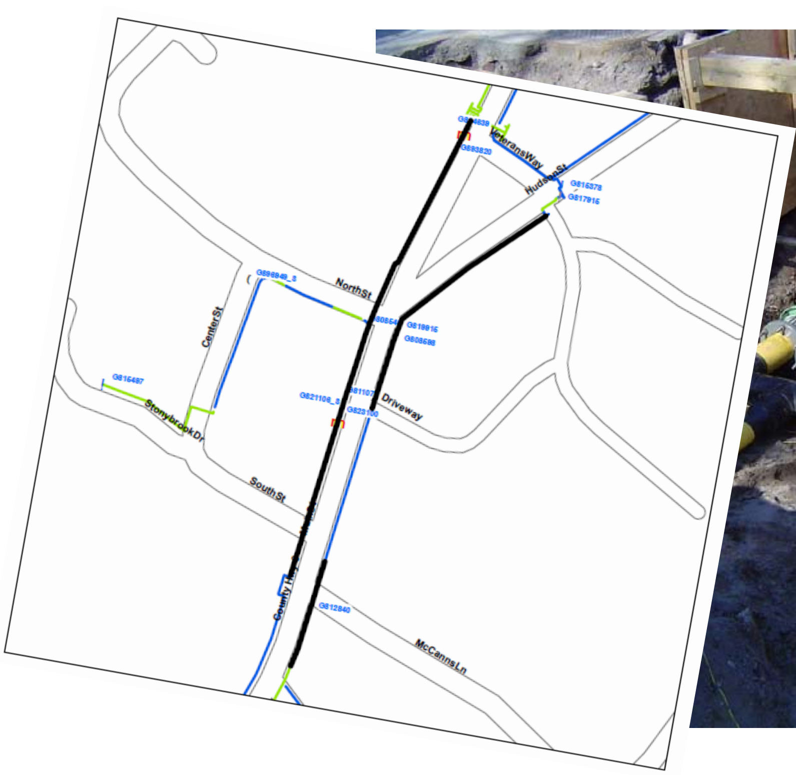
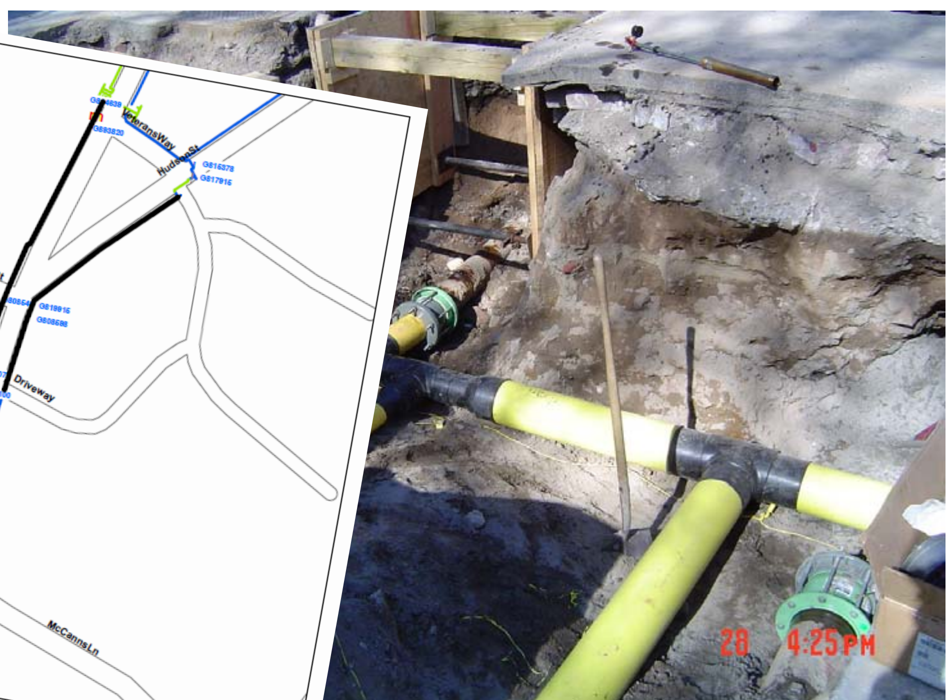
CENTRAL HUDSON GAS & ELECTRIC 2017-2021 CORPORATE CAPITAL FORECAST





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EXECUTIVE SUMMARY

This document presents the comprehensive Capital Investment Plan for the electric and gas transmission and distribution systems and common program areas of Central Hudson Gas & Electric Corporation (Central Hudson or Company) for the period 2017 through 2021 (Capital Plan). This Capital Plan positions Central Hudson to continue to provide safe and reliable service to customers. This Capital Plan is consistent with the mission of the Company as shown below:

"Central Hudson's mission is to deliver electricity and natural gas to an expanding customer base in a safe, reliable, courteous and affordable manner; to produce growing financial returns for shareholders; to foster a culture that encourages employees to reach their full potential; and to be a good corporate citizen."

This Capital Plan proposes to invest $448 million in the electric delivery system, $284 million in the gas delivery system and $212 million in common program areas over the five - year period. The projects and programs proposed in this Capital Plan are what the Company has determined is needed to deliver safe and reliable service to customers. The Company is continually re-evaluating and reprioritizing projects, and the later years of this Capital Plan will likely change as a result of these reevaluations and assessments. The Capital Plan is developed annually consistent with the Company's Capital Prioritization Process Guidelines.

The 5-Year Capital Plan contains projects that will help achieve the following strategic objectives of Central Hudson:

- Practicing continuous improvement in everything we do
- Investing in electric and gas transmission and distribution infrastructure and common program areas to maintain current levels of customer service;
- Investing capital when justified to reduce risk, enhance reliability, and improve customer satisfaction;
- Advocating regulatory and public policy outcomes that are in the interest of our customers and investors; and
- Moderating cost pressures that increase total customer bill costs and variability.

Capital Forecast – Additions

	2017	2018	2019	2020	2021	TOTAL
ELECTRIC	$ 86,470	$ 87,846	$ 91,925	$ 95,242	$ 86,629	$ 448,113
GAS	47,205	56,752	60,858	59,103	60,121	284,040
COMMON	27,883	43,670	45,031	44,058	51,783	212,426
CORPORATE TOTAL	$ 161,559	$ 188,268	$ 197,815	$ 198,403	$ 198,534	$ 944,579

Capital Forecast – Removal

	2017	2018	2019	2020	2021	TOTAL
ELECTRIC	$ 6,463	$ 6,432	$ 6,595	$ 7,840	$ 7,756	$ 35,085
GAS	2,452	2,470	2,504	2,554	2,625	12,605
COMMON	(81)	(85)	(90)	(98)	(108)	(462)
CORPORATE TOTAL	$ 8,834	$ 8,817	$ 9,009	$ 10,297	$ 10,273	$ 47,229

Introduction

Central Hudson’s Corporate Capital Forecast continues to increase at a modest rate and with the addition of several large multi-year capital initiatives being presented this year, the Base Case scenario now totals $945 million in capital expenditures over the five year period 2017-2021. This represents an approximate 10% increase over the prior year’s 5-year forecast. While the electric program forecast is showing a modest increase from the prior forecast, the gas program forecast is increasing more significantly as a result of additional Leak Prone Pipe program and gas marketing program expenditures and the common program is increasing due to IT software needs and a planned training facility.

The major changes to the forecast from the prior year’s forecast primarily concentrated in the gas and common areas and will be covered in more detailed in the body of this report.

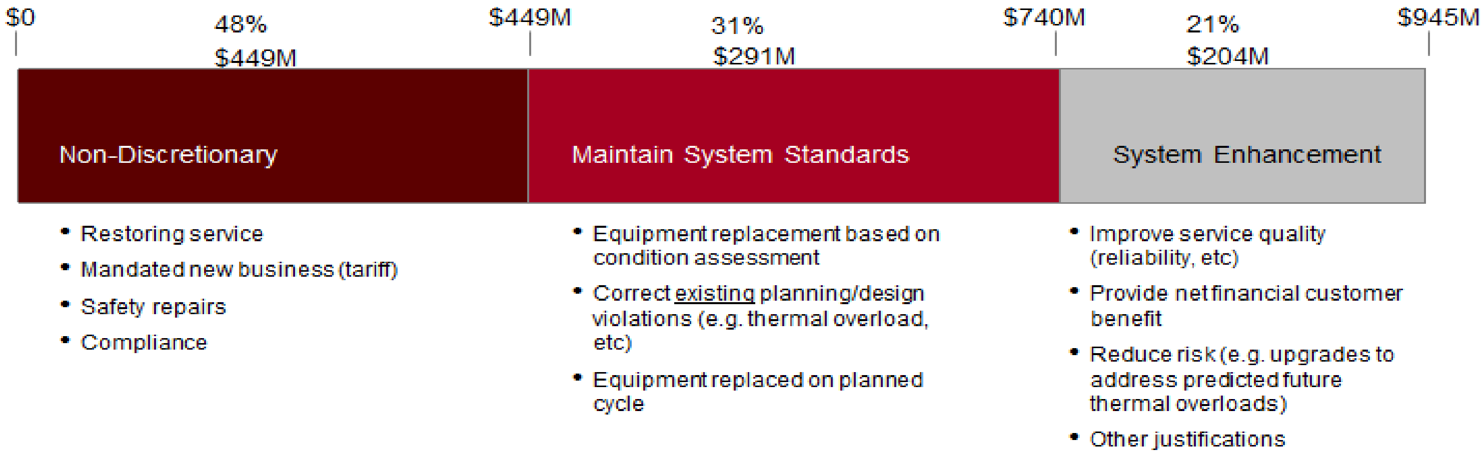
CHG&E Capital Expenditiure Forecast
Comparison of 2016-2020 and 2017-2021
Electric,Gas & Common Forecast

(with inflation & overhead adjustments)

ELECTRIC PROGRAM		
2017-2021 Forecast	$	448,113
2016-2020 Forecast	$	432,423
Change	$	15,690
GAS PROGRAM		
2017-2021 Forecast	$	284,040
2016-2020 Forecast		258,200
Change	$	25,840
COMMON PROGRAM		
2017-2021 Forecast	$	212,426
2016-2020 Forecast		162,500
Change	$	49,926
CORPORATE TOTAL		
2017-2021 Forecast	$	944,579
2016-2020 Forecast		853,122
Change	$	91,456

5-Year Corporate Capital Forecast Summary

A breakdown of the Capital Forecast is shown below indicating the level of spending as we have prioritized the expenditures by their summary categories. Non-discretionary is the level spending that is necessary to meet the minimum standards of service or compliance with Public Service Law. Maintaining System Standards is the level of spending required to maintain our current level of service reliability and safety or to meet obligations set through the rate proceedings. System Enhancement is capital spending aimed at improving our quality of service, reducing risk, or reducing operating costs.



The System Enhancement Capital Spending has been further segregated into the following categories:

- **Projects with a Net Financial Customer Benefit**
  - Projects Revenue requirement of the capital investment is lower than the net benefit (e.g. cost savings) for customers
  - Reduces customer bills in the long term (after next rate case)
  - Increases earnings both short term and long term

- **Projects that Reduce Risk**
  - Investment reduces the risk of a system failure that would:
    - Reduce potential public safety at risk
    - Result in widespread incident, impacting system integrity
    - Spur significant punitive regulatory action

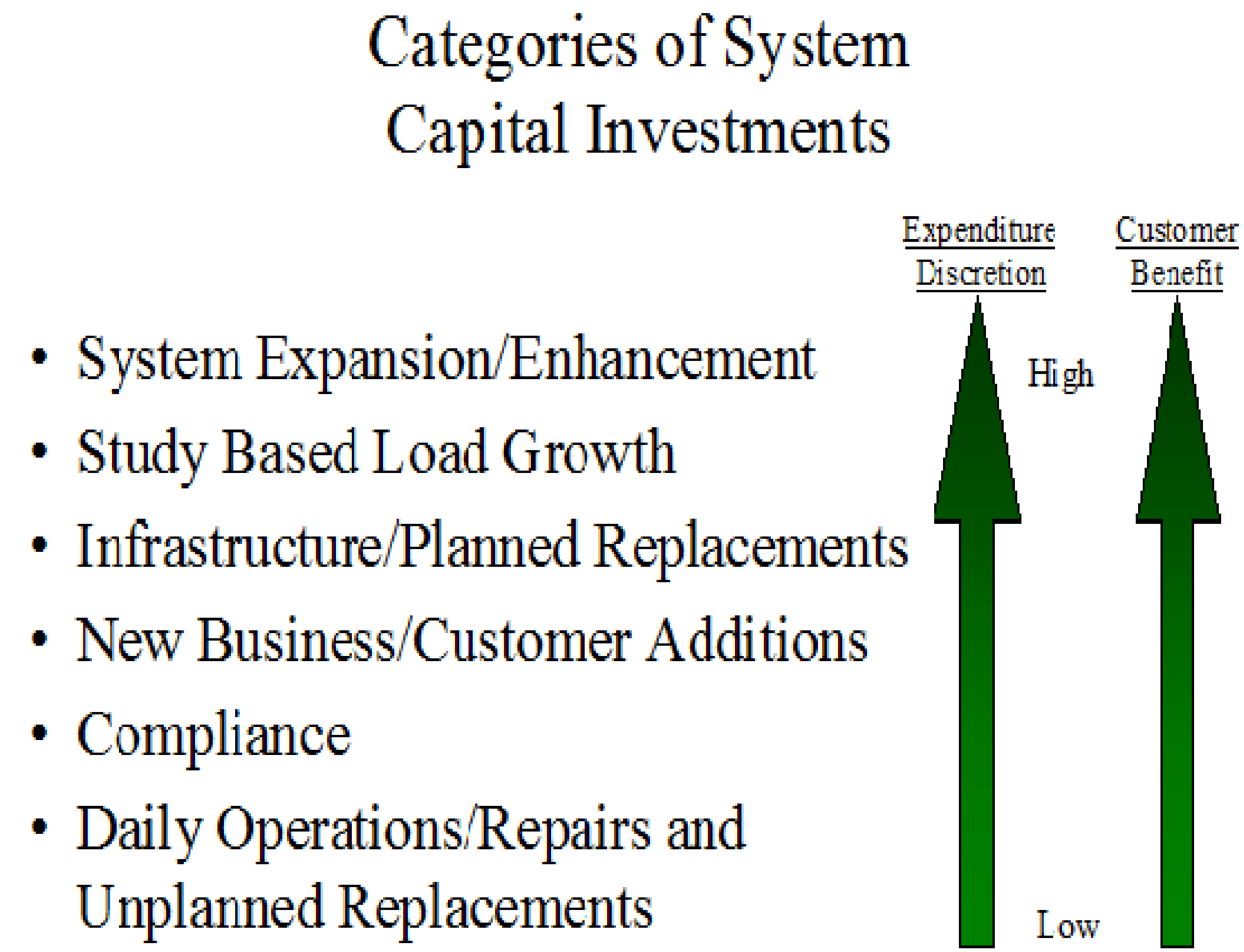
- **Projects that Improve Reliability**
  - Investment improves reliability at a cost that (we believe) customers are willing to pay
  - Demonstrate that increased cost is warranted by the improvement in service quality (benchmark and compare cost per customer outage avoided).

- **Other Projects**
  - Projects that do not clearly fit in the other categories, but can be justified for other reasons
  - Requires detailed individual business case
  - Demonstrate a clear strategic rationale
  - Show financial projections (customer bill impact and earnings impact)
  - Assess risks (regulatory disallowance, etc)

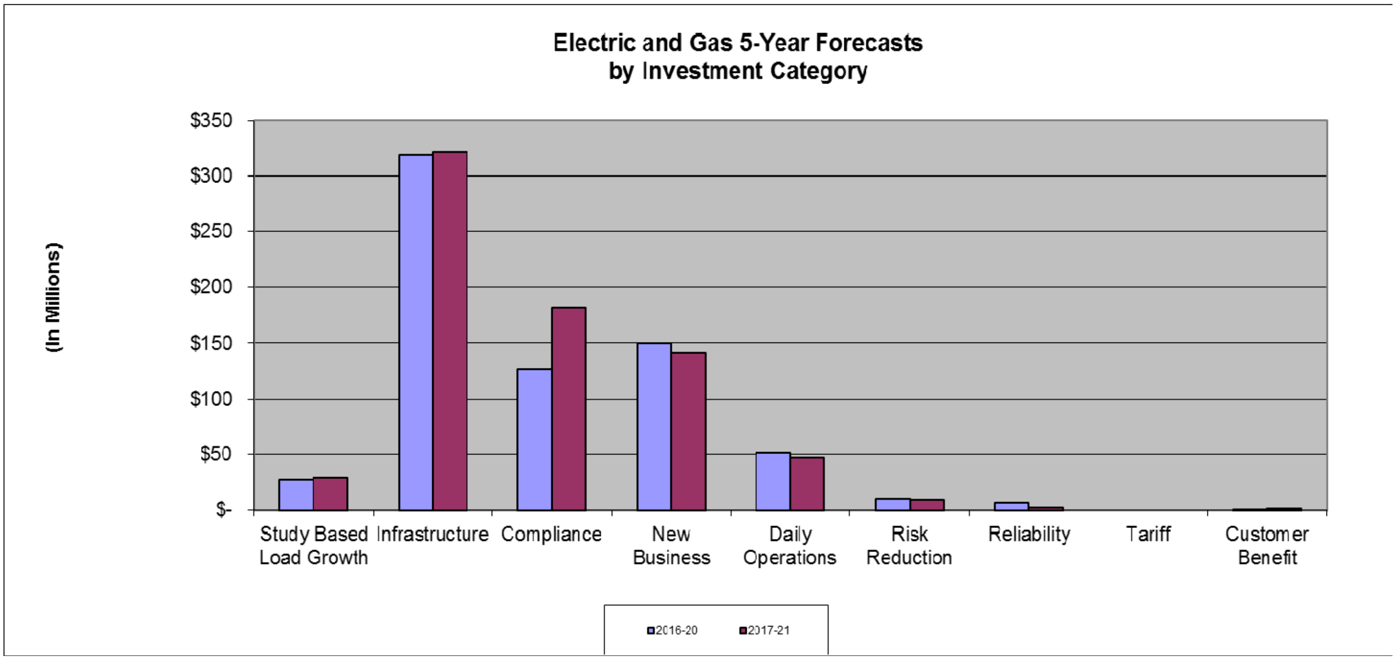
Each year, Central Hudson Gas & Electric Corporation, through its planning and forecasting processes develops a recommended Capital Expenditures Budget for the upcoming fiscal year as well as a forecast for upcoming five-year period.

The corporate capital forecast is developed through a bottom up process where planning studies, infrastructure issues, and compliance requirements, and other corporate initiatives identify specific capital needs. Following the Company's Capital Prioritization Process Guidelines, these needs are prioritized based on the whether the need is non-discretionary (mandated or otherwise not optional), required to maintain the existing level of service or reliability, or a system or service enhancement. In addition to the costs of the projects, the timing of the projects is also analyzed to determine the most appropriate time for the capital investment to be made either due to load growth, risk of failure, or business need.

In addition to the summary categories, the needs are prioritized based on the investment categories shown below. It should be noted that those projects with the least amount of discretion also have the least amount of benefit for customers in terms of improving their level of service quality or reducing operating costs. It is important that we continue to develop sound justifications for the system enhancement projects since they do provide the most benefit to customers.



As can be seen in the comparative graph below load growth related projects represent a very small percentage of the expenditures in the Capital Plan. The major driver of investment continues to be replacing aging assets based on condition with the most significant uptick in expenditures for the Leak Prone Pipe program.



On the electric side, the Distribution Automation Program is a major initiative that has been included in the 5-year forecast. This program will first develop a Distribution Management System to improve reliability, system safety, and system efficiency. After the development of the DMS, there is a large infrastructure improvement aspect of this project which will dramatically alter the design of the electric distribution system by creating robust mainline feeders that can be looped through switching to restore customer after an outage or optimize and balance feeders during normal operations. To accomplish this, there will also be an increased number of Automatic Load Transfer (ALT) switching schemes, switched capacitors, electronic reclosers, and voltage regulators, all of which will be tied back to the DMS to optimize system operation as well as improve reliability and power quality. The cost of this program, including the additional ALTs, reclosers, and capacitors is $44 million and is estimated to improve reliability by reducing the number of customer outages by 20%. In addition, much of the costs are related to the rebuilding and re-conductoring of electric distribution mainline, some of which would need to be replaced as part of the asset replacement program. Additional benefits would include reduced system losses, improved switching safety, and improved restoration times through the use of manual switching when an ALT is not available.

The single largest component of the gas capital program is the Leak Prone Pipe replacement projects. Central Hudson operates 1208 miles of distribution main of which about 230.6 is cast iron or unprotected steel. Over the last three years (2013 – 2015) an average of 6.4 miles of leak prone pipe has been replaced annually. Expenditures are tracked monthly using the Operations Report. The main replacement projects are identified and prioritized using the GL Main Replacement Program (MRP) which develops a risk ‘score’ based on pipe and operating characteristics such as material, operating pressure, age, diameter, leak history, location(proximity to buildings, business district, flood prone areas) and, cathodic protection. This risk score measures the relative likelihood and the consequences of a leak associated with each pipeline segment. In addition Subject Matter Expert (SME's) review and planned highway rebuilds are taken into consideration when developing the proposed main replacement project listing.

Accelerating the replacement of leak prone distribution piping is driven by a number of factors, including recent events in the Northeast experienced by utility operators of similar systems receiving nationwide attention and a renewed focus on pipeline safety by government and regulators, coupled with the internal need to meet PSC rate case safety metrics and reduction of operating and maintenance costs associated with leak inventory.

The total for cast iron and unprotected steel main replacement is $155 million in the 5-year forecast (average annual expenditure of $31M). By increasing current annual expenditures on the leak prone pipe with the most risk, the current replacement program can be reduced from a 50 years to approximately 15 years. Further, the replacement of higher risk medium pressure services escalates over the 5-year forecast in order to continue the program to reduce exposure and risk.

The Common Capital Forecast consists of following categories; Land and Buildings, Office Furniture, Tools & Equipment, Transportation, and Information & Technology. Land & Buildings capital forecast comprises primarily of infrastructure replacement projects due to age or equipment failures. The Tools forecast consists of replacements driven by the replacements of the vehicles they are utilized on, obsolescence and incompatibility, decreased reliability, discontinued manufacturer support, and conformance to changing OSHA or other regulations. Transportation capital forecast is built primarily on the replacement of vehicles and equipment base on industry standard replacement criteria. The IT Capital Budget consists of investments for business driven software implementations, upgrades to existing software solutions, and infrastructure or hardware lifecycle upgrades and ongoing extensions resulting from corresponding software updates or implementations.

Resource Needs of Future Program

Central Hudson will face the following opportunities and challenges as we implement this Capital Plan.

On the electric side, the Company will need to continue to develop enhanced competencies in both asset management as well as distribution automation. Improvements are being made to the System Planning Process especially with the need to integrate additional Distributed Energy Resources (DERs) which will encompass both how we determine asset replacements and the methods used to optimize the portfolio of projects and programs as well as better understand how DERs impact system growth. To ensure that the Plan proceeds in the most optimal fashion, the Company will need to reassess the timing and reprioritize projects using both these improved asset management approaches and the understanding of system needs. Planning shall remain as a core competency for the Company.

On the gas side of the business, accelerating the replacement of leak prone distribution piping, enhancements on the transmission system, and regulator station upgrades and replacements will require further detailed project prioritization and system planning. Additionally, engineering design, permitting, estimating and field construction management and oversight resources will be required to maintain the high degree of safety, and quality installations occurring today.

With regard to construction, it is envisioned that the bulk of the incremental electric and gas transmission and distribution construction will be performed by contracted resources. Although there is an increase in the amount of capital construction, it is not so large an increase as to give any concern that contract resources would not be available to complete the work. Consideration for additional field oversight for this construction work will also likely be needed and these resources in the Customer Services Group would charge their labor to capital.

ELECTRIC PROGRAM SUMMARY

Electric System Overview

The Central Hudson electric system serves approximately 300,000 electric customers in New York State's Mid-Hudson River Valley. Central Hudson electric service territory extends from the suburbs of metropolitan New York City north to the Capital District at Albany.

The Central Hudson system is comprised of substations having an aggregate transformer capacity of 5.0 million kilovolt amps, a transmission system consists of 622 circuit miles of line and a distribution system consists of 7,300 pole miles of overhead lines and 1,400 trench miles of underground lines, as well as customer service lines and meters.

The transmission system operates at voltages of 69 kilovolts, 115 kilovolts and 345 kilovolts. The table below provides a more detailed breakdown of the transmission system.

<table>
<tr><th>Operating Voltage</th><th>Design Voltage</th><th>Overhead Circuit Miles</th><th>Pipe-Type Cable Circuit Miles</th><th>Total Circuit Miles</th></tr>
<tr><td>345 kV</td><td>345 kV</td><td>76</td><td>0</td><td>76</td></tr>
<tr><td>115 kV</td><td>115 kV</td><td>230</td><td>3.9</td><td>233.9</td></tr>
<tr><td rowspan="2">69 kV</td><td>69 kV</td><td>272</td><td rowspan="2">0</td><td rowspan="2">312</td></tr>
<tr><td>115 kV construction operating at 69 kV</td><td>40</td></tr>
<tr><td colspan="2">Total</td><td>618</td><td>3.9</td><td>621.9</td></tr>
</table>

The distribution system operates at voltages of 4.16 kilovolts, 4.8 kilovolts, 13.2 kilovolts, and 34.5 kilovolts. It also encompasses subtransmission systems that operate at 14.4 kilovolts in three urban areas of our service territory, feeding into secondary networks. The table below provides a more detailed breakdown of the overhead portion of the distribution system.

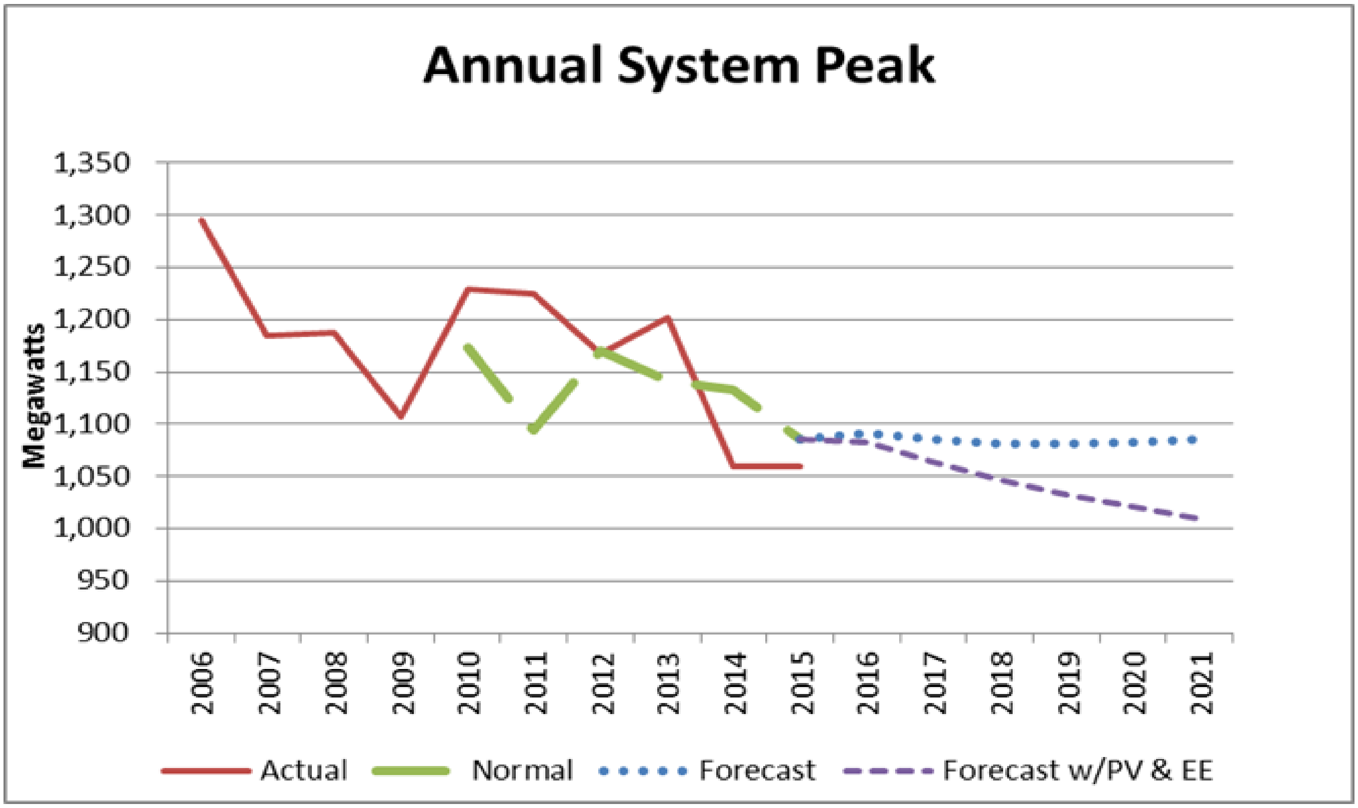
Conductor	Pole Miles of Line
34 kV Overhead	204
13.2 kV Single Phase	4,572
13.2 kV Three Phase	2,380
5 kV or Under	137

Central Hudson's roughly 83 electric substations contain the power transformers that change the voltage from one level to another.

Electric Forecast Overview

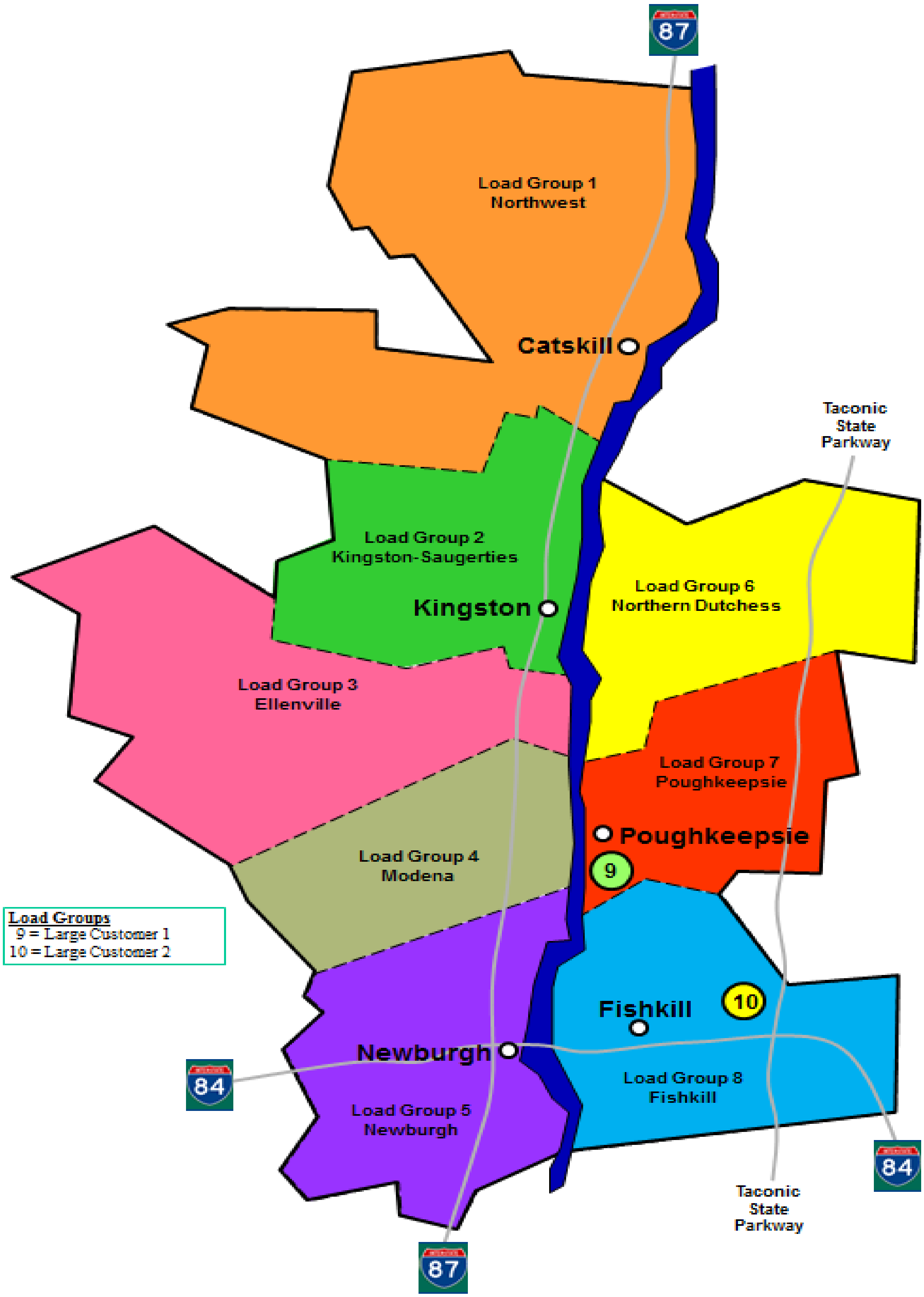
Central Hudson's electric capital forecast for the next 5-year period is developed each year using the most recent planning studies, customer and sales forecasts, corporate load forecasts, and other corporate trends. For the electric capital forecast, an adjusted peak electric demand 1084 MW system load (demand) for 2015 was used as the base year.

The current system peak forecast is shown on the graph below. As can be seen on the graph Central Hudson's peak demand is showing a modest decline based primarily on the regional economy, and the effects of the Company's energy efficiency programs and demand management programs.



In addition, Central Hudson utilizes distribution planning areas to aid in the identification of needs, their timing, the quantification of the risks, and assess the alternatives available to meet those needs. These distribution planning areas largely are based on where the ability exists to transfer load among area substations. The graphic on the next page shows the distribution planning area load groups.

CHGE Franchise Territory by Electric Load Group



Electric Program Detail

The Electric Capital Forecast is developed utilizing guidelines, planning standards and engineering judgment. The forecast is completed for each budget category and integrated into a comprehensive plan. The summaries below provide the annual forecasts for each of the electric program categories.

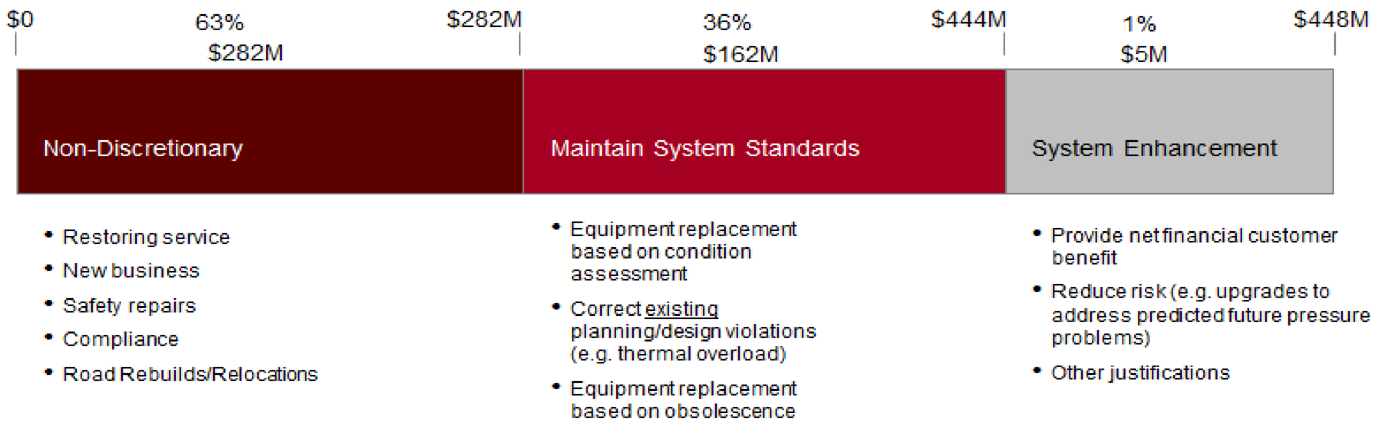
Electric Capital Forecast – Additions

	2017	2018	2019	2020	2021	TOTAL
Production	$ 2,006	$ 2,096	$ 1,559	$ 1,646	$ 1,511	$ 8,817
Transmission	18,920	17,006	19,771	22,096	21,494	99,287
Substation	23,142	21,613	15,306	19,720	16,984	96,766
New Business	4,183	4,497	3,666	3,966	4,193	20,504
Distribution Improvements	30,166	34,380	42,895	38,764	33,085	179,289
Transformers	5,148	5,286	5,698	5,957	6,203	28,292
Meters	2,907	2,968	3,030	3,094	3,159	15,158
Total	$ 86,470	$ 87,846	$ 91,925	$ 95,242	$ 86,629	$ 448,113

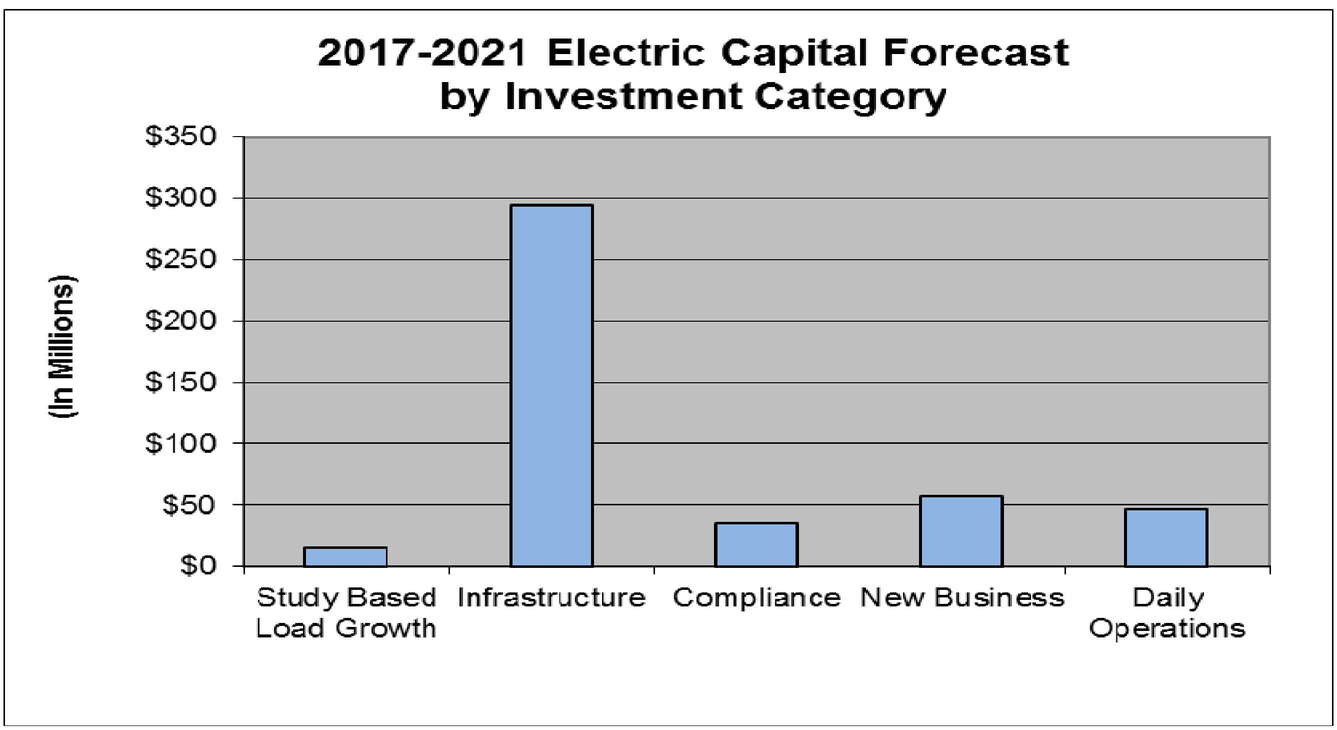
Electric Capital Forecast – Removal

	2017	2018	2019	2020	2021	TOTAL
Production	$ 127	$ 204	$ 130	$ 11	$ 623	$ 1,095
Transmission	1,403	1,551	1,713	2,856	2,306	9,830
Substation	2,038	1,696	1,625	1,786	1,384	8,529
New Business	177	188	184	196	212	956
Distribution Improvements	2,109	2,184	2,303	2,303	2,475	11,374
Transformers	311	311	331	359	398	1,711
Meters	297	297	309	329	357	1,589
Total	$ 6,463	$ 6,432	$ 6,595	$ 7,840	$ 7,756	$ 35,085

A breakdown of the Electric Capital Forecast is shown below indicating the level of spending as we have prioritized the expenditures. Non-discretionary is the level spending that is necessary to meet the minimum standards of service or compliance with public service law. Maintaining System Standards is the level of spending required to maintain our current level of service reliability and to meet obligations set through the rate proceedings. System Enhancement is capital spending aimed at improving our level of service, reducing risk, or reducing operating costs.



In addition, the projects within the Electric Program are categorized by Investment Category as follows: growth, compliance, day-to-day business management, and infrastructure replacement. The bar graph below shows the breakdown of the projects in our current five-year forecast by these Investment Categories.



Electric Transmission

For the Electric Transmission System, the purpose is to serve the expected load by developing a rational program to maintain reliability, avoid unacceptable risks, strive for the most economical reinforcements, and allow for equipment maintenance.

The facilities need to be planned, designed, operated and maintained according to "Good Utility Practice." These are any of the practices, methods or actions required by FERC, NERC, NPCC, NYSRC, NYISO, PSC, applicable law, regulations, or policies and standards, or engaged in or approved by a significant portion of the electric utility industry. Electric Transmission Planning analyses are based on planning criteria where the transmission system is designed and operated to conform to applicable reliability rules: no electric transmission facility should be loaded beyond its normal rating prior to any contingency; no facility to be loaded beyond its applicable emergency rating following any contingency; and fault levels are to be within equipment ratings.

The thermal, voltage, and system stability performance is analyzed under the various customer/load scenarios to assess the load serving capability, identify alternatives to increase load serving capability where needed, and evaluate alternatives.

The significant Electric Transmission projects in the 5-year forecast are: rebuild of the 69kV WH line; rebuild of the northern portion of the 69kV G line; P/MK line structure replacements; rebuild of the 69kV KM/TV lines (note this project remains under study); rebuild of the Hurley Ave – Saugerties SB line for 115kV; rebuild of the Saugerties – North Catskill H line for 115kV; rebuild of the 115kV EF Line; and rebuild of the 69kV CL Line. A project that appeared in our previous 5-year forecast, the Northwest Reinforcement Project (which adds a 345 kV interconnection to the Catskill District 115kV system), has been deferred due to the Targeted Demand Response (DR) Program; this DR program is expected to delay the Northwest Reinforcement in service date until at least 2029.

All of the projects identified above are driven by infrastructure conditions. Included in the list above is the WH Line reconductoring project associated with the ACSR conductor replacement program. The WH Line was originally constructed in 1932 and this project is predicated on conductor failures and subsequent testing of the line conductor. Test results have shown that the existing ACSR conductor requires replacement. This replacement addresses infrastructure issues, while improving reliability and load serving capability to customers. The previously completed A and C line rebuild also was driven by ACSR condition assessment. The expected cost to complete the WH replacements is $6.9M. To a lesser degree, the FV Line has indications that it will require reconductoring in the future. This line will be reevaluated within the next few years.

As listed above, rebuilding portions of the 69kV G-Line are identified in the five year forecast. The G line originally constructed in the 1920's**,** is one of Central Hudson's oldest wood pole transmission lines and inspections have identified more than 60% of the structures would need to be replaced. This has initiated a review of the line to develop the most economical alternative to rebuild the line, improve reliability, and (if possible) improve load-serving capability in the mid Dutchess County area. The project has been split into two parts: the northern section and the southern section. The northern section will remain at 69kV and provide reserve for the Tinkertown substation by rebuilding from the Todd Hill Substation north and installing a 115/69 kV transformer at Todd Hill.

This northern section of the project is expected to be constructed from 2016 through 2017 at a total cost of $12.3M. The southern section of the line will be retired.

G Line Condition				
		Structures to		
Section	**Miles**	**Replace**	**Repair**	**Probable Replacement Percentage**
Knapps – Lagrangeville	6.6	101	4	69.2
Lagrangeville – Tinkertown	10.1	82	2	67.2
Tinkertown – PV	4.0	16	1	30.2
Totals	20.7	199	7	62.0
Data Based on 1Q 2009 Assessment				

Additionally, rebuilding the KM & TV lines is identified in the 5 year forecast. Inspections have identified 58% and 53%, respectively, of the line's wood pole structures needing replacement. These lines originally were constructed in the 1920's and 1930's.

KM Line Condition				
		Structures to		
Section	**Miles**	**Replace**	**Repair**	**Probable Replacement Percentage**
Knapps Corners – P33581	1.0	10	5	65.2%
P33581 – P33591	0.5	9	5	60.8%
P33591 – P140218	0.35	0	0	0
P140218 - Myers Corners	1.0	9	2	64.7%
Totals	2.85	28	12	58.0%

TV Line Condition				
		Structures to		
Section	**Miles**	**Replace**	**Repair**	**Probable Replacement Percentage**
Myers Corners – P46006	1.0	8	2	58.8%
P46006 – North Chelsea	5.3	42	24	52.4%
Totals	6.3	50	26	53.1%

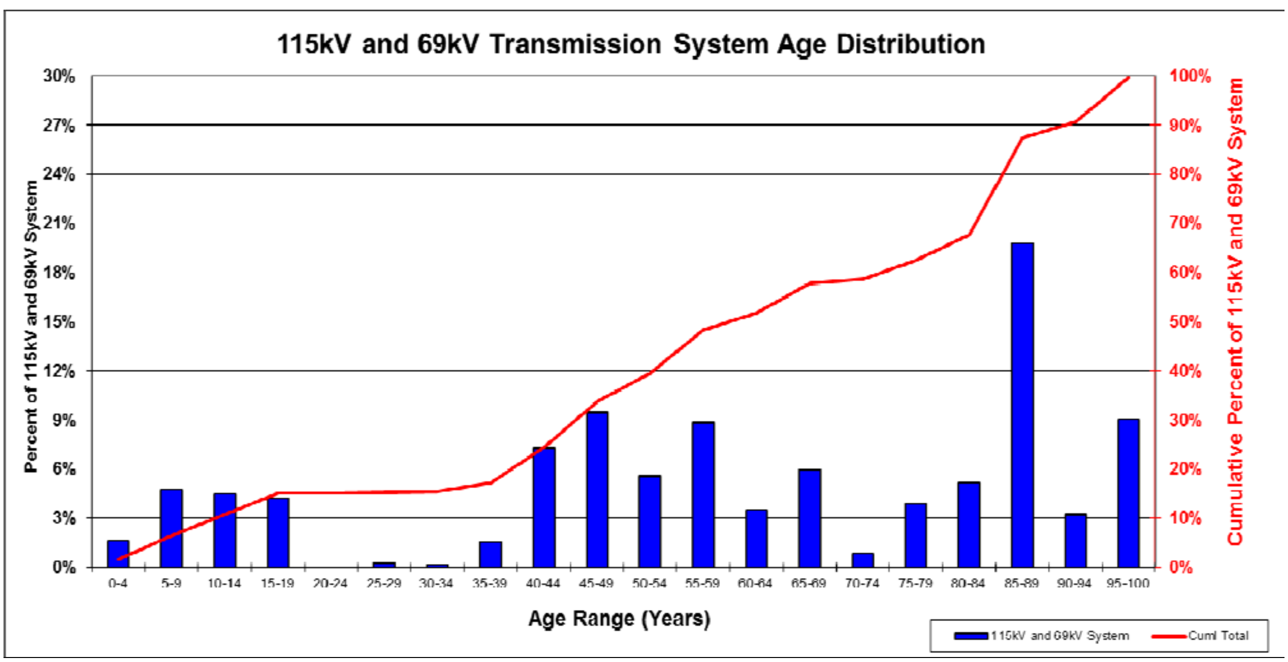
In addition to addressing known infrastructure issues, potential benefits of the KM/TV rebuild include an increase of the transmission supply to the Myers Corners substation. Concerns impacting the rebuild include both numerous right-of-way issues and the proximity to the Dutchess County Airport

The 69kV P and MK lines were built and placed in service in 1991. The need to replace 125 structures on the lines resulted from subsequent design reviews that have led to the discovery that many of the structures on these lines are undersized for current code required structure loading requirements. The updated LiDAR/PLS-CADD data on the lines is being re-analyzed, and an exact plan for the structure replacements on the 69kV P/FK/HK/MG/GK/MK Lines (the original P and MK Lines since have been split into these six lines) is being studied. The previous plan for mitigation was to replace the structures with taller poles and larger class sizes capable of holding the increased loads, similar in scope to the recently completed transmission conductor sag and NERC Mitigation programs. According to that plan, the replacements would occur over the 2018, 2019, and 2020 forecast years at an estimated total cost of $6M.

Rebuilding the 69kV H & SB line also is identified in the 5 year forecast. This transmission path is another of Central Hudson's oldest (c. 1919) but of steel lattice construction. Inspections have shown 32% of structures needing replacement with another 36% in need of significant repair. These findings have initiated a review of the line to develop the most economical alternative to rebuild the line, improve reliability, and (if possible) improve load-serving capability for the Northwest Area. Each line will be rebuilt for 115kV but continue to be operated at 69kV for the foreseeable future. This project is expected to be constructed from 2020 through 2022 at a total cost of approximately $35M.

H & SB Line Condition						
				Structures to		
Line	Section	Miles	# of Structures	Replace/Add mid-span pole	Repair	% of structures that require work
H	Saugerties – N. Catskill	12.061	138	41	66	78%
SB	Hurley Ave. - Saugerties	11.11	118	41	25	56%
	Total	**23.171**	256	82	91	68%

In addition to the above capital expenditures, there are several programs in Electric Transmission designed to reduce risk and improve infrastructure. The "High Priority Replacements (HPR)" Program under the Electric Transmission Budget provides funding to respond to results of the inspections completed each year. High Priority Replacement projects address infrastructure issues that will reduce the risk of system failure, contact incidents, or loss of reliability. The graph directly below indicates the approximate Transmission System Age Distribution. The replacement work is prioritized based upon whether 345 kV or underlying system and whether radial or loop feed. When an inspection severity of 4 or 5 has been indicated, structures, insulators, and other capital items are replaced according to a specified timeline. Based on the number and severity findings for the EF Line and CL Line during inspections, more comprehensive rebuilds will be completed in lieu of individual repairs (note that these projects remain under study).



Electric Substation & Distribution

Central Hudson Electric Substation and Distribution capital programs are developed based on our current planning criteria and address load serving capability, infrastructure, compliance and reliability/operating issues. For infrastructure based issues, Central Hudson utilizes its asset management process, including field inspections, condition monitoring, periodic testing and more in-depth analysis and studies to identify trends, equipment issues and ultimately recommend replacement programs. Infrastructure based replacements also will be reviewed to determine whether to replace units in-kind or pursue an alternative solution. Load serving capability problems related to substation equipment or distribution circuits are identified through our planning process. For each area and substation the capacity and operability of the system under the various load forecast scenarios is analyzed. This analysis includes a review of the Substation and Distribution facilities, requiring a full understanding of the limiting components. For any areas or substations where load serving capability has been identified as a potential problem, plans and alternatives by area are evaluated to develop the best solution considering all costs, benefits, and long-range growth potential. The solutions sets for these projects include both traditional utility projects and the use of Non-Wires Alternative solutions to replace or defer the potential capital upgrades.

The planning criteria are based on a combination of economic factors, current industry practice, design and practical considerations, reliability and judgment. Influencing Factors are:

- Current/ thermal limits related to the ability of the facility to withstand load related heating without damage
- Protection requirements – minimum fault current levels need to be maintained to ensure safe operation
- Power Quality - provide adequate voltage to customer premise ANSI C84.1, +/- 5.0% range during normal conditions, +5.8% to – 8.3% under emergency conditions; eliminate stray voltage
- Reliability – proximity of solutions to load and integration of Distribution Automation
- Regulatory Requirements: NESC, NYPSC

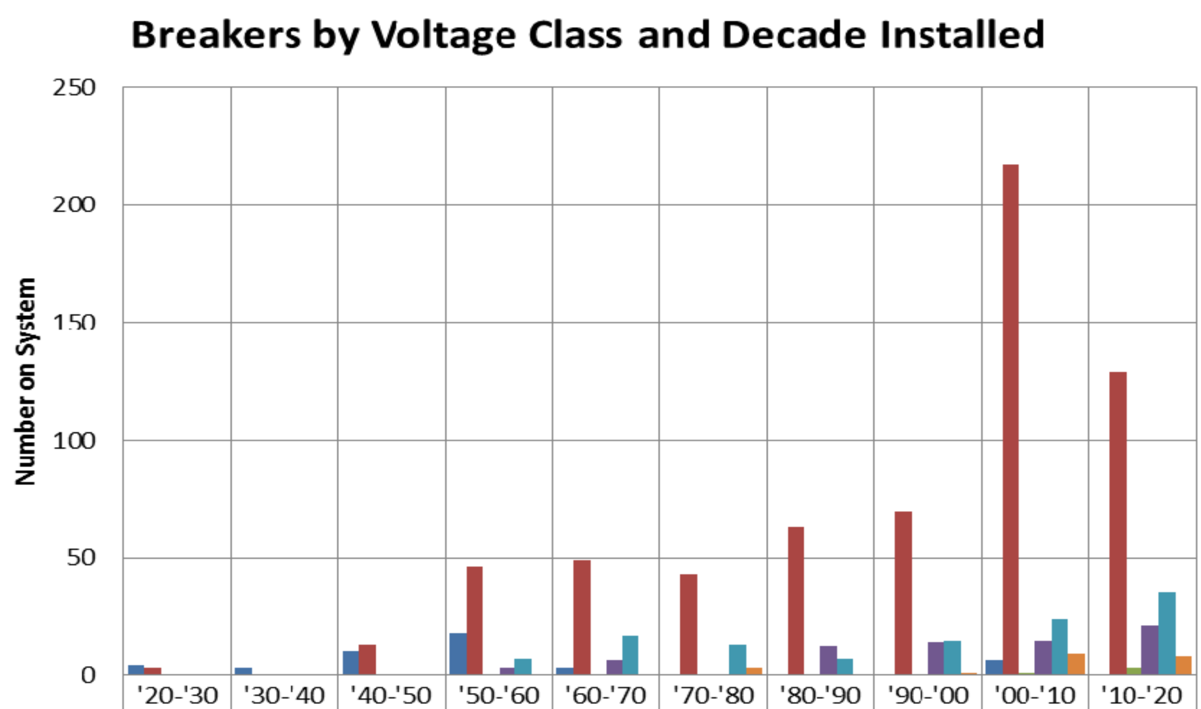
From this process, substation upgrades, equipment replacement programs and projects establishing new substations or the addition of circuits and transformers in existing substations are identified. Due to the projected declining load forecast in the majority of our planning areas, there are a very limited number of growth driven major substation and distribution projects that have been identified through the planning process in this 5-year forecast. Based on the age and the continuing condition assessment of our major substation and distribution infrastructure, there are a number of projects and programs to proactively replace equipment prior to the development of age/condition related operating issues. Currently, the Maybrook Substation upgrade is the only major substation project in our five year forecast due primarily to load serving capability/growth. The addition of a new substation in the Beekman/Phillips Road area of our service territory due to load growth and transmission/substation upgrades to reinforce and increase the load serving capability in the Northwest Area of our system have been deferred outside of our five-year forecast (from 2018 until 2022) due to Non-Wires Alternative solutions.

$85.8M is allocated to infrastructure-related substation programs and projects within the five year forecast. Major substation rebuilds or partial rebuilds due to infrastructure considerations include work/upgrades at the following substations: Sturgeon Pool, Union Avenue, Knapps Corners, Greenfield Road, Montgomery, Modena and Woodstock. Additional major substation projects include the Danskammer storm hardening rebuild due to equipment flooding risk reduction and the addition of a second transformer for reliability and operational flexibility at the New Baltimore Substation in addition to avoiding otherwise required Distribution system infrastructure work.

A major substation infrastructure program included in the five-year forecast is the continuation of our Breaker Replacement Program. This program was initiated to improve infrastructure and maintain system reliability through a planned prioritized equipment replacement program. The assessment process for the selection and prioritization of the breakers included in the replacement program is as follows:

- Breaker Duty: All power circuit breakers with breaker duties greater than 85 % with highest priority given for breakers with duties greater that 100%.
- Condition: All of the power circuit breakers identified based upon the recommendations from our Operations Services Division. These recommendations are based upon reports of failures or reports of poor testing results.
- Obsolescence: Several of the circuit breakers on our system still employ outdated technology, specifically relating to interrupter design. Others suffer from extended service lives and parts are no longer available for many others.
- Other Factors: Other power circuit breakers on our system meet the above breaker duty or condition selection criteria, but they have not been selected for this replacement program because they will be replaced with new breakers as part of new substation construction projects.

The Breaker Replacement Program has been in place since 2009, and, to date, 180 of the originally identified 196 breakers have been replaced. By the end of 2016, 35 additional breakers are scheduled to be replaced as part of this program. As a continuation of this program, 96 breakers have been identified for planned replacement in the 5-year forecast horizon, with $7.65M included in the 5 year forecast.

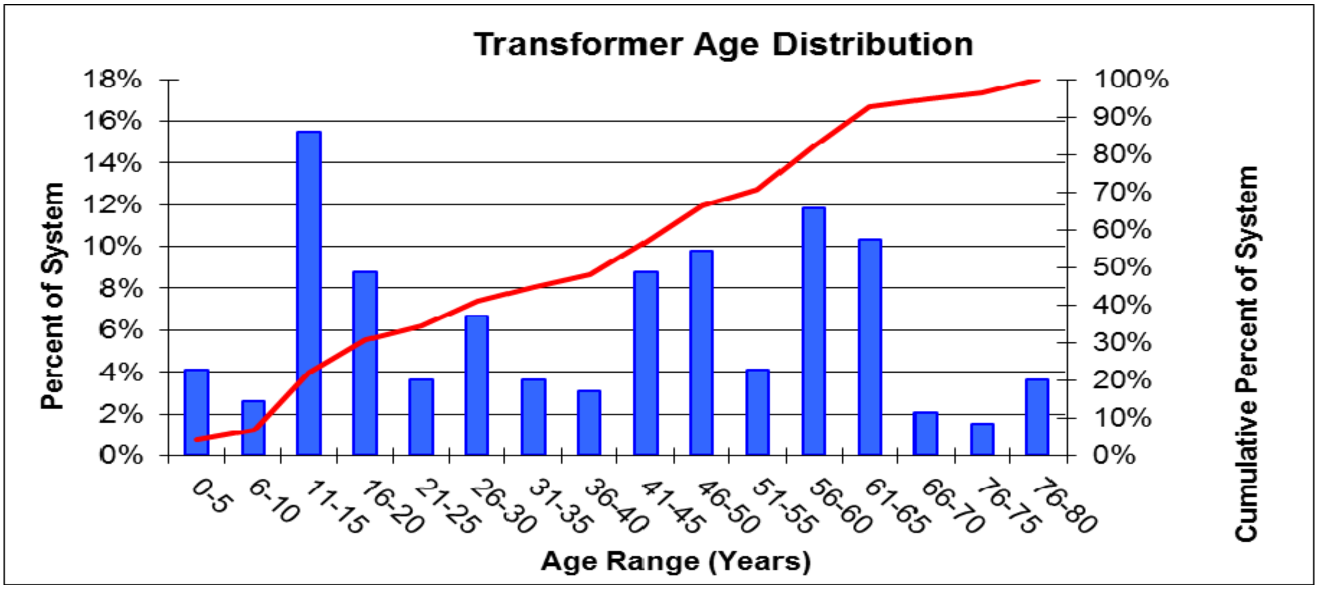


	'20-'30	'30-'40	'40-'50	'50-'60	'60-'70	'70-'80	'80-'90	'90-'00	'00-'10	'10-'20
5kV	4	3	10	18	3	0	0	0	6	0
15kV	3	0	13	46	49	43	63	70	217	129
34.5kV	0	0	0	0	0	0	0	0	1	3
69kV	0	0	0	3	6	0	12	14	15	21
115kV	0	0	0	7	17	13	7	15	24	35
345kV	0	0	0	0	0	3	0	1	9	8

Additional major infrastructure replacement programs associated with substation equipment are the continued replacement of protective relaying equipment and Substation Power Transformers. Additionally, circuit switchers, disconnect switches, and motor-operated switch (MOS) replacement programs have commenced based on feedback and maintenance trends from substation operations.

There is $13M for a comprehensive relay and metering modernization and integration program included in the 5-year forecast to enable replacements of outdated meters, relays, and communications infrastructure. In addition, first generation microprocessor relays were manufactured in a time when technology was changing rapidly; this relay technology quickly was surpassed and is obsolete in many cases. Many of these relays are unsupported by the manufacturers and have limited parts available. The replacement program of these first generation microprocessor relays is nearing completion with $1M in the 5-year forecast to conclude this program.

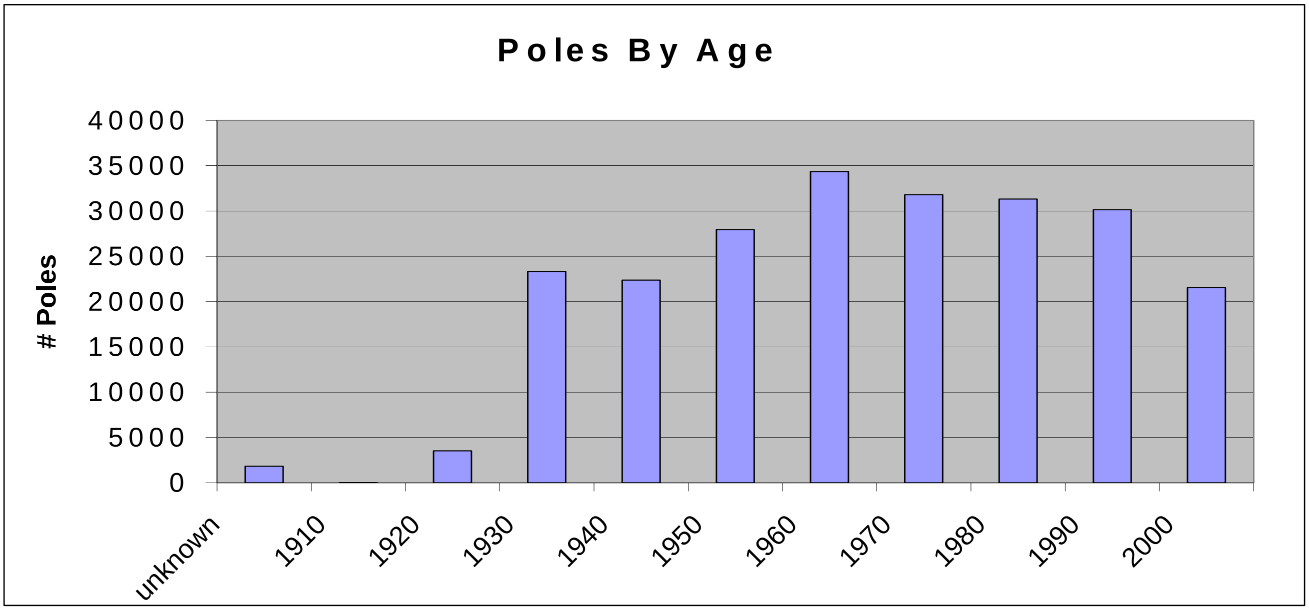
With regard to the Substation Power Transformers, the condition of the power transformers varies and the ability to maintain them is tied closely to their age. The average age of our substation transformers is approximately 40 years old with some transformers more than 80 years old. The transformers are monitored using: dissolved gas analysis; oil screen/testing; and Doble power factor testing at an interval based on voltage level and equipment criticality. Transformers are replaced based on this testing, condition, and the ability to maintain the equipment. There are seven substation projects in the 5-year forecast associated with the condition based replacement of aging transformers totaling $17.6M. These projects include transformer replacements at the following substations: the Boulevard Substation in Kingston; the Coxsackie Substation in Green County; the Reynolds Hill Substation in the City of Poughkeepsie; the Montgomery Street Substation in Newburgh; the Stanfordville Substation in Eastern Dutchess County; the North Chelsea Substation in Southern Dutchess County (the need for this replacement is tied to the KM/TV Line analysis); and the installation of 115/69 kV transformers at the Kerhonkson Substation following the retirement of the Modena 115/69kV transformer and upgrade of the P and MK Lines to 115kV operation. Also, the Ohioville 115/69 kV transformer will be retired following installation of a 115/69 kV transformer at Sturgeon Pool.



Similar to the breaker replacement program, programs have been created to address concerns with the remaining life of substation circuit switchers, disconnect switches, and motor operated switches. Replacement programs have been created to replace proactively these devices subject to potential failure. Recent problems have been identified with certain style switches, and there are limited to no replacement parts available. There is $6M in the 5 year forecast allotted to these replacements.

The Distribution projects are identified as thermal or growth related projects (approximately $12M of growth related projects in the five year forecast), voltage improvement projects, reliability improvement projects justified on a cost per outage avoided basis, and operating improvements allowing flexibility in restoration. In addition to these projects, there are several Distribution Improvement programs or initiatives that are related to infrastructure or extreme reliability issues that are in the capital forecast. These major programs include the 10X program (areas experiencing more than 10 outages per year), the secondary network replacement program, the 5 kV cable replacement program, the overhead secondary replacement program, the 4800V conversion program, the copper wire replacement program, the oil switch replacement program and the URD replacement program.

With regard to the Distribution infrastructure, there are ongoing programs designed to replace proactively aging or failing equipment. The replacement of distribution poles identified through the inspection program is one of those programs. The graph below provides an overview of the age of the Company's Distribution pole plant. The replacement of porcelain cutouts, prone to failure, is another ongoing capital program.



The Distribution Automation Program is a major initiative that has been included in the 5 year forecast. Central Hudson will continue with the Automatic Load Transfer (ALT) switch and recloser replacement programs. Incremental in the 5 year forecast is advanced distribution automation. This program will develop a Distribution Management System (DMS) to improve reliability, system safety, and system efficiency, enhancing the capability of ALTs to include more complex Fault Location, Isolation and Service Restoration (FLISR), while providing for Volt-VAr Optimization. There also is a large infrastructure improvement aspect of this project which will dramatically alter the design of the electric distribution system by creating robust mainline feeders that can be looped through switching to restore customer after an outage or optimize and balance feeders during normal operations.

To accomplish this, there also will be an increased number of Automatic Load Transfer ALT switching schemes, switched capacitors, electronic reclosers, and voltage regulators, all of which will be tied back to the DMS to optimize system operation as well as improve reliability and power quality. The cost of this program within the five year forecast, including the additional ALTs, reclosers, capacitors and DMS/DSCADA system is approximately $36 million and is estimated to have a positive cost/benefit ratio primarily due to the reduced energy usage (supply savings) and capital deferral. Much of the costs are related to the rebuilding and reconductoring of electric distribution mainline, some of which would need to be replaced as part of the normal asset replacement program. Additional benefits will include reduced system losses, improved switching safety, and improved restoration times through the use of manual switching when an ALT is not available. Since a portion of these costs are related to the replacement of aging infrastructure, these costs would be required to maintain system standards and are not included as system enhancement projects.

New Business, Transformer, and Meters

The remainder of the Electric Capital Budget, the New Business, Transformers, and Meters capital forecast is based on the projected customer growth from the corporate forecast. A regression analysis of the prior 5 years capital expenditures and growth rates is performed for these categories to predict the capital expenditures for the upcoming 5 years given the various growth scenarios. In addition any specifically identified transformer or meter replacement programs are included in the forecast.

GAS PROGRAM SUMMARY

Gas System Overview

The Central Hudson gas system contains well over 2,000 miles of pipeline facilities ranging in age from new to over 100 years of age. It supplies gas service to about 79,000 customers in communities near the Mid-Hudson River Valley from Woodbury in the south to Coxsackie in the north and ranges from Carmel in the east to as far west as Montgomery.

The Company's gas transmission system consists of 165 miles of steel piping ranging from 6-16" in diameter and four gate stations. The Maximum Allowable Operating Pressure (MAOP) is between 512-750 PSIG. The majority (81%) of the transmission system was installed during the 1950's and 1960's. The MPI and MPR transmission lines were the last to be installed (1990's) and account for 12.8% of the total transmission pipeline inventory. Three of the four gate stations date to the 1950's and early 1960's. The last gate station, Pleasant Valley, was constructed in the early 1990's to take gas from the then new Iroquois gas transmission line.

A total of 152 gas regulators stations are utilized to supply the distribution system. The stations either reduce transmission pressure to distribution pressure (66) or further reduce distribution pressure to a lower pressure (86).

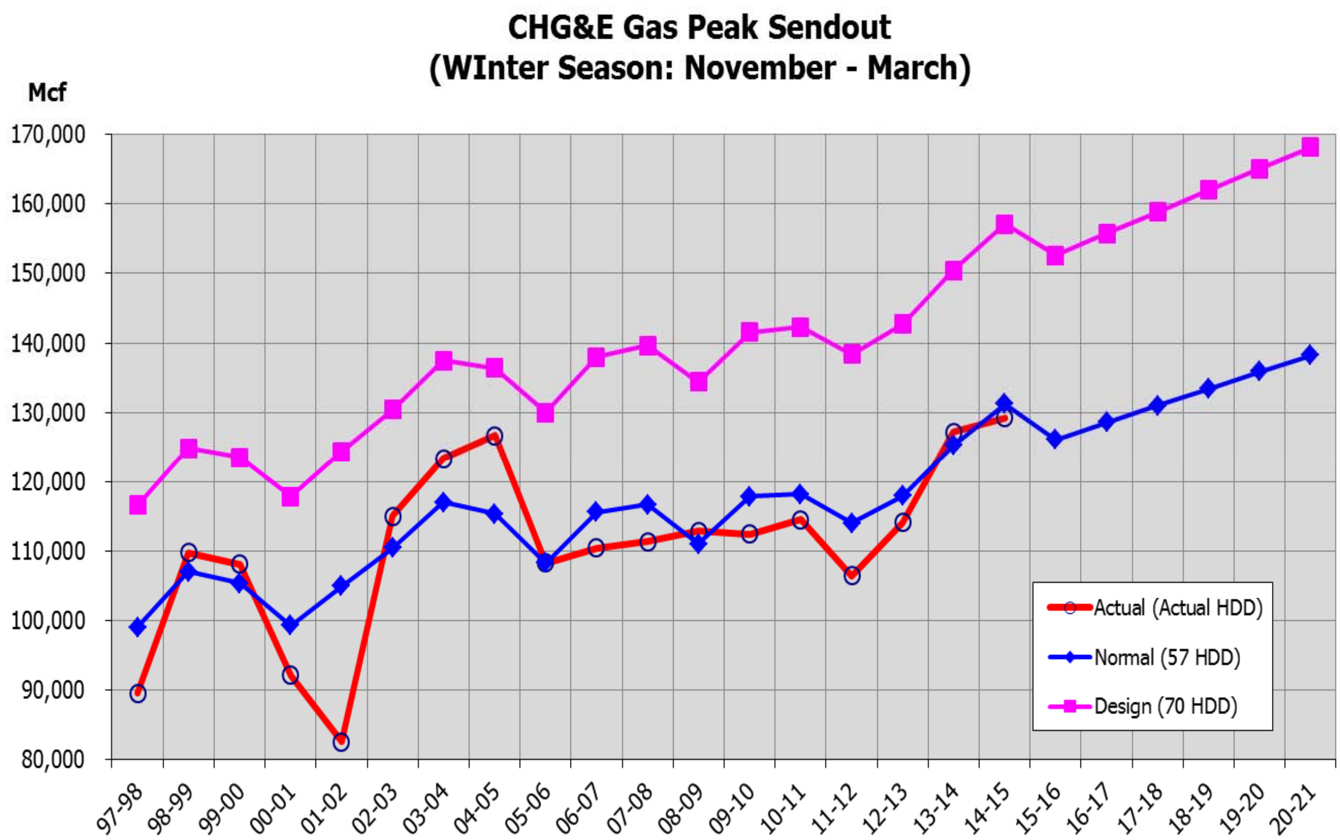
The gas distribution system is comprised of 1,248 miles of distribution main that operates at pressures from utilization (inches of water column) up to 120 psig. Nominal pipe diameters range from ½" to 16 inch in size and comprised of plastic, steel, wrought iron, and cast iron. The predominant material is plastic which makes up 667 miles of the total inventory and cathodically protected steel which accounts for an additional 363 miles. Currently Central Hudson defines leak prone pipe (LPP) as cast iron, wrought iron and unprotected steel. This represents a total of 218 miles or 17% of the total distribution main inventory. The Company's gas service inventory totals 62,320 services of which 39,937 are plastic and 8,383 are protected steel. The remainder, excluding 77 copper services, are considered leak prone.

Low pressure systems exist in each of the larger Cities of Beacon, Newburgh, Poughkeepsie, Kingston, Saugerties, and Catskill. Construction on these systems started in the early 1900s and piping has been added and replaced regularly since that time. These systems contain significant lengths of cast iron, universal, bare steel, and wrought iron piping. Portions of the piping must be replaced in order to maintain a manageable leak inventory. These older communities have transformed from residential/ commercial and industrial centers into primarily residential, light commercial and governmental centers and gas loads have generally stabilized or slightly declined over the years.

Gas Forecast Overview

Central Hudson's gas capital forecast for the next 5-year period is developed each year using a number of inputs such as planning studies, econometric forecasts, corporate load forecasts, facility inspection results, integrity recommendations, field operations feedback as well as others.

Central Hudson's gas peak load forecast is allocated into planning areas to identify system capacity needs and the timing of those needs, quantify the risks of the load growth outpacing our ability to serve that load, and assess the alternatives available to meet that load. As a result of these efforts, the needs are identified, the timing determined, and the alternatives developed from planning studies.



The New Business and Meters capital forecast is based on the projected customer growth from the corporate forecast. A regression analysis of the prior 5 years capital expenditures and growth rates is performed for these categories to predict the capital expenditures for the upcoming 5 years given the various growth scenarios.

For the Gas System, the primary evaluation criteria for area studies are load serving capability, based on system configuration, capacity, and the resulting pressures during design day. The planning criteria are based on AGA Engineering Practices. The minimum operating pressures which are allowed under these planning criteria are 50% of design pressure. Pressures below 50% could result in loss of gas and a significant public safety issue.

The planning criterion is single contingency with no unreserved load. The planning process evaluates the risk associated with load growth uncertainties, the risk of pressure falling below minimum required, the number of customers impacted, and the time associated with restoration of service.

The planning process evaluates alternatives to meet capacity needs based on economic analyses of viable alternatives and develops recommendations and timing that meets system needs at the lowest NPV cost.

Gas Program Detail

The Gas Capital forecast is developed utilizing guidelines, planning standard and engineering judgment. The forecast is completed for each budget category and integrated into a comprehensive plan. The following is a summary of the five year capital forecast for each of the categories.

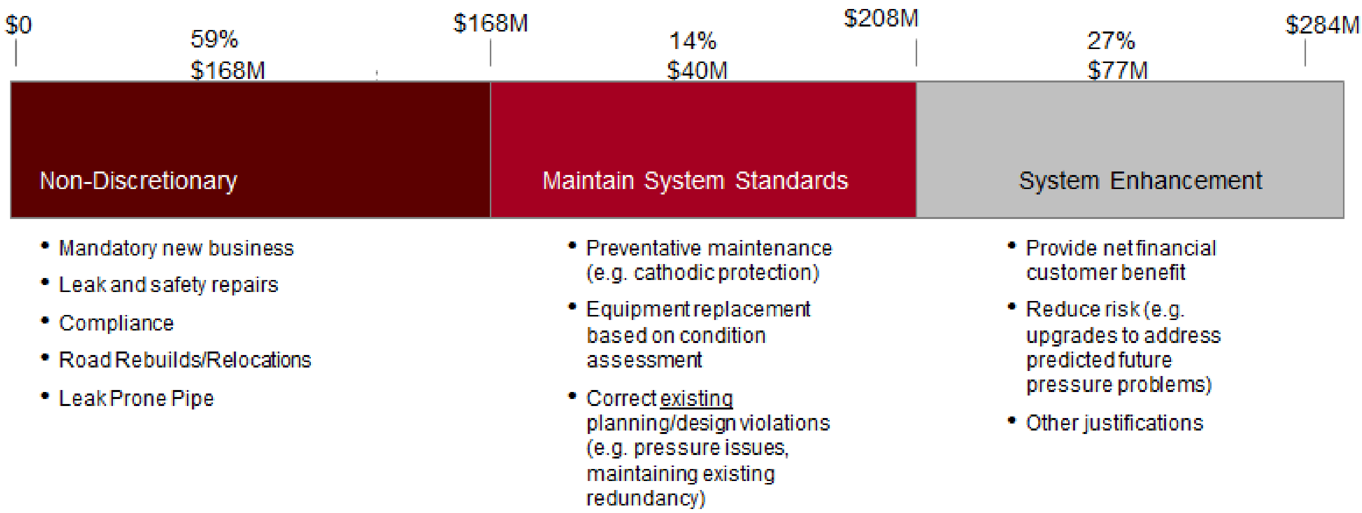
Gas Capital Forecast – Additions

	2017	2018	2019	2020	2021	TOTAL
Production	$ -	$ -	$ -	$ -	$ -	$ -
Transmission	1,678	2,604	6,209	1,684	1,599	13,774
Regulating Stations	1,212	590	1,502	1,571	1,596	6,471
New Business	14,075	14,434	14,293	14,645	14,980	72,427
Distribution Improvements	27,971	36,806	36,489	38,788	39,480	179,534
Meters	2,269	2,317	2,366	2,415	2,466	11,834
Total	$ 47,205	$ 56,752	$ 60,858	$ 59,103	$ 60,121	$ 284,040

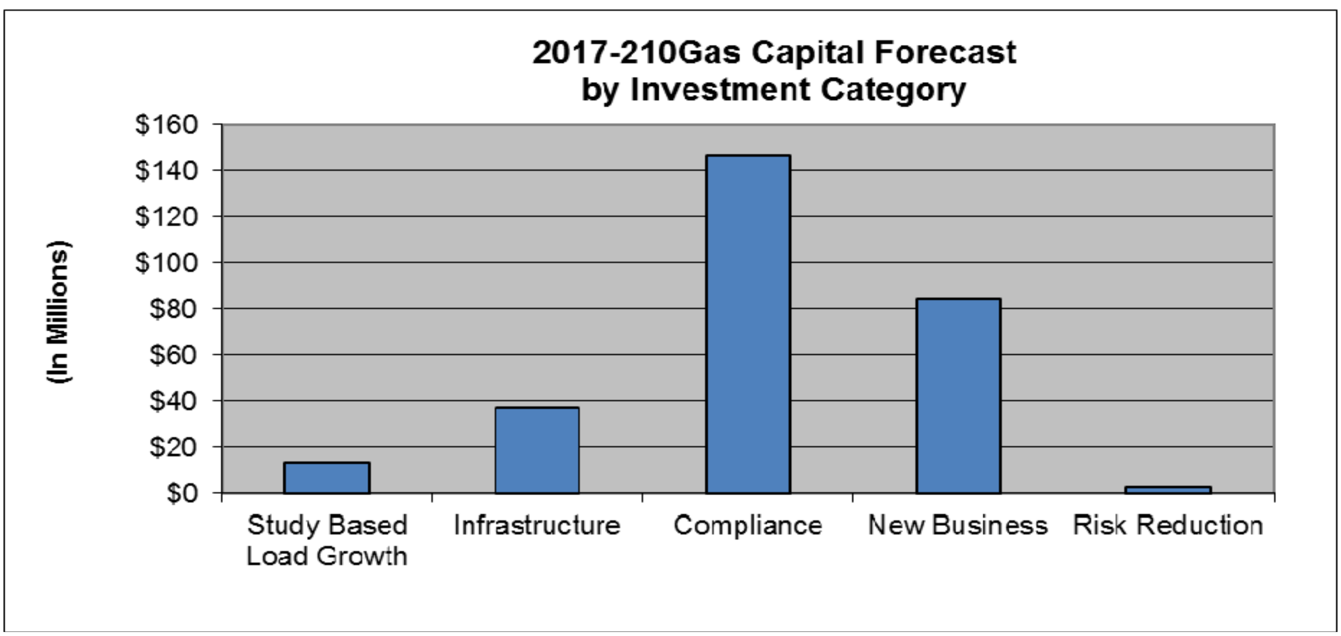
Gas Capital Forecast – Removal

	2017	2018	2019	2020	2021	TOTAL
Production	$ -	$ -	$ -	$ -	$ -	$ -
Transmission	182	191	206	227	256	1,063
Regulating Stations	82	86	91	99	109	467
New Business	1,347	1,342	1,339	1,339	1,338	6,705
Distribution Improvements	837	847	863	885	916	4,349
Meters	4	4	4	4	5	21
Total	$ 2,452	$ 2,470	$ 2,504	$ 2,554	$ 2,625	$ 12,605

A breakdown of the Gas Capital Forecast is shown above indicating the level of spending as we have prioritized the expenditures. Non-discretionary is the level spending that is necessary to meet the minimum standards of service or compliance with public service law. Maintaining System Standards is the level of spending required to maintain our current level of service safety and reliability and to meet obligations set through the rate proceedings. System Enhancement is capital spending aimed at improving our level of service, reducing risk, or reducing operating costs.



In addition, the projects within the Gas Program are categorized by Investment Category as follows: growth, compliance, day-to-day business management, and infrastructure replacement. The bar graph below shows the breakdown of the projects in our current five-year forecast by these Investment Categories.



Gas Transmission

The Gas Transmission category consists of gate station and transmission capital projects. Sample projects may include transmission line replacement/relocations, transmission valve replacements, upgrade/replacement of gate station flow control equipment, etc. The development of the Gas Transmission 5-Year Capital Forecast is derived from the following inputs:

Load Growth
Transmission Integrity Management Program (TIMP)
Regulatory Requirements
Equipment Obsolescence/Performance
Inspection Results
Municipal Projects

The Gas Transmission projects are designed to provide necessary capacity, reduce risk and improve infrastructure. Gas Transmission Capital Projects are primarily a mix of growth, risk reduction and infrastructure. They may stem from System Load Studies or studies performed as part of the Pipeline Integrity Program. These studies result in selected pipeline projects such as casing removals or the installation of remotely operated valves (ROV's). The transmission flow control equipment such as remote terminal units (RTU's) is evaluated to determine useful remaining life. The Gas Transmission 5-Year Capital forecast addresses a number of growth and integrity issues. The remainder of the capital forecast focuses on the following areas for system improvement; TIMP related projects, flow control system upgrades and remote operated valves.

Gas Regulator Stations

The Gas Regulator Station category consists of regulator station capital projects .The projects range from the installation of new stations to the replacement/upgrade of station equipment. The development of the Gas Regulator Station 5-Year Capital Forecast is driven by the following inputs:

Load Growth
Regulatory Requirements
Equipment Obsolescence/Performance
Inspection Results

The Gas Regulator Station projects consist primarily of a mix of capacity, compliance and infrastructure projects. The large scale main replacements associated with the LPP Replacement Program will result in changes in the low and medium pressure system flows. As a result modifications will be made to existing stations as needed to account for increase flow. In some cases stations will be eliminated due to increase main diameters. The remainder of the Gas Regulator Station capital forecast is related to infrastructure and compliance due to regulatory requirements, equipment obsolescence, maintenance issues, improved/remote pressure control, retirements, and relocations. In addition a number of regulator and relief valves have been identified for replacement since they are no longer supported by the manufacturer and are considered obsolete.

Gas Distribution Improvements

The Gas Distribution Improvement category consists primarily of new or replacement main and valve projects as well as service replacements. Projects in this category may include LPP main replacements, main reinforcements, additional valve installations, etc. The development of the Gas Distribution 5 Year Capital Forecast is derived from the following inputs:

Load Growth
Distribution Integrity Management Program (DIMP)
Risk Assessment (including leak history, material type, location, etc.)
Regulatory Updates
Inspection Results
Municipal Projects

The Gas Distribution 5 Year Capital Forecast is driven primarily by the mandated replacement of Leak Prone Pipe (LPP). The table below details the Company's currently approved rate Order which specifies the minimum replacement quantities and the maximum capitalized cost per mile for LPP.

Year	LPP Eliminated (miles)	Cost per Mile (000)
2016	13	$1,400
2017	14	$1,500
2018	15	$1,600

2015 Joint Proposal LPP Replacement Requirements

The LPP replacement projects are identified and prioritized using the GL Main Replacement Program (MRP) which develops a risk 'score' based on pipe and operating characteristics such as material, operating pressure, age, diameter, leak history, location (proximity to buildings, business district, flood prone areas) and, cathodic protection. This risk score measures the relative likelihood and the consequences of a leak associated with each pipeline segment. In addition Subject Matter Expert (SME's) review is taken into consideration when developing the proposed main replacement project listing. Based on industry best practice LPP projects consist of 1- 2 mile 'neighborhood' projects which result in limited disruption to customers and more economical replacement of LPP. While this methodology does result in the replacement of existing short sections (< 100 feet) of plastic and protected steel previously replaced due to undermines or leak repairs the overall efficiencies gained through bypassing and elimination of prolonged customer interruption are significantly more cost effective. The total budget for LPP replacement is $154.9 million in the 5 year forecast.

Included in the Gas Distribution capital budget is funding for main replacements or relocations associated with municipal projects such as road rebuilds. The actual project cost is included when the actual project is known otherwise the budgeted amounts are trended from past year expenditures.

Also included in Gas Distribution Improvements are reinforcements to existing systems based on area studies such as the SM line reinforcement project. This project addresses the current and potential new growth in the Carmel and Mahopac Area. A total of $5.2 million has been identified for this project.

New Business & Meters

The New Business section of the Gas Capital Budget is based primarily on the projected customer growth from the corporate forecast. The forecasted expenditure level is based on historical expenditure levels and historical and forecasted customer growth rates. The Gas New Business has forecast over $63 million over the 5-year period for residential and commercial conversion. An additional $9.8 million has been identified for expansion into new franchise areas and to serve large commercial or industrial customers.

The Gas Meters capital forecast is based on the projected customer growth from the corporate forecast. The forecasted expenditure level is based on historical expenditure levels and historical and forecasted customer growth rates. The meter forecast is based on the annual needs for non-load related meter installations (Meter Testing Program or ERT meter requests) approximately 3000 meters during the forecast period, and the forecast level based on the customer growth, peak, and sales forecast.

COMMON PROGRAM SUMMARY

The Common Capital Forecast consists of the Land and Buildings Capital Budget, the Office Furniture Capital Budget, the Tools & Equipment Capital Budget, the Transportation Capital Budget, and the Information & Technology Capital Budget Forecasts. The following is a summary of the five year capital forecast for each of these categories.

Common Capital Forecast – Additions

	2017	2018	2019	2020	2021	TOTAL
Lands and Buildings	$ 3,947	$ 3,611	$ 5,037	$ 9,191	$ 14,579	$ 36,365
Office Equipment	10,262	23,221	23,819	20,002	23,506	100,810
Tools	1,071	1,630	1,595	1,357	1,280	6,933
Communication	4,648	5,992	4,360	2,882	1,330	19,212
Transportation	7,956	9,216	10,220	10,626	11,088	49,107
Total	$ 27,883	$ 43,670	$ 45,031	$ 44,058	$ 51,783	$ 212,426

Common Capital Forecast – Removal

	2017	2018	2019	2020	2021	TOTAL
Lands and Buildings	$ 243	$ 253	$ 269	$ 292	$ 324	$ 1,380
Office Equipment	1	1	1	1	1	5
Tools	0	0	0	0	0	1
Communication	3	4	4	4	5	20
Transportation	(328)	(342)	(364)	(395)	(438)	(1,867)
Total	$ (81)	$ (85)	$ (90)	$ (98)	$ (108)	$ (462)

Land and Building

The Land & Buildings Capital Budget consists primarily of infrastructure replacement projects due to age or equipment failures. These include roof replacements, paving, HVAC equipment replacements, and electric or plumbing system replacements. In addition to these infrastructure replacement projects, there are several special projects included in the 5-year forecast that are envisioned to improve energy efficiency, productivity, or help fulfill strategic initiatives such as improved security and training. The special projects include a building expansion / upgrades at the Standfordville District Headquarters ($1.5M), renovation and build out of the South Road System Operations area ($625K), creation of disaster recovery center / office space in the Lake Katrine facility ($3M), and a total of $16M for new training facilities and building/renovation at the South Road Campus to address office space needs.

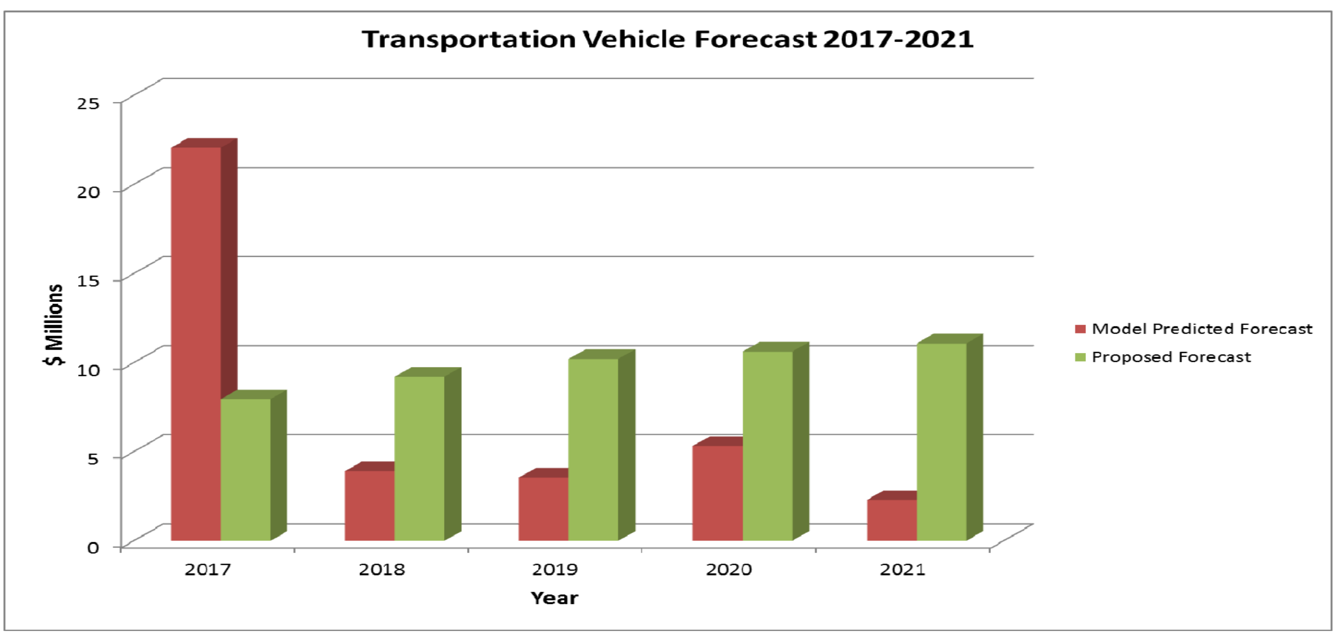
The Office Furniture Capital Budget consists of normal replacements due to wear and tear and those driven by office upgrades or changes requiring additions to meet the new use of the space.

Transportation and Tools

The Tools budget consists of replacements driven by the replacements of the vehicles they are utilized on, obsolescence and incompatibility, decreased reliability, discontinued manufacturer support, and conformance to changing OSHA or other regulations. Specialized tools required to accomplish new tasks or support the application of new techniques, are purchased after a trial use period.

The Transportation Capital Forecast is based primarily on the replacement of equipment. In the past, light duty vehicles were replaced every 10 years/150k miles, medium duty trucks every 12 years/150k miles, and power operated equipment (bucket trucks) every 12 yrs/13,000 engine hours. In 2015 new replacement criteria was implemented based on industry benchmark information for each class of vehicle for a fleet replacement schedule that replaces light/medium duty units at 7 years / 120k miles, and heavy duty units at 10 years / 9,500 engine hours. The changes in criteria were aimed at increasing the reliability of the fleet and controlling expense, operating, and maintenance costs as vehicles and equipment neared the end of their lifecycle. In addition, the expanded capital construction program and in some case type of work (i.e., off-road) were factored into the forecast. Results of the analysis and implementation of new methodology resulted in the following.

- Yielded a $37M spend over 5 years to replace vehicles older than 10 years; heavily weighted to first year ($22M)
- Added $1M / year for replacing non-road equipment
- Added $600K/year for replacing specialized track equipment
- Spend is proposed to be levelized over the next 5 years
- Reduces average fleet age and *"caps"* fleet age at 10 years
- Age is currently main driver of fleet replacement; this budget would "flush" the fleet
- With new mileage and hour tracking systems being installed, fleet can be managed on utilization – most vehicles will be replaced before they reach 10 years old



Information Technology / Communications

The IT Capital Budget consists of investments for business driven software implementations, upgrades to existing software solutions, and infrastructure or hardware lifecycle upgrades and ongoing extensions resulting from corresponding software updates or implementations. For planning purposes, the life cycle of the IT infrastructure is anticipated to be between 5 and 8 years on average, but varies depending upon the type of equipment. The useful life largely depends on usage, environment, technology obsolescence and incompatibility, decreased reliability and discontinued manufacturer support:

Mainframe, peripherals, storage and printers - 8 years
PC & laptops – 5 years
Mobile Computers – 3 years
Network Printers – 3 years
Network devices – 5 years
Telephone systems – 10 to 12 years

Additionally, the IT Capital Forecast includes software applications and upgrades related to providing a net business and customer benefit or reducing corporate risk. For this forecast the major software application projects include further investments into Business Intelligence, Cybersecurity, Enterprise Content Management, Digital (Web/Mobile/Social) Initiatives for Customer Engagement (DICE), Modernization of CIS, Unified Communications / Voice over IP / IVR upgrades, Emergency Management & Mobility, Business Agility with an Enterprise Services Oriented Architecture (SOA) Framework, Increasing the Quality and Speed of Applications Testing, Human Resources System Replacement, Wiki Redesign, GIS extensions, and Financial Application upgrades. These software applications and upgrades are evaluated through the IT Steering Committee with alignment to strategy and financial analysis used as the criteria for approving the project.

Within the communication budget is funding for the Company’s Network Strategy project. The Network Strategy project is an enterprise solution to address communication needs among the company’s fixed assets. These fixed assets include corporate offices, gas gate and regulator stations, electric substations, electric distribution DA (distribution automation) devices, mobile radio tower and large customer meters, The two-way network is being built with a high speed backbone and medium bandwidth mesh radio network to communicate to more dispersed assets. The five year forecast includes $17M for this project.

SUMMARY SCHEDULES 2017-2021 FORECAST

2017- 2021 Construction Forecast ($000's)
INSTALLATION W/ AFUDC
(with inflation & OH adjustment)

		Expenditures with AFUDC										
		2016 JP Budget	2017 Proposed Budget (1st Half)	2017 Proposed Budget (2nd Half)	2017 Proposed Budget	2018 Proposed Budget (1st Half)	2018 Proposed Budget (2nd Half)	2018 Proposed Budget	2019 Proposed Budget	2020 Proposed Budget	2021 Proposed Budget	2017-2021 Proposed Budget Total
ELECTRIC PROGRAM												
Hydro & Gas Turbines	11	1,067	824	1,182	2,006	1,048	1,048	2,096	1,559	1,646	1,511	8,817
Transmission	12	16,866	12,994	5,926	18,920	7,886	9,120	17,006	19,771	22,096	21,494	99,287
Substations	13	22,830	10,681	12,461	23,142	8,796	12,817	21,613	15,306	19,720	16,984	96,766
New Business	14	2,714	2,091	2,091	4,183	2,249	2,249	4,497	3,666	3,966	4,193	20,504
Dist. Improvements	15	30,079	14,696	15,470	30,166	15,243	19,136	34,380	42,895	38,764	33,085	179,289
Transformers	16	4,861	2,543	2,605	5,148	2,643	2,643	5,286	5,698	5,957	6,203	28,292
Meters	17	2,905	1,744	1,163	2,907	1,484	1,484	2,968	3,030	3,094	3,159	15,158
Total Electric Program		81,321	45,573	40,898	86,470	39,349	48,497	87,846	91,925	95,242	86,629	448,113
GAS PROGRAM												
Production	21	-	-	-	-	-	-	-	-	-	-	-
Transmission	22	1,823	222	1,456	1,678	593	2,011	2,604	6,209	1,684	1,599	13,774
Regulator Stations	23	1,531	663	549	1,212	358	233	590	1,502	1,571	1,596	6,471
New Business	24	15,927	7,034	7,041	14,075	7,208	7,226	14,434	14,293	14,645	14,980	72,427
Dist. Improvements	25	23,224	9,942	18,029	27,971	10,637	26,169	36,806	36,489	38,788	39,480	179,534
Meters	27	2,229	1,135	1,135	2,269	1,159	1,159	2,317	2,366	2,415	2,466	11,834
Total Gas Program		44,734	18,996	28,210	47,205	19,954	36,798	56,752	60,858	59,103	60,121	284,040
COMMON PROGRAM												
Buildings	41	3,870	1,974	1,972	3,947	1,805	1,805	3,611	5,037	9,191	14,579	36,365
Buildings Minors		2,324	1,974	1,972	3,947	1,805	1,805	3,611	5,037	9,191	14,579	36,365
UPS		-	-	-	-	-	-	-	-	-	-	-
Fishkill Expansion		-	-	-	-	-	-	-	-	-	-	-
Standfordville Expansion		1,546	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
Office Equipment	42	17,225	5,475	4,787	10,262	9,082	14,139	23,221	23,819	20,002	23,506	100,810
General	421	173	102	102	204	156	156	312	213	326	222	1,276
EMS	423	8,160	1,394	955	2,349	1,754	2,795	4,549	680	1,031	4,489	13,099
EDP	4222	1,922	1,574.62	405.95	1,981	2,081	1,096	3,177	3,107	3,127	3,192	14,583
Software	4220	6,342	2,133.98	2,962.13	5,096	4,747	9,717	14,465	19,185	14,867	15,005	68,618
Security	424	627	270	362	632	344	375	719	633	651	599	3,233
Tools	43	816	535	535	1,071	815	815	1,630	1,595	1,357	1,280	6,933
Communication	44	4,490	2,324	2,324	4,648	2,475	3,517	5,992	4,360	2,882	1,330	19,212
Transportation	45	7,364	3,978	3,978	7,956	4,608	4,608	9,216	10,220	10,626	11,088	49,107
Total Common Program		33,764	14,287	13,597	27,883	18,786	24,884	43,670	45,031	44,058	51,783	212,426
CORPORATE TOTAL		159,819	78,855	82,704	161,559	78,089	110,179	188,268	197,815	198,403	198,534	944,579

2017- 2021 Construction Forecast ($000's)
REMOVAL
(with inflation)

		Expenditures								
		2016 JP Budget	2017 Proposed Budget (1st Half)	2017 Proposed Budget (2nd Half)	2017 Proposed Budget	2018 Proposed Budget	2019 Proposed Budget	2020 Proposed Budget	2021 Proposed Budget	2017-2021 Proposed Budget Total
ELECTRIC PROGRAM										
Hydro & Gas Turbines	**11**	55	117	10	127	204	130	11	623	1,095
Transmission	**12**	1,723	804	600	1,403	1,551	1,713	2,856	2,306	9,830
Substations	**13**	1,262	787	1,250	2,038	1,696	1,625	1,786	1,384	8,529
New Business	**14**	173	88	88	177	188	184	196	212	956
Dist. Improvements	**15**	1,343	1,055	1,055	2,109	2,184	2,303	2,303	2,475	11,374
Transformers	**16**	299	156	156	311	311	331	359	398	1,711
Meters	**17**	2	149	149	297	297	309	329	357	1,589
Total Electric Program		4,857	3,155	3,307	6,463	6,432	6,595	7,840	7,756	35,085
GAS PROGRAM										
Production	**21**	-	-	-	-	-	-	-	-	-
Transmission	**22**	226	91	91	182	191	206	227	256	1,063
Regulator Stations	**23**	78	41	41	82	86	91	99	109	467
New Business	**24**	302	673	673	1,347	1,342	1,339	1,339	1,338	6,705
Dist. Improvements	**25**	125	419	419	837	847	863	885	916	4,349
Meters	**27**	4	2	2	4	4	4	4	5	21
Total Gas Program		734	1,226	1,226	2,452	2,470	2,504	2,554	2,625	12,605
COMMON PROGRAM										
Buildings	**41**	232	121	121	243	253	269	292	324	1,380
Buildings Minors		232	121	121	243	253	269	292	324	1,380
Fishkill Expansion			-	-	-	-	-	-	-	-
Standfordville Expansion		-	-	-	-	-	-	-	-	-
		-								-
Office Equipment	**42**	1	0	0	1	1	1	1	1	5
General	**421**	-	-	-	-	-	-	-	-	-
EMS	**423**	-	-	-	-	-	-	-	-	-
EDP	**4222**	-	-	-	-	-	-	-	-	-
Software	**4220**	-	-	-	-	-	-	-	-	-
Security	**424**	-	-	-	-	-	-	-	-	-
Tools	**43**	-	0	0	0	0	0	0	0	1
Communication	**44**	4	2	2	3	4	4	4	5	20
Transportation	**45**	(315)	(164)	(164)	(328)	(342)	(364)	(395)	(438)	(1,867)
Total Common Program		(78)	(41)	(41)	(81)	(85)	(90)	(98)	(108)	(462)
CORPORATE TOTAL		5,513	4,341	4,493	8,834	8,817	9,009	10,297	10,273	47,229

ELECTRIC PROGRAM INDIVIDUAL PROJECT SUBMITTAL

Budget Submittal Form for Electric Projects

Project Name: High Priority Repair (HPR) Program

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Non-Discretionary

Investment Category: Compliance

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Transmission lines are inspected on a cyclical basis with varying methods ranging from aerial patrols to comprehensive ground patrols. Inspection results are stored in a searchable database, currently the Wagner NextGrid System. This database contains data recorded from all types of inspection methods including aerial patrol, comprehensive aerial inspection, comprehensive ground inspection, ground line testing and treatment, climbing inspection, corona camera inspection, infrared inspection, and other types of inspection as well. Inspection data is recorded for all transmission assets including poles, insulators, guy wires and anchors, structure hardware, foundations, grounding, conductors, static wires, suspect clearances, and right of ways (including encroachments, vegetation, access, etc). After the completion of each inspection cycle, results are analyzed and condition assessments are assigned to the appropriate component of each structure. These conditions are rated on a scale from "1" to "5" with "5" being in the most need of repair. Components with ratings of either "5" or "4" must be repaired or replaced within 1 and 3 years, respectively, after the date of the inspection.

Solution

There is a need to provide funding to respond to the results of the inspection process described above. In some instances components can simply be replaced while in other instances an entire structure might need to be replaced. The design work is then completed and materials ordered. Aside from emergency replacements, replacements are typically grouped in packages to efficiently utilize field resources.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	15,733,000	3,485,000	3,761,000	3,746,000	2,331,000	2,410,000	2,030,000
Expense							

Cost Risks

- [x] Environmental: Matting may be needed for equipment access in swampy areas
- [x] Timing/Permitting: Long Lead time permitting may prolong the project
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections Repair of conditions within the proper timeframes
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure years
- [x] Failure Rates Reduce the risk of increased failure rates
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition Mitigation of aged infastructure
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: P&MK Replacement and Span Correction

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

In January 2006, the MK Line static wire failed mid-span and dropped into the energized phase conductor. This investigation then led to subsequent design reviews and the discovery that many of the structures on the P & MK Lines (Now split into the MK, HK, GK, MG, FK and P Lines) are undersized for current structure loading requirements. The HK, MK, GK, MG, FK and P Lines were evaluated with updated PLS-CADD model data to verify that the lines are compliant with the NESC. The preliminary findings indicate that there are 125 structures requiring mitigation, using an evaluation method based upon now known structure types prone to failure.

Solution

The previous plan for mitigation was to replace the structures with taller poles and larger class sizes capable of holding the increased loads, similar in scope to the recently completed transmission SAG and NERC Mitigation programs. The updated LiDAR/PLS-CADD data on the spans in question is being re-analyzed. Study work is under way to determine the most prudent course of action; the design of that solution is currently in progress and will be completed by the end of 2016.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	6,614,000	378,000	1,118,000	2,787,000	2,331,000	0	
Expense							

Cost Risks

- [x] Environmental: Matting needed for structure access
- [x] Timing/Permitting: PSC approval may be needed as this is an open article VII project
- [ ] Manpower:
- [ ] Other:

Primary Project Objective: Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [x] Failure Rates: Reduce failure rates through preemptive replacement
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Target structure types now know to need reinforcement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Structure Analysis Report In-Progress

Or

Project Alternatives Considered

Instead of structure replacement, Engineering examined the use of pole top bayonets to increase the static wire attachment heights and increase static/conductor clearances. This option proved undesirable as it caused an unacceptable increase to existing structure loading.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: G Line South Rebuild

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 17.799 mile 69 kV G line from Pleasant Valley to Knapps Corners was built in the 1920's with single pole double cross arm structures. Approximately 27.7% of the structures are in need of replacement due to the aging infrastructure and poor condition. The G line has experienced 50 trips outs over a 14 year period (1998 to 2011). The transmission supply to Meyers Corners Substation currently is limited by the area transmission (North Chelsea 115/69 kV transformer). Myers Corners Substation currently is operating at 69 kV and is designed for 115 kV operation.

Solution

The final strategy for the southern (East – West) section is still under development, however, the current preferred option is to rebuild at 69 kV from Knapps Corners to Meyer's Corners to North Chelsea. The routing and construction type alteratives evaluation is anticipated to be completed by mid-2016. Design and permitting will begin thereafter.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	13,244,000	496,000	1,347,000	5,574,000	5,827,000		
Expense							

Cost Risks

- ☑ Environmental: Potential for Matting and scheduling constraints due to clearing restrictions
- ☑ Timing/Permitting: Local permitting approvals needed to begin work
- ☐ Manpower:
- ☑ Other: This project is inter-related with several other CHG&E projects that would need to be completed before work could being. This may affect project schedule and cost.

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Mitigate Existing Sev.4 and Sev. 5 HPR Conditions on the Line
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 90+ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Most of the line is of the original vintage and at the end of its service life
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Internal project alternatives analysis in progress

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: SB Line New 115kV Line Hurley Ave to Saugerties

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 69 kV H & SB Lines connect the North Catskill, Saugerties & Hurley Avenue Substations. Together, the lines are approximately 23.4 miles in length. The 11.1 mile portion of the line from Hurley Avenue to Saugerties is designated as the SB Line. The majority of structures and conductor on this line were built in 1919 and are close to reaching the end of their useful life. There are also a number of spans identified on this line as part of Central Hudson's SAG Mitigation program.

Solution

To address the aging infrastructure and provide the potential for additional area load serving capability to the Northwest Area, the chosen course of action is to rebuild the SB Line for 115 kV. The 115 kV SB line rebuild and an additional 115 kV reinforcement in the Northwest Area will also help maintain system reliability. The budgetary cost estimates below reflect the conceptual estimates found in the relevant planning memo (EP2015-003) as well as additional adjustments based on similar in-progress article VII actual expenditures.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	18,029,000	198,000	305,000	404,000	8,687,000	8,434,000	7,105,000
Expense							

Cost Risks

- ☑ Environmental: Lead paint containment associated with existing tower removals
- ☑ Timing/Permitting: Permitting completion required before start of project
- ☐ Manpower
- ☐ Other

Primary Project Objective: Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Address existing Sev.4 and Sev.5 Findings
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure 90+ years
- [x] Failure Rates: Improve this through preventative replacement
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Optimize structure placement through new design
- [x] Other Program Type: Address SAG Spans deferred from the 2007 SAG Program

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: EP2015-003

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: H Line New 115kV Saugerties to North Catskill

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 69 kV H & SB Lines connect the North Catskill, Saugerties & Hurley Avenue Substations. Together, the lines are approximately 23.4 miles in length. The 12.3 mile portion of the line from North Catskill to Saugerties is designated as the H Line. The majority of structures and conductor on this line were built in 1919 and are close to reaching the end of their useful life. There are also a number of spans identified on this line as part of Central Hudson's SAG Mitigation program.

Solution

To address the aging infrastructure and potentially provide additional area load serving capability to the Northwest Area, the chosen course of action is to rebuild the H Line for 115 kV. The 115 kV H line rebuild and an additional 115 kV reinforcement in the Northwest Area will also help maintain system reliability. The budgetary cost estimates below reflect the conceptual estimates found in the relevant planning memo (EP2015-003) as well as additional adjustments based on similar in-progress article VII actual expenditures.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	12,149,000	198,000	305,000	404,000	2,807,000	8,434,000	7,105,000
Expense							

Cost Risks

- ☑ Environmental: Lead paint containment associated with existing tower removals
- ☑ Timing/Permitting: Permitting completion required before start of project
- ☐ Manpower
- ☐ Other

Primary Project Objective: Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Address existing Sev.4 and Sev.5 Findings
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 90+ years
- [x] Failure Rates: Improve this through preventative replacement
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Optimize structure placement through new design
- [x] Other Program Type: Address SAG Spans deferred from the 2007 SAG Program

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: EP2015-003

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Transmission Minor Projects

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Non-Discretionary

Investment Category: Daily Operations

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Minor Transmission projects arise throughout the year. These projects are not large enough to warrant a line item in the capital budget/forecast. Typically these jobs include the need to update/replace equipment installed on a transmission line such as:

Failed/Damaged:

- Insulators
- Conductor
- Poles
- Structure members
- Other Equipment that fails and is beyond repair
- Minor Pole Relocations

Solution

Install new and update existing equipment as required during the course of a year that is not specifically tied to a major project. Budget projections include for (9) basic single pole replacements annually based on historical project data.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	1,399,000	261,000	278,000	276,000	287,000	297,000	228,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Addressing high risk findings from the inspection program
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ___ years
- [x] Failure Rates: Improve this through preventative replacement
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Address conditions indicating imminent failure
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Network Strategy

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: System Enhancement

Investment Category: Daily Operations

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

In 2015, Central Hudson's Network Strategy Group created a comprehensive plan to install various communication systems throughout the service territory. These communication connections would be placed strategically to allow for efficient and secure company communications between various critical facilities.

Solution

The Network Strategy Group has identified several existing transmission lines that provide existing pathways that can be utilized for communication connections as part of the overall system communication plan. Central Hudson will be installing fiber optic communication on these existing electric transmission pole plants over the course of the next 5 years.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$5,133,000	$0	$0	$3,530,000	$664,000	$940,000	$792,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☑ Reduced Customer Bill: Justified by business case
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement
- [x] Other Program Type: Communication upgrades utilizing existing pole plant

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: ROW Repair Project

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Daily Operations

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Central Hudson had committed voluntarily to obtain additional right of way as follow up to the Northeast Blackout of 2003. The report to the PSC stated that we would identify easements that were deficient from the standard of 100 foot on 69kV and 115kV lines and 150 foot on 345kV lines.

Solution

Central Hudson has identified easement deficiencies along its 69kV, 115kV and 345kV transmission line corridors. The adjacent property owners have been identified and, if haven't already, will be contacted in an attempt to acquire the additional ROW. A vendor will be chosen to provide all of the required work and services to document and obtain additional easement agreements throughout the service territory.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	5,834,000	496,000	508,000	758,000	1,221,000	2,850,000	2,639,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [x] Accessibility (Off Road, underground) Improves Access to Structures
- [x] Strategic Replacement Acquire ROW essential to maintenance of existing facilities
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: ACSR Replacement Project _ WH 1 and WH 2 Line Rebuild

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

During 2003, samples were taken of the WH1 & WH2 line conductor for testing by NEETRAC; this testing revealed evidence of conductor annealing which can result in clearance issues. During the System-Wide Sag Analysis Screening Program, 36 spans of the WH-1 and WH-2 were identified as spans with potential road clearance violations. See EP #2011-010. Also as of 2015, Inspections findings indicate that (47) structures on the line have conditions warranting repair or replacement.

Solution

As recommended, Central Hudson's portion of the 69 kV WH-1 and WH-2 lines should be rebuilt as a single circuit 69 kV line along the same route with 795 ACSR conductor with OPGW neutral for substation communications. The WH-1/2 line taps to Greenfield Road should be rebuilt as a single circuit 69 kV line along the same route with 795 ACSR conductor & OPGW. The Honk Falls WH-769 Breaker should be replaced per the Breaker Replacement Program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	7,453,000	7,453,000					
Expense							

Cost Risks

- [x] Environmental: Matting for Access
- [x] Timing/Permitting: Permitting approvals needed for construction start
- [ ] Manpower:
- [x] Other: Outage constraints involving the NYC DEP and ability of hydro-generation facilities to operate during critical time periods throughout the year.

Primary Project Objective: Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [x] Critical Customers: NYC Board of Water Supply - Hydro Generation Facilities
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Mitigate Existing Sev.4 and Sev. 5 HPR Conditions on the Line
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [x] Other Program Type: SAG Mitigation Program

Infrastructure

- [x] Average Age of Infrastructure 80+ years
- [x] Failure Rates: Reduced rate of failure through preemptive replacements
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Most of the line is of the original vintage and at the end of its service life
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study EP #2011-010

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: G Line North Rebuild - 69kV

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 17.799 mile 69 kV G line from Pleasant Valley to Knapps Corners was built in the 1920's with single pole double cross arm structures. Approximately 27.7% of the structures are in need of replacement due to the aging infrastructure and poor condition. The G line has experienced 50 trips outs over a 14 year period (1998 to 2011).

Solution

The northern section of the G line will continue to operate at 69 kV with the installation of larger conductor. The northern section of the 69 kV G line would begin at Pleasant Valley, supply Tinkertown and terminate at the Todd Hill Substation. A 115/69 kV transformer will be installed at Todd Hill. The portion of the 7023 circuit that is currently double circuit with the G line will be rebuilt in a underbuild configuration on the new G line structures in that section. See EP2013-017 for Details.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	6,952,000	6,753,000	199,000				
Expense							

Cost Risks

- [x] Environmental: Matting
- [x] Timing/Permitting: Permitting needs to be completed prior to construction start.
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Mitigate Existing Sev.4 and Sev. 5 HPR Conditions on the Line
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 80+ years
- [x] Failure Rates: reduce failure rates through preemptive replacements
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Most of the line is of the original vintage and at the end of its service life
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study EP#2013-017

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: EF Line Rebuild - 115kV

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

In 2015, a field inspection of the 1.98 mile 115kV "EF" Line (Shenandoah - East Fishkill) showed that 82% of the existing structure plant would require replacement due to component defects. There were also an additional 8% of structures that showed a significant number of minor defects indicating an overall poor structure condition.

Solution

Given the level of replacement needed to repair the identified component defects, it has been proposed to rebuild all 1.98 miles of the existing 115kV "EF" Line. This would include replacement of all structures, conductor and overhead ground wire. The voltage is planned to remain at 115kV. Structures will remain in the same general locations, and the height of the structures are not planned to increase by more than 10 feet. The total number of structures has the potential to decrease as the design is developed. Additional rights-of-way (ROW) are not required for this rebuild and at this time no existing ROW deficiencies have been identified.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	3,601,000	99,000	1,779,000	1,723,000			
Expense							

Cost Risks

- ☑ Environmental: Potential need for matting and restrictions on tree clearing
- ☑ Timing/Permitting: Outage Restrictions associated with connection into Global Foundaries Facility.
- ☐ Manpower:
- ☐ Other:

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M:
- ☐ Reduced Customer Bill:
- ☐ Other:

Service

Non-Storm Reliability

- ☐ $/COA:
- ☐ 5 Year Average # Outages Avoided:

Non-Storm Operating

- ☐ $/CMA:
- ☐ 5 Year Average Duration of Outages:

Customer Satisfaction

- ☐ Complaints:
- ☑ Critical Customers: Global Foundries
- ☐ LSA Customers:
- ☐ Public Relations Considerations:

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections: Mitigate Existing Sev.4 and Sev. 5 HPR Conditions on the Line
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ___ years
- [x] Failure Rates: Reduce failure rate through preemptive replacement
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Most of the line is of the original vintage and at the end of its service life
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [x] Other Program Type: Driven by HPR Condition findings.

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: Planning Memo in Progress

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: CL Line Rebuild - 69kV

Form submitted by: K.Bragg

Budget Group: 12 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

In 2015, a field inspection of the 11.7 mile 69kV "CL" Line (North Catskill - Lawrenceville - South Cairo) showed that 69% of the existing structure plant would require replacement due to component defects. There were also an additional 23% of structures that showed a significant number of minor defects indicating an overall poor structure condition.

Solution

Given the level of replacement needed to repair the identified component defects, it has been proposed to rebuild 10.16 miles of the existing 11.7 mile line. The 1.54 mile section of line immediately outside of the North Catskill Substation was recently replaced with new steel structures in 2008. The rebuild will include the replacement of all structures, conductors and overhead ground wire in the designated 10.16 mile section of line. The line voltage is planned to remain at 69kV.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	11,672,000	496,000	8,947,000	2,230,000			
Expense							

Cost Risks

- ☑ Environmental: Matting for equipment access
- ☑ Timing/Permitting: Permitting required prior to construction start
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☑ Inspections: Mitigate Existing Sev.4 and Sev. 5 HPR Conditions on the Line
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☑ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☑ Failure Rates: Reduce failure rates through preemptive replacement
- ☐ Obsolete/ Unserviceable Equipment
- ☑ Condition: Most of the line is of the original vintage and at the end of its service life
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☑ Other Program Type: Driven by HPR Condition findings.

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | Planning Memo in Progress

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Substation Minor Projects

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Non-Discretionary

Investment Category: Daily Operations

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Minor Substation projects are completed throughout the year based on failures and equipment condition assessments. These are smaller scale projects and typically based on the need to update/replace substation equipment including:
Battery Chargers
Meters
Controls
Communications
Other Equipment that fails and is unrepairable

Solution

Install new and update existing equipment as required during the course of a year that is not specifically tied to a major project upgrade.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,683,000	$658,000	$743,000	$691,000	$707,000	$884,000	$2,500,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☑ Failure Rates: Reviews of history of equipment failure.
- ☑ Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: ESP Infrastructure Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

A variety of equipment exists in Central Hudson substations, including protective relays, meters, reclosers controls, and other control & communications equipment such as Remote Terminal Units (RTUs). Each of these components serves an integral role in contribution to the overall, integrated substation protection, control, and monitoring function.

The need for upgraded infrastructure has been made evident through the inclusion of new substations and through various targeted replacement programs, all in the Category 13 Capital Forecast. These programs include the RTU Retrofit Program, the Breaker Replacement Program, and the Generation 1 Relay Replacement Program. These programs only address a sample of individual concerns without giving consideration to remaining equipment in the station that should be upgraded on an integrated basis. Without an integrated program, the remaining outdated equipment in the substations is replaced through attrition solely: an accelerated replacement schedule is recommended that takes advantage of the savings that can be realized by performing incremental work at the same time as previously identified and justified capital work.

Solution

Install new and update existing equipment as required during the course of a year that is not specifically tied to a major project upgrade. These upgrades, when coupled with existing projects in a location, can take advantage of construction efficiencies to reduce overall costs of performing the work separately.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$14,315,000	$1,868,000	$3,652,000	$2,230,000	$2,986,000	$3,578,000	$7,895,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [x] Failure Rates: Reviews of history of equipment failure.
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Replace equip. in order to supply protection & metering options.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: SR#2011-07

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Generation 1 Relay Replacement Program

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Generation 1 Relays are the first generation of microprocessor based relays installed on our system. These relays are approaching upwards of twenty years old, many are incapable of performing certain functions and are experiencing more extensive age-related failures. Many Generation 1 relays are now unsupported by the manufacturers and have limited or no parts availability for maintenance.

Solution

Program to replace existing Gen 1 relays during the course of a year that are not specifically tied to major project upgrades.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,066,000	$864,000	$203,000	$0	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 20 years
- [x] Failure Rates These relays have a higher rate of failure than any other relays.
- [x] Obsolete/ Unserviceable Equipment Difficulty finding replacement parts.
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: RTU Replacement Program

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The first and second generation of Remote Terminal Units (RTU's) require more extensive maintenance due to age-related component failures. Many of these RTU's are now unsupported by the manufacturers and have limited or no parts availability for maintenance and repair.

Solution

Planned replacement of first and second generation of RTU's located at Substations, see attached RTU Replacement Table.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,493,000	$218,000	$285,000	$334,000	$324,000	$330,000	$900,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [x] Failure Rates: Reviews of history of equipment failure.
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [x] Condition: Reviews of current conditions of RTUs.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: Central Hudson's "RTU Replacement Table"

Or

Project Alternatives Considered

Decision criteria for alternative selection

Substation / Location	Electric/Gas	Man.	RTU Type	Current Protocol	Future Man.	Future Type	Future Protocol	Comments
Coxsackie Substation	Electric	CDC	8890	CDC	SEL	Axion	DNP	Scheduled for 2019
Coldenham Substation	Electric	Harris	D-20	DNP	SEL	Axion	DNP	Scheduled for 2018
High Falls Substation	Electric	Harris	D-20	DNP	SEL	Axion	DNP	Scheduled for 2018
North Catskill Substation	Electric	Harris	D-20	DNP	SEL	Axion	DNP	Scheduled for 2019
Greenfield Rd. Substation	Electric	Harris	M-4000	CDC	SEL	Axion	DNP	Scheduled for 2020 (Substation Project)
Jansen Ave. Substation	Electric	Harris (DU)	M-4000	CDC	SEL	Axion	DNP	Scheduled for 2018
Maybrook Substation	Electric	Harris (DU)	M-4000	DNP	SEL	Axion	DNP	Scheduled for 2018 (Substation Project)
Woodstock Substation	Electric	Harris (DU)	M-4000	CDC	SEL	Axion	DNP	Scheduled for 2018 (Substation Project)
Standfordville Substation	Electric	Harris (DU)	M-4000	CDC	SEL	Axion	DNP	Scheduled for 2019 (Substation Project)
Hunter Substation	Electric	Harris (DU)	M-4000	CDC	SEL	Axion	DNP	Scheduled for 2020
Vinegar Hill Substation	Electric	Harris (DU)	M-4000	CDC	Telvent(DU)	2100	DNP	Scheduled for 2020
Montgomery Substation	Electric	NONE			SEL	Axion	DNP	Scheduled for 2020 (Substation Project)
Converse St. Substation	Electric	NONE						
Merritt Park Substation	Electric	Novatech	BM85	DNP	SEL	Axion	DNP	Scheduled for 2021
Staatsburg Substation	Electric	Novatech	BM85	DNP	SEL	Axion	DNP	Scheduled for 2021
Westerlo Substation	Electric	Novatech	BM85	DNP	SEL	Axion	DNP	Scheduled for 2021
East Kingston Substation	Electric	Novatech	Orion5R	DNP				
Galeville Substation	Electric	Novatech	Orion5R	DNP				
Milan Substation	Electric	Novatech	BM85	DNP				
Modena 115kV Sub	Electric	Novatech	BM85	DNP				
North Chelsea Sub	Electric	Novatech	BM85	DNP				
Spackenkill Substation	Electric	Novatech	Orion5R	DNP				

Updated 6/2/2016

Budget Submittal Form for Electric Projects

Project Name: Circuit Breaker Replacement Program (345 kV)

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Central Hudson has on going condition based circuit breaker replacement program. The 345kV circuit breakers are critical to the reliable operation of the 345kV bulk electric system. As part of the on-going breaker replacement program, the 345kV circuit breakers at the Roseton and Rock Tavern Substation have been replaced in prior years. Based on age and condition, the remaining 345kV circuit breakers (Hurley Avenue Substation) on our system are planned for replacement.

Solution

Selective replacement of specific breakers as specified by the program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,506,000	$0	$1,688,000	$818,000	$0	$0	$0
Expense							

Cost Risks

- [x] Environmental: Replace old oil circuit breakers.
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [x] Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 40 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | Central Hudson's "Breaker Replacement Program"

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Circuit Breaker Replacement Program (115, 69, 34.5, 13.8 kV)

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Central Hudson has on going condition based circuit breaker replacement program. The majority of power circuit breakers on the Central Hudson System have been in operation for over 40 years. Some of the breakers are at their duty rating, some have inherent design or operating issues, and others are obsolete and do not have spare parts available for repair or maintenance.

Solution

Selective replacement of specific breakers as specified by the program. (This represents the continuation of our on-going circuit breaker replacement program).

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$7,597,000	$1,433,000	$1,631,000	$1,310,000	$1,239,000	$1,983,000	$5,000,000
Expense							

Cost Risks

- [x] Environmental: Replacement of Old Oil Circuit Breakers.
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [x] Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

☐ Thermal/Load Serving Capability

☐ Equipment Type

☐ Current % loaded

☐ Voltage (Stray, Low, High)

☐ Power Quality

Other

Risk Reduction

Safety

☐ Employee Safety

☐ Public Safety

☐ Other Program Type

Compliance

☐ Inspections

☐ Road Rebuild

☐ Joint Facilities/CATV Agreement

☐ NESC Codes

☐ Other Program Type

Infrastructure

☑ Average Age of Infrastructure 40 years

☑ Failure Rates Breakers replaced based on failure rates.

☑ Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.

☑ Condition Breakers replaced based on deteriorated condition.

☐ Accessibility (Off Road, underground)

☑ Strategic Replacement Breakers replaced based on infrastructure upgrades.

☐ Other Program Type

Resilience

☐ $/COA (with storm)

☐ $/CMA (with storm)

☐ Customer Cost of Outage (ICE Calculator)

☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: Central Hudson's "Breaker Replacement Program"

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: 345 kV Switch Replacement Program

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Problems have been identified with the TTT-7, EA, VR2 and VT-1 style motor operated 345kV air disconnects at the Roseton, Rock Tavern and Hurley Ave substations. Limited to no replacement parts are available for these style switches. These disconnects have reached the end of their useful lives, are problematic, and have resulted in extended time trouble-shooting problems and result in increased callouts. There have been several failures in recent times and due to frequency of operation and general condition

Solution

With the developing trend of problems and consideration given to the criticality of the bulk 345kV system, a multi-year systematic 345kV disconnect replacement program has been developed.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,119,000	$540,000	$659,000	$644,000	$659,000	$617,000	$1,600,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective: Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 40 years
- [x] Failure Rates: Reviews of history of equipment failure.
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [x] Condition: Switches replaced based on deteriorated condition.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Switches replaced based on infrastructure upgrades.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: E. Schultz: “Operations Services Infrastructure Projects”, May 10, 2013.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: 115 kV Switch Replacement Program

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Based on condition, age and criticality, Operations Services has identified 115kV disconnect switches as a candidate for targeted replacements.
The 115kV Switch Replacement Program will operate similar to our on-going Breaker Replacement Program. Switches will be identified by condition, criticality, age, use, availability of parts, and maintenance issues in order to create a prioritized list for replacement.

Solution

Development of a 115kV switch replacement program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,297,000	$51,000	$51,000	$1,038,000	$558,000	$1,598,000	$5,000,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 40 years
- [x] Failure Rates Reviews of history of equipment failure.
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [x] Condition Switches replaced based on deteriorated condition.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement Switches replaced based on infrastructure upgrades.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: E. Schultz: “Operations Services Infrastructure Projects”, May 10, 2013.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: DA Program LTC Upgrade

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: System Enhancement

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Central Hudson's current distribution LTC power transformer controls are not equipped with supervisory indication or control of tap position and are limited on the number of steps of voltage reduction. Our distribution automation program includes two-way communication and control of field devices to enable CVR/VVO. The decrease and flattening of customer end use service voltage has been shown to improve end use efficiency with a direct impact or reduction in customer usage. The replacement of substation LTC controls are required for the implementation of our Distribution Automation program.

Solution

Planned replacement / upgrade of Substation transformer LTC controls coordinated with our distribution automation program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,360,000	$595,000	$765,000	$0	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☑ Reduced Customer Bill: Lowering voltage while maintaining current will aid in lowering customer bills.
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement Install LTC controls that perform desired functions and comm.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | See below.

Or

Project Alternatives Considered

F. Bruna,"SCADA Requirements for Distributed Automation", E.P. #2013-015, April 15, 2013

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Danskammer Substation Storm Hardening WO# 5560AR (8516AR)

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The Danskammer Substation requires Storm Hardening upgrades to protect the site from the high water levels associated with storm events. The substation experienced flooding in 2012 during hurricane Sandy.

Solution

Protect the Substation from High Water Levels associated with Storm Events. Install an elevated control house and raise the height of the control boxes on the yard equipment.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,227,000	$1,227,000	$0	$0	$0	$0	$0
Expense	$0	$0	$0	$0	$0	$0	$0

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure years
- ☐ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☑ Condition Prepare the substation for future storms.
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Montgomery Street Substation Replace Transformers

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer.
Based on this review and as recommended in E.P. #2010-013, both Montgomery Street transformers should be replaced due to their condition. The transformers are now over 75 years old and are indicating dielectric breakdown.

Solution

Replace existing transformers due to age and condition.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,466,000	$1,466,000	$0	$	$0	$0	$0
Expense	$0	$0	$0	$0	$0	$0	$0

Cost Risks

- ☑ Environmental: Oil filled transformers - oil containment.
- ☑ Timing/Permitting: Historic Site.
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☑ Employee Safety: Decrease of risk of current transformers failing.
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure 75 years
- ☐ Failure Rates
- ☑ Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- ☑ Condition: Increase of negative DGA sample tests.
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

P. Harpolis, E.P. #2010-013 "Montgomery Street Substation Breaker Replacement", October 4, 2010.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Todd Hill 'G' Line Add 115/69 kV Autotransformer

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 69kV G Line is being reconfigured and rebuilt due to infrastructure issues. The Todd Hill Substation has been determined to be the optimal location to install a 115/69kV source to the area to support the reconfiguration of the 69kV G Line. A 115/69kV autotransformer must be installed at the Todd Hill Substation to provide this source.

Solution

Add a 115/69kV, 50MVA Autotransformer at Todd Hill. The Substation will be expanded to make room for the transformer and G Line structure. The 115kV bus will be extended and the C Line dead end structure will be moved further east. The new 50MVA Autotransformer, G Line dead end structure, 69kV breaker, lightning mast, instrument transformers and disconnect switches will be installed adjacent to Transformer #1 between the C-519 and C-512 switches per EP2014-011.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,466,000	$1,466,000	$0	$0	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☑ Strategic Replacement: Support of the reconfiguration of the G Line.
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

R. Chan, H. Swanson, E.P. # 2014-011, "Updated Recommendation to the Rebuild of the Northern Section of the 69 kV G Line" October 13, 2014.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Union Ave Substation Switchgear Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Due to asset condition and aging infrastructure it has been determined that the existing outdoor switchgear, control house, and RJ-52 115kV breaker in the lower yard of the Union Ave. Substation are nearing the end of their useful life.

Solution

A new Power Control Center will be installed to replace the aging control house and switchgear. The following breakers are to be replaced with switchgear enclosed in the PCC: TD-(4041-4047),TD-4049, UN-594,UW-1494, C-2551, W-1095, W-837, and C-2552. All associated relaying will be replaced as well with the breakers. The RJ line relaying, transformer protection, and RJ-52 breaker failure relays will be replaced in the PCC as well. The RJ-52 breaker will be replaced with a new SF6 gas breaker as part of the breaker replacement program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,238,000	$3,188,000	$51,000	$0	$0	$0	$0
Expense							

Cost Risks

- [ ] Environmental
- [x] Timing/Permitting: Town Hall approval required to expand fenceline.
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [x] Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 60 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [x] Condition Difficulties in the operation of Substation due to outdoor switchgear.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Boulevard Transformer Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer.

As part of this review, Boulevard Transformer #1 (Phases #1, #2 and #3) was assessed and determined to be in poor and degrading condition. This transformer has been in service since 1954 and located at this station since 1998.

The power factor results for the three single-phase banks have been consistently above acceptable values in all insulation. Results for Phase #3 low-ground insulation increased by 75% from 1998 to 2010. Results for all other insulation in Phases #1, #2 and #3 have been consistently above acceptable values (between 0.5% and 1%) over the testing period. Dissolved gas-in-oil analysis results indicate that the Phase #1 unit has just begun to show signs of cellulose overheating.

In addition, Boulevard Transformer #2 is 76+ years old and has increased power factor readings. Based on the age and condition, this transformer requires repalcement.

Solution

Replace the existing three transformers at Boulevard with two 13.4MVA (12MVA) transformers.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,306,000	$2,255,000	$51,000	$0	$0	$0	$0
Expense							

Cost Risks

- ☑ Environmental: Oil filled transformers - oil containment.
- ☑ Timing/Permitting: Permitting required to enforced secondary entrance to install new control house.
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

☐ Thermal/Load Serving Capability

☐ Equipment Type

☐ Current % loaded

☐ Voltage (Stray, Low, High)

☐ Power Quality

Other

Risk Reduction

Safety

☐ Employee Safety

☐ Public Safety

☐ Other Program Type

Compliance

☐ Inspections

☐ Road Rebuild

☐ Joint Facilities/CATV Agreement

☐ NESC Codes

☐ Other Program Type

Infrastructure

☑ Average Age of Infrastructure 62 years

☐ Failure Rates

☑ Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.

☑ Condition Elevated power factor tests results.

☐ Accessibility (Off Road, underground)

☐ Strategic Replacement

☐ Other Program Type

Resilience

☐ $/COA (with storm)

☐ $/CMA (with storm)

☐ Customer Cost of Outage (ICE Calculator)

☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

S. Martino, E.P. # 2014-003, "Boulevard/Jansen Ave./South Wall St./Converse St. Area Study" November 21, 2014.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Reynolds Hill Substation Transformer Replacements

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer.

As part of this review, as well as the lack of spare parts due to their unique 4-winding configuration, it is recommended that both Reynolds Hill Transformers be replaced based on condition and age.

Solution

Replace selected transformers with new 22.4MVA transformers equipped with LTC and remove the circuit regulators.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,205,000	$2,648,000	$557,000	$0	$0	$0	$0
Expense							

Cost Risks

- ☑ Environmental: Oil filled transformers - oil containment.
- ☑ Timing/Permitting: Permitting required for substation footprint additions for new oil containment.
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure 60 years
- ☐ Failure Rates
- ☑ Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☑ Strategic Replacement Replace unique transformer which has no system spares.
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | N. Conza, E.P. # 2012-017, "Reynolds Hill Transformer Study" April 4, 2013.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Woodstock Substation Switchgear Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The existing external switchgear and control house switchgear has reached the end of its useful life and replacement parts are difficult to obtain or no longer available. Maintenance issues have been experienced with racking the 1947 vintage breakers in the external switchgear. Replacement parts for the racking mechanisms are no longer available.

The dial up RTU housed inside of the control house switchgear is unreliable, due to space constraints there is no room to add additional equipment or to replace the RTU. The 1972 vintage breakers utilize a puffer with a plastic manifold, this has been a constant maintenance issue.

The external switchgear and control house switchgear have separate DC voltage supplies, a 24 volt and a 48 volt battery system, respectively. There is no room to upgrade either battery system, and maintenance of the system is problematic.

Solution

It is recommended that the external switchgear and control house switchgear be replaced with a new Power Control Center (PCC). The PCC will contain two bus's with a normally open tie breaker, 15kV breakers rated 2000A and 1200A, protective relaying, interconnection cabinet, PT's, station service transformers, RTU, and DC battery system. The PCC will contain provisions for future expansion.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,121,000	$2,057,000	$1,064,000	$0	$0	$0	$0
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [x] Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [x] Employee Safety: Reduction of the risk of an equipment failure and flash over.
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 69 years
- [x] Failure Rates: RTU is unreliable.
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [x] Condition: Current conditions of switchgears make it impossible to upgrade equipment.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Maybrook Substation Upgrades

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Growth

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The Montgomery and Maybrook area has experienced significant growth over the past decade. The Maybrook Substation transformers are approaching their firm ratings, and the four distribution circuits are runnings close to, at, or above their 6 MVA normal design criteria. As the economy is recovering, a number of larger industrial loads are coming on line, and a continued abundance of available land with proximity to I-84 will drive the continued growth of warehouses and the residential housing market in the long-term. This realized and potential growth has triggered the need to address the loading concerns in the area.

Solution

Upgrade the Maybrook Substation by replacing the two 10 MVA transformers with two new 12 MVA (13.4 MVA) 69/13.8 kV transformers. Transfer the 10MVA transformers to the Montgomery Substation.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,562,000	$978,000	$2,584,000	$0	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [x] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [x] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement Increase of loading conditions.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

C. Ritacco, E.P. # 2011-012, “Montgomery/Maybrook Area Study" January 13, 2012.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Knapps Corners Substation

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The existing Knapps Corners Substation was built in 1941 and later expanded in 1953. Based on condition and age, the major substation equipment (power transformers, circuit breakers, disconnect switches, control house, relaying and control equipment) requires replacement.

Solution

Replace the existing Knapps Corners Substation with a new Substation on adjacent property. The existing substation cannot be removed from service during construction and the existing footprint is constrained. This creates difficulties, impacts reliability and increases the cost of rebuilding the substation in the same location. Based on these factors, a new substation will be constructed adjacent to the existing one, and the existing substation will be retired/removed.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$9,952,000	$1,369,000	$ 5,624,000	$2,959,000	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 60 years
- [x] Failure Rates Reviews of history of equipment failure.
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [x] Condition Reviews of current conditions of existing substation equipment.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement Provisions for the reroute of the G Line South.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

Loeven, E.A.: “Knapps Corners 15 kV Bus Reconfiguration”, S.R.2012-01. June 1, 2012.
Paull, J.: “Knapps Corners Substation Breaker Study”, E.P. # 2009-01. December, 2, 2009.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: North Chelsea Transformer Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The 69kV G Line is being rebuilt due to asset condition. The routing analysis will determine the optimal solution in regards to both line routing and voltage level (115kV or 69kV) for the rebuild. Pending the results of the routing analysis, a 69kV source may be required at the North Chelsea Substation.

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer.

Based on this assessment, it has been determined that the existing three single phase 115/69kV transformers at North Chelsea have reached the end of their useful life and require replacement.

Solution

Replace existing three 115/69 kV single phase transformers with a three phase 115/69 kV autotransformer.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,446,000	$196,000	$355,000	$896,000	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 69 years
- [x] Failure Rates Four of thirteen transformers of this vintage have failed.
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- [x] Condition Elevated power factor measurements above acceptable limit.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement Provisions for the reroute of the G Line South.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

See below.

Or

Project Alternatives Considered

"Central Hudson Gas & Electric Long Range Electric System Plan", October 2013

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Stanfordville Substation New Transformer

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer. Based on this assessment, the existing Standfordville Substation transformer has reached the end of its useful life and requires replacement.

Solution

Replace the existing transformer at the Stanfordville Substation with a 12 MVA 69/13.8kV bank.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,787,000	$489,000	$507,000	$792,000	$0	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M — Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 61 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence in the station.
- [x] Condition: Dissolved Gas Analysis indicating overheating in the transformer insulation.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Reinforcement of the Northeast 69 kV area.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Coxsackie Substation Transformer Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer. Based on this assessment, the existing Coxsackie Substation transformer has reached the end of its useful life and requires replacement.

Solution

Replace the existing transformer at the Coxsackie Substation with a 12MVA transformer.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,545,000	$147,000	$507,000	$841,000	$51,000	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 59 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence in the station.
- [x] Condition: Elevated power factor measurements above acceptable limit.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Kerhonkson Substation Autotransformers

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

The existing Modena Substation115kV/69kV single phase autotransformers have reached the end of their useful life. These units are part of a group of sister transformers installed at the Ohioville, North Chelsea and Modena Substations. Based on condition, age and several failures of these single phase units, these transformers are all planned for replacement. Based on a review of the Ellenville Transmission Area, it is recommended that on the retirement of the Modena 115kV/69kV autotransformers, new autotransformers be installed at the Kerhonkson Substation. This work will need to be completed in conjunction with the upgrade of the P and MK Lines to 115kV operation.

In addition to addressing the infrastructure issues, this work will increase the load serving capability within the Ellenville Area. It is recommended to replace the autotransformers and convert the P and MK lines to 115kV operation by 2020. The majority of the work required for the line conversion has been completed previously based predominately on infrastructure issues (rebuild of the P & MK Lines, rebuild of the High Falls, Galeville, Kerhonkson and Sturgeon Pool Substations).

Solution

Install two new 115/69kV autotransformers at the Kerhonkson Substation and reconfigure the 69kV bus at the Honk Falls Substation.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$5,241,000	$98,000	$507,000	$595,000	$4,042,000	$0	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☑ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☑ Strategic Replacement Part of P & MK area study.
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | Chan, R.: "P & MK Area Study". E.P. #2010-008. May 2, 2011.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Montgomery Substation Rebuild

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer. Based on this assessment, the existing Montgomery transformer has reached the end of its useful life and requires replacement.

Solution

Remove existing 2 MVA 69/4.16 kV transformer at the Montgomery Substation and install two 10 MVA 69/13.8 kV transformers that were located previously at the Maybrook Substation. This work coincides with the distribution circuits upgrade from 4160 V to 13.8 kV.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,773,000	$244,000	$760,000	$844,000	$1,925,000	$0	$0
Expense							

Cost Risks

☐ Environmental

☐ Timing/Permitting

☐ Manpower

☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.

☐ Reduced Customer Bill

☐ Other

Service

Non-Storm Reliability

☐ $/COA

☐ 5 Year Average # Outages Avoided

Non-Storm Operating

☐ $/CMA

☐ 5 Year Average Duration of Outages

Customer Satisfaction

☐ Complaints

☐ Critical Customers

☐ LSA Customers

☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 62 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence in the station.
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: See below.

Or

Project Alternatives Considered

C. Ritacco, E.P. # 2011-012, “Montgomery-Maybrook Area Study" January 13, 2012

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Modena Add Additional 115 kV Breaker

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: System Enhancement

Investment Category: Daily Operations

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Based on the projected load growth and load serving capability within the Ellenville Area, it is recommended to convert the P and MK lines to 115kV operation. The majority of the work required for the line conversion has been completed (rebuild of the P & MK Lines, rebuild of the High Falls, Galeville, Kerhonkson and Sturgeon Pool Substations).

The upgrade of the P&MK Lines to 115kV will require the addition of a third 115kV breaker at the Modena Substation to form a ring bus.

Solution

A third 115 kV breaker will be installed at Modena Substation to form a ring bus. Provision for the third 115 kV breaker already has been incorporated in the Modena Substation electrical layout.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,437,000	$0	$203,000	$395,000	$1,840,000	$0	$0
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☑ Strategic Replacement: Completes a ring bus at Modena Substation.
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: Chan, R.: “P & MK Area Study”. E.P. #2010-008. May 2, 2011.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: New Baltimore Transformer Replacement

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Due to their proximity, the Coxackie and New Baltimore Substations provide reserve capability and operating flexibility between the two substations. The existing distribution infrastructure between the substations is aging, in poor condition and has access limitations due to CSX railroad expansion. To maintain reliability and operating flexibility in this area, the distribution infrastructure requires replacement. A review of the area determined that a more cost effective solution is to install a second transformer and associated circuit positions at the New Baltimore Substation.

Solution

Add an additional 12 MVA transformer and associated distribution feeders to the New Baltimore Substation.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,492,000	$0	$51,000	$273,000	$1,117,000	$51,000	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Provide operational flexibility.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Greenfield Road - Substation Upgrade

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer. Based on this assessment, the existing 69-4.16kV Greenfield Road Substation transformers have reached the end of their useful life and require replacement.

Solution

Retire all of the 4 kV equipment including Transformers #1 and #3 and all other associated equipment. Two existing 69-13.8kV three phase transformers will be utilized (current plans are to use the Modena Substation spare and the retired Kerhonkson Substation transformers).

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,153,000	$98,000	$203,000	$296,000	$505,000	$51,000	$0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 78 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [x] Condition: Elevated power factor measurements above acceptable limit.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Trap Rock Tap Station

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Based on infrastructure issues determined by inspections and a condition based assessment, the 69kV TR needs to be rebuilt. This line is the sole supply to a quarry limiting the ability to obtain outages during a rebuild of the line. A review has determined that the most economical solution is to build a new substation tapped off of the 115kV SC line to supply the quarry and to retire the TR Line.

Solution

Install a new 115/13.8 kV or 115/69 kV Substation to serve Trap Rock. Additionally, install a new 115 kV breaker at the Sand Dock Substation to limit exposure to IBM resulting from a fault at the new tap on the SC Line.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$5,324,000	$400,000	$253,000	$592,000	$2,021,000	$2,058,000	$50,000
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Service

Benefits

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [x] Critical Customers: Trap Rock Quarry
- [ ] LSA Customers
- [x] Public Relations Considerations: The line runs through a residential area; its retirement will remove the infrastructure from customers' property.

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

An alternative considered was to rebuild the TR Line in kind. Construction would be costly and lengthy due to the restrictions from the quarry on the allowable outage durations to perform the work.

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Aged Transformer Replacements

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

As part of the ongoing review of the substation power transformer fleet, Operations Services completes a condition-based assessment of those transformers that are 55 years old or greater. This assessment is based on routine testing and monitoring to determine an overall condition and condition-trend of the transformer.

The following power transformers have been identified due to age (55+) and will have their inspection results monitored more closely as a result. Some of the units have exhibited early indications of degradation. In the event that these transformers show deteriorating condition, they will be targeted for replacement pro-actively before risking failure. These transformers include:

North Catskill Transformers # 4 & #5 (115/69 kV Autos); Smithfield Transformer #1 (69/13.8 kV); Dashville Transformer #2 (69/4 kV); Forgebrook Transformers # 1 & #2 (115/13.8 kV); Pulvers Corners Transformer #4 (69/13.8 kV); Union Avenue Transformers # 1 & #2 (115/13.8 kV); Tinkertown Transformers # 1 & #2 (69/13.8 kV); Converse Street Transformer #2 (14/4 kV); East Park Transformer #1 (69/13.8 kV); Grimley Road Transformer #2 (69/13.8 kV); Neversink Transformers # 3 & #6 (69/13.8 kV); Ohioville Transformers # 1 & #2 (115/13.8 kV); South Cairo Transformer #1 (69/13.8 kV)

Solution

Replace transformers and any associated relaying as appropriate.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$9,971,000	$0	$0	$1,332,000	$3,031,000	$5,608,000	$9,963,000
Expense							

Cost Risks

- [x] Environmental: More extensive oil containment is now required.
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective: Risk Reduction

Benefits

Economic

- [x] Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- [ ] Reduced Customer Bill
- [ ] Other

Service

Non-Storm Reliability

- [ ] $/COA
- [ ] 5 Year Average # Outages Avoided

Non-Storm Operating

- [ ] $/CMA
- [ ] 5 Year Average Duration of Outages

Customer Satisfaction

- [ ] Complaints
- [ ] Critical Customers
- [ ] LSA Customers
- [ ] Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure 55+ years
- ☐ Failure Rates
- ☑ Obsolete/ Unserviceable Equipment Reviews of equipment obsolescence.
- ☑ Condition Varying transformer health.
- ☐ Accessibility (Off Road, underground)
- ☑ Strategic Replacement Prioritized replacements.
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☐ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Aged Switchgear Replacements

Form submitted by: Mason Mullamphy

Budget Group: 13 - Substations

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted

Project ID (District-YYYY-ID)

Description of Problem

Based on condition assessment, several existing switchgears have been identified for replacement due to age and condition. These switchgears are located in the following substations:

Converse Street Substation
Lincoln Park Substation
Sturgeon Pool Generator Breakers Substation
Montgomery Street Substation

Solution

Replace switchgears and any associated relaying as appropriate.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,544,000	$0	$0	$0	$0	$1,544,000	$4,500,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Newer equipment requires less maintenance than existing equipment.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 60 years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment: Reviews of equipment obsolescence.
- [x] Condition: Switchgear deterioration.
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement: Modernization of relaying equipment.
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: 14.4kV Cable Rejuvenation Program

Form submitted by: N. Conza

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

The 14.4kV Rejuvenation program was initiated in 2009, with the replacement of the Poughkeepsie PO, PK and PU PILC network feeder main lines, as well as the majority of the WN cable feed to the Montgomery Street substation. The remaining Newburgh 14.4kV feeds to the Montgomery Street Substation are the B, F and R cables. Just as in Poughkeepsie, these cables are in need of replacement due to age and condition. The underground infrastructure, which is nearly 90 years old is also in need of replacement. The final portion of the WN cable is also in need or replacement due to cable age. The infrastructure is nearly 100 years old and all spare conduits have collapsed. The conduits are currently inaccessible due to a library being built over them in 1973.

Solution

Replace the remaining Newburgh 14.4kV cables, as well as their associated infrastructure.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$5,462,000	$488,000	$1,109,000	$1,084,000	$1,365,000	$1,416,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 100 years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition Collapsed and abandoned ducts, leaking lead cables over 70 years old.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study | E.P. #2011-001

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: 4800V Conversion/Infrastructure Program

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

A large infrastructure concern in the Central Hudson territory is the 4800V circuitry. These 4800V pockets limit the operational as well as the circuit configuration, and load serving capability. The primary concern with the 4800V circuitry is the age. Central Hudson abandoned the practice of installing 4800V circuitry in the 1940s. Much of the area infrastructure is over 70 years old and has exceeded its useful life. Central Hudson has roughly 146 miles of 4800V circuitry.

Solution

A conversion program was developed to the eliminate 4800V aging infrastructure. The program focuses on upgrading 4800V mainline circuitry to 13.2kV operation. A particular focus is placed on developing projects that eliminate overloaded, step-down transformer banks in order mitigate thermal and infrastructure concerns, as well as remove any of the other potential hazards associated with 4800V circuitry.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$11,050,000	$1,331,000	$1,472,000	$1,626,000	$3,222,000	$3,399,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☑ Thermal/Load Serving Capability
  - ☑ Equipment Type
  - ☑ Current % loaded
- ☑ Voltage (Stray, Low, High)
- ☑ Power Quality

Other

Risk Reduction

Safety

- ☑ Employee Safety: Upgrading to a 13.2kV Wye system minimizes associated risks
- ☑ Public Safety: Upgrading to a 13.2kV Wye system minimizes associated risks
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure ___ years
- ☑ Failure Rates
- ☑ Obsolete/ Unserviceable Equipment
- ☑ Condition
- ☑ Accessibility (Off Road, underground)
- ☑ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☑ $/COA (with storm)
- ☑ $/CMA (with storm)
- ☑ Customer Cost of Outage (ICE Calculator)
- ☑ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: CEMI / Worst Circuit Reliability Program

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

Central Hudson maximizes its reliability improvement efforts through continuous analysis and planning, but historic data shows that specific circuits and "pockets" of customers tend to experience a significantly higher frequency or duration of outages than average.

Solution

The CEMI (customers experiencing multiple interruptions) and Worst Performing Circuits program have been designed to help identify and develop reliability improvements for these customers. The customers experiencing the poorest of reliability are identified, and improvement projects are developed annually.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$6,176,000	$1,746,000	$1,109,000	$1,084,000	$1,104,000	$1,133,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure ____ years
- [x] Failure Rates: The program typically replaces antiquated infrastructure
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [x] Accessibility (Off Road, underground): Infrastructure is often made more accessible
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [x] $/COA (with storm)
- [x] $/CMA (with storm)
- [x] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Automation Program

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: System Enhancement

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

An aging infrastructure, an inefficient grid, rising energy costs, increased demand for uninterrupted service, clean energy goals, and increased adoption of technology (i.e. distributed generation and solar), as well as availability of more sophisticated technology, have driven the need for a reformation of the electric distribution system.

Solution

The Electric Distribution Automation program was developed in order to address these growing concerns. Through the implementation of a Distribution Management System (DMS), Central Hudson will be able to implement programs such as Volt-Var optimization (VVO), Conservation Voltage Reduction (CVR), and Fault Location Isolation and Service Restoration (FLISR). Programs such as these are aimed to lower customer energy usage, defer transmission investments, replace aging assets, incorporate modern technology, and improve customer reliability.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$34,402,000	$7,040,000	$9,320,000	$12,291,000	$5,221,000	$530,000	2,500,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Extensive work is involved in a new program
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☑ Reduced O&M: Distribution Automation will reduce O&M costs
- ☑ Reduced Customer Bill: Many of the projects are designed to reduce customer bills
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- [x] Thermal/Load Serving Capability
  - [x] Equipment Type
  - [x] Current % loaded
- [x] Voltage (Stray, Low, High)
- [x] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [x] Other Program Type Reforming the Energy Vision (REV)

Infrastructure

- [x] Average Age of Infrastructure ____ years
- [x] Failure Rates
- [x] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement
- [ ] Other Program Type

Resilience

- [x] $/COA (with storm)
- [x] $/CMA (with storm)
- [x] Customer Cost of Outage (ICE Calculator)
- [x] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: E.P. #2015-12, E.P. #2016-05

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Improvement Blankets

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Non-Discretionary

Investment Category: Daily Operations

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

Newly emerging, operational work on the distribution system must be addressed on a routine basis, such as emergency work, and CATV rebuilds and other compliance related issues.

Solution

Develop work orders to address emerging operational work.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$38,291,000	$7,059,000	$6,133,000	$8,203,000	$8,358,000	$8,538,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☑ Timing/Permitting
- ☑ Manpower
- ☐ Other

Primary Project Objective: Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Distribution improvement projects typically reduce operating and maintenance costs
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☑ Inspections
- ☐ Road Rebuild
- ☑ Joint Facilities/CATV Agreement
- ☑ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ______ years
- ☐ Failure Rates
- ☑ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☑ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Improvement Operating/Infrastructure

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID) 1551-0X

Description of Problem

One of the primary focuses of the Category 15 Capital Budget plan is to improve the reliability of the Central Hudson customers. Operational limitations in the distribution circuitry is a primary driver in the overall duration that the average customer experiences.

Solution

Operating projects are developed with the primary goal being of reducing the duration of outages. Typical projects involve developing a tie between feeders, or reconductoring the lines to make the tie stronger so more load can be reenergized through switching. Many of these projects also address aging infrastructure that does not fall under a specific program.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$16,023,000	$2,376,000	$2,001,000	$4,271,000	$3,838,000	$3,538,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☑ Reduced O&M: Operational improvements can dramatically reduce O&M costs.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
    - [ ] Equipment Type
    - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [x] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [x] Obsolete/ Unserviceable Equipment
- [x] Condition
- [x] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [x] $/COA (with storm)
- [x] $/CMA (with storm)
- [x] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Improvement - Reliability

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

One of the primary focuses of the Category 15 Capital Budget plan is to improve the reliability of the Central Hudson customers. The improvement is focused on both the frequency and duration in which a customer is without power.

Solution

Currently, projects are created according to a 5 year historical average $/COA (customer outage avoided) basis, but ancillary benefits to customer satisfaction and resiliency also are considered. Improvement projects include moving circuitry from off-road to on-road, closing gaps (i.e., new circuit ties), installing electronic reclosers, installing automatic load transfer teams, and replacing failure prone equipment.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$12,647,000	$1,573,000	$2,772,000	$2,710,000	$2,760,000	$2,832,000	TBD
Expense							

Cost Risks

- ☑ Environmental: Reliability projects must still protect environmental factors such as vegetation and wildlife
- ☑ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☑ Reduced O&M: Reliability improvement can dramatically reduce operating and maintenance costs.
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- ☐ Thermal/Load Serving Capability
  - ☐ Equipment Type
  - ☐ Current % loaded
- ☐ Voltage (Stray, Low, High)
- ☐ Power Quality

Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☑ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure ___ years
- ☑ Failure Rates: Engineering analysis determines equipment with a high failure rate
- ☑ Obsolete/ Unserviceable Equipment
- ☑ Condition
- ☑ Accessibility (Off Road, underground)
- ☑ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☑ $/COA (with storm)
- ☑ $/CMA (with storm)
- ☑ Customer Cost of Outage (ICE Calculator)
- ☑ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Improvement - Thermal/Voltage

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Growth

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

Load growth in a particular area may cause equipment to exceed its thermal ratings or load serving capabilities. Additionally, overloaded equipment has a tendency to fail which can be a safety concern and compromises customer reliability.

Solution

Load relief projects are often recommended to mitigate the loading, thermal, and voltage concerns. Polyphasing, reconductoring, or building new lines also are examples of projects that could fall under this line item.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$12,070,000	$2,712,000	$2,716,000	$2,168,000	$2,208,000	$2,266,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☑ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Mitigating loading concerns typically reduces O&M costs
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- ☑ Thermal/Load Serving Capability
  - ☑ Equipment Type
  - ☑ Current % loaded
- ☑ Voltage (Stray, Low, High)
- ☑ Power Quality

Other

Risk Reduction

Safety

- ☑ Employee Safety: Properly sized equipment mitigates safety concerns with overloads
- ☑ Public Safety: Properly sized equipment mitigates safety concerns with overloads
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Road Rebuild
- ☐ Joint Facilities/CATV Agreement
- ☐ NESC Codes
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☑ Failure Rates
- ☐ Obsolete/ Unserviceable Equipment
- ☐ Condition
- ☐ Accessibility (Off Road, underground)
- ☐ Strategic Replacement
- ☐ Other Program Type

Resilience

- ☐ $/COA (with storm)
- ☐ $/CMA (with storm)
- ☐ Customer Cost of Outage (ICE Calculator)
- ☑ Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: Distribution Pole Replacement Program

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Non-Discretionary

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

Much of the Central Hudson pole plant is antiquated and undersized. Many of the poles have been exposed to rot, woodpeckers, and other weather related decay. As the poles weaken, their likelihood of failure dramatically increases. Weak and failing poles are a key driver in decreasing customer reliability.

Solution

As a result of our Distribution Inspections program, defective poles are identified and replaced based on the severity rating of the deficiency. Projects are evaluated for other incremental system benefits, such as relocating pole on road or designing to NESC Grade B construction. Additionally, other poles may be replaced due to a violation of Central Hudson Electric Construction Standards, NESC, IEEE, and other national and international standards.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$17,398,000	$1,952,000	$2,217,000	$3,252,000	$4,878,000	$5,098,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☑ Reduced O&M: Pro-active replacement of equipment greatly reduces the O&M costs
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [x] Public Safety: Larger, stronger poles decreases public exposure
- [ ] Other Program Type

Compliance

- [x] Inspections: Pole inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [x] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure ___ years
- [x] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition: Replaces failure prone poles
- [x] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [x] $/COA (with storm)
- [x] $/CMA (with storm)
- [x] Customer Cost of Outage (ICE Calculator)
- [x] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: New Union Avenue 4049 Circuit

Form submitted by: Angelo Onevelo

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Growth

Number of Customers Affected: 764

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID) N-2017-01

Description of Problem

The Coldenham 4027 circuit has consistently reached or exceeded its 6/9 MVA design criteria. The circuit has historically been classified as a 9/12 MVA circuit, but further review has shown that the circuit only has a design rating of 6/9 MVA. The circuit has peaked over its design criteria in 2013, 2014 and 2015 at 8.62 MVA, 7.28 MVA and 7.10MVA respectively. Load shifting capabilities are severely limited in this area due to the current circuit loading. Due to the expansive load growth in the area of Rt. 17K and Rt. 300, additional load support is needed.

Amerisource (Matrix) is developing a distribution center on Rt. 17K on the east side of I-87. Their demand load is expected to reach 1,450 kVA when the property is completely developed. Currently, the Coldenham 4027 circuit feeds this area. Because of the current circuit loading stated above, the 4027 cannot handle the proposed load from Amerisource.

Solution

Utilization of the former UN or UW breaker positions at the Union Avenue Substation is a possible solution. A new distribution circuit can exit the substation utilizing the UN or UW underground cable path on the back side of the substation as an express feed to Rt. 17K. The circuit should rise on Hillside Ave. and begin heading west as double circuit construction with the Union Ave. 4045 circuit for 0.2 miles. The circuit will then run north along an existing ROW towards the Verizon communications tower for 0.5 miles. A continuation of the ROW will need to be cleared for 0.15 miles to meet up with the existing pole plant on the north side of the Verizon communications tower. The circuit will continue 0.85 miles north along Ellis Ave utilizing an existing pole line. The circuit will then head west along Little Britain Rd. for 0.30 miles as double circuit construction with the Union Ave. 4047 circuit. This new construction will take over the circuitry feeding north on Wisner Ave. and east on 17K to offload the 4027 circuit. A Viper recloser will also be added to the circuit.

The express feed should be comprised of 556 WR ACSR open wire with a 336 Bare ACSR neutral for the entirety of the project. This project will also require 0.8 miles of reconductoring along Rt. 17K. from Wisner Ave. to Dalfonso Rd. The reconductoring will consist of 556 ACSR Bare wire with a 336 Bare ACSR neutral.
See Attachment #1.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	1,115,000	1,115,000					
Expense							

Cost Risks

- ☑ Environmental: Extensive ROW Trimming will be needed.
- ☑ Timing/Permitting: Need to acquire joint pole use through ROW. Network Strategy is working on it.
- ☐ Manpower
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [x] Thermal/Load Serving Capability
  - [x] Equipment Type: Conductor (336 Spacer)
  - [x] Current % loaded: 77%
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ___ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: N-17-06: Extend Circuitry 1.6 Miles Underground Along Rt. 17K

Or

Project Alternatives Considered

Three distribution alternatives were considered and this proposed alternative proved to be the least costly solution.

Decision criteria for alternative selection

1. Survey work as already begun in this area on Rt. 17K. Initial project work has been completed due to the arrival of Amerisource (Matrix Properties) on Rt. 17K.

2. In order for this alternative circuit design to come to fruition, most of the poles from the Union Avenue Substation to Rt. 17K would need to be replaced to accommodate the double circuit construction. Along Union Avenue, the circuitry would be placed in a triple circuit design. This would be placing the vulnerability of the circuits at risk. This alternative project would require 3 circuit miles, which is equal to the ROW option.

3. Reconductoring along Rt. 17K would increase the design criteria of the Coldenham 4027 circuit to 9/12 MVA. This would increase circuit capacity by 1.5 MW. Switching capabilities would still be greatly limited due to the still limited capacity on the circuit. Load growth is still expected in this area.

Budget Submittal Form for Electric Projects

Project Name: Extend Circuitry 1.6 Miles Underground Along Rt. 17K

Form submitted by: Angelo Onevelo

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Growth

Number of Customers Affected: 147

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID) N-2017-06

Description of Problem

The area around Rt. 17K and Rt. 300 in the Town of Newburgh has seen substantial load growth in recent years. The Bethlehem Road 4092 circuit is the primary circuit that feeds this load pocket along Rt. 300. In 2013, the 4092 circuit peaked at 5.37 MVA. Switching options are greatly limited during peak times. The Coldenham 4027 circuit is the circuit that feeds down Rt. 17K on both the east and west sides of I-87. This circuit has consistently peaked over its 6/9 MVA design criteria in 2013, 2014 and 2015 at 8.62 MVA, 7.29 MVA and 7.10 MVA respectively. A budget project currently scheduled for 2017 (N-2017-01) will offload 3 MW from the Coldenham 4027 circuit. Once this work is completed, the 4027 circuit will peak at approximately 4.5 MW. With the additional load from Amerisource (Matrix) in 2017, the circuit will peak at approximately 5.9 MVA. With this additional loading from Amerisource (Matrix), additional load growth will be limited due to available circuit capacity in the area.

Solution

In order to meet the demand of future expected load growth, it is proposed to extend the 4025 circuit from Governor's Drive to the intersection of Rt. 17K and Rt. 300. This circuit extension would be comprised of underground conduit construction and would run for approximately 1.6 miles. This will allow of utilization of the lightly loaded Coldenham 4025 circuit. This will also allow for the development of expected load growth in the Rt. 17K and Rt. 300 area.

This project will fall within the criteria for non-wires alternatives.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	1,600,000	1,600,000					
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Service

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☐ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [x] Thermal/Load Serving Capability
  - [x] Equipment Type: Conductor
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [ ] Condition
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: B, F, & R Cables

Form submitted by: N. Conza

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected:

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID) N-2017-08

Description of Problem

The B, F & R cables that feed the Montgomery Street Substation are mostly comprised of PILC cables. Sections of these cables were installed between 1928 and 1956. Numerous repairs have been made to these cables over the years due to leaking lead splices. In 2015, a major repair was performed on 3 simultaneous leaks in the same manhole. The infrastructure is just as old as the cables and is in poor condition. The 4" fiber duct configuration has resulted in the lead cables being stacked on each other in each manhole. A major failure of one of the cables could potentially result in loss of all three cables. Of the 3 spare ducts in this duct bank, only 2 are available due to a collapse and failed cable pull. The structural integrity of these aging fiber ducts cannot and should not be relied on for new cables.

Solution

Construct a new duct bank and replace the B, F & R cables up to I84 between 2018 and 2026. Continuation south of I84 shall be evaluated in 2022 and assigned a new Newburgh project ID number.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$11,750,000	$1,000,000	$1,500,000	$1,000,000	$1,500,000	$1,250,000	$5,500,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☐ $/COA
- ☐ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☐ 5 Year Average Duration of Outages

Customer Satisfaction

- ☐ Complaints
- ☐ Critical Customers
- ☐ LSA Customers
- ☐ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure 88 years
- [ ] Failure Rates
- [ ] Obsolete/ Unserviceable Equipment
- [x] Condition Cables and ducts are aging and in poor condition. Leaks found during inspections.
- [ ] Accessibility (Off Road, underground)
- [ ] Strategic Replacement
- [ ] Other Program Type

Resilience

- [ ] $/COA (with storm)
- [ ] $/CMA (with storm)
- [ ] Customer Cost of Outage (ICE Calculator)
- [ ] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study: E.P. #2011-001

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Electric Projects

Project Name: URD Replacement

Form submitted by: Chris Ritacco

Budget Group: 15 - Distribution Improvements

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: Varies

For Category 15 only: Budget Year Submitted 2017

Project ID (District-YYYY-ID)

Description of Problem

Many of the aged underground residential developments (URDs) are beginning to experience underground cable failures. When URD faults occur, they are particularly harmful to reliability due to the normally high customer count and extensive repair times.

Solution

Central Hudson continues to pro-actively monitor and address URD replacements on a targeted basis. Aging URDs with higher customer counts are primarily targeted in order to maximize the reliability improvement.

Cost estimate (include AFUDC if appropriate)

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,709,000	$0	$532,000	$0	$1,044,000	$1,133,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☑ Other: digging

Primary Project Objective Service

Benefits

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Service

Non-Storm Reliability

- ☑ $/COA
- ☑ 5 Year Average # Outages Avoided

Non-Storm Operating

- ☑ $/CMA
- ☑ 5 Year Average Duration of Outages

Customer Satisfaction

- ☑ Complaints
- ☑ Critical Customers
- ☑ LSA Customers
- ☑ Public Relations Considerations

Service Standards

- [ ] Thermal/Load Serving Capability
  - [ ] Equipment Type
  - [ ] Current % loaded
- [ ] Voltage (Stray, Low, High)
- [ ] Power Quality

Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Road Rebuild
- [ ] Joint Facilities/CATV Agreement
- [ ] NESC Codes
- [ ] Other Program Type

Infrastructure

- [x] Average Age of Infrastructure ____ years
- [x] Failure Rates: URD cable is a common equipment failure
- [x] Obsolete/ Unserviceable Equipment
- [x] Condition: replaces failure prone cable
- [ ] Accessibility (Off Road, underground)
- [x] Strategic Replacement
- [ ] Other Program Type

Resilience

- [x] $/COA (with storm)
- [x] $/CMA (with storm)
- [x] Customer Cost of Outage (ICE Calculator)
- [x] Grade B Construction

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

GAS PROGRAM INDIVIDUAL PROJECT SUBMITTAL

Budget Submittal Form for Gas Projects

Project Name: Remote Operated Valves, Project 22-4

Form submitted by: Tera Stoner

Recommended In-Service Year: 2017 through 2021

Budget Group: 22 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: 0

Description of Problem

Gas system: Transmission

Gas pressure: 512 psi through 750 psi

Existing pipe size and material:

Proposed length replacement:

The US Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHSMA) will mandate in the near future operators of natural gas transmission lines to have in-service line valves capable of remote operation to isolate a section of main should there be a rupture. In this way, PHSMA hopes to reduce the response time and contain the situation in a timely manner. Central Hudson only has manually operated valves where a crew must travel to the line valve's location and physically close the valve.

Solution

Proposed size: uncertain

In 2016, there are several aspects of the project to be analyzed. Central Hudson would ideally re-configure or modify current line valves already in-service for remote operation capabilities. First, the location of valves relative to high population densities will be identified to prioritize which valves should be modified and when. Second, the pneumatic devices and actuator shall be chosen. It is hopeful the gear hand wheel can be removed and the new pneumatic actuator can be applied. Third, the RTU and communication strategy shall be chosen. The communication strategy should be in line with Central Hudson's current Network Strategy plans.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,474,000	$152,000	$209,000	$434,000	$772,000	$907,000	
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [x] Other: New technology being applied on company equipment for the first time.

Primary Project Objective

Risk Reduction

Benefits

Economic

- [ ] Reduced O&M
- [ ] Replacement
- [ ] Reinforcement
- [ ] Road Rebuild
- [ ] Other

Service

Reliability

- [ ] Radial feed
- [ ] Loop tie

Gas Safety

- Pipeline type
- Number of closed leaks in past 10 years
  - Number of hazardous (Class 1, 2A and 2)
- Number of active leaks
- Length of leak prone pipe eliminated
- Number of high pressure service replacement
- Number of isolated service replacement

Customer Impact

- [ ] Complaints
- [ ] Critical Customers
- [ ] Public Relations Considerations

Other

Risk Reduction

Safety

- [x] Reduce risk of incident
- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Benefits

Compliance

- [x] Central Hudson Inspections
- [x] Elimination of Integrity Related Issues
- [ ] Other Program Type

Infrastructure

1950 to present Infrastructure year installed

Number of Services

- [ ] Indoor meter sets
- [ ] Metallic

- [ ] Obsolete/ Unserviceable Equipment
- [ ] Strategic Replacement
  - [ ] Flood zone
  - [ ] Main feeder route
  - [ ] Low pressure system
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

It is assumed the current gear box on a line valve can be removed and an actuator applied. However, the TP and the AH Line was installed between 1950 and 1960 and current valve actuator models may not be compatible with valves of this age. In this case, Gas & Mechanical will analyze if a new valve assembly will be required taking advantage of a launch port for internal integrity testing tools. In this case it may cost $300,000 to $400,000 per valve for the manual to remote operated conversion. After analyzing several white papers discussing the issue, Gas & Mechanical Engineering recommends a line valve can only be activated by a System Operator. Other companies are proposing to use line break sensors, which are not feasible for Central Hudson's system which allows

Decision criteria for alternative selection

distribution regulator stations to feed from the transmission main itself.

Budget Submittal Form for Gas Projects

Project Name: Poughkeepsie Receival TP Line Feed, Project 22-7

Form submitted by: Tera Stoner

Recommended In-Service Year: 2018

Budget Group: 22 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: 0

Description of Problem

Gas system: MP Line to TP Line

Gas pressure: 750 psi to 512 psi

Existing pipe size and material: various

Proposed length replacement: uncertain

Currently the line valve controlling pressure between the MP Line and the TP Line is both the pressure controller and the over-pressure monitor. There is a risk that if the control valve fails, there is no over-pressure protection for the TP Line. The risk is low because System Operations usually maintains the transmission system pressure between 400 and 450 psi, which is below the MAOP of the TP Line. The feed to the 60 psi regulators is sourced downstream of the control valve. If System Operations had to close the MP Line valve at Poughkeepsie Receival and the TP Line Valve at the West Shore Flow Station to protect the TP Line River Crossing, the feed to the 60 psi regulators will be stopped. These regulators support a major feed to the PN Line and Poughkeepsie's medium and low pressure distribution systems and cannot undergo an interruption.

Solution

Proposed size: uncertain

A second control valve should be installed to monitor pressure downstream of the current control valve to provide over-pressure protection to the TP Line. In addition the feed to the 60 psi regulators shall be moved to upstream of the control valves. With this relocation, the inlet to the 60 psi regulators will need to be uprated for 750 psi MAOP. At the same time, any upgrades to the field equipment reporting to SCADA will be made. The station's SCADA equipment will receive a battery power supply to provide alternative power during service interruptions.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,178,000		$1,178,000				
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☑ Other: This project will occur in a former MGP Site.

Primary Project Objective

Risk Reduction

Benefits

Economic

- ☐ Reduced O&M
- ☐ Replacement
- ☑ Reinforcement
- ☐ Road Rebuild
- ☐ Other

Service

Reliability

- ☐ Radial feed
- ☐ Loop tie

Gas Safety

- Pipeline type:
- Number of closed leaks in past 10 years:
    - Number of hazardous (Class 1, 2A and 2):
- Number of active leaks:
- Length of leak prone pipe eliminated:
- Number of high pressure service replacement:
- Number of isolated service replacement:

Customer Impact

- ☐ Complaints
- ☐ Critical Customers
- ☐ Public Relations Considerations

Other

Risk Reduction

Safety

- ☐ Reduce risk of incident
- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Benefits

Compliance

- ☐ Central Hudson Inspections
- ☐ Elimination of Integrity Related Issues
- ☐ Other Program Type

Infrastructure

1969 Infrastructure year installed

Number of Services

  - ☐ Indoor meter sets
  - ☐ Metallic

- ☐ Obsolete/ Unserviceable Equipment
- ☐ Strategic Replacement
  - ☐ Flood zone
  - ☐ Main feeder route
  - ☐ Low pressure system
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

As this project occurs within a former MGP Site, there is sensitivity working within possible contaminated soils. Gas & Mechanical Engineering will work with Environmental Services to ensure all safety guidelines are met. It may be more cost effective to relocate the station and line valves all together to the top tier of the property where the former Propane-Air Plant was situated to avoid any conflicts with the MGP Remediation work.

Decision criteria for alternative selection

Budget Submittal Form for Gas Projects

Project Name: Pipeline Integrity, Project 22-9

Form submitted by: Tera Stoner

Recommended In-Service Year: 2017 through 2021

Budget Group: 22 - Transmission

Summary Category: Maintain System Standards

Investment Category: Infrastructure

Number of Customers Affected: 0

Description of Problem

Gas system: various

Gas pressure: 512 psi to 750 psi

Existing pipe size and material: various

Proposed length replacement: various

Funds reserved for instances where inspections under the Pipeline Integrity Program may require a pig launch, replacement of pipe, erosion mitigation, ROW security gates, or resolution of easement issues.

Solution

Proposed size: uncertain

For each instance require capital funding for a possible pig launch, replacement of pipe, erosion mitigation, ROW security gates, or resolution of easement issues, all work is analyzed and designed to provide the most cost effective approach. Majority of construction work is competitively bid besides where specialty services may be required such as those provided by Pipetel or TDW Services.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,375,000	$117,000	$209,000	$287,000	$349,000	$413,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☑ Other: Scope may vary greatly for work considering factors such as ROW accessibility, specialized service pricing, length and size of piping affected.

Primary Project Objective

Service

Benefits

Economic

- ☐ Reduced O&M
- ☐ Replacement
- ☐ Reinforcement
- ☐ Road Rebuild
- ☐ Other

Service

Reliability

- ☐ Radial feed
- ☐ Loop tie

Gas Safety

- ☐ Pipeline type
- ☐ Number of closed leaks in past 10 years
  - ☐ Number of hazardous (Class 1, 2A and 2)
- ☐ Number of active leaks
- ☐ Length of leak prone pipe eliminated
- ☐ Number of high pressure service replacement
- ☐ Number of isolated service replacement

Customer Impact

- [ ] Complaints
- [ ] Critical Customers
- [ ] Public Relations Considerations

Other

Risk Reduction

Safety

- [x] Reduce risk of incident
- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Benefits

Compliance

- [x] Central Hudson Inspections
- [x] Elimination of Integrity Related Issues
- [ ] Other Program Type

Infrastructure

1950-present Infrastructure year installed

Number of Services

- [ ] Indoor meter sets
- [ ] Metallic

- [ ] Obsolete/ Unserviceable Equipment
- [ ] Strategic Replacement
  - [ ] Flood zone
  - [ ] Main feeder route
  - [ ] Low pressure system
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

For each instance require capital funding for a possible pig launch, replacement of pipe, erosion mitigation, ROW security gates, or resolution of easement issues, all work is analyzed and designed to provide the most cost effective approach. Majority of construction work is competitively bid besides where specialty services may be required such as those provided by Pipetel or TDW Services.

Decision criteria for alternative selection

Budget Submittal Form for Gas Projects

Project Name: Poughkeepsie Receival Rebuild, Project 23-10

Form submitted by: Tera Stoner

Recommended In-Service Year: 2018

Budget Group: 23 - Regulator Stations

Summary Category: System Enhancement

Investment Category: Infrastructure

Number of Customers Affected: 0

Description of Problem

Gas system: TP System to PN Line

Gas pressure: 512 psi to 60 psi

Existing pipe size and material: various

Proposed length replacement: various

The rebuild of the MP to TP Line control valve also affects the inlet configuration to the regulator runs where pressure is reduced from transmission level to 60 psi to feed the PN Line, PMP System, and PLP System. This rebuild must also coincide with remediation work of the former MGP site. Initial discussion with Environmental Services may require the station to be relocated to the eastern edge of the gas regulator yard to allow for remediation work to be conducted clear of piping. However, it may be more appropriate to relocate the station completely to the upper tier. Regulator runs shall be reconfigured to upgrade the existing heater, correct flange classifications, upgrade from Axial Flow Valve Regulators to modern fully supported regulators while also meeting the needs of the capacity load adjustments driven by Distribution Improvement Projects.

Solution

Proposed size: uncertain

As studies are completed realizing the effects Distribution Improvement Projects have on station load, piping shall be sized according to these requirements. Likely an 8-inch outlet header will be required following a 6-inch inlet header for the 60 psi pressure control runs. A heater and filter will also be incorporated. The header sizes for the medium pressure regulator runs will likely be 8-inch for the inlet header and 10-inch for the outlet header. The header sizes for the low pressure regulator runs will likely be 8-inch for the inlet header and 16-inch for the outlet header. The pressure control regulators and over pressure monitor devices will be fully supported models.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,291,000	0	0	$528,000	$324,000	$439,000	0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☑ Other: Work scope will be in conjunction with the environmental remediation work for the former MGP site. Piping layout, and scope of work may vary depending on the NYS DEC requirements for the property.

Primary Project Objective

Service

Benefits

Economic

- ☐ Reduced O&M
- ☑ Replacement
- ☐ Reinforcement
- ☐ Road Rebuild
- ☐ Other

Service

Reliability

- ☐ Radial feed
- ☐ Loop tie

Gas Safety

- ☐ Pipeline type
- ☐ Number of closed leaks in past 10 years
  - ☐ Number of hazardous (Class 1, 2A and 2)
- ☐ Number of active leaks
- ☐ Length of leak prone pipe eliminated
- ☐ Number of high pressure service replacement
- ☐ Number of isolated service replacement

Customer Impact

- ☐ Complaints
- ☐ Critical Customers
- ☐ Public Relations Considerations

Other

Risk Reduction

Safety

- ☐ Reduce risk of incident
- ☑ Employee Safety
- ☑ Public Safety
- ☐ Other Benefits

Compliance

- ☐ Central Hudson Inspections
- ☐ Elimination of Integrity Related Issues
- ☐ Other Program Type

Infrastructure

1969 Infrastructure year installed

Number of Services

- ☐ Indoor meter sets
- ☐ Metallic

- ☐ Obsolete/ Unserviceable Equipment
- ☐ Strategic Replacement
  - ☐ Flood zone
  - ☐ Main feeder route
  - ☐ Low pressure system
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

As the work scope of this project shall be done in conjunction with the former MGP Site Remediation and MP Line - TP Line interconnect adjustment. Station layout and construction sequence will be analyzed to minimize any service interruption to the PN Line.

Decision criteria for alternative selection

Budget Submittal Form for Gas Projects

Project Name: Leak Prone Pipe Replacement Projects

Form submitted by: K. Reer

Recommended In-Service Year: 2017 to 2021

Budget Group: 25 - Distribution Improvements

Summary Category: Non-Discretionary

Investment Category: Compliance

Number of Customers Affected: 77,000

Description of Problem

Gas system: Low, Medium and High Pressure Systems -

Gas pressure: Various

Existing pipe size and material: Program applies to all Bare steel, wrought iron, and cast iron piping materials

Proposed length replacement: 14.0 Miles

Central Hudson has an inventory of approximately 220 miles of gas distribution pipe considered "leak prone". This piping has been identified the the most recent rate case as requiring replacement. The settlement order set aside funding per the following race case order excerpt:

"The Company agrees to capital expenditures for the replacement or elimination of Leak Prone Pipe at a cost of $1.4 million per mile for 2016; $1.5 million per mile for 2017; and $1.6 million per mile for 2018. The Company further agrees to the following targets for the replacement or elimination of Leak Prone Pipe: a) 13 miles for 2016; b) 14 miles for 2017; and c) 15 miles for 2018. The Company shall maintain the 2018 pipe target until such time as it is changed by the Commission."

Applies to Funding Account 2-2580-00-YY

Solution

Proposed size: This funding project is for Neighborhood LPP Project specific work orders.

2017: BN Line Replacement: $4,805 (k), Cornwall - Faculty Row: $867, Bement Avenue: $2,515, Fullerton to Robinson; $3,137, Jefferson Heights: $1,845.

Projects for years 2018 to 2021 have been tentatively identified and required funding detail provided in the spreadsheet.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$107,517,000	$13,169,000	$21,137,000	$21,607,000	$25,494,000	$26,110,000	$323,517,000
Expense	$3,250,000	$750,000	$750,000	$750,000	$750,000	$750,000	$7,200,000

Cost Risks

☐ Environmental

☐ Timing/Permitting

☐ Manpower

☐ Other

Primary Project Objective

Risk Reduction

Benefits

Economic

☐ Reduced O&M

☑ Replacement — Per rate case orders, elimination of risk and reduction of operating expense

☐ Reinforcement

☐ Road Rebuild

☐ Other

Service

Reliability

☐ Radial feed

☐ Loop tie

Gas Safety

D — Pipeline type

N/A — Number of closed leaks in past 10 years

N/A — Number of hazardous (Class 1, 2A and 2)

100+ — Number of active leaks

14.0 — Length of leak prone pipe eliminated

0 — Number of high pressure service replacement

Number of isolated service replacement

Customer Impact

- [ ] Complaints
- [ ] Critical Customers
- [ ] Public Relations Considerations

Other

Risk Reduction

Safety

- [x] Reduce risk of incident
- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Benefits

Compliance

- [ ] Central Hudson Inspections
- [x] Elimination of Integrity Related Issues
- [ ] Other Program Type

Infrastructure

1875 + Infrastructure year installed

1000/yr Number of Services

  - [ ] Indoor meter sets
  - [x] Metallic

- [ ] Obsolete/ Unserviceable Equipment
- [ ] Strategic Replacement
  - [ ] Flood zone
  - [x] Main feeder route
  - [x] Low pressure system
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Gas Projects

Project Name: Service Replacement and Minor Projects

Form submitted by: K. Reer

Recommended In-Service Year: 2017 to 2021

Budget Group: 25 - Distribution Improvements

Summary Category: Non-Discretionary

Investment Category: Compliance

Number of Customers Affected: 77,000

Description of Problem

Gas system: Low, Medium and High Pressure Systems -

Gas pressure: Various

Existing pipe size and material: Funding program is for minor main projects and service replacements system-wide

Proposed length replacement: N/A

Central Hudson has approximately 60,000 gas service lines and 1250 miles of gas distribution pipe. Minor property unit replacement projects for mains and service line replacements are performed as a normal part of operations. Significant numbers of service lines are replaced as an integral part of the LPP replacement program, the requirements for which are Set forth in the following excerpt.

"The Company agrees to capital expenditures for the replacement or elimination of Leak Prone Pipe at a cost of $1.4 million per mile for 2016; $1.5 million per mile for 2017; and $1.6 million per mile for 2018. The Company further agrees to the following targets for the replacement or elimination of Leak Prone Pipe: a) 13 miles for 2016; b) 14 miles for 2017; and c) 15 miles for 2018. The Company shall maintain the 2018 pipe target until such time as it is changed by the Commission."

Solution

Proposed size: This funding project is for Blankets and Service Replacement Limited Terms.

2017: Service replacements - normal operational needs: $1,435, Service replacements - associated with pipeline replacement work (LPP): $3,264, Service replacements - isolated steel services; $538, Blanket work orders - minor units; $524. Total 2017 funding; $5,761.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$35,407,000	$5,761,000	$7,782,000	$7,292,000	$7,292,000	$7280,000	$73,000,000
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective

Risk Reduction

Benefits

Economic

- [x] Reduced O&M: New pipe reduces leak repair costs
- [x] Replacement: Per rate case orders, elimination of risk and reduction of operating expense
- [ ] Reinforcement
- [ ] Road Rebuild
- [ ] Other

Service

Reliability

- [ ] Radial feed
- [ ] Loop tie

Gas Safety

D	Pipeline type
N/A	Number of closed leaks in past 10 years
N/A	Number of hazardous (Class 1, 2A and 2)
100+	Number of active leaks
	Length of leak prone pipe eliminated
	Number of high pressure service replacement
	Number of isolated service replacement

Customer Impact

- [ ] Complaints
- [ ] Critical Customers
- [ ] Public Relations Considerations

Other

Risk Reduction

Safety

- [x] Reduce risk of incident
- [ ] Employee Safety
- [x] Public Safety
- [ ] Other Benefits

Compliance

- [ ] Central Hudson Inspections
- [x] Elimination of Integrity Related Issues
- [ ] Other Program Type

Infrastructure

Infrastructure year installed

1000/yr Number of Services

- [ ] Indoor meter sets
- [x] Metallic

- [ ] Obsolete/ Unserviceable Equipment
- [ ] Strategic Replacement
  - [ ] Flood zone
  - [ ] Main feeder route
  - [ ] Low pressure system
- [ ] Other Program Type

Other

Move indoor service lines outdoors wherever possible, install EFVs on pounds pressure service lines, reduce or eliminate the approximately 17000 LPP services in inventory and reduce leak survey and repair costs, reduce risk, improve system capacity.

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

COMMON PROGRAM INDIVIDUAL PROJECT SUBMITTAL

Budget Submittal Form for Common Projects

Project Name: Distribution Management System Phase I and Phase II

Form submitted by: Christine Robertson & Erica Tyler

Budget Group: 4230 - EMS

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

Central Hudson does not currently have the capability to remotely monitor and control its electric distribution system from a central location under a single operating authority. This deficiency precludes the ability to implement applications such as VVO and FLISR. The same applies to the existing gas distribution system where the deficiency precludes the ability to implement pressure control alarming that could provide faster response to rising pressures during peak conditions.

DMS Phase II requires additional work tied to advanced applications and final acceptance payment for the DMS. This was separated out of the initial DMS project per accounting as it is expected that this will not be completed until after the system goes into production.

Solution

Central Hudson is installing a Distribution Management System (DMS) which incorporates distribution level SCADA (Supervisory Control and Data Acquisition) with additional applications that allow for alerting, monitoring, and control of the electric and gas distribution networks. Additional electric applications including Switch Order Management, Volt Var Optimization (VVO) and Fault Location Isolation and Restoration (FLISR) are possible with this complex system. Central Hudson will also use the data acquisition and supervisory control capabilities of the new DMS to monitor and control its gas distribution system and improve the overall efficiency of its gas distribution operations. By allowing for remotely monitored and controlled system pressures, this reduces the risk of rising above MAOP and therefore reducing associated violation penalties.

The plan for the implementation of the DMS is staged based on opportunities at the several sections of the service territory. Implementation will be focused initially in Lower Hudson following the Distribution Automation and Network Strategy projects to get optimal benefits provided by implementing these applications.

Continuing work on the DMS applications in Phase II will lead up to the final acceptance payment of the DMS. This work includes fine tuning of Fault Location Isolation and Restorations (FLISR) and Volt Var Optimization (VVO) that is expected after system implementation and prior to final acceptance of the system.
This project is consistent with the Grid Modenization Road-map.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Definitive Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,278,000	$1,278,000					
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Resource availability due to additional work load and projects.
- ☑ Other: Quality risk due to inaccurate and/or missing GIS data for the Network Model. Communication Risk due to cultural differences, lack of feedback, and\or slow response.

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☑ Reduced Customer Bill: Volt-Var Optimization application to achieve customer energy reduction
- ☑ Other: Reductions in customer outages as FLISR is implemented.

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☑ Other Program Type: Installation of new Hardware

Other

The DMS has five separate environments: Primary Control Center, Backup Control Center, Quality Assurance, Program Development and Operator Training Simulator. The Primary Control Center and Backup Control Center environments are highly reliable, fully redundant, scalable, and contain stringent security features to prevent access by unauthorized personnel.

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Central Hudson issued a request for proposals for the DMS in March 2015 to five vendors.

Decision criteria for alternative selection

The vendor and system evaluation process employed used a systematic top down approach starting with generalized functional requirements, a wide field of potential DMS vendors and based on sound criteria and team scoring, working through to a final selection. In conclusion, the Schneider ADMS solution was the appropriate choice for CHG&E.

Budget Submittal Form for Common Projects

Project Name: EMS Software Upgrade (Non-JUMP)

Form submitted by: Erica Tyler

Budget Group: 4230 - EMS

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

To maintain reliable operations of the Energy Management System (EMS) by upgrade existing aging GE PowerOn Reliance EMS hardware and software or replace existing aging GE system with a new system vendor.

Solution

This is a placeholder for the next required upgrade of the existing EMS system. Decision is dependent upon the direction of the EMS software now that the GE/Alstom merger is complete. Evaluation of possible EMS systems will be completed in 2020 with the system updated or new EMS implemented in 2021.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$4,542,000				$109,000	$4,434,000	
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [x] Other: Depending on the reliability and functionality of the future hybrid GE/Alstom system, CH may choose to move forward with an EMS system replacement. This could impact cost of the project.

Primary Project Objective: Service

Benefits:

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Code Requirement/PSC
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/Unserviceable Equipment
- [ ] Condition
- [ ] Strategic Replacement
- [ ] Other Program Type

Other

Provide a reliable Energy Management System for operations to monitor and operate the Electric and Gas Transmission systems and maintain strict compliance for system security.

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: EMS/DMS - Bldg 810 Redesign

Form submitted by: Erica Tyler

Budget Group: 4230 - EMS

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

The Distribution Management System will require a 24/7 Control Operations Center within a secured Physical Security Perimeter. Additionally, current and future staffing levels has exceeded the available work space within the existing secured area that is necessary for these control systems.

Solution

A partial and tentative work order exists for this project and Central Hudson is currently working with a consultant to begin preliminary discussions of this future control center. In 2017 this work will continue with an architect to determine best configuration and begin determination of required budget for the project.

These conceptual place holders were developed using general cost estimates and will require further evaluation.

The following projects are as a result of the redesign of the existing Bldg 810

DMS - DSO work area Bldg 810 S1 - New space for Distribution System Operators
EMS PCC Map-board Replacement (Video Wall) - Replacement of Aging Tile Map-board
EMS DTS Video Wall/Blackboard Software - Operator Training Enhancements - Training enhancement

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	TBD	$357,000	$1,562,000	TBD			
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [x] Other: This work is subject to coordination with system operations.

Primary Project Objective: Service

Benefits:

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [x] Other: Increased situational awareness and coordination between Transmission and Distribution System Operators.

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Code Requirement/PSC
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ____ years
- [ ] Failure Rates
- [ ] Obsolete/Unserviceable Equipment
- [ ] Condition
- [ ] Strategic Replacement
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Analysis is currently being conducted with Bilfinger Mauell.

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Bill Redesign - OT Streamserve

Form submitted by: Surekha Jadhav

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Infrastructure

Description of Problem

Current bill is limited in options to display additional info that customers are requesting.

Solution

Redesign the bill using s/w - the redesigned bill could be given to Kubra or any other print vendor for the paper mailings. Otherwise, based on the need to improve the overall look and flow of the bill coupled with new business models that translate to displaying new information on the bill. Evaluation will be performed against other possible alternatives includinng leveraging Kubra to do the bill redesign.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,530,000	0	$535,000	$658,000	$167,000	$172,000	TBD
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [ ] Other

Primary Project Objective Economic

Benefits:

Economic

- [ ] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Code Requirement/PSC
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ___ years
- [ ] Failure Rates
- [ ] Obsolete/Unserviceable Equipment
- [ ] Condition
- [ ] Strategic Replacement
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Business Intelligence (Cognos)

Form submitted by: Vicki Wheeler

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

The BI program was set up about 5 years ago mainly to address the data silo'd in the mainframe and also provide a solution for numerous reports that required various input sources and therefore were compiled manually into massive spreadsheets. It started out very small with only one full-time resource and an informal project management and request submission process. Now it is a formal program with a defined team and a formal project management process along with IT Steering Committee review and approval of the projects to be undertaken.

Solution

We purchased Cognos and a single Netezza box in December 2011. We hired a skilled contract resource (still on the team today) to start rolling out reports in 2012. Over time, we have built up the team to 3 contract resources and one full time CH PM and a part time Program Manager. in 2016 a second, DR/Test Netezza box was purchased. Many reports and dashboards have been implemented that provide the business areas with way more information than they have ever had before in terms of managing their work and getting visibility into patterns etc; we cannot keep up with the demand for more. The 5 year plan will be established later this year and include rolling some of the reporting up into corporate wide KPIs, pushing data out to mobile devices, creating a enterprise data framework, near real-time data updates and exploring predictive analytics.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$6,158,000	$848,000	$1,278,000	$1,315,000	$1,336,000	$1,380,000	TBD
Expense	$135,000	0	0	$45,000	$45,000	$45,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: resource availability due to additional workload, changing priorities
- ☑ Other: funding availability due to changing priorities/competing projects

Primary Project Objective: Service

Benefits:

Economic

- ☑ Reduced O&M
- ☐ Reduced Customer Bill
- ☑ Other: improved business processes, data management, visibility

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☑ Inspections: Projects implemented to monitor and manage gas inspections and
- ☑ Code Requirement/PSC: Various projects to monitor & manage code & PSC requirements
- ☑ Other Program Type: Various projects to monitor & manage operational compliance

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: CIS / REV Modernization

Form submitted by: Vicki Wheeler

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

The CIS system is a custom built mainframe application that has been in service since 1984. It handles all of the possible interactions with a customer, not just billing, A/R, payments etc. As such it is the hub for just about all other applications in use, both mainframe and otherwise. It has grown in size and complexity over the years, and requires that changes be made by analysts with a significant number of years experience dealing with the system. Most of the original programmers are no longer with Central Hudson and the few remaining are at risk of retiring in the not too distant future. Making changes to CIS can be a long process, mostly in terms of testing through everything to make sure nothing was impacted downstream and unexpectedly.

REV (Reforming the Energy Vision) came into the picture recently, and is changing the utility business. There is more regulatory activity and requirements now than ever before This means the CIS has to change along with it. Due to the points mentioned above, that is not a very agile process and can take more time than we have. For example, our REV demonstration project by the end of 2016 is going to allow customers to choose to have a smart meter installed to provide them with detailed energy analytics. It seems very likely that complex, variable time of use billing rates could come shortly thereafter, in order to allow customers to take full advantage of their new smart meters. With all of the other regulatory requirements that have been stacked up waiting for us to roll out monthly billing on July 1, 2016, it could be some time before we are able to program in house any new complex billing rates.

Solution

For the last year or so, we have been bringing in various vendors to demo their solutions to help us investigate other CIS options that would allow us to increase our CIS billing flexibility:

1. a 'bolt on' rate engine that could calculate a new complex rate value for a meter reading and pass all the info back to the existing CIS. This could include a hosted solution by another Fortis utility.
2. a new billing CIS that could store account data, process all the billing functions for the accounts with those new rates and interface with the existing CIS to pass over any required data to book.
3. a new fully functional CIS that could take certain accounts and perform all CIS processes required for that account - in effect having 2 parallel CIS systems with the assumption that all accounts would eventually over time wind up in the new CIS. At which time the existing CIS would be sunsetted.

All of these options require significant interfacing with the existing CIS so it is still unclear at this point which solution could be the best fit for us. We continue to research and bring various vendors in to perform demo's of their products. At some point in the near future we will likely select one of the vendors to come in and perform a requirements gathering workshop with us to dive more in depth into what solution(s) have the most pros and the least cons for our situation.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$10,543,000	0	$1,758,000	$2,960,000	$2,951,000	$2,874,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: resource availability due to additional workload, changing priorities, retirements
- ☑ Other: funding availability due to changing priorities/competing projects

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☑ Other: improved agility & time to market with regulatory and other billing modifications to 32 yr old CIS

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☑ Other Program Type: new rate design requirements from Public Service Commission

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☑ Condition: CIS custom software increasingly complex (mainframe HW it runs on very current)
- ☑ Strategic Replacement: Aging CIS (1984) will need full/partial replacement eventually
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

so far: Itron's rate engine, Nexant's rate engine, Oracle's CC&B (multiple vendors), hosted solution with TEP, Hansen's Nirvanasoft, an SAP hosted solution (multiple vendors).
Still in progress.

Decision criteria for alternative selection

not laid out yet.

Budget Submittal Form for Common Projects

Project Name: ECM Program

Form submitted by: Vicki Wheeler

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Compliance

Description of Problem

Records Management for electronic documents and email had been a challenge for Central Hudson for some years due to the proliferation of documents on various share drives. In 2012 an RFP was sent out to various software vendors for ECM (Enterprise Content Management) solutions and OpenText was selected. The first phase, to roll out the software to all areas of the company, was guided by the following primary objectives:

1. Increase compliance with Central Hudson's Records Management policy, and
2. Improve the efficiency of the Company's execution of legal and regulatory holds and discovery.

Since then the ECM Program was set up to implement various basic functionality in different Phases, guided by the original objectives and a 5 year plan.

Solution

The ECM Program got underway in 2012 with the purchase of the OpenText Content Server software and related modules. Phases 1-3 were completed by December 31, 2015 to install the basic software, roll it out across the entire company and then start implementing various RM functionality as well as a major software upgrade. Phase IV is scheduled up through Dec 31, 2016. The ECM 5 year plan for 2017-2021 is currently being updated and will include another major software upgrade (to Content Suite 16), Email management, Dispositioning, Physical Objects, Groups & Permissions redesign, new functionality enhancements, etc. Each calendar year is typically another Phase, starting up with Phase V in 2017 (Year 1 below). Our strategic partner for ECM implementations is currently Cognizant, and we have no plans to replace them.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$4,635,00	$973,000	$1,358,000	$1,398,000	$445,000	$460,000	TBD
Expense	$135,000	0	0	$45,000	$45,000	$45,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: resource availability due to additional workload, changing priorities
- ☑ Other: funding availability due to changing priorities/competing projects

Primary Project Objective: Risk Reduction

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☑ Other: Compliance; improved business processes

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☑ Other Program Type: Records Management

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Wiki/CentralHudson.com Redesign - WCM (Web Content Management)

Form submitted by: Vicki Wheeler

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

The implementation will provide the foundation to extending customer self-services, REV related services, and the REV driven customer portal:

o Provides the foundation for a scalable Wiki and Website
o Enables analytics across our web properties including customer self service
o Combined with Portal solution provides the platform for overall customer engagement growth

This project is directly related to enabling our group mission and supports our strategic imperatives - 'Enrich Customer & Business Partner Experience'.

Solution

Software solution purchased, preliminary planning done in 2015. Incorporates a redesign of the Wiki & CentralHudson.com leveraging a WEB Content Management solution that will provide a single development platform for both Web & Mobile enablement of the Wiki and CentralHudson.com. Intent is to drive personalization and provide the ability to have tracking of usage for channel analytics leveraged to see where employees & customers are transacting, dropping off, etc in order to identify where to focus and to ensure focused employee & customer adoption.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,770,000	0	$447,000	$603,000	$612,000	$287,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: resource availability due to additional workload, changing priorities
- ☑ Other: funding availability due to changing priorities/competing projects

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☑ Other: improved web presence and visibility into customer/employee use of the web (and wiki)

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections: Projects implemented to monitor and manage gas inspections and
- ☐ Code Requirement/PSC: Various projects to monitor & manage code & PSC requirements
- ☐ Other Program Type: Various projects to monitor & manage operational compliance

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☑ Strategic Replacement: wiki is old; cumbersome; little external website analytics capability
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Increase Quality & Speed of Delivery of Application Testing

Form submitted by: Nicole Tancredi

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

As part of our goal to Increase Quality and Speed of Delivery of Application Testing, in late 2014, we procured HP Application Lifecycle Management (ALM) and Unified Functional Testing (UFT) software tools. These tools will enable us to reduce cycle time, provide consistency in testing and improve the overall end product quality. This project is a continuation of multi-phased application testing scripts, including automation of testing wherever applicable to reduce delivery cycle time and increase quality.

Solution

This level of spend will enable us to complete the scripting and automation, across the portfolio so that benefits can be realized.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,371,000	$159,000	$533,000	$548,000	$557,000	$575,000	TBD
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Resource Availability due to additional workload and projects.
- ☐ Other

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☑ Other Program Type: Foundational investment - effective, timely, and consistent app delivery.

Other

<u>Alternatives Analysis</u>

Reference Report or Study

<u>Or</u>

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name:	Digital Initiatives for Customer Engagement (DICE)
Form submitted by:	Nicole Tancredi
Budget Group:	42 - Office Equipment
Summary Category:	System Enhancement
Investment Category:	Daily Operations

Description of Problem

This project is an initial investment to keep momentum going forward on digital initiatives as prioritized by the Digital Interactive Working Group. Ongoing investment in Digital (Web/Mobile/Social) customer enablement via extending self service capabilities, growing adoption of existing self service offerings, and aligning customer experience across all channels.

Solution

Expanded investment in digital will enable significant progress in development, translating to more customer engagement and satisfaction. Identification of potential productivity and/or hard savings through reductions in costs of other customer touchpoints will need to be estimated and measured.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$8,903,000	$127,000	$1,385,000	$2,412,000	$2,450,000	$2,530,000	TBD
Expense	$1,792,000	0	$118,000	$338,000	$558,000	$778,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower — Resource Availablity due to additional workload and projects.
- ☐ Other

Primary Project Objective Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☐ Other Program Type

Other

<u>Alternatives Analysis</u>

Reference Report or Study

<u>Or</u>

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name:	Business Agility with Enterprise SOA
Form submitted by:	Nicole Tancredi
Budget Group:	42 - Office Equipment
Summary Category:	System Enhancement
Investment Category:	Daily Operations

Description of Problem

The Business Agility with an Enterprise SOA (Service Oriented Architecture) project will establish the foundation and tools to allow Central Hudson to be more agile in business process implementation by exposing core business logic and enabling the integration of key processes and information. SOA will be key to how fast we deliver, how we can leverage existing business functions across our portfolio, and to how we build the foundation for our future with mobile application solutions, cloud, and modernization vs. mass replacement. By making foundational investments, we will enable a flexible, scalable, secure, and reliable environment. This environment will be poised for current and anticipated information and technology demands across the enterprise coupled with a continued focus on digital (web, mobile, social, IVR), self-service oriented offerings to increase overall customer engagement.

Solution

In 2014, the software tools were purchased for Oracle SOA Suite and in 2015, together with our Strategic Partners, we installed and configured these tools. In 2016, we have deployed several services within SOA. The continued investment in SOA is a necessity in order to reduce complexity and costs. It will bring flexibility, interoperability, discoverability, reusability, and shared services, allowing us to leverage new and existing business logic via exposed services.

The investment aims to fully implement SOA across the entire application portfolio. In 2017, we continue with limited incremental progress. The investment in outer years allow us to increase progress through full implementation and continuous extension of portfolio.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Definitive Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$5,189,000	$254,000	$959,000	$1,261,000	$1,336,000	$1,380,000	$1,200,000
Expense							

Cost Risks

- ☐ Environmental
- ☑ Timing/Permitting: Timing with other ongoing IT projects
- ☑ Manpower: Resource Availability due to additional workload and projects.
- ☐ Other

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☑ Other Program Type: Strategic cornerstone of IT future projects & initiatives

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Mainframe Bundled Releases

Form submitted by: Nicole Tancredi

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

This project is to include bundling of minor changes on our mainframe systems into planned releases.

Solution

By bundling mainframe enhancements and improvements into a release, we are able to satisfy the business requirements with minimal impact on our production systems.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,467,000	$140,000	$320,000	$329,000	$334,000	$345,000	$350,000
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Resource Availablity due to additional workload and projects.
- ☐ Other

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ____ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☑ Other Program Type: Keeping systems current and up to date

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: TotalHR Replacement

Form submitted by: Nicole Tancredi

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Daily Operations

Description of Problem

TotalHR system has been upgraded and kept up to date but lacks features such as Performance Management, Employee Self Service portal, etc.

Solution

Replacement of TotalHR with a full featured solution will provide a more robust solution for the HR department and for employees.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$2,144000	0	$533,000	$767,000	$557,000	$287,000	0
Expense							

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Resource Availablity due to additional workload and projects.
- ☐ Other

Primary Project Objective: Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☑ Strategic Replacement: Full featured HR system
- ☑ Other Program Type: Keeping systems current and up to date

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Emergency Management Software Upgrade

Form submitted by: Surekha Jadhav

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Infrastructure

Description of Problem

The existing EMS s/w is approaching end of life phase where the vendor stop supporting the current version we're on. This will leave us with unsupported version of this critical s/w.

Solution

Various software upgrades, enhancements, and/or other software needs for this domain.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,327,000	0	$320,000	$329,000	$334,000	$345,000	TBD
Expense	$450,000	0	$45,000	$90,000	$135,000	$180,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Service

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☑ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☐ Strategic Replacement
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Mobility Upgrade

Form submitted by: Surekha Jadhav

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Infrastructure

Description of Problem

Current mobility solution - h/w and s/w is aging. The s/w is approaching end of support phase leaving our critical resources with unsupported h/w and s/w.

Solution

Replace aging h/w and upgrade mobility (mobile workforce management) s/w to a more recent version of the s/w.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$1,570,000	$1,132,000	0	$438,000	0	0	0
Expense							

Cost Risks

- [ ] Environmental
- [ ] Timing/Permitting
- [ ] Manpower
- [x] Other: Need to make sure the scope is controlled

Primary Project Objective: Economic

Benefits:

Economic

- [x] Reduced O&M
- [ ] Reduced Customer Bill
- [ ] Other

Risk Reduction

Safety

- [ ] Employee Safety
- [ ] Public Safety
- [ ] Other Program Type

Compliance

- [ ] Inspections
- [ ] Code Requirement/PSC
- [ ] Other Program Type

Infrastructure

- [ ] Average Age of Infrastructure ___ years
- [ ] Failure Rates
- [ ] Obsolete/Unserviceable Equipment
- [ ] Condition
- [x] Strategic Replacement
- [ ] Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: OMS Replacement

Form submitted by: Surekha Jadhav

Budget Group: 42 - Office Equipment

Summary Category: System Enhancement

Investment Category: Infrastructure

Description of Problem

Existing OMS s/w is approaching end of life phase leaving with an unsupported version of s/w.

Solution

Upgrade/replace OMS.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Conceptual Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$3,028,000	0	$1,164,000	$1,864,000	0	0	TBD
Expense	$1,421,000	0	$164,000	$419,000	$419,000	$419,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☐ Manpower
- ☐ Other

Primary Project Objective Economic

Benefits:

Economic

- ☐ Reduced O&M
- ☐ Reduced Customer Bill
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☐ Average Age of Infrastructure ___ years
- ☐ Failure Rates
- ☐ Obsolete/Unserviceable Equipment
- ☐ Condition
- ☑ Strategic Replacement
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study

Or

Project Alternatives Considered

Decision criteria for alternative selection

Budget Submittal Form for Common Projects

Project Name: Network Strategy Project

Form submitted by: Gary Schmid

Budget Group: 44 - Communication

Summary Category: System Enhancement

Investment Category: Infrastructure

Description of Problem

Central Hudson is in the process of constructing an internal network for communication with its fixed assets. This project is referred to as the Network Strategy Project. The Network Strategy Project was approved in the Order Approving Rate Plan issued by the New York State Public Service Commission on June 17, 2015. The Network Strategy Team developed the following problem statement. "A well-defined plan to leverage technologies for current and future communication needs does not exist. This absence has led to a patchwork of infrastructure and technologies that lacks adequate documentation and results in poor reliability for some applications. A long term, cost effective strategy is needed to establish robust systems that provide reliable and secure communications."

Solution

Network Strategy is a well-defined plan to leverage technologies for current and future communication needs. This is a long-term cost effective strategy to establish robust systems that provide reliable and secure communications that we can control, monitor and maintain 24x7x365. The scope of Network Strategy is communication with Central Hudson's fixed assets. Central Hudson's fixed assets included in the scope are corporate offices, gas gate and regulator stations, electric substations, electric system distribution automation equipment, mobile radio towers, and large customer meter installations. Central Hudson's planned topology is a tiered network. Tier 1 is the high bandwidth backbone connecting our most critical sites, including our most critical substations. Tier 1 will be a combination of existing and new fiber optic cables and microwave connections. Most of the sites on the Tier 1 network will also serve as gateways for connection to the Tier 2 network. Tier 2 is the medium bandwidth network. Tier 2 will be a mesh radio network for communication with distribution automation equipment, electric substations, gas regulator stations and large customer meter installations. Provision would be made available for a future Tier 3 low bandwidth network that could reach further into our territory for future needs.

Cost estimate (include AFUDC if appropriate):

Type of estimate: Preliminary Estimate

	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Future
Capital	$16,786,000	$4,444,000	$4,742,000	$3,935,000	$2,556,000	$1,108,000	
Expense	$3,734,000	$472,000	$699,000	$837,000	$854,000	$872,000	TBD

Cost Risks

- ☐ Environmental
- ☐ Timing/Permitting
- ☑ Manpower: Limited manpower has slowed implementation, will increase as operational responsibilities grow
- ☐ Other

Primary Project Objective: Service

Benefits:

Economic

- ☑ Reduced O&M: operational costs are projected to decrease
- ☑ Reduced Customer Bill: This project supports the DMS/DA implementation and resulting reductions.
- ☐ Other

Risk Reduction

Safety

- ☐ Employee Safety
- ☐ Public Safety
- ☐ Other Program Type

Compliance

- ☐ Inspections
- ☐ Code Requirement/PSC
- ☐ Other Program Type

Infrastructure

- ☑ Average Age of Infrastructure: 20 years
- ☑ Failure Rates: high failure rates with existing TELCO equipment
- ☑ Obsolete/Unserviceable Equipment: existing equipment obsolete/difficult to maintain
- ☐ Condition
- ☑ Strategic Replacement: New system will provide higher reliability,speed and security
- ☐ Other Program Type

Other

Alternatives Analysis

Reference Report or Study: 2015 Business as Usual vs DA/NS/DMS Cost Justification Analysis

Or

Project Alternatives Considered

Decision criteria for alternative selection

DETAIL SCHEDULES 2017-2021 FORECAST

	ELECTRIC ADDITIONS					W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Growth vs. Sustaining	Discretion Level	Investment Type	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Production	Hydro Minor Projects	G-Sustaining	Maintain Standards	Infrastructure	On-going	111	163	168	173	184	799
Production	GT Minor Projects	G-Sustaining	Maintain Standards	Infrastructure	On-going	111	163	168	173	184	799
Production	Sturgeon Pool Rotor Unit#2	G-Sustaining	Non Discretionary	Daily Operations	12/31/2017	703	0	0	0	0	703
Production	Sturgeon Pool Wet Section Unit#2	G-Sustaining	Non Discretionary	Daily Operations	12/31/2017	1080	0	0	0	0	1080
Production	Sturgeon Pool Wet Section Unit#3	G-Sustaining	Non Discretionary	Daily Operations	12/31/2018	0	1073	0	0	0	1073
Production	Dashvillel Rotor Unit#1	G-Sustaining	Non Discretionary	Daily Operations	12/31/2018	0	704	-6	0	0	698
Production	Dashvillel Rotor Unit#2	G-Sustaining	Non Discretionary	Daily Operations	12/31/2019	0	-6	727	0	0	720
Production	Sturgeon Pool Dam Camara System	G-Sustaining	Non Discretionary	Compliance	12/31/2019	0	0	224	0	0	224
Production	High Falls Facility Camara System	G-Sustaining	Non Discretionary	Daily Operations	12/31/2019	0	0	224	0	0	224
Production	Dashville Facility Camara Suystem	G-Sustaining	Non Discretionary	Daily Operations	12/31/2020	0	0	0	231	0	231
Production	Dashville Rubber Gate Replacement	G-Sustaining	Non Discretionary	Daily Operations	12/31/2020	0	0	56	929	0	985
Production	Hydro SCADA - New Com Link	G-Sustaining	Non Discretionary	Daily Operations	12/31/2020	0	0	0	139	0	139
Production	Dashville Remote Start	G-Sustaining	Non Discretionary	Compliance	12/31/2021	0	0	0	0	301	301
Production	Dashville Window Replacements	G-Sustaining	Maintain Standards	Infrastructure	12/31/2021	0	0	0	0	373	373
Production	Sturgeon Pool Window Replacements	G-Sustaining	Maintain Standards	Infrastructure	12/31/2021	0	0	0	0	469	469
Production	Subtotal - Electric Production					2,006	2,096	1,559	1,646	1,511	8,817
Transmission	NERC Alert (until June 2016) and HPR Combined	T-Sustaining	Non Discretionary	Compliance	On-going	2975	3557	3537	2118	2193	14381
Transmission	Transmission Minor Projects	T-Sustaining	Non Discretionary	Daily Operations	On-going	214	231	228	238	247	1158
Transmission	Network Strategy Projects	T-Sustaining	Maintain Standards	Infrastructure	On-going	0	0	3271	515	855	4640
Transmission	ROW Repair Project (Deficiencies)	T-Sustaining	Maintain Standards	Risk Reduction	On-going	496	508	758	1221	2850	5834
Transmission	ACSR Conductor Replacement Program, WH1 and WH2 Lines - Part 102C: 13.8 miles each	T-Sustaining	Maintain Standards	Infrastructure	06/01/2017	6943	0	0	0	0	6943
Transmission	G Line - North Section - 7.83 miles at 69 kV	T-Sustaining	Maintain Standards	Infrastructure	12/31/2017	6447	199	0	0	0	6646
Transmission	EF Line: 115kV Line Rebuild - East Fishkill -	T-Sustaining	Non Discretionary	Compliance	03/31/2019	99	1626	1567	0	0	3292
Transmission	CL Line: 69kV Line Rebuild - North Catskill - Cairo	T-Sustaining	Non Discretionary	Compliance	12/01/2019	496	8131	2021	0	0	10648
Transmission	P&MK Structure Replacement and Span Correction	T-Sustaining	Maintain Standards	Infrastructure	06/01/2020	347	1016	2527	2118	0	6008
Transmission	69kV G Line South - Knapps to North Chelsea - 102C	T-Sustaining	Maintain Standards	Infrastructure	12/01/2020	496	1118	5053	5295	0	11962
Transmission	TR Line Retirement	T-Sustaining	Maintain Standards	Infrastructure	12/01/2021	0	0	0	212	0	212
Transmission	SB Line: New 115kV Line - Hurley Ave. to Saugerties - Article VII: 11.11 miles	T-Sustaining	Maintain Standards	Infrastructure	12/01/2021	198	305	404	7837	7674	16419
Transmission	H Line: New 115kV Line - Saugerties to N.Catskill - Article VII: 12.25 miles	T-Sustaining	Maintain Standards	Infrastructure	12/01/2022	198	305	404	2542	7674	11124
Transmission	ACSR Conductor Replacement Program, A & C Lines - Article VII: 10.8 miles total	T-Sustaining	Maintain Standards	Infrastructure	06/30/2016	10	10	0	0	0	20
Transmission	Subtotal - Electric Transmission					18,920	17,006	19,771	22,096	21,494	99,287
Substation	Substation Minor Projects	D-Sustaining	Non Discretionary	Daily Operations	On-going	464	549	493	505	515	2526
Substation	ESP Infrastructure Repl. (relays, meters, data transfer equip, etc.).	D-Sustaining	Maintain Standards	Infrastructure	On-going	1691	3297	2022	2694	3236	12941
Substation	Generation 1 Relay Replacement Program	D-Sustaining	Maintain Standards	Infrastructure	On-going	782	203	0	0	0	985
Substation	RTU Replacement Program	D-Sustaining	Maintain Standards	Infrastructure	On-going	208	275	314	303	309	1408
Substation	Breaker Replacement Program (345kV)	D-Sustaining	Maintain Standards	Infrastructure	On-going	0	1520	740	0	0	2260
Substation	Breaker Replacement Program (115kV, 69kV, 13.8kV)	D-Sustaining	Maintain Standards	Infrastructure	On-going	1127	1325	789	707	1441	5390
Substation	Circuit Switcher Replacement Program	D-Sustaining	Maintain Standards	Infrastructure	On-going	261	0	0	0	0	261
Substation	345kV Switch Replacement Program	T-Sustaining	Maintain Standards	Infrastructure	On-going	489	608	592	606	617	2912
Substation	115kV Switch Replacement Program	D-Sustaining	Maintain Standards	Infrastructure	On-going	0	0	986	505	1544	3035
Substation	DA Program LTC Automation	D-Sustaining	System Enhancements	Customer Benefit	On-going	518	765	0	0	0	1283
Substation	Danskammer - Storm Hardening	T-Sustaining	System Enhancements	Risk Reduction	04/01/2017	1227	0	0	0	0	1227
Substation	Montgomery Street - Transformer Replacements	D-Sustaining	Maintain Standards	Infrastructure	06/30/2017	1466	0	0	0	0	1466
Substation	Todd Hill ("G" line 115kV - Add 115/69kV Tr and 69kV Bkr)	D-Sustaining	Maintain Standards	Infrastructure	12/31/2017	1466	0	0	0	0	1466
Substation	Union Ave. - Station Upgrade (New Switchgear)	D-Sustaining	Maintain Standards	Infrastructure	12/01/2017	2933	51	0	0	0	2983
Substation	Boulevard - Transformer Replacements	D-Sustaining	Maintain Standards	Infrastructure	12/01/2017	2102	51	0	0	0	2153

CAT.	ELECTRIC ADDITIONS Description	Growth vs. Sustaining	Discretion Level	Investment Type	Preliminary In-Service Date	W/ AFUDC, Inflated & OH Adjustments 2017	2018	2019	2020	2021	5-Year Total
Substation	Reynolds Hill - Transformer Replacements	D-Sustaining	Maintain Standards	Infrastructure	12/01/2017	2444	557	0	0	0	3001
Substation	Woodstock - Switchgear Replacement	D-Sustaining	Maintain Standards	Infrastructure	06/01/2018	1955	1013	0	0	0	2968
Substation	Maybrook - Substation Upgrades (2 New 20 MVA 69-13.8kV Transformers)	D-Sustaining	Maintain Standards	Study Based Load G	12/30/2018	978	2533	0	0	0	3511
Substation	Knapps Corners - New Substation	D-Sustaining	Maintain Standards	Infrastructure	06/30/2019	1369	5573	2959	0	0	9901
Substation	North Chelsea - Single Phase Transformers Replacement	T-Sustaining	Maintain Standards	Infrastructure	06/30/2019	196	304	740	0	0	1239
Substation	Stanfordville - New Transformer (12MVA)	D-Sustaining	Maintain Standards	Infrastructure	06/30/2019	489	507	740	0	0	1735
Substation	Coxsackie - Transformer Replacement	D-Sustaining	Maintain Standards	Infrastructure	12/01/2019	147	507	789	51	0	1493
Substation	Kerhonkson Autos (formerly New Honk Falls Sub)	D-Sustaining	Maintain Standards	Infrastructure	03/31/2020	98	507	543	4042	0	5189
Substation	Montgomery - Transformer Replacement (Reuse one 12MVA from Maybrook)	D-Sustaining	Maintain Standards	Infrastructure	06/01/2020	244	760	740	1819	0	3563
Substation	Modena - Add 3rd Bkr to complete 115kV Ring Bus (see P&MK memo)	D-Sustaining	System Enhancements	Reliability	06/01/2020	0	203	395	1819	0	2416
Substation	Terminal upgrade work for 115kV (High Falls, Galeville, and Modena)	D-Sustaining	Maintain Standards	Infrastructure	12/01/2020	0	0	0	101	10	111
Substation	New Baltimore - Transformer Replacement (Reuse a bank tbd)	D-Sustaining	Maintain Standards	Infrastructure	12/01/2020	0	51	247	1010	51	1359
Substation	Greenfield Rd. - Substation Upgrade (Reuse Kerhonkson xfmr)	D-Sustaining	Maintain Standards	Infrastructure	12/01/2020	98	203	296	505	51	1153
Substation	Trap Rock - Tap Station	T-Sustaining	Maintain Standards	Infrastructure	12/31/2021	196	253	592	2021	2058	5120
Substation	Aged Transformer Replacements	D-Sustaining	Maintain Standards	Infrastructure	Future	0	0	1332	3031	5608	9971
Substation	Aged Switchgear Replacements	D-Sustaining	Maintain Standards	Infrastructure	Future	0	0	0	0	1544	1544
Substation	Honk Falls (Work assoc w/ WH line rebld) (see memo)	D-Sustaining	Maintain Standards	Infrastructure	12/01/2016	49	0	0	0	0	49
Substation	Sturgeon Pool	D-Sustaining	Maintain Standards	Infrastructure	12/01/2016	147	0	0	0	0	147
Substation	Subtotal - Electric Substation					23,142	21,613	15,306	19,720	16,984	96,766
New Business	New Business	D-Growth	Non Discretionary	New Business	On-going	1320	1419	1157	1251	1323	6471
New Business	New Business - Blanket OH	D-Growth	Non Discretionary	New Business	On-going	2338	2514	2049	2217	2344	11463
New Business	New Business - Blanket URD Combo	D-Growth	Non Discretionary	New Business	On-going	391	420	342	370	392	1915
New Business	New Business - Blanket URD	D-Growth	Non Discretionary	New Business	On-going	134	144	117	127	134	655
New Business	Subtotal - Electric New Business					4,183	4,497	3,666	3,966	4,193	20,504
Distribution	Distribution Improvement Blankets (15BL-01)	D-Sustaining	Non Discretionary	Daily Operations	On-going	6788	5955	7938	8093	8213	36987
Distribution	Relocation Blankets (15BL-02)	D-Sustaining	Non Discretionary	Compliance	On-going	201	207	205	209	212	1034
Distribution	Distribution Improvement Minors (1511-0X)	D-Sustaining	Non Discretionary	Infrastructure	On-going	603	621	615	627	636	3102
Distribution	Distribution Improvement Conversions (1521-0X)	D-Growth	Non Discretionary	Infrastructure	On-going	302	311	307	313	318	1551
Distribution	Road Rebuild Relocation Projects (1531-0X)	D-Sustaining	Non Discretionary	Compliance	On-going	503	518	512	522	530	2585
Distribution	Distribution Improvement (1551-0X) - Thermal / Voltage	D-Growth	Non Discretionary	Study Based Load G	On-going	2514	2537	2048	2089	2119	11308
Distribution	Distribution Improvement (1551-0X) - Reliability	D-Sustaining	Non Discretionary	Infrastructure	On-going	1458	2589	2561	2611	2649	11868
Distribution	CEMI/Worst Circuit Reliability Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	1619	1036	1024	1044	1060	5783
Distribution	Microgrids	D-Sustaining	Non Discretionary	Infrastructure	On-going	503	518	0	0	0	1021
Distribution	Cutout Replacement Program - lower threshold	D-Sustaining	Non Discretionary	Infrastructure	On-going	251	259	256	261	265	1292
Distribution	Distribution Improvement (1551-0X) - Operating/ Infrastructure	D-Sustaining	Non Discretionary	Infrastructure	On-going	2202	1869	4035	3603	3285	14995
Distribution	5kV Aerial Cable Replacement Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	251	311	461	470	477	1970
Distribution	Overhead Secondary Replacement Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	201	207	205	209	212	1034
Distribution	Distribution Pole Replacement Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	1810	2071	3073	4699	4769	16422
Distribution	Copper Wire Replacement Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	453	466	615	627	636	2796
Distribution	4800 V Conversion/Infrastructure Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	1234	1375	1536	3133	3179	10458
Distribution	14.4 kV Cable Rejuvination	D-Sustaining	Non Discretionary	Infrastructure	On-going	453	1036	1024	1305	1325	5142
Distribution	Oil Switch Replacement	D-Sustaining	Non Discretionary	Infrastructure	On-going	101	104	102	104	106	517
Distribution	CE Mesh / Protector Relays	D-Sustaining	Non Discretionary	Infrastructure	On-going	91	124	92	125	127	559
Distribution	Secondary Network Upgrade Program (All Districts)	D-Sustaining	Non Discretionary	Infrastructure	On-going	302	207	512	261	265	1547
Distribution	URD replacement	D-Sustaining	Non Discretionary	Infrastructure	On-going	0	497	0	1044	1060	2601
Distribution	Maybrook Substation Circuit Exits	D-Sustaining	Non Discretionary	Study Based Load G	06/01/2018	0	621	0	0	0	621

	ELECTRIC ADDITIONS					W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Growth vs. Sustaining	Discretion Level	Investment Type	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Distribution	Montgomery Substation Circuit Exits	D-Sustaining	Non Discretionary	Infrastructure	12/01/2019	0	0	2356	0	0	2356
Distribution	Boulevard Substation Integration	D-Sustaining	Non Discretionary	Infrastructure	12/01/2017	503	0	0	0	0	503
Distribution	Stanfordville Integration	D-Sustaining	Non Discretionary	Infrastructure	12/31/2018	0	621	0	0	0	621
Distribution	Greenfield Road Substation Integration	D-Sustaining	Non Discretionary	Infrastructure	12/01/2020	0	0	0	940	0	940
Distribution	Clinton Avenue Retirement	D-Sustaining	Non Discretionary	Infrastructure	12/01/2021	0	0	0	0	424	424
Distribution	Knapps Corners circuit exits	D-Sustaining	Non Discretionary	Infrastructure	06/30/2018	0	518	0	0	0	518
Distribution	Coxsackie Circuit exits	D-Sustaining	Non Discretionary	Infrastructure	12/31/2019	0	0	512	0	0	512
Distribution	New Baltimore Circuit exits	D-Sustaining	Non Discretionary	Study Based Load G	12/01/2020	0	0	0	313	0	313
Distribution	Greenfield Rd. - Substation Upgrade (Reuse Kerhonkson xfmr)+	D-Sustaining	Non Discretionary	Infrastructure	12/01/2017	256	0	0	0	0	256
Distribution	Distibution Automation - Major Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	7040	9320	12291	5221	530	34402
Distribution	Electronic Recloser Replacement Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	352	362	358	679	689	2441
Distribution	Distribution Automation - ALT Program	D-Sustaining	Non Discretionary	Infrastructure	On-going	175	119	256	261	0	811
Distribution	Subtotal - Electric Distribution Improvements					30,166	34,380	42,895	38,764	33,085	179,289
Transformer	Transformers - New Business	D-Sustaining	Non Discretionary	New Business	On-going	4367	4413	4720	4861	5063	23424
Transformer	Capacitors	D-Sustaining	Non Discretionary	Infrastructure	On-going	42	43	46	47	49	226
Transformer	Regulators	D-Sustaining	Non Discretionary	Infrastructure	On-going	210	235	264	297	310	1316
Transformer	Network Protectors	D-Sustaining	Non Discretionary	Infrastructure	On-going	530	595	668	751	782	3327
Transformer	Subtotal - Electric Transformers					5,148	5,286	5,698	5,957	6,203	28,292
Meter	X041A - Special Meter Installations	D-Sustaining	Non Discretionary	Compliance	On-going	153	156	159	163	166	798
Meter	X042A - Instrument Transformers	D-Sustaining	Non Discretionary	Compliance	On-going	266	272	278	284	290	1389
Meter	X043A - Electric Meters	D-Sustaining	Non Discretionary	New Business	On-going	2487	2540	2593	2648	2703	12971
Meter	Subtotal - Electric Meters					2,907	2,968	3,030	3,094	3,159	15,158
	Total - Electric					86,470	87,846	91,925	95,242	86,629	448,113

	ELECTRIC REMOVALS								
CAT.	Description	Discretion Level	Investment Type	2017	2018	2019	2020	2021	5-Year Total
Production	Hydro Minor Projects	Maintain Standards	Infrastructure	5	5	5	5	5	26
Production	GT Minor Projects	Maintain Standards	Infrastructure	5	5	5	5	0	21
Production	Sturgeon Pool Rotor Unit#2	Non Discretionary	Daily Operations	117	0	0	0	0	117
Production	Sturgeon Pool Wet Section Unit#2	Non Discretionary	Daily Operations	0	0	0	0	5	5
Production	Sturgeon Pool Wet Section Unit#3	Non Discretionary	Daily Operations	0	76	0	0	0	76
Production	Dashvillel Rotor Unit#1	Non Discretionary	Daily Operations	0	0	120	0	0	120
Production	Dashvillel Rotor Unit#2	Non Discretionary	Daily Operations	0	117	0	0	0	117
Production	Dashville Rubber Gate Replacement	Non Discretionary	Daily Operations	0	0	0	0	109	109
Production	Dashville Window Replacements	Maintain Standards	Infrastructure	0	0	0	0	224	224
Production	Sturgeon Pool Window Replacements	Maintain Standards	Infrastructure	0	0	0	0	280	280
Production	Subtotal - Electric Production			127	204	130	11	623	1,095
Transmission	NERC Alert (until June 2016) and HPR Combined	Non Discretionary	Compliance	510	204	208	213	217	1352
Transmission	Transmission Minor Projects	Non Discretionary	Daily Operations	47	47	48	49	50	241
Transmission	Network Strategy Projects	Maintain Standards	Infrastructure	0	0	259	149	85	493
Transmission	ACSR Conductor Replacement Program, WH1 and WH2 Lines - Part 102C: 13.8 miles each	Maintain Standards	Infrastructure	510	0	0	0	0	510
Transmission	G Line - North Section - 7.83 miles at 69 kV	Maintain Standards	Infrastructure	306	0	0	0	0	306
Transmission	EF Line: 115kV Line Rebuild - East Fishkill -	Non Discretionary	Compliance	0	153	156	0	0	309
Transmission	CL Line: 69kV Line Rebuild - North Catskill - Cairo	Non Discretionary	Compliance	0	816	208	0	0	1024
Transmission	Retirement of O & OB Line Section from Dashville Tap to Ohioville	Maintain Standards	Infrastructure	0	0	52	585	0	637
Transmission	P&MK Structure Replacement and Span Correction	Maintain Standards	Infrastructure	31	102	260	213	0	606
Transmission	69kV G Line South - Knapps to North Chelsea - 102C	Maintain Standards	Infrastructure	0	229	521	532	0	1282
Transmission	TR Line Retirement	Maintain Standards	Infrastructure	0	0	0	0	434	434
Transmission	SB Line: New 115kV Line - Hurley Ave. to Saugerties - Article VII: 11.11 miles	Maintain Standards	Infrastructure	0	0	0	851	760	1611
Transmission	H Line: New 115kV Line - Saugerties to N.Catskill - Article VII: 12.25 miles	Maintain Standards	Infrastructure	0	0	0	266	760	1026
Transmission	Subtotal - Electric Transmission			1,403	1,551	1,713	2,856	2,306	9,830
Substation	Substation Minor Projects	Non Discretionary	Daily Operations	194	194	198	202	369	1157
Substation	ESP Infrastructure Repl. (relays, meters, data transfer equip, etc.).	Maintain Standards	Infrastructure	176	355	208	292	342	1374
Substation	Generation 1 Relay Replacement Program	Maintain Standards	Infrastructure	82	0	0	0	0	82
Substation	RTU Replacement Program	Maintain Standards	Infrastructure	10	10	21	21	22	84
Substation	Breaker Replacement Program (345kV)	Maintain Standards	Infrastructure	0	168	78	0	0	246
Substation	Breaker Replacement Program (115kV, 69kV, 13.8kV)	Maintain Standards	Infrastructure	306	306	521	532	543	2207
Substation	Circuit Switcher Replacement Program	Maintain Standards	Infrastructure	25	0	0	0	0	25
Substation	345kV Switch Replacement Program	Maintain Standards	Infrastructure	51	51	52	53	0	207
Substation	115kV Switch Replacement Program	Maintain Standards	Infrastructure	51	51	52	53	54	262
Substation	DA Program LTC Automation	System Enhancements	Customer Benefit	76	0	0	0	0	76
Substation	Union Ave. - Station Upgrade (New Switchgear)	Maintain Standards	Infrastructure	255	0	0	0	0	255
Substation	Boulevard - Transformer Replacements	Maintain Standards	Infrastructure	153	0	0	0	0	153
Substation	Reynolds Hill - Transformer Replacements	Maintain Standards	Infrastructure	204	0	0	0	0	204
Substation	Woodstock - Switchgear Replacement	Maintain Standards	Infrastructure	102	51	0	0	0	153
Substation	Maybrook - Substation Upgrades (2 New 20 MVA 69-13.8kV Transformers)	Maintain Standards	Study Based Load	0	51	0	0	0	51
Substation	Knapps Corners - New Substation	Maintain Standards	Infrastructure	0	51	0	0	0	51
Substation	Knapps Corners - Retire Old Substation	Maintain Standards	Infrastructure	0	204	0	319	0	523
Substation	North Chelsea - Single Phase Transformers Replacement	Maintain Standards	Infrastructure	0	51	156	0	0	207
Substation	Stanfordville - New Transformer (12MVA)	Maintain Standards	Infrastructure	0	0	52	0	0	52
Substation	Coxsackie - Transformer Replacement	Maintain Standards	Infrastructure	0	0	52	0	0	52
Substation	Kerhonkson Autos (formerly New Honk Falls Sub)	Maintain Standards	Infrastructure	0	0	52	0	0	52
Substation	Montgomery - Transformer Replacement (Reuse one 12MVA from Maybrook)	Maintain Standards	Infrastructure	0	0	104	106	0	210
Substation	Modena - Add 3rd Bkr to complete 115kV Ring Bus (see P&MK memo)	System Enhancements	Reliability	0	0	0	21	0	21
Substation	Terminal upgrade work for 115kV (High Falls, Galeville, and Modena)	Maintain Standards	Infrastructure	0	0	0	27	0	27

CAT.	ELECTRIC REMOVALS Description	Discretion Level	Investment Type	2017	2018	2019	2020	2021	5-Year Total
Substation	New Baltimore - Transformer Replacement (Reuse a bank tbd)	Maintain Standards	Infrastructure	0	0	26	106	0	132
Substation	Trap Rock - Tap Station	Maintain Standards	Infrastructure	204	0	0	0	0	204
Substation	Van Wagner - Retire Substation	0	0	51	0	0	0	0	51
Substation	McKinley Street - Retire Substation	0	0	51	0	0	0	0	51
Substation	Balmville - Retire Substation	0	0	51	0	0	0	0	51
Substation	Maryland Ave - Retire Substation	0	0	0	51	0	0	0	51
Substation	Beacon - Retire Substation	0	0	0	102	0	0	0	102
Substation	Conway - Retire Substation	0	0	0	0	52	53	0	105
Substation	Clinton Ave. - Retire Substation	0	0	0	0	0	0	54	54
Substation	Subtotal - Electric Substation			2,043	1,696	1,625	1,786	1,384	8,534
New Business	New Business	Non Discretionary	New Business	76	79	79	84	91	410
New Business	New Business - Blanket OH	Non Discretionary	New Business	71	74	74	78	85	381
New Business	New Business - Blanket URD Combo	Non Discretionary	New Business	15	16	16	17	18	81
New Business	New Business - Blanket URD	Non Discretionary	New Business	15	16	16	17	18	81
New Business	Subtotal - Electric New Business			177	184	184	196	212	953
Distribution	Distribution Improvement Blankets (15BL-01)	Non Discretionary	Daily Operations	271	178	265	265	325	1304
Distribution	Relocation Blankets (15BL-02)	Non Discretionary	Compliance	16	15	12	12	15	69
Distribution	Distribution Improvement Minors (1511-0X)	Non Discretionary	Infrastructure	47	44	36	36	44	207
Distribution	Distribution Improvement Conversions (1521-0X)	Non Discretionary	Infrastructure	24	22	18	18	22	103
Distribution	Road Rebuild Relocation Projects (1531-0X)	Non Discretionary	Compliance	40	37	30	30	37	172
Distribution	Distribution Improvement (1551-0X) - Thermal / Voltage	Non Discretionary	Study Based Load	198	179	119	119	146	762
Distribution	Distribution Improvement (1551-0X) - Reliability	Non Discretionary	Infrastructure	115	183	149	149	183	779
Distribution	CEMI/Worst Circuit Reliability Program	Non Discretionary	Infrastructure	127	73	60	60	73	393
Distribution	Microgrids	Non Discretionary	Infrastructure	40	37	0	0	0	76
Distribution	Cutout Replacement Program - lower threshold	Non Discretionary	Infrastructure	20	18	15	15	18	86
Distribution	Distribution Improvement (1551-0X) - Operating/ Infrastructure	Non Discretionary	Infrastructure	173	132	235	235	253	1028
Distribution	5kV Aerial Cable Replacement Program	Non Discretionary	Infrastructure	20	22	27	27	33	128
Distribution	Overhead Secondary Replacement Program	Non Discretionary	Infrastructure	16	15	12	12	15	69
Distribution	Distribution Pole Replacement Program	Non Discretionary	Infrastructure	142	146	179	179	329	976
Distribution	Copper Wire Replacement Program	Non Discretionary	Infrastructure	36	33	36	36	44	184
Distribution	4800 V Conversion/Infrastructure Program	Non Discretionary	Infrastructure	97	97	90	90	220	593
Distribution	14.4 kV Cable Rejuvination	Non Discretionary	Infrastructure	36	73	60	60	92	320
Distribution	Oil Switch Replacement	Non Discretionary	Infrastructure	8	7	6	6	7	34
Distribution	CE Mesh / Protector Relays	Non Discretionary	Infrastructure	7	9	5	5	9	35
Distribution	Secondary Network Upgrade Program (All Districts)	Non Discretionary	Infrastructure	24	15	30	30	18	116
Distribution	URD replacement	Non Discretionary	Infrastructure	0	35	0	0	73	108
Distribution	Maybrook Substation Circuit Exits	Non Discretionary	Study Based Load	0	44	0	0	0	44
Distribution	Montgomery Substation Circuit Exits	Non Discretionary	Infrastructure	0	0	137	137	0	275
Distribution	Boulevard Substation Integration	Non Discretionary	Infrastructure	40	0	0	0	0	40
Distribution	Stanfordville Integration	Non Discretionary	Infrastructure	0	44	0	0	0	44
Distribution	Greenfield Road Substation Integration	Non Discretionary	Infrastructure	0	0	0	0	66	66
Distribution	Knapps Corners circuit exits	Non Discretionary	Infrastructure	0	37	0	0	0	37
Distribution	Coxsackie Circuit exits	Non Discretionary	Infrastructure	0	0	30	30	0	60
Distribution	New Baltimore Circuit exits	Non Discretionary	Study Based Load	0	0	0	0	22	22
Distribution	G Line – Rebuild the 7023 circuit as an underbuild under the new G Line	Non Discretionary	Infrastructure	20	0	0	0	0	20
Distribution	Distibution Automation - Major Program	Non Discretionary	Infrastructure	553	658	717	717	366	3011
Distribution	Electronic Recloser Replacement Program	Non Discretionary	Infrastructure	28	26	21	21	48	143
Distribution	Distribution Automation - ALT Program	Non Discretionary	Infrastructure	14	8	15	15	18	70
Distribution	Subtotal - Electric Distribution Improvementa			2,109	2,184	2,303	2,303	2,475	11,374
Transformers	Transformers - New Business	Non Discretionary	New Business	311	311	331	359	398	1711
Transformers	Subtotal - Electric Transformers			311	311	331	359	398	1,711
Meters	X041A - Special Meter Installations	Non Discretionary	Compliance	297	297	309	329	357	1589
Meters	Subtotal - Electric Meters			297	297	309	329	357	1,589
	Total - Electric			6,468	6,428	6,595	7,840	7,756	35,086

	GAS ADDITIONS				W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Investment Type	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Transmission	Prior Year Projects	Maintain_Standards	Infrastructure	12/01/2017	26	0	0	0	0	26
Transmission	Cathodic Test Stations	Maintain_Standards	Infrastructure	12/01/2017	87	0	0	0	0	87
Transmission	Pipeline Integrity	Maintain_Standards	Infrastructure	12/01/2017	117	0	0	0	0	117
Transmission	West Shore Control Valves Upgrades	System_Enhancements	Infrastructure	12/01/2017	101	0	0	0	0	101
Transmission	West Shore SCADA	System_Enhancements	Reliability	12/01/2017	101	0	0	0	0	101
Transmission	West Shore Over Pressure Protection	System_Enhancements	Risk Reduction	12/01/2017	432	0	0	0	0	432
Transmission	Remote Operated Valves	System_Enhancements	Risk Reduction	12/01/2017	152	0	0	0	0	152
Transmission	TP Line Reroute at Harriman Station	Maintain_Standards	Risk Reduction	12/01/2017	509	0	0	0	0	509
Transmission	Gate Station sourced from HVEX Design	System_Enhancements	Infrastructure	12/01/2017	153	0	0	0	0	153
Transmission	Prior Year Projects	Maintain_Standards	Infrastructure	12/01/2018	0	26	0	0	0	26
Transmission	Cathodic Test Stations	Maintain_Standards	Infrastructure	12/01/2018	0	37	0	0	0	37
Transmission	Pipeline Integrity	Maintain_Standards	Infrastructure	12/01/2018	0	209	0	0	0	209
Transmission	Poughkeepsie Receival Control Valve Rebuild with Over Pressure Protection	System_Enhancements	Risk Reduction	12/01/2018	0	1178	0	0	0	1178
Transmission	Poughkeepsie Receival SCADA and Battery Backup	System_Enhancements	Risk Reduction	12/01/2018	0	105	0	0	0	105
Transmission	Remote Operated Valves	System_Enhancements	Risk Reduction	12/01/2018	0	209	0	0	0	209
Transmission	Gate Station sourced from HVEX Bidding, Initial Construction	System_Enhancements	Infrastructure	12/01/2018	0	525	0	0	0	525
Transmission	Rose Place TP Line Replacement	Maintain_Standards	Infrastructure	12/01/2018	0	314	0	0	0	314
Transmission	Prior Year Projects	Maintain_Standards	Infrastructure	12/01/2019	0	0	27	0	0	27
Transmission	Cathodic Test Stations	Maintain_Standards	Infrastructure	12/01/2019	0	0	38	0	0	38
Transmission	Pipeline Integrity	Maintain_Standards	Infrastructure	12/01/2019	0	0	287	0	0	287
Transmission	Remote Operated Valves	Maintain_Standards	Infrastructure	12/01/2019	0	0	434	0	0	434
Transmission	Gate Station sourced from HVEX Construction	System_Enhancements	Infrastructure	12/01/2019	0	0	5423	0	0	5423
Transmission	Prior Year Projects	Maintain_Standards	Infrastructure	12/01/2020	0	0	0	28	0	28
Transmission	Cathodic Test Stations	Maintain_Standards	Infrastructure	12/01/2020	0	0	0	39	0	39
Transmission	Pipeline Integrity	Maintain_Standards	Infrastructure	12/01/2020	0	0	0	349	0	349
Transmission	Remote Operated Valves	Maintain_Standards	Infrastructure	12/01/2020	0	0	0	772	0	772
Transmission	Mahopac Heater	Maintain_Standards	Infrastructure	12/01/2020	0	0	0	496	0	496
Transmission	Prior Year Projects	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	28	28
Transmission	Cathodic Test Stations	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	40	40
Transmission	Pipeline Integrity	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	413	413
Transmission	Remote Operated Valves	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	907	907
Transmission	Tuxedo Gate Station Control Valve Sizing	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	153	153
Transmission	Gas Chromatographs	Maintain_Standards	Infrastructure	12/01/2021	0	0	0	0	57	57
Transmission	Subtotal Tranmission				1,678	2,604	6,209	1,684	1,599	13,774
Regulator Stations	Pressure Chart Upgrades	Maintain_Standards	Infrastructure	01/01/2017	51	0	0	0	0	51
Regulator Stations	Station Pressure Stabilization	Maintain_Standards	Infrastructure	01/01/2017	142	0	0	0	0	142
Regulator Stations	Fullerton Regulator Station Rebuild	System_Enhancements	Infrastructure	01/01/2017	188	0	0	0	0	188
Regulator Stations	South Street Regulator Station Rebuild	System_Enhancements	Infrastructure	01/01/2017	284	0	0	0	0	284
Regulator Stations	South Clinton Street Property Purchase	System_Enhancements	Infrastructure	01/01/2017	101	0	0	0	0	101
Regulator Stations	First Street Regulator Station Property Purchase	System_Enhancements	Infrastructure	01/01/2017	101	0	0	0	0	101
Regulator Stations	Coxsackie Regulator Runs and Heater Rebuild	System_Enhancements	Infrastructure	01/01/2017	324	0	0	0	0	324
Regulator Stations	Prior Year Projects	Maintain_Standards	Infrastructure	01/17/2017	20	0	0	0	0	20
Regulator Stations	Pressure Chart Upgrades	Maintain_Standards	Infrastructure	01/01/2018	0	52	0	0	0	52
Regulator Stations	Station Pressure Stabilization	Maintain_Standards	Infrastructure	01/01/2018	0	104	0	0	0	104
Regulator Stations	Prior Year Projects	Maintain_Standards	Infrastructure	01/01/2018	0	21	0	0	0	21
Regulator Stations	South Clinton Street Regulator Station Rebuild	System_Enhancements	Infrastructure	01/01/2018	0	414	0	0	0	414
Regulator Stations	Pressure Chart Upgrades	Maintain_Standards	Infrastructure	01/01/2019	0	0	53	0	0	53
Regulator Stations	Station Pressure Stabilization	Maintain_Standards	Infrastructure	01/01/2019	0	0	212	0	0	212

CAT.	GAS ADDITIONS Description	Discretion Level	Investment Type	Preliminary In-Service Date	W/ AFUDC, Inflated & OH Adjustments 2017	2018	2019	2020	2021	5-Year Total
Regulator Stations	Prior Year Projects	Maintain_Standards	Infrastructure	01/01/2019	0	0	21	0	0	21
Regulator Stations	Poughkeepsie Receival Rebuild 60 psig regulators/ heater/ filter	System_Enhancements	Infrastructure	01/01/2019	0	0	528	0	0	528
Regulator Stations	Regulator Station SCADA implemenation	System_Enhancements	Infrastructure	01/01/2019	0	0	211	0	0	211
Regulator Stations	First Street Regulator Station Rebuild	System_Enhancements	Infrastructure	01/01/2019	0	0	476	0	0	476
Regulator Stations	Pressure Chart Upgrades	Maintain_Standards	Infrastructure	01/01/2020	0	0	0	54	0	54
Regulator Stations	Station Pressure Stabilization	Maintain_Standards	Infrastructure	01/01/2020	0	0	0	216	0	216
Regulator Stations	Prior Year Projects	Maintain_Standards	Infrastructure	01/01/2020	0	0	0	22	0	22
Regulator Stations	Regulator Station SCADA implemenation	System_Enhancements	Infrastructure	01/01/2020	0	0	0	216	0	216
Regulator Stations	Union Ave. Regulator Station Rebuild	System_Enhancements	Infrastructure	01/01/2020	0	0	0	416	0	416
Regulator Stations	Catskill Heater Replacement	System_Enhancements	Infrastructure	01/01/2020	0	0	0	324	0	324
Regulator Stations	Poughkeepsie Receival Medium Pressure Rebuild	System_Enhancements	Infrastructure	01/01/2020	0	0	0	324	0	324
Regulator Stations	Pressure Chart Upgrades	Maintain_Standards	Infrastructure	01/01/2021	0	0	0	0	55	55
Regulator Stations	Station Pressure Stabilization	Maintain_Standards	Infrastructure	01/01/2021	0	0	0	0	220	220
Regulator Stations	KS-System Additional Feed, New Regulator Station Build	System_Enhancements	Infrastructure	01/01/2021	0	0	0	0	308	308
Regulator Stations	Regulator Station SCADA implemenation	System_Enhancements	Infrastructure	01/01/2021	0	0	0	0	220	220
Regulator Stations	Poughkeepsie Receival Low Pressure Rebuild	System_Enhancements	Infrastructure	01/01/2021	0	0	0	0	439	439
Regulator Stations	Highland Mills Heater	System_Enhancements	Infrastructure	01/01/2021	0	0	0	0	331	331
Regulator Stations	Prior Year Proects	Maintain_Standards	Infrastructure	01/01/2021	0	0	0	0	22	22
Regulator Stations	Subtotal Regulator Stations				1,212	590	1,502	1,571	1,596	6,471
New Business	Residential Conversion	System Enhancements	New Business	Multiple	8,319	8,531	8,447	8,656	8,853	42805
New Business	Commercial Conversion	System Enhancements	New Business	Multiple	2,017	2,068	2,048	2,098	2,146	10377
New Business	New Franchise / Large C&I Proj.	System Enhancements	New Business	Multiple	1,920	1,969	1,950	1,998	2,044	9882
New Business	Traditional NB Res/Comm	Non Discretionary	New Business	Multiple	1,819	1,866	1,847	1,893	1,936	9362
New Business	Subtotal New Business				14,075	14,434	14,293	14,645	14,980	72,427
Distribution	Corrosion Control - Emergent Projects	Maintain_Standards	Infrastructure	Multiple	133	138	159	162	166	759
Distribution	Unidentified Road Rebuild - Replacing Leak Prone Pipe	Maintain_Standards	Infrastructure	Multiple	461	472	793	811	830	3367
Distribution	Unidentified Road Rebuilds - Plastic or Protected Steel	Maintain_Standards	Infrastructure	Multiple	51	52	53	54	55	266
Distribution	Cast Iron Undermines	Non Discretionary	Compliance	Multiple	205	210	211	189	194	1009
Distribution	Unidentified Leaking Pipe Replacement	Maintain_Standards	Infrastructure	Multiple	179	184	793	811	830	2797
Distribution	Service Replacement Limited Term Work Orders - Emergent Work	Non Discretionary	Compliance	Multiple	1,435	1,364	1,374	1,405	1,329	6907
Distribution	Service Replacement Limited Terms - Associated w Identified LPP Projects	Non Discretionary	Compliance	Multiple	3,264	5,363	4,966	5,162	5,287	24042
Distribution	Replacements - Isolated Steel Services	Non Discretionary	Compliance	Multiple	538	525	423	216	111	1812
Distribution	Local Orders - Blankets - for replacement of LPP	Maintain_Standards	Infrastructure	Multiple	419	420	396	405.39	388	2028
Distribution	Local Orders - Blankets - for replacement of Plastic or Protected Steel	Maintain_Standards	Infrastructure	Multiple	105	111	132	135	166	649
Distribution	Mount Carmel and Delafield Neighborhood	Maintain_Standards	Infrastructure	2017	124	-	-	-	-	124
Distribution	North Water Street PN Line Replacement - POK	Maintain_Standards	Infrastructure	2017	-	881	-	-	-	881
Distribution	Uptown Kingston	Maintain_Standards	Infrastructure	2018	-	-	682	-	-	682
Distribution	Wappingers - PN Line	Maintain_Standards	Infrastructure	2019	-	-	2,643	-	-	2643
Distribution	PN - Near South Road	Maintain_Standards	Infrastructure	2020	-	-	-	2,703	-	2703
Distribution	PN - Next mile south	Maintain_Standards	Infrastructure	2021	-	-	-	-	2,768	2768
Distribution	Cornwall 2 Faculty Row/Academy	Maintain_Standards	Load Growth	2017	139	-	-	-	-	139
Distribution	Bement Avenue Neighborhood	Maintain_Standards	Load Growth	2017	275	-	-	-	-	275
Distribution	Fullerton to Robinson	Maintain_Standards	Load Growth	2017	268	-	-	-	-	268
Distribution	Roosevelt Park - Run 60 PSIG Feeder	Maintain_Standards	Load Growth	2017	615	-	-	-	-	615
Distribution	Jefferson Heights	Maintain_Standards	Load Growth	2017	395	-	-	-	-	395
Distribution	Arterial crossing - Pershing Avenue	Maintain_Standards	Load Growth	2017	307	-	-	-	-	307
Distribution	SM Line Carmel	Maintain_Standards	Load Growth	2017	512	4,721	-	-	-	5233
Distribution	South Wall Street	Maintain_Standards	Load Growth	2018	-	236	-	-	-	236

	GAS ADDITIONS				W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Investment Type	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Distribution	Mansion Violet Hamilton	Maintain_Standards	Load Growth	2018	-	824	-	-	-	824
Distribution	North Clanceyville	Maintain_Standards	Load Growth	2018	-	169	-	-	-	169
Distribution	Uptown Kingston	Maintain_Standards	Load Growth	2019	-	-	201	-	-	201
Distribution	Fullerton to West St Newburgh	Maintain_Standards	Load Growth	2019	-	-	174	-	-	174
Distribution	Kings Street	Maintain_Standards	Load Growth	2019	-	-	296	-	-	296
Distribution	TV Line - Station Outlet	Maintain_Standards	Load Growth	2019	-	-	1,586	-	-	1586
Distribution	Cedar Avenue Neighborhood	Maintain_Standards	Load Growth	2020	-	-	-	496	-	496
Distribution	Mailer and Main - Cornwall	Maintain_Standards	Load Growth	2020	-	-	-	296	-	296
Distribution	Main Mill Bridge	Maintain_Standards	Load Growth	2020	-	-	-	235	-	235
Distribution	Fairview and Quarry	Maintain_Standards	Load Growth	2020	-	-	-	41	-	41
Distribution	Randolph	Maintain_Standards	Load Growth	2020	-	-	-	173	-	173
Distribution	Place Holder	Maintain_Standards	Load Growth	2021	-	-	-	-	1,246	1246
Distribution	Deleware Avenue Neighborhood Project	Non Discretionary	Compliance	2017	2,541	-	-	-	-	2541
Distribution	Mount Carmel and Delafield Neighborhood	Non Discretionary	Compliance	2017	2,833	-	-	-	-	2833
Distribution	BN Line Replacement	Non Discretionary	Compliance	2017	4,805	-	-	-	-	4805
Distribution	Cornwall 2 Faculty Row/Academy	Non Discretionary	Compliance	2017	867	-	-	-	-	867
Distribution	Bement Avenue Neighborhood	Non Discretionary	Compliance	2017	2,515	-	-	-	-	2515
Distribution	Fullerton to Robinson	Non Discretionary	Compliance	2017	3,137	-	-	-	-	3137
Distribution	Jefferson Heights	Non Discretionary	Compliance	2017	1,845	-	-	-	-	1845
Distribution	Roosevelt Park	Non Discretionary	Compliance	2018	-	4,935	-	-	-	4935
Distribution	South Wall Street	Non Discretionary	Compliance	2018	-	2,958	-	-	-	2958
Distribution	Mansion Violet Hamilton	Non Discretionary	Compliance	2018	-	3,128	-	-	-	3128
Distribution	Kingston and Wilbur Backyards	Non Discretionary	Compliance	2018	-	3,342	-	-	-	3342
Distribution	Cornwall 3 - Hasbrouck and Union Area	Non Discretionary	Compliance	2018	-	2,617	-	-	-	2617
Distribution	North Clanceyville	Non Discretionary	Compliance	2018	-	2,144	-	-	-	2144
Distribution	East Newburgh Broadway to Third	Non Discretionary	Compliance	2018	-	2,014	-	-	-	2014
Distribution	Albany Foxhall Manor Madison	Non Discretionary	Compliance	2019	-	-	2,420	-	-	2420
Distribution	West Saugerties	Non Discretionary	Compliance	2019	-	-	4,421	-	-	4421
Distribution	Uptown Kingston	Non Discretionary	Compliance	2019	-	-	1,542	-	-	1542
Distribution	Kings Street	Non Discretionary	Compliance	2019	-	-	4,226	-	-	4226
Distribution	SW Poughkeepsie Hooker/Hamilton	Non Discretionary	Compliance	2019	-	-	3,154	-	-	3154
Distribution	Fullerton to West St - Newburgh	Non Discretionary	Compliance	2019	-	-	3,459	-	-	3459
Distribution	Cornwall 4 - Main and Hudson	Non Discretionary	Compliance	2019	-	-	2,384	-	-	2384
Distribution	Clifton East Chester Neighborhood	Non Discretionary	Compliance	2020	-	-	-	3,054	-	3054
Distribution	Fairview/Quarry Street Area	Non Discretionary	Compliance	2020	-	-	-	3,154	-	3154
Distribution	East Saugerties	Non Discretionary	Compliance	2020	-	-	-	3,362	-	3362
Distribution	Randolph Ferris Beechwood Neighborhood	Non Discretionary	Compliance	2020	-	-	-	3,446	-	3446
Distribution	Main Mill Bridge	Non Discretionary	Compliance	2020	-	-	-	3,268	-	3268
Distribution	Cedar Avenue Neighborhood	Non Discretionary	Compliance	2020	-	-	-	2,185	-	2185
Distribution	Cornwall - Mailer Ave/Mill Street	Non Discretionary	Compliance	2020	-	-	-	2,353	-	2353
Distribution	West Newburgh Area	Non Discretionary	Compliance	2020	-	-	-	4,672	-	4672
Distribution	Place Holder - 2021 Neighborhood Projects	Non Discretionary	Compliance	2021	-	-	-	-	26,110	26110
Distribution	Subtotal Distribution Improvements				27,971	36,806	36,489	38,788	39,480	179,534
Meters	X081A - Gas Meters	Non Discretionary	New Business		1780	1817	1855	1894	1934	9281
Meters	X084A - Special Meter Installation	Non Discretionary	New Business		490	500	510	521	532	2553
Meters	Subtotall Gas Meters				2,269	2,317	2,366	2,415	2,466	11,834
	Total Gas				47,205	56,752	60,858	59,103	60,121	284,040

	COMMON ADDITIONS			W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Land & Buildings	Daily Operations - Electric	System Enhancements	on going	26	52	54	55	57	243
Land & Buildings	Daily Operations - Flooring	Maintain Standards	on going	26	52	54	55	57	243
Land & Buildings	Daily Operations - HVAC	Maintain Standards	on going	26	52	54	55	57	243
Land & Buildings	Daily Operations - Unidentified	System Enhancements	on going	256	521	536	553	567	2434
Land & Buildings	Repave Parking Lot (Multi Year) (Kingston)	System Enhancements	on going	154	260	268	277	284	1243
Land & Buildings	Repave Parking Lots (Multi Year)	Maintain Standards	on going	154	260	268	277	284	1243
Land & Buildings	Building 800 Window Replacement - 1st Floor	Maintain Standards	2017	390	0	0	0	0	390
Land & Buildings	Building 801 - VVT Automation	Enhancements	2017	82	0	0	0	0	82
Land & Buildings	Building 810 Control Center Replace Heat Pumps w/ RTU's	Enhancements	2017	82	0	0	0	0	82
Land & Buildings	Building 802 - VVT Automation	Enhancements	2017	82	0	0	0	0	82
Land & Buildings	Building 807 - Replace Roof - Auditorium	Maintain Standards	2017	103	0	0	0	0	103
Land & Buildings	Building 804 - Renovate OMS Office Area	Maintain Standards	2017	51	0	0	0	0	51
Land & Buildings	Install Pole Racks	Enhancements	2017	103	0	0	0	0	103
Land & Buildings	Enlarge Loading Dock / Install Leveler (Ellenville)	Enhancements	2017	51	0	0	0	0	51
Land & Buildings	Pole Barn along South side of property (40x80x15)(Ellenvill	Enhancements	2017	152	0	0	0	0	152
Land & Buildings	Install New sand/salt sheds (Fishkill)	Enhancements	2017	78	0	0	0	0	78
Land & Buildings	Replace Back Staircases (Fishkill)	Maintain Standards	2017	51	0	0	0	0	51
Land & Buildings	Relocate/Install new pole pile (Fishkill)	Enhancements	2017	41	0	0	0	0	41
Land & Buildings	Replace Pole Piles (Newburgh)	Maintain Standards	2017	41	0	0	0	0	41
Land & Buildings	Install Pole Barn - NE Side of Building	Enhancements	2017	152	0	0	0	0	152
Land & Buildings	Build Out Office Space Kingston)	Maintain Standards	2017	308	0	0	0	0	308
Land & Buildings	Enlarge Transformer Dock & Replace Roof (Ellenville)	Enhancements	2018	0	32	0	0	0	32
Land & Buildings	Replace Roof - 1/3 Back Building	Maintain Standards	2018	0	521	0	0	0	521
Land & Buildings	Build Pole Barn for Transformers (Newburgh)	Enhancements	2018	0	125	0	0	0	125
Land & Buildings	Window Replacements - Front and North Side	Enhancements	2018	0	135	0	0	0	135
Land & Buildings	Improve Drainage around Newburgh Building	Enhancements	2018	0	156	0	0	0	156
Land & Buildings	Building 802 - Replace Roof	Maintain Standards	2018	0	83	0	0	0	83
Land & Buildings	Replace Street Light Poles	Maintain Standards	2018	0	60	0	0	0	60
Land & Buildings	South Road Complex - Install New Curbing	Enhancements	2018	0	60	0	0	0	60
Land & Buildings	Building 806 Resurface and Restripe Garage Floors	Maintain Standards	2018	0	94	0	0	0	94
Land & Buildings	Building 808 - Replace Windows	Enhancements	2018	0	104	0	0	0	104
Land & Buildings	Building 807 - Replace Windows	Enhancements	2018	0	156	0	0	0	156
Land & Buildings	Build Additional Office/Cubical Space	Enhancements	2018	0	260	0	0	0	260
Land & Buildings	Building 807 Relocate Transformers and Replace Steps	Maintain Standards	2019	0	0	322	0	0	322
Land & Buildings	Repave Back Parking Lot near Line Garage (Newburgh)	Maintain Standards	2019	0	0	86	0	0	86
Land & Buildings	Renovate Cottage for Additional Meeting Space	Enhancements	2019	0	0	161	0	0	161
Land & Buildings	Paving front of Lodge and roadway into site	Maintain Standards	2019	0	0	161	0	0	161
Land & Buildings	Replace Ice Machine	Maintain Standards	2019	0	0	5	0	0	5
Land & Buildings	Building 802 - Install Awning @ Drafting Entrance	Enhancements	2019	0	0	11	0	0	11
Land & Buildings	Building 807 - Customer Service Entrance Awning	Enhancements	2019	0	0	11	0	0	11
Land & Buildings	Building 810 - Install Awning @ Back Entrance	Enhancements	2019	0	0	11	0	0	11

	COMMON ADDITIONS			W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Land & Buildings	Building 808 Fluid Containment Mechanics Garage	Enhancements	2019	0	0	27	0	0	27
Land & Buildings	Building 801 Replace 50 Ton RTU	Enhancements	2019	0	0	139	0	0	139
Land & Buildings	Building 803 - Call Center Break Room Renovation	Enhancements	2019	0	0	54	0	0	54
Land & Buildings	Building 810 - Replace Roof	Maintain Standards	2019	0	0	268	0	0	268
Land & Buildings	Replace Roof - 1/3 Back Building	Maintain Standards	2019	0	0	429	0	0	429
Land & Buildings	Remove Steam / Water Pipes - Main Building (Asbestos)	Enhancements	2019	0	0	86	0	0	86
Land & Buildings	Install Roof over wire storage area (Fishkill)	Enhancements	2019	0	0	129	0	0	129
Land & Buildings	Transformer Shop Upgrade	Enhancements	2019	0	0	161	0	0	161
Land & Buildings	Replace Storm Drains	Maintain Standards	2019	0	0	54	0	0	54
Land & Buildings	Pedestrian Entrance Doors - Main Building & Garage	Maintain Standards	2019	0	0	38	0	0	38
Land & Buildings	Swing Arm for Transformer Platform (Greenville)	Enhancements	2019	0	0	43	0	0	43
Land & Buildings	Pave Parking Lot	Maintain Standards	2020	0	0	0	166	0	166
Land & Buildings	Install Generator at Storeroom	Enhancements	2020	0	0	0	55	0	55
Land & Buildings	Lighting Upgrade - Storeroom	Enhancements	2020	0	0	0	44	0	44
Land & Buildings	Replace Exhaust Fan in lineman's garage	Maintain Standards	2020	0	0	0	28	0	28
Land & Buildings	Replace Pavillion & Bath House Roof	Maintain Standards	2020	0	0	0	77	0	77
Land & Buildings	Controls System HVAC	Enhancements	2020	0	0	0	111	0	111
Land & Buildings	Lighting Upgrade - Storeroom	Enhancements	2020	0	0	0	44	0	44
Land & Buildings	Replace/Upgrade 803 RTU's	Maintain Standards	2020	0	0	0	221	0	221
Land & Buildings	Replace Training Room HVAC Unit hook up to new controls	Maintain Standards	2020	0	0	0	66	0	66
Land & Buildings	Pave Pole & Equipment area	Maintain Standards	2020	0	0	0	89	0	89
Land & Buildings	Replace Carpeting - Call Centers	Maintain Standards	2020	0	0	0	83	0	83
Land & Buildings	Install fire protection under raised floor - Bldg 810	Enhancements	2020	0	0	0	102	0	102
Land & Buildings	Bldg 807 - Dispatch Center Renovation	Enhancements	2020	0	0	0	83	0	83
Land & Buildings	Upgrade Lighting - Mechanics Garage	Enhancements	2020	0	0	0	11	0	11
Land & Buildings	Install New signs	Maintain Standards	2020	0	0	0	11	0	11
Land & Buildings	Replace Roof - 1/3 Back Building	Maintain Standards	2020	0	0	0	443	0	443
Land & Buildings	Install fire protection @ EC Lineman's, Transformer, Storer	Enhancements	2020	0	0	0	199	0	199
Land & Buildings	Controls System HVAC	Enhancements	2021	0	0	0	0	340	340
Land & Buildings	Resurface Gas Garage Floors - Linemen's Garage	Maintain Standards	2021	0	0	0	0	57	57
Land & Buildings	Resurface Gas Garage Floors - Gas Garage	Maintain Standards	2021	0	0	0	0	57	57
Land & Buildings	Building 803 - Replace Asbestos Tile	Enhancements	2021	0	0	0	0	57	57
Land & Buildings	Building 800 - Create Women's Rest Room 1st Floor	Enhancements	2021	0	0	0	0	68	68
Land & Buildings	Building 805 Resurface and Restripe Garage Floors	Maintain Standards	2021	0	0	0	0	68	68
Land & Buildings	Building 808 - Roof Replacment	Enhancements	2021	0	0	0	0	284	284
Land & Buildings	Bldg 807 - Credit Union Roof Replacement	Maintain Standards	2021	0	0	0	0	284	284
Land & Buildings	Replace Carpeting - Main Bldg and Training Room (Fishkill)	Maintain Standards	2021	0	0	0	0	93	93
Land & Buildings	Replace Sidewalks	Maintain Standards	2021	0	0	0	0	62	62
Land & Buildings	Replace Roof Front Bldg	Maintain Standards	2021	0	0	0	0	159	159
Land & Buildings	Replace Sloped Roof - Front Annex Bldg	Maintain Standards	2021	0	0	0	0	397	397

	COMMON ADDITIONS			W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Land & Buildings	Building Expansion (Stanfordville)	Enhancements	2017	1539	0	0	0	0	1539
Land & Buildings	Kingston Build Out - 1st Floor	Enhancements	2020	0	0	0	1660	0	1660
Land & Buildings	Kingston Build Out - 2nd Floor	Enhancements	2019	0	0	1609	0	0	1609
Land & Buildings	System Operations Build Out	Enhancements	2018	0	625	0	0	0	625
Land & Buildings	Linemen and Gas Training Centers	Enhancements	2020	0	0	0	4426	0	4426
Land & Buildings	Parking Garage & Office Bldg	Enhancements	2021	0	0	0	0	11348	11348
Land & Buildings				3,947	3,611	5,037	9,191	14,579	36,365
Office Equipment	South Road - Daily Operations - Larger Projects	Maintain Standards	on going	66	68	69	71	72	346
Office Equipment	South Road - Misc. Furniture	Maintain Standards	on going	41	42	43	43	44	213
Office Equipment	South Road - Office Chair Replacement Program	Maintain Standards	on going	36	36	37	38	39	186
Office Equipment	New Office Furniture	Maintain Standards	2019	0	0	21	0	0	21
Office Equipment	Additional Cubicles - Lake Katrine	Maintain Standards	2020	0	0	0	43	67	110
Office Equipment	Upgrade Office Furniture - Fishkill	Maintain Standards	2017	61	0	0	0	0	61
Office Equipment	New Office Furniture (Stanfordville)	Maintain Standards	2018	0	62	0	0	0	62
Office Equipment	Bldg 807 - Dispatch Office	Maintain Standards	2020	0	0	0	22	0	22
Office Equipment	Bldg 810 - System Operations New Furniture	Maintain Standards	2018	0	104	0	0	0	104
Office Equipment	Rifton - Cottage Meeting Room	Maintain Standards	2019	0	0	43	0	0	43
Office Equipment	New Line & Gas Training Facility	Maintain Standards	2020	0	0	0	109	0	109
Office Equipment				204	312	213	326	222	1,276
EMS	EMS Jump Second Upgrade	System Enhancements	08/01/2016	663	0	0	0	0	663
EMS	DMS - New Distribution Management System and D-Scada	System Enhancements	03/30/2017	604	0	0	0	0	604
EMS	DMS - New Distribution Management System Phase II	System Enhancements	09/30/2017	674	0	0	0	0	674
EMS	DMS - DSO work area Bldg 810 S1	System Enhancements	12/31/2017	357	1562	0	0	0	1919
EMS	EMS PCC Mapboard Replacement (Video Wall)	System Enhancements	09/01/2018	0	2604	0	0	0	2604
EMS	EMS DTS Video Wall/Blackboard Software - Operator Trair	System Enhancements	09/01/2018	0	331	0	0	0	331
EMS	Network Infrastructure Upgrade	System Enhancements	12/31/2019	0	0	532	0	0	532
EMS	EMS eDNA Historian Upgrade	System Enhancements	08/01/2019	0	0	96	0	0	96
EMS	EMS Software Upgrade (non-JUMP)	System Enhancements	08/01/2021	0	0	0	109	4434	4542
4231	DMS - Software Upgrade	System Enhancements	06/01/2020	0	0	0	868	0	868
EMS	Miscellaneous Hardware and Software Failures	System Enhancements	Ongoing	51	52	53	54	55	266
EMS				2,349	4,549	680	1,031	4,489	13,099
Hardware	Hardware Minors	System Enhancements	Annual	130	245	153	163	166	857
Hardware	PC and Laptop Replacements	System Enhancements	Annual	368	655	588	543	554	2708
Hardware	Mobile (Pen) Computing Replacements	System Enhancements	Annual	173	209	235	271	277	1165
Hardware	Monitors, Network Printers-Adds/Repl.	System Enhancements	Annual	108	165	118	136	139	665
Hardware	Server Replacements and Storage Upgrades	System Enhancements	Annual	812	1263	882	923	942	4821
Hardware	Network Infrastructure Upgrades/Replacements	System Enhancements	Annual	271	438	353	380	388	1829
Hardware	Cyber Security	System Enhancements	Annual	65	120	82	109	111	486
Hardware	Copiers (new budget line item requested by Tim B)	System Enhancements	Annual	54	82	59	60	61	316
Hardware	IT Strategic Initiatives Hardware	System Enhancements	12/31/2019	0	0	638	543	554	1735

	COMMON ADDITIONS			W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Software	Business Intelligence (Cognos)	System Enhancements	many/year	848	1278	1315	1336	1380	6158
Software	Enterprise Content Management - Phase V	System Enhancements	12/31/2016	973	0	0	0	0	973
Software	Enterprise Content Management - future Phases	System Enhancements	Annual	0	1358	1398	445	460	3661
Software	Bill Redesign - OT Streamserve	System Enhancements	01/00/1900	0	533	658	167	172	1530
Software	EmpCenter Upgrades & Enhancements	System Enhancements	12/31/2015	0	80	164	167	172	584
Software	CIS / REV Modernization	System Enhancements	Annual	0	1758	2960	2951	2874	10543
Software	Claims System Replacement	System Enhancements	01/00/1900	0	107	0	0	57	164
Software	CDM - Financial Reporting	System Enhancements	01/00/1900	26	0	0	56	0	82
Software	Cyber Security	System Enhancements	Annual	340	426	438	445	460	2110
Software	Unified Communications, VoIP, IVR Upgrades & Enhancem	System Enhancements	Annual	169	426	987	668	690	2940
Software	Mainframe Bundled Releases	System Enhancements	01/00/1900	140	320	329	334	345	1467
Software	Mobility Upgrade - (Tim H)*	System Enhancements		1132	0	438	0	0	1570
Software	Emergency Management Software - Upgrades & Enhancen	System Enhancements	01/00/1900	0	320	329	334	345	1327
Software	Emergent Software Packages/Upgrades	System Enhancements	Annual	0	639	1096	1336	1610	4681
Software	Business Agility with an Enterprise SOA Framework	System Enhancements	Annual Releases	254	959	1261	1336	1380	5189
Software	Increase the Quality & Speed of Delivery of Application Tes	System Enhancements	Annual Releases	159	533	548	557	575	2371
Software	Digital Initiatives for Customer Engagement (DICE)(Include	System Enhancements	Annual Releases	127	1385	2412	2450	2530	8903
Software	Digital Analytics (REV CenHub)	System Enhancements	12/31/2017	212	0	0	0	0	212
Software	PPM - Project Portfolio Management Solution	System Enhancements	12/31/2016	0	217	219	223	230	889
Software	Wiki/CentralHudson.com Redesign - WCM	System Enhancements	12/31/2016	0	447	603	612	287	1950
Software	Chevin - Fleetwave Upgrades & Enhancements	System Enhancements	12/31/2015	0	107	219	111	115	552
Software	EAM - Enterprise Asset Mgmt	System Enhancements	12/31/2019	0	213	438	111	0	763
Software	HRIS - TotalHR Replacement	System Enhancements	12/31/2019	0	533	767	557	287	2144
Software	Electric GIS- Estimating Design (Frank B)	System Enhancements	06/01/2017	51	0	0	0	0	51
Software	Electric GIS- Underground manhole (Frank B)	System Enhancements	12/01/2019	0	365	389	0	0	755
Software	Electric GIS - Upgrades & Enhancements (Frank B)	System Enhancements	12/01/2021	0	0	0	0	575	575
Software	AP Automation System Upgrade - (Joe C)	System Enhancements	12/01/2015	0	266	0	0	287	554
Software	PowerPlan - Upgrades & Enhancements (Joe C)	System Enhancements	12/01/2018	0	0	0	668	0	668
Software	PowerPlan - Construction Budgeting upgrades (Chris R)	System Enhancements	06/01/2016	529	0	0	0	0	529
Software	Taurigma Automated Fault Location and Event Retriever (E	System Enhancements	Annual	68	73	78	0	0	219
Software	GL Essentials Upgrades & Enhancements	System Enhancements	Annual	0	0	274	0	0	274
Software	Clarity Replacement/Upgrade (Stan K)	System Enhancements	12/31/2019	0	692	0	0	0	692
Software	ARCOS Upgrades & Enhancements	System Enhancements	06/01/2016	0	160	0	0	172	332
Software	OMS Replacement (Tim H)	System Enhancements	06/01/2019	0	1164	1864	0	0	3028
Software	CYME (Adams)	System Enhancements	12/01/2018	0	107	0	0	0	107
Software	Loadflow (PSS/e - MUST)	System Enhancements	06/01/2019	69	0	0	0	0	69

	COMMON ADDITIONS			W/ AFUDC, Inflated & OH Adjustments					
CAT.	Description	Discretion Level	Preliminary In-Service Date	2017	2018	2019	2020	2021	5-Year Total
Software & Hardware				7,077	17,641	22,293	17,993	18,197	83,201
Security	Security Guard Booths District Offices Phase 2	System Enhancements	2017	153	0	0	0	0	153
Security	Security Guard Booth Corporate Offices	System Enhancements	2017	204	0	0	0	0	204
Security	Fishkill Plains Sub Cameras/Intrusion detection	System Enhancements	2017	102	0	0	0	0	102
Security	Manchester Sub Cameras/Intrusion Detection	System Enhancements	2017	133	0	0	0	0	133
Security	Easy Lobby Visitor ID Program - District Offices	System Enhancements	2017	41	0	0	0	0	41
Security	Todd Hill Sub Cameras/Intrusion Detection	System Enhancements	2018	0	135	0	0	0	135
Security	Knapps Corners Sub Cameras/Intrusion Detection	System Enhancements	2018	0	135	0	0	0	135
Security	License Plate Cameras District Offices	System Enhancements	2018	0	208	0	0	0	208
Security	Poughkeepsie Gas Cameras/Intrusion detection	System Enhancements	2018	0	104	0	0	0	104
Security	Spackenkill Sub Cameras/Intrusion Detection	System Enhancements	2018	0	135	0	0	0	135
Security	Poughkeepsie River Crossing Pump House/Intrusion detect	System Enhancements	2019	0	0	149	0	0	149
Security	Hurley Ave Sub Thermal Security Cameras	System Enhancements	2019	0	0	186	0	0	186
Security	Hudson Crossing Cameras/Intrusion Detection	System Enhancements	2019	0	0	159	0	0	159
Security	Myers Corners Sub Cameras/Intrusion Detection	System Enhancements	2019	0	0	138	0	0	138
Security	Napanoch Sub Cameras/Intrusion Detection	System Enhancements	2020	0	0	0	109	0	109
Security	Substation Gunshot Detection System	System Enhancements	2020	0	0	0	109	0	109
Security	Rifton - Cameras/Intrusion Detection	System Enhancements	2020	0	0	0	141	0	141
Security	North Chelsea Sub Cameras/Intrusion Detection	System Enhancements	2020	0	0	0	141	0	141
Security	Mahopac Gas Sub Cameras/Intrusion detection	System Enhancements	2020	0	0	0	87	0	87
Security	Pleasant Valley Sub Additional Cameras/Intrusion detection	System Enhancements	2020	0	0	0	65	0	65
Security	Pleasant Valley Gas Sub Cameras/Intrusion detection	System Enhancements	2021	0	0	0	0	94	94
Security	Rock Tavern Sub Thermal Security Cameras	System Enhancements	2021	0	0	0	0	194	194
Security	Roseton Sub Thermal Security Cameras	System Enhancements	2021	0	0	0	0	89	89
Security	Smithfield Sub Cameras/Intrusion detection	System Enhancements	2021	0	0	0	0	111	111
Security	Highland Sub Cameras/Intrusion Detection	System Enhancements	2021	0	0	0	0	111	111
Security				632	719	633	651	599	3,233
Tools	Small Tools	Maintain Standards	0	1071	1630	1595	1357	1280	6933
Tools	Tools								
Communications	Network Strategy Pilot Project - Phase 2	System Enhancements	Ongoing	4444	4742	3935	2556	1108	16786
Communications	Radio Minor	System Enhancements	Ongoing	204	1250	425	326	222	2426
Communications	Communication			4,648	5,992	4,360	2,882	1,330	19,212
Transportation	Transportaion	Maintain Standards	0	7956	9216	10220	10626	11088	49107
	Total			27,883	43,670	45,031	44,058	51,783	212,426