7,182,673	$5,000,000	$3,666,000	$3,666,000	$3,666,000	$23,180,673
		06007 I&M - NW Sub-T Line Work From Insp	C26167	$2,566,967	$3,834,000	$3,667,000	$3,667,000	$3,667,000	$17,401,967
	Inspection & Maintenance Total			$13,415,640	$12,667,000	$11,000,000	$11,000,000	$11,000,000	$59,082,640
	New Business	04874 Metering Lighthouse Hill	C22215	$150,000	$0	$0	$0	$0	$150,000
		06779 TxD RESERVE for New Business Commercial Unidenti	RESERVE 036_011 LINE	$1,000,000	$1,050,000	$1,100,000	$1,150,000	$1,200,000	$5,500,000
	New Business Total			$1,150,000	$1,050,000	$1,100,000	$1,150,000	$1,200,000	$5,650,000
	Public Requirements	05728 DOT NYRt28 in State Forest Preserve	C34704	$10,000	$400,000	$50,000	$100,000		$560,000
		05769 DOTR NYSRt28 White Lk-McKeever SubT	C34722		$50,000	$100,000	$1,700,000	$1,700,000	$3,550,000
		06782 TxD RESERVE for Public Requirements Unidentified S	RESERVE 036_013 LINE	$490,260	$61,000	$371,000	$1,000	$0	$923,260
		17131 School St-Watervliet #3/#4 T#6 & Mohawk River Retire	PPM 17131	$100	$0	$0	$0	$0	$100
	Public Requirements Total			$500,360	$511,000	$521,000	$1,801,000	$1,700,000	$5,033,360
	S or R Other	11340 Trenton-Deerfield #21/#27 Additional ROW	CD0210	$100,000	$0	$0	$0		$100,000
	S or R Other Total			$100,000	$0	$0	$0		$100,000
	Sub-T Tower	06017 IE - NC SubT Towers	C31853	$500,000	$500,000	$500,000	$500,000	$500,000	$2,500,000
		06029 IE - NE SubT Towers	C31852	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
		06039 IE - NW SubT Towers	C31855	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000
	Sub-T Tower Total			$1,750,000	$1,750,000	$1,750,000	$1,750,000	$1,750,000	$8,750,000
Statutory/Regulatory Total				$17,605,000	$16,696,000	$15,122,000	$16,482,000	$16,462,000	$82,367,000
Damage/Failure	Blanket	04707 CNY Sub Trans-Substation Blanket	CNC074	$232,000	$240,000	$249,000	$257,000	$265,000	$1,243,000
		04778 ENY Sub Trans-Substation Blanket	CNE074	$402,000	$416,000	$432,000	$446,000	$461,000	$2,157,000
		05220 WNY Sub Trans-Substation Blanket	CNW074	$69,000	$71,000	$74,000	$76,000	$78,000	$368,000
		05557 CNY Sub Trans-Line Damage Failure	CNC073	$461,000	$477,000	$496,000	$512,000	$529,000	$2,475,000
		05849 ENY Sub Trans-Line Damage Failure	CNE073	$820,000	$849,000	$882,000	$911,000	$941,000	$4,403,000
		06958 WNY Sub Trans-Line Damage Failure	CNW073	$923,000	$955,000	$992,000	$1,024,000	$1,057,000	$4,951,000
	Blanket Total			$2,907,000	$3,008,000	$3,125,000	$3,226,000	$3,331,000	$15,597,000
	D/F Other	09669 Schoharie Replace Disc. 2166	CD0150	$450,000	$0	$0	$0	$0	$450,000
		17491 69kV tap to Florida Station	PPM 17491	$180,000					$180,000
	D/F Other Total			$630,000	$0	$0	$0	$0	$630,000
	TBD	05183 TxD RESERVE for Damage/Failure Unidentified Specif	RESERVE 036_014 SUB TxD		$110,000	$120,000	$130,000	$140,000	$500,000
		06777 TxD RESERVE for Damage/Failure Unidentified Specif	RESERVE 036_014 LINE	$500,000	$525,000	$550,000	$575,000	$600,000	$2,750,000
	TBD Total			$500,000	$635,000	$670,000	$705,000	$740,000	$3,250,000
Damage/Failure Total				$4,037,000	$3,643,000	$3,795,000	$3,931,000	$4,071,000	$19,477,000
System Capacity & Perfo	Blanket	05558 CNY Sub Trans-Line Load Relief	CNC077	$54,000	$56,000	$58,000	$60,000	$62,000	$290,000
		05561 CNY Sub Trans-Line Reliability	CNC076	$128,000	$132,000	$137,000	$141,000	$145,000	$683,000
		05850 ENY Sub Trans-Line Load Relief	CNE077	$30,000	$31,000	$32,000	$33,000	$34,000	$160,000
		05853 ENY Sub Trans-Line Reliability	CNE076	$199,000	$206,000	$214,000	$221,000	$228,000	$1,068,000
		06959 WNY Sub Trans-Line Load Relief	CNW077	$18,000	$19,000	$20,000	$21,000	$22,000	$100,000
		06962 WNY Sub Trans-Line Reliability	CNW076	$304,000	$314,000	$326,000	$336,000	$347,000	$1,627,000
	Blanket Total			$733,000	$758,000	$787,000	$812,000	$838,000	$3,928,000
	Capacity Planning	04977 NY SubT PS&I Activity	C08154	$52,500	$55,000	$57,500	$60,000	$62,500	$287,500
		05099 Seneca - Replace Series Reactors	C29100	$30,000	$0	$0	$0		$30,000
		05184 TxD RESERVE for Load Relief Unidentified Specifics &	RESERVE 036_016 SUB	$0	$400,000	$0	$300,000	$400,000	$1,100,000
		05323 Beth-AveA #10 - reconductor	C31951	$100,000	$0	$0	$0	$0	$100,000
		05378 Buffalo 23kV Reconductor - Huntley	C28892	$1,300,000	$1,600,000	$1,700,000	$0	$0	$4,600,000
		05379 Buffalo 23kV Reconductor - Huntley2	C28893	$200,000	$1,300,000	$1,600,000	$1,700,000	$0	$4,800,000
		05380 Buffalo 23kV Reconductor - Kens2	C28903	$0	$0	$200,000	$1,300,000	$1,600,000	$3,100,000
		05381 Buffalo 23kV Reconductor - Kensing.	C28894	$0	$200,000	$1,300,000	$1,600,000	$1,700,000	$4,800,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		05683 Delaware-Bethlehem 14 - Reconductor	C31952	$100,000	$0	$0	$0		$100,000
		05919 Frankhauser - Relocate L605 / L606	C30005	$20,000	$180,000	$0	$0		$200,000
		06778 TxD RESERVE for Load Relief Unidentified Specifics &	RESERVE 036_016 LINE	$1,499,916	$688,546	-$269	$749,381	$2,500,000	$5,437,574
		09257 Livonia Substation Capacitor Bank	C36080	$350,000	$0	$0	$0		$350,000
		11316 Spier-Rotterdam Project - Sub-T relocations	CD0190	$808,000	$137,000	$0	$0	$0	$945,000
		11955 Queensbury Station - Replace M/C S/G's & install cap b	PPM 11955	$0	$20,000	$410,769	$137,019		$567,788
	Capacity Planning Total			$4,460,416	$4,580,546	$5,268,000	$5,846,400	$6,262,500	$26,417,862
	SC&P Other	11615 Northville-Mayfield #8 69kV P#111-P#120	CD0317	$425,000	$0	$0	$0		$425,000
		11803 Valley-Inghams #26/#27 Cemetary Rd SW's	CD0303	$150,000	$0	$0	$0		$150,000
		17782 SW- Install arresters on the 852 Line	PPM 17782	$255,000					$255,000
	SC&P Other Total			$830,000	$0	$0	$0		$830,000
	Sub-T Automation	05655 DA - NC SubT Automation Line 31	C35865	$0	$332,500	$17,500	$0		$350,000
		05657 DA - NE SubT Automation Wilton Sub	C35863	$125,000	$750,000	$0	$0		$875,000
		05658 DA - NW SubT Automation Line 401	C35864	$265,588	$0	$0	$0	$0	$265,588
		05666 DA-NY SubT Automation Place Holder	C36661	$0	$0	$2,600,000	$3,000,000	$3,000,000	$8,600,000
		09214 DA - NC SubT Auto. Lines 21/23/26	C35866	$200,000	$1,500,000	$300,000	$0		$2,000,000
		12842 MV-Automate X24-1 on Trenton-Middleville 24	CD0346	$25,000	$0	$0	$0		$25,000
		12843 MV-Install ScadaMates on Valley-Inghams #27 Line	PPM 12843	$152,885	$0	$0	$0		$152,885
		12897 WD - Install ScadaMates on 218 Line	PPM 12897	$509,615	$0	$0	$0		$509,615
		12898 WD - Install ScadaMates on the 224/226 Lines	PPM 12898	$0	$733,654	$0	$0		$733,654
		12899 WD - Install ScadaMates on the 301 Line	CD0474	$50,000	$370,000	$0	$0	$0	$420,000
		12906 WD - Install ScadaMates on the 803 Line	PPM 12906	$356,731	$0	$0	$0		$356,731
		15722 WD - Install ScadaMates on 861 Line	PPM 15722	$356,713					$356,713
	Sub-T Automation Total			$2,041,532	$3,686,154	$2,917,500	$3,000,000	$3,000,000	$14,645,186
	Sub-T Line Removal	05316 Beck - Harper L105 Removal	C36195	$100	$100	$100	$0	$0	$300
		05317 Beck - Harper L106 Removal	C36196	$0	$100	$100	$100	$0	$300
		05930 Gardenville-Blasdell L131/L132 Rem.	C36201	$0	$0	$0	$0	$100	$100
		06150 Lockport - Maple Rd L92E&W Removal	C36200	$0	$0	$0	$100	$100	$200
		06459 Rankine - Harper - L16 & L17 Rem.	C36205	$165,952	$0	$0	$0		$165,952
		06744 Terminal Sta B - R48, R46, R25 Rem.	C36204	$0	$0	$0	$100	$100	$200
		06745 Terminal Sta C - C12 & C14 Removal	C36203	$0	$100	$100	$100	$0	$300
		06746 Terminal Sta D - 12D, 19D, 20D Rem.	C36202	$0	$0	$100	$100	$100	$300
		06773 TSC - Gardenville L92 Removal	C36199	$0	$0	$100	$100	$100	$300
	Sub-T Line Removal Total			$166,052	$300	$500	$600	$500	$167,952
System Capacity & Performance Total				$8,231,000	$9,025,000	$8,973,000	$9,659,000	$10,101,000	$45,989,000
Asset Condition	AC Other	06725 SUNY-East Reloc #11 line	C36420	$125,000	$0	$0	$0		$125,000
		09272 Schuyler Rd Repl 918 928 CirSws	C35185	$300,000	$500,000	$0	$0	$0	$800,000
		09754 Seneca - Replace Series Reactors 5S, 12S, 17S, 14S,	CD0273	$400,000	$0	$0	$0		$400,000
		11259 Harper Station 25 Cycle Retirement	PPM 11259	$100	$0	$0	$0	$100	$200
		11260 Lockport Station 25 Cycle Retirement	PPM 11260	$100	$0	$0	$0	$0	$100
		11262 Terminal House B - 25 Cycle Retirement	PPM 11262	$100	$0	$0	$100	$0	$200
		11263 Terminal Station C - 25 Cycle Retirement	PPM 11263	$100	$100	$0	$0	$0	$200
		11264 Terminal Station D - 25 Cycle Retirement	PPM 11264	$100	$0	$0	$0	$100	$200
		11301 Buffalo Station 122 Rebuild - 23kV	PPM 11301	$10,000					$10,000
		11457 Maplewood-Latham#9 Mapleview Tap Relocation	PPM 11457	$100,000	$500,000				$600,000
		11888 Randall Rd - New station - Inst/Rem sub-T lines	PPM 11888	$50,000	$1,487,000	$1,487,000	$1,487,000	$50,000	$4,561,000
		16881 Genesee South - SubT System Study	PPM 16881		$754,442	$868,889	$892,804	$135,230	$2,651,365
		17492 Trenton-Whitesboro L25 N of Marcy Hosp Refr.	PPM 17492	$50,000	$450,000				$500,000
		17493 Solvay 22-34.5 kV line Refur.	PPM 17493	$50,000	$450,000				$500,000
		17494 Teall-Headson L31-34.5 kV line Refurbishment	PPM 17494	$50,000	$450,000				$500,000
		17495 Mallory-Cicero L33-34.5 kV line Refurbishment	PPM 17495	$50,000	$450,000				$500,000
	AC Other Total			$1,185,500	$5,041,542	$2,355,889	$2,379,904	$185,430	$11,148,265
	Blanket	05556 CNY Sub Trans-Line Asset Replace	CNC075	$191,000	$197,000	$204,000	$210,000	$216,000	$1,018,000
		05848 ENY Sub Trans-Line Asset Replace	CNE075	$102,000	$105,000	$109,000	$112,000	$115,000	$543,000
		06957 WNY Sub Trans-Line Asset Replace	CNW075	$375,000	$387,000	$400,000	$412,000	$424,000	$1,998,000
	Blanket Total			$668,000	$689,000	$713,000	$734,000	$755,000	$3,559,000
	Cable Replacement	06018 IE - NC Sub-T UG Cable Replacement	C32147	$990,000	$945,000	$795,000	$1,520,000		$4,250,000
		06030 IE - NE Sub-T UG Cable Replacement	C32146		$538,000	$2,440,000	$1,425,000	$1,421,000	$5,824,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		09222 Menands-Liberty #9 Cable Replacemen	C36276	$100,000	$400,000	$0	$0	$0	$500,000
		09223 Partridge-Ave A # 5 Cable Replaceme	C36273	$850,000		$0	$0	$0	$850,000
		11064 South Mall cables replacements	CD0086	$200,000		$0	$0	$0	$200,000
	Cable Replacement Total			$2,140,000	$1,883,000	$3,235,000	$2,945,000	$1,421,000	$11,624,000
	Pilot Wire	09230 Ash - Burnett - Replace Pilot	C36010		$100,000	$300,000	$0	$0	$400,000
		09259 Maplewood-Norton-Replace Pilot Wire	C36006	$100,000	$300,000	$0	$0	$0	$400,000
		09269 Partridge St.-Riverside-Repl PW	C36007		$100,000	$300,000	$0	$0	$400,000
		09271 Repl Pilot Wire-Central Ave-Patroon	C36031		$100,000	$200,000	$0	$0	$300,000
		09278 Weaver St. - Emmet -Repl Pilot Wire	C36009	$200,000	$500,000	$100,000	$0	$0	$800,000
	Pilot Wire Total			$300,000	$1,100,000	$900,000	$0	$0	$2,300,000
	Substation Breaker	09245 Circuit Breaker Reclosr Rpl NYC TXD	C35142	$560,000	$750,000	$750,000	$750,000	$750,000	$3,560,000
		09246 Circuit Breaker Reclosr Rpl NYE TXD	C34882	$395,000	$750,000	$750,000	$750,000	$750,000	$3,395,000
		09247 Circuit Breaker Reclr Repl NYW TXD	C34883	$490,000	$750,000	$750,000	$750,000	$750,000	$3,490,000
	Substation Breaker Total			$1,445,000	$2,250,000	$2,250,000	$2,250,000	$2,250,000	$10,445,000
	Substation Indoor	05410 Buffalo Station 27 Rebuild - 23 kV	C33470	$50,000	$100,000	$50,000	$0	$0	$200,000
		05412 Buffalo Station 29 Rebuild - 23 kV	C06724	$150,000	$150,000	$0	$0		$300,000
		05418 Buffalo Station 31 Rebuild - 23 kV	PPM 05418		$25,000	$25,000	$150,000	$0	$200,000
		05429 Buffalo Station 37 Rebuild - 23 kV	C33471	$20,000	$125,000	$25,000	$0	$0	$170,000
		05433 Buffalo Station 41 Rebuild - 23 kV	PPM 05433		$0	$0	$25,000	$25,000	$50,000
		05437 Buffalo Station 43 Rebuild - 23kV	C27945	$10,000	$0	$0	$0		$10,000
		05446 Buffalo Station 52 Rebuild - 23 kV	C27946	$75,000	$0	$0	$0		$75,000
		05450 Buffalo Station 59 Rebuild - 23 kV	C33472	$0	$0	$20,000	$90,000	$90,000	$200,000
	Substation Indoor Total			$305,000	$400,000	$120,000	$265,000	$115,000	$1,205,000
	Substation Metal-Clad Sw	04587 Ash Street-Replace Metal Clad Sub	C36104	$3,252,000	$2,382,000	$9,000	$0	$0	$5,643,000
		05059 Replace/Relocate 13.8kV SG @Oneida	C25139	$1,011,500	$3,788,500	$0	$0	$0	$4,800,000
	Substation Metal-Clad Switchgear Total			$4,263,500	$6,170,500	$9,000	$0	$0	$10,443,000
	Substation Mobile	09266 MOBILE READY NYW TXD	C36070		$200,000	$0	$0	$0	$200,000
	Substation Mobile Total				$200,000	$0	$0	$0	$200,000
	Substation Power Transf	17505 Elm Street Station Spare	PPM 17505	$153,000	$157,000				$310,000
	Substation Power Transformer Total			$153,000	$157,000				$310,000
	Sub-T Line Removal	05324 Beth-Voorheesville-Retire Callanan	C27582	$50,000	$100,000	$100,000	$0		$250,000
		05342 Booher Lumber Tap Remove	C35607	$100	$0	$0	$0	$0	$100
		05476 Canajoharie Sub Retirem-Sub-T Line	C35502	$350,000	$0	$0	$0		$350,000
		05931 Gardenville-Symington 714 Remove	C33187	$10,000	$100	$0	$0	$0	$10,100
		05970 Harper-Adams Line Removals	C35444	$0	$150,000	$0	$0	$0	$150,000
		06110 Lancaster Stone Tap Remove	C35609	$100					$100
		06277 Niagara Falls Remove 12kV Lines	C33191	$25,000	$25,000	$0	$0	$0	$50,000
		06965 Woodard-Whitacre Tap Remove	C33211	$100	$0	$0	$0	$0	$100
		11315 Johnstown-Market Hill #8 69kV Tribes Hill Tap Retireme	CD0179	$100	$0	$0	$0		$100
		17239 Hoosick-Clay Hill #8 SubT Tap to Bennington Paper ret	PPM 17239	$100	$100				$200
	Sub-T Line Removal Total			$435,500	$275,200	$100,000	$0	$0	$810,700
	Sub-T Overhead Line	05259 Albion - Brockport 308 Refurbish	C33131	$540,000	$0	$0	$0		$540,000
		05275 Amsterdam-Rotterdam 3/4 Relocation	C33182	$100,000	$1,930,000	$0	$0		$2,030,000
		05469 Caledonia-Golah 213-refurbish	C27586	$10,000	$0	$0	$0		$10,000
		05484 Carthage-N.Carthage 24/28 Refurbish	C29441	$115,000	$0	$0	$0		$115,000
		05530 Charlton-Ballston #9 Rebuild/Recnfg	C06739	$50,000	$450,000	$0	$0	$0	$500,000
		05948 Gloversville - Canaj. #6 Refurbish	C16236	$50,000	$2,000,000	$100,000	$0		$2,150,000
		05957 Greenbush-Defreesville 7 Rebuild	C07519	$50,000	$190,000	$0	$0		$240,000
		05975 Hartfield-Ashvile 854 Refurbish	C33294	$1,000,000	$0	$0	$0		$1,000,000
		05976 Hartfield-S. Dow 859 Refurbish	C33180	$250,000	$1,250,000	$0	$0	$0	$1,500,000
		05989 Hoag Station and Supply Line Rehab	C36334	$950,000	$0	$0	$0	$0	$950,000
		06103 Lake Clear-Tupper Lake #38 Rebuild	C13046	$585,000	$0	$0	$0		$585,000
		06205 Menands-Liberty 9 Relocation	C33172	$550,000	$0	$0	$0	$0	$550,000
		06237 N Angola - Bagdad 862 Refurbishment	C27502	$300,000	$0	$0	$0	$0	$300,000
		06240 N Lakeville-Richmond 224 Refurbish	C35503	$400,000	$0	$0	$0		$400,000
		06285 Norfolk-Norwood 23kv	C29443	$80,000	$0	$0	$0		$80,000
		06460 Ransom-Phillips Rd 402 Refurbish	C33181	$250,000	$350,000	$0	$0	$0	$600,000
		06653 Spier-Glens Falls 8-pls	C27583	$22,393	$0	$0	$0		$22,393

Exhibit 2 - 2012 Sub-Transmission Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		06968 Yahnundasis-Schuyler 25/26 Refur.	C33174	$100,000	$550,000	$0	$0	$0	$650,000
		06971 Youngstown-Sanborn 403 Refurbish	C34462	$2,000,000	$2,750,000	$0	$0		$4,750,000
		09777 Rathbun Labrador #39 Refubishment Phase II SubT	CD0183	$60,000	$0	$0	$0		$60,000
		17459 Station 66 (Union Rd) Rebuild - SubT Line	CD0544	$219,000	$0	$0	$0	$0	$219,000
	Sub-T Overhead Line Total			$7,681,393	$9,470,000	$100,000	$0	$0	$17,251,393
	TBD	05182 TxD RESERVE for Asset Replacement Unidentified Sp	RESERVE 036_017 SUE	-$2,500,000	-$5,000,000	$3,500,000	$5,000,000	$6,000,000	$7,000,000
		06776 TxD RESERVE for Asset Replacement Unidentified Sp	RESERVE 036_017 LINE	$50,107	-$2,000,242	$12,827,111	$14,354,096	$21,639,570	$46,870,642
	TBD Total			-$2,449,893	-$7,000,242	$16,327,111	$19,354,096	$27,639,570	$53,870,642
Asset Condition Total				$16,127,000	$20,636,000	$26,110,000	$27,928,000	$32,366,000	$123,167,000
Non-Infrastructure	ISO Capacitor Banks	09331 NE NYISO 34kV Sub Cap Banks	C36839	$0	$0	$0	$0	$0	$0
	ISO Capacitor Banks Total			$0	$0	$0	$0	$0	$0
Non-Infrastructure Total				$0	$0	$0	$0	$0	$0
Grand Total				$46,000,000	$50,000,000	$54,000,000	$58,000,000	$63,000,000	$271,000,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
Statutory/Regulatory	Asset Condition I&M	06043 IE- NC- MH Program Placeholder	C32101		$100,000	$200,000	$200,000	$200,000	$700,000
		06045 IE-NC Duct Replac Placeholder	C32091	$0	$100,000	$100,000	$100,000		$300,000
		06047 IE-NE_-Duct Replace Placeholder	C32093	$0	$100,000	$100,000	$100,000		$300,000
		06048 IE-NE-MH-Program-Placeholder	C32103		$100,000	$200,000	$200,000	$200,000	$700,000
		06050 IE-NW_Duct replace Placeholder	C32095	$0	$100,000	$100,000	$100,000	$100,000	$400,000
		06051 IE-NW-MH Program Placeholder	C32102	$0	$200,000	$200,000	$200,000	$200,000	$800,000
	Asset Condition I&M Total			$0	$700,000	$900,000	$900,000	$700,000	$3,200,000
	Blanket	05497 Cent NY-Dist-3rd Party Attch Blankt	CNC022	$101,000	$104,000	$107,000	$110,000	$113,000	$535,000
		05501 Cent NY-Dist-Land/Rights Blanket	CNC009	$1,513,000	$1,554,000	$1,596,000	$1,639,000	$1,683,000	$7,985,000
		05503 Cent NY-Dist-Meter Blanket	CNC004	$1,161,000	$1,245,000	$1,347,000	$1,438,000	$1,535,000	$6,726,000
		05504 Cent NY-Dist-New Bus-Comm Blanket	CNC011	$3,927,000	$4,103,000	$4,303,000	$4,487,000	$4,679,000	$21,499,000
		05505 Cent NY-Dist-New Bus-Resid Blanket	CNC010	$9,149,000	$9,545,000	$9,988,000	$10,404,000	$10,837,000	$49,923,000
		05506 Cent NY-Dist-Public Require Blanket	CNC013	$1,067,000	$1,109,000	$1,157,000	$1,201,000	$1,246,000	$5,780,000
		05508 Cent NY-Dist-St Light Blanket	CNC012	$3,407,000	$3,523,000	$3,662,000	$3,777,000	$3,896,000	$18,265,000
		05808 East NY-Dist-3rd Party Attch Blankt	CNE022	$110,000	$113,000	$116,000	$119,000	$122,000	$580,000
		05815 East NY-Dist-Meter Blanket	CNE004	$703,000	$754,000	$816,000	$871,000	$930,000	$4,074,000
		05816 East NY-Dist-New Bus-Comm Blanket	CNE011	$3,962,000	$4,139,000	$4,341,000	$4,527,000	$4,721,000	$21,690,000
		05817 East NY-Dist-New Bus-Resid Blanket	CNE010	$10,005,000	$10,438,000	$10,922,000	$11,377,000	$11,851,000	$54,593,000
		05818 East NY-Dist-Public Require Blanket	CNE013	$1,327,000	$1,379,000	$1,438,000	$1,492,000	$1,548,000	$7,184,000
		05820 East NY-Dist-St Light Blanket	CNE012	$1,887,000	$1,951,000	$2,028,000	$2,092,000	$2,158,000	$10,116,000
		06282 NiMo Meter Purchases	CN3604	$4,280,000	$4,540,000	$4,900,000	$5,145,000	$5,300,000	$24,165,000
		06283 NiMo Transformer Purchases	CN3620	$26,616,000	$28,213,000	$30,471,000	$31,995,000	$32,500,000	$149,795,000
		06892 West NY-Dist-3rd Party Attch Blankt	CNW022	$100,000	$103,000	$106,000	$109,000	$112,000	$530,000
		06897 West NY-Dist-Land/Rights Blanket	CNW009	$513,000	$527,000	$541,000	$556,000	$571,000	$2,708,000
		06899 West NY-Dist-Meter Blanket	CNW004	$925,000	$992,000	$1,073,000	$1,146,000	$1,223,000	$5,359,000
		06900 West NY-Dist-New Bus-Comm Blanket	CNW011	$4,622,000	$4,829,000	$5,065,000	$5,282,000	$5,508,000	$25,306,000
		06901 West NY-Dist-New Bus-Resid Blanket	CNW010	$7,082,000	$7,388,000	$7,731,000	$8,053,000	$8,388,000	$38,642,000
		06902 West NY-Dist-Public Require Blanket	CNW013	$1,369,000	$1,423,000	$1,484,000	$1,540,000	$1,598,000	$7,414,000
		06904 West NY-Dist-St Light Blanket	CNW012	$3,199,000	$3,308,000	$3,438,000	$3,546,000	$3,658,000	$17,149,000
	Blanket Total			$87,025,000	$91,280,000	$96,630,000	$100,906,000	$104,177,000	$480,018,000
	Inspection & Maintenanc	05999 I&M - NC D-Line OH Work From Insp	C26160	$7,525,000	$6,519,000	$5,848,000	$5,848,000	$5,848,000	$31,588,000
		06000 I&M - NC D-Line UG Work From Insp	C26163	$833,000	$833,000	$833,000	$833,000	$833,000	$4,165,000
		06002 I&M - NE D-Line OH Work From Insp	C26159	$17,176,800	$13,038,000	$5,848,000	$5,848,000	$5,848,000	$47,758,800
		06003 I&M - NE D-Line UG Work From Insp	C26162	$650,000	$833,000	$833,000	$833,000	$833,000	$3,982,000
		06005 I&M - NW D-Line OH Work From Insp	C26161	$8,996,221	$6,519,000	$5,848,000	$5,848,000	$5,848,000	$33,059,221
		06006 I&M - NW D-Line UG Work From Insp	C26164	$1,500,000	$1,434,000	$1,434,000	$1,434,000	$1,434,000	$7,236,000
	Inspection & Maintenance Total			$36,681,021	$29,176,000	$20,644,000	$20,644,000	$20,644,000	$127,789,021
	New Business	05645 Crown Island Project	C33330	$50,000	$0	$0	$0	$0	$50,000
		05980 Helderberg Meadows URD, Phase 1	C31612	$250,000	$0	$0	$0		$250,000
		06511 Reserve for New Business Commercial Unidentified Sp	RESERVE 036_011 LINE	$4,295,000	$4,450,000	$4,600,000	$4,750,000	$4,900,000	$22,995,000
		06512 Reserve for New Business Residential Unidentified Spe	RESERVE 036_010 LINE	$1,890,000	$2,800,000	$2,900,000	$3,000,000	$3,100,000	$13,690,000
		06696 SU Hill Area Upgrades	CD0015	$5,000	$0	$0	$0	$0	$5,000
		09456 Colonie Country Club Estate URD, Phase 1	CD0055	$165,000	$0	$0	$0		$165,000
		11461 Synergy Biogas Facility System Upgrades	CD0206	$10,000	$0	$0	$0		$10,000
		11611 Foxbrook Line Extension, Redfield, NY	CD0276	$120,000	$0	$0	$0		$120,000
		12803 Kildare Meadows URD, Brewerton, NY	CD0302	$115,000	$0	$0	$0		$115,000
		12882 Faith Ridge URD - Baldwinsville, NY	CD0334	$110,000	$0	$0	$0		$110,000
		15730 DOT Lemoyne Av & Factory Av OH relocation	CD0361	$112,000	$0	$0	$0		$112,000
		17477 APP Pharmaceutical Expansion - DLine	PPM 17477	$250,000	$0	$0	$0	$0	$250,000
		17509 Buffalo Station 64 - New F6451	PPM 17509	$750,000	$0	$0	$0	$0	$750,000
	New Business Total			$8,122,000	$7,250,000	$7,500,000	$7,750,000	$8,000,000	$38,622,000
	Public Requirements	05719 DOT Batchellerville Bridge	C34864	$200,000	$0	$0	$0	$0	$200,000
		05733 DOT PIN 1757.16 Erie Blvd	C35862	$200,000	$0	$0	$0	$0	$200,000
		05760 DOT-Beebe Road Niagara County	C35789	$294,000	$0	$0	$0	$0	$294,000
		05779 DOTR RT28 White Lk - McKeever Dist	C35027		$5,000	$40,000	$245,000	$0	$290,000
		06514 Reserve for Public Requirements Unidentified Specifics	RESERVE 036_013 LINE	$7,050,017	$9,195,458	$9,360,000	$9,355,000	$9,800,000	$44,760,475
		07002 MV-Frankfort Municipal Route 5	C36848	$156,962	$20,542	$0	$0	$0	$177,504
		07032 Lynch's Trailer Park	CD0008	$175,000	$0	$0	$0	$0	$175,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		11256 DOT PIN 5460.28-Niagara Falls Reconstruction	CD0161	$200,000	$0	$0	$0	$0	$200,000
		11884 DOT Rt 11/Main St., Gouverneur	CD0282	$300,000	$0	$0	$0		$300,000
		11885 DOT Rt 56, Colton	CD0281	$250,000	$0	$0	$0		$250,000
	Public Requirements Total			$8,825,979	$9,221,000	$9,400,000	$9,600,000	$9,800,000	$46,846,979
	S or R Other	11832 Onondaga Lake Pkwy - UG St Light Circuit Rebuild	CD0333	$490,000	$0	$0	$0		$490,000
	S or R Other Total			$490,000	$0	$0	$0		$490,000
Statutory/Regulatory Total				$141,144,000	$137,627,000	$135,074,000	$139,800,000	$143,321,000	$696,966,000
Damage/Failure	Blanket	04693 Cent NY-Dist-Subs Blanket	CNC002	$504,000	$522,000	$542,000	$560,000	$578,000	$2,706,000
		04762 East NY-Dist-Subs Blanket	CNE002	$1,022,000	$1,058,000	$1,099,000	$1,135,000	$1,172,000	$5,486,000
		05206 West NY-Dist-Subs Blanket	CNW002	$419,000	$434,000	$451,000	$466,000	$481,000	$2,251,000
		05499 Cent NY-Dist-Damage/Failure Blanket	CNC014	$3,938,000	$4,075,000	$4,234,000	$4,372,000	$4,515,000	$21,134,000
		05810 East NY-Dist-Damage/Failure Blanket	CNE014	$5,988,000	$6,196,000	$6,437,000	$6,648,000	$6,865,000	$32,134,000
		06894 West NY-Dist-Damage/Failure Blanket	CNW014	$7,676,000	$7,943,000	$8,252,000	$8,522,000	$8,801,000	$41,194,000
	Blanket Total			$19,547,000	$20,228,000	$21,015,000	$21,703,000	$22,412,000	$104,905,000
	D/F Other	04644 Buffalo Sta 54 - repl MOD 101, 201	C34666	$155,000	$0	$0	$0		$155,000
		17430 New Florida Station	PPM 17430	$2,641,000	$1,706,000				$4,347,000
		17432 Florida Station Feeder Getaways	PPM 17432	$55,000	$660,000	$426,500			$1,141,500
		17512 Selkirk 14952 - Rebuild Getaway - Conversion	PPM 17512	$300,000	$0	$0	$0	$0	$300,000
	D/F Other Total			$3,151,000	$2,366,000	$426,500	$0	$0	$5,943,500
	Major Storms	06688 Storm Damage - Dist - Western Div	C00056	$518,000	$536,000	$555,000	$575,000	$586,000	$2,770,000
		06689 Storm Damage Distribution East Div.	C00328	$518,000	$536,000	$555,000	$575,000	$596,000	$2,780,000
		06690 Storm Damage-Dist-Cent Div	C12965	$518,000	$536,000	$555,000	$575,000	$596,000	$2,780,000
	Major Storms Total			$1,554,000	$1,608,000	$1,665,000	$1,725,000	$1,778,000	$8,330,000
	TBD	05062 Reserve for Damage/Failure Unidentified Specifics & S	RESERVE 036_014 SUE	$1,145,000	$1,350,000	$2,400,000	$2,450,000	$2,500,000	$9,845,000
		06509 Reserve for Damage/Failure Unidentified Specifics & S	RESERVE 036_014 LINE	$500,000	$525,000	$850,500	$850,000	$850,000	$3,575,500
	TBD Total			$1,645,000	$1,875,000	$3,250,500	$3,300,000	$3,350,000	$13,420,500
Damage/Failure Total				$25,897,000	$26,077,000	$26,357,000	$26,728,000	$27,540,000	$132,599,000
System Capacity & Perfo	Blanket	05502 Cent NY-Dist-Load Relief Blanket	CNC016	$506,000	$523,000	$542,000	$559,000	$576,000	$2,706,000
		05507 Cent NY-Dist-Reliability Blanket	CNC015	$1,575,000	$1,628,000	$1,689,000	$1,742,000	$1,797,000	$8,431,000
		05814 East NY-Dist-Load Relief Blanket	CNE016	$394,000	$407,000	$422,000	$435,000	$448,000	$2,106,000
		05819 East NY-Dist-Reliability Blanket	CNE015	$1,594,000	$1,647,000	$1,709,000	$1,763,000	$1,818,000	$8,531,000
		06898 West NY-Dist-Load Relief Blanket	CNW016	$619,000	$639,000	$662,000	$682,000	$703,000	$3,305,000
		06903 West NY-Dist-Reliability Blanket	CNW015	$3,458,000	$3,574,000	$3,709,000	$3,826,000	$3,946,000	$18,513,000
	Blanket Total			$8,146,000	$8,418,000	$8,733,000	$9,007,000	$9,288,000	$43,592,000
	Capacity Planning	04748 Duguid Second Transformer	C32497	$405,000	$855,000	$1,350,000	$0		$2,610,000
		04792 Frankhauser New Station - T Sub Work	C36520	$300,000	$2,000,000	$730,000	$0		$3,030,000
		04793 Frankhauser-115-13.2KV- Bus & Bkrs	C28931	$20,000	$605,000	$485,000	$0		$1,110,000
		04812 Harris Second Transformer	C32496	$203,846	$1,048,077	$2,153,846	$0	$0	$3,405,769
		04827 Inman Rd -Add M/C & 13.2kV Bus work	C28770	$645,000	$0	$0	$0		$645,000
		04828 Install 2nd Transformer - Inman Rd	C35270	$900,000	$0	$0	$0	$0	$900,000
		04895 N Syracuse Capacity Inc	C28831	$380,000	$3,610,000	$930,000	$0	$0	$4,920,000
		04903 NC Starr Rd Second Xfrm-13kv Switch	C32368	$10,000	$590,000	$600,000	$150,000		$1,350,000
		04904 NC Starr Rd. Second Xfrm	C32503	$750,000	$2,250,000	$2,000,000	$0		$5,000,000
		04950 NW N Collins Repl T1 Xfrm	C32313	$100,000	$603,462	$10,000	$0	$0	$713,462
		04951 NW Repl Eden Ctr Xfrm / LTC	C32331		$150,000	$600,000	$807,692		$1,557,692
		04953 NW Upgrade Panama Xfrm / Regs	C32306		$500,000	$0	$0		$500,000
		04989 Ogden Brook- install 13.2 kV s/gear	C32597	$1,000,000	$250,000	$0	$0		$1,250,000
		04990 Ogdenbrook Sta - Add Ckt Sw & TB2	C34783	$850,000	$500,000	$0	$0		$1,350,000
		04994 Paloma Second Transformer	C32495	$0	$405,000	$855,000	$855,000		$2,115,000
		05011 PS&I Activity - New York	C08153	$105,000	$110,000	$115,000	$120,000	$125,000	$575,000
		05063 Reserve for Load Relief Unidentified Specifics & Sched	RESERVE 036_016 SUE	$400,000	-$11,000,000	-$1,400,000	$7,500,000	$13,500,000	$9,000,000
		05083 S.Philadelphia 764 Transf. Upgrade	C32430	$0	$42,000	$412,500	$0		$454,500
		05139 Station 214 - Install TB2	C29186	$0	$200,000	$1,200,000	$0	$0	$1,400,000
		05194 W. Albion Transformer Addition	C32346	$165,000	$0	$0	$0		$165,000
		05224 Youngstown 88 - Station Rebuild	C29049		$200,000	$700,000	$0		$900,000
		05283 Attica12-Rebuild,Xfer F1263 to 0158	C26379	$250,000	$0	$0	$0	$0	$250,000
		05473 Canajoharie 03122 - Rebuild Rt 162	C00329		$830,000	$0	$0	$0	$830,000
		05866 F13861 Extend & Transfer to F23251	C26557	$60,000	$0	$0	$0	$0	$60,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		05867 F13862 Extend & transfer to F23255	C26558	$60,000	$0	$0	$0	$0	$60,000
		05878 F7654 - Extend & Transfer to 23251	C26559	$60,000	$0	$0	$0	$0	$60,000
		05920 Frankhauser New Station - Line Work	C28929	$118,000	$2,003,000	$236,000	$0	$0	$2,357,000
		06127 Liberty 9490 - replace getaway	C28786	$130,000	$0	$0	$0	$0	$130,000
		06243 N Syracuse Sub Getaways	C30506	$10,000	$2,917,000	$110,000	$0	$0	$3,037,000
		06299 Northville 52 - Convert N. Shore Rd	C07477	$3,000	$0	$0	$0	$0	$3,000
		06393 Ogden Brook - Install new feeders	C32598	$500,000	$0	$0	$0	$0	$500,000
		06510 Reserve for Load Relief Unidentified Specifics & Sched	RESERVE 036_016 LINE	-$2,000,000	-$6,000,000	$0	$750,000	$4,500,000	-$2,750,000
		06675 Station 214 - New F21466/67	C29187	$0	$30,000	$1,500,000	$1,500,000	$0	$3,030,000
		06978 North Syracuse Substation DxT	C36985	$600,000	$2,680,000	$130,000	$0	$0	$3,410,000
		06981 Sanborn Substation Rebuild (D-Sub)	C36857		$1,925,000	$875,000	$175,000		$2,975,000
		06990 PLACEHOLDER---Duguid Second Transformer (D-line)	C36844	$0	$20,962	$86,154	$0	$0	$107,116
		09227 Walmore 217 Contingency Load Relief	C36566	$0	$175,000	$0	$0	$0	$175,000
		09229 Wolf Rd. 34452 UG Cable Replacement	C36470	$175,000	$1,000,000	$0	$0	$0	$1,175,000
		09234 Bflo Sta 139 - Replace Transformers	C36639		$1,210,000	$550,000	$110,000		$1,870,000
		09235 Bflo Sta 55 - Replace Transformers	C36644	$0	$0	$330,000	$1,210,000		$1,540,000
		09236 Bridge St. Second Transformer	C36185	$0	$250,000	$1,500,000	$250,000		$2,000,000
		09239 Buffalo Sta 56- upgrade 4 Xfmrs	C36502	$400,000	$1,511,058	$131,010	$134,615		$2,176,683
		09249 Delphi Transformer Rating Increase	C36166		$605,000	$275,000	$55,000		$935,000
		09263 Military Road 210 - Install TB#2	C36056	$0	$0	$500,000	$3,000,000		$3,500,000
		09270 Poland Sta 66 - Replace Transformer	C36624	$0	$0	$0	$315,000		$315,000
		09273 Shawnee Road 76 (DSub)	C36059	$318,558	$2,709,279	$1,665,385	$257,596	$0	$4,950,818
		09277 Walmore 217 Load Relief (DSub)	C36579	$160,000	$250,000	$0	$0		$410,000
		09279 Wilson 93 Load Relief - Replace TB1	C35743	$563,750	$256,250	$51,250	$0		$871,250
		11086 Ash St 12 kV Metalclad Replacement getaway cable	CD0134	$30,000	$225,000	$0	$0	$0	$255,000
		11196 Buffalo Station 38 - F3863 Relief	CD0252	$50,000		$0	$0	$0	$50,000
		11197 Buffalo Station 46 & 44 - F4672/F4468 Relief	CD0253	$195,000	$0	$0	$0	$0	$195,000
		11201 Buffalo Station 38 - F3864 Relief	CD0321	$453,725	$0	$0	$0	$0	$453,725
		11323 Getaway upgrade overloaded section	CD0341	$108,000	$0	$0	$0	$0	$108,000
		11354 East Norfolk 91361 line reconductoring	CD0358	$102,000		$0	$0		$102,000
		11358 Beech Ave Conversion Niagara Falls	C32751	$0	$207,843	$203,039	$0	$0	$410,882
		11361 8th St Conversion Niagara Falls	PPM 11361	$0	$51,961	$0	$0	$0	$51,961
		11380 Welch Ave Conversion Load Relief	PPM 11380	$0	$20,000	$213,824	$240,441	$0	$474,265
		11486 Starr Rd 33453/Tuller Hill 24651	PPM 11486	$700,000	$482,353	$100,000	$0	$0	$1,282,353
		11490 Inman 37055 -- Lisha Kill Road Conversion (4.16kV to 1	CD0209	$250,000		$0	$0		$250,000
		11744 Buffalo Station 40 - F4067 Relief	PPM 11744	$0	$0	$0	$98,353	$0	$98,353
		11838 2163 Load Relief	PPM 11838	$20,000	$137,212	$0	$0	$0	$157,212
		11886 Randall Rd - New station - M/C S/G & Cap Bank	PPM 11886	$0	$0	$0	$64,615	$1,534,615	$1,599,230
		11887 Randall Rd - New station - Dist getaways, etc	PPM 11887	$50,000	$347,000	$347,000	$347,000	$50,000	$1,141,000
		11933 Sodeman Rd Station - new station - M/C & cap bank	PPM 11933	$0	$0	$0	$394,615	$405,000	$799,615
		11943 Sodeman Rd - New station - dist getaways, reconducto	PPM 11943	$50,000	$430,000	$1,383,077	$1,604,231	$40,000	$3,507,308
		11956 Queensbury Station - Reroute getaways to new M/C S/	PPM 11956	$0	$0	$20,000	$363,654	$393,750	$777,404
		11958 McCrea Station - New station - Install M/C & cap bank	PPM 11958	$0	$0	$30,000	$600,288	$646,875	$1,277,163
		11959 McCrea Station - New station - Getaways, etc.	PPM 11959	$0	$20,000	$303,077	$328,846	$0	$651,923
		13238 Albion 8064 Getaway Reconductor	PPM 13238	$0	$0	$0	$46,302	$0	$46,302
		13245 South Livingston Relief - Station Work	PPM 13245	$265,000	$2,354,400	$604,800	$0	$0	$3,224,200
		13246 South Livingston relief - DLine work	PPM 13246	$265,000	$1,940,200	$504,000	$0	$0	$2,709,200
		13249 NW North Eden Replace	PPM 13249	$20,000	$716,058	$50,000	$0	$0	$786,058
		13270 Albion Station 34.5kV cap bank installation	PPM 13270	$693,000	$76,000				$769,000
		13280 Grooms Rd 34557 - Saratoga Rd Conversion (4.8 to 13	PPM 13280	$0	$187,500	$0	$0	$0	$187,500
		15713 Newtonville 30584 Load Relief	CD0388	$75,000	$0	$0	$0		$75,000
		15714 Berry Road Distribution Line Cap installations	PPM 15714	$155,000	$8,400				$163,400
		15715 Roberts Road Distribution Line Cap installations	PPM 15715	$155,000	$8,400				$163,400
		15717 Bennett Road Distribution Line Cap installations	PPM 15717	$250,000					$250,000
		15744 PLACEHOLDER - Study for Dunkirk 34.5kV	PPM 15744	$0	$0	$0	$0	$67,500	$67,500
		15746 PLACEHOLDER -Study for Genesee North 34.5kV	PPM 15746	$0	$0	$0	$0	$67,500	$67,500
		17420 Rotterdam 13853 - Route 5S Conversion (4.16 / 13.2kV	PPM 17420	$450,000	$0	$0	$0	$0	$450,000
		17496 Baker St Distribution Line Cap Installations	CD0540	$125,000					$125,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		17510 Grooms Rd 34457 - Rosemary Drive Conversion - 4.16	PPM 17510	$225,000	$0	$0	$0	$0	$225,000
		17511 - Buffalo Station 64 - South Grand Island Area Relief - F	PPM 17511	$20,000	$0	$0	$0	$0	$20,000
		17793 NR-Coffeen 76051_Gaffney St_Reconductor	PPM 17793	$225,000					$225,000
		17795 French Creek Station 56 - Transformer Replacement	PPM 17795	$917,000					$917,000
		17810 CR- Paloma 57 - Convert Schuyler St Ratio	CD0553	$225,000					$225,000
		17819 CR- Convert CR 57 on Whitaker 53	PPM 17819	$625,000					$625,000
		17827 CR- Rock Cut 53 Midland Ave conversion	PPM 17827	$350,000					$350,000
		17852 CR- W Monroe 51 CR 11 Conversion	PPM 17852	$200,000					$200,000
		17870 SW - Reconductor #6 Wire on Machias 1362 on State H	PPM 17870	$440,000					$440,000
	Capacity Planning Total			$15,330,879	$22,503,415	$22,439,962	$21,278,248	$21,330,240	$102,882,744
	ERR	05273 Amsterdam 51/53 - Widow Susan Rd Area	C28835	$250,000	$250,000	$0	$0		$500,000
		05305 Batavia 0155 - Knapp Rd 22651 Tie	C28719	$200,000	$0	$0	$0	$0	$200,000
		05547 Clinton 53 - Convert Ft Plain	C06698	$69,000	$0	$0	$0	$0	$69,000
		05882 F9753 Rebuild/Conv tie w/F21754	C28689	$60,000	$0	$0	$0	$0	$60,000
		06300 Northville 52 - EJ West 51 Tie	C29435	$25,000	$0	$0	$0	$0	$25,000
		06305 NR_81652_CoRte26_StepDown	C34803	$50,000	$0	$0	$0	$0	$50,000
		06441 Port Henry 51 - Convert Westport	C18991	$500,000	$0	$0	$0	$0	$500,000
		06657 St Johnsville - Sanders Road	C29439	$185,000					$185,000
		06731 Swann Rd F10552 tie with F10557	C28106	$40,000	$0	$0	$0	$0	$40,000
		11077 NR-Chasm Falls 85251-Indian Lake/Mtn View Lake-Re	CD0088	$300,000	$0	$0	$0	$0	$300,000
		11105 NR-Lowville 77354-Pine Grove Rd-Overloaded Step-do	CD0476	$436,471	$0	$0	$0		$436,471
		11600 MV Humphrey Rd Rebuild	CD0264	$110,884		$0	$0		$110,884
		11633 EJ West 51 - Scofield Rd. 53 Single Phase Tie	CD0256	$95,000	$0	$0	$0		$95,000
		11914 UG Cable Replacements - NYS Lake Ontario State Par	CD0292	$302,400	$0	$0	$0	$0	$302,400
		11922 Brook Road 55 - Young Road Rebuild	CD0299	$70,000	$0	$0	$0		$70,000
		12731 Middleburgh 51 - Relocate Route 30 Creek Crossing	CD0324	$225,000	$0	$0	$0		$225,000
		12732 Middleburgh 51 - North Road Rebuild	CD0312	$415,000	$0	$0	$0		$415,000
		12761 Port Henry 51 - Rebuild Route 9N from P148-158	CD0306	$25,000	$0	$0	$0		$25,000
		12773 Port Henry 51 - Rebuild Route 9N from P195-205	CD0326	$75,000	$0	$0	$0		$75,000
		12832 Center St 54 - Hyney Hill Road Rebuild	CD0357	$122,500	$0	$0	$0		$122,500
		12834 Center St. 54 - Extend 3Ø on State Route 30A	CD0329	$525,000	$0	$0	$0		$525,000
		12883 NR_TI_81455_NYSRte12E_Overloaded Step-down	CD0344	$315,000	$0	$0	$0		$315,000
		12912 Delameter - F9354 Load Relief	CD0354	$734,900	$0	$0	$0	$0	$734,900
		13276 Hudson 08753 - Rhinebeck-Hudson Road - Reconducto	CD0372	$185,000	$0	$0	$0		$185,000
		17119 Ashley 51 - Baldwin Corners Road Phase 1	CD0389	$100,000	$0	$0	$0		$100,000
		17247 Schoharie 52 - State Route 443 Rebuild	CD0424	$485,000					$485,000
		17610 ERR Program Placeholder	PPM 17610	$0	$3,500,000	$3,500,000	$3,500,000	$3,500,000	$14,000,000
	ERR Total			$5,901,155	$3,750,000	$3,500,000	$3,500,000	$3,500,000	$20,151,155
	Heavily Loaded Transfor	06011 IE - NC Dist Transformer Upgrades	C14846	$1,000,000	$1,067,000	$1,184,000	$1,234,000	$1,286,000	$5,771,000
		06023 IE - NE Dist Transformer Upgrades - C15828	C15828	$1,000,000	$1,066,000	$1,183,000	$1,233,000	$1,285,000	$5,767,000
		06033 IE - NW Dist Transformer Upgrades	C10967	$1,000,000	$1,067,000	$1,183,000	$1,233,000	$1,285,000	$5,768,000
	Heavily Loaded Transformer Total			$3,000,000	$3,200,000	$3,550,000	$3,700,000	$3,856,000	$17,306,000
	New Business	05512 Center St 54 - Rebuild Route 5S	C29426	$50,000	$0	$0	$0	$0	$50,000
	New Business Total			$50,000	$0	$0	$0	$0	$50,000
	Overhead Distribution Fu	06016 IE - NC Side Tap Fusing	C15511	$600,000	$600,000	$600,000	$600,000	$600,000	$3,000,000
		06028 IE - NE Side Tap Fusing	C15510	$600,000	$600,000	$600,000	$600,000	$600,000	$3,000,000
		06038 IE - NW Side Tap Fusing	C15509	$600,000	$600,000	$600,000	$600,000	$600,000	$3,000,000
	Overhead Distribution Fusing Total			$1,800,000	$1,800,000	$1,800,000	$1,800,000	$1,800,000	$9,000,000
	Recloser	06014 IE - NC Recloser/Switch Installs	C13267	$1,072,000	$0	$0	$0	$0	$1,072,000
		06026 IE - NE Recloser/Switch Install	C13266	$1,608,000	$107,200	$0	$0	$0	$1,715,200
		06036 IE - NW Recloser/Switch Installs	C13268	$804,000	$0	$0	$0	$0	$804,000
	Recloser Total			$3,484,000	$107,200	$0	$0	$0	$3,591,200
	SC&P Other	04674 BuffaloAlbanyFlyingGroundsSwitchRpl	C33636	$750,000	$1,500,000	$750,000	$0		$3,000,000
		05095 Schuylerville Station - Bus Changes	C35226		$75,000	$175,000	$0	$0	$250,000
		05256 Albany Network Study Construction	CD0016	$1,617,165	$0	$0	$0	$0	$1,617,165
		05367 Brook Road 55/57 - Daniels Rd	C29425	$216,000		$0	$0	$0	$216,000
		05399 Buffalo Station 03 - F0303 Removal	C36207	$100	$100	$100	$0	$0	$300
		05400 Buffalo Station 12 - Fdr Rem & Ties	C36208	$25,000	$100,000	$100,000	$0	$0	$225,000

Exhibit 3 - 2012 Distribution Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		06341 NR-North Carthage 81652-53 Fdr Tie	C10693	$0	$150,000	$750,000	$0	$0	$900,000
		06755 Tonawanda - F7128 Removal	C36206	$0	$100	$100	$100	$0	$300
		06872 W.Hamlin 8254 - Tie w/F8252 & F7458	C28715	$350,000	$0	$0	$0	$0	$350,000
		07003 MV-Kingsley Ave Convert 5kV	C36851	$195,000	$0	$0	$0	$0	$195,000
		09250 East Malloy- feeders and getaways	C36188	$0	$538,712	$3,500,000	$1,000,000		$5,038,712
		09252 Fly Rd. Transformer Addition	C36189	$0	$356,346	$503,462	$46,587		$906,395
		11147 Bethlehem 02158 - Juniper 44651 TIE (02158 Conversi	PPM 11147		$300,000	$0	$0	$0	$300,000
		11318 Spier-Rotterdam Project - Dist relocations	CD0187	$4,235,000	$63,000	$0	$0	$0	$4,298,000
		11602 MV Mulholland Rd Convert to 13.2kV	CD0245	$180,000	$0	$0	$0		$180,000
		13373 East Malloy transformer addition	PPM 13373	$0	$356,346	$503,462	$46,587	$0	$906,395
		13866 East Malloy- low side sub equipment	PPM 13866	$0	$314,423	$1,098,462	$526,154	$0	$1,939,039
		13999 Fly Rd Low side substation equipment	PPM 13999	$0	$167,692	$236,923	$21,923	$0	$426,538
		14031 Fly Rd Low side feeders/getaways	PPM 14031	$0	$446,481	$1,674,615	$731,135	$0	$2,852,231
		15685 Orangeville Substation - Modify Regulator Bank	PPM 15685	$79,500	$0	$0	$0	$0	$79,500
		17185 DLine -To expand Rock Cut Sub Retire Brighton 4kV	PPM 17185	$200,000	$719,231	$100,000	$0	$0	$1,019,231
		17513 Ruth Rd 38153 - Lisha Kill Rd Conversion	CD0563	$162,500	$0	$0	$0	$0	$162,500
		17515 Karner 31716 Conversion - New 13.2kV Tie	PPM 17515	$0	$150,000	$0	$0	$0	$150,000
		17516 Reynolds Rd 33455 Line Extension (34.5kV to 13.2kV (	PPM 17516	$0	$120,000	$0	$0	$0	$120,000
		17517 Buffalo Station 42 - Voltage Mitigation	CD0541	$200,000	$0	$0	$0	$0	$200,000
		17733 NR-Coffeen 76052_E Watertown 81756_Inner Loop_Fe	CD0560	$356,000					$356,000
	SC&P Other Total			$8,566,265	$5,357,431	$9,392,124	$2,372,486	$0	$25,688,306
	Substation Relay/Protect	04615 Bethlehem L10, L14 Relay Upgrades	C36193	$150,000	$275,000		$0		$425,000
		04877 MikeCooperTASRelayReplacemntCo36DxT	C34691	$300,000	$300,000	$200,000	$0		$800,000
	Substation Relay/Protection Total			$450,000	$575,000	$200,000	$0		$1,225,000
	Substation RTU	05027 REP - Dist Subs EMS RTU DNP Plan	C20173	$250,000	$250,000	$150,000	$150,000	$150,000	$950,000
		05028 REP - Dist Subs Without RTUs	C19851	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$12,500,000
		07037 Birch Ave Sub EMS Modifications	CD0009	$50,000	$0	$0	$0	$0	$50,000
	Substation RTU Total			$2,800,000	$2,750,000	$2,650,000	$2,650,000	$2,650,000	$13,500,000
	TBD	04752 DxT Study Budgetary Reserve - NIMO - C31550	C31550	$100,000	$100,000	$100,000	$100,000	$100,000	$500,000
		05065 Reserve for Reliability Unidentified Specifics & Schedul	RESERVE 036_015 SUB	$0	-$1,500,000	-$4,000,000	$3,750,000	$5,500,000	$3,750,000
		06515 Reserve for Reliability Unidentified Specifics & Schedul	RESERVE 036_015 LINE	-$6,725,299	$999,954	$1,074,914	$3,149,266	$4,224,760	$2,723,595
	TBD Total			-$6,625,299	-$400,046	-$2,825,086	$6,999,266	$9,824,760	$6,973,595
	Arc Flash Mediation	18023 Arc Flash Mediation - 480V Spot Networks	PPM 18023	$150,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$16,150,000
	Arc Flash Mediation Total			$150,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$16,150,000
System Capacity & Performance Total				$43,053,000	$52,061,000	$53,440,000	$55,307,000	$56,249,000	$260,110,000
Asset Condition	AC Other	04682 Canajoharie Sub Retirement	C29948	$100					$100
		04869 McBride Station - Retire 5kV Assets	C36209	$74,000	$0	$0	$0	$0	$74,000
		04970 NY Small Capital Items	C26760	$100,000	$100,000	$100,000	$100,000		$400,000
		05215 White Lake Station Upgrades	C08435	$13,000	$0	$0	$0	$0	$13,000
		05475 Canajoharie D-Line Work	C28837	$25,000	$0	$0	$0	$0	$25,000
		06212 Middleburgh 52 - Kelsey Hill Road	C35083	$70,000	$0	$0	$0	$0	$70,000
		06543 Rock City Falls 40415 - Armer Road	C20071	$18,000	$0	$0	$0		$18,000
		06623 Sharon 52 - Rebuild Routes 20 & 145	C06680	$425,000	$0	$0	$0	$0	$425,000
		07009 NR-Samaritan Keep Nursing Home	C36846	$115,000	$0	$0	$0		$115,000
		09221 Market Hill Convert Load	C36638	$108,000	$432,000	$0	$0	$0	$540,000
		09228 Warrensburg 51 - E Schroon River Rd	C35271	$50,000	$0	$0	$0	$0	$50,000
		09242 Carthage Reploace Struct Footings	C36183	$0	$280,000	$385,000	$35,000		$700,000
		09254 Hoag Station Rehab	C36050	$950,000	$750,000	$0	$0	$0	$1,700,000
		09258 Lockport Road 216 - Install TB#2	C36057	$50,000					$50,000
		10829 Distribution Transfers on Line #308 Rebuild	CD0082	$100,000	$0	$0	$0	$0	$100,000
		11122 Greenbush 07854 - Best Road Conversion	CD0152	$325,000		$0	$0		$325,000
		11257 Buffalo Station 12 - 25 Cycle Retirement	PPM 11257	$100	$0	$0	$100	$0	$200
		11258 Buffalo Station 14 - 25 Cycle Retirement	PPM 11258	$100	$100	$0	$0	$0	$200
		11299 Buffalo Station 122 Rebuild - Sta	PPM 11299	$50,000					$50,000
		11300 Buffalo Station 122 Rebuild - Line	PPM 11300	$10,000					$10,000
		11314 Amsterdam 54 - Langley Rd 3Ø Extension	CD0169	$5,000	$0	$0	$0		$5,000
		11458 MV- Poland 62258 Route 8 Reconductor	PPM 11458	$650,000	$475,000	$0	$0	$0	$1,125,000
		11460 Conkling Station relief	PPM 11460	$203,846		$0	$0	$0	$203,846

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		11496 Burgoyne 51 - Rebuild Durkeetown Rd.	CD0222	$745,000	$0	$0	$0		$745,000
		11695 Feed 2762 - #6A reconductoring	CD0353	$600,000	$0	$0	$0	$0	$600,000
		11805 Stow F5261 & Chautauqua F5762 transfer underbuilt o	CD0452	$134,000	$0	$0	$0	$0	$134,000
		12835 Station 66 (Union Rd) Rebuild - Sub	PPM 12835	$281,000	$282,000	$0	$0	$0	$563,000
		13180 MV Dyke Rd - Schuyler 66356	PPM 13180	$5,096	$117,385	$0	$0	$0	$122,481
		13273 Steamburg Rebuilt	PPM 13273	$20,000	$189,615	$2,153,846	$0	$0	$2,363,461
		15684 Orangeville Substation - Upgrade Bypass Switch	PPM 15684	$68,288	$0	$0	$0	$0	$68,288
		17054 Grand St. 51 - Route 7 Gap Closing	CD0374	$225,000		$0	$0		$225,000
		17808 Lenox Station 513 - Station Improvement	PPM 17808			$230,000	$776,000		$1,006,000
		17815 Hancock Station 137	PPM 17815		$989,000	$989,000			$1,978,000
		17820 Rock City Falls Station - Improvement	PPM 17820				$510,000	$510,000	$1,020,000
	AC Other Total			$5,420,530	$3,615,100	$3,857,846	$1,421,100	$510,000	$14,824,576
	Blanket	05498 Cent NY-Dist-Asset Replace Blanket	CNC017	$2,420,000	$2,495,000	$2,580,000	$2,656,000	$2,735,000	$12,886,000
		05809 East NY-Dist-Asset Replace Blanket	CNE017	$2,176,000	$2,244,000	$2,320,000	$2,389,000	$2,460,000	$11,589,000
		06893 West NY-Dist-Asset Replace Blanket	CNW017	$2,602,000	$2,683,000	$2,774,000	$2,856,000	$2,941,000	$13,856,000
	Blanket Total			$7,198,000	$7,422,000	$7,674,000	$7,901,000	$8,136,000	$38,331,000
	Cable Replacement	05365 Brook Road 36954 Getaway cable repl	C29113	$400,000	$0	$0	$0	$0	$400,000
		05982 Henry St 36 - River Crossing	C29432	$415,000		$0	$0	$0	$415,000
		06044 IE-NC Cable Replacements Placeholde	C13822	$680,000	$20,000	$0	$0	$0	$700,000
		06046 IE-NE Cable Replacements Placeholde	C11099	$0	$184,000	$2,245,500	$2,750,000	$2,750,000	$7,929,500
		06338 NR-Mill St-Failed Ductline	C32650	$400,000	$0	$0	$0	$0	$400,000
		06686 Stonehenge URD	C28826	$100,000	$0	$0	$0		$100,000
		06917 Whitaker 51 River Crossing	C06850	$95,000	$0	$0	$0	$0	$95,000
		09220 Liberty St. UG Cable Replacement	C36469	$1,316,000	$1,316,000	$0	$0	$0	$2,632,000
		09224 Riverside 28855 UG Cable Replacemen	C36468	$1,500,000		$0	$0		$1,500,000
		09226 Utica UG Cable Replacement	C36446	$20,000	$980,000	$1,200,000	$1,700,000	$1,700,000	$5,600,000
		09276 Trinity TB4 UG Cables	C36390	$250,000		$0	$0		$250,000
		11500 Buffalo Station 22 - Recond 4 kV Getaways	CD0472	$207,843	$0	$0	$0	$0	$207,843
	Cable Replacement Total			$5,383,843	$2,500,000	$3,445,500	$4,450,000	$4,450,000	$20,229,343
	Conductor Replacement	06015 IE - NC Replace open wire primary	C31861	$0	$0	$500,000	$500,000		$1,000,000
		06027 IE - NE Replace open wire primary	C31860	$0	$0	$500,000	$500,000		$1,000,000
		06037 IE - NW Replace open wire primary	C31862	$0	$0	$500,000	$500,000	$500,000	$1,500,000
		17785 CR- Small & steel wire replacement on 27853	CD0551	$200,000					$200,000
		17851 SW - Replace Steel Conductor on Cuba Lake 3761 - Br	PPM 17851	$220,000					$220,000
		17867 SW - Replace Steel Conductor on Cuba Lake 3761 - Ja	PPM 17867	$470,000					$470,000
	Conductor Replacement Total			$890,000	$0	$1,500,000	$1,500,000	$500,000	$4,390,000
	Cutout Replacement	06010 IE - NC Cutout Replacement	C12967	$100,000	$0	$0	$0		$100,000
	Cutout Replacement Total			$100,000	$0	$0	$0		$100,000
	ISO Capacitor Banks	06977 NE NYISO 13.2kV Sub Cap Banks	C36827	$0	$0	$0	$0	$0	$0
		07004 NE NYISO Dist Line Cap Banks	C36831	$0	$0	$0	$0		$0
	ISO Capacitor Banks Total			$0	$0	$0	$0	$0	$0
	Network	05519 Central Div_Syr_Ash_LVAC_Trans	C36604	$200,000	$0	$0	$0	$0	$200,000
		05520 Central Div_Syr_Temple_LVAC_Trans	C36605	$200,000	$0	$0	$0	$0	$200,000
		05522 Central Div_Watertown_LVAC_Trans	C36602	$200,000	$0	$0	$0	$0	$200,000
		06258 Network Protector Replacement - C36651	C36651	$175,000	$0	$0	$0	$0	$175,000
		06260 Network Transformer Replacement - C36636	C36636	$75,000	$0	$0	$0	$0	$75,000
	Network Total			$850,000	$0	$0	$0	$0	$850,000
	Substation Battery and R	04606 BatteryRplStrategyCo36DxT	C33846	$300,000	$300,000	$300,000	$300,000	$300,000	$1,500,000
		04607 Batts/Charg- NY Central	C32013	$250,000	$250,000	$250,000	$125,000	$125,000	$1,000,000
		04608 Batts/Charg- NY West	C32014	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
		04609 Batts/Charg--NY East	C32012	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
	Substation Battery and Related Total			$1,050,000	$1,050,000	$1,050,000	$925,000	$925,000	$5,000,000
	Substation Breaker	04902 NC ARP Breakers & Reclosers	C32253	$1,000,000	$1,500,000	$2,000,000	$2,250,000	$2,250,000	$9,000,000
		04905 NE ARP Breakers & Reclosers	C32252	$1,000,000	$1,500,000	$2,000,000	$2,250,000	$2,250,000	$9,000,000
		04947 NW ARP Breakers & Reclosers	C32261	$1,000,000	$1,500,000	$2,000,000	$2,250,000	$2,250,000	$9,000,000
		11619 NY Circuit Breaker Replacement	C37883	$0	$2,000,000	$1,000,000	$0		$3,000,000
	Substation Breaker Total			$3,000,000	$6,500,000	$7,000,000	$6,750,000	$6,750,000	$30,000,000
	Substation Circuit Switch	04703 Circuit Switcher Strategy Co:36 DxT	C18850	$0	$2,000,000	$1,000,000	$0	$5,000,000	$8,000,000

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
	Substation Circuit Switcher Total			$0	$2,000,000	$1,000,000	$0	$5,000,000	$8,000,000
	Substation Indoor	04635 Buffalo Indoor Sub. #29 Refurb.	C06722	$1,998,000	$0	$0	$0	$0	$1,998,000
		04636 Buffalo Indoor Sub. #43 Refurb.	C25660	$300,000	$0	$0	$0	$0	$300,000
		04637 Buffalo Indoor Sub. #52 Refurb.	C25659	$1,608,630	$0	$0	$0	$0	$1,608,630
		04654 Buffalo Station 27 Rebuild - Sta	C33473	$1,500,000	$2,750,000	$750,000	$0	$0	$5,000,000
		04657 Buffalo Station 31 Rebuild - Sub	PPM 04657	$0	$0	$0	$300,000	$1,500,000	$1,800,000
		04663 Buffalo Station 37 Rebuild - Sub	C33474	$375,000	$0	$3,850,000	$750,000	$0	$4,975,000
		04665 Buffalo Station 41 Rebuild - Sub	PPM 04665	$0	$0	$0	$300,000		$300,000
		04670 Buffalo Station 59 Rebuild - Sub	C33475	$480,000	$0	$640,000	$1,760,000	$1,200,000	$4,080,000
		05411 Buffalo Station 27 Rebuild - Line	C33476	$1,000,000	$100,000	$75,000	$0	$0	$1,175,000
		05413 Buffalo Station 29 Rebuild - Fdrs	C06723	$450,000	$150,000	$0	$0		$600,000
		05419 Buffalo Station 31 Rebuild - Line	PPM 05419	$0	$0	$0	$50,000	$1,500,000	$1,550,000
		05430 Buffalo Station 37 Rebuild - Line	C33477	$1,000,000	$700,000	$500,000	$100,000		$2,300,000
		05434 Buffalo Station 41 Rebuild - Line	PPM 05434	$0	$0	$0	$50,000	$1,500,000	$1,550,000
		05438 Buffalo Station 43 Rebuild - Fdrs	C27948	$75,000	$0	$0	$0	$0	$75,000
		05447 Buffalo Station 52 Rebuild - Fdrs	C27949	$200,000	$25,000	$0	$0	$0	$225,000
		05451 Buffalo Station 59 Rebuild - Line	C33478	$0	$0	$0	$60,000	$120,000	$180,000
		11877 Rock Cut #286 2nd Tranf and Metalclad	PPM 11877	$340,000	$1,364,154	$2,156,471	$230,000	$0	$4,090,625
	Substation Indoor Total			$9,326,630	$5,089,154	$7,971,471	$3,600,000	$5,820,000	$31,807,255
	Substation Metal-Clad Sw	04582 Altamont Sub Metalclad Replacement	C32296	$750,000	$0	$0	$0		$750,000
		04867 Market Hill Sub Metalclad Replacemt	C32298	$200,000	$960,000	$940,000	$100,000		$2,200,000
		05269 Altamont Switchgear Replacmt D_Line	C33746	$150,000	$0	$0	$0	$0	$150,000
		05846 Emmet St - Repl TB1 and mclad	C17952	$0	$345,865	$1,303,077	$602,885	$123,750	$2,375,577
		09244 Chrisler Metal Clad Replacement	C36213	$0	$314,423	$1,250,000	$548,077		$2,112,500
		13341 Union St 376 - Replace Metalclad Gear	PPM 13341	$0	$0	$20,000	$341,731	$1,361,250	$1,722,981
		13342 Johnson Rd - Replace Metalclad Gear	PPM 13342	$0	$0	$20,000	$341,731	$1,361,250	$1,722,981
		13343 Pinebush - Replace Metalclad Gear	PPM 13343	$0	$0	$20,000	$20,000	$341,731	$381,731
		13345 Hopkins 253 - Replace Metalclad Gear	PPM 13345	$0	$20,000	$335,000	$1,326,000	$619,000	$2,300,000
		13346 Whitesboro 632 - Replace Metalclad Gear	PPM 13346	$0	$0	$0	$20,000	$341,731	$361,731
		17828 Henry Street Station 316 - Replace Metalclad	PPM 17828	$20,000	$335,000	$1,326,000	$619,000		$2,300,000
	Substation Metal-Clad Switchgear Total			$1,120,000	$1,975,288	$5,214,077	$3,919,424	$4,148,712	$16,377,501
	Substation Mobile	11331 New NY Mobile Substation 69kV -13.8x4.8x4.16kV	PPM 11331	$1,000,000	$1,000,000				$2,000,000
		17809 Mobile Sustation 7C - Refurbish and Upgrade	PPM 17809	$700,000					$700,000
		17811 Mobile Substation 2E - Replacement	PPM 17811			$544,000	$394,000		$938,000
		17812 Mobile Substation 4E - Refurbish and Upgrade	PPM 17812			$526,000			$526,000
		17821 Mobile Substation 6E - Rewind	PPM 17821				$659,000		$659,000
	Substation Mobile Total			$1,700,000	$1,000,000	$1,070,000	$1,053,000		$4,823,000
	Substation Power Transf	04962 NY ARP Spare Substation Transformer	C26055	$1,679,000	$900,000	$0	$0		$2,579,000
		09248 Cuyler#24 Inst 34/4kV Substation	C36102	$300,000	$200,000	$0	$0		$500,000
		09251 Fisher Ave Replace 34/13kV Trans	C36101	$917,000	$0	$0	$0		$917,000
		09275 TRANS REPL NY	C36043	$0	$0	$0	$0	$0	$0
		17796 Liberty Street Station 94-Replace Transformer	PPM 17796	$917,000					$917,000
		17798 Summit Station Transformer Replacement	PPM 17798		$765,000				$765,000
		17805 Station 124 - Almeda Ave Transformer Replacement	PPM 17805				$0	$2,806,000	$2,806,000
		17806 Rock City Station 623 - Transformer Replacement	PPM17806				$1,012,000		$1,012,000
		17807 Indian Lake - Replace Transformers	PPM 17807			$1,012,000	$0		$1,012,000
	Substation Power Transformer Total			$3,813,000	$1,865,000	$1,012,000	$1,012,000	$2,806,000	$10,508,000
	Substation RTU	04969 NY RTU Program - DxT Subs	C22151	$2,200,000	$500,000	$0	$0	$0	$2,700,000
	Substation RTU Total			$2,200,000	$500,000	$0	$0	$0	$2,700,000
	TBD	05061 Reserve for Asset Replacement Unidentified Specifics &	RESERVE 036_017 SUE	-$8,500,000	-$6,500,000	-$9,896,480	$2,448,742	-$416,952	-$22,864,690
		06508 Reserve for Asset Replacement Unidentified Specifics &	RESERVE 036_017 LINE	-$6,890,003	$5,012,458	$10,918,586	$10,350,734	$8,700,240	$28,092,015
	TBD Total			-$15,390,003	-$1,487,542	$1,022,106	$12,799,476	$8,283,288	$5,227,325
	Buffalo Street Light	18022 Buffalo Street Light Cable Replacement	PPM 18022	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$12,500,000
	Buffalo Street Light Total			$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$12,500,000
Asset Condition Total				$29,162,000	$34,529,000	$44,317,000	$47,831,000	$49,829,000	$205,668,000
Non-Infrastructure	Blanket	04508 Cent NY-General-Genl Equip Blanket	CNC070	$1,085,000	$1,129,000	$1,186,000	$1,228,000	$1,272,000	$5,900,000
		04525 East NY-Genl Equip Budgetary Reserv	CNE070	$865,000	$900,000	$946,000	$980,000	$1,015,000	$4,706,000
		04559 Telecom and Radio Equipment	C04157	$1,075,000	$1,110,000	$1,150,000	$1,150,000	$1,150,000	$5,635,000

Exhibit 3 - 2012 Distribution Capital Investment Plan

Spending Rationale	Program	Project Name	Project #	FY13	FY14	FY15	FY16	FY17	TOTAL
		04563 West NY-General-Genl Equip Blanket	CNW070	$1,135,000	$1,181,000	$1,241,000	$1,285,000	$1,331,000	$6,173,000
		05509 Cent NY-Dist-Telecomm Blanket	CNC021	$14,000	$15,000	$16,000	$17,000	$18,000	$80,000
		05821 East NY-Dist-Telecomm Blanket	CNE021	$11,000	$12,000	$13,000	$14,000	$15,000	$65,000
		06905 West NY-Dist-Telecomm Blanket	CNW021	$9,000	$9,000	$10,000	$10,000	$10,000	$48,000
	Blanket Total			$4,194,000	$4,356,000	$4,562,000	$4,684,000	$4,811,000	$22,607,000
	Non-Infrastructure	17519 Belfry Mountain-site revamp	PPM 17519	$0	$0	$200,000	$0	$0	$200,000
		17521 Attica Roadway Re-build	PPM 17521	$200,000	$0	$0	$0	$0	$200,000
		17522 Jordanville Site Purchase/Rebuild	PPM 17522	$0	$0	$0	$200,000	$0	$200,000
		17523 Duanesburg Site Purchase/Rebuild	PPM 17523	$0	$0	$0	$200,000	$0	$200,000
		17524 Expand VHF Coverage - Northeast	PPM 17524	$0	$0	$400,000	$0	$0	$400,000
		17525 Bald Mountain Tower Replacement	PPM 17525	$0	$0	$400,000	$0	$0	$400,000
		17526 Recloser Communication RF Links	PPM 17526	$100,000	$100,000	$0	$0	$0	$200,000
	Non-Infrastructure Total			$300,000	$100,000	$1,000,000	$400,000	$0	$1,800,000
	TBD	04546 Reserve for General Equipment Specifics & Schedule C	RESERVE 036_070 LINE	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
	TBD Total			$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
Non-Infrastructure Total				$4,744,000	$4,706,000	$5,812,000	$5,334,000	$5,061,000	$25,657,000
Grand Total				$244,000,000	$255,000,000	$265,000,000	$275,000,000	$282,000,000	$1,321,000,000

Exhibit 4

NIAGARA MOHAWK POWER CORPORATION
Summary of Bill Impact Associated with FY13 - FY17 T & D Capex Only
For Fiscal Years 2014, 2015 & 2016
($000's)

	FY 2014	FY 2015	FY 2016
Depreciation Expense	7,646	15,737	24,395
Rate Base:			
Net Utility Plant	517,173	998,770	1,505,051
Accumulated Deferred Taxes	-75,922	-126,671	-184,092
Total Rate Base	441,250	872,099	1,320,959
ROR	9.45%	9.45%	9.45%
Return on Rate Base	41,710	82,437	124,867
Total Revenue Requirement Impact of FY14 - FY16 Capex Only	49,356	98,175	149,262
Rate Base Impact of Depreciation on 12/31/11 Embedded Plant	-76,079	-228,238	-380,397
ROR	9.45%	9.45%	9.45%
Total Revenue Requirement Impact of 12/31/11 Embedded Plant	-7,192	-21,575	-35,958
Total Revenue Requirement Impact of Capex less impact of Embedded Plant	**$42,165**	**$76,600**	**$113,304**
Allocation of Revenue Requirement to SC1 Residential Customers	25,390	46,125	68,226
SC1 Residential Customers Cumulative Bill Impact per kWh	**$0.00236**	**$0.00429**	**$0.00635**

Assumptions:

1) FY13 - FY17 capex per the 1/31/2012 CIP filing (Transmission, Distribution & Sub-Transmission only)
2) NYS PSC Staff's Depreciation Rates per 1/24/11 Commission Order - Case 10-E-0050
3) ROR based on 9.3% ROE per 1/24/11 Commission Order - Case 10-E-0050
4) Embedded historic plant generates depreciation expense that will reduce rate base (increase to depreciation reserve). Reduced the revenue requirement to include the inherent reduction to ratebase from depreciating embedded plant determined as follows:

December 31, 2011 Electric Depreciable Plant	6,938,712
Composite Electric Depreciation Rate	2.19%
Total Annual Electric Depreciation based on embedded plant	152,159

   Ratebase impact determined by using a half year average of annual depreciation per year
5) Allocated revenue requirement to SC1 customers based on 2011 T&D Revenue at Proposed Rates per Exhibit (RCDM-5), Schedule 1, Sheet 4, Column (F) (based on 1/24/11 Commission Order - Case 10-E-0050)
6) SC1 bill impact utilized SC1 kWh based on 2011 T&D Revenue at Proposed Rates per Exhibit (RCDM-5), Schedule 1, Sheet 4, Column (B) (based on 1/24/11 Commission Order - Case 10-E-0050)