



David P. Warner
Associate Counsel
Consolidated Edison Company of New York, Inc.
4 Irving Place, Room 1815-S, New York, NY 10003
(212) 460-4286 FAX: (212) 677-5850
Email: warnerd@coned.com

February 29, 2016

Via Electronic Filing
Hon. Kathleen H. Burgess
Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, NY 12223

Re: Case 13-E-0030 - Proceeding on Motion of the Commission as to
the Rates, Charges, Rules and Regulations of Consolidated Edison
Company of New York, Inc. for Electric Service - *Report on 2015
Capital Expenditures and 2016-2020 Electric Capital Forecast*

Dear Secretary Burgess:

Consolidated Edison Company of New York, Inc. ("Con Edison") submits for
information purposes and filing its *Report on 2015 Capital Expenditures and 2016-2020
Electric Capital Forecast* ("Report") in the above referenced proceeding.

This Report is submitted pursuant to the Public Service Commission's *Order
Approving Electric, Gas and Steam Rate Plans in Accord with Joint Proposal*, issued
February 21, 2014 ("Order"). Appendix 23 of the Joint Proposal explains Con Edison's
capital reporting requirements pursuant to the Order.

Thank you for your assistance in this matter.

Sincerely,

Att:

Cc: Active Parties in Cases 13-E-0030 (*Via E-Mail*)

Consolidated Edison Company of New York, Inc.
Report on 2015 Capital Expenditures
and 2016-2020 Electric Capital Forecast

Case 13-E-0030 - Proceeding on Motion of the Commission As to the Rates,
Charges, Rules and Regulations of Consolidated Edison Company of New
York, Inc. for Electric Service

New York, New York
February 29, 2016

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Summary T&D Capital Plan
2015 Capital Budget and Actual Spend
(\$'s thousands)

	2015				
	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
Electric T&D					
System and Transmission	108,550	60,700	64,142	3,442	6%
Substations	184,392	181,094	168,829	(12,265)	(7%)
Distribution	783,544	773,023	832,537	59,514	8%
Sub-total Electric T&D	1,076,486	1,014,817	1,065,508	50,691	5%
Electric Interference	56,718	96,569	78,314	(18,255)	(19%)
Total Electric T&D	1,133,204	1,111,386	1,143,822	32,436	3%
Electric Production	24,569	24,789	25,004	215	1%
Shared Services					
Facilities	59,321	58,137	33,338	(24,799)	(43%)
IT Initiatives	52,377	69,648	79,014	9,366	13%
General Equipment	66,069	61,243	95,926	34,683	57%
Other	24,395	25,414	22,560	(2,854)	(11%)
Total Shared Services*	202,162	214,442	230,838	16,396	8%
Sub-total Capital	1,359,935	1,350,617	1,399,664	49,047	4%
Storm Hardening**	282,100	277,586	242,413	(35,173)	(13%)
Total Capital Expenditures	1,642,035	1,628,203	1,642,077	13,874	1%

Note: *83% of Shared Services is allocated to Electric

** Storm Hardening details are included on the subsequent pages for Electric T&D, Production and Common

**Excludes Indian Point Contingency Projects

**System and Transmission Operations
2015 Capital Budget and Actual Spend
(\$'s Thousands)**

DESCRIPTION	2015				
	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
DISTRIBUTION ORDERS ENHANCEMENTS	300	300	268	(32)	(11%)
TOTAL - WORK MGMT SYSTEMS	300	300	268	(32)	(11%)
EMS RELIABILITY AECC AND ECC	200	200	336	136	68%
OTHER	-	-	4	4	-
TOTAL - CONTINUANCE	200	200	340	140	70%
CYBER SECURITY	400	400	895	495	124%
OPERATIONS NETWORK FOR EMS	400	400	675	275	69%
TOTAL - OPERATIONS REQUIREMENTS	800	800	1,570	770	96%
SYSTEM OPERATION ENHANCEMENTS	300	300	364	64	21%
DISTRICT OPERATOR TASK MANAGING SYSTEM	300	300	406	106	35%
OPERATION MANAGEMENT SYSTEM ENHANCEMENTS	400	400	183	(217)	(54%)
TOTAL - DISTRICT OPERATIONS IMPROVEMENT	1,000	1,000	953	(47)	(5%)
COMPUTER ROOM RENOVATION	1,500	1,100	196	(904)	(82%)
ECC/AECC FACILITY SECURITY ENHANCEMENTS	600	600	700	100	17%
TOTAL - FACILITIES/UTILITIES IMPROVEMENT	2,100	1,700	896	(804)	(47%)
TOTAL - SYSTEM OPERATIONS	4,400	4,000	4,027	27	1%
TRANSMISSION FEEDER FAILURES	6,000	10,000	11,922	1,922	19%
QUEENSBORO BRIDGE PROJECT	-	-	29,319	29,319	-
TOTAL - FAILURES	6,000	10,000	41,241	31,241	312%
DYNAMIC FEEDER RATING PROGRAM	1,500	1,500	264	(1,236)	(82%)
FARRAGUT-PLYMOUTH ST-UPRATE FEEDERS 32071,32710, AND 32078	-	3,500	428	(3,072)	(88%)
TOTAL - LOAD RELIEF	1,500	5,000	692	(4,308)	(86%)
PIPE ENHANCEMENT PROGRAM	10,000	18,500	15,870	(2,630)	(14%)
ENVIRONMENTAL ENHANCEMENTS	1,700	1,700	447	(1,253)	(74%)
OTHER	-	-	175	175	-
TOTAL - ENVIRONMENTAL	11,700	20,200	16,492	(3,708)	(18%)
EMERGENT TRANSMISSION RELIABILITY	8,500	6,500	1,868	(4,632)	(71%)
ASTORIA INTERCONNECT FOR FEEDER 34091	-	500	68	(432)	(86%)

TRANSMISSION FEEDER PIPE SUPPORT AT QUEENSBORO BRIDGE	4,450	7,500	-	(7,500)	(100%)
RAINEY TO CORONA-NEW 138KV FEEDER	67,000	2,000	-	(2,000)	(100%)
JOINT REPLACEMENT PROGRAM	5,000	5,000	-	(5,000)	(100%)
OTHER	-	-	(246)	(246)	-
TOTAL - RELIABILITY & FDR REPLACEMENT	84,950	21,500	1,690	(19,810)	(92%)
TOTAL - TRANSMISSION OPERATIONS	104,150	56,700	60,115	3,415	6%
					-
SUB-TOTAL - SYSTEM & TRANSMISSION OPERATIONS	108,550	60,700	64,142	3,442	6%
UPGRADE OVERHEAD 345KV TRANSMISSION STRUCTURES - FEEDER 75 L&M UPGRADE	2,000	2,000	1,853	(147)	(7%)
L-LINE SPLICE AND DEAD END ASSEMBLY	-	2,900	2,212	(688)	(24%)
OTHER	-	-	145	145	-
TOTAL - STORM HARDENING	2,000	4,900	4,210	(690)	(14%)
TOTAL - SYSTEM AND TRANSMISSION OPERATIONS	110,550	65,600	68,352	2,752	4%

Substation Operations
2015 Capital Budget and Actual Spend
(\$'s Thousands)

	2015				
DESCRIPTION	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
SMALL CAPITAL EQUIPMENT PROGRAM	2,725	2,000	2,327	327	16%
TOTAL - SMALL CAPITAL	2,725	2,000	2,327	327	16%
SECURITY ENHANCEMENTS	6,362	15,000	10,187	(4,813)	(32%)
CIP V5 REQUIRED SECURITY UPGRADES	909	1,800	1,440	(360)	(20%)
TOTAL - SECURITY	7,271	16,800	11,627	(5,173)	(31%)
AVENUE A: INSTALL WATER SPRAY ON TRANSFORMERS	750	-	-	-	-
EAST 75TH STREET: TRANSFORMER COOLING TR1, TR2, TR3	750	-	-	-	-
EAST 179TH STREET: SWITCHGEAR & BUS REPLACEMENT	12,000	10,000	10,814	814	8%
EAST 179TH STREET: INSTALL WATER SPRAY FOR 43MVA TRANSFORMERS	500	500	-	(500)	(100%)
EAST 179TH STREET: INSTALL FANS FOR LIMITING BUS, BREAKERS AND REACTORS	750	750	-	(750)	(100%)
FRESH KILLS: INSTALL ADDITIONAL COOLING FOR TRANSFORMER 22E	500	500	-	(500)	(100%)
FRESH KILLS: REPLACE LIMITING FEEDERS ASSOCIATED W/ TR 21W	750	751	-	(751)	(100%)
GREENWOOD: REPLACE OVERDUTIED EQUIPMENT	-	2,000	2,385	385	19%
PLYMOUTH STREET - REPLACE LIMITING EQUIPMENT	-	500	-	(500)	(100%)
PARKCHESTER #2: REPLACE LIMITING 13KV BUS SECTIONS	3,500	-	-	-	-
UPRATE SYN BUS SECTIONS AT LEONARD STREET	-	-	843	843	-
MILLWOOD SUBSTATION - INSTALL FANS and CONTROL CABINET FOR TR 1	-	-	417	417	-
GREENWOOD: INSTALL SURGE ARRESTORS AT BUS SECTION 2N	-	-	577	577	-
REPL. LIMITING BUS AT PLYMOUTH STREET	-	-	20	20	-
INSTALLATION OF THE 4TH TRANSFORMER AT NEWTON	-	500	-	(500)	(100%)
QUEENSBIDGE: REPLACE OVERDUTIED DISCONNECT SWITCHES	4,000	1,001	-	(1,001)	(100%)
New 138 kV FEEDER	-	500	-	(500)	-
LOAD RELIEF - OTHER	-	-	42	42	-
TOTAL - LOAD RELIEF	23,500	17,002	15,098	(1,904)	(11%)
AREA SUBSTATION RELIABILITY AND AUTO GROUND CIRCUIT SWITCHERS	9,311	8,311	10,265	1,954	24%
BREAKER CAPITAL UPGRADE PROGRAM	6,631	7,000	7,294	294	4%
CATEGORY ALARMS PROGRAM	1,363	-	356	356	-
CONDITION BASED MONITORING EQUIPMENT	227	227	130	(97)	(43%)
CORONA: STABILIZATION OF POTHEAD STAND SUPPORTS	908	-	-	-	-
DC SYSTEM UPGRADE PROGRAM	3,438	3,438	3,631	193	6%
DISCONNECT SWITCH CAPITAL UPGRADE PROGRAM	2,727	-	243	243	-
DISTURBANCE MONITORING EQUIPMENT PROGRAM (345KV)	8,003	8,003	4,270	(3,733)	(47%)
DISTURBANCE MONITORING EQUIPMENT PROGRAM (138KV)	3,105	3,105	1,614	(1,491)	(48%)
EAST RIVER UPGRADE	5,453	1,453	1,569	116	8%
ELMSFORD: UPGRADE OF #2 STATION	-	-	1,028	1,028	-
FACILITY IMPROVEMENT PROGRAM	5,999	4,000	2,105	(1,895)	(47%)
FIRE SUPPRESSION SYSTEM UPGRADES	4,904	4,555	6,760	2,205	48%
HIGH VOLTAGE TEST SETS	4,544	1,150	1,328	178	15%
REINFORCED GROUND GRID	1,454	1,454	2,055	601	41%
RELAY HOUSE ENCLOSURE	-	-	4	4	-
RELAY MODIFICATIONS PROGRAM	6,856	5,400	6,176	776	14%
RELAY PROTECTION SYSTEM REDUNDANCY - SINGLE POINT OF CONTACT	4,544	-	-	-	-
RETROFIT OVERDUTIED 13/27KV CIRCUIT BREAKER PROGRAMS	9,544	11,000	10,727	(273)	(2%)
ROOF REPLACEMENT PROGRAM	2,727	-	510	510	-
TRANSFORMER REPLACEMENT PROGRAM	23,102	23,102	21,309	(1,793)	(8%)
U-BUSHING PROGRAM	-	2,300	1,272	(1,028)	(45%)
BUCHANAN -Y94 BY PASS - REPLACEMENT	-	-	2,424	2,424	-
PHASE MONITORING UNIT	-	-	559	559	-
S/S LOSS CONTINGENCY	-	-	4,768	4,768	-
CAPACITOR BANK TRIPPING	-	-	23	23	-
MURRAY HILL CAPACITOR BANK UNITS	-	-	942	942	-
138 kV FEEDERS 34051 & 34052 REACTORS	-	7,500	0	(7,500)	(100%)
WILLOWBROOK - INSTALL NEW BREAKERS IN SYN BUS DUMMY POSITIONS	-	1,000	171	(829)	(83%)
RELIABILITY - OTHER	-	-	81	81	-
TOTAL - RELIABILITY	104,840	92,998	91,614	(1,384)	(1%)
EH&S RISK MITIGATION	9,804	9,803	7,831	(1,972)	(20%)
PUMPING PLANT IMPROVEMENT PROGRAM	4,996	4,000	4,131	131	3%
TOTAL - ENVIRONMENTAL	14,800	13,803	11,962	(1,841)	(13%)
FAILED EQUIPMENT OTHER THAN TRANSFORMERS PROGRAM	4,867	7,502	5,496	(2,006)	(27%)
FAILED TRANSFORMER PROGRAM	25,400	30,000	29,582	(418)	(1%)
TOTAL - FAILURES	30,267	37,502	35,078	(2,424)	(6%)
TECHNOLOGY IMPROVEMENTS	989	989	1,122	133	13%
TOTAL - OTHER	989	989	1,122	133	13%
GOETHALS: SUBSTATION RECONFIGURATION (LINDEN VFT)	-	-	1	1	-
TOTAL - GENERATION INTERCONNECTION	0	0	1	1	-
SUB-TOTAL - SUBSTATION OPERATIONS	184,392	181,094	168,829	(12,265)	(7%)
EAST 13TH STREET	34,000	43,050	31,687	(11,363)	(26%)
EAST RIVER	2,800	2,800	3,044	244	9%

EAST 15TH STREET	3,250	3,500	2,895	(605)	(17%)
EAST 36TH STREET	1,500	4,500	4,242	(258)	(6%)
SEAPORT	1,300	4,300	4,168	(132)	(3%)
TRADE CENTER	700	1,300	1,249	(51)	(4%)
GOWANUS	6,250	6,300	9,485	3,185	51%
GOETHALS	7,200	7,200	7,580	380	5%
FRESH KILLS	6,250	6,300	7,017	717	11%
FARRAGUT	2,600	3,700	3,934	234	6%
HELLGATE	1,900	1,900	197	(1,703)	(90%)
SHERMAN CREEK	1,700	1,700	169	(1,531)	(90%)
RAINEY	275	275	-	(275)	(100%)
VERNON	275	275	-	(275)	(100%)
LEONARD STREET	-	100	-	(100)	(100%)
AVENUE A	-	100	-	(100)	(100%)
VARIOUS SUBSTATIONS -WIRELESS ALARMS/ RELAY UPGRADE	-	5,000	4,252	(748)	(15%)
VARIOUS SUBSTATIONS -MISC	-	2,650	-	(2,650)	(100%)
STORM HARDENING PROGRAM	70,000	94,950	79,919	(15,031)	(16%)
TOTAL - SUBSTATION OPERATIONS	254,392	276,044	248,748	(27,296)	(10%)

Electric Distribution Operations
2015 Capital Budget and Actual Spend
(\$'s Thousands)

Description	2015				
	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
New Business Capital	148,355	156,636	154,994	(1,642)	(1%)
Meter Installation	18,667	15,567	26,913	11,346	73%
Total - New Business	167,022	172,203	181,907	9,704	6%
Primary Cable Replacement (OA's)	48,527	53,620	98,110	44,490	83%
Overhead	14,945	18,016	35,303	17,287	96%
Temporary Services (incl. conduit)	28,605	30,893	65,945	35,052	113%
Street Lights (incl. conduit)	20,184	19,913	25,475	5,562	28%
Transformer Installation	20,184	32,178	32,873	695	2%
Total - Emergency Response / Replacement	132,445	154,620	257,706	103,086	67%
System Reinforcement					
Part of Richmond/Brownsville (30 MW)	22,000	7,000	3,807	(3,193)	(46%)
Part of Pennsylvania (74 MW) to create Waterside network	5,563	9,000	6,985	(2,015)	(22%)
Cable Crossing (XW Riverdale & BQ Flushing)	2,782	2,970	203	(2,767)	(93%)
59th Street Bridge Crossing	1,000	7,600	1,883	(5,717)	(75%)
179th St. Area Substation Reconstruction	-	497	-	(497)	(100%)
Advance Relief (Parkchester 13MV) Transfer	-	-	311	311	-
Part of Cooper Square (15 MW)	4,000	11,000	7,003	(3,997)	(36%)
Total - Load Transfers	35,345	38,067	20,192	(17,875)	(47%)
Primary Feeder Relief	12,019	14,777	4,181	(10,596)	(72%)
Network/Non Network Transformers Relief	33,770	18,648	3,095	(15,553)	(83%)
NonNetwork Fdr Relief (Open Wire)	7,440	5,858	1,911	(3,947)	(67%)
Secondary Main Relief	-	2,000	288	(1,712)	(86%)
Overhead Transformer Relief	2,266	2,632	1,638	(994)	(38%)
Total - Base Growth / Relief	55,495	43,915	11,113	(32,802)	(75%)
Osmose (C Truss)	1,918	1,625	1,280	(345)	(21%)
Autoloop Reliability (27kV Inc'l.)	4,006	-	-	-	-
Aerial Cable Replacement	1,259	-	-	-	-
#4,#6 Self Supporting Wire	1,603	-	-	-	-
Automated Emergency Ties	801	-	-	-	-
OH Feeder Sectionalizing	1,796	-	-	-	-
Overhead Conductor Clearance	572	-	-	-	-
Overhead Feeder Reliability/VRS Replacement	572	-	-	-	-
Oil Minders	572	459	2,050	1,591	347%
Secondary Open Mains	117,127	123,405	156,378	32,973	27%
HiPot	1,717	930	-	(930)	(100%)
PILC	15,460	11,890	3,606	(8,284)	(70%)
Vented Service Box Covers	14,459	5,000	2,038	(2,962)	(59%)
4 kV UG Reliability	2,290	176	-	(176)	(100%)
Underground Secondary Reliability Program	40,385	26,886	21,565	(5,321)	(20%)
Overhead Secondary Reliability Program	230	112	797	685	612%
Remote Monitoring System 3rd Generation Transmitter Upgrade	1,718	3,754	3,826	72	2%
Pressure, Temperature and Oil Sensors	3,436	4,870	3,868	(1,002)	(21%)
Sectionalizing Switches	3,427	1,163	52	(1,111)	(96%)
Grounding transformers	687	-	-	-	-
Shunt reactors	1,946	1,061	437	(624)	(59%)
Targeted Primary DBC Replacement	572	498	4,445	3,947	793%
Network Reliability	18,590	1,048	3,712	2,664	254%
ATS Installation USS Reliability XW	229	-	-	-	-
Transformer Vault Moderization	6,179	9,584	8,971	(613)	(6%)
Street Lights Service Reliability Program	618	-	-	-	-

Total - Reliability	242,169	192,461	213,025	20,564	11%
Enhanced Customer Communication Storm Outage Mgmt System	1,391	1,500	1,311	(189)	(13%)
Electric Distribution Control Center Upgrades	7,418	8,000	4,950	(3,050)	(38%)
Electronic Distribution Feeder Sign On	289	312	452	140	45%
Decision Aids - Decision Optimizer - Contingency Analysis Program	232	250	92	(158)	(63%)
Area Profile System	46	50	27	(23)	(46%)
PQ View System Upgrade	-	-	2,085	2,085	-
CPMS 2 Implementation and CPMS Stabilization	-	-	3,550	3,550	-
BQDM	-	-	4,646	4,646	-
REV	-	4,500	-	(4,500)	(100%)
Emerging System Reinforcement IT Projects for Enhanced Initiatives DE Analysis Misc. and IT Projects	4,009	7,000	3,940	(3,060)	(44%)
Total - Information Technology	13,385	21,612	21,053	(559)	(3%)
Total - System Reinforcement	346,394	296,055	265,383	(30,672)	(10%)
Meter Purchase	12,358	10,900	11,169	269	2%
Transformer Purchase	121,000	132,000	108,665	(23,335)	(18%)
Sub-Total	779,219	765,778	824,830	59,052	8%
Total - Distribution Substation	4,325	7,245	7,707	462	6%
Sub-Total Distribution	783,544	773,023	832,537	59,514	8%
Switches For Network Redesign	30,000	29,107	12,538	(16,569)	(57%)
Selective Undergrounding	100,000	93,844	53,620	(40,224)	(43%)
460V Network Protector Replacement	15,000	3,748	9,754	6,006	160%
120/208V Non-Submersible Unit Replacement	15,000	4,368	7,681	3,313	76%
Overhead Equipment Upgrades	15,000	14,968	31,838	16,870	113%
Transformer Purchases	11,400	22,000	34,997	12,997	59%
Total - Storm Hardening	186,400	168,035	150,428	(17,607)	(10%)
Total Distribution	969,944	941,058	982,965	41,907	4%

Electric Production
2015 Capital Budget and Actual Spend
(\$'s Thousands)

Description	2015				
	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
Security	-	-	(113)	(113)	-
EH&S	675	3,942	3,911	(30)	(1%)
Control Systems	1,207	1,235	1,321	86	7%
Boilers	4,073	10,845	10,037	(807)	(7%)
Mechanical Equipment Replacement	2,015	1,071	1,959	888	83%
Electrical Equipment	14,868	4,942	5,459	517	10%
Structures	500	2,251	1,958	(293)	(13%)
Waterfront	-	-	5	5	-
Roofs	1,231	504	468	(36)	(7%)
Sub-Total Electric Production	24,569	24,789	25,004	215	1%
Storm Hardening	21,000	2,050	3,517	1,467	72%
Total Electric Production	45,569	26,839	28,521	1,682	6%

**Shared Services Capital Plan
2015 Capital Budget and Actual Spend
(\$ Thousands)**

Description	2015				
	Rate Plan	Budget	Actual	Variation Between Budget and Actual	Variation %
Irving Place Re-Stacking	25,037	30,000	17,505	(12,495)	(42%)
Facilities Buildings & Yards - (Critical Infrastructure)	21,507	15,627	12,968	(2,659)	(17%)
Facilities Buildings & Yards - (Roof Replacement Program)	3,277	3,001	1,596	(1,405)	(47%)
Safety Environmental	9,500	2,501	1,269	(1,232)	(49%)
CFS Blanket (Outfall B)	-	7,008	-	(7,008)	(100%)
Total Facility Projects	59,321	58,137	33,338	(24,799)	(43%)
Strategic IT Projects					
Cyber Security	3,424	4,175	4,099	(76)	(2%)
Server Farm Infrastructure - Worth St.	0	14,900	13,886	(1,014)	(7%)
Scada Net - IR	1,240	1,233	1,211	(22)	(2%)
CCTN Expansion - Fiber Projects	1,327	1,318	1,272	(46)	(3%)
Desktop Infrastructure	1,371	1,362	1,352	(10)	(1%)
Server Farm Infrastructure	519	1,301	1,286	(15)	(1%)
CCTN Expansion - Mobile WiMAX Access Network	805	799	780	(19)	(2%)
Business Systems Sustainability - Upgrade Applications to SQL Server 2008	926	939	925	(14)	(1%)
New Technology	503	697	696	(1)	(0%)
CCTN Modernization - Mapping System	0	248	247	(1)	(0%)
CCTN Facilities Improvements	532	528	410	(118)	(22%)
CCTN Modernization - Sonet Conversion	196	195	218	23	12%
Computer and Communications Accounting System	113	112	96	(16)	(14%)
Replace Unsupported Technologies	10,000	-	22	22	-
Enterprise Applications	815	-	-	-	-
Replacement of Transform Applications	347	-	-	-	-
Collaboration Tools/ Enterprise Software Collaboration	512	-	-	-	-
Upgrade Applications to Window Server 2008 (BSS - Server OS Plan	347	1,217	1,207	(10)	(1%)
IT Asset Management	253	-	-	-	-
COBOL Modernization and Upgrade	232	-	-	-	-
NetMap and Maps Website Replacement and Consolidation	232	-	-	-	-
IBM Script Mitigation to HP Extream	116	-	-	-	-
Replacement of RAMIS NARKIV and Cognos Reporting Tools	116	-	-	-	-
Metaphase Replacement - Phase 2 (Project Explorer)	200	548	429	(119)	(22%)
AutoCad (Engineering Computer Upgrades)	700	695	594	(101)	(15%)
Microfiche Pdf Conversion Project	200	-	-	-	-
Conduct Maximo Upgrade for Steam and SSO	-	3,280	2,570	(710)	(22%)
Outage Scheduling System Re-Write	-	-	1,035	1,035	-
Wring Access Raceway System (WARS)	200	-	-	-	-
Asset Optimization	100	-	-	-	-
Compass Rewrite	1,522	248	274	26	10%
Upgrade Contractor Oversight System (COS)	300	-	205	205	-
Construction Survey Mapping Repository	500	498	549	51	10%
CEES Estimating System	200	-	-	-	-
Misc. IT Projects - Construction	978	-	674	674	-
CCI Mobile Office (FORMS)	500	-	-	-	-
Install Pies System	250	-	-	-	-
Customer Service System Improvements	5,000	7,500	6,888	(612)	(8%)
Off System Billing	1,000	994	822	(172)	(17%)

Steam Billing System	276	273	164	(109)	(40%)
Meter Data Management System (MDMS) Expansion	805	800	697	(103)	(13%)
Digital Customer Experience	-	5,000	4,587	(413)	(8%)
Customer Interaction Center	-	-	626	626	-
Increasing Call Retention	-	-	216	216	-
Competitive Market Customer Service System	1,268	-	856	856	-
Environmental Management Information System (EMIS)	-	600	1,299	699	117%
Safety Health Information Management System (SHIMS)	-	1,209	672	(537)	(44%)
Hellgate Flush Pit	-	2,500	1,916	(584)	(23%)
Farrington Flush Pit	-	2,500	1,637	(863)	(35%)
Integrated Gas Software System (IGS)	-	-	198	198	-
NYSO Transmission Owner Data Reporting System	-	1,440	2,608	1,168	81%
eLearning - HR	600	596	597	1	0%
TLC infrastructure upgrades - HR	302	-	352	352	-
PeopleSoft HR Help Desk	-	-	2,596	2,596	-
Security Perimeter project	1,124	344	371	27	8%
Enterprise Security Platform	0	4,900	6,714	1,814	37%
Allegro System Upgrade	910	1,706	1,828	122	7%
Budget System Enhancements	-	993	3,408	2,415	243%
PI 360 Governance Expansion	-	-	807	807	-
Power Tax Project	-	1,092	816	(276)	(25%)
Software For Power Plan Provision System Phase 2	-	-	251	251	-
Enterprise Project Mg System	-	-	292	292	-
Customer Usage System Enhancements	200	199	190	(9)	(5%)
Portfolio Server Upgrade	-	-	457	457	-
Gas Rate Design and Analysis System Enhancement	-	-	147	147	-
Install CISCO Screens - Various Locations	-	-	299	299	-
Reconciliation of CSS and Sastellite Systems Financial Data (RCSF)	-	-	696	696	-
Oracle Upgrade	6,000	-	-	-	-
Electronic Appropriation Project	1,500	-	-	-	-
Payroll Budgeting System	500	-	-	-	-
Gas Customer Usage Extract System	277	-	-	-	-
Bill Impact Enhancements	100	-	25	25	-
Tax Depreciation Forecast	100	-	-	-	-
Occupational Health Electronic Medical Records	2,023	-	-	-	-
Investigation Tracking System - Law	816	-	-	-	-
Case Management	-	2,494	1,945	(549)	(22%)
Other	-	215	-	(215)	(100%)
Total Strategic IT Projects	52,377	69,648	79,014	9,366	13%
Other					
Upgrade Cng Fuel Stations	-	3,277	785	(2,492)	(76%)
Upgrade Of Vehicle Fuel Stations	4,310	2,184	(415)	(2,599)	(119%)
AMR - Bronx West	18,100	17,980	19,990	2,010	11%
AMR - Strategic/Hard to read meters	1,635	1,625	1,959	334	21%
Install Telecom Facilities	350	348	241	(107)	(31%)
Total Other	24,395	25,414	22,560	(2,854)	(11%)
General Equipment					
XM1 - Office equipment	850	845	1,560	715	85%
XM2/13 - Vehicles and equipment	37,900	37,648	54,264	16,616	44%
XM3 - Stores equipment	416	410	417	7	2%
XM4 - Shop equipment	333	-	905	905	-
XM5/15 - Lab & Test equipment	5,634	6,125	10,893	4,768	78%
XM6 - Construction equipment	6,703	1,193	1,491	298	25%

XM7 - AV equipment	900	1,794	2,472	678	38%
XM8 - Communications equipment	2,680	7,799	19,648	11,849	152%
XM10 - Computer equipment	10,653	5,429	4,276	(1,153)	(21%)
Total General Equipment	66,069	61,243	95,926	34,683	57%
Total Shared Services	202,162	214,442	230,838	16,396	8%
Facilities Storm Hardening	-	4,969	1,347	(3,622)	(73%)
Telecommunications Storm Hardening	2,700	2,682	2,992	310	12%
Total Storm Hardening	2,700	7,651	4,339	(3,312)	(43%)
Total CECONY Shared Services Capital	204,862	222,093	235,177	13,084	6%

Capital Budget vs. Actual Variation Explanations

\$ Thousands				
	2015			Explanation
	Budget	Actual	Variation (%)	
S&TO				
QUEENSBORO BRIDGE PROJECT	-	29,319	-	Variation due to pre-emptive splicing completed in October and due to lower than anticipated contractor costs and process efficiencies gained during the event.
TRANSMISSION FEEDER FAILURES	10,000	11,922	19%	Charges for failure repairs on Feeders 15055 and Y50.
EMERGENT TRANSMISSION RELIABILITY	6,500	1,868	(71%)	TO resources diverted to the QBB project earlier in the year. Work on various project performed in 2015 included: Pothead Supplemental Reservoirs, Hudson River Towers, Willowbrook Feeder 29212 C-Phase Pothead Replacement.
JOINT REPLACEMENT PROGRAM	5,000	-	(100%)	Work has been deferred. Funding used to offset the QBB project expenditures.
TRANSMISSION FEEDER PIPE SUPPORT AT QUEENSBORO BRIDGE	7,500	-	(100%)	Pipe support work on the Queensboro Bridge has been deferred until 2016.
Substation Operations				
				Loss of outages occurred at Buchanan for ballistic protection, in addition to permit and contractor issues caused delays at Greenwood and Jamaica.
Security Enhancements	15,000	10,187	(32%)	
East 179th Street: Install Water Spray for 43MVA Transformers	500	-	(100%)	Updated load relief plan, project deferred to 2016.
East 179th Street: Install Fans for Limiting Bus, Breakers and Reactors	750	-	(100%)	Re-evaluation confirmed removal of Load Relief project.
Fresh Kills: Install Additional Cooling For Transformer 22E	500	-	(100%)	Updated load relief plan, project cancelled.
Fresh Kills: Replace Limiting Feeders Associated Tr 21W	751	-	(100%)	Updated load relief plan, project cancelled.
Queensbridge: Replace Overdutied Disconnect Switches	1,001	-	(100%)	Deferred project , EPRI Study in Progress
				Opportunity to schedule additional outage to complete installation of digital transfer tripping at Washington Street, Cedar and Dunwoodie.
Area Substation Reliability and Auto Ground Circuit Switchers	8,311	10,265	24%	
Disturbance Monitoring Equipment Program (345KV)	8,003	4,270	(47%)	Lower costs due to labor force efficiency.
				Procurement delays resulting from terms and condition negotiations.
Disturbance Monitoring Equipment Program (138KV)	3,105	1,614	(48%)	
				Adverse weather, permitting issues and higher bids than estimates caused delays.
Facility Improvement Program	4,000	2,105	(47%)	
				Acceleration of work to meet operational needs, primarily FM - 200 systems testing, purchase of fire equipment for Brownsville and installation of water supply at Fresh Kills.
Fire Suppression System Upgrades	4,555	6,760	48%	
				Scope change from unforeseen field conditions resulted in higher contractor costs.
Reinforced Ground Grid	1,454	2,055	41%	
EH&S Risk Mitigation	9,803	7,831	(20%)	Credit from Hyland Arbitration settlement and cancellation of PO for Mott Haven and Glendale
				Lower anticipated failures, in addition to postponement of HMI Replacement project due to prioritization of Storm Hardening related projects.
Failed Equipment Other Than Transformers Program	7,502	5,496	(27%)	
				Lower level of activity due to delays in building permits and extended contract bid negotiations.
EAST 13TH STREET	43,050	31,687	(26%)	
GOWANUS	6,300	9,485	51%	Re-design of pumping station 2 and higher contractor bids.
Electric Operations				
Meter Installation	15,567	26,913	73%	Greater demand in all regions for meters
				Over budget in underground conduit units as a result of the winter storms
Primary Cable Replacement (OA's)	53,620	98,110	83%	
				Over budget due primarily to the winter storms that occurred in the 1st quarter
Overhead - Replacements	18,016	35,303	96%	
				Overrun due to a reduction in the shunts and bridges backlog. As evidenced by increase in units.
Temporary Services (incl. conduit)	30,893	65,945	113%	
Street Lights (incl. conduit)	19,913	25,475	28%	Overrun due to higher than planned street light installs.
				Work deferred until 2016 to help fund the emergency items mentioned above.
Part of Richmond/Brownsville (30 MV)	7,000	3,807	(46%)	
				Work deferred until 2016 to help fund the emergency items mentioned above.
Part of Pennsylvania (74MV) to create Waterside network	9,000	6,985	(22%)	
				Work deferred until 2016 to help fund the emergency items mentioned above.
59th Street Bridge Crossing	7,600	1,883	(75%)	
				Work deferred until 2016/2017 to help fund the emergency items mentioned above.
Part of Cooper Square (15 MV)	11,000	7,003	(36%)	
				Higher priority work in 2015 (specifically emergency replacement mentioned above) and no major projects.
Primary Feeder Relief	14,777	4,181	(72%)	
				Higher priority work in 2015 (specifically emergency replacement mentioned above) and no major projects.
Network/Non Network Transformer Relief	18,648	3,095	(83%)	
				Higher priority work in 2015 (specifically emergency replacement mentioned above) and no major projects.
NonNetwork Fdr Relief (Open Wire)	5,858	1,911	(67%)	
				Over budget due primarily to winter storms that occurred in the 1st quarter of 2015
Secondary Open Mains	123,405	156,348	27%	
				Higher priority work in 2015 (specifically emergency replacement mentioned above).
PILC	11,890	3,606	(70%)	
				Higher priority work in 2015 (specifically emergency replacement mentioned above).
Vented Service Box Covers	5,000	2,038	(59%)	
				Higher priority work in 2015 (specifically emergency replacement mentioned above).
Underarround Secondary Reliability Program	26,886	21,565	(20%)	

Enhanced Distribution Control Center Upgrades	8,000	4,950	(38%)	Work reprioritized to fund other projects within IT
Transformer Purchases	132,000	108,665	(18%)	Delays in deliveries
Emerging System Reinforcement IT Projects for Enhanced Initiatives DE Analysis and Misc. It Projects	7,000	3,940	(44%)	Higher priority IT work in 2015 than anticipated
Switches For Network Redesign	29,107	12,538	(57%)	Reprioritization of Storm Hardening Work
Selective Undergrounding	93,844	53,620	(43%)	Reprioritization of Storm Hardening Work
460V Network Protector Replacement	3,748	9,754	160%	Reprioritization of Storm Hardening Work
120/208V Non-Submersible Unit Replacement	4,368	7,681	76%	Reprioritization of Storm Hardening Work
Overhead Equipment Upgrades	14,968	31,838	113%	Reprioritization of Storm Hardening Work
Transformer Purchases	22,000	34,997	59%	Reprioritization of Storm Hardening Work
Electric Interference	96,569	78,314	(19%)	The underrun is driven by Contractor Phasing and Project delays due to city prioritization for Electric/Steam. The variance is partially offset by accelerated work for Gas.

Shared Services				
Irving Place Re-Stacking	30,000	17,505	(42%)	Underrun in Re-stacking is primarily due to a deferral of projects to 2016 and beyond.
Facilities Buildings & Yards - (Critical Infrastructure)	15,627	12,968	(17%)	Reprioritization to fund other projects within the Common corporate portfolio.
XM2/13 - Vehicles and equipment	37,648	54,264	44%	CGC approved funding of \$10 million for additional purchases for the Gas Operations Expansion Program, and the acceleration of 2016 purchases of approximately \$6 million.
XM5/15 - Lab & Test equipment	6,125	10,893	78%	CGC approved funding for additional purchases of lab equipment
XM8 - Communication Equipment	1,795	2,471	38%	CGC approved funding for additional purchases for Gas Operations Expansion Program.
XM10 - Computer equipment	7,799	19,648	152%	CGC approved funding for additional purchases to replace obsolete equipments and Gas Operation Expansion Program sanction.

Rate Plan vs. Capital Budget Explanations

	\$ Thousands			Explanation
	Rate Plan	Budget	Actual	
S&TO				
ASTORIA INTERCONNECT FOR FEEDER 34091	0	500	68	Work started earlier than anticipated.
FARRAGUT-PLYMOUTH ST-UPRATE FEEDERS 32071,32710, AND 32078	0	3,500	428	Work started earlier than anticipated. See White paper attached
QUEENSBORO BRIDGE PROJECT	0	29,319	-	Variation due to pre-emptive splicing completed in October and due to lower than anticipated contractor costs and process efficiencies gained during the event. White paper part of joint replacement program. See white paper attached.
Substation Operations				
AVENUE A: INSTALL WATER SPRAY ON TRANSFORMERS	750			Due to planned transformer replacements at Ave A, temporary water spray was found to be suitable at this time. This capital project was cancelled.
EAST 75TH STREET: TRANSFORMER COOLING TR1, TR2, TR3	750			Changes to the load relief forecast delayed the need for this project
GREENWOOD: REPLACE OVERDUTIED EQUIPMENT	0	2,000	2,385	Project completion date delay due to lack of available outage window. See White Paper
PARKCHESTER #2: REPLACE LIMITING 13KV BUS SECTIONS	3,500			Changes to the load relief forecast delayed the need for this project
UPRATE SYN BUS SECTIONS AT LEONARD STREET		750	843	Required to satisfy the forecasted peak load of 2015 and beyond See White Paper
MILLWOOD SUBSTATION - INSTALL FANS and CONTROL CABINET FOR TR 1	-	-	417	Updated Load Relief forecast identified need for this emergent project. See White Paper
GREENWOOD: INSTALL SURGE ARRESTORS AT BUS SECTION 2N	-	-	577	Emergent project required due to transient over voltage condition on bus section 2N - See White Paper
REPL. LIMITING BUS AT PLYMOUTH STREET		500	20.00	Procurement delays of Bus and required outages were not available, deferred to 2016.- See White Paper
INSTALLATION OF THE 4TH TRANSFORMER AT NEWTON/ NEW 138 FEEDER	-	1,000	-	Deferred project until 2016 to facilitate funding for other T&D emergency items. - See White Paper
ELMSFORD: UPGRADE OF #2 STATION			1028	Overall project completion delay due to final civil work to be done - See White Paper
ROOF REPLACEMENT PROGRAM	2,727		510	Not funded due to higher priority work -See White Paper
RELAY PROTECTION SYSTEM REDUNDANCY - SINGLE POINT OF CONTACT	4,544			NERC requirement not in effect
U Bushing	0	2,300	1,272	Cancelled outages due to system failures.- See White Paper
BUCHANAN -Y94 BY PASS - REPLACEMENT			2,424	Emergent project due to acceleration of work to meet 2016 refueling outage. - See White Paper
PHASE MONITORING UNIT			559	Emergent project to meet additional NERC CIP Version 5 BES Cyber System requirements.- See White Paper
				Emergent project to address rapid recovery of a loss of an area station and the procurement of transmission resiliency transformers.- See White Paper
S/S LOSS CONTINGENCY			4,768	
CAPACITOR BANK TRIPPING			23	Emergent project to connect various capacitor banks to UFLS panels.-See White Paper
MURRAY HILL CAPACITOR BANK UNITS	-	-	942	Emergent project due to the Midtown East contingency related to the Queensboro bridge failures.- See White Paper
138 kV Feeders 34051 & 34052 Reactors		7,500	0	Deferred project until 2017 to facilitate funding for other T&D emergency items.- See White paper
RAINEY	275	275	0	Contract bid delays.
VERNON	275	275	0	Contract bid delays.
LEONARD STREET		100	0	Contract bid delays.
AVENUE A		100	0	Project work ruled expense.
VARIOUS SUBSTATIONS -WIRELESS ALARMS/ RELAY UPGRADE		5000	4252	Minor delays resulting from outage unavailability.
Willowbrook - Install New Breakers in SYS Bus Dummy Positions		1,000	171	Outage unavailability in critical Staten Island load pocket. See White paper.
Electric Operations				
Autoloop Reliability (27KV Incl.)	4,006	0	0	Program complete money was in rate plan. Money used to fund other projects
Aerial Cable Replacement	1,259	0	0	Program complete money was in rate plan. Money used to fund other projects
#4 #6 Self Supporting Wire	1,603	0	0	Program complete money was in rate plan. Money used to fund other projects
Automated Emergency Ties	801	0	0	Program complete money was in rate plan. Money used to fund other projects
OH Feeder Sectionalizing	1,796	0	0	Program complete money was in rate plan. Money used to fund other projects
Overhead Conductor Clearance	572	0	0	Program complete money was in rate plan. Money used to fund other projects
Overhead Feeder Reliability/VRS Replacement	572	0	0	Program complete money was in rate plan. Money used to fund other projects
Grounding Transformers	687	0	0	Program complete money was in rate plan. Money used to fund other projects
ATS Installation USS Reliability XW	229	0	0	Program complete money was in rate plan. Money used to fund other projects
Street Lights Service Reliability Program	618	0	0	Program complete money was in rate plan. Money used to fund other projects
179th St. Area Substation Reconstruction	0	497		Money was used for another program. See White Paper attached
Advance Relief (Parkchester 13 MV) Transfer	0	0	311	Program started earlier than anticipated see White Paper attached

CPMS 2 Implementation and CPMS Stabilization	0	0	3,550	Program started earlier than anticipated see White Paper attached
PQ View System Upgrade	0	0	2,085	Program started earlier than anticipated see White Paper attached
REV	0	4,500	0	See White paper attached
BQDM	0	0	4,646	Program started earlier than anticipated see White Paper attached

Shared Services				
Server Farm Infrastructure - Worth Street	0	14,900	13,886	See White Paper attached
CCTN Modernization - Mapping System	0	248	247	See White Paper attached
Replace unsupported technologies	10,000	0	22	Work deferred to other more important programs
Enerprise Applications	815	0	0	Work deferred to other more important programs
Replacement of Transform Applications	347	0	0	Work deferred to other more important programs
Collaboration Tools/Enerprise Software Collaboration	512	0	0	Work deferred to other more important programs
IT Asset Management	253	0	0	Work deferred to other more important programs
COBOL Modernization and Upgrade	232	0	0	Work deferred to other more important programs
NetMap and Maps Website Replacement	232	0	0	Work deferred to other more important programs
IBM Script Mitigation to HP Extream	116	0	0	Work deferred to other more important programs
Replacement of RAMIS NARKIV and Cognos Reporting Tools	116	0	0	Work deferred to other more important programs
Microfice PDF Conversion Project	200	0	0	Work deferred to other more important programs
Conduct Maximo Upgrade for Steam and SSO	0	3,280	2,570	Project accelerated to meet deadlines
Outage Scheduling System Re-Write	0	0	1,035	Project accelerated to meet deadlines
Wring Access Raceway System (WARS)	200	0	0	Work deferred to other more important programs
Asset Optimization	100	0	0	Work deferred to other more important programs
CEES Estimating System	200	0	0	Work deferred to other more important programs
CCI Mobile Office (FORMS)	500	0	0	Work deferred to other more important programs
Install Pies System	250	0	0	Work deferred to other more important programs
Digital Customer Experience	0	5,000	4,887	Update website see white paper attached
Customer Interaction Center	0	0	626	Improve customer interaction. See white paper attached
Increasing Call Retention	0	0	216	Improving call retention for customers
Environmental Management Information System (EMIS)	0	600	1,299	Improve environmental management information system. See white paper attached.
Sfety Health Informaton Management System (SHIMS)	0	1,209	672	Improve safety health system. See white paper attached
Hellgate Flush Pit	0	2,500	1,916	Project accelerated to meet deadlines
Farrington Flush Pit	0	2,500	1,637	Project accelerated to meet deadlines
Integrated Gas Software System (IGS)	0	0	198	See white paper attached
NYSO Transmission Owner Data Reporting System		1,440	2,608	See white paper attached
People Soft HR Help Desk	0	0	2,596	See white paper attached
Enterprise Security Platform	0	4,900	6,714	See white paper attached
Budget System Enhancements	0	993	3,408	Project accelerated to meet deadlines
PI 360 Governance Expansion	0	0	807	See White Paper attached
Power Tax Project	0	1,092	816	Project accelerated to meet deadlines
Software for Power Plan provision System Phase 2	0	0	251	Project accelerated to meet deadlines
Portfolio Server Upgrade	0	0	457	Project accelerated to meet deadlines
Gas Rate Design and Analysis System Enhancement	0	0	147	See white paper attached
Install CISCO Screens - Various Locations	0	0	299	See white paper attached
Reconciliation of CSS an Satellite Systems Financial Data (RCSF)	0	0	696	See white paper attached
Oracle Upgrade	6,000	0	0	Work deferred to other more important programs
Electronic Appropriation Project	1,500	0	0	Work deferred to other more important programs
Payroll Budgeting System	500	0	0	Work deferred to other more important programs
Gas Customer Usage Extract System	277	0	0	Work deferred to other more important programs
Tax Depreciation Forecast	100	0	0	Work deferred to other more important programs
Occupational Health Electronic Medical records	2,023	0	0	Work deferred to other more important programs
Investigation Tracking System - Law	816	0	0	Work deferred to other more important programs
Case Management	0	2,494	1,945	See white paper attached
Upgrade Cng Fuel Stations	0	3,277	785	See white Paper attached
Facilities Storm Hardening	0	4,969	1,347	See white Paper attached

Capital Unit and Unit Cost Data

Substation Operations Variation Analysis By Program

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Breaker Capital Upgrade Program	7	5	40%	\$1,040	\$1,400	(26%)
Retrofit Overdutied 13/27kV Circuit Breaker Programs	63	57	11%	\$170	\$196	(13%)

Electric Distribution Variation Analysis By Program

Meter Installation

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Meter Installations	57,124	65,763	(13%)	\$460	\$276	67%

Primary Cable Replacement (OA's)

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Underground Conductor Primary URD	89	76	17%	\$25,711	\$7,186	258%
Underground Primary Cable	1,060	2,108	(50%)	\$66,778	\$22,013	203%
Underground Conduit	36,368	28,538	27%	\$553	\$599	(8%)

Overhead Emergency Response

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Poles, Towers, Fixtures	427	636	(33%)	\$28,227	\$13,634	107%
Overhead Primary Conductor	690	1,625	(58%)	\$15,028	\$2,483	505%
Overhead Secondary Conductor	1,023	1,265	(19%)	\$2,305	\$1,224	88%
Overhead Service Conductor	548	1,326	(59%)	\$9,450	\$1,024	823%
Overhead Street Light Conductor	443	1,169	(62%)	\$3,741	\$662	465%
Overhead Transformer Installation	366	1,083	(66%)	\$6,077	\$3,719	63%
Aerial Cable	308	137	125%	\$11,261	\$12,631	(11%)

Temp Services (incl. Conduit)

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Underground Services Cable Conv	3,791	2,669	42%	\$6,770	\$3,325	104%
Underground Services Cable URD	350	158	122%	\$3,236	\$3,392	(5%)
Underground Service Conduit	77,449	47,420	63%	\$441	\$455	(3%)

Street Lights Emergency Response (Incl. Conduit)

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Cable	109	1,891	(94%)	\$32,537	\$1,817	1691%
Conduit	62,559	38,209	64%	\$335	\$415	(19%)
URD	302	305	(1%)	\$853	\$2,359	(64%)

Transformer Installation Emergency Response

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Underground Transformer Installation	973	1,854	(48%)	\$23,291	\$15,091	54%
Overhead Transformer Installation	366	1,083	(66%)	\$6,077	\$3,719	63%

Primary Feeder Relief

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Underground Primary cable	80	292	(73%)	\$22,079	\$22,181	(0%)

Underground Secondary Reliability

Description	Actual Units	Budget Units	Variance	Actual Unit Cost	Budget Unit Cost	Variance
Underground Conduit	2,545	14,041	(82%)	\$610	\$468	30%

Unit and Unit Cost data subject to anomalies as a result of new work mananagement system implementation

2015 WHITE PAPERS

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Central Operations / System & Transmission Operations

Project/Program Title	Farragut - Plymouth St - Uprate Feeder 32071
Project Manager	Mark Bauer
Hyperion Project Number	20985530
Organization's Project Number	26228-15
Status of Project	Engineering
Estimated Start Date	January 2016
Estimated Completion Date	December 2016
Work Plan Category	Operationally Required

Work Description:

This project will replace two sections of cable and associated joints on 138kV Feeder 32071 (between the Farragut and Plymouth Street Substations), and also includes the replacement of the cable terminations at the Plymouth Street Substation, Transformer #3. Approximately 2,000 linear feet of High-Pressure Fluid-Filled (HPFF) 750kcmil conductor cable will be replaced with HPFF 2500kcmil conductor cable. The increase in conductor size of Feeder 32071 will enable the circuit to provide a higher electrical capacity for the supplied load.

Justification Summary:

The Plymouth Street Area Substation is a second contingency designed substation located in the borough of Brooklyn. The substation is supplied from the Farragut Substation by five 138 kV feeders. This project is to replace limiting sections of cable for one of the feeders in order to meet required ratings and not overload the cable during contingency conditions. Load projections included in the 2015 – 2024 Area Substation and Subtransmission Feeder Ten-Year Load Relief Program, Feeder 32071 located between Farragut Substation and Plymouth Street Substation will not meet the 2016 300-hour Summer Emergency Rating of 675Amps under contingency conditions. The current 300-hour Summer Emergency Rating for the feeder is 524Amps.

Supplemental Information:

- **Alternatives:**
Expand the Gowanus Substation and built the new Nevins Substation and transfer a portion of the load from the Plymouth Street Area Substation to the new Nevins Area Substation. This alternative requires the installation of 3 new circuit breaks and three new transformers as part of the Gowanus Expansion. In addition, several miles of 138kV underground transmission and the new Nevin Substation with three transformers and 27kV switchgear is required. This alternative is more costly than upgrading several sections of transmission cable.

Customer Sited Solutions (CSS) are always considered for load relief projects where feasible, economical and can meet the required project schedule. If CSS is determined to be impracticable,

then the traditional utility based solution shall be implemented. In this case, the traditional utility solution of upgrading the limiting section of cable was chosen as the preferred option over CSS.

- Risk of No Action:
If this project is not performed, the limiting sections of cable will be overloaded and will not be able to meet customer demand during summer peak load conditions in 2016.
- Non-financial Benefits:
N/A
- Summary of Financial Benefits (if applicable) and Costs:
Not Applicable
- Technical Evaluation/Analysis:
Increasing the rating of the cable is the most cost effective and viable solution. This larger cable conductor will be capable of achieving the needed 2016 300-hour Summer Emergency Rating of 675 Amps.
- Project Relationships (if applicable):
None
- Basis for Estimate:
This estimate is based on a similar past projects for the identified scope of work.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2014</u>
N/A	N/A	N/A	N/A		N/A

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor						
M&S						
A/P						
Other						
Overheads						
Total	N/A	N/A	N/A	N/A		N/A

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$3,600	\$	\$		

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	1,056				
M&S	894				
A/P	79				
Other	215				
Overheads	1,356				
Total	\$3,600				

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Central Operations/System & Transmission Operations

Project/Program Title	Joint Replacement Program - 2016
Project Manager	Various
Hyperion Project Number	21555439
Organization's Project Number	Various
Status of Project	Ongoing
Estimated Start Date	NA
Estimated Completion Date	NA
Work Plan Category	Operationally Required

Work Description:

The work plan is to replace joints on existing transmission feeders that are at risk of failing electrically and/or mechanically and cannot be addressed through corrective maintenance. This is a program that will improve the reliability of the transmission system.

The Transmission Joint Replacement Program will target approximately two joint inspections or replacements each year based upon priority (as determined by Transmission Engineering), and feeder outage availability. The work plan will have an annual estimated budget of \$5.7M (in order to cover the replacement of two joints each year).

Engineering has developed a prioritized list of transmission feeder joints to be addressed under this program as listed below:

1. FDR 72 – Manhole M27001
2. FDR M51 – Manhole M61727
3. FDR 72 – Manhole M26595
4. FDR 71 – Manhole M27001
5. FDR 72 – Manhole M26594
6. FDR 71 – Manhole M26595
7. FDR M52 – Manhole M61736
8. FDR 71 – Manhole M26594
9. FDR 702 – Manhole M7062
10. FDR 702 – Manhole M55953

Justification Summary:

There have been failure events (both electrical and mechanical) associated with joints on transmission feeders during the last 3-4 years (that have motivated investigation into whether similar vulnerabilities exist in other locations). These investigations have identified transmission feeder joints that are at risk of electrical and or mechanical failures that will adversely affect reliability.

Electrical failures and cable damage encountered on Feeders M51 (2011), 69M05 (2012), 38B05 (2012) and 72 (2014) exhibited root causes that suggested the potential for other locations with similar conditions. The April 2011 failure of Feeder M51 was in a semi-stop joint (on Broadway in Manhattan). The observed failure mechanism led to digital x-ray investigation of other joints of similar design on 345kV Feeders M51 and M52. These x-ray results led to the opening of another semi-stop joint on Feeder M51 in March of 2012 to determine if similar damage occurred; significant damage was found, which led to the semi-stop joint's proactive replacement with two buried joints and a cable insert. The failure of High Pressure Gas Filled (HPGF) Feeder 69M05 in manhole M58297 led to similar investigations of other 69kV feeders with similar configurations deemed to be providing inadequate joint support. The further investigations of 69kV feeders led to a joint opening on Feeder 69M06; significant damage was found and led to the proactive replacement of the joint with two joints and a cable insert. Failures on 138kV Feeder 38B05 and 345kV Feeder 72 were deemed to be due to shielding damage and splice connector vulnerabilities that led to similar x-ray and joint openings and subsequent joint replacements.

Compromised pipe integrity due to loss of wall thickness has led to many leaks on various High Pressure Fluid-Filled (HPFF) transmission feeders in manholes. Pipe integrity is maintained by pipe coatings and, in buried sections, cathodic protection. Cathodic protection is ineffective in manholes due to the absence of surrounding fill material to act as an "electrochemical cell" allowing the flow of cathodic protection current. Thus, compromised pipe coating in manholes has an increased likelihood of developing leaks. The high leak rate of some of these events can result in a loss of feeder pressure sufficient to require that the feeder be removed from service to maintain its dielectric integrity and to make necessary repairs. Repeated corrosion issues, feeder leaks and repair solutions on joint casings and auxiliary piping systems in certain locations have led to conditions that can no longer be addressed with corrective maintenance. These locations exhibit leaks that have a significant impact on feeder availability- and thus overall system reliability- as leaks can result in emergency de-energization of their associated feeders. Engineering inspections have led to the identification of multiple locations on 138kV Feeder 702 and 345kV Feeder M51 that require a splice joint replacement due to corrosion conditions that are beyond the normal scope of repair.

Based upon these recent developments, this program will target joints on the underground transmission system that exhibit the susceptibility for electrical or mechanical failure. Engineering has developed a prioritized list of suspect transmission feeder joints to be addressed under this program going forward; however, future evaluations may result in an expanded list and a new priority with which to address them.

Supplemental Information:

- Alternatives: *Perform Corrective Maintenance:* Corrective maintenance cannot address the potential electrical and mechanical failure causes in various transmission splice joints or joint casings that have been identified through engineering inspections because the material conditions require wholesale replacement.
- Risk of No Action: No action on replacing these joints is allowing them to "Run to Failure" . This course of action would allow the joints to fail in service, requiring emergency replacement and restoration. This course of action leads to unscheduled outages that may occur during periods of either high demand or concurrent to planned system outages, affecting transmission system reliability and potentially its ability to supply the required load. Unplanned outages may also cause the cancellation of planned outages to perform scheduled reliability work as well as result in increased expenditure on the deployment of emergency resources. See "Risk of No Action" for more detail.
- Non-financial Benefits: The benefits of this program are improved system reliability and a reduction in the likelihood of dielectric fluid leaking to the environment.

- Summary of Financial Benefits (if applicable) and Costs: Prior to 2016, the spend of this ongoing program was swept to QBB feeder failures.
- Technical Evaluation/Analysis: Some recent transmission joint failures have, upon inspection, displayed damage characteristics that indicate the presence of potential common modes of failure that may exist on certain joints on the transmission system. As technology advances and non-destructive inspection methods (including digital x-ray) become more sophisticated, opportunities to identify and proactively address reliability concerns before joint failure are increasing. Issues related to joint movement and the mechanical strength of splice connectors have already been identified as affecting joint reliability. Under this program, these issues and others in the future will continue to be addressed to increase overall system reliability.
- Project Relationships (if applicable): Not applicable.
- Basis for Estimate: The estimate is based on targeting two 345kV joints per year at a projected unit cost of \$2.85M per joint replacement.

Total Funding Level (\$000):

Historical Spend – New Program in 2015

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
					\$0

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

No funds for this project have been expended to date.

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor						51
M&S						11
A/P						28
Other						11
Overheads						85
Total	NA	NA	NA	NA		\$186

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$5,700	\$5,700	\$5,700	\$5,700	\$5,700

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	1,540	1,540	1,540	1,540	1,540
M&S	792.10	792.10	792.10	792.10	792.10
A/P					
Other	1,416.30	1,408.80	1,531.40	1,469.20	1,593.30
Overheads	1,951.70	1,959.10	1,836.50	1,898.70	1,774.60
Total	\$5,700	\$5,700	\$5,700	\$5,700	\$5,700

2015 – Central Operations/Transmission & Substation Operations

Project/Program Title	Replace Overdutied Equipment at Greenwood Substation
Priority Number	15
Project Manager	Charles Davoren
Project/Task	24077-10
Status of Project	Ongoing
Estimated Start Date	January, 2010
Estimated Completion Date	December 31, 2018
Work Plan Category	(choice of Regulatory Mandated, Operationally Required, or Strategic)
ERM Addressed	Oper Risk 06 Prolonged Electric Outage Impact Customers, Oper Risk 07 Prolonged Transmission Substation Loss, Oper Risk 08 Prolonged Area Substation Loss

Work Description:

This project has been initiated to replace circuit breakers, disconnect switches, and bus at the Greenwood Substation that are overloaded or may be overloaded in certain projected system configurations.

There are a total of 5 circuit breakers that require replacement--7S, 6S, 2N, 5N, and 7N. There are a total of 6 disconnect switches that require replacement - 5N4, 7N7, 1S1, 1S8, 8N7, and 4N4.

There are 2 section of bus that requires replacement - between feeders 38B11 and 23161, and between feeders 38B14 and 42231.

This equipment will be replaced with higher rated equipment that will remove the overload conditions.

Justification:

In order to enhance reliability, and to enable Greenwood Substation to operate under the analyzed contingency conditions and remain within operating ratings, it is necessary to replace the identified circuit breakers, disconnect switches, and bus sections. It is noted that the new ABB type 145PM63-30 circuit breakers have been used extensively in Breaker Upgrade Program. Replacing the existing motor operated disconnect switches with new manually operated type will reduce construction costs without affecting safety and reliability of the equipment.

- **Current Status**

2014 Work Plan:

- Replace D/S 1S1 and Upgrade Bus Section 1S – 4/18/14 – 4/26/14
- Replace Bkr 6S and Upgrade Bus Section 5S – 10/15/14 – 11/18/14
- Replace Bkr 7S and Upgrade Bus Section 7S – 11/21/14 – 12/28/14
- Replace Bkr 2N – Date to be determined

2015 – 2018 Work Plans:

- Replace Bkr 7N – Dates to be determined
- Replace disconnects 7N7 and 8N7 – Dates to be determined.

- **Alternative:**

Develop Operation Procedures to Eliminate Overload Conditions: This alternative is not recommended, as it could result in limitations in operating capabilities, generation dispatch, and negative impact on reliability.

- **Risk of No Action**

This alternative of no action is not acceptable because the affected equipment could be damaged if the defined post-contingency scenario were to occur.

- **Technical Evaluation/Analysis:**

A 2009 Greenwood Substation transmission load flow study identified six(6) 138kV circuit breakers, seven(7) disconnect switches and five(5) bus sections that would experience overload conditions, exceeding short-term emergency(STE), long-term emergency(LTE) or normal ratings following a defined contingency scenario which includes Gowanus GTs running and high summer loads.

- **Project Relationships(If Applicable):**

Replacement of the selected breakers disconnects, and bus sections will require system outages. The outages will be subject to system conditions.

Historical Elements of Expense:

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor	80.4	120.2	623	933		870
M&S	0.1	28.1	106	139		75
A/P	74.9	535.0	147	285		337
Other	481.5	(396.1)	73	153		28
Overhead	314.4	236.7	790	1,109		1,075
Total	951.4	523.9	1,739	2,619		2,385

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor		—	—	—	—
M&S		—	—	—	—
A/P		—	—	—	—
Other		—	—	—	—
Overheads		—	—	—	—
Contingency					
Total		—	—	—	—

Variations between Budgets – Actual:

<u>2009</u>			<u>2010</u>			<u>2011</u>			<u>2012</u>		
<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>
-	-	-	-	-	-						

						1,500	951	(549)	4,000	524	(3,476)
Reason:			Reason:			Reason: Lower scope than originally identified for 2011, work on Bus Section 2 only and delivery of Breakers.			Reason: Bus Section Outage for Bus Section 1-S deferred to 2013; Breaker 2N outage denied in Fall 2012.		

Authorization (if Applicable):

1ES6503 - Capital: \$16,000,000
Retirement: \$11,000,000

Appropriation (if Applicable):

1ES6503 - Capital: \$8,319,000
Retirement: \$2,931,418

Place an "X" next to the appropriate category:

☒ Capital

☐ O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Leonard Street No. 2: West Synchronous Bus upgrade to 4500A
Project Number	25346-13
Status of Project	Engineering
Estimated Start Date	2014
Estimated Completion Date	2015
Work Plan Category	Operationally Required

Work Description:

A bus replacement project has been initiated to replace the west syn-bus at Leonard Street No 2 ahead of summer 2015. This work includes installing approximately 40' of 4500A phase segregated bus with a 95kV BIL and S.C. Rating of 63kA to replace the existing West Syn-Bus from T8 to the T9/T11 tie.

Planning and estimating started in June 2014. Engineering is starting in November 2014. Equipment delivery is projected for March 2015 with installation to be completed no later May 2015.

Justification Summary:

Load flow analyses conducted by Area Substation Planning have forecasted that during a 2nd contingency and under certain conditions, the electrical loads during the summer of 2015 on the west synchronous bus at Leonard Street No. 2 may exceed the 3125A capacity of the existing bus. In order to maintain adequate service reliability to the Canal and Park Place networks, it is necessary to uprate the west synchronous bus to 4500A capacity to satisfy the 300hr rating requirement during peak loading conditions and to address the possibility of a 2nd contingency. This replacement is required to satisfy the forecasted peak loads of 2015 and beyond.

Supplemental Information:

- Alternatives:
Forced cold air cooling was installed on the west synchronous bus in 2012; however with this only maintained the existing 3125A rating. No other alternatives are considered.
- Risk of No Action:
If no action is taken, there is a possibility of reduced reliability and loss of equipment in the event of bus failure due to overloading. In addition load shedding may be required to maintain network integrity.
- Non-financial Benefits:
Ensures continued and uninterrupted service to customers. Maintains system reliability.
- Summary of Financial Benefits (if applicable) and Costs:
The estimated cost to complete this project is \$650,000
- Technical Evaluation/Analysis:

Area substation planning performed load flow analysis to determine the expected ampere flows through the synchronous bus sections. It was found that during a 2nd contingency, under certain conditions, the projected load flow for summer 2015 would overload part of the synchronous bus. Engineering has reviewed the existing synchronous bus ratings and the load flow analysis and recommends that replacing the existing 3125A bus with 4500A bus will ensure the required substation capability of 283MW.

- Project Relationships (if applicable):
N/A
- Basis for Estimate:
Prior work of a similar nature was used in developing the cost analysis. Material and equipment costs are based on recent purchase orders for similar material & equipment.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
0	0	0	0	0	843

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1 million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						207
M&S						3
A/P						8
Other						276
Overheads						349
Total	0	0	0	0	0	843

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor	192				
M&S	120				
A/P	105				
Other	69				
Overheads	265				
Total	750	0	0	0	0

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Millwood – Install Cooling on Transformer 1
Project Manager	M. Lentini
Hyperion Project Number	
Organization's Project Number	26115-15
Status of Project	Construction
Estimated Start Date	March 2015
Estimated Completion Date	May 2015
Work Plan Category	Operationally Required

Work Description:

At Millwood West Substation, the station capability will be increased by replacing the existing single-speed cooling fans and associated controls on Transformer No. 1 with new two-stage cooling fans and controls. Transformer No. 1 is limiting the station capability with a 1-hour rating of 88 MW. The addition of two-speed cooling fans will increase the transformer's 1-hour capability to 99 MW, which is sufficient through the ten-year load relief plan.

Additional field switching will be performed within one hour which will ultimately keep the transformer below its 300 hour rating.

Justification Summary:

The Millwood West 13.8 kV Substation is located in New Castle, Westchester County, New York.

The Millwood West 13.8 kV Substation is a single ring outdoor area substation supplied by two 138 kV feeders from the Millwood West 138 kV Substation. The substation is designed to operate at full load under first contingency conditions. There are two 65 MVA rated transformers at the station with varying emergency ratings based on transformer design. Transformer No. 1 limits the station capability with a 1-hour rating of 88 MW. Transformer No. 1 is a 132/13.8 kV, 65 MVA transformer manufactured by Savigliano.

The Preliminary Ten-Year Load Relief Plan (2015-2024) projects 2015 summer peak station load for Millwood West Substation at 89 MW, which exceeds the current station capability. Millwood Substation is limited by the capability of Transformer No. 1.

Supplemental Information:

- Alternatives: Option 1 – Remove and replace existing transformer with a new transformer, which will meet the load outlined in the Ten-Year Load Relief Plan. This option is unacceptable because it is uneconomical (approximately \$6M).

Option 2 – Install a temporary water spray/sprinkler system. The use of water spray is not an acceptable solution for this longer-term period due to the resulting degradation of the radiators from the water spray.

- Risk of No Action:
N/A
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: N/A
- Project Relationships (if applicable): NA
- Basis for Estimate: Current funding request based previous similar projects.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
					417

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						62
M&S						221
A/P						
Other						2
Overheads						132
Total						417

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					

M&S					
A/P					
Other					
Overheads					
Total					

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	New 138 kV Feeder from Vernon to Glendale and Newtown with the installation of the 4 th Transformer at Newtown and 5 th transformer at Glendale
Project Number	TBD
Status of Project	Planning
Estimated Start Date	Fall 2016
Estimated Completion Date	Spring 2019
Work Plan Category	Operationally Required

Work Description:

The Farragut-Brownsville 138 kV sub-transmission feeders supplying the Brownsville No. 1 and Brownsville No. 2 area stations will be overloaded during normal operating conditions in 2019. To provide load relief for these feeders, it is recommended that 80 MW (Part of the Ridgewood network, supplied from Brownsville No. 1) be transferred to the Glendale area station in Queens.

To accommodate this load transfer, it is recommended that a new 138 kV cable be installed from the Vernon 138 kV station to the Glendale and Newtown 27 kV area stations. In addition, it is recommended that a 4th transformer at the Newtown area station be installed along with a 5th transformer at the Glendale area station. Finally, this request includes 14 new feeder positions to be established at the Glendale area substation.

Justification Summary:

The Farragut-Brownsville 138 kV sub-transmission feeders supplying the Brownsville No. 1 and Brownsville No. 2 area stations will be overloaded during normal operating conditions in 2019. When this occurs, special operating measures used to achieve a higher feeder capability will no longer be available. The total feeder loading is expected to reach 819 MW at a time when the feeder capability will be 769 MW. To provide load relief for these feeders, it is recommended that 80 MW (Part of the Ridgewood network, supplied from Brownsville No. 1) be transferred to the Glendale area station in Queens.

To accommodate this load transfer, it is necessary to increase the capability of the Vernon-Glendale/Newtown 138 kV feeders. To achieve this, it is recommended that a 5th Vernon-Glendale/Newtown 138 kV feeder be established and supplied from the Vernon 138 kV East Ring. The new 138 kV feeder will supply a fourth transformer at Newtown and a fifth transformer at Glendale. Installation of both transformers are required to also accommodate the 80 MW load transfer from Brownsville to Glendale.

Supplemental Information:

- Alternatives:

Expand the Gowanus substation, establish the new Gateway area station in Brooklyn, and transfer part of the load from the Brownsville substations to the new Gateway station.

- Risk of No Action:
Taking no action poses the risk of overloading substation equipment during peak load conditions, resulting in potential service interruptions to customers.
- Non-financial Benefits:
The benefits of the project include providing relief for overloaded feeders, which will ensure continued reliable service to the Brownsville load pocket.
- Summary of Financial Benefits (if applicable) and Costs:
Multiple alternatives were considered in order to relieve the Brownsville load pocket. The selected option is the least expensive of the available options.
- Technical Evaluation/Analysis:
The capability of the Brownsville 138 kV sub-transmission feeders is based on operating voltage and 300-hour feeder ratings. Based on the demand forecast and 138 kV feeder capabilities, the 138 kV sub-transmission feeders will be deficient. To accommodate an 80MW load transfer, a new 138kV supply feeder is needed along with new transformers at Glendale and Newtown Substations.
- Project Relationships (if applicable):
- Basis for Estimate:
Prior work of a similar nature was used in developing the order of magnitude cost analysis. Material and equipment costs are based on recent purchase orders for similar material & equipment.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
0	0	0	0	0	0

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						
M&S						
A/P						
Other						
Overheads						
Total	0	0	0	0	0	0

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>
2,000	65,178	59,788	6,969	

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	520	16,422	15,092	467	
M&S	308	9,615	8,678		
A/P	281	8,900	7,800		
Other	196	6,943	5,582		
Overheads	695	23,298	22,636	6,501	
Total	2,000	65,178	59,788	6,969	

☒ Capital
☐ O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Plymouth Street Substation: Transformer Bus upgrade to 3000A
Project Number	TBD
Status of Project	Planning
Estimated Start Date	JUNE 2015
Estimated Completion Date	MAY 2017
Work Plan Category	Operationally Required

Work Description:

A bus replacement project is planned to replace the section from the transformer throat to the split at the synchronous bus before summer of 2017. Install approximately 50' of 3000A phase segregated bus with a 150kV BIL and S.C. Rating of 44kA to replace the existing transformer bus connecting transformer 5.

Planning and estimating is projected to begin in June 2015. Engineering is projected to start in November 2015. Equipment delivery projected for March 2017 with installation to be completed no later than May 2017.

Justification Summary:

Load flow analyses conducted by Area Substation Planning have forecasted that in certain circumstances starting in 2017, the projected electrical loads on the TR5 transformer bus section at Plymouth Street Substation may be as much as 2758A, 758A in excess of the 2000A bus capacity of the existing bus. In order to maintain adequate service reliability to the various networks fed by TR5, it is necessary to uprate the TR5 transformer bus section to 3000A capacity to satisfy the 300hr rating requirement during peak loading. This replacement is required to satisfy the forecasted peak loads of 2017 and beyond.

Supplemental Information:

- Alternatives:
Forced cold air cooling could be installed on the transformer bus, however with this method, this would only maintain the existing 2000A rating and not address forecasted peak loads, starting in 2017. No other alternatives are considered.
- Risk of No Action:
If no action is taken, there is a possibility of reduced reliability and loss of equipment in the event of bus failure due to overloading. There is also the possibility of adversely affecting the Borough Hall and Newtown Creek WPC Plant networks. In addition, under certain circumstances, load shedding could be required to maintain network integrity.
- Non-financial Benefits:
Ensures continued and uninterrupted service to our customers. Maintains our system reliability.
- Summary of Financial Benefits (if applicable) and Costs:
The estimated cost to complete this project is \$5,500,000
- Technical Evaluation/Analysis:

Area substation planning performed load flow analysis to determine the expected ampere flows through the transformer and synchronous bus sections. It was found that in certain conditions, the projected load flow for summer 2017 would overload part of the transformer and the synchronous bus. Engineering has reviewed the existing bus ratings and the load flow analysis and recommends replacing the existing 2000A bus with 3000A bus to ensure the required substation capability of 344MW.

- Project Relationships (if applicable):
N/A
- Basis for Estimate:
Prior work of a similar nature was used in developing the cost analysis. Material and equipment costs are based on recent purchase orders for similar material & equipment.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
0	0	0	0	0	20

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1 million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						10
M&S						10
A/P						
Other						
Overheads						
Total	0	0	0	0	0	20

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
4,400	1,045			

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	1,188	266			
M&S	678	157			
A/P	614	145			
Other	404	123			
Overheads	1,516	354			
Total	4,400	1,045	0	0	0

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Greenwood – Install Surge Arrestors at Bus Section 2N
Project Manager	C. Davoren
Hyperion Project Number	
Organization's Project Number	25116-13
Status of Project	Construction
Estimated Start Date	August 2015
Estimated Completion Date	October 2015
Work Plan Category	Operationally Required

Work Description:

This project will install a matched set of three surge arrestor unit (960 kJ per unit for a total of 2,880 kJ), per phase at bus section 2N. Shunting the overvoltage energy through a surge arrestor of adequate capacity would provide the required protection. The calculated 2,221 kJ of energy per phase is required to be discharged through the arrestors.

Major items associated with this project are as follows:

1. Surge Arrestors – 960 kJ per unit – a total of 9 – Purchase and Install
2. Supports for the above – Purchase and Install
3. Foundation for the above – Install
4. All parts and accessories to complete the install – Purchase and Install

Justification Summary:

The “Transmission System Electromagnetic Transients Program Switching Study Associated with the Interconnection of Bayonne Energy Center,” dated July 2010, determined a transient overvoltage condition at feeder 42232 on Bus section 2N at Greenwood. The overvoltage transient was the result of a breaker failure contingency and requires the shunting of 2,221 k-joules per phase through surge arrestors. Transmission Planning requested that the high energy surge arrestors be installed. The analysis determined the transient over voltage was an existing condition and was not directly attributed to the BEC generation or the reconfiguration of the Gowanus bus.

Greenwood Bus Section 2N does not have surge arrestors; the nearest arrestor is a lightning arrestor located on bus section 3N. The Bus Section 3N surge arrestors do not have the capacity to shunt the calculated 2,221 kJ of energy resulting from the 3.51 p.u. overvoltage. The overvoltage would severely over duty equipment for the analyzed contingency and could result in equipment failure.

Supplemental Information:

Alternatives: Do nothing. See below.

- Risk of No Action:

No action is not recommended because a high energy surge as calculated can damage station equipment such as transformers, circuit breakers, etc.

- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: N/A.
- Project Relationships (if applicable): NA
- Basis for Estimate: Current funding request based field estimates.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
					577

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						179
M&S						37
A/P						85
Other						23
Overheads						253
Total						577

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
	9,197	4,563		

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	2,228		1,122		
M&S	1,545		744		
A/P	1,947		1,035		
Other	415		230		
Overheads	3,062		1,432		
Total	9,197		4,563		

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations/Substation Operations

Project/Program Title	Upgrade of Elmsford 2 Substation
Project Number	20762-03
Status of Project	Ongoing
Estimated Start Date	2006
Estimated Completion Date	2015
Work Plan Category	Strategic

Work Description:

This project will enhance the reliability of the Elmsford Substation. Modern switchgear controlled by state-of-the art relay protection will be installed in a new building that will also provide space for a new control room, new battery rooms, new communications room, and new relay rooms. Multiple outages are required on the existing equipment to transfer the supply of power from the existing distribution bus sections to the new bus sections. Additionally, individual distribution feeder outages are required to transfer the supply of each feeder from the previous bus sections to the new bus sections. All of these outages will occur in a pre-approved sequence and none can be completed during our summer period. Each of the outages creates the first contingency in a single contingency area.

Justification Summary:

The Elmsford Substation, located in Westchester County, is in service for over 50 years. It is one of the few area stations with outdoor switchgear and underground protection and control wiring. Being an outdoor substation, the weather has taken its toll on the equipment, its supporting structures, and protection/control wiring.

The existing substation consists of 4 transformers, 8 sections of switchgear, and 3-20 MVAR capacitor banks. The switchgear utilizes circuit breakers that have reached the end of their useful life due to lack of spare parts and manufacturer support. The equipment enclosures have deteriorated resulting in leaks and equipment outages due to water damage and misalignment. The equipment supporting structures are corroding and switchgear components have also been susceptible to water damage. As the structural components deteriorate, manual operation of the existing heavy circuit breakers has become increasingly difficult and requires more time and resources.

Finally, by first rebuilding the substation on the existing property the number of system outages and the time duration for outages will be minimized, as well as facilitating the transfer of the station load from the existing station to the new station.

Supplemental Information:

- **Alternatives:**
The only means of improving existing conditions is to either replace the switchgear and its protection/control wiring or transfer load to nearby substations and retire the Elmsford substation. The station currently supplies approximately 180 MW of load, and transferring this load to nearby substations will result in those stations exceeding their capability, therefore the only option is to replace the switchgear and its protection/control wiring.

Another alternative is to rebuild switchgear sections to 63kA and replace breakers with vacuum type circuit breakers.

This alternative is not recommended because:

- The estimated cost for procurement and installation of new switchgear would be approximately \$15,000,000. This investment would not be cost effective for the following reasons:
- This alternative would not mitigate the overall problems caused by poor drainage in a low-lying area, and would not address the deteriorated wiring and control systems.
- Equipment would still be located in deteriorated enclosures. The substructure is rusting, floors are deforming under load and the building leaks.
- 13 kV outages will be very restrictive and lengthy to allow for environmental mitigation and will impact customer service.
- The substation would not contain the latest automation technologies.

- Risk of No Action:

Continued risk of outages, including extended outages, to our customers due to failures of the existing equipment. This project will improve the feeder processing durations of the Elmsford electric distribution system. The substation would still be an outdoor facility, subject to weather conditions, and less conducive to efficient operation and maintenance.

- Non-financial Benefits:

Increases overall system reliability and reduces the likelihood of service interruptions for the customers served by this substation.

- Summary of Financial Benefits (if applicable) and Costs:

- Current Status:

The following work has been completed:

- Completed physical construction of the new switchgear building in October 2010.
- Commenced the installation of the BMS, HVAC and Fire Protection systems.
- Completed a substantial portion of the new distribution feeder conduit banks and the control and indication troughs/conduits.
- Commenced the installation of the exterior bus support foundations.
- Completed the installation and testing of the building BMS, HVAC and Fire protections systems.
- Received and installed all sections of new switchgear and bus duct
- Completed preliminary testing of the new switchgear
- Completed installation of equipment in the new Control Room, Battery Rooms and Communications Rooms
- Completed the installation of all remaining troughs and conduits.
- Completed the migration of all distribution feeders to the new station.
- Completed the physical and electrical isolation of the retired switchgear from the new facility.
- Completed lead and asbestos abatement of all retired equipment.
- Completed the demolition of the old switchgear and other retired electrical facilities and above grade conduits around the station, including all retired equipment in the old control room.
- Completed the modifications to the façade of the old control room and fire walls visible from the street.
- Final grading work is the one outstanding item that must be completed, and is required in order to obtain a final Certificate of Occupancy for the new facility. A

limited amount of this work was done in 2014, and it is expected to be completed in 2015.

- Project Relationships (if applicable):
- Basis for Estimate:

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Actual 2015</u>
26,251	27,797	2,832	527	301

Historical Elements of Expense

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Actual 2015</u>
Labor	6,675	546	98	142	160
M&S	603	145	220	48	13
A/P	7,660	2,284	8	(29)	540
Other	(372)	(1180)	11	2	4
Overheads	13,232	1,038	190	138	311
Total	27,797	2,832	527	301	1,028

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>

Request by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015– Central Operations/ Substation Operations

Project/Program Title	Roof Replacement Program
Project Manager	C. Davoren
Hyperion Project Number	2ES8200
Organization's Project Number	Various
Status of Project	Ongoing
Estimated Start Date	N/A
Estimated Completion Date	N/A
Work Plan Category	Strategic

Work Description:

This program provides replacement of roofing on buildings and major equipment at our substations, pumphouses and pressurizing plants, where the roofing has deteriorated or when leaks are found. The Company has an ongoing program to inspect each of the 533 roofs approximately once every five years (more frequently for older roofs, less frequently for newer roofs), averaging 100 roofs per year. A large number of our facility roofs have deteriorated, and have been repaired numerous times. The roof inspection program reveals which of our roofs have deteriorated beyond repair. Roofs are replaced when needed. Typically the two types of roof systems used are ethylene propylene diene monomer (EPDM) and Kemper. EPDM roofs consist of a rubber membrane adhered to rigid insulation which is fastened to the existing roof deck. The Kemper system consist of a primer applied to the existing roof deck then a fleece layer saturated with polyester resins. Removal of existing roofing materials will also assure any asbestos issues, if present, are alleviated.

Justification Summary:

This work is required to avoid permanent damage to equipment, accelerated structural deterioration and personal safety hazards. Delay in roof replacements when needed increases the likelihood of these events.

Supplemental Information:

- **Alternatives:** Repair existing roofs. This alternative would be a temporary solution at best and repairs would increase in scope and cost on an annual basis. For roofs with a certain rating, as discussed below in the Technical Evaluation, it provides an unacceptable service life and does not eliminate the potential operational and safety concerns. Another less desirable alternative for this program is to cover with tarps. This approach is not recommended as prolonged exposure to the elements will result in water intrusion that will consequently result in further degradation of the roofing system. Since equipment housed within the substation buildings is not designed to be exposed to the elements, water intrusion will adversely affect the equipment, thereby affecting system reliability.
- **Risk of No Action:** This work is required to avoid permanent damage to equipment, accelerated structural deterioration and personal safety hazards.

- Non-financial Benefits: Increased reliability of equipment and facilities, eliminating possible inadvertent trips including outages to equipment and customers, and reduced personal safety hazards.
- Summary of Financial Benefits (if applicable) and Costs: This program will remove the need to make repeated O&M repairs to these roofs.
- Technical Evaluation/Analysis: In order to provide reliable service, we must maintain our electric delivery facilities in good working condition and toward that end have continued the roofing program. This program is committed to inspecting each of the 450 roofs every five years (more frequently for older roofs, less frequently for newer roofs), averaging 100 roofs per year, and to repair or replace roofs as needed. The results from the roof inspections determine if a particular roof can be repaired or needs to be replaced. The roofs are rated on a standardized 1-9 scale, with 1 being a roof in excellent condition and 9 being a roof requiring immediate attention. Roofs scoring 7 or above are scheduled for replacement, all others are repaired as required. Generally, roofs scoring below a 7 can be effectively repaired to address issues found. Repairs are short term fixes that will extend the life of the roof by a few years. Replacement roofs are typically good for 20 years. Typically, roofs requiring replacement are not candidates for repair, except on an emergency basis.

RATINGS DESCRIPTION

1. New roof 1 to 2 years old, no work needed.
2. Roof more than 2 years old, no work needed.
3. Roof has no leaks, less than 5% of the roof area to be repaired. This also includes repairs to gutters, drains, leaders, and painting of metal roof and debris removals.
4. Roof has no leaks, 5-10% of the roof area needs repairs.
5. Roof has no leaks, 10-20% of the roof area needs repairs.
6. Roof has leaks; up to 20% of the roof area needs repairs.
7. Roof has leaks; up to 40% of the roof area needs repairs.
8. Roof leaks and requires replacement. No structural damage to deck or framing.
9. Roof leaks are bad and roof requires replacement. Structural damage to deck and/or framing is present and represents a hazard to occupants and equipment.

Water intrusion due to roof leaks can result in equipment damage and affect substation reliability. Standing water on floors and roofs causes slippery conditions and electrical hazards that are personnel safety concerns. Prolonged exposure to water intrusion causes concrete spalling, corrosion of rebar, and degradation of the structural integrity of the building. The installation of new roofing will eliminate leaks and the operational and safety hazards associated with water intrusion and accumulation.

- Project Relationships (if applicable): NA
- Basis for Estimate: Near term work is based on Engineering estimates based on similar types of work done in the past. Outer term work is based on cost of similar types of work done in the past. As this is an ongoing program, work scopes are generally similar in nature. The current unit cost for roof replacement is \$30 per square foot for EPDM roofs and \$65 per square foot for Kemper roofs. Historically, we have replaced 12-15 roofs per year.

Total Funding Level (\$000):**Historical Spend**

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
\$1,229	\$1,704	\$423	\$1,005	-	\$510

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor	302	453	98	134		117
M&S	11	4	0			11
A/P	412	698	172	554		201
Other	23	(250)	15	1		(9)
Overheads	481	799	138	316		190
Total	\$1,229	\$1,704	\$423	\$1,005	-	\$510

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$3,026	\$3,065	\$2,590	\$3,090	\$3,090

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	816	844	765	876	915
M&S	540	525	459	529	546
A/P	485	483	412	483	483
Other	143	144	84	150	150
Overheads	1,042	1,069	870	1,052	996
Total	\$3,026	\$3,065	2,590	\$3,090	\$3,090

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations/Substation Operations

Project/Program Title	“U” Type Bushing Replacement Program
Project Number	Various
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic – System and Component Upgrades

Work Description:

Utility industry experts have identified transformer bushings that have design and manufacturing problems. A bushing is a device that brings out the transformer internal winding leads through an insulating tube for connection to the power system. The identified bushings are General Electric Type U and Haefely Trench Type COTA bushings. Failure of the bushings can lead to transformer failure, decreasing system reliability and availability of transformers on the transmission and sub-transmission systems. Bushing problems have started to occur more frequently because of increased transformer load, which causes increased operating temperatures and voltage stress degradation.

Approximately thirty (30) 345 kV bushings, two-hundred and fifty (250) 138 kV bushings, forty-five (45) 69 kV bushings, and ten (10) 23 kV bushings have been identified for replacement and upgrade.

It is recommended that identified bushings be replaced and upgraded based on failure probability and system impact. The recommended priority is:

1. 138 kV and 345 kV shunt reactors
2. 345 kV transmission autotransformers
3. All phase angle regulators (PARs)
4. Other 138 kV and 345 kV auto-transformers
5. Two bank area substation transformers
6. Other area substation transformers

Justification Summary:

A major component of a power transformer is a bushing. General Electric Co. (GE) was a major supplier of bushings for all transformer manufacturers until the late 1980s. GE manufactured bushings with ratings from 15 kV through 800 kV and has served over 60% of the US market. One of the many types of bushings that GE supplied was the Type U bushing, a condenser-type design. The condenser-type design utilized a metal core tube with insulating paper and an electrically conductive foil or semi-conductive electrode wound around the core. The Type U design used alternate layers of plain Kraft paper and Kraft paper with conductive ink printed in a herring-bone pattern on the surface. In the late 1970s, users reported increases in the power factor of Type U bushings.

Teardown of failed and high power factor bushings revealed the following problems:

1. Heavy loading of some transformers (e.g., generator step-up transformers and shunt reactors), generated a higher internal temperature than the temperature expected from conductor-generated heat. This higher temperature resulted in increased pressure in the gas space above the oil, leading some of the gas to become dissolved in the oil. Rapid temperature cycling resulted in the gas

bubble generation and a reduction of dielectric stress. Insulation system degradation resulted in an increased power factor.

2. Over time, the conductive ink transferred from the printed-paper layers to the plain kraft paper layers. This bleeding of the conductive ink resulted in an increased power factor.
3. The terminal connection on the top of the bushing used a "flex-seal" system composed of a gasket, a seal nut, and a spring. If the cover bolts became loose over time, hot spots developed that compromised the gasket seal. Water would enter the bushing through the compromised gasket seal.

In addition, Type COTA bushings from Haefely Trench experienced unexpected failures in the middle of the last decade. Haefely Trench started manufacturing the Type COTA bushings in 1994. The Type COTA is also a condenser-type design. The failures occurred around the flange section of the bushing. The Type COTA bushing is shorter than bushings of the same rating manufactured by other manufacturers, which made it a good universal replacement. Because of the shorter dimension, the design must control the maximum and average voltage stresses in the Kraft paper insulation system.

Users started measuring the power factor of the Type COTA bushings and reported increased power factor measurements. No definitive root cause was found for the bushing failures.

Bushings are subjected to high dielectric, thermal, and mechanical stresses, which makes them a critical component of a transformer. It has been well documented that the physical damage a failed bushing causes can lead to a damaged power transformer. Several of our substations have transformer bushings that have been identified as having design and manufacturing problems.

Upgrading bushings will result in a reliable transmission and sub-transmission system, a reliable and available transformer, and minimal transformer failures from bushing failures.

Supplemental Information:

- Alternatives:
 1. Do nothing and replace the bushings if they fail. This is not an acceptable alternative. See risk of No Action
 2. Perform routine power factor testing on existing bushings that have a higher potential of failure. Bushings could fail between periodic testing resulting in the same issues as Alternative 1. In addition, this would also result in numerous additional outages for testing. Therefore, this alternative is not acceptable.
 3. Procure and install new transformer bushings. This alternative is recommended.
- Risk of No Action:

Waiting for bushings to fail and then replace them can cause transformer failure. This alternative is not acceptable since failure of a bushing and/or a transformer during the summer period will negatively impact the reliability of the transmission system. In addition the cost replace a transformer can easily cost to \$15 to \$40 M, which is significantly more than the cost of replacing the bushings.
- Non-financial Benefits:

Upgrading bushings will result in a reliable transmission and sub-transmission system, a reliable and available transformer, and minimal transformer failures from bushing failures.
- Summary of Financial Benefits (if applicable) and Costs:

Bushing failures have the potential to be catastrophic resulting in large costs for damages to transformers and lengthy outages on the system that could impact customers. The lack of a bushing replacement strategy is not prudent and could lead to a deteriorated transformer fleet.

- Technical Evaluation/Analysis:
- Project Relationships (if applicable):
“U” bushing replacements may be scheduled in conjunction with Tap Changer inspections where the increased outage duration does not impact the system.
- Basis for Estimate:
Near term work based on Engineering estimates. Outer term work based on cost of similar types of work done in the past. As this is an ongoing program, work scopes are generally similar in nature.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2013</u>	<u>Actual 2015</u>
		1,638	4,374	1,272

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Actual 2015</u>
Labor			654	1,425	459
M&S			8	77	26
A/P			171	942	216
Other			39	138	23
Overheads			765	1,792	548
Total	0	0	1,638	4,374	1,272

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>
3,000	3,000	3,000	3,000	3,000

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	784	789	827	796	846
M&S	470	458	468	476	475
A/P	420	420	418	420	420
Other	306	305	306	306	306
Overheads	1,020	1,028	981	1,002	953
Total	3,000	3,000	3,000	3,000	3,000

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Substation Operations

Project/Program Title	Buchanan - Y94 Upgrade to Solid Dielectric
Project Manager	John Dorn
Hyperion Project Number	20986977
Organization's Project Number	24617-12
Status of Project	Engineering
Estimated Start Date	2015
Estimated Completion Date	2016
Work Plan Category	Strategic

Work Description:

The Con Edison Buchanan temporary wood pole bypass is a 345 kV transmission line from the G-Line entering the Buchanan Substation. The current bypass was designed and built in 2002 as a contingency for the Feeder Y94 SF6 bus which had a history of gas leaks and failures. As a result, the SF6 gas insulated bus was retired as of 2012. A site survey was performed and it was determined that the temporary installation must be upgraded or replaced.

This project will replace the Y94 bypass with a Solid Dielectric (SD) cable installation comprised of two parallel feeders. The two SD feeders will connect the 345 kV Y94 transmission tower #54 to the North Ring Bus.

Justification Summary:

Feeder Y94 is in service with a temporary wood pole bypass. The wood-pole overhead bypass does not include the provision of a feeder disconnect and ground switch. Feeder Y94 also connects to the same bus section as TA5 and its corresponding feeder 95891. Current vertical clearances will only permit trained personnel to work beneath the line. This does not allow most contract forces to perform regular maintenance work near or below the poles.

The wood pole overhead line also crosses the demarcation on the city map for a provisional city road (First Street), which belongs to the village of Buchanan. Under these crossings, there is insufficient clearance as specified by NESC requirements.

Supplemental Information:

- **Alternatives:**

The following two alternatives were considered::

- 1) Install a 345 kV motor operated disconnect and ground switch by Transmission Tower 54 within the Buchanan Substation property.
 - The current wood pole line is not completely within the property line. It crosses the demarcation of a provisional city road that is owned by the village of Buchanan and the line does not provide the necessary NESC road clearance

- There is insufficient space for a disconnect and ground switch between the Y94 wood poles and the North Ring Bus
- 2) Install a new overhead line on steel H-frame structures in route of the retired SF6 gas insulated feeder trench and connect to the existing disconnect switch F11-12.
- A new overhead line along the line of the SF6 feeder trench will require a significant amount of rock excavation, increasing the cost of this option in order to achieve required clearances
- Risk of No Action:
Minimum NESC and or current Substation and Transmission Design requirements will not be met. Furthermore, risk of future clearance improvements to meet road requirements by NESC may be enforced by the village of Buchanan.
 - Non-financial Benefits:
The new span of solid dielectric cable resolves all clearance and right of way issues.
 - Summary of Financial Benefits (if applicable) and Costs:
The replacement of the Y94 bypass would reduce the costs of periodic pole inspections and replacements.
 - Technical Evaluation/Analysis:
Since 2012, the wood pole overhead line has been put in service for normal operation. However, the wood pole line maintains very low clearances that do not meet NESC or current Substation and Transmission Design requirements. Furthermore, the bypass traverses a provisional road, which belongs to the village of Buchanan. The wood poles were not intended to provide a permanent installation for feeder Y94 between the north ring bus and tower #54.
 - Project Relationships (if applicable):
Construction activity requiring clearance and cut-over outages will need to be coordinated with Indian Point refueling outages and other projects.
- This project was previously associated with project 26083-15, to provide an independent bus section for feeder Y94 and 95891.
- Basis for Estimate:
This project is currently appropriated.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
-	-	-	-	-	\$2,424

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						224
M&S						191
A/P						1,300
Other						47
Overheads						662
Total	-	-	-	-	-	\$2,424

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
9,900	-	-	-	-

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	2,534				
M&S	1,542				
A/P	1,397				
Other	1,091				
Overheads	3,336				
Total	9,900	-	-	-	-

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Develop Non-Routable Communications for PMU
Project Manager	R. Denezzo
Hyperion Project Number	
Organization's Project Number	25900-14
Status of Project	Construction
Estimated Start Date	August 2015
Estimated Completion Date	December 2015
Work Plan Category	Operationally Required

Work Description:

This project will eliminate the use of externally routable protocol in Substation Operations by revising the PMU communications system to use CCTN.

Justification Summary:

NERC Critical Infrastructure Protection (CIP) standards provide a framework for identification and protection of critical cyber assets that have a function for reliable operation of the Bulk Electric System (BES).

FERC has approved NERC CIP standard version 5 on November 2013. The implementation of NERC CIP version 5 is April 2016. The critical assets in version 5 are called BES Cyber Systems.

Substation Operations has started a project to identify, classify, and put controls on these BES Control Systems. One of the BES Cyber Systems is the Phasor Measurement Unit (PMU).

NERC CIP Version 5 introduces additional requirements for BES Cyber Systems with externally routable connectivity. Under the current configuration, in order to meet these new requirements there would have to be a project to develop systems, physical security, and processes and procedures and there would be an annual cost in excess of \$900K.

1. PMU is the only BES Cyber System with externally routable connectivity.
2. For non-externally routable connectivity the NERC CIP Version 5 requirements are reduced to 56 requirements from 111.

Supplemental Information:

- Alternatives: Option 1 – Keep the current communications protocol. This would require a project to develop systems, physical security, and processes and procedures and there would be an annual cost in excess of \$900K. This alternative was not selected.

Option 2 – Develop a non-routable fiber network for bulk electric system (BES) communications. This was determined to be cost prohibitive, and this alternative was not selected.

- Risk of No Action:
N/A
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: SSO PST performed analysis of NERC CIP version 5, and found that the only equipment using externally routable protocol that would be subject to increased requirements are the Phasor Monitoring Units. It was determined that in order to meet these additional requirements, modifications would be required to physical security, revisions to policy, development of additional systems, and ongoing operations and maintenance costs. The annual O&M burden associated with compliance is estimated at \$900K. The project is justified by eliminating this recurring cost.
- Project Relationships (if applicable): NA
- Basis for Estimate: Current funding request based previous similar projects.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
					559

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						148
M&S						11
A/P						147
Other						37
Overheads						216
Total						559

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Substation Loss Contingency - Rapid Recovery of an Area Substation/Transmission Resiliency Transformers
Project Manager	John McCoy
Hyperion Project Number	21384664
Organization's Project Number	26141-15 / 26116-15
Status of Project	Design / Procurement
Estimated Start Date	January 2015
Estimated Completion Date	December 2018
Work Plan Category	Strategic

Work Description:

There are two projects included under this Program, Transmission Resiliency Transformers and Rapid Recovery of an Area Station.

Rapid Recovery of an Area Substation (PN 26141-15)

This project will provide for the purchase of equipment required for the rapid recovery of a three bank area substation with 24 dual feeder positions. Equipment includes:

- a) Three (3) Resiliency Transformers on trailers
- b) Three (3) 138 kV Disconnect switches
- c) Three (3) 35kV, 40 kA fixed position SF6 distribution switchgear with one transformer breaker and eight (8) dual pothead distribution feeder positions and accessories.
- d) Universal modular control room equipped with relay protection, controls and ancillary equipment (AC and DC power supplies, local HMI – control, monitoring & alarms)
- e) Mobile relay enclosure
- f) Grounding mat
- g) 35kV 3000A segregated bus

In the event the Company incurs a loss of an area substation, this equipment would be deployed in conjunction with other operational measures which may include load management initiatives such as voltage reductions, rolling blackouts, network cutouts, temporary generator installations, and other similar temporary solutions.

Transmission Resiliency Transformers (PN 26116-15)

This project will provide for the purchase of electrical equipment (Transformers, potheads, and cable) for system restoration and resiliency for the complete loss of a single transmission substation. Loss of any of the large transmission substations would result in severe issues with system power flows and stability and/or a loss of supply to a number of area substations, potentially impacting a large number of customers. Resiliency (mobile) transformers and associated trailers, 138 kV and 69 kV cables and potheads, protective system mobile trailers, and associated equipment would be required to construct an ad-hoc substation in the street adjacent to the damaged substation to restore the supply to the effected area substations.

Long lead equipment includes, but is not limited to: six (6) 100/50 MVA, 345-138/138-69 kV, single-phase mobile transformers, integrated automation/relay protection system and relay panels trailer.

Justification Summary:

Rapid Recovery of an Area Substation / Substation Loss Contingency

The loss of a single area substation would result in a significant interruption of electric service to our customers.. Much of the focus of the work at area substations has been on reducing the risk of the likelihood that a catastrophic loss would occur. Capital and O&M programs such as the preventive maintenance program, breaker replacement program, security programs and procedures, pumping plant improvement program, and storm hardening efforts all address this risk.

Recent weather events, equipment failures and past terrorist events have shown the possibility of the extended loss of an area substation. These include flooding, fire, and a building collapse (9/11/2001). Additionally, the 2013 attack on the Metcalf utility substation in California increased concern about physical attacks. . In some of these instances, the customers supplied by the failed substation were restored to service from mobile generators or shunts from physically adjacent area substations.

A t review of all of our area substations shows the ability to restore customers by using portable generation or transfers to a nearby area substation is not always feasible due to the station loading, distance or impracticality due to the amount and locations of shunts and/or mobile generators that would be required. As a result, alternate sources of power to restore must be developed. In response to a loss of an area substation for 24 hours or longer at some of our area substations, the only means to quickly restore electric service to all of the customers affected includes the construction of a rapid deployment area substation in the vicinity of the failed substation.

Transmission Resiliency Transformers / Substation Loss Contingency

Large transmission substations interconnect circuits to form the transmission grid, sending and receiving power, transforming voltages, and directing flows so that the circuits operate within their current carrying capacity and voltage limits. Potential causes of the loss of transformers include items such as weather events like significant flooding or wind, a fire or building collapse at a property adjacent to a substation, or acts of terrorism or vandalism.

The resiliency transformers are for use at any of the 33 transmission substations. The loss of any of these transmission substations would result in severe issues with system power flows and stability and/or a loss of supply to a number of area substations that serve critical load in our service territory potentially impacting a large number of customers.

Supplemental Information:

- Alternatives: The alternative solution considered was to reduce the size of the networks and/or build additional new area substations and transfer load accordingly. This is also not viable or cost effective because too many new area substations would have to be built at a very considerable cost.
- Risk of No Action: System power flow control issues, system reliability concerns, and/or possible outages at multiple area substations resulting in a significant number of customer outages for an extended period of time. This is not recommended due to the potential inability to maintain reliable system power flows, or the inability to restore electric service to all of our affected customers during a loss of one or multiple substations.
- Non-financial Benefits:

Rapid Recovery of an Area Substation / Substation Loss Contingency

The project addresses the current inability to quickly restore power to customers following the loss of an area substation for 24 hours or longer in instances where it is either impractical or not viable to restore electric service via typical distribution solutions (generators, shunts, switching). In such cases, a new rapid deployment area substation will be installed adjacent to the failed substation to restore power to those customers not able to be restored via other means.

Transmission Resiliency Transformers / Substation Loss Contingency

The project addresses the current inability to quickly restore reliable power flows through one or more area substations during certain catastrophic events. In such cases, these new transformers would be dispatched to the transmission stations to restore reliable power flows, or to feed area substations in order to restore power to those substations, hence to the customers supplied by those area substations.

- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: A technical study to evaluate the loss of each area substation for 24 hours or longer has been updated by Electric Operations / Regional Engineering. It is estimated that five stations need a rapid deployment solution, and a rapid deployment station may be the most viable solution since a distribution solution is estimated to take longer. That being said, although technical solutions exist for each station, there are multiple cases where the solution is not readily feasible or practical due to various reasons as previously noted.
- Project Relationships (if applicable): N/A
- Basis for Estimate: Order of Magnitude Estimate

Total Funding Level (\$000):

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
-	-	-	-	-	4,768

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						6
M&S						3,632
A/P						26
Other						8
Overheads						1,096
Total	-	-	-	-	-	\$4,768

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>
\$6,800	\$29,085	\$37,500	-	-

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	129	807	1,143		
M&S	5,130	20,466	27,336		
A/P					
Other	110	1,096	857		
Overheads	1,431	6,716	8,164		
Total	\$6,800	\$29,085	\$37,500	-	-

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Capacitor Bank Tripping
Project Manager	B. Kennedy
Hyperion Project Number	
Organization's Project Number	10223-94
Status of Project	Construction
Estimated Start Date	May 2015
Estimated Completion Date	June 2017
Work Plan Category	Operationally Required

Work Description:

This program will install new jumper wires at the Capacitor Banks 'C1', 'C2' and 'C3' breaker cubicles at Murray Hill Substation, such that Capacitor Banks 'C1', 'C2' and 'C3' will be wired to trip along with both Side 'A' and Side 'B'.

This program will also install new jumper wires at the Capacitor Banks 'C1' and 'C2' breaker cubicles at Murray Hill Substation, such that Capacitor Banks 'C1' and 'C2' will be wired to trip along with both Side 'A' and Side 'B'.

Justification Summary:

There are sixty (60) area substations that contain Startup/Shutdown (SU/SD) panels, which supply power to a total of eighty-six (86) network load areas. Forty-six (46) of these area substations also have Automatic Under-Frequency Load Shedding (UFLS) relays that will trip their network loads, via the SU/SD panels, in case of a UFLS event.

In addition to supplying power to their network load areas, many of these substation bus sections are connected to various capacitor banks. Capacitor banks are typically used to correct or counteract undesirable characteristics, such as power factor lag or phase shifts inherent in a substation. Presently, not all of the capacitor banks at the area substations trip automatically along with their network loads through the SU/SD panels. The remaining capacitor banks are either tripped manually or via supervisory control.

As load trips during a UFLS event, system voltages will automatically rise due to the system being unloaded. Without simultaneously tripping the connected capacitor banks, the voltages both on the distribution level as well as on the transmission level could rise to excessive levels. Therefore, corrective action needs to be taken (faster than that of a manual supervisory operation) by connecting the remaining available capacitor banks to the Startup (SU) and Shutdown (SD) panels to trip along with their loads.

Supplemental Information:

Alternatives: Do nothing. See below.

- Risk of No Action:
No action would continue to allow the capacitor banks at Murray Hill and Bruckner Substations to trip on the existing Startup/Shutdown side. This alternative is not acceptable.
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: Transmission Planning has recently done a study and has found that with the present percentage of cap banks tripping, for an under-frequency load shedding condition, the 345 kV, 138 kV, and area station bus voltages could exceed their respective system ratings. By connecting the remaining available capacitor banks to the SU/SD panels to trip long with their respective loads, the bus voltages would be lower.
- Project Relationships (if applicable): NA
- Basis for Estimate: Current funding request based field estimates.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
					23

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						11
M&S						
A/P						
Other						
Overheads						13
Total						23

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 – Central Operations / Substation Operations

Project/Program Title	Murray Hill – Install Capacitor Banks C2A, C2B
Project Manager	M. Lentini
Hyperion Project Number	
Organization's Project Number	26513-15
Status of Project	Construction
Estimated Start Date	June 2015
Estimated Completion Date	August 2015
Work Plan Category	Operationally Required

Work Description:

This project is to install two 15 kV, 10 MVAR ABB-SIKAP Capacitor Bank units. Each Capacitor bank unit shall come fully furnished with a Southern States capacitor switcher including all controls, unbalancing relays, current transformers, gourn and shorting switch and all associated electrical connections. The fully furnished capacitor banks will provide voltage support for varying voltage levels and compensate for the expected load growth at Murray Hill Substation.

Justification Summary:

The Murray Hill 13 kV Substation has a completely enclosed switchgear building with outdoor transformers supplied by four 138 kV Feeders (38M03, 38M04, 38M05, and 38M06) from Vernon 138 kV Substation. During a second contingency, there is a considerable concern of losing a remaining transmission path to Murray Hill Substation, subsequently effectively shutting down the Empire and Fashion Networks.

Murray Hill substation is designed to operate at full load under first and second contingency conditions. If the station operates on third contingency, immediate response is required for load relief with the use of capacitor banks to prevent another loss of transmission feeders.

As a response to this contingency, there are currently four 2 MW mobile generators in place to compensate the demand response when the system load exceeds 11,500 MW.

In order to support high load conditions capacitor banks need to be in place to provide reactive power (VAR) to maintain high voltage demand and delivery reactive power through the transmission lines. When sufficient reactive sources are not provided, large voltage drops occur. This reactive power is essential to prevent large voltage drops and move reactive power through the transmission and distribution system to the customer to compensate the load demand.

Currently the mobile generator in place will not be able to support the forecasted loads risking system reliability. It is imperative to provide additional reactive sources (VAR) for voltage support which can be established by the installation of capacitor banks. This prevents voltage losses through the transmission system for high peak conditions. Consequently during off-peak conditions, capacitor banks will need to be switched off to prevent excess generations of reactive power which can damage key equipment. In

order to respond to the changes in voltage support requirements, switching capacitor banks via transformer load tap changer can provide flexibility during varying load conditions.

Considering the fact that the forecasted loads can potential result in a network exceeding its design criteria, there is a risk of subsequent cascading feeder failures that could jeopardize network reliability and loss of Murray Hill Substation. Therefore immediate installation of capacitor banks is required. The additional relief from the capacitor banks and existing mobile generator in place can regulate the voltage and reactive power during peak and off-peak load conditions, preventing further loss of feeders.

Supplemental Information:

- Alternatives: Do nothing, see below.
- Risk of No Action: Do not install the capacitor banks and continue operating under contingency basis. This alternative is not acceptable considering system reliability requirements. The station needs to be restored to its design contingency basis.
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: The installation of capacitor banks will be significantly impactful since it will correct voltage requirements during varying load levels. It will also provide additional station capability by supplying VAR loading and relief to the transformers and transmission feeders. This will essentially mitigate system losses ensuring stability of the power system.
- Project Relationships (if applicable): NA
- Basis for Estimate: Current funding request based previous similar projects.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
					942

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						387
M&S						60
A/P						9
Other						19
Overheads						468
Total						943

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

2015 – Substation Operations

Project/Program Title	138 kV Feeders 34051 & 34052 Reactors Foundation
Project Number	24786-12
Status of Project	Design
Estimated Start Date	April 2015
Estimated Completion Date	May 2015
Work Plan Category	Operational Required - Reliability

Work Description:

This project consists of the following:

- a. Construction of two concrete foundations supported on helical piles for the 138 kV Feeders 34051 & 34052 in a new location within the station in the Spring/Summer of 2015
- b. Relocate reactor 34052 to the new location in the Fall of 2015
 1. Installation of helical piles to re-support the two pothead stands
 2. Install new disconnect switch
 3. Build new moats to prevent an oil spill
- c. Relocate reactor 34051 to the new location in the Spring of 2016
 1. Installation of helical piles to re-support the two pothead stands
 2. Build new moats to prevent an oil spill

Justification Summary:

The Astoria East/ North Queens Substation is a 138kV transmission substation and 27kV area substation located in Queens County in the New York. There are six oil-filled 138 kV series reactors for feeders 34051 and 34052. One reactor is installed in each phase of each feeder and each is supported by a timber foundation. The existing timber foundations supporting the series reactors on Feeders 34052 34052 have been settling and are straining the 138kV overhead aluminum bus. This condition has caused the Disconnect Switch F1W support insulator to fail requiring repairs and the installation of flex bus connections in the interim. However, additional settlement has caused the center phase of the reactors' radiators' piping to twist and strain the flex connections. In addition, two of the foundations for the pothead stand on Feeder #34052 are also settling causing the bus structure to twist. Due to the settlement the radiator banks and reactors are shifting in different directions and stressing the connecting expansion joints. This condition poses a risk to the reliability of these feeders due to continued settlement and degradation of the timber foundations which may lead to structural failure and oil spills.

Supplemental Information:

- Alternatives:
Replace the timber foundations with like in kind. This alternative was rejected because timber foundations do not comply with current Con Edison standards and would be subject to similar failure in the future. Although the scope of the project would be very similar (with the exception of the different foundation designs), the incremental cost for concrete foundations is warranted due to the significant protection provided by these structures.
- Risk of No Action:
Maintaining the status quo may result in feeder outages, requiring costly emergency repairs and posing a significant risk of structural failure.

- Non-financial Benefits:
This project is needed to ensure the reliable operation of feeders 34051 & 34052.
- Summary of Financial Benefits (if applicable) and Costs:
This project is required to prevent outages on two major 138 kV feeders and ensure the reliable operation of the electric system supply in the Borough of Queens. The financial benefits of this project are compelling when compared with frequent corrective maintenance that would be required due to the progressive degradation of the timber foundations. In addition, the emergency response that may be required in the event of a major structural failure resulting in a feeder outage and disruption of service would also be quite costly.
- Technical Evaluation/Analysis:
N/A
- Project Relationships (if applicable):
A relay modification on these feeders was rescheduled to coincide with this project and take advantage of the same feeder outages.
- Basis for Estimate:
The funding request is based on engineering estimates performed for this project.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
-	-	-	-		-

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor	-	-	-	-	-	-
M&S	-	-	-	-	-	-
A/P	-	-	-	-	-	-
Other	-	-	-	-	-	-
Overheads						
Total	-	-	-	-	-	-

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
	7,119	3,038		

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	1,743	784			
M&S	1,093	467			
A/P	979	420			
Other	926	397			
Overheads	2,378	970			
Total	7,119	3,038			

X	Capital
	O&M

2015 – Central Operations/Substation Operations

Project/Program Title	Willowbrook - Replace Dummy Breakers with Bus Tie Breakers
Project Number	25348-13
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic – System and Component Upgrades

Work Description:

This project will replace two dummy breakers with bus tie circuit breakers at Willowbrook Substation. This will automatically isolate the faulted bus section and limit the loss of distribution feeders to one bus section. Since the faulted bus section is taken out of service by the bus tie circuit breaker, operators can isolate the faulted feeder from a dead bus and restore the bus and feeders quickly. This enhances safety and operational flexibility.

Major items associated with this project are as follows:

1. Dummy breakers – remove and retire
2. Modify dummy breaker cubicles to full function circuit breaker cubicles – purchase and install
3. Bus tie breakers, protective relays and control equipment – purchase and install
4. All parts and accessories to complete the installation – purchase and install

Justification Summary:

The Willowbrook Area Substation is a 13.8 kV ring bus configured as two east buses (1E & 2E) and two west buses (1W & 2W) separated by two dummy breakers: breaker 11 on the east bus and breaker 22 on the west bus. The dummy breaker is an insertable link device and does not have open/close capability. The station is supplied by two transformers.

The Willowbrook 13.8 kV Substation is designed as a normally unattended substation, and controlled from the District Operator's Office located at the ECC/AECC, via Energy Management System. In the event of a fault (bus fault or feeder breaker failure during a feeder fault), two bus sections (1E and 2E or 1W and 2W) will be tripped. The associated dummy breaker must be removed from the cubicle prior to returning the unaffected bus section to service. Since this is an unattended substation, it takes time to dispatch operators to Willowbrook Substation and remove the dummy tie breaker.

The Willowbrook Station is scheduled for 13.8kV circuit breaker retrofits. The retrofit breaker installation requires a bus outage on the respective connecting bus. This will require multiple bus pair outages to insert and remove the dummy breaker, this will negatively affect station reliability during switching evolutions. Replacement of the dummy breakers with full function circuit breakers will facilitate the switching operations associated with the bus section outages to implement the retrofits.

Supplemental Information:

- Alternatives:
 1. Do nothing. This is not an acceptable alternative. See risk of No Action
 2. Replace the dummy breaker with a breaker type switch device. This option will simplify manual switching capability to isolation a bus section. This option will not respond to protection initiated auto trips and does not resolve the reliability problem for breaker failure tripping. This option is not recommended.
 3. Replace the dummy breakers with bus tie circuit breakers to automatically isolate the faulted bus section and minimize loss of distribution feeders and enhance operational flexibility and safety. This is the recommended option because it is the most cost effective method, to provide enhanced operational flexibility and reliability in the event of a bus fault or a feeder breaker failure.
- Risk of No Action:
The existing configuration has excessive restoration time during a bus trip. The existing configuration presents switching difficulties when removing a bus section from service. This option is not recommended.
- Non-financial Benefits:
N/A
- Summary of Financial Benefits (if applicable) and Costs:
N/A
- Technical Evaluation/Analysis:
- Project Relationships (if applicable):
- Basis for Estimate:

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2013</u>	<u>Actual 2015</u>
				848

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Actual 2015</u>
Labor					29
M&S					524
A/P					0
Other					0
Overheads					295
Total	0	0	0	0	848

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

X	Capital
	O&M

2016 – Electric Operations

Project/Program Title	East 179 th St Substation Reconstruction Distribution Feeder Transfers
Project Number	20593360
Status of Project	Ongoing
Estimated Start Date	Spring 2013
Estimated Completion Date	Fall 2022
Work Plan Category	Operationally Required: Reliability

Work Description:

The Fordham Network is a Bronx Region network serving 107, 740 customers as of 2014. Over the next 8 years, the network's 24 distribution feeders will be undergoing changes following the Area Substation equipment changes from the old standard single synchronous bus design to the more reliable double synchronous bus design. When each minor bus section will be established, the new starting point, or the feeder breaker cubicle for all of the distribution feeders will need to be transferred and rebuilt.

High level schedule: Ongoing activity to transfer feeders from old breaker positions to new ones between Fall 2013 to Spring 2021 of Fordham Network feeders being transferred to complement Area Substation's new reliable design is below:

Date	Actual Fall 2013	Spring 2016	Fall 2016	Spring 2017	Spring 2019	Spring 2020	Spring 2021	Spring 2022
# of feeders to be transferred	5	3	7	7	4	4	4	4

Justification Summary:

The East 179th St Substation is the source of supply that feeds the Fordham – 3X Network in the Bronx. The construction of the Area Substation program is meant to modernize critical equipment and is a proactive effort to upgrade aging equipment with the intent of improving substation and network reliability.

Supplemental Information:

- Alternatives:
There are no alternatives to replacing aging substation equipment to improve reliability other than the continuation of the substation reconstruction project.
- Risk of No Action:
Without the substation reconstruction, there would be high likelihood of decreased reliability of the Fordham Network. Taking no action would lead to equipment failures, customer outages, and a network shutdown during severe system contingencies.

- Non-financial Benefits:
The completion of the Substation Reconstruction Project and the transfer of the feeders to the new switch positions will provide increased reliability to the Fordham Network and allow for the introduction of new feeders into this densely populated network.
- Summary of Financial Benefits (if applicable) and Costs:
The completion of this project in conjunction with the substation reconstruction helps to minimize the possibility of a network shutdown due to substation component failures. Benefits include avoiding costly penalties such as the existing Reliability Performance Mechanism (RPM) revenue adjustment of \$10 million incurred for each network shutdown.
- Technical Evaluation/Analysis:
This project is conjunctional to the Substation Reconstruction Project. This project requires the relocation of feeders to the new switchgear and enables the continuation of the substation project.
- Project Relationships (if applicable):
The following Central Operations – Substation projects are related to this Electric Operations project:
 - EAST 179TH STREET: SWITCHGEAR & BUS REPLACEMENT
 - EAST 179TH STREET: INSTALL WATER SPRAY FOR 43MVA TRANSFORMERS
 - EAST 179TH STREET: INSTALL FANS FOR LIMITING BUS, BREAKERS AND REACTORS
- Basis for Estimate:
Historical costs were applied after a review of cable and splicing requirements and the includes the projected obstruction rate costs (stemming from cable and conduit installation related to feeders being transferred that are stuck within in the conduit and reroute plan of feeders would need to be designed and built).

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2015</u>
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
500	500	500	500	500

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2014 – Electric Operations / Bronx Westchester

Project/Program Title	13 MW Radial Load Transfer From Parkchester 2 to 1
Project Manager	Jonathan Russell
Project Number	
Status of Project	Preliminary Design
Estimated Start Date	January 2015
Estimated Completion Date	May 2015
Work Plan Category	Operationally Required

Work Description:

Transfer 13MW of radial load from Parkchester 2 to Parkchester 1 Area Substation. The 13 MW includes Van Nest and Neil Ave loops on feeders 5X64 and 5X65. The project will start in 2015.

Justification Summary:

In 2015, the Parkchester 2 Substation will be loaded to 177 MW which exceeds the substation rating of 168 MW. The most cost effective way to relieve Parkchester 2 Substation is to transfer 13 MW of radial load to Parkchester 1.

Supplemental Information:

- Alternatives:

Increase Parkchester 2 capability by replacing the limiting station bus equipment. This would increase the station rating to 182 MW; however, the estimated cost is \$4 million. Transferring the 13 MW is cost effective and defers the bus replacement until 2020.

- Risk of No Action:

Parkchester 2 Area Substation would be 105% overloaded in 2015. An overloaded substation jeopardizes electric service reliability. In this case approximately 79,942 network customers and 31,955 radial customers would be at risk of losing electric service.

- Non-financial Benefits:

The project provides for the relief of the Parkchester 2 Substation which is projected to exceed it's rating during the summer of 2015.

- Summary of Financial Benefits (if applicable) and Costs:

The proposed load transfer is more cost effective than replacing the limiting bus equipment.

- Technical Evaluation/Analysis:

Parkchester 2 Substation will be loaded to 177 MW which exceeds the substation rating of 168 MW. The most cost effective way to relieve Parkchester 2 Substation is to transfer 13 MW of radial load to Parkchester 1. Transferring the 13 MW is cost effective and defers the bus replacement until 2020.

- Project Relationships (if applicable):

- Basis for Estimate:

Historical costs were applied after a review of the cable and splicing required and the inclusion of a projected 20% obstruction rate.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2009</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2013</u>
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2009</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2013</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2014</u>	<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>
	<u>\$500</u>			

^aRequest by Elements of Expense

<u>EOE</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

X Capital

☐ O&M

2016 – Common / Energy Services

Project/Program Title	Customer Project Management System Enhancements
Project Manager	Steven Malena
Project Number	
Status of Project	Not Started
Estimated Start Date	01/04/2016
Estimated Completion Date	01/04/2018 (30 months)
Work Plan Category	

Work Description:

Energy Services is committed to improving its business operations by building upon the Customer Project Management System (CPMS) that went live in 2013. The project was a significant step in improving overall customer service. The CPMS system streamlined and refined a number of internal processes. However, the scope of initial CPMS deployment was limited and it focused on internal Con Edison business processes to achieve internal improvements and did not build its requirements around customer facing interactions that are now possible.

CPMS Enhancements plans to add:

- 1) New Mobile functionality for customers and Energy Services field workers that will enable case transactions to be executed remotely and automatic updates pushed to customers
- 2) New Telephony service integration with the Customer Service Call Center hardware to automatically provide customers with self-service case information and call routing
- 3) New capability to provide our customers with self-service Electronic Scheduling of inspection appointments and scoping meetings
- 4) A new Knowledge Management repository designed to capture case experience and key information that can be re-used in future cases
- 5) New Analytic tools to facilitate performing timely analysis of customer statistics and business processes to further improve customer service

Justification Summary:

The total estimated project cost for the five aforementioned phases that includes building, testing, and deployment of CPMS Enhancements is \$19.0M, including appropriate contingencies. The estimated duration of CPMS Enhancements is 30 months, starting in January 2016 and completing in June 2018. Con Edison and Vendor team sizes will vary during the course of the CPMS Enhancements project with an approximate peak at 40 resources including vendor offshore resources.

A Phase 0 project was recently completed which included a fit/gap analysis of each functional area noted above. This entailed defining the related business requirements and use cases through a series of structured workshops, developing detailed designs, and preparing detailed

implementation plans for the build, testing, and deployment of the CPMS Enhancements that is the subject of this white paper.

Based upon the work conducted thus far in Phase 0, the work scope required for further phases of deployment are as follows:

- Due to the estimated dollar value of the CPMS Enhancements deployment, a competitive bid process will be undertaken.
 - This involves RFP preparation, RFP administration, Vendor selection and Mobilization.
 - The estimated time for this competitive bid and vendor selection is approximately 7 months.
- During the RFP process some required pre-requisite work on the CPMS Enhancements application will commence and run in parallel to the RFP process and vendor selection. This work is estimated to take approximately 7 months and includes conducting design workshops targeting the following:
 - Exploiting functional business improvements inherent in Pega v7.1.6.
 - Adding additional process and functional enhancements to exploit other Con Edison improvement projects such as customer online payments, meter orders, green sheets, work request dashboard, etc.
- The Build, Testing, and Deployment phases will commence after vendor mobilization, run for approximately 30 months, involve multiple tracks running in parallel and includes the following:
 - The Build phase requires using the designs completed in Phase 0 and performing the necessary development work to enable the specified functionalities on top of the CPMS base application software.
 - The Testing phase is conducted in several steps and requires multiple test environments to be readied, test scripts developed, tests executed, defects log and fixes applied.
 - The Deployment phase requires a phased rollout across all operating areas and system stabilization.

Supplemental Information:

- Alternatives:
 - Continue to utilize the system as deployed with limited customer self-service capabilities.
 - No integration with Call Center CTI switches to answer customer's call to facilitate self-service.
 - Limited remote system access for field workers.
 - Rely on customers to call to manually request and book appointments.
 - Modify Project Center for self- service scheduling.
 - No mobile capability for customers to check case status or push notification via smart phone or tablet.
 - Knowledge transfer will be lost as staffing is turned over.
 - Analysis of customer statistics will not be utilized to the fullest extent to help improve customer relations.

Without these new functional capabilities, Energy Services staff will continue with the existing processes of responding to customer needs and inquiries. The existing methods and processes are extremely resource dependent and routinely lead to backlogs, substantial delays and inconsistencies. This results in increased customer frustrations and hinders the company's ability to provide excellent customer service.

- Risk of No Action:
 - Energy Services staff will continue with the existing manual and resource intensive processes of responding to customer needs and inquiries.
 - Additional staffing may be required to accommodate caseloads instead of re-allocating resources that could be freed up from performing routine tasks that customer self-service could provide.
 - Limited workflow, telephony and resource scheduling capabilities, which does not align with two of the company's main cultural imperatives, cost management and external stakeholder relationships, namely customers.
 - Maintain the CPMS system with limited self-service and no mobile functionality.
 - Loss of knowledge skills as long term employees retire or move on to new positions.
 - Analyzing raw customer data and statistics with standard tools and data base extractions that are extremely time consuming and inaccurate.
- Summary of Financial Benefits and Costs:
 - The introduction of new technologies will provide an opportunity to operate more efficiently and create value for the customers we serve and their contractors. In addition, the CPMS Enhancements will provide better information to determine more precise Energy Services business staffing requirements.
 - Implementation of the CPMS Enhancements case management tool is expected to provide savings and cost avoidance through the automating and streamlining of processes, optimizing use of resources and enabling the customer and contractors to do more on their own.
- Non-financial Benefits:
 - The implementation of the CPMS Enhancements case management system is expected to increase customer satisfaction by streamlining the new business process and leveraging new workflow technologies.
 - Consistency and speed in responding to customer needs and inquiries will allow for more new business to be taken on.
- Technical Evaluation/Analysis:
 - The new solution in CPMS Enhancements will be based on a leading commercial case management and customer relationship management platforms that are used by other utilities/companies. It will leverage the latest software, database and server technologies and include improved workflow functionality and interfaces to customer service and work management systems.
 - The Company expects the use of the CPMS Enhancements case management solution to ensure compliance with PSC incentive goals and improve overall customer satisfaction.

- Project Relationships (if applicable):
 - The CPMS system was deployed with the full deployment of the work management system for Electric Operations. These two systems will continue to interface with each other to provide greater visibility to customers as to the status of their cases. Energy Services now plans to expand this core system to add new functionalities of telephony, scheduling, mobility, knowledge management and analytics.
- Basis for Estimate:
 - This request is based on the cost to build, test and deploy the CPMS Enhancements project designs and includes the following:
 - Mobile functionality for Customers and Energy Services field workers
 - Telephony integration with call center hardware for self-service functionality
 - Electronic Scheduling for customer appointments
 - Knowledge Management repository to capture business knowledge
 - Analytical capability geared to improving the customer's experience as well as providing pertinent data to drive business decisions.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Actual 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Actual 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
5,000	8,000	6,000	0	0

^a**Request by Elements of Expense**

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

2015 Capital – Electrical Operations

Project/Program Title	PQView System Upgrade
Project Manager	Cristiana Dimitriu
Project Number	
Status of Project	Engineering
Estimated Start Date	2014
Estimated Completion Date	July 2016
Work Plan Category	Strategic IT Enhancements

Work Description (Includes units per Year and a high level schedule):

This project will reengineer and extend the domain models, database schema, software libraries, algorithms, services, and applications used in PQView 3 into a new application suite that will be known as PQView 4.

The goals of upgrading PQView are grouped into three phases:

1. Objectives of Phase 1 – Initial Development
In this initial phase of development, key aspects of the project are being developed. The high-level requirements and overall system architecture will be defined, and initial versions of key components of the core system will be developed and tested. Partial functionality in a few areas critical to PQView functionality will be developed into a demonstrable, proof-of-concept form.
2. Objectives of Phase 2 – Core Development
After the initial phase, development of PQView 4 will transition into a core development phase, where core components of the infrastructure, models, and services are developed, and basic functionality for numerous critical functional areas is developed. One or more PQView Explorer 4 Edition applications will be created to demonstrate the evolving functionality.
3. Objectives of Phase 3 – Release Development
The objective of this phase is the creation of the first viable release of PQView 4 applications. In this final phase of development, release versions of the infrastructure, domain models, etc. are developed, and enough functionality for the product to be considered viable is completed and stabilized. This phase ends with the delivery of the release version of PQView 4.0.

Con Edison currently uses PQView 3 with power quality monitors at distribution substation transformers to locate faults on its 13 and 27kV underground network feeders. The power quality monitors serve as the voltage and current monitors in an automatic fault location system. Fault measurements captured by the meters are downloaded automatically, integrated into a PQView 3 database, and impedances are calculated. PQView 3 then combines impedance calculations with up-to-date distribution circuit models and geographic information system data to build estimated fault location tables and map displays. The systems are integrated on Con Edison's intranet and real time email notifications are sent to numerous individuals within Con Edison including electric operations, system protection, and power quality. The system detects and locates incipient and permanent single-phase and multi-phase faults. PQView 3 also sends email alerts

when subcycle faults and magnetizing inrush current transients are detected. For single-phase faults in Con Edison, the system's accuracy regularly exceeds 65% success in placing the fault location within 10% of the total number of the feeder structures. In 2008, the system was expanded to incorporate data from feeder relays and in 2009 it was expanded to include data from transmission digital fault recorders. In 2009, data from the PQ monitors, microprocessor relays, and digital fault recorders was integrated with operations data from the SCADA historian (PI Server) using PQView 3.

Analysis provided by PQView 3 has also been integrated into control center and operations systems including the Heads Up Display (HUD), Visual Distribution Information System (VDIS) and the Feeder Management System (FMS). Integration in these systems has provided operators with automated decision support in key areas such as fault locating and determination if a Cut-In-Open-Auto is due to a fault or magnetizing inrush. Data analyzed by PQView 3 is also being integrated into an automated bus fault analysis and correlation tool for System and Electric Operations.

In addition to the information described above, PQView 3 also analyzes and provides ready access to critical operating information including fault duration, overvoltage conditions, relay targets, digital fault recorder oscillography, and smart meter data (from High Tension metering). PQView has also been improved to analyze "follow on faults" which can cause cascading in networks, and to analyze capacitor switching transients, breaker restrike, and breaker fault duties which will help drive asset management decisions. Additionally, as we migrate to additional devices such as microprocessor relays and PQNodes being installed at our 4 kV unit substations; additional feeders and systems can be quickly and fully enhanced with the same functionality and decision support that is available now at area and transmission substations.

Attachment 1 shows the relationship between the intelligent electronic devices, other data sources, PQView 3 and the major functionalities and systems in Con Edison supported by PQView.

PQView 3 is the primary analysis tool which has allowed us to do long term characterization of the Harmonic Distortion Levels on the primary and secondary distribution systems as well as the development of voltage sag and momentary interruption performance indices.

Further, PQView 3 is playing a key role in developing a new tool, StationSpec. By integrating data from the PQNodes and other intelligent electronic devices in our area substations and secondary networks, and the SCADA historian (PI Server) data, we are developing statistical process control tools in PQView that will facilitate continuous monitoring and performance reporting for the voltage and var control systems at area substations.

One of the primary reasons that Con Edison has chosen to build its fault location, inrush detection and other grid asset health diagnostic system on the PQView 3 architecture is because of the wide variety of sensors and other instruments that can be integrated into a PQView system, and its ease of learning and use. As described above PQView 3 integrates data from an unlimited array of power quality monitors, digital fault recorders, electronic relays, revenue meters, data historians, and SCADA systems. First and foremost, Con Edison uses PQView because it is a highly advanced system for processing IEEE Std 1159.3-2003 PQDIF files and IEEE Std C37.111-1991/1999 COMTRADE files. However, it also includes functionality for

integrating devices using generic communication protocols such as Modbus. Furthermore, PQView has a large number of drivers for integrating data from many proprietary systems. This is critical as we progress into a smarter grid with more and more advanced intelligent electronic devices.

Justification Summary:

Con Edison plans to expand the number of intelligent electric power system monitors by about 300% in less than five years. PQView is a critical component to provide automatic integration and analysis of measurements from these sensors for prognostics, diagnostics, analytics, and decision support for system restoration. However, the current PQView 3 design limitations make it a weak link in the overall goal of having greatly expanded data acquisition of grid parameters that focus on disturbance prevention and reliability improvement. Therefore, Con Edison sees a reengineering of PQView as a critical need for a smarter, more reliable Con Edison grid.

Expansion of the number of intelligent electronic devices on our systems makes the upgrade of PQView by the creation of the PQView 4 platform more urgent: features such as PQView 4's scalability, its ability to import and process data more autonomously and reliably, its greater support for various device integration standards (e.g., IEC 61850), and its extensibility via a software development kit, make PQView 4 a key component to moving forward in this arena.

PQView 4 will improve upon PQView 3 in the following ways:

- **New Technology Platform**
Moving to a new technology platform is a primary and critical driver for PQView 4, and is required in order to ensure PQView's longevity and to allow it be a host for diverse smart grid prognostic and diagnostic applications, which are both critical capabilities for sustaining reliable power delivery. A new platform will be the key enabler to allow for improved features, flexibility, performance, availability, and needed scalability. PQView 4 will be based on Microsoft's modern development platforms. It will include built-in support for modern versions of Microsoft Windows, including support for 64-bit processing architectures.
- **User Interface**
While very functional, the PQView 3 user interface (UI) has a twenty-year history, and in places appears cluttered and unintuitive. For PQView 4, the UI will be re-factored with the goals of improving ease of use and consistency. The PQView 3 user interface and controls appear dated in their look and feel; PQView 4 will provide a fresh, modern interface. The PQView 4 user interface will be more layered and modular, facilitating consistency, flexibility, maintainability, and extensibility. A powerful, highly interactive PQView 4 user interface will be available via a lightweight deployment and update option, extending application reach and ease of use, and greatly facilitating maintainability. As an example, fault location modules will provide integrated, interactive GIS map and aerial imagery to expedite fault understanding and remediation.
- **Data Federation and Enhanced Integration**
For the most part, PQView 3 only analyzes and reports on data that has been imported into a PQView database. Additionally, a single instance of PQView 3 can work only with one PQView database at a time. There is a growing need to integrate the power systems measurements imported into a PQView database with large external data stores such as

SCADA systems, data historians, and more. Integration of these data stores is important in order to provide a comprehensive solution for analyzing all of the assets needed to sustain reliable system operations.

PQView 4 will add support for a generic model for “federating” with external data stores. An example of a federated system would be if one or more native PQView databases are combined with a SCADA database or an OMS database that could be accessed simultaneously using the same PQView 4 domain model. A single PQView 4 instance will be able to access data from both integrated and federated data stores, including multiple PQView databases.

- **Enterprise-Class Features and Performance**
Although PQView 3 stores its power systems measurements in a powerful SQL Server 2005 or 2008 database system, its data management module runs a single-threaded, desktop application. PQView 3 does not utilize longer-running, more robust modules, such as Windows services, which are commonly used for enterprise-class processes. Instead, imports occur within an interactive process, mostly without failure recovery. Key goals of PQView 4 will be to embrace key enterprise-class server features to improve performance and availability. Its architecture will support reliable, long-running, recoverable, unattended data import and server processing. It will have the built-in processing ability to effectively utilize multiple threads, processors, and machines to distribute and handle dynamic work load. Its architecture will support high availability operation, allowing the automatic shift of workload to currently available systems. Furthermore, as more distributed sensors are added to the monitoring system, high scalability features will become more critical for grid operation.
- **Improved Standards Support**
PQView 3 currently allows integration with smart grid standards including IEEE 1159.3 PQDIF and IEEE C37.111 COMTRADE. It also offers indirect integration with open industry standards such as Modbus. PQView 4 will have deeper, better-aligned integration with numerous industry standards; candidates include IEC 61970 Common Information Model (CIM), MultiSpeak for Distribution Modeling, IEC 61968 Information Exchange between Distribution Systems, and IEC 61850 Electrical Substation Automation. Tighter integration with IEEE 1159.3 PQDIF and IEEE standards 519 & 1453 will be considered. PQView 4 will offer real-time and historical data exchange via OPC. Software standards such as WSDL, SOAP, WS-*, and XML will be key to service-oriented systems. Integration with some of these standards will require redefinition of the domain model used by PQView itself. Embracing such standards will greatly facilitate the much needed interoperability that the smart grid objectives demand.
- **Richer, .NET-Based Developer Framework/Software Development Kit**
The PQView 3 architecture allows third-party software development using ActiveX libraries and Component Object Model interfaces. Some third-party developers also directly query a PQView database using SQL statements. PQView 4 will be built on a “PQView platform” that uses the .NET framework and concepts such as service orientation, loose coupling, and modularization.

The resulting PQView 4 platform will provide an extensible framework for building additional advanced applications for both proactively maintaining the grid and responding to failures.

- **Security**

PQView 3 supports a certain degree of database-level authorization support when used with SQL Server, which can use SQL Server or Windows authentication.

PQView 4 will move to a capability/role based user authorization scheme implemented at the service layer. It will function and provide security independently of any database-based security mechanisms, providing access consistently, even across federated data stores. By leveraging the power of .NET's Windows Communication Foundation (WCF), PQView 4 should be able to provide flexible and powerful security functionality. It will be designed to optionally integrate with Windows security, allowing the user to have a single sign-on shared by their workstation and PQView when used within the corporate intranet.

- **Prognostic Health Management and Distribution Sensing using PQView 4**

The sensors and intelligent electronic devices that can be integrated with PQView monitor the equipment critical to ensuring reliable grid operations, including transformers, switchgear, cables, lines, and feeders. PQView 4's added support for both distribution system interoperability standards such as IEC 61850 and enhanced security will securely extend its reach further into areas critical for improving grid reliability, efficiency, and security. The algorithms developed for PQView 3 will be migrated to PQView 4 and will be enhanced and extended. These algorithms and applications focus on monitoring substation equipment, distribution feeders and transformers for signatures of: forthcoming failure such as self-clearing and intermittent faults, unbalanced regulator operation, unbalanced reactive power delivery by capacitors, incorrect regulator setting based on load level, tap changer degradation, and abnormal switching of circuit breakers.

Supplemental Information:

- **Alternatives:**

We know of no other commercial alternative to the data gathering, analytics and information visualization provided by the PQView suite of programs and data bases. Maintaining PQView 3 might work for the short term, but it is not scalable and will not be a reliable or secure plan for the longer term as noted below in the Risk section.

- **Risk of No Action:**

As powerful and flexible as the present PQView 3 architecture is, it is based on dated and superseded technologies which are not scalable to the level needed to sustain our emerging smarter grid. Many of the PQView 3 libraries are based on enterprise development tools that have passed out of mainstream support by Microsoft. These older technologies are not the best fit given the current state of technology and IT industry focus, and the current and future needs of PQView. The current PQView 3 platform was developed 20 years ago. The database structure, user interface, scalability, inability to acquire data directly from intelligent electronic devices, and security concerns are making the system more and more difficult to maintain. Meanwhile, the number of devices from

which it will have to manage and analyze data for automation, decision support and engineering analysis is about to increase geometrically. Not upgrading the PQView 3 system will put at risk the ability to support such basic applications as feeder fault location, automated inrush detection, bus fault trip out analysis, and the voltage regulation statistical process control analysis.

- Summary of Benefits (financial and non-financial) and Costs:

The benefits of this project are that it will develop scalability and stability to continue to sustain the gains achieved with decision support, situational awareness and feeder processing duration reduction, including:

- Reactance to Fault Analysis by PQView (Reduces Fault Locating time, especially in the critical summer period)
 - Fault Locating Accuracy approaching 80% within 1-3 manholes
 - Fault Locating time trending to 50% of values before RTF introduced
 - Key factor in reducing feeder processing time and cascading network event risk
- Automated inrush detection (allows rapid restoration of CIOA feeders which are not faulted)
 - 55 CIOA Feeders were restored promptly after PQView detected and analyzed inrush currents in 2009 through 2011 (data presented to operators via email notifications and the HUD system). This represents savings of approximately \$1.125M annually in avoided repairs.
 - Key factor in reducing feeder outage time and cascading network event risk.
- Incipient fault detection on underground circuits will allow proactive repairs on the distribution feeder
- Transmission Event DFR automated notifications
- Statistical Process Control Analysis to support voltage regulation at area substations
- Develop new tools, including:
 - Bus Section Trip Out/Bus fault correlation analysis and decision support
 - Asset Management applications for transformers, breakers, capacitor banks and other equipment
 - Fault Location on 4kV feeders

The total cost to Con Edison for Phases 2 and 3 would be \$2,750,000.

- Project Relationships (if applicable):

- Smart Grid Investment and Demonstration Grants
- Electric Control Center Upgrade project.
- Power Quality (PQ) System Upgrade

- Technical Evaluation:

See Justification Summary

- Basis For Estimate:

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
650	0	0	0	0

¹Request by Elements of Expense

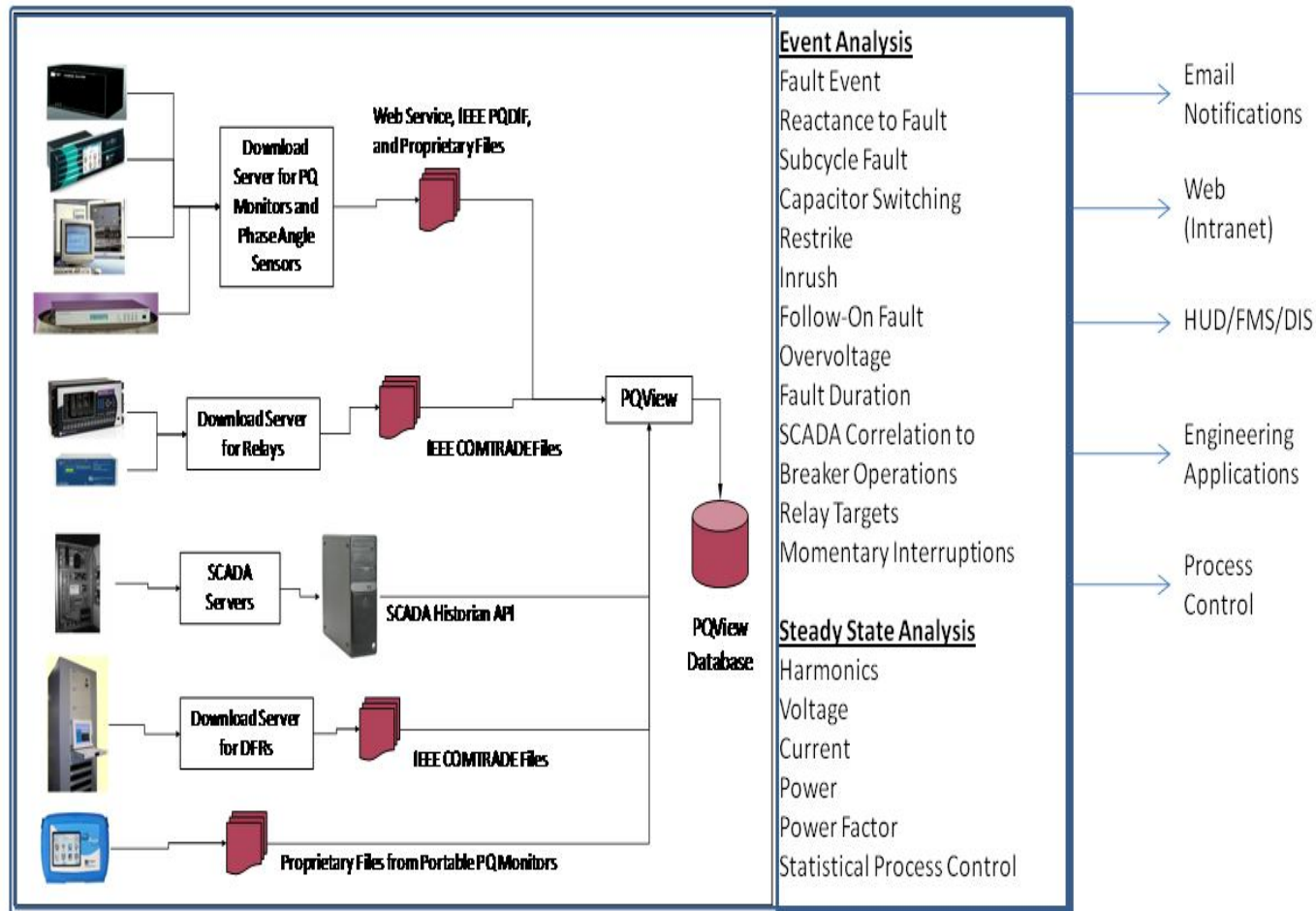
<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					

- **Authorization – 10/2012 - \$650,000**
- **Appropriation – 10/2012 - \$650,000**
- **Authorization – 9/27/2013 - \$2,750,000**
- **Appropriation Increase – 9/27/2013 - \$2,750,000**

Note: The current authorization / appropriation will fund PQView 4 Development Phases 2 and 3. We also fund Phase 1 through EPRI.

¹ All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

Simplified Diagram of Con Edison systems showing relationship between electronic devices and SCADA (PI), and PQView 3 which provides event and steady state analysis, and functionalities supported for end users



Attachment 2
2009 through 2011 CIOA Feeders Restored Rapidly after
Non-Fault Inrush Conditions were identified by PQView

2009 Data									
2M41	CIOA	Closed	West 110th St. # 1 13.2kV	HARLEM NWK	12-15-2009 23:49	12-16-2009 02:13	12-15-2009 23:49	Details	Non fault
6M42	CIOA	Closed	East 29th St. 13.2kV	MADISON SQUARE NWK	12-09-2009 13:21	12-09-2009 15:55	12-09-2009 13:21	Details	Non fault
2M41	CIOA	Closed	West 110th St. # 1 13.2kV	HARLEM NWK	10-18-2009 07:22	10-18-2009 12:55	10-18-2009 07:22	Details	Non fault
2M41	CIOA	Closed	West 110th St. # 1 13.2kV	HARLEM NWK	10-18-2009 05:38	10-18-2009 07:22	10-18-2009 05:38	Details	Non fault
23M59	CIOA	Closed	West 65th St. # 2 13.2kV	LINCOLN SQUARE NWK	06-13-2009 14:19	06-13-2009 16:38	06-13-2009 14:33	Details	Non fault
7M56	CIOA	Closed	Avenue A 13.2kV	COOPER SQUARE NWK	04-06-2009 17:17	04-06-2009 18:17	04-06-2009 17:31	Details	Non fault
7M56	CIOA	Closed	Avenue A 13.2kV	COOPER SQUARE NWK	04-06-2009 15:46	04-06-2009 17:31	04-06-2009 16:29	Details	Non fault
4M67	CIOA	Closed	East 40th St. # 1 13.2kV	GRAND CENTRAL NWK	01-31-2009 22:54	02-01-2009 00:54	01-31-2009 22:54	Details	Non fault
9B10	CIOA	Closed	Brownsvi lle # 2 27kV	RICHMOND HILL NWK	12-31-2009 21:18	01-01-2010 04:01	12-31-2009 21:20	Details	Non Fault
8B87	CIOA	Closed	Greenwo od 27kV -	BAYRIDG E NWK	12-07-2009 17:15	12-07-2009 23:11	12-07-2009 17:17	Details	Non Fault
1B52	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	11-26-2009 01:48	11-26-2009 05:54	11-26-2009 01:48	Details	Non Fault
8B80	CIOA	Closed	Greenwo od 27kV -	BAYRIDG E NWK	11-14-2009 03:31	11-14-2009 04:31	11-14-2009 03:31	Details	Non Fault
8B90	CIOA	Closed	Greenwo od 27kV -	BAYRIDG E NWK	09-07-2009 04:42	09-07-2009 05:22	09-07-2009 04:41	Details	Non Fault
6B44	CIOA	Closed	Water St. 27kV	WILLIAM SBURG NWK	08-21-2009 17:34	08-21-2009 17:47	08-21-2009 17:34	Details	Non Fault
2B09	CIOA	Closed	Greenwo od 27kV -	PARK SLOPE NWK	08-19-2009 18:28	08-19-2009 18:49	08-19-2009 18:34	Details	Non Fault
6B44	CIOA	Closed	Water St. 27kV	WILLIAM SBURG NWK	07-05-2009 21:30	07-05-2009 21:35	07-05-2009 21:29	Details	Non Fault
8B90	CIOA	Closed	Greenwo od 27kV -	BAYRIDG E NWK	06-24-2009 00:22	06-24-2009 01:01	06-24-2009 00:23	Details	Non Fault
1Q14	CIOA	Closed	North Queens # 1 127kV	LONG ISLAND CITY NWK	05-06-2009 18:19	05-06-2009 18:54		Details	Non Fault
9B12	CIOA	Closed	Brownsvi lle # 2 27kV	RICHMOND HILL NWK	04-25-2009 00:21		04-25-2009 00:21	Details	Non Fault
1B56	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	03-03-2009 22:48	03-04-2009 14:40	03-03-2009 22:59	Details	Non Fault
5Q42	CIOA	Closed	Jamaica 27kV	JAMAICA NWK	01-13-2009 11:21	01-13-2009 12:25	01-13-2009 11:21	Details	Non Fault
7Q66	CIOA	Closed	Corona # 1 27kV	FLUSHIN G NWK	01-10-2009 08:44	01-11-2009 10:38	01-10-2009 08:44	Details	Non Fault
7Q66	CIOA	Closed	Corona # 1 27kV	FLUSHIN G NWK	01-10-2009 05:06	01-10-2009 08:44	01-10-2009 05:06	Details	Non Fault
7Q66	CIOA	Closed	Corona # 1 27kV	FLUSHIN G NWK	01-10-2009 03:49	01-10-2009 05:04	01-10-2009 03:54	Details	Non Fault

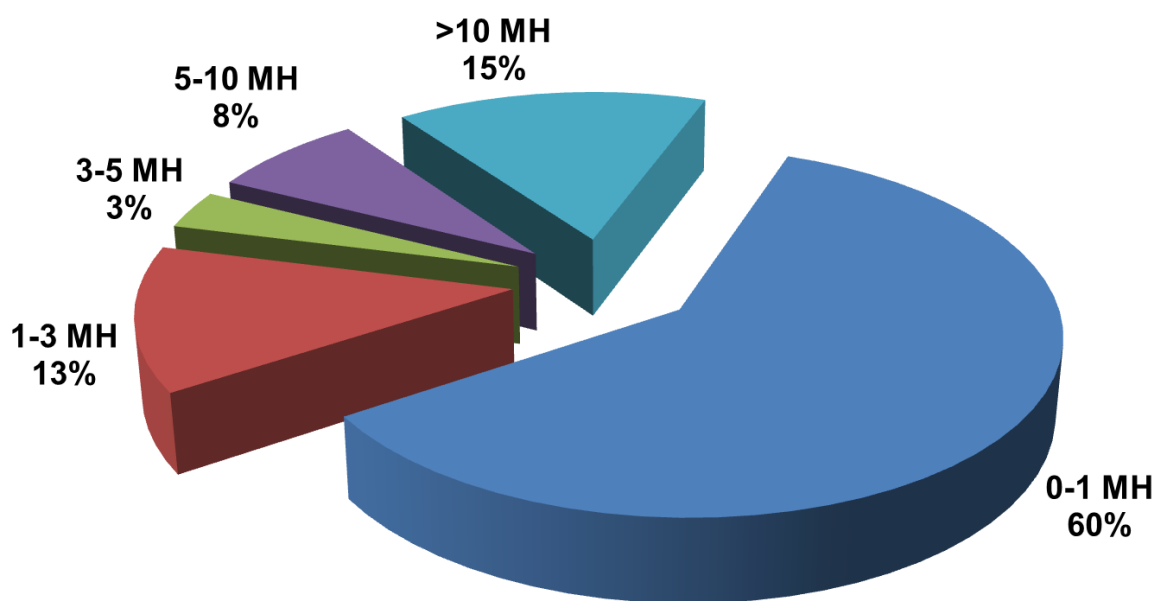
2010 Data									
33R08	CIOA	Closed	Fresh Kills 33/13kV		01-05-2010 17:09	01-05-2010 19:03	01-05-2010 17:09	Details	non Fault
1B56	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	01-22-2010 12:52	01-22-2010 13:17	01-22-2010 12:53	Details	non Fault
1B56	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	01-22-2010 13:18	01-22-2010 14:13	01-22-2010 13:17	Details	non Fault
1Q21	CIOA	Closed	North Queens # 1 127kV	LONG ISLAND CITY NWK	02-10-2010 21:50	02-10-2010 22:11	02-10-2010 21:50	Details	non Fault
6M38	CIOA	Closed	East 29th St. 13.2kV	MADISON SQUARE NWK	02-16-2010 05:23	02-16-2010 06:13	02-16-2010 05:26	Details	non Fault
1B65	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	03-27-2010 23:06	03-27-2010 23:17	03-27-2010 23:05	Details	non Fault
1B65	CIOA	Closed	Plymouth h St. 27kV	BORO HALL NWK	03-27-2010 23:18	03-28-2010 02:54	03-27-2010 23:18	Details	non Fault
8B84	CIOA	Closed	Greenwo od 27kV -	BAYRIDG E NWK	04-03-2010 11:14	04-03-2010 11:21	04-03-2010 11:14	Details	non Fault
1B93	CIOA	Closed	Plymouth h St. 27kV		04-21-2010 22:06	04-22-2010 01:30	04-21-2010 22:06	Details	non Fault
2M41	CIOA	Closed	West 110th St. # 1 13.2kV	HARLEM NWK	05-30-2010 15:33	05-30-2010 16:44	05-30-2010 15:35	Details	non Fault
5Q30	CIOA	Closed	Jamaica 27kV	JAMAICA NWK	06-06-2010 01:52	06-06-2010 02:48	06-06-2010 01:51	Details	non Fault
9B12	CIOA	Closed	Brownsvi lle # 2 27kV	RICHMOND HILL NWK	06-08-2010 18:51	06-08-2010 19:29	06-08-2010 18:52	Details	non Fault
9B09	CIOA	Closed	Brownsvi lle # 2 27kV	RICHMOND HILL NWK	06-22-2010 15:54	06-22-2010 16:21	06-22-2010 15:53	Details	non Fault
25M41	CIOA	Closed	East 63rd St. # 2 13.2kV	TURTLE BAY NWK	07-28-2010 05:52	07-28-2010 07:05		Details	non Fault
6M31	CIOA	Closed	East 29th St. 13.2kV	MADISON SQUARE NWK	10-25-2010 11:46	10-25-2010 12:14	10-25-2010 11:47	Details	non Fault
10B67	CIOA	Cut In	Bensonhurst # 1 27kV	SHEEPSH EAD BAY NWK	11-22-2010 03:00	11-22-2010 10:41	11-22-2010 02:59	Details	non Fault
2B91	CIOA	Closed	Greenwo od 27kV -		12-15-2010 03:37	12-15-2010 12:45	12-15-2010 03:37	Details	non Fault
2B91	CIOA	Closed	Greenwo od 27kV -		12-15-2010 11:58	12-16-2010 14:02	12-15-2010 12:45	Details	non Fault
2B91	CIOA	Closed	Greenwo od 27kV -		12-16-2010 14:02	12-18-2010 07:59	12-16-2010 14:02	Details	non Fault
5Q30	CIOA	Closed	Jamaica 27kV	JAMAICA NWK	12-20-2010 18:54	12-20-2010 22:16	12-20-2010 18:54	Details	non Fault
5Q30	CIOA	Closed	Jamaica 27kV	JAMAICA NWK	12-24-2010 02:18	12-24-2010 03:03	12-24-2010 02:20	Details	non Fault

2011 Data

7B47	CIOA	Bensonhurst # 1 27kV	OCEAN PARKWAY NWK	01-27-2011 20:39	01-27-2011 21:02	no fault
5Q30	CIOA	Jamaica 27kV	JAMAICA NWK	02-27-2011 09:24	02-27-2011 09:41	no fault
13W86	CIOA	Buchanan 13.2kV		03-04-2011 22:16	03-04-2011 22:56	no fault
1B55	CIOA	Plymouth St. 27kV	BORO HALL NWK	03-27-2011 09:06	03-27-2011 16:18	no fault
12B40	CIOA	Water St. 27kV	PROSPECT PARK NWK	05-15-2011 20:46	05-16-2011 17:01	no fault
43M56	CIOA	East 36th St. 13.2kV	KIPS BAY NWK	06-08-2011 06:33	06-08-2011 07:24	no fault
5X36	CIOA	Parkchester #2 13kV	NORTHEAST BRONX NWK	07-16-2011 14:05	07-16-2011 15:46	no fault
31M57	CIOA	East 63rd St. # 2 13.2kV	ROOSEVELT NWK	07-27-2011 08:11	07-27-2011 09:35	no fault
13W86	CIOA	Buchanan 13.2kV		08-15-2011 04:50	08-15-2011 05:24	no fault
29M78	CIOA	East 40th St. # 2 13.2kV	BEEKMAN NWK	09-02-2011 10:37	09-02-2011 11:45	no fault

Attachment 3

RTF Performance Con Edison - Summer 2013 (6/01 - 8/31)



0-1 MH	1-3 MH	3-5 MH	5-10 MH	> 10 MH	Total
156	34	9	20	40	259
60%	13%	3%	8%	15%	

Project/Program Title	Emerging IT Project Initiative for Enhanced Distribution System Analysis
Priority Number	
Project Manager	Patrick McHugh
Project Engineer	Various
Budget Reference	NXC0001
Project Number	
Status	Ongoing
Estimated Service Date	
Work Plan Category	System Reinforcement Technology Projects
ERM Addressed	

Work Description:

The Emerging IT Project Initiative for Enhanced Distribution System Analysis provides funding for the development of engineering and operational support tools to provide operators with information which allows them to better understand the real time trajectory of the distribution system, anticipate and identify problems, make the best operational decisions, evaluate the impact of those decisions and conduct effective post event analysis.

This initiative develops software tools which combine data available across many disparate operational, engineering and information systems and perform analysis to derive and present new useful engineering and operational information.

The Emerging IT Project Initiative for Enhanced Distribution System Analysis includes the following elements:

Engineering Dashboard – A single database repository that provides engineers, particularly those functioning in an operations support role, access to data from a multitude of sources with a single security clearance. The Engineering Dashboard will allow engineers to support operations by conducting advanced analysis through seamless access to data from asset repository, reliability performance, load flow, equipment availability, inspection, maintenance and other databases.

Enhancements to the “Heads Up Display” (HUD) System – Provides operators with a composite view of the distribution system by consolidating data from a number of different systems (feeder maps, mains & service plates, inspection data, reactance to fault, etc) into a single, overlay view to allow operators to make the best operating decisions based on available information. Among the enhancements targeted for the HUD system is a cross commodity integration module which will display gas and steam infrastructure in relation to electric infrastructure allowing operators to determine the potential impact of gas and steam events on the electric system.

Subcycle Fault Detection and Analysis – Con Edison has been one of the pioneers in the advancements of subcycle fault detection which identifies incipient or impending faults in distribution cables, splices and equipment. Subcycle fault detection can allow operators to take proactive measures to isolate defective equipment and perform diagnostics to return that

equipment to service in a timely manner. Integration of subcycle fault information into the HUD system and PQ view systems will allow better operational response to such indications.

Transformer Failure Risk Analysis – Con Edison is in the process of deploying remote monitoring system pressure temperature and oil level sensors across its fleet of distribution transformers. This deployment is producing significant amounts of data that provides a benefit of reducing risk of transformer failure but requires significant effort to analyze. Development of real time tools to analyze data from remote sensors will help prioritize operating and maintenance actions to reduce risk of transformer failure.

Bus Fault Decision Support – When a bus section trips out of service at a substation the result is several feeders coming out of service simultaneously. This reduces network reliability until the feeders are restored to service. Bus section trips may be the result of legitimate bus section problems or may be the result of inadvertent relay operation. Knowing the cause of the bus section trip helps expedite restoration and improve network reliability. The bus fault decision support tool will combine data from several systems and provide decision support to operators in restoring bus sections to service.

Negative Sequence Detection System – Con Edison has identified the detection of negative sequence current during feeder faults as an indicator that there may be a second fault on a distribution feeder. Early awareness of the presence of a second fault on a distribution feeder is extremely useful from an operational perspective as it allows operators to take actions that best reduce feeder restoration time. This effort will integrate negative sequence data into the PQ view system and ultimately the HUD system to optimize feeder restoration time.

Non-network Reliability Indicator System – Based on the success of the Network Reliability Index (NRI) program to predict the reliability of the network system and provide a guide for allocating system reinforcement as well as real time operations, the Company is in the process of developing a Non-Network Reliability Index application that will incorporate weather, component failure rates and network topology to rank non-network circuits based on their reliability. This tool will assist in optimal allocation of resources to non-network circuits to achieve target reliability at lowest cost and assist in operation of the system in a reliable manner.

Justification:

The significant amount of data available across the systems of the company presents an unprecedented opportunity to mine information for useful relationships and create engineering and operational value for minimal cost by combining information from different systems and applying analytics to the resulting dataset.

Alternatives:

The alternative to this project is to develop individual dedicated information systems for each of the applications identified. This would be more costly than the proposed method of combining data from various systems to provide incremental value to our engineering and operations.

Risk of No Action:

Unavailability of the systems described will result in less effective engineering and operational performance. Failure to develop and enhance the systems described will deny engineers and operators:

- Critical operational information that will result in less effective performance with delayed restoration times
- The ability to anticipate impending faults and proactively remove feeders to protect the system.
- The ability to model analyze and predict potential distribution transformer failure
- The ability to identify the potential for second faults on distribution feeders resulting in delayed restoration time and greater risk to the network
- The ability to identify the source of bus faults and delay restoration
- The ability to more quickly identify and respond to feeder faults resulting in delayed restoration times and greater risk to the network.
- The ability to accurately model non-network risk and identify optimal design, maintenance and operational strategies to reduce network risk.

Summary of Benefits (financial and non-financial):

Advanced Engineering and Operational support tools will provide improvements in employee and public safety, reliability and reductions in cost.

Project Relationships (if applicable):**EH&S Overview:****Analysis of prior year funding request versus actual:****Data Reports issued that support program:****Specifications & procedures pertaining to Program/Project:****Is this a mandated program? If yes, include verbiage associated with mandate:****Completion Date:**

Funding Forecast (Capital or O&M)

Actual 2009	Actual 2010	Actual 2011
0	0	0

	2012 Budget	2013 Request	2014 Forecast	2015 Forecast	2016 Forecast	2017 Forecast	5 yr (13-17)
Funding (\$000s)	0	139	1,862	2,554	4,842	4,000	13,397

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Electric Operations

Project/Program Title	BQDM
Project Manager	Lou Cedrone
Project Number	
Status of Project	Implementation
Estimated Start Date	2015
Estimated Completion Date	2017
Work Plan Category	Strategic

Work Description:

On July 15, 2014 the Company filed a petition in order to address a forecasted overload condition of the electric sub transmission feeders serving the Brownsville No.1 and No.2 substations using non-traditional utility and customer sided solutions.

Effective 12/12/2014 the PSC acted on the petition and issued an order in Case 14-E-0302 establishing the Brooklyn/Queens Demand Management Program. The BQDM Program is composed of a total of approximately 52 MW consisting of non-traditional utility-side (11MW's) and customer-side solutions (42MW's). In conjunction with the BQDM Program, the Company plans to also undertake approximately 17 MW of traditional utility infrastructure investment, consisting of capacitor bank installations that will provide 6 MW of capability and 11 MW of load transfers from the affected area networks.

For the 11 MW's of utility sided non-traditional solutions, technologies include 1) a utility-side battery energy storage system to be installed at a USS in the Brownsville substations No. 1 and 2 load area. Construction is estimated to begin in 2015 and continue into 2016 with an in service date of 2016. 2) Voltage Optimization is scheduled for pilot implementation in 2015 with ramp up through 2016 and 2017. 3) in the 3rd qtr 2015 RFP's for Solar PV, Fuel Cells and DG are scheduled for release and award with construction in 2016 and 2017 to meet in service dates of 2017.

Justification Summary:

Areas of Brooklyn and Queens have been experiencing unexpectedly high demand growth for a variety of reasons, including significant growth in residential electric demand in a number of neighborhoods. In 2013, increased customer demand began to exceed current system capabilities of the sub-transmission feeders into the Brownsville No. 1 and No. 2 substations.

These substations provide service to the Company's three electric distribution networks covered by this proposal: the Ridgewood, Richmond Hill and Crown Heights networks. After accounting for demand growth, the Company forecasts that the total resource need for the sub-transmission infrastructure serving Brownsville No. 1 and No. 2 will be 69 MW above the system's current capabilities to meet reliability requirements by 2018; the expected extent of such overload per year is approximately 40 – 48 hours per year (these hours occur in the summer months).

Supplemental Information:

- **Alternatives:**

The traditional solution to address the projected overload in Brooklyn/Queens would be to build the New Substation/Gowanus Package. The New Substation would be built within the area served by Brownsville No. 1 and No. 2; the location is not finalized because the Company does not currently own land in this area sufficient for a new distribution substation. Land purchase would be the first step to build the New Substation/Gowanus Package; finalizing the location determines the length of the needed sub-transmission feeders and the final substation layout.

- **Risk of No Action:**

The risk for no action is that existing equipment which is operating above its normal operating parameters at its peak load may reduce the life of the distribution system equipment as well as would require load shedding during peak load conditions. This may increase the risk of customer outages as well as a reduction in customer satisfaction.

- **Non-financial Benefits:**

The benefits of the project are the relief of overloaded equipment which will insure continued reliable service to the targeted load area. The project will also provide the Company with a clear understanding of how best to utilize cost effective Distributed Energy Resource (DER) systems for maximum benefit to both the Company and the Company's customers. It also shows a proactive role in REV.

- **Summary of Financial Benefits (if applicable) and Costs:**

Through an RFP process, the financial cost of each of the design alternatives will be taken into consideration before a final design is chosen. In addition the Company created a Cost benefit Analysis (CBA) which was sent to DPS Staff as part of the approving Order issued by the PSC. The CBA showed a positive result based on estimated costs and benefits

- **Technical Evaluation/Analysis:**

In general, infrastructure adequacy is determined by comparing the infrastructure capability against the net load to be served. The net load is determined from the gross forecasted customer demand less any load relief measures such as energy efficiency or local distributed resources in the network. Utility owned or third party DER's will be evaluated on performance and ability to provide cost effective load relief for the minimum hours required. During the RFP process a technical team is assembled to review the technical feasibility of the proposed solution.

- Project Relationships (if applicable):

Several energy efficiency initiatives, microgrids, load transfers and other distributed resource applicable projects specifically designed for the Brownsville contingency plans.

- Basis for Estimate:

An initial estimate is based on industry best practices and past project costs from external vendors. A detailed estimate will be developed from responses to the RFP.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
28,000	13,000			

^aRequest by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P					
Other					
Overheads					
Total					

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Server Farm Expansion
Project Manager	Terrence Walsh
Hyperion Project Number	21551718
Project Number	2XC9724
Status of Project	Design Phase Complete
Estimated Start Date	01/01/2015
Estimated Completion Date	12/31/2020
Work Plan Category	Operational - Critical Repair

Work Description:

This budget item is intended to develop plans and projects to maintain the infrastructure to provide and maintain a server farm environment for Con Edison IT assets necessary to service business applications and provide resources for file, emails, and other resources required to run the business. Con Edison hosts over 500 business applications and maintains over 3,000 server images. In addition, plans exist for several high end new systems to support Advanced Metering Infrastructure (AMI), Reforming the Energy Vision (REV), and Distributed Generation, and other utility of the future initiatives. Projects associated with this program include but are not limited to upgrading the physical facilities, HVAC, power systems, and providing monitoring tools and automation needed to manage and support the environment.

The following plans are targeted for work in 2015 and include:

- Expand the existing server farm at Van Nest to support the relocation of the mainframe and servers from data centers at 4 Irving Place which are designated for decommissioning. The legacy data centers support server and mainframe equipment displaced due to restacking efforts within 4IP required to comply with Local Law 26 at a cost of \$10 million. This plan was chosen to take advantage of existing HVAC and power available at the existing server farm (\$10 million) Due to delays in obtaining the necessary permits, completion is expected in early 2016.
- Equip the Van Nest expansion with network, server, and storage capacity (\$3 million) (Complete)
- Implement tools to monitor and manage server and storage capacity and automate the operation to eliminate human error and improve provisioning and delivery of computing capacity (\$2 Million) (Complete)

Plans for 2016 through 2019 include:

- Relocate the mainframe operation and associated infrastructure and equipment to Van Nest extension (\$300k)
- Continue to transform the server farm operation in 2016 with more automation, self-service, and capacity management, and monitoring technology (\$2 million)
- Begin initiative to construct a new server farm at the Company facility located at 30 Worth St in Yonkers at a total cost of \$40 million. The server farm is a modular design and will be installed on a concrete pad near the parking lot on an area that is currently unused. The plan calls for construction to begin in 2017 and be completed in 2018. The Worth St. server farm will support new initiatives planned over the next 5 years including but not limited to:

- AMI
- DSP and other REV related systems
- New CSS
- New GIS mapping system

This work is potentially impacted by the success of cloud computing which is being evaluated in 2015-2016. Cloud computing may provide a further deferment of the construction of the new server farm.

Additionally, server farms constructed in early 2000's at Grasslands and Rye Service Center will eventually need to be emptied and decommissioned beginning in 2019. These server farms are not capable of supporting today's high density equipment from a cooling and power perspective. They are inefficient and capacity is limited. This new farm would support those workloads as well. The scalable design would also meet the demand for future growth in server and storage applications and accommodate the retirement of other less efficient server rooms, thus reducing the Company's IT carbon footprint. The new server farm will be implemented in three phases to reduce upfront costs and provide a scalable solution over many years.

The proposed structure will be modular, resistant to fire, flood, and explosions. In addition the design will be scalable so that investments can be made on expansions only when they are needed, but can be done very quickly.

Information Technology and Facilities Engineering will contract the consulting engineering firm which has performed the design and engineering work.

Justification Summary:

Information Technology (IT) department recommends the construction of a new server farm at the Company facility located at 30 Worth St in Yonkers at a total cost of \$39.1 million. The server farm is a modular design and will be installed on a concrete pad near the parking lot on an area that is currently unused. The plan was originally planned for 2014 and 2015 however was delayed due to other corporate priorities. The plan now calls for construction to begin in 2017 and be completed in 2018.

The Company's restacking plan for 4 Irving Place has been accelerated in order to comply with Local Law 26. As each floor is renovated per the restacking plan, affected IT infrastructure is displaced and must be relocated elsewhere in order to maintain operations. Such infrastructure includes existing data centers on 4 and 17. Facilities Management and IT have established a plan to eliminate these data centers and relocate the essential equipment to the expansion at Van Nest server farm and this proposed new server farm at 30 Worth St. The existing data center on the 4th floor houses the Company's mainframe environment which runs critical business systems including the customer system and billing. Additionally, there are over 500 distributed servers running in the two data centers. The restacking plan includes the renovation of these two locations and conversion to traditional office space.

The Worth St server farm plan also provides for the Company's expanding server and storage needs by establishing a scalable architecture that would meet the demand for future growth in server and storage applications and accommodate the retirement of other less efficient server rooms thus reducing the Company's IT carbon footprint. The amount of electronic data has grown 10X over the past 5 years and the number of server images has grown by 12% each year. This project addresses corporate and departmental risks associated with:

- Failure of critical business application
- Significant IT Projects
- Failure of the Email System

- Infrastructure constraints
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: Keep the 4th and 17th floor data centers, Grasslands, and Rye Service Center server farms in operation to support the Company's mainframe environment and existing server and storage environment and provide compliance with Local Law 26 with the equipment in place. This would require maintaining the two data centers with the inefficient HVAC and power infrastructure going forward. This would also introduce water based fire suppression systems that would damage computing equipment if ever discharged.

Another alternative would be to lease server farm capacity from cloud providers. Con Edison will be piloting and investigating this option. Certain workloads likely can fit in the cloud, but from a performance and data security risk standpoint, sensitive applications and data should reside in-house. Depending on the success of the cloud solutions, this may further defer the Worth St construction.

- Risk of No Action: The mainframe environment could continue to operate at 4 Irving Place with increasing costs to maintain the HVAC and power facilities. Action would be required to condition the locations to comply with Local Law 26 with equipment in place. This would also introduce water based fire suppression systems that would damage computing equipment if ever discharged.
- Non-financial Benefits: Server and storage applications enable critical business functions for the Company including financial systems, customer systems, and control systems. Servers also provide access to Company data in the form of email, files, and maps. The ability to access these systems and resources is critical to the Company. The amount of electronic data has grown 10X over the past 5 years. This project will provide the Company with scalable reliability for these resources for the next 10 years. Worth St will also present opportunities to deploy systems faster and access resources faster and more reliably than today.
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: Information Technology performs planning and analysis, based on a diverse and redundant design and goes through a security and flood map review before a location is selected. Projected server and storage growth are all factored in the design and selection. The modular and scalable design of the Worth Street Data Center is expected to support future changes in technologies and computing resource requirements.
- Project Relationships (if applicable): Irving Place Re-Stacking (Local Law 26) requires the relocation of multiple server rooms supported by dedicated business units and the data centers DC1 and DC2. This plan calls for the decommissioning of these data centers and conversion to office space. Future IT projects require IT infrastructure and new systems planned will require a reliable, secure, and efficient server farm environment. These include AMI, new CSS, GIS, and REV related applications.
- Basis for Estimate: Estimates were performed by central engineering for two sites, the 59th St steam plant and the Worth St location. The Worth St location was selected because it was approximately \$2 million less and is preferred for a number of technology reasons:

- 1) Location:
 - a. Access - real possibility of restricted access into Manhattan by car and limited or no mass transit for an extended period after a major storm event (i.e. post Sandy) or terrorist attack or threat
 - b. Diversity from Manhattan where we have numerous assets at 4 Irving Place
 - c. Flooding – 59th St is located on the river, has a Zone A classification and was flooded during Sandy. The Worth St location has been steady and reliable throughout all storms over the past 5 years
- 2) O&M Impact (logistics/support/costs):
 - a. Damage and faults in the OH fiber system are more quickly detectable because at Worth Street because it's visible. Repair will not involve UG excavation work thus reducing restoration time by at least an order of magnitude. Similarly, annual inspection costs of OH fiber are much less costly than UG fiber. Most importantly, Con Edison does not have to deal with manhole burnouts, atmospheric testing, oil/environmental tags, flush trucks, damage to fiber caused by electric crews and other vendors (Con Edison & City) working in the manholes, replacement and clearing of collapsed duct, and installation of inner duct. Also Overhead fiber cables will not be in proximity to high pressure steam pipes. Our experience is that we can repair an overhead fiber break in 1-2 days where underground it can take 1-2 weeks
 - b. Physical security costs are expected to be higher at 59th St, the security zone will be spread across 3 levels and a roof, and there are many windows on the west side of building
 - c. At 59th St, moving heavy IT equipment up several levels in freight elevator could be problematic. Heavy traffic and street congestion will add to delays. At Worth St, elevators will not be needed for large repair items like UPSs, battery stacks and HVAC replacements, and there will be little to no congestion in terms of service vehicles and equipment and temp HVAC / chiller equipment if needed
 - d. Troubleshooting problems will be made more difficult by having equipment on different elevations
 - e. Access at Worth St may not be subject to TWICS or gen station security rules and work permitting, which adds significant delays to restoration time if there is a separate entrance / exit
 - f. Facilities Operations has made a commitment to provide O&M support to server farm supporting infrastructure (generator, chiller plant, FM-200, switchgear) at Worth Street. There is no commitment from SBU to provide O&M support at 59th St. and we do not know that they have the required resources, expertise, and/or contracts in place to operate and maintain these complex and critical systems
 - g. Consolidated Phase 2 and 3 server room at 59th St has a greater FM200 impact (media cost) upon system activation
 - h. Parking is not readily available for bringing heavy equipment into the building
- 3) Availability: Consolidating Phase 2 and 3 (twice as many servers in one room/pod) will reduce server availability in the event of a fire / EPO activation, which would result in the loss of 50+ cabinets vs. the standard room configuration of 26 cabinets.

Total Funding Level (\$000):**Historical Spend**

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
0	1,189	1,371	1,070		14,900

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor			59	251		3,495
M&S						0
A/P		919	1442	628		8,745
Overheads		270	(146)	190		2,646
Other			16	1		14
Total		1,189	1,371	1,070		14,900

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
2,765	9,992	30,000	1,500	1,500

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	960	960	960	300	300
M&S	177	5,652	21,619	881	892
A/P	809	1,083	1,080	0	0
Other	88	1,279	4,311	163	166
Overheads	731	1,018	2,030	156	142
Total	2,765	9,992	30,000	1,500	1,500

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Modernization - Mapping System
Project Manager	Jay Wilamowski
Hyperion Project Number	2XC9720
Organization's Project Number	10025665
Status of Project	Ongoing Program
Estimated Start Date	January 1, 2014
Estimated Completion Date	December 31, 2020
Work Plan Category	Oper. - Critical Repair

Work Description:

Con Edison owns and operates a private communications network called the Corporate Communications Transmission Network (CCTN). This network is the highway that enables secure communications circuits for voice, video, feeder protection, and the computing and storage environment to ride on. CCTN enables computing resource consolidation, disaster recovery, as well as the reduction of public carrier cost savings. There are over 120 Company locations, which house the equipment used by CCTN. These locations, referred to as CCTN nodes, are equipped with communications equipment that delivers communications circuits using standard protocols called Synchronous Optical Network (SONET) and Dense Wave Division Multiplexor (DWDM). In addition to the electronic equipment, over 475 miles of fiber optic cable have been installed to provide CCTN communications services. The fiber is located in outside plant (OSP) and inside plant (ISP) and is used with SONET, DWDM, Fiber Optic multiplexers, Channel Banks, and other telecommunications equipment to provide services. This requires a sophisticated and unique mapping system to not only track the fiber routes and equipment, but also to permit instantaneous viewing of what circuits traverse what fiber optic cables and equipment. The current complexity of the CCTN network has expanded beyond the capabilities of the current static spreadsheet and Circuit Layout Record (CLR) formats, which are maintained by a staff augmentee. A more sophisticated dynamic platform is required to map all the components of the CCTN network as we continue to expand this important communications backbone for the company and depend less on manual record keeping. This map based graphical information systems (GIS) software will provide for the day-to-day design, planning, troubleshooting, and response and repair to the many elements of the CCTN network including SONET, DWDM, Ethernet, OSP/ISP Fiber, Copper, CAT5 and COAX network infrastructures.

In 2013, the mapping software solution was selected via a requirements analysis and through our RFP process.

In 2014, the new system was purchased, installed, and tested. The system architecture was implemented to handle CCTN network elements and our staff was trained on the system's operation.

In 2015, we estimated that 75% of the existing data will be manually input into the system. The extensive asset information, including the structures, conduits, equipment, fiber optic cables, geographic positions, and other relevant data represents a significant undertaking. Asset information will be loaded into the system in a prioritized fashion. We anticipate spending \$250K in 2015 to have this accomplished. This

task will extend into 2016 due to the quantity of information that accumulated since the inception of the CCTN network more than 30 years ago.

In 2016 we are planning to complete loading asset information. In 2017 we plan to interface the mapping system in our monitoring and alerting systems located in the operations center. In future years, we anticipate costs related to system upgrades, enhancements, and expansion of the network to include new locations and assets that will be required.

Justification Summary:

We are planning to convert our CCTN network inventory, provisioning, and capacity management to a full-featured telecommunications oriented packaged software solution that will enhance the information flow by reporting data in a geographical view. This map based GIS software will also enable us to integrate and correlate data such as OSP/ISP Fiber Cables, Network Equipment, Network Facilities, and Circuit Layout Records, and ultimately lessen our dependence on a contractor to manually do this work. The system will be available on the corporate network to authorized users, and will allow staff to quickly determine fiber routes to assist with repairing fiber breaks or designing new paths improving recovery time.

The system will prepare for the elimination of a contractor who is currently responsible for maintaining paper records and producing reports as needed.

This project will be able to address departmental and corporate risks associated with:

- Failure of critical business applications
- Failure of the Distribution Automation and Smart Grid systems
- Critical radio system infrastructure
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: The alternative to this mapping system is to continue using the manual input and static Circuit Layout Records (CLRs) to track an expanding CCTN network. This approach is not recommended due to the increasing complexity of the CCTN network and need to rapidly repair, design, and determine complex communications circuit routings.
- Risk of No Action: Risks include the inability to accurately track and maintain the CCTN network on an automated and standardized basis; the increased time required to locate fiber breaks in the field; the productivity lost manually looking for circuit documentation; the potential of losing manual data gathered over the years; and incomplete issuance of change management documentation when all circuits on a particular fiber cannot be determined quickly
- Non-financial Benefits:
The proposed Mapping project of CCTN will offer the following other benefits:
 - Provides a dynamic map view of the entire CCTN network's elements
 - Generates circuit layout records automatically
 - Indicates with greater precision fiber break locations and circuits effected
 - Improves recovery times from communication failures
 - Provides scalability to handle system expansion and replace other static mapping or diagrammatic systems used by Information Technology Planning (ITP)
 - Provides a dynamic tool for system design and testing

- Summary of Financial Benefits (if applicable) and Costs: Completion of the project will result in the elimination of a contractor (\$100k per year) dedicated to CCTN record keeping under the legacy process, enabling the organization to fully staff in anticipation of CCTN expansion to support AMI, REV and Physical Security communications.
- Technical Evaluation/Analysis: Information Technology has reviewed and analyzed mapping system software packages offered by seven vendors. Vendors were individually evaluated for their ability to meet set criteria set forth by Communications Planning. Multiple criteria were established in order to rank the strengths and weaknesses of each platform and a technical ranking matrix that enabled the selection of the winning system was developed.
- Project Relationships (if applicable): IT projects, completed or future, require and expect sufficient performance of the network. CCTN provides the network with which all applications are delivered to employees.
- Basis for Estimate: Contracts are in place with pricing set at software system purchase.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
		218	713		248

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
115	125	125	125	125

Request by Elements of Expense:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	25	25	25	25	25
M&S	66	76	77	80	81
A/P	0	0	0	0	0
Other	6	7	7	7	7
Overheads	18	17	16	13	12
Total	115	125	125	125	125

2015 – Customer Operations

Project/Program Title	Website Redesign
Project Manager	Michael Murphy
Project Number	PR.21088410
Status of Project	Planning
Estimated Start Date	January 2015
Estimated Completion Date	December 2018
Work Plan Category	Strategic

Work Description:

Con Edison is embarking on an initiative to create an improved online experience with a redesign that covers the external website, the mobile website, My Accounts, and the mobile app. The redesign will consider all webpages, including but not be limited to, welcome pages, menu structures, informational pages, secure login sections, and transactional processes in all sections of the website (including customer central, energy efficiency, news and information, and career opportunities).

Overall goals and objectives for the future state of the website:

- Improve the way we communicate and conduct business with our different customer segments, with judicious focus on My Account users: enhance the customer experience in the My Account service centers, where customers can view their bill, pay their bill online, view account information, submit a meter reading among other things
- Improve the way we communicate and conduct business with our internal and external stakeholders including job seekers, vendors and suppliers
- Provide a brand-consistent online experience across the multiple channels over which Con Ed communicates with our customers and partners
- Employ applicable best practices to ensure ease of use for first time visitors, efficiency in finding information, intuitive self-service transactions, and improve overall customer satisfaction.
- Design a solution to be robust and flexible enough to leverage new technology and support the continued expansion of customer self-service features

Justification:

A redesign of the corporate website is necessary to optimize the viewing experience for Company stakeholders including but not limited to, residential, commercial and industrial customers, regulators, consumer advocate groups, governmental agencies, investors, potential employees, and Energy Service Companies.

The current Con Edison website is maintained by in-house resources, with the web content being controlled by various internal departments within Con Edison. The website has expanded over the years, rendering the site difficult to navigate, and has made many sections cumbersome to use. Unanticipated growth of content categories has resulted in additions to the websites, which has led to a confusing customer experience. The redesign will address these issues as well as provide new functionality to customers and other stakeholders; this will enable an optimal experience across a range of platforms, browser devices, and mobile operating systems. The redesign will encompass a technology solution that is dynamic to support company change and growth by allowing in-house staff to easily and cost effectively update content and modify the website. This effort also addresses customer engagement initiatives and new business functions that will likely be required under the Reforming the Energy Vision proceeding. Finally redesigned solution will also ensure that customer data remains secure across all device platforms and conforms to all corporate cyber security and PII guidelines.

Supplemental Information:

- **Alternatives:**
The only alternative would be to continue to make changes to websites in a piecemeal fashion. This would not be prudent in that the websites would continue to be limited in its functions and performance.
- **Risk of No Action:**
There are several key risks associated with not redesigning our websites: 1) diminished smartphone and tablet user experience since we would not have Responsive Web Design 2) reduced use by customers and other stakeholders as users become increasingly frustrated, 3) increased cost due to customers contacting call center rather than using self-service applications.

Non-financial Benefits: N/A

- **Summary of Financial Benefits (if applicable) and Costs:** N/A
- **Technical Evaluation/Analysis:** N/A
- **Project Relationships (if applicable):** N/A
- **Basis for Estimate:**
Based on cost comparisons of similar projects done by other utilities.

Total Funding Level :**Historical Spend:**

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2014</u>

Historical Elements of Expense:

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2014</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
\$5,000	\$10,000	\$10,000	\$5,000	

Request by Elements of Expense (Capital) :

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor	\$1,250	\$1,347	\$1,749	\$360	
M&S					
A/P	\$2,636	\$7,234	\$6,258	\$3,253	
Other					
Overheads	\$1,114	\$1,419	\$1,993	\$1,387	
Total	\$5,000	\$10,000	\$10,000	\$5,000	

X	Capital
X	O&M

2016 Customer Operations

Project/Program Title	Customer Interaction Center
Project Manager	Sebastian Cacciatore
Hyperion Project Number	PR.21574219
Status of Project	Planning
Estimated Start Date	January 2016
Estimated Completion Date	July 2017
Work Plan Category	Strategic

Work Description:

The Call Center has recently completed implementation of a next generation contact center platform. The new platform provides a foundation that can be leveraged as a single routing engine to service the needs of our customers and the Call Center, including Back Office areas. As such, the platform will be used to implement a number of technologies to automate the management of back office work and to improve quality assurance for customer calls. Technology will also be implemented to provide foreign language functionality for self-service Call Center applications in Mandarin, Chinese, Korean, and Russian languages. Updated branch office queuing software will also be implemented at Walk-In-Centers. In addition, this program will enable customer survey technology to obtain valuable customer feedback. The plan is to purchase automation, speech analytics, speech recognition, survey, and queuing software and all related vendor professional services. The implementation is planned to start in January 2016.

Justification Summary:

Customer Assistance handles a high volume of back office work including accounting referrals and customer inquiries and requests. The nature of back office work is expanding with customers seeking more information about their energy usage and customer programs. In addition, the types of channels that a company must offer to its customers have been changing over the past decade. While phone calls/interactions still are the dominant method of contact, industry research indicates that the adoption of email, chat, SMS, mobile, web, and social media technology are now available in some form in over 90% of contact centers. High adoption rates of these preferred channels across all industries have created service expectations for customers, including interactions with their utility companies. Increasingly, back office work is received via a variety of channels including by post, by fax, through the Call Center, and through multiple web based technologies. Currently these functions are not automated and work must be accessed from these various sources.

In addition, the resolution of a request may involve multiple steps and multiple departments. Manual back office functions have a high dependency on printed documents and materials that may contain sensitive information about customers. Automation of this work will consolidate this work into one source and assist in the management of this increasingly diverse work. It will also provide for an automated flow of all documents related to the customer request and better assure that Personally Identifiable Information (PII) is protected. This program will also better equip Back Office management personnel with work performance tracking and reporting tools that provide real-time visibility of accounting referrals and customer requests and how they are handled from start to finish.

Implementation of other technologies are also needed to improve the customer experience at the Call Center and Walk in Centers. In the area of customer calls, the Company will leverage its quality assurance call recording system through the use of speech analytics and speech recognition capability to improve on first call resolution, provide for the coaching of employees, and enhance the customer experience. Foreign language functionality will be implemented for self-service applications so that more of our customers can utilize self-service at the Call Center. In addition, updating of branch office queuing software at the customer service Walk-In-Centers is needed. The current systems have reached their end of life and will no longer be supported by the vendor.

The Company also seeks to gain customer insights on their service experience and more information on their needs and preferences with respect to the services we provide. The implementation of customer survey technology is needed to assist the Company in obtaining valuable customer feedback.

Supplemental Information:

- Alternatives:
 - The Company can continue the manual handling of Call Center and Back Office work.
 - The Company can continue to utilize less sophisticated methods of monitoring customer call handling.
 - There are no alternatives for providing foreign language functionality for self service applications or the updating of Walk-In Center queuing functionality.
 - There is no viable alternative that will provide for customer survey technology.
- Risk of No Action:
 - Continued manual handling of Call Center and Back Office work will create difficulties in handling work on a timely basis and managing customer PII as increasing volumes of work are received from a diversity of sources and increasingly complex.
 - The lack of speech analytics and speech recognition technology will handicap our ability to improve the customer experience and improve first call resolution.
 - Without the upgrade, at some point the queuing functionality at the Walk-In Center will become inoperable and queuing will have to be done manually. This will increase Walk In Center human resource costs and potentially diminish the customer experience.
- Non-financial Benefits:
 - Quality assurance activities will provide for improvements in first call resolution and the customer experience. The implementation of foreign language functionality for self service will enhance the service we provide to non-English speaking customers. The implementation of customer survey technology will assist the Company in obtaining valuable customer feedback.
- Summary of Financial Benefits (if applicable) and Costs:
 - With the continued growth of customer contacts from sources such as email and various internet portals, it is becoming increasingly difficult to manage the workload without additional human resources. Automation of this work can help to avoid the need to hire additional resources to handle this workload on a timely basis and afford protection of customer data.
- Technical Evaluation/Analysis:
- Project Relationships (if applicable):
- Basis for Estimate:
 - The vendor provided pricing for the software and professional services.

Total Funding Level (\$000):**Historical Spend**

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000) - Capital:

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$2,000	\$565			

^aRequest by Elements of Expense - Capital

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	\$420				
M&S					
A/P	\$1,277	\$558			
Other					
Overheads	\$303	\$7			
Total	\$2,000	\$565			

Request (\$000) – O&M:

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$259	\$358	\$358	\$358	\$358

^bRequest by Elements of Expense – O&M:

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P	\$259	\$358	\$358	\$358	\$358
Other					
Overheads					
Total	\$259	\$358	\$358	\$358	\$358

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2015 Capital – Business Unit/ Division

Project/Program Title	Call Center Call Retention
Priority Number	
Project Manager	Sebastian Cacciatore
Project Number	
Status of Project	
Estimated Start Date	July 1 st , 2015
Estimated Completion Date	
Work Plan Category	Regulatory

Work Description:

Increase Call Center's call recording capacity to allow for three years of continuous call records on the Customer Interaction Center system (aka I3).

Justification:

Currently, the Call Center maintains inbound customer call records for a period of two years less two weeks, or one hundred two weeks. The Public Service Commission has mandated (Commission's Rules, 16 NYCRR Part 293) the Company to maintain three year of call records. Accordingly, the Call Center will increase call recording capacity to satisfy the Commission's rule.

- Alternatives
Do not increase call recording capacity and be in violation of the Commission's rule.
- Risk of No Action
Being out of compliance with Commission's rule
- Summary of Financial Benefits and Costs
None
- Non-Financial Benefits
- Technical Evaluation/Analysis
- Project Relationships (if applicable)

Total Funding Level:

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
\$200K				

Variations between Budget and Actual:

<u>2010</u>			<u>2011</u>			<u>2012</u>			<u>2013</u>		
<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>	<u>Budget</u>	<u>Actual</u>	<u>Variation</u>

Variation Discussion:

Historical Elements of Expense:

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)
Labor					
M&S					
A/P					
Other					
Total					

Request by Elements of Expense:

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor					
M&S					
A/P	\$200K				
Other					
Overheads					
Total					

2013 Capital - Environmental, Health & Safety

Project Name	Environmental Management Information System (EMIS)
Project Number	
Work Plan Category	Strat - Strategic IT Enhancements
Priority	0.57
Project Manager	Katina Foy
Project Engineer	Paul Hammer
Budget Reference	
Project Status	Project Not Started
End Date	Mar 31 2015
ERM Addressed	

Work Description:

EMIS, CECONY's repository for environmental-related data, is a web-based system consisting of three modules utilized to track environmental spill incidents, hazardous waste manifests, and waste water discharge monitoring samples. It is used to help the company to maintain compliance with Federal and State regulatory requirements.

Specifically, the EMIS incident module is used to record information regarding environmental incidents that occur throughout the company. The Hazardous Waste Tracking module tracks information associated with the accumulation and storage of hazardous waste. The Discharge Monitoring Reporting (DMR) module houses State Pollutant Discharge Elimination System (SPDES) permit conditions and facilitates the scheduling and recording of analytical samples taken at facilities that discharge waste water into the State's water ways.

To eliminate redundant data sources and promote data integrity, EMIS interfaces with a number of systems. Data transmitted through the system interfaces reduce manual data entry activity, and contributes to data consistency and integrity. The systems are:

- Employee Data Warehouse (EDW) – EDW Information is used to auto-populate employee information associated with persons involved with tracking of spills, waste, and SPDES permits.
- Vehicle Management System (VMS) – EMIS obtains information regarding transporting trucks associated with specific manifests from VMS.
- Laboratory Information Management System (LIMS) – Sample analysis results associated with spill and DMR records are transferred from LIMS to EMIS.
- Authorization Administration Application (AAA) – User access to the various modules of EMIS is managed through AAA.
- Environmental Protection Agency (EPA) Provisional ID System –The EMIS Hazardous Waste Tracking module uses information associated with Provisional ID numbers to produce quarterly and annual reports that are submitted to the New York State Department of Environmental Conservation (DEC).

- Present user-configurable dashboards that support the graphical display of regulatory compliance information.
- Provide a robust tool that generates ad-hoc and canned reports that will support data analysis. A wildcard feature will improve search capabilities.
- Provide a user-friendly interface that will improve data input efficiency and reduce data entry errors. Business intelligence will be integrated into the system to auto-populate specific fields based on user preferences.
- Provide users with additional time before their session times out and include a feature that automatically saves user entered data.
- Employ measures to improve data quality including:
 - o Project and task validation
 - o Elimination of redundant data streams and utilization of existing data repositories such as the Asset Repository System (Logica) and the Work Management System (WMS) to validate data about structure ID, structure detail, transporter detail and vendor information.
- Generate email alerts to notify users of status changes and impending deadlines.
- Support the deployment of advanced wireless scanners and printers to support the EMIS wireless module.

* Alternatives:

Do Nothing – Microsoft will end support for .Net 1.1 during October 2013. After that date Microsoft will discontinue security updates leaving the application vulnerable to emerging threats. Waiting to upgrade may put us in a vulnerable state as IR may be forced to shut down the system if the application is compromised prior to the .Net 3.5 update.

Select an Out-of-the-Box Environmental Management Information System – This alternative will expose us to the following issues, challenges and risks:

- The vendor software package may require customization to meet our specific business needs and requirements.
- Business units may need to implement process workarounds if the system does not satisfy their business requirements.
- The system may be incompatible with existing core external business systems that feed critical information to the existing EMIS requiring modification to business processes or the use of additional software or modifications to support the required systems interaction.
- The cost of future upgrades is likely to be more expensive than an in-house developed solution.
- Use of a vendor package may make it difficult for Corporate EH&S to manage product obsolescence as control over product life cycle will be in the hands of the system manufacturer and system component manufacturers.

* Risk of No Action:

The system will become obsolete during October of 2013 and the introduced security vulnerabilities will be in contrast to the company's cyber security initiatives. In contrast to Corporate EH&S's goal to consolidate systems with similar purposes, we will retain and continue to expend O&M dollars associated with the management of separate stand-alone systems. System users will continue to require end-user computing systems to support data analysis and to generate regulatory reports where the current system does not address reporting and data analysis requirements.

* Non Financial Benefit Explanation:

This project will result in the delivery of a single environmental management information system that is capable of supporting a range of regulatory compliance activities. The proposed system will provide improved reporting capabilities allowing for the creation of ad-hoc and

canned reports. Development on a current application platform will help to ensure that the system remains compliant with technology requirements and supports goals for continued management of system obsolescence.

* Technical Evaluation and Analysis:

* Project Relationships:

The following is an overview of existing stand-alone systems whose functionality will be incorporated into EMIS as part of this project.

1) EPA Provisional ID (EPA-ID) - EPA-ID is used to store and maintain information about identification numbers (referred to as Provisional IDs) assigned to temporary non-Company owned sites by the Environmental Protection Agency. The system is used to assign and track provisional IDs and produce summary reports for various regulatory agencies.

2) The Self-Monitoring Report (SMR) is used to produce the water sampling monitoring report.

3) The Asbestos Project Tracking System (APTS) - APTS is used to maintain and report (to government agencies) information related to facilities that store or contain asbestos materials.

4) Non-hazardous/universal waste – currently end-users manage non-hazardous and universal waste streams outside of EMIS.

5) Non-compliance/Violations

Current Status:

Current Working Estimate: \$1,675,000

Funding: (\$000s)

Funding Cost	2013	2014	2015	2016	2017	2018	2019	2020	Total
	\$108	\$1,200	\$387	\$0	\$0	\$0	\$0	\$0	\$1,675

Benefit: (\$000s)

- * 2008 to 2012 Budget in Thousands- \$0
- * 2013 to 2017 Budget in Thousands- \$1,675
- * Authorization-
- * Appropriation-

2012 Capital - Environmental, Health & Safety

Project Name	Safety Health Information Management System (SHIMS)
Project Number	
Work Plan Category	Strat - Strategic IT Enhancements
Priority	
Project Manager	Frank Diaz
Project Engineer	Paul Hammer
Budget Reference	
Project Status	Not Started
End Date	Aug 1 2013
ERM Addressed	Oper Risk 03 Fatality Due to Safety Negligence

Work Description:

The Safety, Health Information Management System (SHIMS) is CECONY's and O&R's repository for safety and health-related data. It is a web-based system that records information involving illnesses and injuries, motor vehicle accidents, respirator fit testing, and industrial hygiene samples. Red light camera violation data and Close Call information are also managed in the system. The system is used extensively across both companies with over 500 users inputting data for almost 22,000 injuries and illnesses, and approximately 13,000 motor vehicle accidents. SHIMS was developed in-house and rolled out in 2009. In alignment with one of EH&S's strategic IT objectives, the system was designed to have the same look and feel of the Environmental Management Information System (EMIS) that was implemented in May 2006. SHIMS was also developed under the same technology platform as EMIS (Microsoft dot net 1.1), a technology that is scheduled to become obsolete in the fourth quarter of 2013.

In general, data stored in SHIMS is used to monitor and track the progress against goals, support root cause and Pareto analyses, and produce various federal and state required forms. The Respirator Fit Test module manages the data collected in conjunction with respirator fit testing. The Industrial Hygiene Module is utilized to record exposure assessment-related sample data associated with work activities that involve contaminants such as lead, dust, noise and asbestos.

Summary of Current Features and Back-End Processes

Data Entry - Many of the fields on the entry screens use drop-down lists to ensure consistent data capture. Data validation and business logic allows for further refinement of items in the drop-downs to facilitate data entry and promote data integrity. The sources for these drop-down items are maintained by either the system administrator or they are auto-populated from external data sources as described above.

OSHA Incidence Rate Calculation - A series of back-end processes allow for extraction of labor hours from EDW and are tallied against injuries and illnesses to compute the company's OSHA Incidence Rate.

Morning Report – A list of incidents entered into the system are compiled on a daily basis, appended to existing cases for that month and summarized in tabular format. This table is then emailed daily to targeted email distribution lists. This feature is intended to display daily up-to-date incident information at a glance.

Email alerts – When cases are initially recorded (draft), emails are sent to distribution lists associated with the organization of the person involved. Additional notifications are automatically generated as more information about the cases is entered. These include draft, approved, pending root cause, and lost work time notifications.

Search, canned and ad-hoc reports – Authorized users can search for cases based on a pre-defined set of fields. In addition, users can generate various reports from a standard list. The results of these reports can be exported to various user-defined formats. An ad-hoc feature allows for the creation of reports not available in the standard list. These user-defined reports can also be exported for trending analysis and can be saved so that they are available for later use saving both time and effort.

Audit Trail - Behind-the-scenes processing captures and creates an audit trail of new, edited, or deleted records. This method is applied to all fields and an email is sent to a public folder for accountability purposes.

Justification:

The company is undergoing major software upgrades that will make changes and upgrades to the SHIMS system difficult to perform. The existing platform that SHIMS operates on will become obsolete within the next year. This will significantly limit the ability to make changes, upgrades and repairs to the existing system. A rewrite of the system is required in order to sustain the system going forward. Additionally, SHIMS is cumbersome and confusing to navigate through. This often results in data being entered into SHIMS incorrectly which results in inaccurate reports which require additional reviews and corrections. The new system will include business logic to prevent erroneous data, a streamlined flow for data entry and enhanced reporting capability.

By rewriting SHIMS and incorporating user experiences and lessons learned from the initial version of the system, we will minimize the amount of time spent correcting data and allow more time for analysis. This SHIMS upgrade will include data dependencies and data intelligence. It will also include an easier to use and streamlined user interface to ensure data accuracy while minimizing the time to enter and review data. Safety professionals within the Company need to quickly identify trends, and the business intelligence gained from a robust information system will support our corporate safety-related goals. These proposed enhancements are needed to support the company's ongoing efforts to become an industry leader in safety performance.

*** Alternatives:**

*** Risk of No Action:**

The current SHIMS system is not intuitive and is cumbersome to use. This can lead to incorrectly entered data and extensive time spent reviewing and modifying cases. Additionally, the reporting function can

be improved to meet current needs and provide flexibility for future requirements.
Field groups spend extensive amounts of time exporting and formatting data to create trends and required reports.

* Non Financial Benefit

Explanation:

* Technical Evaluation and Analysis:

* Project Relationships:

The following is an overview of some of the high level functionality available in the current system which will carry forward in the new design. To eliminate redundant data sources and promote data integrity, SHIMS interfaces with the following databases:

1) Employee Data Warehouse (EDW) - Corporate data repository for all personnel information involving Con Edison employees and contractors. Information from EDW is used to auto-populate employee information when recording injury/illness cases. Also included are calculations for productive and excused labor hours for Con Edison employees (Management and Union). These labor hours combined with captured injury/illness case entries are used to compute the OSHA incidence rate.

2) Vehicle Management System (VMS) - Corporate data repository for Con Edison's and O&R's fleet of vehicles. This system is queried for information in the event of a motor vehicle accident (MVA) involving company vehicles. The system contains information such as the vehicle's license, registration, make, and model.

3) Occupational Health Administration System (OHAS) - This system houses data regarding employee work absences as recorded by the Occupational Health department. Work-related information from OHAS is available to SHIMS with the exception of data considered private and protected by the HIPPA privacy rule.

4) Employee Personal Information Center (EPIC) - EPIC provides employees with an effective and simple method for viewing and reporting employee personal data for both CECONY and O&R via an intranet portal. A feed from SHIMS to EPIC provides and associates safety-related information to employee records in EPIC. EPIC access is restricted to the employee and their immediate manager.

5) Emergency Control System (ECS) - This system contains information regarding "B-ticket" items issued for incident calls received by the Electric Control Centers. This allows SHIMS injuries to be associated with incidents in the field.

6) Authorization Administration Application (AAA) - AAA is a web-based application that provides a central point for the management of user access to various EH&S computer systems. Access for SHIMS users is managed through various roles that are assigned using the AAA system. The privacy of information related to SHIMS cases is protected through the use of these various roles. As an example, certain personal information about injured or ill employees is limited to only the highest levels of authorization.

7) Environmental Management Information System (EMIS) - Corporate data repository for oil/chemical spills, hazardous waste tracking, and

Discharge Monitoring Reports. Site and facility-related data in EMIS is shared and available in SHIMS.

Current Status:

Current Working Estimate: \$585,000

Funding: (\$000s)

Funding Cost	2012	2013	2014	2015	2016	2017	2018	2019	Total
	\$80	\$505	\$0	\$0	\$0	\$0	\$0	\$0	\$585

Benefit: (\$000s)

- * 2008 to 2012 Budget in Thousands- \$80
- * 2013 to 2017 Budget in Thousands- \$505
- * Authorization-
- * Appropriation-

Project/Program Title	IGS Project One Changes
Priority Number	
Project Manager	Todd Ichihara
Project Engineer	
Budget Reference	
Project Number	
Status	
Estimated Service Date	December 2014
Work Plan Category	Regulatory
Work Plan Category	

Work Description:

This mandatory project includes two major components. The first component implements enhancements to IGS that will take advantage of new business processes introduced with the recent implementation of Oracle' EBS system, known at Con Edison as Project One. The project will review existing business processes and seek improvements in the Gas Supply business process and implement corresponding system enhancements. At present, it is anticipated that significant changes are required to IGS to change from the current process of using Purchase Orders (POs) throughout the system, to an alternative approach. The project component includes four major functionality Milestone deliverables:

1. Document Upload

Enhance IGS to be able to upload vendor invoices, supply confirmations, vendor contracts, and RAPs to a file server. Documents should be retrieved for viewing through the application.

2. Partial Invoice Validation and Submission

Enhance IGS to allow for entry and validation of partial invoice payments in one month. This should provide for multiple payments and validation per payment that sets the validated items to read-only.

3. Multiple Demand charges per transaction

Multiple demand charges per transaction should be provided

4. Re-design Invoice Entry

Re-design the invoice entry user interface to provide for more intuitive usage and improved performance.

The second component implements technology upgrades to the existing IGS and IGS Web Services that implement interfaces between IGS and other systems, as well as upgrading to a later version of Visual Studio .net. These changes include remediation to replace deprecated technologies.

With the recent implementation of EBS at Con Edison, there are a number of known and anticipated changes required in IGS to do business in a safe, secure, correct, and SOX and audit compliant manner.

This project will require a significant effort of resources from IR, and Gas Supply to review the impact of Project One on the existing Gas Supply business requirements, as well as working with other areas of Energy Management to upgrade the PDS and Allegro interfaces..

Justification:

- Energy Management's Gas Supply Department process approximately \$1 billion in wholesale gas transactions, and requires a supportable software platform to track and schedule energy transactions, as well as perform proper risk oversight functions.
- The Gas Supply business requires changes as the current PO process has changed with implementation of Project One.
- Energy Management and Energy Risk Management are frequent areas of audits, and require strict compliance with SOX controls, and audit capabilities.
- Deprecated technologies must be replaced on a timeline dictated by the technology vendors. In this case Visual Studio 2003, which is used by the IGS interfaces will end Extended Support from Microsoft in August 2013. After then, the software is at risk of becoming unusable for security exposure reasons, and non-maintainable due to lack of vendor support.
- **Alternatives:**
- **Risk of No Action:** The risk of no action would be a possible disruption to the PO based Gas Purchasing process, or lack of proper controls by implementing processes outside of the IGS system. In addition, if the technology upgrade is not performed, there is a risk of these interfaces becoming unusable for security exposure reasons, and non-maintainable due to lack of vendor support. If the interfaces are not used, manual entry of data would be required, with a reduction in system controls and increase in human data entry errors.
- **Summary of Financial Benefits and Costs:** The financial benefits of this project are in increased controls, SOX compliant business processes, and continued ability to support regulatory requirements by using a vendor supported software platform.
- **Technical Evaluation/Analysis:** N/A
- **Sensitivity Analysis (if applicable):** N/A
- **Project Relationships (if applicable):** N/A

Estimated Completion Date:

December 2014

Planning and Budgeting:

This project is expected to span the budget year of 2014.

Constraints:

Implementing this project will require significant time investment for user testing and specification of requirements. In addition, other concurrent systems projects may constrain SME resources and create implementation and schedule constraints.

Status: Project has not started

- Current Working Estimate (if applicable): This estimate is based upon the anticipated need for employee and contractor resources for a 12 month project.

Funding: (\$000s)

Funding: (\$000s)

Actual 2007	Actual 2008	Actual 2009	Actual 2010	Actual 2011	Approved 2012
-	-	-	-	-	-

Forecast 2013	Forecast 2014	Forecast 2015	Forecast 2016	Forecast 2017	Forecast/Approved Total 2013-2017
-	790	-	-	-	790

- Authorization – This project has been authorized under budget reference number 20227277. Authorization for 2013/2014 was 490K. This will need to be revised to 790K.
- Appropriation – This project has been appropriated for \$490K. under budget reference number 20227277. This will need to be revised to 790K.

X	Capital
	O&M

Capital – Shared Services – IR/Energy Management

Project/Program Title	NYISO Transmission Owner Data Reporting System (TODRS)
Project Manager	Carlos Villalba
Project Number	1XC2000
Status of Project	In progress. Approximately 5% complete.
Estimated Start Date	Ongoing
Estimated Completion Date	July 2016
Work Plan Category	Regulatory

Work Description:

Replace the Company's current New York State Independent System Operator (NYISO) Transmission Owner Data Reporting System (TODRS). This project involves multiple departments of the Company, such as Information Resources, Rate Engineering, Customer Operations, and Energy Management, as well as an external consultant to develop a new program in order to better support the Retail Access Program. The new system will provide transparency and expandability of the energy and capacity reconciliation process.

Justification Summary:

There are two systems which provide information that the Company uses to report reconciliation and other information to the NYISO. These systems are the Capacity tag calculation and the Energy Reconciliation system. These programs retrieve data and supporting information from several programs, some of which are being modified or changed. Energy Management reviews and analyzes the data in the system and makes adjustments when necessary.

If no adjustment is required, Energy Management releases the information to the NYISO. If the file needs to be adjusted, Energy Management manually adjusts the information and then releases the information to the NYISO. This process is completed each month in order to satisfy requirements set forth by the NYISO. It is largely manual, susceptible to calculation errors, and cannot be reproduced for troubleshooting.

System modifications are required due to the changes taking place within the market, new systems being put into place that provide information to the Energy Reconciliation system, the correction of issues taking place within the system, and the switch to weekly billing by the NYISO.

When the original program was developed, the market was not clearly defined. Over the years, the programs have been updated using program patches and by increasing the manual effort of Company employees. The patches and manual processes developed have created issues due to increased program complexity and "black box" type calculations that are dependent on individual knowledge and memory to maintain system integrity, which makes the process less transparent.

Some examples of market changes that affected the system are:

- The NYISO shortened its settlement cycle, which resulted in transparency in the system to account for changes to customers' bills
- Station Power accounts are no longer allocated losses and unaccounted for energy during Load Forecast and TOL reporting, resulting in a time-consuming manual process to separate these accounts during ICAP and energy reconciliation processes

A new NYISO Transmission Owner Data Reporting System will improve accuracy, oversight, and reliability of the reporting process by eliminating some manual operations and by making use of modern programming language and tools. It will allow the Company to adapt the reporting process to suit the needs of the market and participating Energy Supply Companies. This, in turn, will benefit Retail Access participants/ESCO's by creating a more accurate and effective system since transactions will be more transparent and will allow for Company personnel to readily troubleshoot and resolve reporting problems due to customer billing or metering issues.

A new system, in comparison to the existing system, is expected to provide the following needed changes to the system:

- The new system will be able to handle non-interval customers that participate on time-of-use programs
- The new system will enable the reporting of an ESCO customers' non-interval metered on-peak and off-peak usage to the NYISO
- The new system will use the best available metering information regardless of the customer service classification
- The new system will automatically process ICAP tags for accounts in the Mandatory Hourly Pricing (MHP) program
- ICAP tag adjustments as a result of NYPA allocation changes could be recorded based on the effective date and end date
- The method for allocating load lost due to departing customers could be made consistent with the NYISO tariff
- Customers will be located in the electric system electrically based on the feeder location instead of a zip code allowing further analysis of losses and estimated load shapes
- Provisions could be created for analyzing Unaccounted for Energy (UFE)
- The new database can be easily queried to produce different types of reports. This would allow through analyses of the business rules without having to have detailed knowledge of the computer language to implement them and allow for greater transparency and greater flexibility as the market and systems change
- A user interface will allow an analyst with less knowledge of the reconciliation process to produce the NYISO reports and perform basic troubleshooting of the process

A portion of this project addresses a commitment included in the existing Electric Rate Plan in Case 13-E-0030.

Supplemental Information:

- Alternatives:

The alternatives to the TODRS are:

1. Create a new Energy Reconciliation system that is capable of utilizing information from all internal systems, provides transparency of the calculations, and corrects issues that exists in the current system (This option was selected.).
2. Modify the existing Energy Reconciliation System to allow it to perform the functions needed to use information from updated systems within the Company and corrects issues. This option would still retain the existing system's inherent flaws of disaggregated program structure, obsolete programming language, and intensive manual intervention.
3. Keep the system unchanged. The Company is implementing several new systems and programmatic changes which will render the existing system inoperable if left unchanged and this magnifies the flaws of the existing system, as noted in Option 2 above.

- Risk of No Action:
See justification section. This upgraded system would also limit ESCO customer energy data and transparency concerns will continue amongst the ESCOs.
- Non-financial Benefits:
See justification section.
- Summary of Financial Benefits (if applicable) and Costs:
- Technical Evaluation/Analysis:
- Project Relationships (if applicable):
- Basis for Estimate:
Vendor quote and IR quote.

Total Funding Level (\$000):

CAPITAL

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2014</u>
\$0	\$0	\$240	\$0	No O&M	\$400

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1 million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2014</u>
Labor						\$35
M&S						
A/P			\$240			\$345
Other						
Overheads						\$20
Total	\$0	\$0	\$240	\$0	No O&M	\$400

Request (\$000):

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
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\$1,440	\$1,569	\$0	\$0	\$0

Request by Elements of Expense:

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor	\$160	\$165			
M&S					
A/P	\$1,155	\$1,195			
Other		\$80			
Overheads	\$125	\$129			
Total	\$1,440	\$1,569			

X	Capital
	O&M

2017 – Shared Services / Human Resources

Project/Program Title	PeopleSoft HR Help Desk
Project Manager	Marie Chatterjee
Hyperion Project Number	21546554
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	January 2017
Estimated Completion Date	September 2017
Work Plan Category	Strategic

Work Description:

The Human Resources Service Center (HRSC) responds to calls and written requests from employees, Human Resource Professionals (HRP) and retired employees. The HRSC representatives respond to calls and written requests, including emails, by initiating tasks using Microsoft Outlook. This manual process relies on the HRSC representatives to initiate the task, manually complete it, and document its completion. The requests from the HRPs come in various formats and are again logged as tasks using Outlook. The HRSC handles approximately 26,000 requests annually. Supervisors manually monitor the status of the requests to ensure timely completion. There is no transparency for the customer to monitor the status of their requests. Additionally, there are no metrics or reports available to monitor the completion of the requests or determine if any Key Performance Indicators (KPIs) related to the written requests are at risk. The current process does not allow retirees to process minor transactions, and they must call the HRSC or wait to receive their pay statement in the mail. Finally, under the Health Insurance Portability and Accountability Act (HIPAA) regulations, disclosure of Personal Health Information (PHI) must be recorded and reportable. The current method of recording such disclosures is manual.

The PeopleSoft HR Help Desk, a module of PeopleSoft CRM designed to integrate with PeopleSoft HCM, will apply automated workflow for tasks, inquiries, and requests for all of Human Resources (HR). It will be implemented in the following business areas:

- Employee Benefits
- Compensation
- Labor Relations
- Occupational Health
- HR Support
- Payroll Department
- Learning and Inclusion

Employee requests and questions can be routed to responsible departments and the status will be maintained within the system in real time. The Help Desk is also essential for Human Resources to maintain regulatory compliance, achieve productivity and cost savings, improve internal customer experiences and provide self-service for retirees and employees.

Estimated Project Timeline Starting January 2017

Project Start-Up – 12 - 16 Weeks

- Technical assessment of security requirements
- Create a Request for Proposal (RFP) for the selection of a vendor to assist with the implementation as an integrator
- Review and select a vendor who responded to the RFP
- Requisition and purchase orders placed
- HR and IR resources identified for project team

Define Phase – 4 Weeks

- Determine business requirements
- Complete technical analysis of planned work
- Create detailed project plan and budget
- Establish steering committee

Design Phase – 4 Weeks

- Complete detailed functional and technical system specifications
- Validate compliance and business requirements are met
- Complete system configuration and user security set up

Build Phase – 5 Weeks

- Complete technical development and unit testing of system requirements
- Develop detailed plans
 - Testing and defect resolution
 - Communication and training
 - Post production support

Testing Phase – 4 weeks

- System Testing – Validate PeopleSoft HR Help Desk functions as expected
- Integration Testing – Validate PeopleSoft HR Help Desk integrates with PeopleSoft HR Payroll System as designed
- User Acceptance Testing – Validate PeopleSoft HR Help Desk functions perform to user expectations.

Deployment Phase – 2 Weeks

- Execute planned communication and training
- Complete mock go live and develop cutover checklist
- Establish post production support

Justification Summary:

The following objectives are being strengthened by the implementation of PeopleSoft HR Help Desk.

Reduce and Manage Risk

The system will provide enhanced security to reduce the risk of a data breach of employee or retiree's Personally Identifiable Information (PII) and Protected Health Information (PHI). All correspondences and call notes will be stored securely within a corporate system and will be safeguarded. This will eliminate the need for physical notes that may be compromised. The HR Help Desk security profiles and permissions are integrated and kept in sync with the core PeopleSoft HCM system. This minimizes maintenance of security profiles and will ensure that users are not able to access any unauthorized data.

Calls that require access to PII and PHI will be logged and an automated prompt will be displayed for identify verification with all the appropriate information. Any data retrieved for a specific call will be logged within the system with a clear audit trail.

Specific benefits include:

- Adherence to the (HIPAA) requirement to log all PHI disclosures.
- Provides secure escalation of complex and confidential cases containing PHI such as call notes and information from the benefits provider in accordance to HIPAA.
- Ability to record and manage requested PII and PHI disclosure restrictions as prescribed by HIPAA.
- Automate identity verification to reduce the risk of PII/PHI data breaches.
- Elimination of manual paper process will reduce the risk loss or theft of PII/PHI.
- All stored documents and case history will be maintained on a corporate system managed by Con Edison Information Resources (IR) in accordance to all security protocols

Strengthen Company Processes

The system will gather analytics to improve productivity and enable HR to proactively address employee and retiree concerns. Greater efficiencies can also be achieved for tasks and requests that need to be coordinated between multiple sections across organizations, resulting in the reduction of human resources needed to support the HRSC. Specifically this system will:

- Improve workflow and routing of HR, Benefits, and Payroll tasks and requests and eliminate manual paper processes.
- Provide data for root cause analysis and highlight training and communication opportunities through metrics and reports.

- Drive employee interaction to self-service versus the call center to realize cost savings.

Enhance Customer Experience

Employees, Retirees, and HR Professionals can monitor the status of requests. In addition, work can be routed to the various sections within HR, Learning and Inclusion and Payroll for more expeditious processing.

The project will also create a Knowledge Base that will assist in organizing information on policy and procedures and deliver self-service answers to employees and retirees more effectively and consistently which will reduce the call volume.

Customer feedback survey functionality is built into the system and can be generated based on logged calls or tickets submitted via self-service. Customer feedback is critical in improving the customer experience.

Specific benefits include:

- Deliver a consistent service experience regardless of the manner in which the employees engage HR.
- Employees will be able to open cases and requests 24 hours a day using a self-service tool. The system will also generate customer feedback surveys to help continually improve the service provided.
- Case status will be available online 24 hours a day in real time. The requester will be able to see all the activity and kept up to date which will result in increased trust.
- Introduce enhanced self-service functionality for retirees to update W-4, direct deposit, and view paystubs online.
- Improve and expand quality assurance analysis of completed cases, requests and transactions by simplifying the retrieval and review process.

In addition, self-service for active and retired employees will be provided. The self-service application will be available during off hours and tickets can be submitted at a time that is convenient for the employee and retiree. The system will provide employees and retirees with up to date status on submitted tickets on a dashboard providing transparency and enhanced communication.

The implementation of this project will also reduce calls and requests that require manual intervention. Some examples of self-service function include updating retirees contact information, changing W-4 Tax withholding, changing their banking information for direct deposit, and viewing their paystub online.

Supplemental Information:

- **Alternatives:** The HR Service Center investigated two technical alternatives to meet the business objectives.
 - The HP Help Center is the product used by the IR Help Desk. After discussions with the IR Help Desk, it was determined that Human Resources would not be able to use the existing installation in the Help Center. The existing HP Help Center has been installed and set up specifically for IR related issues and cases. In order for HR to utilize the HP solution a new system would need to be purchased and installed.

The HP solution does not offer the same integration capabilities with our existing PeopleSoft HR Payroll system. All required integrations will have to be created and maintained internally. Data security would be maintained separately from the core PeopleSoft HR Payroll system.

- Customer Operations is currently planning on a case management system in 2017. The case management is part of the I3 system that was implemented for call and email routing in all of customer operations. This new system would be designed specifically for customer operations and would require extensive modifications for use by the HR Service Center.

The I3 system is not designed specifically for HR functions and any specific requirements and security needs will have to be built. The I3 system does not offer the same integration capabilities with our existing PeopleSoft HR Payroll System. All required integrations will have to be created and maintained internally. Data security would be maintained separately from the core PeopleSoft HR Payroll system. Additionally, the support of the system would be managed by customer operations which could limit HR's ability to update the system as business needs change.

Other HelpDesk or workflow/Customer Relationship Management (CRM) products, from other vendors like HP or Pega systems, were not considered as they would require extensive coding for integration to HR Payroll and security requirements and updates would be costly and inefficient.

- **Risk of No Action:** The Company is at risk of unauthorized disclosure of PII/PHI for employees and retirees due to a failure in a manual process or procedure resulting in a violation of HIPAA regulations which may include civil and criminal penalties assessed by the Department of Health and Human Services. In addition, if we do not install PeopleSoft HR Help Desk, we would need to meet the security and retiree access requirements with other methods.
- **Non-financial Benefits:** Increased self-service and transparency to our internal customers and retirees

- **Summary of Financial Benefits (if applicable) and Costs:** The implementation of PeopleSoft HR Help Desk is projected to reduce a net of three full time equivalencies (FTE) from 2018-20.

One FTE will be required for long term production support and data analytics for the new system which has a slight impact on the financial benefit (see below).

Description	Financial Benefit per FTE	Financial Benefit Total
Two union employees	\$65,000	\$130,000
Two Management employees	\$100,000	\$200,000
Total FTE Reduction		\$330,000
One management employee for support	\$100,000	\$100,000
Total Annual Financial Benefit		\$230,000

\$1.1 million dollars in savings realized in the five years after implementation.

- **Technical Evaluation/Analysis:**

Infrastructure Support:

Oracle's PeopleSoft Help Desk for HR is a module of the PeopleSoft Customer Relationship Management (CRM) application, and is not currently installed at Con Edison. We expect that we will need to install new server infrastructure (database server, application, and web and stat server) to support this effort. In addition, Help Desk requires the Secure Enterprise Search feature of Oracle, which will require additional infrastructure. Access to the system by retirees will require additional security, servers and configuration.

System Compatibility:

PeopleSoft HR Help Desk shares the same architecture and technology with the PeopleSoft HR Payroll system so it will tightly integrate using existing PeopleSoft PeopleTools framework. Con Edison should be able to leverage current HR/Payroll Security and auditing features to integrate with PeopleSoft HR Help Desk.

While PeopleSoft HR Help Desk is a different application, the PeopleTools architecture is the same as that used for the existing HR/Payroll system, and can be maintained by our current technical and functional PeopleSoft HR Payroll support team with help from some additional resources or staff augmentation on technical and business support teams during the implementation.

Customization/Development:

As per Oracle's guidance there is usually about 5-10% customization done by customers to the delivered application while deploying PeopleSoft HR Help Desk.

- **Project Relationships (if applicable):** PeopleSoft HR Help Desk will be an augmentation of the existing PeopleSoft HCM system. Maintenance of the two systems will be handled together by the HR Payroll Support team. All future upgrades would be done together and managed by a single team.
- **Basis for Estimate:** Vendor price quote for software purchase used for white paper estimate. Oracle database cost estimates are based on historical spend for HR and Finance systems using the same platform.

Expense Description	Estimated Cost
PeopleSoft HR Help Desk Software Purchase	\$ 834,300
PeopleSoft HR Help Desk Maintenance Fee	\$ 183,546
Oracle Database License	\$ 938,124
Oracle Database Maintenance Fee	\$ 185,400
Program Migration Tool	\$ 13,905
Technical Hardware	\$ 444,960
Vendor/Contractor (Integrator)	\$ 973,426
Internal IR Support	\$ 371,000
A&G/Labor Overhead	\$ 251,868
Total	\$ 4,196,529

Total Funding Level (\$000):

Historical Spend

<u>Actual</u> <u>2011</u>	<u>Actual</u> <u>2012</u>	<u>Actual</u> <u>2013</u>	<u>Actual</u> <u>2014</u>	<u>Historic</u> <u>Year</u> (O&M only)	<u>Actual</u> <u>2015</u>
					<u>\$2,596</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual</u> <u>2011</u>	<u>Actual</u> <u>2012</u>	<u>Actual</u> <u>2013</u>	<u>Actual</u> <u>2014</u>	<u>Historic</u> <u>Year</u> (O&M only)	<u>Actual</u> <u>2015</u>
Labor						
M&S						\$ 471
A/P						\$2,054
Other						\$ 71
Total						<u>\$2,596</u>

*It should be noted that funding has been advanced in 2015 during the Corporate Governance Optimization process for the hardware and software. Should additional funds become available in 2016, the balance of the funding below will not be necessary in 2017.

Request (\$000):

<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>	<u>Request</u> <u>2020</u>
	1,500			

Request by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor		268			
M&S					
A/P		967			
Other		86			
Overheads		179			
Total		1,500			

2014 – Corporate Security

Project/Program Title	Enterprise Security Platform
Project Manager	Kayla Prettitore/Denise Reid
Project Number	20708813
Status of Project	Planning
Estimated Start Date	November 1, 2014
Estimated Completion Date	December 31, 2018
Work Plan Category	Regulatory Mandated

Work Description:

This project implements an advanced security software suite that is able to provide real-time monitoring of ingress and egress points within Con Edison facilities. New software will require the installation of Mercury brand access control security panels that will be open enterprise, providing Con Edison with the ability to competitively source software solutions as well as security integrators.

Current advanced access control management software suites are capable of incorporating various platforms to provide a robust and comprehensive security management tool. Visitor management, video management, and biometrics are all components that will be fused to provide a seamless transition for monitoring our assets and thwarting potential threats.

The project will also require the installation of RFID readers and tags to monitor the egress of employees and visitors during an emergency evacuation drill or event.

The following will be required as part of the ongoing project:

- Installation of new servers
- Installation of enterprise suite access control software
- Installation of new access control panels
- Installation of Video Management System
- Installation of RFID readers
- Integration of Intrusion Detection System
- Installation of Visitor Management System
- Re-badging of all personnel

Justification Summary:

Vast improvements have been made over the past few years in the area of security technology. Currently, most of Corporate Security's equipment and software are independent, don't communicate with each other, and lack the ability to provide a comprehensive overview of our assets to the security team and our stakeholders. In addition, some of the existing security

software platforms currently utilized are no longer supported by the initial vendors nor the technical advancements made to both server and operating systems by IR.

Currently, Con Edison relies heavily on proprietary hardware that limits our ability to competitively source new technology and security integrators that would significantly enhance our security posture.

Continental's access control system was originally designed for a smaller platform, which supported 2 servers, 26 locations, and 275 card readers in 2005. However, since 2005 Con Edison's access control footprint has grown exponentially. We continue to install access control readers and panels at each of our facilities. Currently there are 99 Con Edison locations, 385 card access control panels, and 1413 card readers, an increase of 514% from 2005.

Our current access control software system has multiple limitations including the number of communication servers, access groups, workstations, database records, and sites. Over the past seven years, the current system had to be frequently upgraded to be compatible with the Con Edison network. Continental's Card Access Version 2.7 will not support a Windows 7 operating system nor the 2008 R2 servers being implemented on the Con Ed network.

Due to the vast amount of records now in our database, the software is unable to compile daily reports or provide security with working features used to manage badge holders efficiently and accurately. Currently employee transfers need to be manually recorded in the system to reflect changes to access privileges.

To date, there are 1049 security cameras at 85 company locations that are not tied to the card access system. These cameras safeguard the facilities' assets and support employee safety. Without an integration to access control, we are lacking the ability to provide a real-time, instant view of conditions at each facility. Security operators are often alerted to unusual or suspicious behavior first by triggered alarms in card access. By integrating a video management system alongside an access control system, we can provide security operators with every advantage to protect both personnel and inventory.

Also, this project will fund the addition of new security systems at important Con Ed locations.

In addition, there are specific requirements that must be met under NERC CIP v5. Sites rated as High or Medium impact under these standards must adhere to specific alarm triggers, segregation of data, as well as the ability to audit all changes within the system. The company has over two dozen sites that fall into these two categories.

Supplemental Information:

- Alternatives: On a cost effective basis, access control provides the most effective deployment of a robust security system at all locations requiring increased security. As an alternative to this enterprise security software suite, the company would continue patching the current system which has reached end of life and create costly workarounds to meet the demands of the NERC CIP v5 requirements.

- Risk of No Action: Without action, the company will be left with outdated and limited security technology. The current system does not support the features required to comply with NERC CIP v5. In order to address these requirements, costly workarounds would need to be created. No adherence to NERC CIP v5 would be costly to the company.
- Non-financial Benefits: The enterprise wide security software suite will provide an important cyber security measure to protect the critical cyber assets of the company. Employee safety and security are significantly enhanced when these measures are introduced.
- Summary of Financial Benefits (if applicable) and Costs: As a result of implementing an enterprise wide security software suite, the company will be better equipped to strategically source competitive bids for security software, hardware, and integration. In addition, by moving toward an open enterprise security panel, the company is assuring that we are not locked into one software manufacturer or one set of integrators as we are now with proprietary panels.
- Technical Evaluation/Analysis: This security system will provide state of the art security and safety at all company locations. Con Edison will especially benefit from centralized monitoring and data management functions, which integrate access control, video surveillance, and fire and burglar alarm systems. The expected results are increased efficiency at a lower cost. System integration will help Con Edison to respond more quickly to potential security threats. New technology helps maximize the convergence of physical and logical access control. Centralized access control systems feature control of multiple databases and systems from a single point, giving our company greater efficiency and simplicity.
- Project Relationships (if applicable): The companies' data centers, server farms, and communication rooms will be protected by this enhanced access control and RFID system. It will better protect the cyber assets our company is implementing for cyber security, for better business continuity.
- Basis for Estimate: This estimate was created using an MSRP listing from the manufacturer, internal labor rates, and external hourly labor rates from the security integrators. The estimate covers the purchase of the software and hardware as well as labor for software integration hardware installation.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>

Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
\$4,899	\$7,979	\$8,144	\$4,378	\$4,600

¹Request by Elements of Expense

EOE	2015	2016	2017	2018	2019
Labor	\$1,462	\$2,822	\$2,606	\$1,858	\$1,666
M&S					
A/P	\$1,119	\$2,483	\$2,967	\$892	\$860
Other					
Overheads	\$2,318	\$2,674	\$2,571	\$1,628	\$2,074
Total	\$4,899	\$7,979	\$8,144	\$4,378	\$4,600

¹ All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

2015 – Common Capital Portfolio

Project/Program Title	PI360 Governance Expansion
Project Manager	Tileeyah Robinson
Project Number	
Status of Project	Approved, Not Started
Estimated Start Date	4/1/15
Estimated Completion Date	12/31/15
Work Plan Category	Strategic - Efficiency and Process Improvements

Work Description:

UMT will use the ongoing and proven implementation approach used for the Common portfolio when working with the Gas business unit. In addition to ConEd specific knowledge, UMT will use a best practices methodology to support the assessment and implementation of process & capability improvements and enabling technology. The implementation will follow 5 steps in order to positively effect change and gain successful adoption. Each capability area will leverage a core focus group within CECONY to help clarify the business problems, organizational capability, and technology required to build a common solution for the CECONY team to build upon. Before beginning the process design of the solution, UMT will conduct a brief current state assessment of the existing processes and maturity of CECONY's EPM processes. The assessment will enable UMT to effectively identify the strengths and weaknesses of current processes and begin to design/re-engineer these processes in a way that best benefits CECONY.

Defining the overall processes that are necessary to successfully address the gaps in CECONY's existing practices requires the UMT team and CECONY Stakeholders to work together in a series of workshops. These workshops mark the beginning of the change management that will be necessary to redesign the processes that will govern CECONY's EPM process. The initial involvement of these Stakeholders will, by virtue of design, transform them into the champions of the change being brought to CECONY.

The workshops will be conducted throughout the Current-State, Process Design, and Solution Building phases. They will serve as a form of knowledge transfer between CECONY and UMT. Furthermore, the workshops will be collaborative sessions between key stakeholders and the UMT consulting team.

The process design is conducted in an iterative approach. Requirements and specifications are first gathered during a series of exploratory workshops. UMT will then develop a proposed solution based on the needs and the current state of CECONY's process. UMT will then present this design in the next iteration, and the workshop group will work together to modify and build upon the proposed process as necessary. This continues until an effective and desired process is agreed upon.

As the process is being designed and validated, UMT expand the current PI360 solution. In the latter part of the process design, the actual solution will be demonstrated, allowing a complete proof of concept before production. The solution will then be fully tested. The core Con Ed working team will be part of the testing and validation of the design and solution. UMT360 support and software assurance start when the solution is installed.

Training will be an ongoing effort, beginning with a carefully chosen set of early adopters. There are various training techniques that UMT can employ, and it will be decided during the Process Design phase which method(s) will be used. These training methods include classroom training sessions, video training, training exercises, and one-on-one walkthroughs among other methods.

Early adopters of the solution will be identified prior to the completion of the Process Design. They will be the first users to be trained, and their projects will be moved to production. UMT will work very closely with these early adopters. UMT will ensure the solution meets all requirements identified in the process design.

The change management component of the process design will be an ongoing effort. Beginning with the workshops to design the new processes, CECONY's stakeholders will be involved with all change being built into the system. Recurring status meetings and status reports will assess the progress of this change, and present it to the key stakeholders. Through weekly meetings and the ongoing workshop sessions, stakeholders and managers will have an opportunity to indicate if and where the solution may fall short. This will allow UMT to continuously develop practical processes and solution to meet CECONY's needs.

Justification Summary:

In 2014 and early 2015, UMT supported the CECONY Enterprise Project Management Office (EPMO) with the design and implementation of the PI360 (Portfolio Intelligence 360) solution for the Common portfolio. The purpose of this document is to provide CECONY with a proposal to refine and expand the solution to the Gas portfolio.

The Gas portfolio is currently leveraging a Microsoft Portfolio Server 2007 environment (no longer supported by Microsoft). UMT will upgrade the Gas portfolio to the latest version of the solution, called PI360 (a combination of Microsoft Project Server 2013 and UMT360). The work undertaken under this proposal will build on the existing portfolio alignment and optimization process that is currently used to prioritize and select the ~\$600m annual project spending for the Gas portfolio. The PI360 solution currently being used by the Common portfolio will be expanded to accommodate the inclusion of the Gas portfolio.

In addition, this upgrade together with the UMT360 solution will enable CECONY to streamline and automate many of the current EPMO processes and reporting needs, including project financial management. Implementation and maturity of all the EPM disciplines within an organization is a significant change effort. A key focus of the engagement will therefore be on training activities and support of the operationalization and adoption of the improved processes and solution.

UMT Consulting Group will work with the CECONY Common and Gas teams to deliver the objectives discussed in this Proposal by leveraging and enabling an ability to:

- Streamline and automate time-phased financial analysis and reporting
- Design and implement financial forecasting process, including change request and revised budget (part of sweep process, now with audit trail)
- Automate EPMO Project Reporting
- Improve forecasting process to minimize budget redirects
- Connect different data sources into one common repository for EPMO analysis, reporting and financial management
- Prepare a solution to support the management of the Gas portfolio, i.e., manage all projects using the same process and technology platform
- Retire Project Portfolio Server 2007 for the Gas portfolio. This will involve archiving the historical Gas project data and migrating the recent information to PI360.

- Design and implement a Financial Management data import module to connect Oracle BI with PI360.
- Design and implement a Risk Management framework to include CECONY's Enterprise Risk Management (ERM) and Risks, Opportunities, Assumptions, Decisions (ROADs) models.

Supplemental Information:

- Alternatives:

Alternative 1 – Do nothing. This would mean using MS Excel and PowerPoint for governance analysis and reporting for the Gas Capital (~\$600M). The legacy system (PPS2007/Optimizer) is no longer supported by Microsoft, so the historical data would not be migrated to the new PI360 solution.

This alternative has a higher risk for error, is more time consuming and resource intensive, and provides less automated process controls and quality checks.

Alternative 2 – Migrate the Gas Capital portfolio data from PPS2007 to PI360 and cleanse data using internal resources. This alternative will be manually intensive, time consuming and a highly resource intensive effort. There is a risk to this alternative as we currently do not have the skilled resources and the manpower in house to complete such a task.

- Risk of No Action:

Process Risks

- We would not have a tightly integrated optimization and governance process.
- The governance process for the majority of the ~\$600m capital Gas portfolio will be completed manually each month. This will limit the analysis and reporting benefits from a more automated governance process. It will also leave us open to human error, and technical issues and limitations associated with the use of a spreadsheet based process.
- Reporting will continue to be manual and inflexible with the lack of automated rollup and drill down capabilities. Ad Hoc reporting will be either impossibly hard or extremely labor intensive.
- Establishing enterprise and objective project and portfolio execution performance measurements will be labor intensive, inflexible and subject to manual interpretation without the structure and integration supported by the platform.

Cost Risks

- No single source of data will be available for portfolio management / governance reporting, leading to increased manual effort to consolidate and summarize reporting.

Quality Risks

- The manual data collection process is prone to error.
- No single source of data will be available for reporting on project financials, status, issues and risks, decreasing the quality of financial and project reporting.
- The application of universal performance standards is difficult and prevents the Company from identifying and remedying situations of sub-par performance.

- Non-financial Benefits:

Some of the Non-financial Benefits of this project are:

- Increased alignment between our capital investments and our Enterprise Business Strategy

- Creates an opportunity to improve business processes.
- The integrated view of all projects planned and in-progress provides support in managing the portfolio budgets and identifying opportunities.
- A standardized platform provides the infrastructure for incremental process improvement activities.

Additional benefits are:

- Project Delivery – Integration of financial budgets, actuals and re-forecasting. Increased transparency on projects, improvements to budgeting and reforecasting via Sanctioned Change Requests.
- Budget Development and Management – Tools to prepare and actively manage project forecast, earned value and actuals.
- Training efficiency and employee mobility
- New employee integration
- Administrative efficiencies
- Summary of Financial Benefits (if applicable) and Costs:
 - **Financial Benefits:**
 - Improved transparency the Gas portfolio's spending, project-specific and portfolio-wide forecasting, and Change Request (Releases and Requests) processes.
 - The PI360 solution (processes and tools) will help the EPMO and Gas management teams operate quicker, make improved fact-based decisions and provide improved/automated financial transparency to the entire Capital portfolio.
 - **Costs:**
 - The Costs are based on an estimated number of days for professional services from UMT Consulting Group: \$597,200
 - In addition, Expenses are estimated to be: \$41,800
- Technical Evaluation/Analysis:
 - UMT360/PS2013 (known internally as Portfolio Intelligence 360, or simply PI360) – Portfolio Management system automating management from development of white papers, through optimization and budget process, through Management of active portfolio on a per year basis. The Common portfolio is leveraging the PI360 solution now, and this will expand the solution to include the entire Gas Capital portfolio.
- Project Relationships (if applicable):
 - The EPMO is currently implementing the PI360 solution for the Common portfolio, so this new project will expand the solution (as a Phase 2) to train, onboard, manage data, implement reports/analytics, etc. for the Gas portfolio.
- Basis for Estimate:

Total Funding Level (\$000):

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
<u>\$771</u>				

^aRequest by Elements of Expense

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor	<u>\$75</u>				
M&S					
A/P	<u>\$639</u>				
Other	<u>\$57</u>				
Overheads					
Total	<u>\$771</u>				

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Finance, Rate Engineering

Project/Program Title	Gas Rate Design and Analysis Systems Enhancement
Project Manager	Margaret Lenz
Project Number	20744281
Status of Project	In Progress
Estimated Start Date	August 2014
Estimated Completion Date	March 2017
Work Plan Category	Strategic

Work Description:

The Gas Rate Design and Analysis Systems project, which incorporates the Gas Customer Usage System (Gas CUS), included the replacement of a flat file mainframe system with server-based database technology and enhanced gas bill impact reporting. Gas CUS replaced a mainframe system that relied on an inflexible, obsolete reporting software with a system having user-friendly desk-top tools.

This Enhancement project addresses additional gas rate case systems enhancements and reporting requirements that were outside the scope of the build project:

- Enhance CUS data and bill impact process to include off-system billing (e.g. distributed generation is expected to grow as a result of the REV proceeding).
- Updates to the Dynamic Load Shaping system (DLS) to incorporate gas billing and/or gas interval data input systems, when available.
- Improve Rate I interruptible annual reconciliation process to eliminate reliance on obsolete unsupported data sources.
- Improve reporting format to increase efficiency and mitigate manual error.

The high level schedule covers approximately three years from August 2014 through March 2017.

Justification Summary:

Rate Engineering utilizes Bill Engine for its bill impact calculations and recognizes the need for enhancements, particularly to accommodate the population of customers with bills not calculated in CSS (manual or off-system billing). These populations of customers often have unique billing structures, or characteristics that require separate treatment outside of CSS.

Proposed enhancements include both the expansion of bill impact analyses to customers in the Off-System Billing System and interfaces to the CUS, a billing determinant data warehouse used to support rate cases.

The work involved will include updating CUS to accept data, integrate data in the Bill Engine and perform bill impact calculations from the off-system billing systems. The current sources for CUS are database tables which serve CSS. To the extent an account is billed off-system or manually, CUS will not be able to treat these customers appropriately when queried or in customer reports. CUS will be modified to accept these other sources of data and integrate them into the Bill Engine and will allow bill impact logic and reporting.

The current process for the annual revenue reconciliation for interruptible rate I customers relies on obsolete data sources that will no longer be maintained. There are few IT experts available to make modifications to the programs and/or reporting.

The dynamic load shaping system facilitates automated downloading of electric interval data but does not currently include gas interval data. Additionally the gas billing data resides in CUS which is not linked to DLS. The gas interval data is currently available from two distinct data repositories. This project will link DLS to CUS and/or interval data repositories to extract and merge disparate data sources into a single database for use in load research.

The current data summary formatting requires manual intervention to reformat for inclusion in rate case filings. This reformatting of these reports will eliminate the need for manual intervention in preparing rate case exhibits and will facilitate the efficient use of data by other employees.

Supplemental Information:

- **Alternatives:** There are no cost-effective alternatives other than maintaining the status quo. Given the importance of these reports to rate case preparation, there is real concern about whether these mainframe reports can meet the increasing gas service analysis demands in a dynamic regulatory environment.
- **Risk of No Action:** These mainframe reports rely on information from sources that have been, or are now, in the process of being replaced or consolidated in other corporate projects (e.g., revenues in RevStat). Absent the redesign and replacement of these reports, the shortcomings will have a cascading effect, requiring more off-system analysis and offline data manipulation, both of which are labor intensive and error prone.
- **Non-financial Benefits:** Rate Engineering has achieved benefits (such as being able to work more efficiently) from past information technology developments that provided the department with access to more standardized information for rate case analyses. As a result, the department was able to support increased regulatory activity over the years without having to increase staffing. The department expects to experience continued benefits as additional functionality is incorporated into these established platforms.

This system enhancement effort is an important step in eliminating many of the time-consuming steps associated with the multiple downloads and inconsistent file formats associated with the system in its current state. The enhancements will continue to streamline the bill impact process, and will result in more thorough scenario analyses.

The CUS system effort has benefits beyond those already discussed:

- The architecture design and process review has increased scrutiny of the complex coding utilized for standardization of consumption storage in CUS, resulting in an update of this logic and a process for ongoing review.

- The choice of Business Intelligence (BI) platform may better leverage revenue and other data stored on the same platform for analysis and reporting.
- Multi-department review has led to a better understanding of some of the more complex logic (e.g., aligning usage by trips and use of service point to align sales by premises) and its uses in other analyses.
- Summary of Financial Benefits (if applicable) and Costs: This project is expected to cost \$600 thousand over a period of years starting in 2014. Costs were determined in 2013 based on the actual cost of two contractor programmers on board at the time supporting other information technology development. As the effort required for prior projects subsided, one contractor transitioned over in 2014 to Gas Rate Design and Analysis Systems Enhancement in order to leverage contractor experience in building a standardized platform for all companies and commodities. This effort will then continue to be supported by one contractor in 2016 and 2017.
- Technical Evaluation/Analysis: The Off-System Billing application selected for this effort will rely on a joint evaluation of the complexity and potential benefits by Information Resources and Rate Engineering.

Existing impact programming will need to be evaluated to determine how rate structures that are not currently addressed in Bill Engine will be incorporated into the bill impact process.

As bill impact functionality for off system rate designs is a new requirement and will include:

- Determination of a bill impact calculation methodology
- Creation of interfaces to CUS
- Revision of CUS bill impact analysis routines to include new logic for additional billing determinants and reporting

Currently, the DLS system continues to extract gas billing information from mainframe files. Updates to DLS will require an interface to move data from CUS to the DLS system. Interval data updates to DLS would query two data warehouses.

We will evaluate the existing process for the annual interruptible revenue reconciliation for Rate I customers and look for opportunities for improvement in efficiency and design.

- Project Relationships (if applicable): CECONY has several different legacy billing platforms, and Rate Engineering had parallel but not identical mainframe systems for electric and gas usage storage. The CUS platform is now standardizing customer usage and rate design analysis across companies and services.

This is an enhancement to the Gas Rate Design and Analysis System and addresses added scope.

Rate Engineering's strategic systems plan is to develop an integrated system that will improve analysts' ability to access rate case information. Where possible, Rate Engineering is replacing all systems that rely on obsolete coding.

Key elements include:

- replacement of two mainframe systems—Load Study System and its companion demand analysis reporting system with DLS, a modular load research and sample design system
- replacement of an obsolete mainframe system with CUS
- integration of CUS, DLS and rate design/bill comparison pricing systems, specifically BillCalc
- Basis for Estimate:
Funding was determined based on the cost of one contract programmer including contingency and escalation.

Total Funding Level (\$000):

Historical Spend

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
			\$130		\$150

Historical Elements of Expense

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor				\$15		\$4
M&S						
A/P				105		143
Other						
Overheads				10		3
Total				\$130		\$150

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
\$275	\$45			

Request by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor					
M&S					
A/P	\$275	\$45			
Other					
Overheads					
Total	\$275	\$45			

2015 – Public Affairs

Project/Program Title	CISCO Screens
Project Manager	David Driscoll
Project Number	21206345
Status of Project	Ongoing
Estimated Start Date	May 2015
Estimated Completion Date	August 2015
Work Plan Category	Strategic

Work Description: Purchase and installation of 60-inch digital video screens plus CISCO encoder boxes in multiple company locations. Connection of each screen and box through a LAN port to the company's internal network.

Justification Summary: CISCO screens are a flexible, dynamic and easily adaptable system that can transmit print messages and video content in an attractive, clear and self-contained package. Video content of employee focused "news" stories and other messages are run on a regular basis along with notes about blood drives, Applause quotes, contests and other upcoming events.

Supplemental Information:

- **Alternatives:** The alternative to the CISCO screens would be to have each of the twenty-four company locations procure, mount, install and connect to the company's communication resources and distribute messaging and video content in a non-standard format, and at a much higher cost.
- **Risk of No Action:** A delay in having a uniform messaging system to reach a greater number of employees. Reliance on old media to communicate information which will lead to slower distribution.
- **Non-financial Benefits:** Rapid distribution of safety messages, increase employee awareness of important corporate news, improve employee morale through recognition messaging, create a more open communication channel throughout the company, increase awareness of customer focused initiatives.
- **Summary of Financial Benefits (if applicable) and Costs:**
- **Technical Evaluation/Analysis:** IR has evaluated the CISCO boxes as a sound technology and has programmed the first batch of fifty boxes to distribute corporate messages.

- Project Relationships (if applicable): Distributing information through the video screens will decrease reliance of emails or messages distributed through costly postal mailings to the employees' homes.
- Basis for Estimate:

Total Funding Level (\$000):

Historical Spend

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year</u> (O&M only)	<u>Actual 2014</u>
Labor						
M&S						
A/P						
Other						
Total						<u>120,000</u>

Request (\$000):

<u>Request 2015</u>	<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>
<u>300,000</u>				

^aRequest by Elements of Expense

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor					
M&S					
A/P					
Other					
Overheads					

^a All contingencies were developed in accordance with the Con Edison "Estimating Cost Contingency" Guidelines.

Total					
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X	Capital
	O&M

2015 – Finance

Project/Program Title	Reconciliation of CSS and Satellite systems Financial data (RCSF)
Project Manager	Lynn Urbano
Project Number	
Status of Project	Not Started
Estimated Start Date	April 2015
Estimated Completion Date	September 2016
Work Plan Category	Strategic – IT Enhancement

current process. These new modifications would streamline processes that affect analyzing data from a number of systems (e.g., Standby billing, Net Metering, Recharge New York, Excelsior Jobs Program, CUBS, gas billing related to Distributed Generation, billing under gas interruptible for Rate I & II, Steam billing, etc.)

In addition, as more complex rate designs and structures are possible in the future, the current inefficiencies with the data collection process and data sources will become more prevalent as more and new information is needed and may result in adding additional satellite systems. For example, even though the customer base is small, total annual revenue associated with Electric Standby and Recharge New York customers currently totals about \$90 million. Total annual revenues associated with Gas Interruptible Transportation and off-peak firm service total about \$50 million. This revenue is substantial so it is important that the Company mitigate the potential for error in our financial reports.

In terms of benefits to data reporting requirements, having greater consistency and transparency of data used by multiple departments for financial reporting and other regulatory reporting, such as rate cases, will benefit departments such as Accounting, Rate Engineering, Revenue and Volume Forecasting, and the Tax Department that will be able to utilize standardized data from a centralized source.

Supplemental Information:

- Alternatives: Keep the current process or do partial enhancement
- Risk of No Action:
 - We will continue to use manual processes which are time consuming and more error prone.
 - The financial data used for reporting, revenue analysis and forecasting won't be centralized. The benefit of having greater consistency and transparency of data used by multiple departments for financial reporting and other regulatory reporting will not occur without this enhancement.
- Non-financial Benefits:
 - Increased accuracy and transparency of revenue or billing data. For example, when reconciling to the Company's books or CSS (e.g., closing process, rate adjustments, etc.), revenues from separate systems are reported in total and separate and multiple analyses are performed to report the revenues by rate component. Eliminates a number of labor intense manual processes – which includes estimating billing components and reconciling with net sales. The worksheets are developed to estimate the required information. These manual processes can cause delays and variances that take time to investigate.
 - Centralized data for consistency/single source of truth – several departments may be analyzing similar data and there is currently no centralized location to obtain information. There is underlying risk if different departments estimate using different methods.

- Enhance customer experience - based on the above, improvements would allow data to be more readily provided (e.g., interrogatories, monthly closings, periodic rate adjustments, ad hoc requests, etc.) in a timely and consistent manner.
- Summary of Financial Benefits (if applicable) and Costs: Risk reduction in reporting revenues from satellite systems since the process is more complete, transparent and information is accessible in the same place to multiple departments that use the data.
- Technical Evaluation/Analysis: Each satellite system will be evaluated and analyzed to determine the best method to provide a high degree automation, ease of maintenance and compliance with financial reporting system.
- Project Relationships (if applicable): Provides enhancements related to revenue analytics as described in Whitepaper 20613829 to be filed in the upcoming electric rate case in 2016.
- Basis for Estimate: The estimate was provided by Information Resources, Application Services, based on prior and similar in scope projects and resource requirements.

Total Funding Level (\$1.63 Million):

Historical Spend: N/A

<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year (O&M only)</u>	<u>Actual 2014</u>

Historical Elements of Expense: N/A

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2010</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Historic Year (O&M only)</u>	<u>Actual 2014</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$1.63 Million):

<u>Request</u> <u>2015</u>	<u>Request</u> <u>2016</u>	<u>Request</u> <u>2017</u>	<u>Request</u> <u>2018</u>	<u>Request</u> <u>2019</u>
\$ 1,000	\$631			

^aRequest by Elements of Expense

<u>EOE</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Labor	\$300	\$190			
M&S	\$150				
A/P	\$325	\$301			
Other					
Overheads	\$225	\$140			
Total	\$1,000	\$631			

^a All contingencies were developed in accordance with the Con Edison “Estimating Cost Contingency” Guidelines.

**2013-2017 Capital
Business Unit/ Division**

Project/Program Title	Case Management System
Priority Number	
Project Manager	Paul Hammer (Application Services), Teresa Barillas (Law)
Project Engineer	
Budget Reference	
Project Number	
Status	Planning Stage
Estimated Service Date	Fourth Quarter 2015 (Completed Implementation)
Work Plan Category	
ERM Addressed	Technology in computer systems becomes unsupported

Work Description:

Units per Year: N/A

Mandatory: No

High-level schedule: Anticipated Start – Fourth Quarter 2012
Anticipated Completion – Fourth Quarter 2015

The existing Case Management System contains the following modules supporting CECONY and O&R claims and litigation processing:

Docket management subsystem - records litigation documents served on or by the company and maintain the schedule and assignment of appearances.

File Room/Library subsystem - tracks claim and litigation files maintained by the Law Department in its Central File Room

Case Tracking subsystem - tracks of claims, lawsuits and memo bills

Time allocation subsystem - records attorney, paralegal and investigator time spent on projects, claims or lawsuits.

Notes – records notes related to projects, claims or lawsuits

Process Service – accepts and tracks activity of subpoenas and information requests received by CECONY and O&R

Outside Legal System – processes payments and tracks activity of law firms and consultants retained for various legal matters.

- Summary of Financial Benefits and Costs:

The Medicare, Medicaid, and SCHIP Extension Act of 2007 (MMSEA) imposes a new duty on companies identified as “primary payers” (any entity with liability for medical payments). The Act imposes a mandatory reporting requirement to provide the government with the knowledge of all settlements, awards, judgments or other payments for personal injury cases involving a Medicare beneficiary and gives Medicare the absolute right of recovery of payments made on behalf of recipients. The Act requires us to electronically submit quarterly reports of tort liability matters, workers’ compensation and no-fault cases. As of January of this year, we are required to report all workers’ compensation and no fault cases opened on or after January 1, 2010. Beginning January, 2012, there is an added requirement to electronically submit quarterly reports of total payments for personal injury matters paid on or after October 1, 2011. Failure to comply with these reporting requirements will result in a penalty of \$1,000 per day per claim.

To accommodate the electronic exchange of information, Medicare has developed a software product requiring very specific file formatting. We are currently working with Sedgwick (our workers’ compensation third-party administrator) to self-administer mandatory reporting using the software product (viaOne) they have developed to handle compliance in workers’ compensation cases. However, because there is no integration between Case Management and Sedgwick, the process is time-consuming and inefficient. Every personal injury claim or lawsuit must be manually entered on to viaOne and individually monitored for compliance apart from Case Management. The possibility of failing to enter a case or monitor it up until the time to report is a significant concern.

The purchase of a new case management system with the capability of transmitting data to Medicare would eliminate the duplication of entering data as well as reduce the possibility of missing reportable cases.

In addition to the mandatory legal reporting requirements described above, the system is a 16-bit application that uses a development language and communications gateway that is no longer supported by the vendor. The department relies on Information Technology to provide frequent enhancements to accommodate claim processing for major incidents or litigation involving multiple parties. It also lacks basic flexibility for ad hoc reporting, browsing and attaching files, photos and other supporting documentation for claims and litigation.

- Current Status

The project is currently underway, but the project scope has been increased to account for the following expanded needs: funding needed to interface with several third party applications, additional servers for report writing, additional reports for cyber security contingencies, to include an application whose servers are expiring and the conversion of data in that system and to cover project work that was determined could not be handled in-house as previously anticipated.

- Non-financial Benefits (if applicable):

Increased efficiencies to handle existing volume with anticipated attrition

- Technical Evaluation/Analysis:

- Sensitivity Analysis (if applicable):

- Project Relationships (if applicable):

Justification:

- Alternatives: Continue to use the company's third-party administrator system to manage mandatory Medicare reporting requirements.
- Risk of No Action: Failure to report medicare-eligible claims and litigation as required under the Medicare and Medicaid SCHIP Extension Act of 2007. System failure resulting in the inability of the Law Department to manage court appearances and status dates. System failure when managing claims and litigation against the Company including processing claims resulting from major system incidents.

Estimated Completion Date: Fourth Quarter 2015

Status: Implementation Phase

Current Working Estimate (if applicable): \$951,000

Funding (\$000):

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Actual 2015
\$112,000	\$504,269	\$310,622		

Approved 2011	Forecast 2012	Forecast 2013	Forecast 2014	Forecast 2015	Forecast/Approved Total 2013-2017
\$105,000	\$605,000	\$1,500,000	\$500,000		2,710,000

- **Authorization - Approved**
- **Appropriation – Approved**

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Shared Services / Facilities & Field Services

Project/Program Title	CNG Fuel Station Upgrades
Project Manager	Fortunato Gulino
Hyperion Project Number	10079271
Organization's Project Number	1XC9719
Status of Project	In Progress
Estimated Start Date	June 2014
Estimated Completion Date	December 2017
Work Plan Category	Operationally Required

Work Description:

In order to align with current standards for the operation and fueling of natural gas vehicles (NGVs), station operating pressures at the Company's compressed natural gas (CNG) fueling stations must be increased from a 3,000 psi to 3,600 psi output. This project will increase the operating pressure and replace aging equipment at the Company's eight CNG stations (listed below). In order to accomplish this, the five CNG fueling stations listed below will receive new dispensers, storage vessels, compressor skid, piping and associated valves, control panels, electronic control units (ECUs), and card reader systems designed to operate at the higher pressure.

Queens:

College Point
Astoria

Westchester:

Eastview
Rye

Bronx:

Van Nest

The other three CNG stations will receive upgrades to their piping, dispensers, associated valves and controls, electrical and a card reader system that can operate under the newer pressure.

Manhattan:

W28th Street
E16th Street

Brooklyn:

3rd Avenue

The stations are 20 years old, and the upgrades will extend the life of the capital assets, provide increased capacity, and lower operating and maintenance costs associated with outdated equipment that is at the end of its useful life.

Project Update: In January of 2014, CECONY completed the upgrades to the Manhattan CNG stations and to achieve the standard 3600 psi output. By the end 2015, the Brooklyn station upgrade will have been completed. However, due to an environmental issue and the rescheduling of the related Fueling Station Project at Eastview, both the Rye and Eastview stations will now be completed 2016. In addition, during the engineering design phase, CECONY discovered issues in upgrading four stations (Astoria,

Eastview, College Point, and Van Nest). The original build design of these units will not allow for the output pressure to be increased without replacing the entire unit. Therefore, these stations required a plan re-evaluation which extended the timeline of the project through 2016.

Justification Summary:

Current NGV technology requires 3,600 psi to effectively achieve the manufacturer's mileage ratings. Currently, the CECONY CNG stations operate at 3,000 psi. This project will provide the Company and outside customers with additional vehicle range and increased throughput at these stations. In addition, the higher pressure and current technology will allow for continued expansion of NGVs within the CECONY fleet. The Company currently has 310 NGVs in the fleet, and has plans to continue purchasing NGVs over the next several years. The NGV purchases will help maintain the Company's Sustainability Strategy in the future by:

- Reducing petroleum consumption of the fleet, to meet compliance with the Department of Energy (DOE) Energy Policy Act (EPAct) of 1992
- Reducing the Company's Greenhouse Gas Emission
- Realizing a fuel cost savings of an estimated \$1.56 per equivalent gallon of gasoline compared to non-Con Edison CNG stations

In addition, the DOE (in accordance with the EPAct), requires the Company to utilize alternate fuel vehicles (AFVs) for 90% of the replacement vehicles purchased annually. NGVs provide 10% of CECONY's long range EPAct strategy.

Furthermore, all of the stations have been in service for over 20 years and replacement parts are becoming obsolete and difficult to obtain, and should a major failure occur at a station, it is possible the station would be out of service for a considerable amount of time until repairs could be made. This would impact the ability to refuel Company vehicles at the site as well as providing fueling capability for outside customers.

Supplemental Information:

- Alternatives: Using non-Con Edison CNG stations at a premium of \$1.56/Gasoline Gallon Equivalent (GGE) for the Company's 310 NGVs, the Company would incur additional fuel cost.
- Risk of No Action: The Company can continue to operate the facilities at 3,000 psi, which reduces the range of the NGVs in the fleet, and is below manufacturer's mileage specifications. Also, due to the age of the equipment, the parts will become obsolete and difficult to obtain and causing a potential for stations to be out of service for extended periods of time. This will impact the ability to fuel the Company's fleet vehicles, requiring the Company to redirect its NGVs to non-Con Edison CNG stations at a premium of \$1.56 per equivalent gallon. The non-Con Edison CNG stations have limited fueling locations scattered throughout the Con Edison service territory, with limited fueling times. In addition, this would severely impact the ability of outside customers to access CNG fuel, which would negatively affect gas revenues. Some external account holders are:
 - US Postal Service
 - New York City Agencies
 - City College of New York
 - Verizon
 - NYC Taxis

- United Parcel Services
- New York State Agencies
- Port Authority of NY & NJ

In addition, the Company needs to meet the DOE EPCa Regulation to use alternate fuels, such as CNG in its fleet. The use of CNG enhances our ability to meet this regulation. Failure to comply with the EPCa could result in penalties being imposed on the Company.

- Non-financial Benefits: Clean AFVs produce lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Evaporative and start-up emissions are also significantly lower. As a result, clean AFVs reduce impacts on the environment, air quality, global warming and public health. The use of clean AFVs in the fleet also reduces the Company's carbon footprint, which supports one of Con Edison's Sustainability Initiatives.

The upgrade to these stations will continue to help reduce petroleum consumption of the fleet while meeting the DOE EPCa compliance. Purchasing and operating AFVs result in lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Expanding the Company's clean AFV fleet will reduce negative impacts on the environment, air quality, global warming and public health.

By marketing the Company's CNG stations and CNG fleet vehicles, and by providing outside fleets and private owners access to CNG stations, Con Edison will continue to enhance and promote its commitment to environmental excellence within its service territory.

- Summary of Financial Benefits (if applicable) and Costs: The estimated total cost of the project is \$7.48 million.
Con Edison currently has 310 NGVs in its fleet with a mix of cars, cargo vans, and trucks and the Company's plan to purchase additional NGVs to replace gasoline and diesel powered vehicles over the next several years. By subtracting the Company's internal CNG cost per GGE (\$0.89/GGE) from the assumed estimate price per gallon of diesel fuel (\$2.80/gallon) and gasoline (\$2.50/gallon), Con Edison will save per gallon approximately \$1.61 compared to gasoline and \$1.91 compared to diesel.
- Technical Evaluation/Analysis: An engineering study was performed to evaluate the existing Con Edison CNG stations and determine what upgrades are required to improve fueling times and fill pressures.

A majority of the stations were built in the early 1990's, and were designed to fuel light duty and medium duty vehicles to a minimum onboard storage pressure of 3,000 PSIG. Current CNG vehicles store fuel onboard at a pressure of 3,600 PSIG.

Four of the stations: Astoria, College Point, Eastview, and Van Nest use identical natural gas engine driven compressor packages, and all but the Astoria station utilize storage cascades. The balance of the stations use a variety of compressor designs based upon available gas pressure, flow rates, etc.

- Project Relationships (if applicable): This project will be in conjunction with the "Fuel Station Upgrades" to minimize the outages to the fuel stations and reduce yard interruptions for the tenants.
- Basis for Estimate: The estimate is based on an engineering estimate that incorporates component pricing estimates and vendor labor cost estimates derived from the scope of work of the project.

Total Funding Level (\$000):**Historical Spend**

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor				80		78
M&S				301		292
A/P				238		230
Other				80		77
Total				\$699		\$677

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
	\$3,300	\$2,800		

Request by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	84	84			
M&S	1,310	1,000			
A/P	930	614			
Other	222	283			
Overheads	754	853			
Total	\$3,300	\$2,834			

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Storm Hardening
Project Manager	Leo Palmer
Hyperion Project Number	PR.20407885
Organization's Project Number	PR.20407885
Status of Project	Planning and Engineering
Estimated Start Date	01/2015
Estimated Completion Date	12/2016
Work Plan Category	Operations – Storm Hardening

Work Description:

In the wake of Super Storm Sandy, many Con Edison Facilities throughout its service territory were flooded creating citywide damage and significant disruption to its services leading to power outages that lasted several days to weeks in some areas. To mitigate future occurrences, Con Edison put into place a storm hardening program aimed at protecting critical infrastructure in the event of such disasters. The design benchmarks were based on flood data from a variety of authoritative sources including FEMA, SLOSH maps and Sandy actual above ground water levels.

As a first step Facilities hired a consultant to study and make recommendations for the properties involved. These studies are complete. In 2015-2016, Facilities will undertake the work resulting from these evaluations based on the consultant's recommendations. The effort has begun with the evaluation of sites most vulnerable to storm surge/flooding according to the SLOSH/FEMA maps (e.g., 16th Street, 28th Street, 110th Street, Neptune Ave, College Point, Eastview Service Centers, and the Learning Center Campus).

Based on this information, three different types of measures were identified: permanent, deployable and administrative. Permanent or passive measures involve physical modification to a building or site with the intent of making it a permanent feature of the facility such as structural strengthening of building/room enclosures to sustain high hydrostatic forces and prevent water from a storm surge from damaging critical building infrastructure necessary to keep the facilities habitable and functional (e.g. chiller, boilers, sewage pumps, emergency generators, air compressors, electrical equipment, etc.). Deployable measures involve temporarily allowing for immediate response of potential flooding situations that would require manpower to ready these measures prior to a storm in order to provide protection for the duration of the storm event and to be removed after the storm has passed. Administrative measures are emergency preparedness measures that will allow relocation and/or equipment and supplies removal to minimize damage and allow for faster deployment.

By prioritizing the building protection measures, a 3-tier mitigation recommendation was developed: The first tier is primarily aimed at keeping water out of the building or site; the second tier focusses on protecting critical locations and equipment within the building and the third tier is protecting more minor building systems or administrative measures that will speed up recovery efforts.

The initial storm hardening studies established the design criteria for the RFP's, which were prepared in 2014/2015 to generate the detailed design packages. For each of the 2015/2016 properties, Facilities has issued a request for proposal (RFP) to generate detailed design packages based on concept study design criteria specified in the RFP. The detailed design engineering for the 16th St. and 28th St. Service Centers and The Learning Center is complete and the projects are going out for bid. The plan is for construction at these properties to begin and be completed in 2015. The design packages for 110th St., College Point and Neptune Ave Service Centers sites are being prepared and should be completed in 2015 for construction in 2016.

The design for each project will incorporate various measures to prevent water from entering the building and that provide "defense-in-depth" protection for key locations and equipment within the building.

The various hardening measures consist of the following:

- Harden and seal existing interior and exterior CMU walls surrounding equipment rooms
- Replace existing doors
- Replace or remove existing windows
- Replace elevator sensors and switches with submersible cable and equipment
- Provide for emergency power to critical equipment
- Provide submersible sump pumps/leak detection
- Relocate vents/louvers
- Seal electrical penetrations
- Seal concrete slabs
- Deploy drain plugs

Justification Summary:

Several Facilities Buildings and Yards experienced unprecedented flooding during Super Storm Sandy and installing storm hardening protection measures will help restore normal operation as quickly as possible following such as event. Preliminary work (flood) maps issued by FEMA in June 2013 identified new levels for the 100-year flood. The design flood elevation for final storm hardening measures shall be three (3) feet above this level at the Con Edison facilities listed above.

As an example, the Company's Learning Center experienced very significant damage due to flooding in its basement and first floors, which house equipment such as its fire pump, fire alarm panel, roof tank fill and domestic water pumps, sewer ejector pumps, air compressors, elevators, and roll-up doors, along with classroom facilities (e.g., damage to sheet rock walls, cabinets, training equipment). All will need to be repaired or replaced in the short term in order to return this facility to full operations for Company training. The E. 16th Street Service Center also experienced significant damage to key operational equipment, such as its steam absorption chillers, hot water boiler and heaters, UPS's, security systems, A/C systems and vacuum pumps, along with damage to its first floor locker and equipment storage areas. While other Buildings and Yards of Facilities, such as the Neptune Ave, Rye, Van Nest, Davis Ave, 28th Street, Victory Blvd and Bruckner Service Centers, all experienced damage to key equipment and basic critical infrastructure, such as fencing, lighting, signage, security systems, flooring, sheet rock walls, and sanitary sewage systems, which all needed to be repaired or replaced in the short and immediate term.

Supplemental Information:

- Alternatives:
This is a Corporate Program to address storm surge from hurricanes and other severe weather events. Various permanent, deployable and administrative measures are being considered to best address the unique situation at each location. More deployable and administrative (versus permanent) measures can be taken but those will require manpower to implement at a time when

personnel are already busy preparing for the impending event. A mix of all three measures is therefore the best alternative.

- Risk of No Action:
Citywide damage and significant disruption to its services leading to power outages that may last several days to weeks. The storm hardening program is aimed at protecting critical infrastructure in the event of such disasters.
- Non-financial Benefits:
See Above.
- Summary of Financial Benefits (if applicable) and Costs:
See Above.
- Technical Evaluation/Analysis:
The storm hardening studies have established the design criteria for the RFP's, which were prepared to generate the detailed design packages. Facilities plans to harden the six most vulnerable of these sites during 2015 and 2016 at a cost of \$5 million per year, as follows:

2015 - 16th St. and 28th St. Service Centers and portions of The Learning Center

2016 - 110th St., College Point and Neptune Ave Service Centers

Note that in 2017, Facilities plans to harden Eastview Service Center, which was not heavily damaged by Super Storm Sandy but is prone to flooding from the adjacent Saw Mill River; and the remaining interior portions of The Learning Center as part of a separate effort to be funded by the Company's Common Capital Budget (i.e. Facilities Flood Mitigation Program). The most vulnerable areas of The Learning Center will be protected by hardening the facilities' perimeter and preventing storm surge from entering the building's lower level, as part of the 2015 HH program described above.
- Project Relationships (if applicable):
All sites are unique and the storm hardening studies will establish their respective conceptual design.
- Basis for Estimate:
Engineering Storm Hardening Conceptual Studies completed by Parson Brinkerhoff in 2014.

Total Funding Level (\$000):**Historical Spend**

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>\$2,969</u>

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of \$500 thousand or more and, for all other organizations, projects/programs of \$1million or more.)

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2015</u>
Labor						222
M&S						166
A/P						1,825
Other						756
Total						\$2,969

Request (\$000):

<u>Request 2016</u>	<u>Request 2017</u>	<u>Request 2018</u>	<u>Request 2019</u>	<u>Request 2020</u>
5000				

Request by Elements of Expense

<u>EOE</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Labor	374				
M&S	279				
A/P	3,074				
Other	72				
Overheads	1,201				
Total	5,000				

<input checked="" type="checkbox"/>	Capital
<input type="checkbox"/>	O&M

2016 – Electric Operations

Project/Program Title	Advanced Metering Infrastructure (AMI)
Project Number	21603023
Status of Project	2016 AMI IT Platform Work, approved by PSC
Estimated Start Date	2/2015
Estimated Completion Date	7/2022
Work Plan Category	Strategic Enhancements

Work Description:

Con Edison plans to deploy Advanced Metering Infrastructure (AMI) across its service territory from 2016 - 2022. The scope of work for this project includes the following:

1. Building the AMI IT platform and developing the system interfaces between the AMI IT platform and legacy applications
2. Installing the AMI communications network for territory-wide coverage
3. Installing approximately 3.6 million electric smart meters, retrofitting 1 million gas meters with AMI modules and replacing approximately 180,000 tin case gas meters that cannot be upgraded with a new meter and AMI module

In 2015, the AMI Implementation Team developed a number of Requests for Proposals (RFP's) for the AMI meters and communications system, Meter Data Management System (MDMS), Meter Asset Management System (MAMS), IT System Integrator services, Meter Installation Vendor (MIV), and Communications Installation Vendor (CIV). The information from these bids was utilized to refine project estimates. Con Edison selected vendors for the System Integrator consultant services, MDMS and MAMS in 4Q2015 as part of the PSC conditionally approved 2016 scope for the AMI Project. Con Edison plans to negotiate final terms with the AMI meter and communications system vendor, MIV and CIV between the 4Q2015 - 1Q2016. On November 16, 2015, Con Edison submitted an updated Business Plan to the PSC that included an updated project estimate. The total estimated cost for the AMI project is approximately \$1.3 Billion. An estimated \$1.05B of the \$1.3B capital funds is requested for the 5-year rate period from 2016 – 2020.

Project Implementation Plan in Detail:

As part of the Joint Proposal Settlement Agreement, in June 2015 a PSC Order was issued approving Con Edison to implement the MDMS and MAMS in 2016.

Beginning in 2016, the AMI IT infrastructure will be designed, configured, tested, and brought on line to support the meter deployment. Two new AMI systems will be integrated: the Meter Asset Management System (MAMS) and Meter Data Management System (MDMS). In addition, at no cost to Con Edison, the AMI vendor will support the integration of the AMI head end system to the MDMS. This initial infrastructure development requires approximately 12-15

months, and the infrastructure needs to be tested and implemented before the first meters can be installed.

Following the AMI platform system integration work starting in 2017, Con Edison plans to begin deployment of the AMI communications network and the installation of approximately 4.8 million smart meters (3.6 AMI electric smart meters, retrofitting approximately 1 million gas modules in existing gas meters, and the installation of approximately 180,000 new gas meters that are equipped with AMI modules). Below is the phased deployment plan for the communications network infrastructure and the meter installations, as well as the AMI Functionality Roadmap:

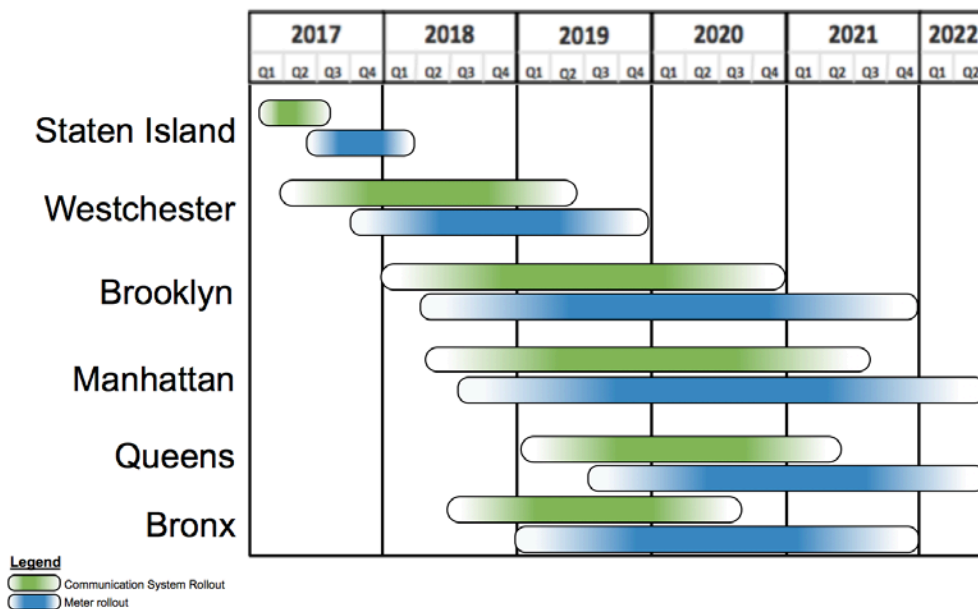


Fig 1: Deployment Plan for Communications and Meter Infrastructure

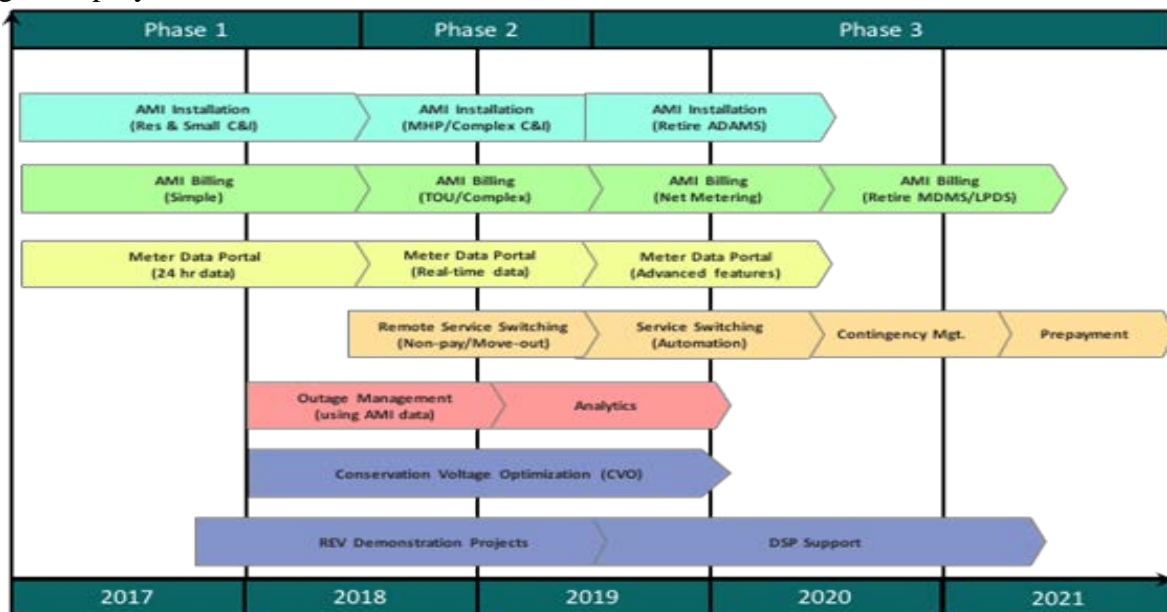


Fig 2: AMI Functionality Roadmap

Justification Summary:

The Company believes that the AMI Project will enhance the customer experience by providing information that will enable customers to better manage their energy usage, control costs and help the environment, while allowing the Company to provide improved services that better meet customer expectations in the 21st century. The AMI Project will result in operational efficiencies, including enhanced outage management, a reduction in manual meter reading costs and the number of estimated bills, and remote customer service activation. The AMI project will also support the PSC's Reforming the Energy Vision (REV) initiative to build a clean and resilient energy system for all New Yorkers. The Company is proposing a full scale AMI deployment as the Company believes that the full implementation of AMI is foundational to facilitating enhanced delivery of various customer programs and maximizing customer and Company benefits.

AMI data will enable improved conservation voltage optimization (CVO) and equipment usage analysis that will promote increases in system efficiency. AMI will also be able to provide more accurate outage and outage restoration notifications that will enable improved storm response. The enhanced monitoring and control functionality associated with AMI will reduce the duration of outages at critical facilities. In addition, with AMI across our entire service territory, enrollment in demand response programs will expand, reducing peak usage and enabling a reduction in capital spend. Please refer to Fig. 3 for estimated benefits resulting from a full scale AMI implementation.

From a customer benefit point of view, AMI presents an opportunity to provide new energy management alternatives that will enable them to reduce energy costs by using electricity more efficiently and wisely. The detailed energy consumption data provided by AMI will provide customers with insight into their usage patterns and allow them to more effectively manage their bills. Usage data will enable the development of new utility and third party products and incentive programs that will further empower customers.

The AMI communications network will enable additional functions, such as the integration of a variety of sensors to improve the Company's knowledge of its distribution networks and the identification of potential problems or issues, measure and monitor stray voltage, methane levels, carbon monoxide, pipe corrosion, air quality and fault current. This additional functionality through AMI is strategic in modernizing our infrastructure with smart technologies toward an intelligent grid. This will allow the Company to better manage the evolution of the grid to incorporate increasing numbers of distributed energy resources (Note that the AMI project funding of \$1.3 Billion includes integration of two types of sensors into the network, as well as conducting a streetlight pilot. It does not include the deployment of the two selected sensors across our service territory).

Major cost savings and cost reduction benefits due to full AMI Implementation have an impact of \$2,706 million NPV over the 20-year evaluation period. Figure 3 below depicts all benefits to our customers, the Company, and cost reductions as a result of AMI implementation.

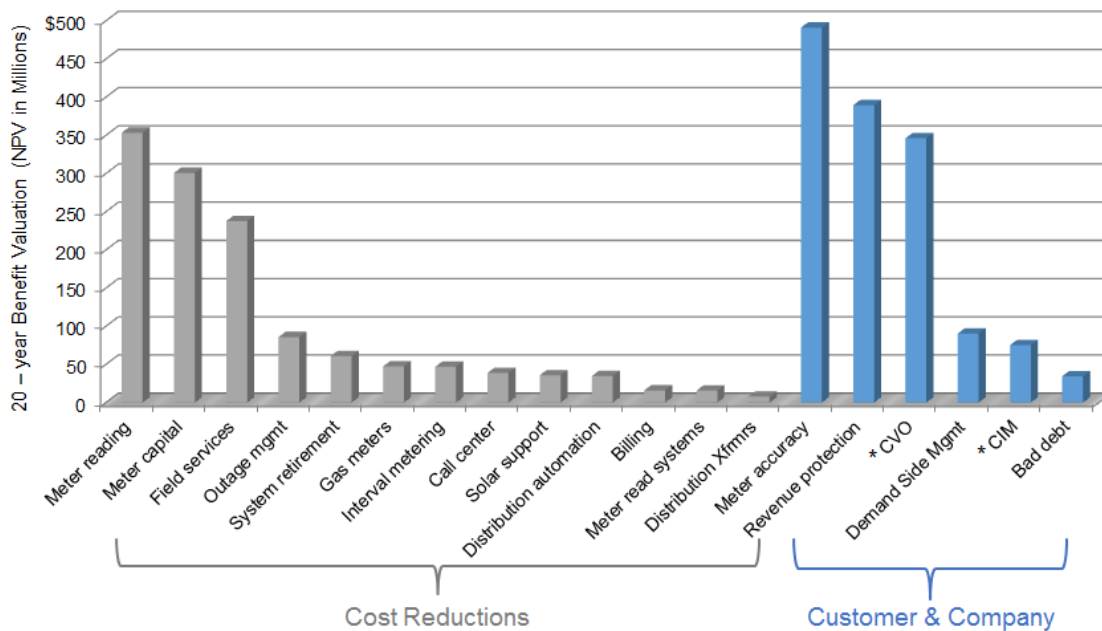


Fig 3: Benefits as a result of AMI implementation

Supplemental Information:

- Alternatives:** Con Edison has determined that a full scale AMI implementation best meets our customers' current and future needs, facilitates wide scale demand response program participation, and will be the single most effective means of enabling the energy vision and marketplace envisioned in the Commission's REV initiative. The Company evaluated multiple alternatives to a fully enabled AMI rollout and determined that there are a number of benefits that would not be realized by a partial or non AMI deployment; notably, Con Edison would be unable to meet a number of REV objectives in a cost effective manner or create a cyber-secure communication infrastructure to support the current and future functionality that will be realized by AMI.
- Risk of No Action or Delayed Action:** There would be a delay in realizing the environmental, customer and company benefits. No action in the near term could mean capital investments in other programs within the distribution network (e.g., transformer upgrades) that could have been avoided or minimized assuming AMI will be implemented in the future. In addition, the bids received from the AMI vendors today are competitive, and there would be a risk of higher costs if the Company chooses to postpone AMI implementation. A risk of no action could result in Con Edison not fully advancing the REV policy objectives. The prevalence of AMI at other utilities may also lead to a failure to meet evolving customer expectations.
- Non-financial Benefits:** Customer focused benefits include reduced estimated bills, not having to make appointments for meter reads, a number of environmental benefits (such as energy use reduction through consumer behavior changes in expanded Demand Response Programs, reduced greenhouse gases (GHG) through Conservation Voltage Optimization (CVO), and reduced vehicle emissions resulting from significantly reduced vehicle miles for meter reading, servicing turn on/offs and transfers, avoided false outage service calls and efficiencies in service restoration following storms, etc.) and improved

outage response. Societal benefits include reduction in pollutants (e.g., CO₂) as well as enablement of market enabling REV/DR. Additionally, AMI may reduce the risk of outages in the event of an emergency with the ability to remotely operate meter service switches through the AMI wireless communications network to enable remote load shedding to maintain grid stability.

- Summary of Financial Benefits (if applicable) and Costs: Over the course of the past several months, a Benefit Cost Analysis (BCA) was developed for the project that identified key costs and benefits of a full implementation of AMI throughout the Company's service territory. RFP's were issued for all major equipment, software and installation services. The overall results of the evaluation are positive and customers will realize significant service enhancements with the deployment of AMI. Furthermore, the analysis shows that the operational and financial benefits justify a full deployment of AMI: Over the 20-year evaluation period, assuming a six-year project life with a five-year meter deployment scenario, the Company would expect to invest, on a present value basis, \$1,074 million in new capital and incur \$552 million in operational costs to run the system. This results in a Net Present Value (NPV) of \$1,080 billion for the project, with a payback period of ten years (November 16th AMI Business Plan Filing).

Major cost savings and cost reduction benefits due to full AMI Implementation have an impact of \$2,706 million NPV over the 20-year evaluation period, which include but are not limited to:

- Reduced labor in field services, meter reading, billing and call center
- Reduced expenses in relation to meter reading systems, such as fleet maintenance and fuel costs, meter reading equipment and cell phone expenses
- Estimated benefits from a system perspective in relation to outage management (reduced 'truck rolls' due to more detailed and nested outage data from smart meters, better understanding of mutual aid needs, reduced site safety costs, etc.)
- System retirement benefits (avoided costs from AMR deployment, ADAMS replacement, and associated O&M costs for the existing MDMS)

For the extensive list of benefits as a result of AMI implementation, please refer to Figure 3: Benefits as a result of AMI implementation above.

- Technical Evaluation/Analysis: Con Edison has completed RFP's for the AMI meters, communications network and AMI head end system software, MAMS and MDMS software, and assessed other hardware and software required to complete the AMI project. Technology analyses and recommended vendor selections have been completed in 4Q2015 – 1Q2016 to begin the work plan in 2016.
- Project Relationships (if applicable):
 - The AMI system will support the Distributed System Platform, envisioned by REV. AMI will facilitate Distributed Generation integration and other REV initiatives.
 - The network will support various SCADA initiatives including:
 - Control of Network Protector (NWP) switches
 - The AMI network will be capable of supporting future Smart City initiatives such as street light control

- **Basis for Implementation Estimate:** The basis for the AMI Project is estimated to cost \$1.3 Billion in capital funds, which is covered in extensive detail in the Business Cost Analysis section in AMI Business Plan. This will provide all the necessary financing for all work identified to complete the comprehensive implementation of AMI IT platforms, communications equipment installation, and electric and gas meter and module installations across the Company's service territory between the years 2016 - 2022. These cost estimates are based on a number of equipment/software vendor and installation services RFP's, as well as Company SME cost estimates for required personnel support, additional software/hardware components, etc.

The cost summary of the \$1.3B capital funds needed to finance the multi-year full roll-out of AMI is provided below. \$1.05B of the total \$1.3B spend is requested during the 5-year rate case period from 2016-2020.

Component	Cost in millions
Meter and module equipment	\$399
Meter and module installation	378
Communications network equipment	40
Communications network installation	62
AMI IT platform (software, hardware, analytics)	150
AMI Project Management and IT implementation (company labor)	164
Other Project Costs (IT system integrator, Operations Center facility, etc.)	107
Total	\$1,300

**Please note that these numbers are reflective of the October 15th Business Plan and financial model*

Total Funding Level (\$000):

Historical Spend – N/A

<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2015</u>

Historical Elements of Expense – N/A

<u>EOE</u>	<u>Actual 2011</u>	<u>Actual 2012</u>	<u>Actual 2013</u>	<u>Actual 2014</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2015</u>
Labor						
M&S						
A/P						
Other						
Total						

Request (\$000):

	2016	2017	2018	2019	2020	Total
AMI Implementation Total Project Request	\$68,800	\$173,253	\$194,895	\$285,025	\$325,431	\$1,047,405

Request by Elements of Expense (\$000):

EOE	2016	2017	2018	2019	2020	5 Yr. Total
Labor	\$1,402	\$2,046	\$3,564	\$4,800	\$5,100	\$16,912
Contract Service	\$58,507	\$153,418	\$160,046	\$237,721	\$265,200	\$874,892
Other EOE's	\$5,219	\$14,513	\$26,997	\$36,911	\$49,145	\$132,785
Capital Burdens	\$3,672	\$3,276	\$4,289	\$5,593	\$5,986	\$22,816
Total	\$68,800	\$173,253	\$194,895	\$285,025	\$325,431	\$1,047,405

**Please note that these numbers are reflective of the October 15th Business Plan and financial model*

Note:

1. The AMI BCA information provided in the Summary of Financial Benefits provides the recent November 16th 2015 AMI Business Plan filed with the PSC
2. The Benefits (Fig. 3) as a result of AMI reflect the recent November 16th 2015 AMI Business Plan filed with the PSC
3. The Basis for Implementation Estimate and tables in section Total Funding Level (\$000) reflect the October 15th 2015 AMI Business Plan filed with the PSC to reflect the submitted Hyperion budget numbers provided to Cost Management due to the timing of the submission

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
2016-2020 ELECTRIC CAPITAL FORECAST

Summary T&D Capital Plan
2016-2020 Capital Forecast
(\$'s thousands)

Forecast						
	2016	2017	2018	2019	2020	5 Year Total
Electric T&D						
System and Transmission	88,090	144,549	131,248	103,364	51,700	518,951
Substations	230,927	363,891	333,049	248,228	226,654	1,402,750
Distribution	883,191	964,397	937,468	935,599	893,072	4,613,727
Sub-total Electric T&D	1,202,209	1,472,837	1,401,765	1,287,191	1,171,426	6,535,428
Electric Interference	86,500	91,078	103,005	96,998	46,185	423,766
Total Electric T&D	1,288,709	1,563,915	1,504,770	1,384,189	1,217,611	6,959,194
Electric Production	21,614	30,441	33,001	28,054	25,055	138,164
Shared Services						
Facilities	57,900	61,500	51,500	38,500	39,000	248,400
IT Initiatives	93,916	116,708	110,257	64,270	69,347	454,497
General Equipment	71,588	83,350	81,307	76,028	67,962	380,235
Other	15,700	26,435	82,828	44,233	7,750	176,946
Total Shared Services*	239,103	287,993	325,892	223,031	184,059	1,260,078
Sub-total Capital	1,549,426	1,882,349	1,863,662	1,635,274	1,426,724	8,357,436
Storm Hardening**	337,107	34,700	17,700	10,000	7,119	406,626
Total Capital Expenditures	1,886,533	1,917,049	1,881,362	1,645,274	1,433,843	8,764,062
AMI	68,800	173,253	194,896	285,025	325,431	1,047,404

Note: *83% of Shared Services is allocated to Electric

**Storm Hardening details are included on the subsequent pages for Electric T&D, Electric Production and Common

***Excludes Indian Point Contingency Projects

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System and Transmission Operations
(\$000)

Capital Expense (CWIP) by Function-Project Report Consolidated Edison Of New York Inc. S&TO - Capital		Year Total					
		Current Forecast					
		Total Dollars (\$000)					
Category Code	Project/Program Description	FY16	FY17	FY18	FY19	FY20	5 Yr. Total
	<i>Environmental</i>						
<i>Environmental</i>	Environmental Enhancements Program	600.0	600.0	600.0	600.0	600.0	3,000.0
<i>Environmental</i>	Dec Program Line	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	600.0	600.0	600.0	600.0	600.0	3,000.0
	<i>Information Technology</i>						
<i>Information Technology</i>	Operation Management System At Energy Control Center	400.0	450.0	450.0	300.0	400.0	2,000.0
<i>Information Technology</i>	District Operator Task Managing	300.0	300.0	300.0	300.0	400.0	1,600.0
<i>Information Technology</i>	Computerized Notification System	0.0	0.0	0.0	0.0	0.0	0.0
<i>Information Technology</i>	Control Center Phone Replacement	0.0	0.0	0.0	0.0	0.0	0.0
<i>Information Technology</i>	Outage Scheduling System Re-Write	0.0	0.0	0.0	0.0	0.0	0.0
<i>Information Technology</i>	Compliance Management System	0.0	0.0	0.0	0.0	0.0	0.0
<i>Information Technology</i>	Plant Information System	0.0	0.0	0.0	250.0	0.0	250.0
<i>Information Technology</i>	Charged to completed projects	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	700.0	750.0	750.0	850.0	800.0	3,850.0
	<i>Replacement</i>						
<i>Replacement</i>	Transmission Feeder Failures	10,000.0	10,000.0	10,000.0	10,000.0	10,000.0	50,000.0
<i>Replacement</i>	Transmission Failures - Other	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	5,000.0
<i>Replacement</i>	ECC UPS Replacement	-	-	350.0	400.0	-	750.0
<i>Replacement</i>	EMS Replacement ECC and AECC	-	-	-	4,500.0	3,500.0	8,000.0
	Sub-Total	11,000.0	11,000.0	11,350.0	15,900.0	14,500.0	63,750.0
	<i>Replacement</i>						
<i>Replacement</i>	QBB Transmission Feeder Joint Replacement	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	0.0	0.0	0.0	0.0	0.0	0.0
	<i>System Expansion</i>						
<i>System Expansion</i>	Rainey to Corona 138kV Feeder	14,000.0	65,309.0	67,865.0	49,514.0	0.0	196,688.0
<i>System Expansion</i>	Replace Limiting Sections Feeder 38Q04	0.0	7,015.0	0.0	0.0	0.0	7,015.0
<i>System Expansion</i>	Vernon to Glendale - Repl Limiting Section(s) Cable for Feeder 38Q03	0.0	6,631.0	0.0	0.0	0.0	6,631.0
<i>System Expansion</i>	Reinforcement - M29	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	38M72 PAR & Vernon East Ring	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Install Dynamic Feeder Rating Systems	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Astoria - Feeder 34091	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Farragut - Plymouth St - Uprate Feeders 32071	3,600.0	0.0	0.0	0.0	0.0	3,600.0
<i>System Expansion</i>	Charges To Completed Projects	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	17,600.0	78,955.0	67,865.0	49,514.0	0.0	213,934.0
	<i>Risk Reduction</i>						
<i>Risk Reduction</i>	Pipe Enhancement Program	34,000.0	34,019.0	34,033.0	20,000.0	20,000.0	142,052.0
<i>Risk Reduction</i>	Transmission Fdr. Pipe Support at Queensboro Bridge	7,500.0	2,250.0	0.0	0.0	0.0	9,750.0
<i>Risk Reduction</i>	Joint Replacement Prgram	5,700.0	5,700.0	5,700.0	5,700.0	5,700.0	28,500.0
<i>Risk Reduction</i>	LP Reservoir Replacements	2,500.0	2,500.0	2,500.0	2,500.0	2,500.0	12,500.0
<i>Risk Reduction</i>	Emergent Transmission Reliability Program	2,000.0	2,000.0	2,000.0	2,000.0	1,000.0	9,000.0
<i>Risk Reduction</i>	Dynamic Feeder Rating System Program	1,500.0	750.0	750.0	1,500.0	1,500.0	6,000.0
<i>Risk Reduction</i>	RTU Replacement ECC and AECC	500.0	0.0	0.0	0.0	0.0	500.0
<i>Risk Reduction</i>	ECC Replacement of EMS Video Wall	840.0	1,025.0	0.0	0.0	0.0	1,865.0
<i>Risk Reduction</i>	ECC UPS Battery Replacement Room 1	250.0	0.0	0.0	0.0	0.0	250.0
<i>Risk Reduction</i>	Operations Network for EMS	600.0	200.0	200.0	300.0	300.0	1,600.0
<i>Risk Reduction</i>	EMS Reliability AECC and ECC	300.0	700.0	300.0	300.0	300.0	1,900.0
<i>Risk Reduction</i>	System Operation Enhancements	500.0	300.0	350.0	300.0	300.0	1,750.0
<i>Risk Reduction</i>	Distribution Orders Enhancements	300.0	300.0	300.0	400.0	300.0	1,600.0
<i>Risk Reduction</i>	Overhead Transmission Structures Program	0.0	2,000.0	2,000.0	2,000.0	2,000.0	8,000.0
<i>Risk Reduction</i>	Hudson River Crossing Towers	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Promenade - Feeders 46/48	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Lindsey Restoration Structures	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Charges To Completed Projects	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	AECC Replacement of EMS Video Wall	0.0	0.0	850.0	0.0	0.0	850.0
	Sub-Total	56,490.0	51,744.0	48,983.0	35,000.0	33,900.0	226,117.0
	<i>Storm Hardening</i>						
<i>Storm Hardening</i>	Overhead Transmission Structures Program	2,000.0	0.0	0.0	0.0	0.0	2,000.0
<i>Storm Hardening</i>	Feeder 99941 & 999942 (E-Line) Upgrade	0.0	0.0	0.0	0.0	0.0	0.0
<i>Storm Hardening</i>	L-Line Splice & Dead End Assembly - Fdr 398	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	2,000.0	0.0	0.0	0.0	0.0	2,000.0
	<i>Facilities</i>						

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System and Transmission Operations
(\$000)

Capital Expense (CWIP) by Function-Project Report Consolidated Edison Of New York Inc. S&TO - Capital		Year Total					
		Current Forecast					
		Total Dollars (\$000)					
Category Code	Project/Program Description	FY16	FY17	FY18	FY19	FY20	5 Yr. Total
<i>Facilities</i>	Super Value Demo	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	0.0	0.0	0.0	0.0	0.0	0.0
	<i>Municipal Infrastructure Support</i>						
<i>Municipal Infrastructure Support</i>	Interference STO	1,000.0	13,577.0	25,837.0	26,604.0	0.0	67,018.0
	Sub-Total	1,000.0	13,577.0	25,837.0	26,604.0	0.0	67,018.0
	<i>Safety and Security</i>						
<i>Safety and Security</i>	Overhead Tower Rapid Rail Program	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	5,000.0
<i>Safety and Security</i>	Cyber Security	500.0	500.0	500.0	500.0	500.0	2,500.0
<i>Safety and Security</i>	Computer Room Renovation	0.0	0.0	0.0	0.0	0.0	0.0
<i>Safety and Security</i>	ECC and AECC Facility Security Enhancements	200.0	0.0	200.0	0.0	400.0	800.0
	Sub-Total	1,700.0	1,500.0	1,700.0	1,500.0	1,900.0	8,300.0
	Total	\$ 91,090.0	\$ 158,126.0	\$ 157,085.0	\$ 129,968.0	\$ 51,700.0	\$ 587,969.0

Capital Expense (CWIP) by Function-Project Report Company. Substation Operations (EN.ORG-00773)		Year Total					
		Current Forecast					
		megan\$2006					
Category Code	Function	FY16	FY17	FY18	FY19	FY20	5 Yr. Total
Environmental	Substation EH&S Risk Mitigation Program	3,559.0	15,775.0	16,375.0	19,625.0	17,775.2	73,109.2
Environmental	Charges To Completed Projects						
		3,559.0	15,775.0	16,375.0	19,625.0	17,775.2	73,109.2
Information Technology	Substation Technology Improvements Program	1,086.9	1,081.0	1,077.0	1,077.0	1,077.0	5,398.9
Information Technology	Non-Routeable Communications Phasor Measurement Unit						-
Information Technology	Charges To Completed Projects						-
	Information Technology	1,086.9	1,081.0	1,077.0	1,077.0	1,077.0	5,398.9
Risk Reduction	138Kv Disturbance Monitoring Program	5,503.0	10,500.1	10,500.0	9,000.0	9,000.0	44,503.0
Risk Reduction	Buchanan Y94 Upgrade to Solid Dielectric	9,899.9	-	-	-	-	9,899.9
Risk Reduction	Category Alarm Program Various	2,680.1	3,000.1	3,000.1	3,000.1	3,000.3	14,680.6
Risk Reduction	DC System Upgrade Program	2,994.0	5,677.9	4,636.9	5,900.0	5,900.0	25,108.9
Risk Reduction	Disconnect Switch Capital Upgrade Program	3,500.0	3,499.0	2,999.8	3,500.0	3,500.0	16,998.8
Risk Reduction	Farragut Feeder 32077 Breaker and V Disconnect Switch Addition		-	500.0	3,280.0		3,780.0
Risk Reduction	345kV Disturbance Monitoring Program						-
Risk Reduction	Analog To Digital Upgrade						-
Risk Reduction	Control Cable Upgrade Program						-
Risk Reduction	Charges To Completed Projects						-
Risk Reduction	Capacitor Bank Tripping						-
Risk Reduction	Capacitor Cable Upgrade Program						-
Risk Reduction	East 179th Street: Bus Section Upgrade						-
Risk Reduction	E 13th St.: Alarm Panel Replacements & Controls Sys.						-
Risk Reduction	GIC Monitoring						-
Risk Reduction	Murray Hill Capacitor Bank Units						-
Risk Reduction	Purs Supervisory Control & Data Acquisition						-
Risk Reduction	SOCCS - RTU Replacement						-
Risk Reduction	Willowbrook - Install New Breakers in Syn Bus Dummy Positions						-
Risk Reduction	Gateway Park Substation		-	1,425.0	12,825.0		14,250.0
Risk Reduction	GE Area Substation HMI Upgrade	1,000.0	1,999.9	2,000.0	2,000.0	2,000.0	8,999.9
Risk Reduction	Jamaica Install Additional Breakers in Bus Section 2E and 3W	5,000.0	5,000.0	-	-		10,000.0
Risk Reduction	Jamaica: install Switchgear Fall Protection						-
Risk Reduction	Circuit Switcher Replacement Program	1,500.0	1,500.0	-	-		3,000.0
Risk Reduction	Other Capital Equipment Upgrades	3,673.1	3,200.0	4,000.0	4,000.0	4,000.0	18,873.0
Risk Reduction	Pumping Plant	6,650.0	5,700.4	5,699.5	5,700.1	5,700.0	29,450.0
Risk Reduction	Ramapo Install New Surge Arrestors	764.0	1,999.9	2,000.0	-		4,763.9
Risk Reduction	Reinforced Ground Grid Program	1,605.1	1,625.0	1,638.9	1,639.0	1,639.0	8,147.0
Risk Reduction	Relay House Enclosure Program	500.0	2,000.0	1,030.0	1,029.9	1,030.0	5,589.9
Risk Reduction	Relay Protection Communication Upgrades	1,000.0	5,500.0	5,500.1	5,500.1	5,500.0	23,000.1
Risk Reduction	Retrofit Overduty 13kV and 27kV Circuit Breaker Programs	10,500.1	10,500.0	10,500.0	10,500.0	10,500.0	52,500.2
Risk Reduction	Ss Reliability Auto Grd Ckt Swtchrs	10,000.0	9,951.8	9,508.1	10,776.0	10,776.1	51,012.0
Risk Reduction	Stabilization of Pothead Stand Supports/Settlement	1,010.0	2,000.0	2,862.0	2,861.9	2,862.0	11,595.9
Risk Reduction	Structural and Infrastructure Upgrades	6,852.0	9,000.9	9,000.6	10,587.9	10,887.8	46,329.3
Risk Reduction	Switchgear Enclosure Upgrade Program	500.0	500.1	499.9	500.0	500.0	2,500.0
Risk Reduction	Texas RTU Replacements	1,000.1	1,000.8	749.9	999.8	999.7	4,750.3
Risk Reduction	Transmission Station Metering & SCADA Upgrades	699.9	3,000.0	3,000.0	3,000.0	3,000.0	12,699.9
Risk Reduction	Condition Based Monitoring	274.9	278.9	281.0	281.0	280.9	1,396.7
Risk Reduction	Fire Suppression System Upgrades	6,000.1	9,000.0	8,000.1	7,000.0	7,000.0	37,000.1
Risk Reduction	High Voltage Test Set Program	4,585.1	3,643.6	4,182.1	3,682.1	3,682.2	19,775.0
Risk Reduction	Relay Modifications Program	9,750.0	9,750.0	9,750.0	9,750.0	10,000.0	49,000.0
Risk Reduction	Roof Replacement Program	3,026.0	3,065.0	2,590.0	3,090.0	3,090.0	14,861.0
Risk Reduction	138kV Feeders 34051 & 34052 Reactors Foundation		7,119.9	3,038.3	-		10,158.2
Risk Reduction	Buchanan - Addition of New Breakers for Nuclear Switchyard		5,999.9	6,000.0	-		11,999.9
Risk Reduction	East River Automation - Upgrade The 69kV Yard	4,000.1	4,000.0	4,000.0	-		12,000.1
Risk Reduction	High Voltage Circuit Breaker Capital Upgrade Program	8,715.1	9,500.0	9,500.0	9,500.0	9,500.0	46,715.1
Risk Reduction	SSO Loss Contingency Area Stat Rapid Recovery/Transm Resiliency Tsfs	6,800.0	29,085.5	37,498.6	-		73,384.1
Risk Reduction	Relay Protection System Redundancy - Single Point of Contact						-
Risk Reduction	Substation Transformer Replacement Program	25,000.0	36,000.1	24,354.1	24,354.0	24,354.1	134,062.3
Risk Reduction	Various G&T Devices						-
Risk Reduction	U Type Bushing Replacement Program	3,000.0	3,000.0	3,000.0	3,000.0	2,999.9	14,999.9
	Total - Risk Reduction	147,982.2	207,598.9	193,244.8	157,257.0	141,702.0	847,784.9
System Expansion	Cricket Valley Contractor Oversight	250.0	1,200.0	1,000.0	-		2,450.0
System Expansion	Avenue A: Replace Overloaded Syn Bus Sections						-
System Expansion	Avenue A: Install Water Spray on Transformers						-
System Expansion	Charges To Completed Projects						-
System Expansion	Elmsford: Install New Substation						-
System Expansion	Fresh Kills: Replace Limiting Feeders Assoc. W/ TR 21W						-
System Expansion	Fresh Kills: Install Additional Cooling for TR 22E						-
System Expansion	Fox Hills - Transformer Cooling - TR2 & TR3						-
System Expansion	Greenwood: Replaced Overloaded Equipment						-
System Expansion	Jamaica - Install Add'l Cooling on TR3						-
System Expansion	Leonard Street - Uprate Bus Sections						-
System Expansion	Emergent Load Relief Program	1,100.0	1,100.0	1,100.0	1,100.1	1,100.0	5,500.0

Capital Expense (CWIP) by Function-Project Report Company. Substation Operations (EN.ORG-00773)			Year Total					
			Current Forecast					
			megan\$2006					
Category Code	Function		FY16	FY17	FY18	FY19	FY20	5 Yr. Total
System Expansion		Millwood Substation - Install New Dual speed Fans & Control Cabinet for Tr. 1						-
System Expansion		Newtown: Establish New Substation						-
System Expansion		Parkchester #1 - Install Transformer Cooling on TR1-TR4 (Co-Op City)						-
System Expansion		Transformer Cooling						-
System Expansion		Uprate Syn Bus Sections At West 65th Street					300.0	300.0
System Expansion		VFT Interconnection						-
System Expansion		Water Street: Fourth Transformer						-
System Expansion		Woodrow : Install Fifth Transformer And 138kv Feeder						-
System Expansion		York: Establish New Area Station						-
System Expansion		West 19th Street: Replace Overloaded Syn Bus Sections						-
System Expansion		East 179 St. Transformer #4 - Fans for Bus, Bkr & Reactor	750.0					750.0
System Expansion		Inst.bkn 3n & Switch Feeder Connections At Greenwood Substation.		9,197.0	4,563.0	-		13,760.0
System Expansion		Bronxville: Relieve Overload						-
System Expansion		Install Water Spray For 43Mva Transformers At E179Th St Substation	500.0	475.0	-	-		975.0
System Expansion		Parkchester 2 Replace Limiting 13KV Bus Sections No. 2	3,299.0	1,616.1	-	-		4,915.1
System Expansion		Plymouth Street Install Transformer Cooling on all Transformers	2,499.6	2,375.4	-	-		4,875.0
System Expansion		Queensbridge: Replace Overduted Disconnect Switches (3ES0800)	1,000.1	950.0	-	-		1,950.0
System Expansion		E. 179th Street Switchgear and Bus Replacement	10,000.1	3,800.0	3,400.0	9,700.0	12,200.0	39,100.1
System Expansion		New 138kV Fdr Vernon-Glendale & Newtown & Inst 5th Tsf @ Glendale	2,000.1	65,178	59,789	6,969		133,936.1
System Expansion		Astoria: Feeder Cable Bypass						-
System Expansion		Replace Limiting Bus at Plymouth Street	4,400.1	1,045.0	-	-		5,445.1
		Total - System Expansion	25,799.0	86,936.4	69,852.0	17,769.1	13,600.0	213,956.5
Replacement		Failed Substation Transformer Program	30,000.0	30,000.0	30,000.0	30,000.0	30,000.1	150,000.1
Replacement		Failed Substation Equipment Other than Transformers	6,500.0	6,500.0	6,500.0	6,500.0	6,500.0	32,500.0
Replacement		Charges To Completed Projects						
		Total - Replacement	36,500.1	36,500.0	36,500.0	36,500.0	36,500.1	182,500.2
Safety and Security		Critical Infrastructure Protection (NERC) Security Upgrades	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	5,000.0
Safety and Security		Substations Security Enhancements Program	15,000.0	15,000.0	15,000.0	15,000.0	15,000.0	75,000.0
		Total Failures	16,000.0	16,000.0	16,000.0	16,000.0	16,000.0	80,000.0
Storm Hardening		Substations Storm Hardening	151,450.9	34,700	17,700	10,000	7,119	220,969.9
		Total Storm Hardening	151,450.9	34,700.0	17,700.0	10,000.0	7,119	220,969.9
		Total	382,378.1	398,591.3	350,748.8	258,228.0	233,773.3	1,623,719.5

Capital Expense (CWIP) by Function-Project Report Consolidated Edison Of New York Inc. Electric Operations - Capital		Year Total					
		Current Forecast					
		Total Dollars (\$000)					
Category Code		FY16	FY17	FY18	FY19	FY20	5 Yr. Total
<i>New Business</i>	<i>New Business</i>						
<i>New Business</i>	New Business Capital	153,000.0	144,734.0	142,479.0	144,694.0	149,458.0	734,365.0
<i>New Business</i>	Meter Installations	22,500.0	24,031.0	24,090.0	24,163.0	24,306.0	119,090.0
	Sub-Total	175,500.0	168,765.0	166,569.0	168,857.0	173,764.0	853,455.0
	<i>Replacement</i>						
<i>Replacement</i>	Primary Cable Replacement (OA's, FOT's, C&D Fault)	70,260.0	81,799.0	79,969.0	81,607.0	83,561.0	397,196.0
<i>Replacement</i>	Overhead Emergency Response	34,843.0	46,332.0	45,152.0	46,245.0	47,019.0	219,591.0
<i>Replacement</i>	Service Replacements	51,930.0	58,000.0	56,000.0	56,001.0	40,919.0	262,850.0
<i>Replacement</i>	Street Lights (including conduit)	22,073.0	19,106.0	18,781.0	19,947.0	20,235.0	100,142.0
<i>Replacement</i>	Transformer Installation	32,013.0	25,083.0	26,455.0	25,557.0	24,696.0	133,804.0
<i>Replacement</i>	Secondary Open Mains	147,406.0	154,085.0	156,478.0	155,634.0	168,786.0	782,389.0
<i>Replacement</i>	Targeted Primary DBC Replacement	2,921.0	4,750.0	4,669.0	4,731.0	4,877.0	21,948.0
	Sub-Total	361,446.0	389,155.0	387,504.0	389,722.0	390,093.0	1,917,920.0
	<i>System Expansion</i>						
<i>System Expansion</i>	Woodrow Load Area Autoloop	0.0	14,524.0	0.0	0.0	0.0	14,524.0
<i>System Expansion</i>	Part of Pennsylvania (74 MW) to create Waterside network	1,000.0	0.0	0.0	0.0	0.0	1,000.0
<i>System Expansion</i>	New Pennsylvania Feeders for Hudson Yards	6,000.0	8,265.0	3,585.0	1,836.0	0.0	19,686.0
<i>System Expansion</i>	Part of Richmond Hill/Brownsville (12MW)	3,000.0	0.0	0.0	0.0	0.0	3,000.0
<i>System Expansion</i>	Sheridan Network (12MW) to Canal Network	1,700.0	1,533.0	0.0	0.0	0.0	3,233.0
<i>System Expansion</i>	Cooper Square (20MW) to City Hall (Phase 1)	3,000.0	2,003.0	0.0	0.0	0.0	5,003.0
<i>System Expansion</i>	Primary Cable Crossing (XW City Island, Riverdale Croton River, and BQ Flushing)	7,733.0	7,631.0	8,587.0	1,008.0	1,014.0	25,973.0
<i>System Expansion</i>	Buchanan New Feeder (alternate to Mohansic)	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Granite Hill to Rockview	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Parkchester #1 to Parkchester #2 Trsfr 13mw	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Elmsford Refurbishment 2008	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Fordham (6MW) Combine with Riverdale Network	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Newtown	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Astor (Herald Sq. Transfer)	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	59th Street Bridge Crossing	7,600.0	0.0	0.0	0.0	0.0	7,600.0
<i>System Expansion</i>	City Hall to Cortland 25 MW	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Yorkville Crossings and Feeder Relief	2,000.0	2,803.0	1,980.0	7,513.0	7,724.0	22,020.0
<i>System Expansion</i>	60 MW Transfer Ridgewood to Maspeth	16,500.0	30,225.0	32,088.0	19,242.0	0.0	98,055.0
<i>System Expansion</i>	Advance Relief (Parchester (13MW) Transfer	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Primary Feeder Relief	4,926.0	8,908.0	9,272.0	15,101.0	15,844.0	54,051.0
<i>System Expansion</i>	Network Transformers Relief	9,271.0	14,546.0	15,846.0	14,972.0	17,382.0	72,017.0
<i>System Expansion</i>	Non-Network Fdr Relief (Open Wire)	5,590.0	6,955.0	6,874.0	6,970.0	7,283.0	33,672.0
<i>System Expansion</i>	4kV Feeder & Wire Relief	0.0	0.0	0.0	0.0	0.0	0.0
<i>System Expansion</i>	Overhead Transformer Relief	2,077.0	2,394.0	2,097.0	2,062.0	2,299.0	10,929.0
<i>System Expansion</i>	Secondary Mains Load Relief	3,201.0	3,623.0	3,859.0	2,796.0	2,529.0	16,008.0
<i>System Expansion</i>	Other Advance Relief	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	73,598.0	103,410.0	84,188.0	71,500.0	54,075.0	386,771.0
	<i>Risk Reduction</i>						
<i>Risk Reduction</i>	E179th St. Substation Reconstruction Distribution Feeder Transfers	500.0	480.0	469.0	477.0	488.0	2,414.0
<i>Risk Reduction</i>	Osmose	1,685.0	1,936.0	2,359.0	2,355.0	2,333.0	10,668.0
<i>Risk Reduction</i>	Anderson Switches	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Autoloop Reliability (27kV Inc'l.)	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Aerial Cable Replacement	490.0	0.0	0.0	0.0	0.0	490.0
<i>Risk Reduction</i>	#4,#6 Self Supporting Wire	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	ESCO Switch Replacement	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	4 kV Feeder Sectionalizing/ Add'l Kyle	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Additional 13 kV Feeder Sectionalizing	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Automated Emergency Ties	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Overhead Feeder Reliability/VRS Replacement	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Rear-Lot Pole Elimination	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Overhead Conductor Clearance	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Overhead Feeder Sectionalizing Program	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	HiPot	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Street Lights Service Reliability Program	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Vented Manhole Covers	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Vented Service Box Covers (Includes Manholes)	8,250.0	7,625.0	7,376.0	7,613.0	0.0	30,864.0
<i>Risk Reduction</i>	4 kV Substations - Reliability	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	4 kV UG Reliability	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Underground Secondary Reliability	25,880.0	46,212.0	63,055.0	68,095.0	68,084.0	271,326.0
<i>Risk Reduction</i>	Non-Network Reliability	0.0	1,953.0	1,958.0	1,964.0	1,976.0	7,851.0
<i>Risk Reduction</i>	Transformer Vault and Structures Modernization	15,156.0	16,314.0	16,336.0	15,205.0	15,350.0	78,361.0
<i>Risk Reduction</i>	Remote Monitoring System 3rd Generation	4,446.0	4,708.0	4,005.0	4,044.0	3,222.0	20,425.0
<i>Risk Reduction</i>	Pressure, Temperature and Oil Sensors	5,512.0	5,550.0	6,405.0	6,433.0	0.0	23,900.0
<i>Risk Reduction</i>	Grounding transformers	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Shunt reactors	2,500.0	1,272.0	1,286.0	1,269.0	1,290.0	7,617.0
<i>Risk Reduction</i>	Coastal Storm Risk Mitigation	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Network Reliability	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	URD Cable Rejuvenation/Fault Indicator	300.0	0.0	0.0	0.0	0.0	300.0
<i>Risk Reduction</i>	ATS Installation USS Reliability XW	669.0	0.0	0.0	0.0	0.0	669.0
<i>Risk Reduction</i>	Other Reliability	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Primary Feeder Reliability	5,765.0	12,999.0	13,049.0	13,226.0	13,261.0	58,300.0
<i>Risk Reduction</i>	Customer Project Management System - Phase 2 Customer Enhancement Implementation	5,000.0	5,000.0	5,000.0	0.0	0.0	15,000.0
<i>Risk Reduction</i>	USS Automation	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	4kV USS Switchgear House Replacement	2,131.8	4,676.0	4,469.0	4,832.0	5,073.3	21,182.1
<i>Risk Reduction</i>	USS Transformer Temperature Guages	99.9	101.0	101.0	101.0	101.4	504.3
<i>Risk Reduction</i>	Unit Substation Transformer Replacement Program	868.6	3,919.0	4,043.0	3,816.0	3,897.7	16,544.3
<i>Risk Reduction</i>	USS Tap Changer Position Indicator System	74.8	45.0	43.0	44.0	38.4	245.2
<i>Risk Reduction</i>	Life Extension	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Unit Substation Load Relief	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	Auto Reclose on Bank Breakers	0.0	0.0	0.0	0.0	0.0	0.0
<i>Risk Reduction</i>	USS Site Improvement for SPCC Plans	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	79,328.1	112,790.0	129,954.0	129,474.0	115,114.8	566,660.9
<i>Storm Hardening</i>	Storm Hardening	146,260.0	0.0	0.0	0.0	0.0	146,260.0
<i>Equipment Purchases</i>	Meter Purchase	11,500.0	0.0	0.0	0.0	0.0	11,500.0

Equipment Purchases	Transformer Purchase	125,000.0	125,194.0	128,565.0	132,014.0	116,645.0	627,418.0
Informaton Technology	Information Technology						
Informaton Technology	Energy Services Case Management	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Power Quality (PQ) System Upgrade	1,093.5	0.0	0.0	0.0	0.0	1,093.5
Informaton Technology	High Tension Monitoring Data Acquisition System (HTMDAS)	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	RMS Data Acquisition System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	ATS Automation	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Automated Crew Callout System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Integrated System Model - Process Management	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	DECC Alarm Manager and Analytics System	499.9	501.0	0.0	0.0	0.0	1,000.9
Informaton Technology	Decision Aids - Decision Optimizer - Contingency Analysis Program (CAP)	239.6	250.0	250.0	252.0	0.0	991.6
Informaton Technology	Grid Optimization - Controller - Dynamic Scheduler	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Enhanced Customer Communication Storm Outage Mgmt System Phase II	1,499.8	0.0	0.0	0.0	0.0	1,499.8
Informaton Technology	Distribution Operations Training Simulator	249.9	1,251.0	0.0	0.0	0.0	1,500.9
Informaton Technology	Mapping System Upgrades (IDMS - B/Q Only)	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	SCADA Systems Consolidation	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Electric Distribution Control Center Upgrades - SI & BW	5,999.9	3,500.0	6,500.0	1,000.0	999.9	17,999.8
Informaton Technology	Area Profile System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Customer Energy Management Tool (CEMT)	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Energy Efficiency Information System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Electric System Damage Assessment (ESDA)	200.1	249.0	250.0	252.0	0.0	951.1
Informaton Technology	Electronic Feeder Sign On	504.4	481.0	402.0	352.0	0.0	1,739.4
Informaton Technology	Secondary Visualization Model II	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Engineering Dashboard	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Demand Resonse Management System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Work Management Project Tracking	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Heads Up Display (HUD) Application	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Joint Use Pole Software	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	SCN Replacement Project	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	PQView System Upgrade	640.6	0.0	0.0	0.0	0.0	640.6
Informaton Technology	System Enhancements to Support Conservation Voltage Optimization	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Tough Tablet Pilot	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Columbia Algorithm	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	PVL, NRI and NNRI	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	New NTX Intellegent Data Concentrators for U/S/S	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Data Servers and Field Laptops for Storm Data Collection	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Install USA Monitoring Equipment ATF Automation	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Develop Integrated System Management Various	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Customer Project Management System (CPMS) - Upgrade the CPMS software to Pega version 7.1.	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	CPMS2 Implementation	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	CPMS Stabilization	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Outage Management Dashboard BI - Upgrade	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Servers and Sec. Syst. Anal. Mobile	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	External Outage Map	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Electronic Site Safety Device And Monitoring Application	300.0	0.0	0.0	0.0	0.0	300.0
Informaton Technology	Stray & Contact Voltage Evaluation	250.1	0.0	0.0	0.0	0.0	250.1
Informaton Technology	Mobile infr. And rocket upgrade	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Customer Relationship Management	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Customer Appointment Management System	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	WMS Sustainability Project	0.0	0.0	0.0	0.0	0.0	0.0
Informaton Technology	Emerging IT Project Initiative for Enhanced Distribution System Analysis	3,550.5	12,213.0	8,712.0	13,212.0	13,412.0	51,099.5
	sub-total	15,028.3	18,445.0	16,114.0	15,068.0	14,412.0	79,067.3
Environmental	Oil Minders	638.0	667.0	695.0	715.0	718.0	3,433.0
	Total Distribution	\$ 988,298.4	\$ 918,426.0	\$ 913,589.0	\$ 907,350.0	\$ 864,821.8	\$ 4,592,485.2
Municipal Infrastructure Support	Municipal Infrastructure Support	85,500.0	77,501.0	77,168.0	70,394.0	46,185.0	356,748.0
	Total	\$ 1,073,798.4	\$ 995,927.0	\$ 990,757.0	\$ 977,744.0	\$ 911,006.8	\$ 4,949,233.2
REV	BQDM (Non Traditional Solutions)	28,000.0	12,999.0	0.0	0.0	0.0	40,999.0
REV	REV	13,153.0	32,972.0	23,879.0	28,249.0	28,250.0	126,503.0

Capital Expense (CWIP) by Function-Project Report Consolidated Edison Of New York Inc. Electric Production - Capital		Year Total Current Forecast					
		Total Dollars (\$000)					
		FY16	FY17	FY18	FY19	FY20	5 Yr. Total
Category Code	Project/Program Description						
	Environmental						
<i>Environmental</i>	Traveling Screen Nos. 4 and 5 Overhaul	4,000.0	0.0	0.0	0.0	0.0	4,000.0
<i>Environmental</i>	Replace Tank Farm Moat Drains - ER 70	0.0	0.0	639.0	0.0	0.0	639.0
	Sub-Total	4,000.0	0.0	639.0	0.0	0.0	4,639.0
	Replacement						
<i>Replacement</i>	Upgrade L&P 3 Bus, Bkr 13 and 19 and TIE Transformer TR1 - 6 ER70	0.0	0.0	500.0	1,677.0	0.0	2,177.0
<i>Replacement</i>	Upgrade L&p Bus 1, Bkr 29 And Tie Transfr2 69kv13.8kv	0.0	0.0	440.0	1,920.0	0.0	2,360.0
<i>Replacement</i>	70 Fdw Fan Switchgear And Transformer Replacement	0.0	2,973.0	0.0	0.0	0.0	2,973.0
<i>Replacement</i>	70 Idw Fan Switchgear And Transformer Replacement	0.0	2,943.0	0.0	0.0	0.0	2,943.0
<i>Replacement</i>	Replace Contl Room Hvac	600.0	0.0	0.0	0.0	0.0	600.0
<i>Replacement</i>	60 Me-Sub Switchgear Replacement	0.0	500.0	2,490.0	0.0	0.0	2,990.0
<i>Replacement</i>	Replace 6CP Unit Substation - ER 60	0.0	0.0	750.0	0.0	0.0	750.0
<i>Replacement</i>	70 Ide Fan Switchgear And Transformer Replacement	0.0	2,933.0	0.0	0.0	0.0	2,933.0
<i>Replacement</i>	60 Fdw Unit Substation Replacement- ER60	0.0	0.0	0.0	500.0	3,000.0	3,500.0
<i>Replacement</i>	70 Fde Fan Switchgear And Transformer Replacement	0.0	2,983.0	0.0	0.0	0.0	2,983.0
<i>Replacement</i>	60 FDE Unit Substation Refurbishment- ER60	0.0	0.0	0.0	500.0	3,000.0	3,500.0
<i>Replacement</i>	Relay Cabinet & UPS Room Ventilation - ER 10/20	0.0	459.0	0.0	0.0	0.0	459.0
<i>Replacement</i>	Replace Station Trench Oil Water Separator	0.0	0.0	750.0	1,552.1	0.0	2,302.1
<i>Replacement</i>	Replace 3 Floor Maintenance Complex HVAC	459.0	0.0	0.0	0.0	0.0	459.0
<i>Replacement</i>	Replace LA Plant Raw Water Tank - ER70	0.0	0.0	2,020.0	0.0	0.0	2,020.0
<i>Replacement</i>	Install New Floor in B50 Area - East River Unit 7	0.0	0.0	0.0	1,805.0	0.0	1,805.0
<i>Replacement</i>	60 CPRW Tubes and Tile Replacement	7,000.0	0.0	0.0	0.0	0.0	7,000.0
<i>Replacement</i>	Dock Structural Upgrades - ER70	0.0	0.0	0.0	1,500.0	0.0	1,500.0
<i>Replacement</i>	70 Reheater - East River Station	0.0	0.0	500.0	4,250.0	0.0	4,750.0
<i>Replacement</i>	Battery Replacements - East River Station	50.0	100.0	99.9	0.0	0.0	249.9
<i>Replacement</i>	Install Fire Pump #2 Control Panel - East River Station	0.0	250.0	1,250.0	0.0	0.0	1,500.0
<i>Replacement</i>	Transformer 13/23 Breaker Installation - East River Station	0.0	0.0	0.0	0.0	2,000.0	2,000.0
<i>Replacement</i>	Facility Upgrades - Various Station	0.0	300.0	250.0	500.0	504.1	1,554.1
<i>Replacement</i>	UPS & Low Voltage Dist. Replacement Program	0.0	250.0	250.0	500.0	1,000.0	2,000.0
<i>Replacement</i>	LP,HP and Misc Structures - Steel and Concrete - East River Stati	0.0	499.9	1,000.0	0.0	0.0	1,499.9
<i>Replacement</i>	Replace Tank Farm OWS Inlet MOV's - East River Station	300.0	0.0	0.0	0.0	0.0	300.0
<i>Replacement</i>	Boiler 70 Rear Wall Hopper Slope At East River Station	0.0	0.0	0.0	0.0	3,250.2	3,250.2
<i>Replacement</i>	EI. 157' Floor Replacement At East River Station.	0.0	0.0	0.0	0.0	2,700.1	2,700.1
<i>Replacement</i>	60 Furnace Front and Rear Wall Replacement	0.0	1,000.0	8,299.9	0.0	0.0	9,299.9
<i>Replacement</i>	71 Circulator Switchgear and Transformer Replacement	0.0	0.0	220.0	1,000.0	0.0	1,220.0
<i>Replacement</i>	Upgrade L&P Bus 2, Bkr 49 and TIE Transformer TR4 - ER60	0.0	0.0	0.0	100.0	2,600.0	2,700.0
<i>Replacement</i>	67 Silos Liner Replacement	0.0	0.0	0.0	0.0	1,000.0	1,000.0
<i>Replacement</i>	Replace Transformer No. 7E Replacement - East River 7	0.0	0.0	1,250.0	7,749.9	0.0	8,999.9
<i>Replacement</i>	73 Bfp Substation Replacement	0.0	0.0	0.0	0.0	500.0	500.0
<i>Replacement</i>	72 Circulator Switchgear and Transformer Replacement	0.0	0.0	221.0	1,000.0	0.0	1,221.0
	Sub-Total	8,409.0	15,190.9	20,290.8	24,554.0	19,554.4	87,999.1
	Safety & Security						
<i>Safety & Security</i>	Install Access Platforms - ER70	500.0	500.1	500.1	500.0	500.0	2,500.2
	Sub-Total	500.0	500.1	500.1	500.0	500.0	2,500.2
	Storm Hardening						
<i>Storm Hardening</i>	15th Street Vault, 14th Street Wall, Other Civil Work East Rive	12,000.0	0.0	0.0	0.0	0.0	12,000.0
<i>Storm Hardening</i>	Tunnel Flood Protection - East River Station	8,000.0	0.0	0.0	0.0	0.0	8,000.0
<i>Storm Hardening</i>	Upgrade Cooling Control Panel - East River Station	5,000.0	0.0	0.0	0.0	0.0	5,000.0
<i>Storm Hardening</i>	Barrier Breaker 49 in 69kV Yard - East River Station	2,000.0	0.0	0.0	0.0	0.0	2,000.0
<i>Storm Hardening</i>	Emergency Egress - East River Station	2,000.0	0.0	0.0	0.0	0.0	2,000.0
<i>Storm Hardening</i>	GT Replacement Parts - Hudson Avenue Station	1,000.0	0.0	0.0	0.0	0.0	1,000.0
	Sub-Total	30,000.0	0.0	0.0	0.0	0.0	30,000.0
						0.0	
<i>Equipment Purchases</i>	Mps 71/72 Substation Spare Transformer	0.0	0.0	0.0	0.0	0.0	0.0
	Facilities					0.0	
<i>Facilities</i>	Bridge and Tower Roofs - ER70	216.0	0.0	0.0	0.0	0.0	216.0
<i>Facilities</i>	Lp Area Steel & Concrete Work At East River Station.	1,150.0	0.0	0.0	0.0	0.0	1,150.0
	Sub-Total	1,366.0	0.0	0.0	0.0	0.0	1,366.0
						0.0	
	Risk Reduction					0.0	
<i>Risk Reduction</i>	East River BFP Meter Room #2	160.0	0.0	0.0	0.0	0.0	160.0
<i>Risk Reduction</i>	Fire Alarm Sys.in Unit 67 Plant Areas At East River Station	0.0	0.0	0.0	0.0	1,500.0	1,500.0
<i>Risk Reduction</i>	Tank Farm Foam Sys.Control Panel At East River Station	919.0	0.0	0.0	0.0	0.0	919.0
<i>Risk Reduction</i>	Terminal Board Rm Fire Detection At East River Station	1,000.0	0.0	0.0	0.0	0.0	1,000.0
<i>Risk Reduction</i>	Stuyvesant Pump House Demolition	400.0	0.0	0.0	0.0	0.0	400.0
<i>Risk Reduction</i>	Lube Oil Room Ventilation	550.0	0.0	0.0	0.0	0.0	550.0
<i>Risk Reduction</i>	Boiler 60 Chemical Clean Modifications - ER60	0.0	500.0	3,070.0	0.0	0.0	3,570.0
<i>Risk Reduction</i>	Upgrade Unit 6 Feedwater System	0.0	0.0	0.0	0.0	1,000.0	1,000.0
<i>Risk Reduction</i>	Automate ER 6&7 Chemical Injection System	350.1	0.0	0.0	0.0	0.0	350.1
<i>Risk Reduction</i>	Unit 7 Vibration Upgrades	0.0	250.0	0.0	0.0	0.0	250.0
<i>Risk Reduction</i>	60 Exciter Controller - East River Station	500.0	0.0	0.0	0.0	0.0	500.0
<i>Risk Reduction</i>	Unit 6 Vibration Upgrades	250.0	0.0	0.0	0.0	0.0	250.0
<i>Risk Reduction</i>	60 Dissolved Gas Removal - East River Station	0.0	0.0	0.0	0.0	2,500.1	2,500.1
<i>Risk Reduction</i>	GT-1 Blackstart - 59th Street Station	750.0	0.0	0.0	0.0	0.0	750.0
<i>Risk Reduction</i>	Water Treatment Process - East River Station	0.0	14,000.1	8,000.7	2,999.9	0.0	25,000.7
<i>Risk Reduction</i>	City Water Header @ Er.	500.1	0.0	0.0	0.0	0.0	500.1
<i>Risk Reduction</i>	Install a Hydrogen Generator - East River Unit 70	0.0	0.0	500.0	0.0	0.0	500.0
<i>Risk Reduction</i>	Unit 6 Bfp Throttle Vavle Upgrade	1,460.0	0.0	0.0	0.0	0.0	1,460.0
	Sub-Total	6,839.2	14,750.1	11,570.7	2,999.9	5,000.1	41,160.0
						0.0	
<i>System Expansion</i>	LA Plant Regeneration Piping Replacement - East River Station	500.0	0.0	0.0	0.0	0.0	500.0
						0.0	
	Total Electric Production	\$ 51,614.2	\$ 30,441.1	\$ 33,000.6	\$ 28,053.9	\$ 25,054.5	\$ 168,164.3

**Shared Services Capital Plan
2016-2020 Capital Forecast
(\$ Thousands)**

Description	Forecast					
	2016	2017	2018	2019	2020	5 Year Total
4 Irving Place - Re-Stacking (Local Law 26)	39,000	39,000	19,000	-	-	97,000
Facilities Critical Infrastructure Short Term Priority/Programs	13,400	12,000	15,000	17,500	18,000	75,900
Facilities Buildings and Yards - (Roof Replacement Program)	3,000	3,000	10,000	11,000	11,000	38,000
Facilities Buildings and Yards - (Safety Environmental Regulatory)	2,500	2,500	2,500	5,000	5,000	17,500
Facilities Service Center Renovations	-	-	5,000	5,000	5,000	15,000
Facilities Flood Mitigation Program	-	5,000	-	-	-	5,000
Total - Facility Projects	57,900	61,500	51,500	38,500	39,000	248,400
Strategic IT Projects						
SCADANET	1,475	750	751	750	750	4,476
COLLABORATION TOOLS	461	251	901	901	901	3,414
ENTERPRISE APPLICATIONS	415	525	325	326	326	1,916
NEW TECHNOLOGY	-	750	900	900	900	3,451
DESKTOP INFRASTRUCTURE (User Technology Plan)	692	782	703	703	704	3,584
CCTN FACILITIES IMPROVEMENT	462	533	550	550	550	2,645
CCTN Modernization - SONET Conversion	185	196	215	215	215	1,026
BUSINESS System Sustainability - Database Plan	1,061	775	1,231	1,230	1,231	5,528
BUSINESS SYSTEMS SUSTAINABILITY - Desktop OS Plan	1,107	650	560	560	560	3,438
Business Systems Sustainability - Server OS Plan	1,106	2,230	2,211	2,210	2,211	9,967
CCTN Expansion - Wireless Mobile Access Network	1,705	3,250	3,250	3,251	3,250	14,706
CCTN MODERNIZATION MAPPING SYSTEM	115	125	124	125	125	614
CYBERSECURITY	4,425	4,400	4,375	4,375	4,375	21,951
CCTN EXPANSION - NEW FIBER - Fiber Projects	645	750	1,397	1,397	1,397	5,585
IT Asset Management	231	281	225	225	225	1,187
Computer and Communications Accounting System	92	113	-	-	-	205
Data Center Renovation Network Operations Center	-	550	550	550	550	2,199
Server Farm Infrastructure	1,383	1,201	1,501	1,503	1,500	7,087
Advanced Application Monitoring And Configuration Management	922	1,490	1,490	-	-	3,902
Server Farm Expansions	2,765	9,992	29,988	1,500	1,500	45,745
Health Integrated Data Management Platform	726	745	328	132	-	1,931
PeopleSoft HR Help Desk	-	1,500	-	-	-	1,500
PeopleSoft HR/Payroll System Upgrade	-	-	-	2,339	-	2,339
PeopleSoft Recruitment Module	2,457	3,105	-	-	-	5,562
eTrain Enhancements	464	-	-	-	-	464
Enterprise Security Platform	7,800	6,699	4,725	-	-	19,224
Company Wide Camera Rollout Program	345	1,000	1,000	1,000	1,000	4,345
Emergency Operations Center Incident Information	300	125	124	121	-	670
System Emergency Assignment Module Development	350	344	342	337	-	1,373
Astoria Warehouse IT Hardware Replacement	500	-	-	-	-	500
Data Analysis and Reporting Tool	-	1,500	1,100	-	-	2,600
nMarket Upgrade/Replacement Project (Design & Implementation)	-	-	-	4,100	6,400	10,500
NYISO Transmission Owner Data Reporting System - Next Generation	-	200	600	600	400	1,800
Metrix IDR Load Forecasting Upgrade	-	220	640	640	-	1,500
TGS Interface with Pipeline Bulletin Boards	650	655	-	-	-	1,305
Gas Transaction System Requirements Definition	-	885	-	-	-	885
Gas Transaction System Replacement/Upgrade	-	-	4,390	3,400	1,900	9,690
Implementation of new TCIS functionality and technology upgrades	-	2,790	1,925	1,425	-	6,140
MV 90 Upgrade/Replacement project	-	-	-	800	1,000	1,800
Transport Customer Info System (TCIS) Daily Delivery Service	1,000	-	-	-	-	1,000
Wars Replacement	500	-	-	-	-	500
Autocad Program (Engineering Computer Upgrades)	400	1,000	900	-	-	2,300
Construction - Survey Mapping Repository	675	750	750	750	750	3,675
Upgraded And Enhance Contractor Oversight System	-	500	-	-	-	500
Asset Management Technology Enhancement Program	500	-	-	-	-	500
Outage Scheduling System Re-Write	1,000	-	-	-	-	1,000
Metaphase Replmnt-Phase 2	514	-	-	-	-	514
Misc. IT Projects - Construction	475	1,050	700	550	550	3,325
Compass Replacement	1,600	750	250	-	-	2,600
Electronic Appropriation Project	-	1,000	2,000	-	-	3,000
Gas Cus- Customer Usage Extract System	275	45	-	-	-	320
Allegro System Upgrade	300	-	-	-	-	300
Powerplant Application Upgrade	576	-	-	-	-	576
Budget System Enhancements	3,100	2,500	2,000	2,000	1,000	10,600

BI Enhancements	-	1,000	500	500	500	2,500
Strategic Analytics - As-Billed - Revenue Analytics (SARA)	800	5,200	-	-	-	6,000
Corporate Accounting Request Application	300	464	278	927	-	1,969
Rate Case Enhancement Project	-	-	300	300	4,700	5,300
Treasury Workstation Replacement / Upgrade	-	-	1,500	-	-	1,500
Reconciliation of CSS and Satellite Systems Financial Data (RCSF)	850	-	-	-	-	850
PowerPlant Application Upgrade 2	-	232	232	927	927	2,318
PI360 Governance Expansion - O&M	-	1,000	1,000	500	500	3,000
Certificate of Disclosure - Conflicts of Interest Management Soft	462	151	151	-	-	764
Strategic Analytics - Sales and Revenue Forecasting Upgrade	-	-	3,000	3,000	5,000	11,000
HSF Enhancement	-	-	2,000	-	-	2,000
Compliance Tracking System	5,300	-	-	-	-	5,300
Law Scanning and Coding Project	2,500	-	-	-	-	2,500
PI360 Governance Expansion - Steam	-	751	-	-	-	751
PI360 Governance Expansion - New Functionality	-	-	500	500	500	1,500
PI360 Governance Expansion - Electric	1,000	751	-	-	-	1,751
Oracle EBS 12.2.4 Upgrade and Oracle BI 7.5.4 Upgrade	3,300	19,838	7,787	-	-	30,925
Cust Usage Sys Enhancements	200	-	-	-	-	200
Bill Impact Enhancements	100	400	200	200	-	900
Oracle EBS Infrastructure Mobility Enhancement	-	-	-	927	-	927
Purchase Of Computer Hardware For Meter Data Management System Expa	750	2,500	2,500	750	800	7,300
Steam Billing System & Customer Service Enhancements	-	1,900	289	275	150	2,614
New Customer Service System	-	-	-	-	11,000	11,000
Digital Customer Experience (DCX)	20,000	12,000	5,000	5,000	5,000	47,000
CSS Sustainability	10,000	10,000	10,000	10,000	5,000	45,000
Off System Billing Automations	1,000	1,000	1,000	1,000	1,000	5,000
Customer Interaction Center	2,000	565	-	-	-	2,565
EH&S Information Mgmt. System	600	-	-	-	-	600
Vehicle Collision Mitigation Program	1,000	2,000	1,000	-	-	4,000
Total - Strategic IT Projects	93,916	116,708	110,257	64,270	69,347	454,497
Other						
CNG Fuel Station New Installation	-	1,000	1,500	2,500	-	5,000
CNG Fuel Station Upgrades	3,300	2,835	-	-	-	6,135
Electric Vehicle Charging Infrastructure	3,000	3,000	4,000	-	-	10,000
Fleet Management Solution	-	-	4,000	-	-	4,000
Fuel Station Upgrades	6,400	4,309	-	-	-	10,709
Sherman Creek Service Center	-	15,291	68,328	33,983	-	117,602
Windows Replacement - 4 Irving Place	-	-	5,000	7,750	7,750	20,500
Amr Saturation - Other Areas	3,000	-	-	-	-	3,000
Total - Other	15,700	26,435	82,828	44,233	7,750	176,946
General Equipment						
XM 1 – Office Furniture and Equipment	1,341	925	905	872	870	4,913
XM 2 / XM 13 - Vehicles and Equipment	40,977	48,086	49,121	45,963	38,537	222,684
XM 3 - Stores Equipment	490	416	416	424	437	2,183
XM 4 - Shop Equipment	330	400	400	400	400	1,930
XM5 / XM15 - Lab and Test Equipment	5,099	4,848	4,773	4,792	4,890	24,402
XM 6 - Tools and Work Equipment	13,910	11,314	9,681	7,798	7,042	49,745
XM 7 - Miscellaneous Equipment	1,250	1,203	1,199	1,195	1,228	6,075
XM 8 Communications Equipment	2,812	3,374	2,889	2,857	2,854	14,786
XM10 Computer Equipment	5,379	12,784	11,923	11,727	11,704	53,517
Total - General Equipment	71,588	83,350	81,307	76,028	67,962	380,235
Sub-Total Shared Services	239,103	287,993	325,892	223,031	184,059	1,260,078
Telecommunications Storm Hardening	2,396	-	-	-	-	2,396
Facilities Storm Hardening	5,000	-	-	-	-	5,000
Total - Storm Hardening	7,396	-	-	-	-	7,396
Total CECONY Shared Services Capital	246,499	287,993	325,892	223,031	184,059	1,267,474
AMI	68,800	173,253	194,896	285,025	325,431	1,047,404