

# Commonwealth Edison Company's Infrastructure Investment Plan

## **Attachment 2: 2012 Investment Plan**

**January 6, 2012**

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## Executive Summary

### Plan Overview

On November 8, 2011, Commonwealth Edison Company (“ComEd”) filed its proposed performance-based formula rate, Rate DSPP – Delivery Service Pricing and Performance (“Rate DSPP”), with the Illinois Commerce Commission (“Commission”) in pursuant to Section 16-108.5 of the Public Utilities Act (“Act”). The Commission commenced Docket No. 11-0721 to review that filing. In making that filing, ComEd confirmed that it elected to become a “participating utility”, and committed to undertake the investments described in Section 16-108.5(b) of the Act. Section 16-108.5(b) also calls on ComEd, within 60 days of such filing, to submit a plan for satisfying its infrastructure investment program commitments pursuant to subsection (b), which must include a schedule and staffing plan for the next calendar year.

Accordingly, ComEd submits to the Commission together with its 10-year Infrastructure Investment Plan (“Plan”) this 2012 Investment Plan (“2012 Plan”), for informational purposes, as prescribed by the Act. As also prescribed, the 2012 Plan organizes individual projects under two broad categories of investment:

*Reliability-Related Investments:* Section I of the 2012 Plan sets forth electric system upgrades, modernization projects, and training facilities; and

*Smart Grid-Related Investments:* Section II of the 2012 Plan describes the Smart Grid electric system upgrades and transmission and distribution infrastructure upgrades and modernization.

The 2012 Plan includes an estimated cumulative total of \$139 million of capital investment and associated expense in electric system upgrades, modernization projects, and training facilities (“Reliability-Related Investments”). The 2012 Plan also includes an estimated cumulative total of \$94 million of capital investment and associated expense in Smart Grid-Related Investments.

In the event that Section 16-108.5 becomes inoperative or Rate DSPP is terminated, then this 2012 Plan and the multi-year Plan, including but not limited to all programs and investments, will also become inoperative and terminate immediately.

### **Summary 2012 Plan Scope**

The 2012 Plan provides information on scope, schedule, budget, staffing, and units of work that are planned to be completed in 2012 in association with ComEd’s Plan.

***Reliability-Related Investments.*** These programs are described in detail in Section I of the 2012 Plan, and include, but are not limited to, the following specific programs briefly described below:

- **Underground Residential Cable (“URD”) injection and replacement.** This program is designed to remediate an estimated 461 miles of bare concentric cable in 2012, some of which was installed as early as 1966. This work will reduce long duration outages primarily experienced in residential subdivisions.
- **Mainline cable system refurbishment and replacement.** The most complex of all the Reliability-Related investments, this program includes planned assessment and refurbishment of an estimated 4,420 manholes, replacement of an estimated 44

miles of mainline underground cable, and testing of an estimated 117 sections of mainline cable over the course of 2012. This program is primarily targeted at the testing and replacement of lead cable in urban areas.

Because remediation scope is based on inspection results, the complex nature of the underground system, interrelationship of multiple circuits within a manhole, and certain potential moratoriums on work, this program also contains the highest degree of scope uncertainty of all the Reliability-Related investments.

- **Ridgeland 69kV cable replacement.** This program involves planned replacement of an estimated 3.2 miles of high voltage (69kV) underground cable in 2012, a majority of which was installed in the early 1950's, and some as early as 1927.
- **Construction of training facilities.** This program provides for planned construction of two new facilities – one in Chicago and one in Rockford – to provide electric and customer operations training. These facilities will provide the ability to offer year-round practical, hands-on training to ComEd's field employees and will enable them to practice classroom theory on real equipment and technology year-round.
- **Wood pole inspection, treatment, and replacement.** There are approximately 1.3 million wood poles on the ComEd system. This program entails planned inspection, and treatment of an estimated 133,400 wood poles, and replacement or reinforcement of an estimated 2,500 additional poles over the course of 2012. This program will reduce customer interruptions due to wood pole failures by programmatically assessing the strength and integrity of ComEd's wood poles.

- **Storm hardening.** This program is designed to further reduce the susceptibility of circuits to storm-related damage, and will include deployment of a variety of engineered solutions including, but not limited to, overhead-to-underground conversion, installation of tree-resistant conductors, and additional vegetation management. In order to optimize customer benefits, circuits will be prioritized based on historical susceptibility to storm-related damage. Engineered solutions will be designed specifically for each circuit.

More detailed descriptions for each of these, including scope, schedule, capital budget, staffing and units of work are included in Section I of this document.

**Smart Grid Electric System Upgrades.** These programs are described in detail in Section II of the 2012 Plan, and include, but are not limited to, the following specific programs briefly described below:

- **Distribution Automation (“DA”).** DA technology uses “sectionalizing” devices and remote communications to detect issues on the distribution system and automatically re-route power to minimize the number of customers impacted. This is commonly referred to as the self-healing nature of the Smart Grid. ComEd’s DA program includes installation of an estimated 470 DA devices over the course of 2012.
- **Substation micro-processor relay upgrades.** This program is designed to modernize one ComEd substation in 2012, including upgrade of electro-mechanical protective relays to modern microprocessor-based devices, replacement of aging circuit breakers, two-way communications between ComEd’s control center and each substation, and installation of technology to remotely monitor the health of

ComEd's largest assets, its transformers. This program provides for fault detection, remote asset monitoring and improved site security. Partial upgrades may be applied across the service territory. ComEd has over 250 transmission-fed substations, and over 800 substations in total.

- **Smart Meters.** This program involves the planned replacement of all retail meters on the ComEd distribution system with Smart Meters, including deployment of an Advanced Metering Infrastructure (“AMI”), which provides a two-way communications infrastructure to support other customer services and Smart Grid applications. Expected benefits include reductions in the number of estimated bills, unaccounted for energy, and consumption on inactive meters. Deployment of Smart Meters will occur pursuant to the Advanced Metering Infrastructure Deployment Plan (“AMI Plan”) to be filed with the Commission no later than April 23, 2012, which must be approved within 60 days after filing. Prior to ComEd's filing, ComEd will review its proposed AMI Plan with the Smart Grid Advisory Council. Although the AMI Plan is currently under development, in general, ComEd expects at this time that Smart Meter installs will begin in the 3rd quarter of 2012, ending in 2021.

### **Summary 2012 Plan Schedule**

In order to establish a framework to plan for and schedule future work while efficiently addressing this inherent change and uncertainty, ComEd is employing a proven iterative planning structure. Under this structure, work plans will be developed on a rolling basis for each quarter of the investment period. Each work plan will outline a series of tasks comprising: project and work planning, design, regulatory and public affairs functions where required (e.g., permitting), project implementation, and review.

This periodic quarterly cycle is illustrated throughout this 2012 Plan in a series of Gantt charts showing repeating cycles of work planning and management activity. Please note that while this work planning and management cycle repeats on a quarterly basis, the activities associated with each quarter's iteration may take longer than a quarter to complete. This structure allows ComEd to implement its multi-year Plan effectively and rigorously, while retaining the required flexibility.

The individual program schedules included in this 2012 Plan explain when each program is planned to start and end. Most include both a rolling quarterly work plan process and a high-level task list. The Gantt charts that appear in the 2012 Plan are illustrative and are not intended to establish specific milestones. It is recognized that scope priorities will be adjusted over the course of the programs as new information is obtained. Note that 2012 is considered a ramp-up year for a majority of the programs. Figure A.1 in Appendix A presents a high level schedule to complete the entire scope of work associated with the 2012 Plan. Detailed 2012 planned schedules for specific program areas are provided in the sections that follow.

### **Summary 2012 Plan Budget**

The program budget identifies the planned monthly capital cost for each program. The 2012 Plan budget total is estimated to be \$233 million in incremental capital investments plus associated expenses. Table A.1 in Appendix A presents a summary of the 2012 Plan's estimated total capital budget by program, and Figure A.2 in Appendix A presents the estimated total capital budget by month associated with the 2012 Plan. Note that the costs by month shown in Figure A.2 exclude costs for the Smart Meter Program, which will be included in ComEd's AMI Plan.

## **Summary 2012 Program Staffing**

The program staffing identifies the 2012 full-time equivalents (“FTEs”) required for completion of program scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the 2012 Plan and dividing by 2,080. Estimated worker-hours are composed primarily of:

1. Worker-hours charged directly to work orders associated with specific scopes of work; and
2. Worker-hours charged on timesheets in support of the 2012 Plan.

Worker-hours charged on timesheets in support of the 2012 Plan have been allocated to the specific scopes of work proportionally, based on the estimated worker-hours charged to work orders for specific scopes of work. The estimated FTEs shown in the 2012 Plan include direct and contractor FTEs as defined in Appendix A of ComEd’s Plan. However, they do not include any induced FTEs.

Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft. Figure A.3 in Appendix A presents the estimated FTEs to execute the scheduled scope of work associated with the 2012 Plan. FTEs are not defined as employee head counts, and should not be confused with employment levels and trends.

## **Summary 2012 Plan Quantity of Units**

The program quantity of units describes the estimated number of work units, where applicable, that are planned to be completed in 2012 for each program area. Units of work for each program are discussed, as applicable, in that program’s

respective section of the Plan. All units of work associated with the identified work scopes are included in the estimated quantities in this document, and will be counted towards achievement of the 2012 Plan goals. However, this does not limit additional units from being performed as part of the baseline spend at ComEd's discretion. The monthly targets listed are not intended to be firm milestones, but rather to provide directional guidance towards accomplishment of the annual goals.

## **SECTION I: Reliability-Related Investments**

### **SECTION I.A: Underground Residential Cable (“URD”) Injection and Replacement**

#### **I.A.1: 2012 Program Scope**

ComEd's URD system has approximately 8,700 miles of bare concentric neutral URD cable on its system that was installed between 1966 and 1985, which is primarily used to serve residential and commercial areas. The URD Injection and Replacement program excludes mainline direct buried cable, which is covered under the Mainline Cable System Refurbishment and Replacement program described in Section I.B below. URD cable failures mainly occur within the population of bare concentric neutral URD cable. As this cable ages, the number of annual failures in this type of cable has been trending up in recent years as this cable continues to age. Approximately 2,000 to 2,500 miles of this cable have already been addressed. ComEd anticipates that it will be necessary to inject or replace approximately 4,177 additional miles of the problematic cable over the course of the program. ComEd anticipates that, by the end of the program, the number of annual failures in this type of cable will be significantly reduced. This reduction in faults will reduce long-duration outages primarily experienced in residential subdivisions. The program consists of two major components:

- URD Cable Injection
- URD Cable Replacement

Each of these components is described in more detail below.

### URD Cable Injection

Cable injection fills in cable insulation voids and avoids cable failures. In general, URD cables that are candidates for injection typically have intact concentric neutral conductors, are not solid cable or strand-filled cable, and have a low number of cable splices. Where it is practical, cable injection is typically a more cost beneficial way to avoid URD cable failures than cable replacement. Based on ComEd's past experience with URD cable injection, it is expected that during 2012 an estimated 97 miles of URD cable will be injected.

### URD Cable Replacement

URD cables that cannot practically or economically be injected will be replaced on a schedule prioritized to replace worst performing URD cables first. It is expected that during 2012 an estimated 364 miles of URD cable will be replaced.

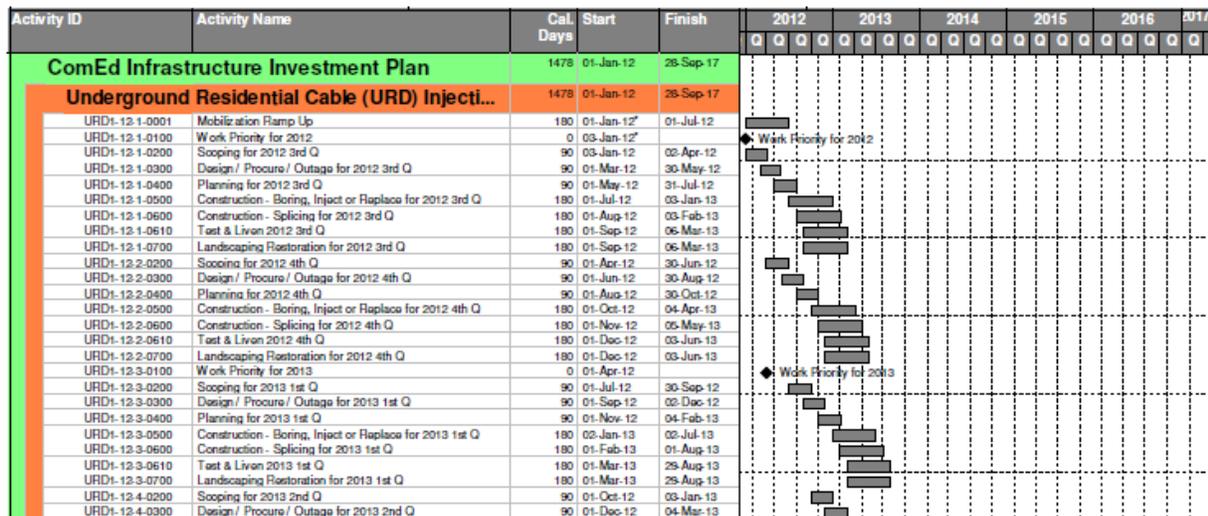
## **I.A.2: 2012 Program Schedule**

Figure I.A.2 presents the planned 2012 schedule to complete the URD Injection and Replacement program. Estimates of cost, units of work, and schedules for that work, may evolve over time. The schedule consists of summary level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Mobilization and ramp-up
- Establish priority for the calendar year
- Perform scoping

- Perform design tasks, procure material, and identify required outages in schedule
- Planning (develop work packages and secure permits)
- Construction – Boring, injection or replacement
- Construction – Splicing where required
- Test and liven
- Landscaping restoration

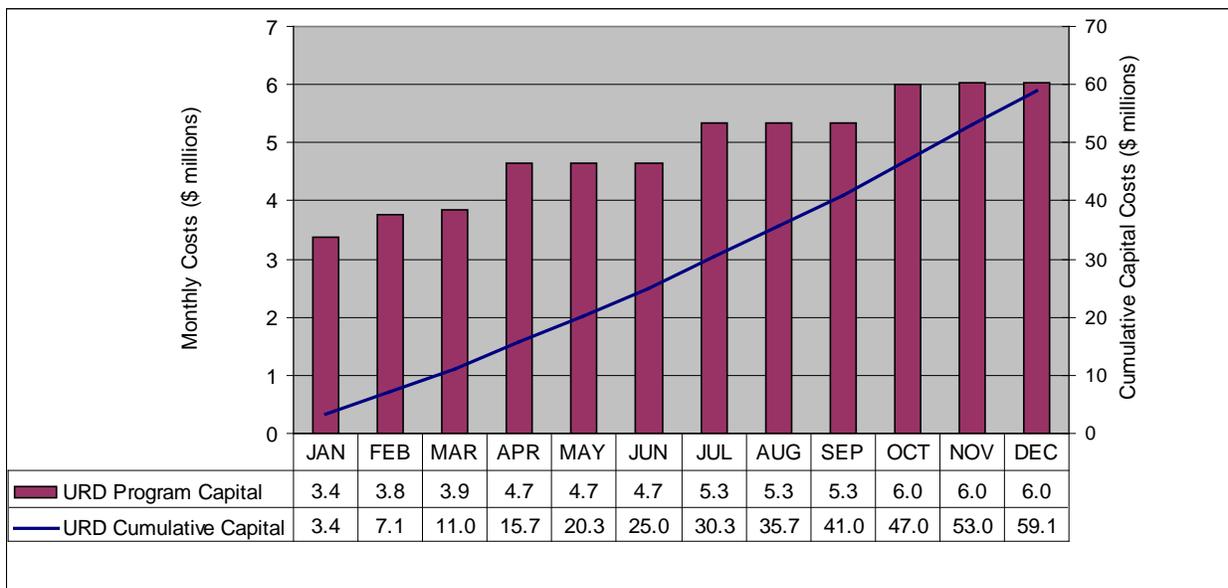
**FIGURE I.A.2: URD INJECTION AND REPLACEMENT 2012 SCHEDULE**



### I.A.3: 2012 Program Budget

Figure I.A.3 represents the estimated 2012 capital budget for the URD Injection and Replacement program. ComEd estimates the 2012 program cost to be capital investments of \$59 million plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

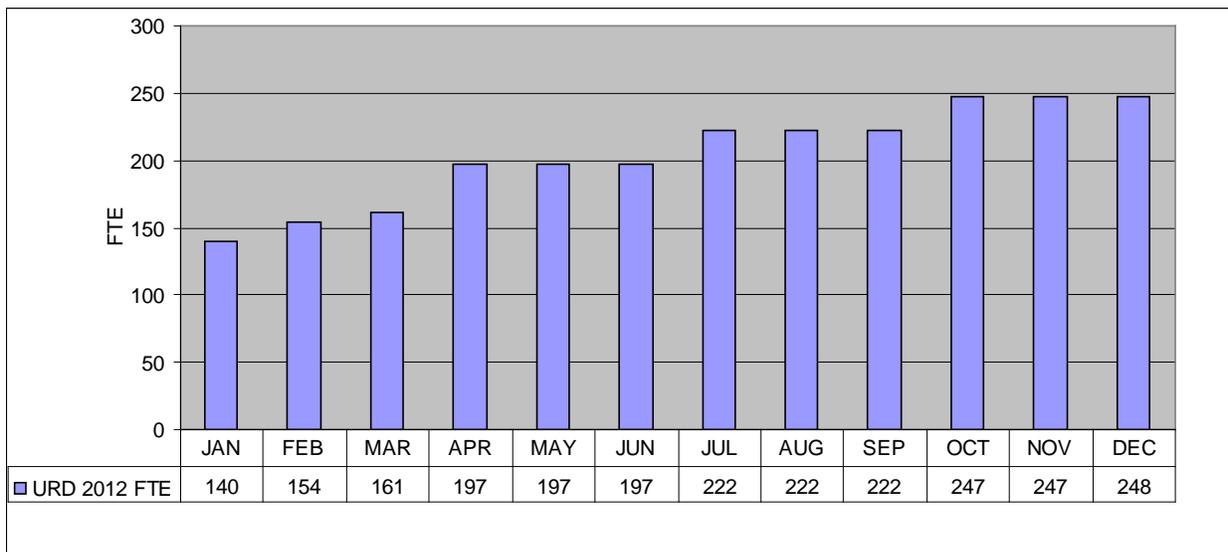
**FIGURE I.A.3: URD INJECTION AND REPLACEMENT 2012 CAPITAL BUDGET**



**I.A.4: 2012 Program FTEs**

Figure I.A.4 presents the estimated FTEs required to perform the scheduled 2012 scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.A.4: URD INJECTION AND REPLACEMENT 2012 FTES**



**I.A.5: 2012 Program Units**

Figure I.A.5.A shows the miles of URD cable estimated to be injected in 2012. This chart will serve as a tracking mechanism over the course of 2012, and reflects the scope of work planned to be accomplished, as well as the scope of work left to be performed. It is estimated that approximately 97 miles will be injected in 2012. Estimates of cost, units of work, and schedules for that work may evolve over time.

**FIGURE 1.A.5.A: URD CABLE INJECTION 2012 UNITS**

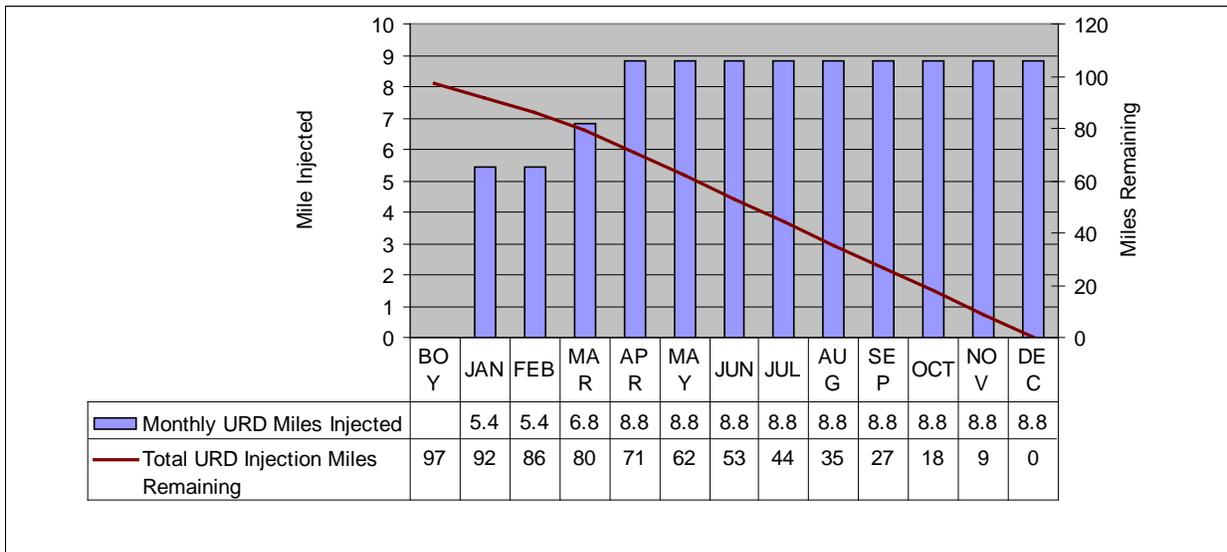


Figure I.A.5.B shows the miles of URD cable estimated to be replaced in 2012. This chart will serve as a tracking mechanism over the course of 2012, and reflects the scope of work planned to be accomplished, as well as the scope of work left to be performed. It is estimated that approximately 364 miles will be replaced over the course of the program. Estimates of cost, units of work, and schedules for that work may evolve over time.

**FIGURE I.A.5.B: URD CABLE REPLACEMENT 2012 UNITS**



## **SECTION I.B: Mainline Cable System Refurbishment and Replacement**

### **I.B.1: 2012 Program Scope**

The ComEd mainline underground system includes approximately 8,300 miles of cable installed in conduit systems or direct buried. Mainline cable system refurbishment and replacement has the most complex scope of work of all the programs. The scope is composed of three main work categories:

- Manhole assessment and cable system refurbishment
- Cable replacement
- Cable testing

The accomplishment of this scope is highly dependent on the ability to obtain necessary permits and to schedule equipment outages. Certain periods of time or certain work restrictions, such as summer critical periods, may limit the types of work that can be performed due to the need to maintain system configuration. Such periods will be reflected in ComEd's annual or summer critical work plans. Because remediation scope is based on inspection results, the complex nature of the underground system, interrelationship of multiple circuits within a manhole, and certain potential moratoriums on work, this program contains the highest degree of scope uncertainty of all the Reliability-Related investments.

### Manhole Assessment and Cable System Refurbishment

ComEd has approximately 28,300 manholes on its system. Over the course of 2012 ComEd plans to assess an estimated 4,420 manholes and perform refurbishment within the parameters of the Act.

Assessment includes the evaluation of the overall condition of the manhole, cables, and cable support systems. Refurbishment includes replacing or repairing cable systems in the manhole, and addressing other structural issues as required. Manhole structural work may range from minor refurbishment to replacement of an entire manhole.

Concurrent with manhole assessments, cable joint issues discovered within the manholes (e.g., bulging or leaking joints) will be addressed primarily with cable replacement. As assessments are performed, work plans will be generated to address the findings.

### Cable Replacement

Replacement criteria will be based, in part, on the method of original installation. Replacement of cable in conduit will be based on manhole assessment findings. Direct buried mainline cable will either be replaced without testing, or replaced after testing, based on cable length and prior fault history. It is estimated that approximately 44 miles of mainline cable will be replaced in 2012. This estimate is based on assumptions concerning inspection results, which will be adjusted over time as actual data becomes available. Because of their inherent reliance on assumptions, early estimates of cable

replacement contain a high degree of uncertainty and are not intended to reflect firm scope.

### Cable Testing

Underground cable is divided into sections largely as a result of limits placed on cable lengths by the manufacturers and limits due to the physical configuration of the circuits.

An estimated 117 circuit sections will be selected in 2012 for Very Low Frequency (“VLF”) Testing per the Institute of Electric and Electronics Engineers (“IEEE”) standard 400.2 to validate the serviceability of the section of cable, including circuit sections that either have not had a prior test, or circuit sections that have had multiple faults within the last 36 months, but are not candidates for replacement without testing. It is estimated that cable tests will result in replacement of cable sections, which are included in the estimate shown in the “Cable Replacement” section above. This estimate is based on assumptions concerning inspection results, which will be adjusted over time as actual data becomes available. Because of their inherent reliance on assumptions, early estimates of cable testing contain a high degree of uncertainty and are not intended to reflect firm scope.

### **I.B.2: 2012 Program Schedule**

Figure I.B.2.A presents the estimated 2012 schedule to complete the Manhole Assessment and Cable System Refurbishment program. Estimates of cost, units of work, and schedules for that work, may evolve over time. The schedule consists of high

level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Mobilization and ramp up
- Establish manhole inspection priority for the calendar year
- Perform scoping and configuration analysis; review sequence for capacity issues
- Perform design tasks, procure material, and identify required outages in schedule; include identified joint issues in evaluation
- Planning (develop work packages and secure permits)
- Construction – Manhole cleaning (environmental) if required
- Construction - Conduct manhole assessments and refurbish cable systems as necessary
- Evaluate results
- Develop cable replacement plans as necessary

Figure I.B.2.B presents the estimated 2012 schedule to complete the Mainline Cable Replacement program. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Mobilization and ramp-up
- Establish replacement priority for the calendar year
- Perform scoping and configuration analysis; review sequence for capacity issues

- Perform design tasks, procure material, and identify required outages in schedule; include identified joint issues in evaluation
- Planning (develop work packages and secure permits)
- Construction – Install conduit when required
- Construction – Pull / install cable and terminal pole work
- Construction – Pull / install cable
- Construction – Install dead joints
- Test cable and liven

Figure I.B.2.C presents the estimated 2012 schedule to complete the Mainline Cable Testing program. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Ramp-up period
- Establish testing priority for the calendar year
- Perform scoping and configuration analysis; review sequence for capacity issues
- Perform design tasks, procure material, and identify required outages in schedule; include identified joint issues in evaluation
- Planning (develop work packages and secure permits)
- Perform testing
- Evaluate results
- Develop work program for testing failures (*i.e.*, cable replacement) based on results



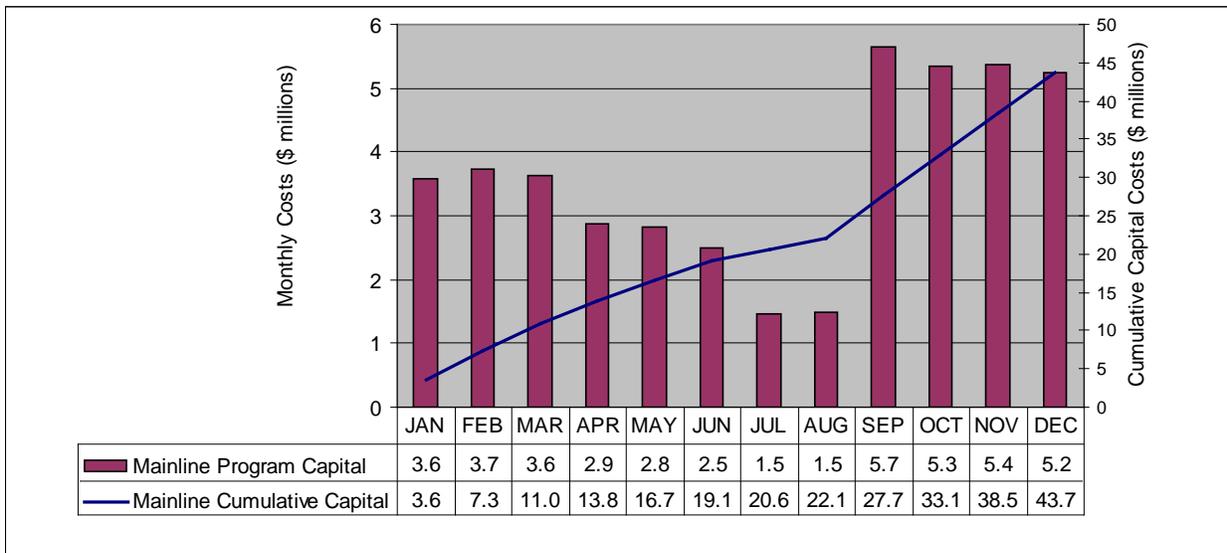
**FIGURE 1.B.2.C: MAINLINE CABLE TESTING 2012 SCHEDULE**

Activity ID	Activity Name	CaL Days	Start	Finish	2012	2013	2014	2015	2016	2017
					Q	Q	Q	Q	Q	Q
<b>ComEd Infrastructure Investment Plan</b>		1392	01-Jan-12	31-May-17						
<b>Mainline Cable Testing</b>		1392	01-Jan-12	31-May-17						
MC1-12-1-0001	Mobilization Ramp Up	180	01-Jan-12	01-Jul-12	█					
MC1-12-1-0100	Work Priority 2012	0	01-Jan-12		◆					
MC1-12-1-0150	Work Scope / Configuration Analysis / Review Capacity L...	90	01-Jan-12	01-Apr-12	█					
MC1-12-1-0200	Design / Procure Material / Identify Required Outages in ...	90	01-Feb-12	30-Apr-12	█					
MC1-12-1-0250	Work Planning - 2012 2nd Q	90	01-Mar-12	30-May-12	█					
MC1-12-1-0300	Perform Testing - 2012 2nd Q	60	01-Apr-12	31-May-12	█					
MC1-12-1-0350	Evaluate Results - 2012 2nd Q	60	01-Apr-12	31-May-12	█					
MC1-12-1-0400	Develop Work Program for Testing Failures - 2012 2nd Q	90	01-May-12	31-Jul-12	█					
MC1-12-2-0150	Work Scope / Configuration Analysis / Review Capacity L...	90	01-Apr-12	30-Jun-12	█					
MC1-12-2-0200	Design / Procure Material / Identify Required Outages in ...	90	01-May-12	31-Jul-12	█					
MC1-12-2-0250	Work Planning - 2012 3rd Q	90	01-Jun-12	30-Aug-12	█					
MC1-12-2-0300	Perform Testing - 2012 3rd Q	60	01-Jul-12	30-Aug-12	█					
MC1-12-2-0350	Evaluate Results - 2012 3rd Q	60	01-Jul-12	30-Aug-12	█					
MC1-12-2-0400	Develop Work Program for Testing Failures - 2012 3rd Q	90	01-Aug-12	30-Oct-12	█					
MC1-12-3-0150	Work Scope / Configuration Analysis / Review Capacity L...	90	01-Jul-12	30-Sep-12	█					
MC1-12-3-0200	Design / Procure Material / Identify Required Outages in ...	90	01-Aug-12	30-Oct-12	█					
MC1-12-3-0250	Work Planning - 2012 4th Q	90	01-Sep-12	02-Dec-12	█					
MC1-12-3-0300	Perform Testing - 2012 4th Q	60	01-Oct-12	01-Dec-12	█					
MC1-12-3-0350	Evaluate Results - 2012 4th Q	60	01-Oct-12	01-Dec-12	█					
MC1-12-3-0400	Develop Work Program for Testing Failures - 2012 4th Q	90	01-Nov-12	04-Feb-13	█					
MC1-12-4-0100	Work Priority 2013	0	01-Jul-12			◆				
MC1-12-4-0150	Work Scope / Configuration Analysis / Review Capacity L...	90	01-Oct-12	03-Jan-13		█				
MC1-12-4-0200	Design / Procure Material / Identify Required Outages in ...	90	01-Nov-12	04-Feb-13		█				
MC1-12-4-0250	Work Planning - 2013 1st Q	90	01-Dec-12	04-Mar-13		█				

### I.B.3: 2012 Program Budget

Figure I.B.3 presents the estimated 2012 capital budget for the Mainline Cable System Refurbishment and Replacement program. ComEd estimates the 2012 program cost to be capital investments of \$44 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

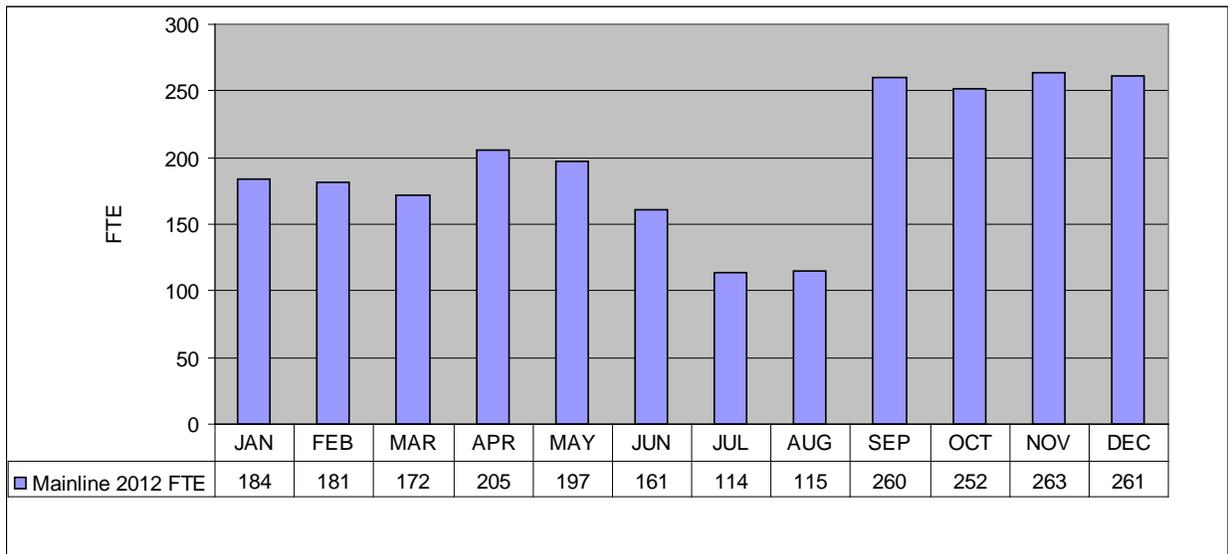
**FIGURE I.B.3: MAINLINE CABLE SYSTEM REFURBISHMENT AND REPLACEMENT 2012 CAPITAL BUDGET**



**I.B.4: 2012 Program FTEs**

Figure I.B.4 presents the estimated FTEs to perform the scheduled 2012 scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.B.4: MAINLINE CABLE SYSTEM REFURBISHMENT AND REPLACEMENT 2012 FTES**

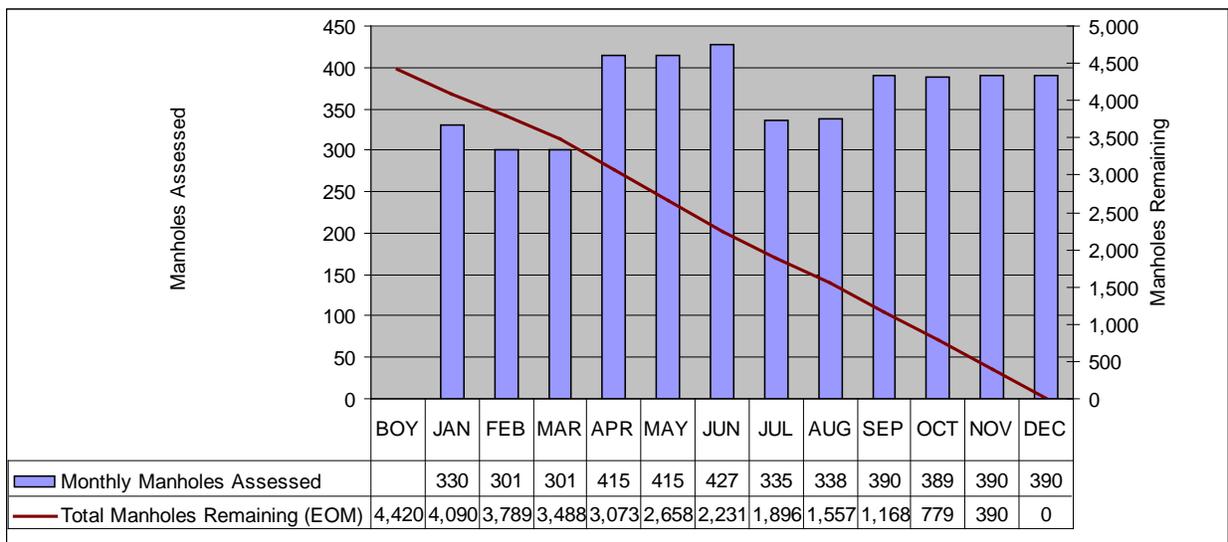


## I.B.5: Program Units

### Manhole Assessment and Cable System Refurbishment

Figure I.B.5.A shows the estimated number of manhole assessments to take place over the course of 2012 at 4,420. This chart will serve as a tracking mechanism over the course of the year, and reflects the scope of work planned to be accomplished as well as the scope of work left to be performed. Estimates of cost, units of work, and schedules for that work may evolve over time.

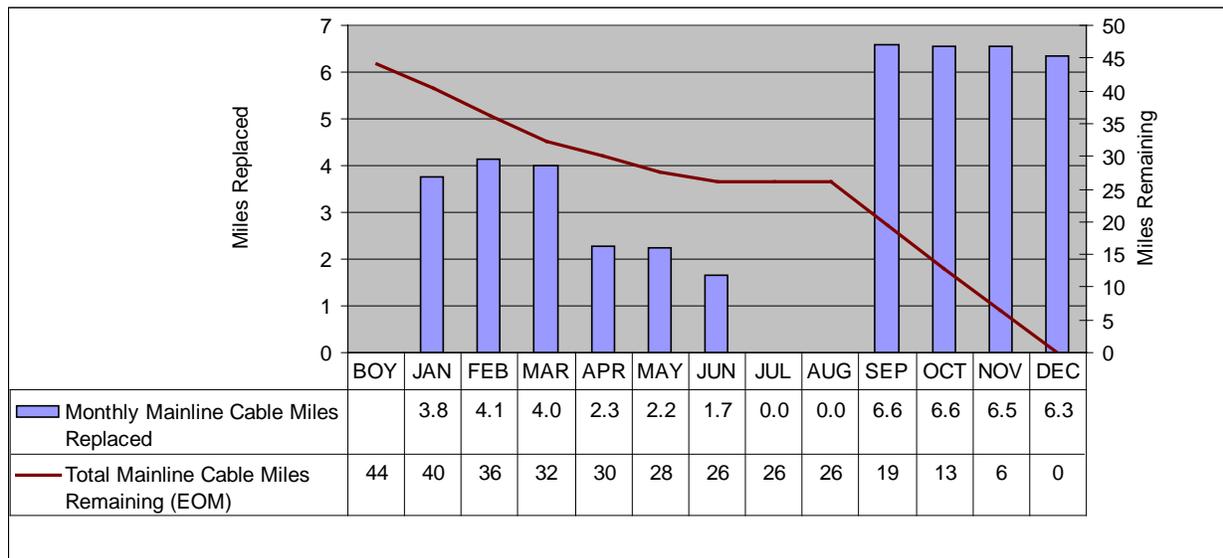
**FIGURE I.B.5.A: MANHOLE ASSESSMENT 2012 UNITS**



Cable Replacement

Figure I.B.5.B shows the estimated miles of Mainline cable to be replaced in 2012. It is expected that some cables will be replaced based on historical performance of the cable, without the need for prior VLF testing. This chart will serve as a tracking mechanism over the course of the year, and reflects the planned scope of work to be accomplished in 2012 as well as the scope of work left to be performed. The current estimate for replacement in 2012 is approximately 44 miles of mainline underground cable, which includes cables replaced and those that may fail VLF testing. Estimates of cost, units of work, and schedules for that work may evolve over time.

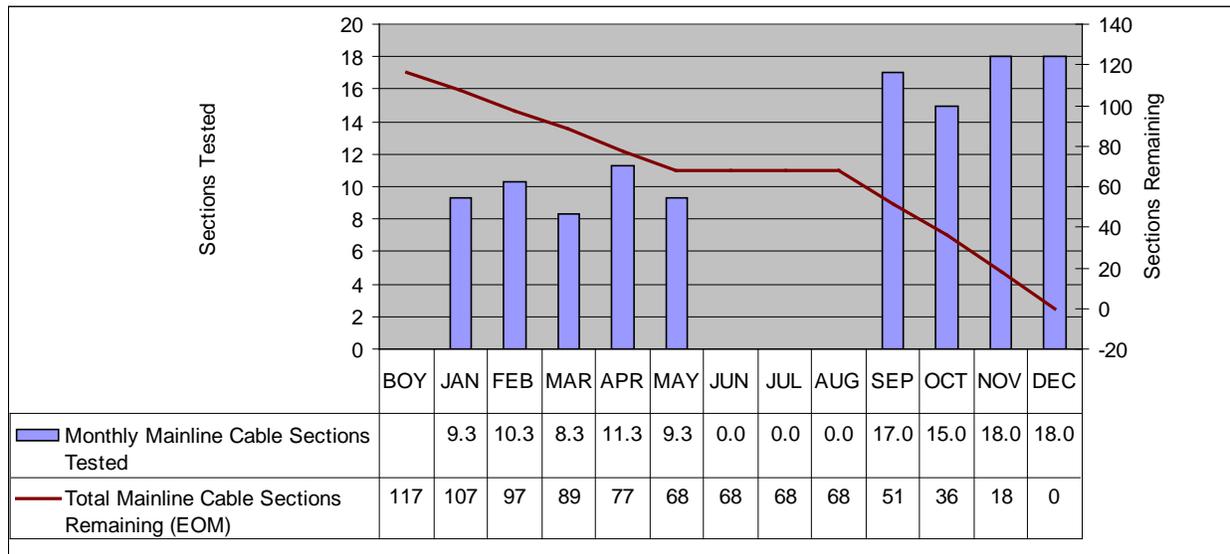
**FIGURE I.B.5.B: MAINLINE CABLE REPLACEMENT 2012 UNITS**



Cable Testing

Figure I.B.5.C shows the estimated number of sections of mainline cable to be VLF tested in 2012. This chart will serve as a tracking mechanism over the course of the year. This chart reflects the scope of work planned to be accomplished in 2012 as well as the scope of work left to be performed. It is estimated that approximately 117 sections of mainline cable will be VLF tested in 2012. Estimates of cost, units of work, and schedules for that work may evolve over time.

**FIGURE I.B.5.C: MAINLINE CABLE TESTING 2012 UNITS**



## **SECTION I.C: Ridgeland 69kV Cable Replacement**

### **I.C.1: 2012 Program Scope**

The Ridgeland 69kV cable system is approximately 40.5 circuit miles, composed of four cable subsystems: Solid Paper Lead (“PL”), Cross-Link Polyethylene (“XLPE”), Low Pressure Fluid Filled (“LPFF”), and High Pressure Fluid Filled (“HPFF”).

The cable replacement program for the Ridgeland area began in 1998, targeting poor performing paper insulated lines. The majority of the paper insulated lines that are being replaced were installed in the early 1950’s, although some were installed as early as 1927. Replacement of circuits with the reliable XLPE cable systems will increase the long term reliability in the area.

The focus of the 2012 program is to replace line L-19202Y Berwyn to Hawthorne, and line L-19204 Hawthorne to Cicero, representing approximately 3.2 circuit miles.

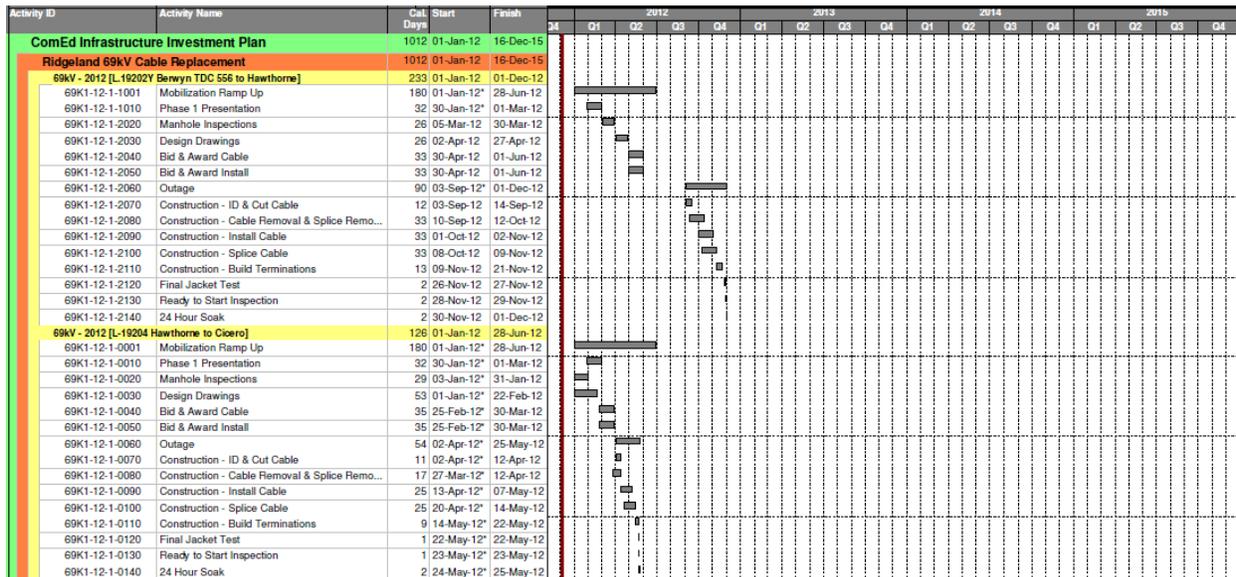
### **I.C.2: 2012 Program Schedule**

Figure I.C.2 presents the estimated schedule to complete the Ridgeland 69kV Cable Replacement 2012 scope of work. Estimates of cost, units of work, and schedules for that work may evolve over time. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Ramp-up period
- Establish replacement priority for the calendar year
- Perform scoping and configuration analysis; review sequence for capacity issues

- Perform design tasks, procure material, and identify required outages in schedule; include identified joint issues in evaluation
- Planning (develop work packages and secure permits)
- Construction – Remove old cable
- Construction – Pull / install new cable and splice
- Cable commissioning (test cable and liven)

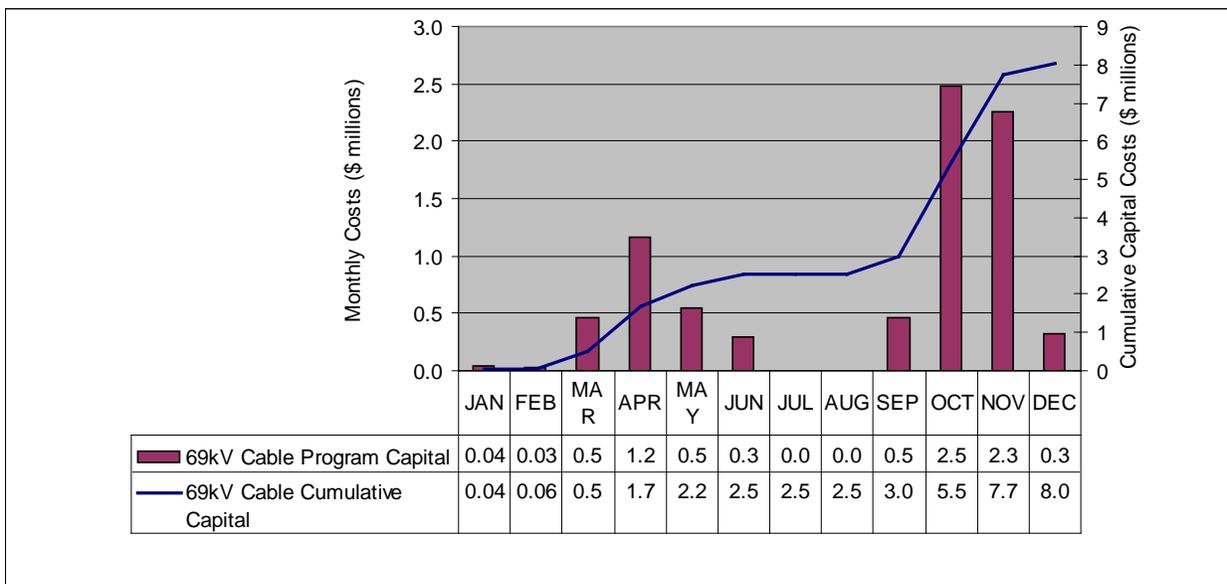
**FIGURE I.C.2: RIDGELAND 69KV CABLE REPLACEMENT 2012 SCHEDULE**



### I.C.3: 2012 Program Budget

Figure I.C.3 presents the estimated 2012 capital budget for the Ridgeland 69kV Cable Replacement program. ComEd estimates the 2012 program cost to be capital investments of \$8 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

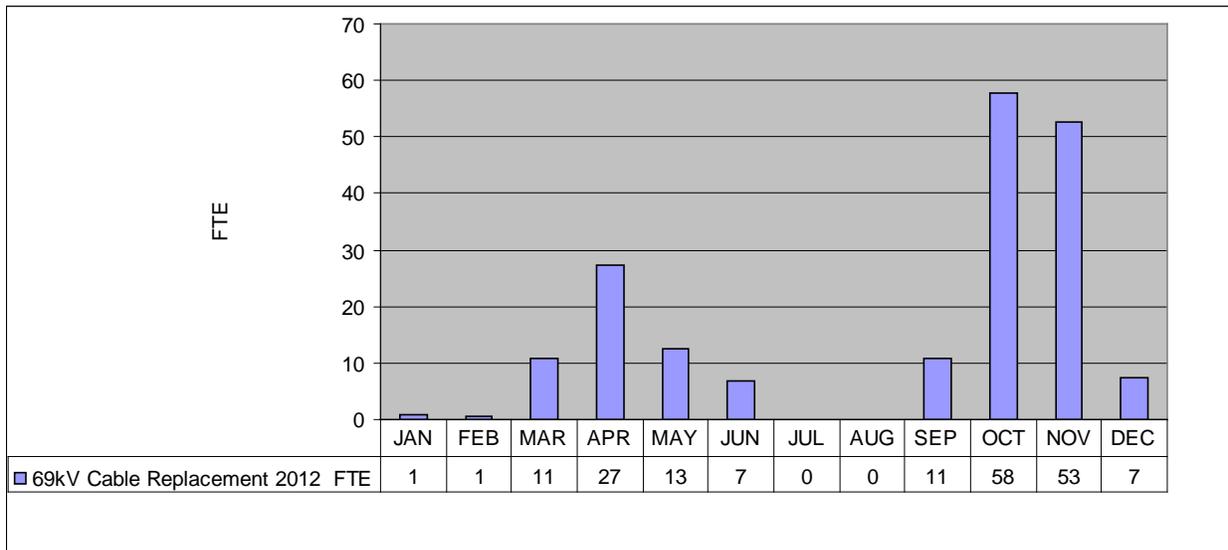
**FIGURE I.C.3: RIDGELAND 69kV REPLACEMENT CAPITAL BUDGET**



**I.C.4: 2012 Program FTEs**

Figure I.C.4 presents the estimated FTEs to perform the scheduled 2012 scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.C.4: RIDGELAND 69kV CABLE REPLACEMENT 2012 FTES**



## **SECTION I.D: Construction of Training Facilities**

### **I.D.1: 2012 Program Scope**

ComEd currently provides electric and customer operations training at five locations within its service territory, with one location being leased and two locations using temporary trailers. Under Section 16-108.5(b)(1)(A)(ii), ComEd must undertake training facility construction or upgrade projects totaling an estimated \$10,000,000. This Section further provides that, at a minimum, one facility must be located in a municipality having a population of more than 2 million residents and one facility must be located in a municipality having a population of between 150,000 and 170,000 residents. Accordingly, the Training Facilities program provides for construction of two training facilities - one facility to be located in Chicago (approximately 2.7 million residents); and one facility to be located in Rockford (approximately 153,000 residents). The Chicago facility will be designed for the purpose of obtaining certification under the United States Green Building Council's Leadership in Energy Efficiency Design (LEED) Green Building Rating System.

#### *Chicago Facility*

The Chicago facility will be designed for the purpose of obtaining, certification under the United States Green Building Council's Leadership in Energy Efficiency Design (LEED) Green Building Rating System. The Chicago facility will be an overhead, underground, substation construction, transmission underground, area operating and distribution operations training facility planned to have the following characteristics:

- Indoor space consisting of classrooms, instructor office space, restroom and locker facilities, indoor equipment area, new technology area, storage, conference room, student break area, food area (microwaves/refrigerators), 20 indoor underground cable splicing bays, and an indoor pole yard.
- Outdoor yard area consisting of approximately 40 poles and associated overhead primary and secondary conductors, overhead equipment, distribution automation equipment, URD distribution equipment, underground manholes and conduit, and substation equipment. The estimated yard size is 400' x 600'.

### Rockford Facility

The Rockford facility will be an overhead construction training facility planned to have the following characteristics:

- Indoor area consisting of classrooms, instructor office space, restroom & locker facilities, storage, conference room, student break area, and a food area (microwaves/refrigerators).
- Outdoor yard area consisting of approximately 40 poles and associated overhead primary and secondary conductors, overhead equipment, distribution automation equipment, and URD distribution equipment. The estimated yard size is 200' x 300'.

The 2012 scope for this program includes planning, ground-breaking and construction for the Rockford Facility, and initial planning and design for the Chicago Facility.

## **I.D.2: 2012 Program Schedule**

Figure I.D.2 presents the estimated schedule to complete the Training Facilities program. The Training Facilities program is planned to be completed over a three-year period. Estimates of cost, and units of work, and schedules for that work, may evolve over time. Given the relatively short duration of this program, the entire program schedule is shown here. The schedule consists of the following key tasks:

- Mobilization and ramp-up
- Building requirement and location research
- Concept and schematic design
- Construction design
- Construction documents
- Permitting
- Bidding process
- Award contract
- Construction phase
- Demobilization

**FIGURE I.D.2: TRAINING FACILITIES SCHEDULE**

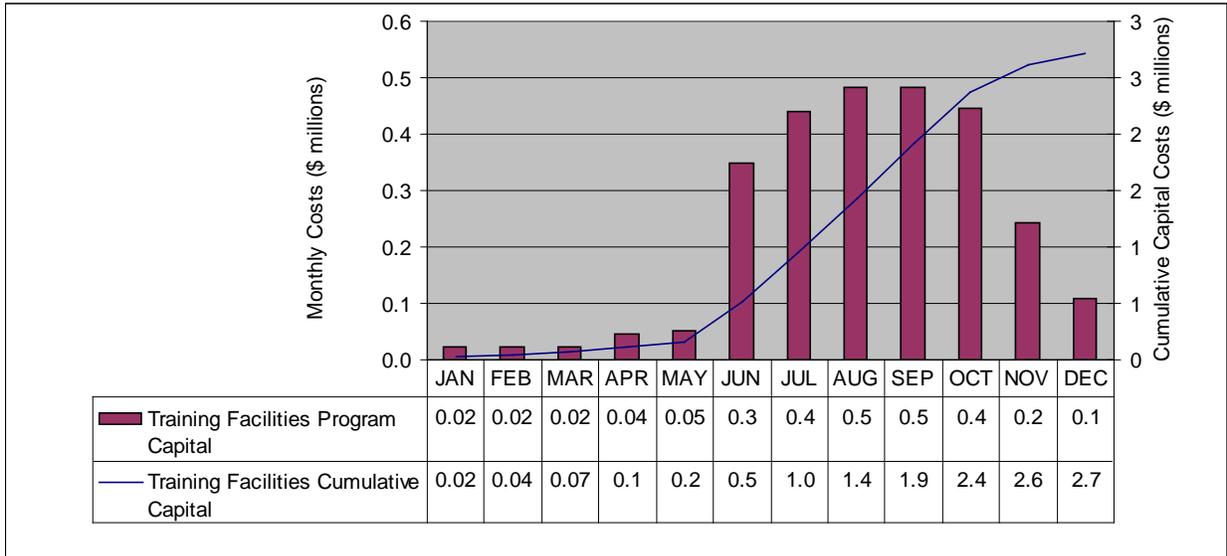
Activity ID	Activity Name	Cal. Days	Start	Finish	2012		2013		2014		2015		2016		2017
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
<b>ComEd Infrastructure Investment Plan</b>															
<b>Training Facilities</b>															
<b>Rockford Training Facility</b>															
FR-12-0010	Confirmation of project use and building square footage s...	10	20-Jan-12	29-Jan-12											
FR-12-0020	Confirmation of site needs and area	5	30-Jan-12	03-Feb-12											
FR-12-0030	Property search (size based on building at site needs det...	5	04-Feb-12	08-Feb-12											
FR-12-0040	Initial property selection	5	09-Feb-12	13-Feb-12											
FR-12-0110	Zoning analysis	5	14-Feb-12	18-Feb-12											
FR-12-0120	Geotechnical investigation	5	14-Feb-12	18-Feb-12											
FR-12-0130	Survey & title commitment analysis	5	14-Feb-12	18-Feb-12											
FR-12-0140	Easement and encumbrance analysis	5	14-Feb-12	18-Feb-12											
FR-12-0150	Site concept plan evaluation	5	14-Feb-12	18-Feb-12											
FR-12-0160	Property procurement & closing (based on favorable due ...	5	19-Feb-12	23-Feb-12											
FR-12-0310	Design Contracting	5	24-Feb-12	28-Feb-12											
FR-12-0320	Schematic Design: Cost Estimate	15	29-Feb-12	14-Mar-12											
FR-12-0330	Schematic Design: Preliminary meetings with City & otha...	15	15-Mar-12	29-Mar-12											
FR-12-0340	Design Development: Design Development Cost Estimate	29	29-Feb-12	28-Mar-12											
FR-12-0350	Construction Documents	21	30-Mar-12	19-Apr-12											
FR-12-0360	Submit for Building Permit	30	20-Apr-12	19-May-12											
FR-12-0370	Issue Construction Documents for Bidding	0		20-Apr-12											
FR-12-0380	Bidding & scope reviews	30	20-Apr-12	19-May-12											
FR-12-0385	Award Construction Contracts	0		19-May-12											
FR-12-0390	Contractor submittals and reviews by design professional	15	20-May-12	04-Jun-12											
FR-12-0410	Mobilization	2	03-Jun-12	04-Jun-12											
FR-12-0420	Property clearing and grubbing	5	05-Jun-12	08-Jun-12											
FR-12-0430	Site work and mass grading	10	10-Jun-12	19-Jun-12											
FR-12-0440	Site Utilities	14	20-Jun-12	03-Jul-12											
FR-12-0450	Foundation excavation, forming, pouring and backfill	18	03-Jul-12	21-Jul-12											
FR-12-0460	Building structure erection	31	20-Jul-12	19-Aug-12											
FR-12-0465	Site Work (Pavin etc...)	20	20-Aug-12	08-Sep-12											
FR-12-0470	Building exterior enclosure	16	20-Aug-12	06-Sep-12											
FR-12-0480	Mechanical, Electrical, Plumbing & Fire Protection (MEP)...	15	06-Sep-12	20-Sep-12											
FR-12-0490	Interior framing	15	21-Sep-12	06-Oct-12											
FR-12-0500	Interior finishes	10	06-Oct-12	15-Oct-12											
FR-12-0510	MEP Trim	10	16-Oct-12	25-Oct-12											
FR-12-0520	Systems start-up and testing	10	26-Oct-12	04-Nov-12											
FR-12-0530	Equipment & Technology Installation	15	05-Nov-12	19-Nov-12											
FR-12-0540	Substantial Completion	0		19-Nov-12											
FR-12-0550	Punch list & walk through	29	20-Nov-12	20-Dec-12											
FR-12-0555	Final Completion	0		20-Dec-12											
<b>Chicago Training Facility</b>															
FR-12-1010	Confirmation of project use and building square footage s...	5	20-Jun-12	24-Jun-12											
FR-12-1020	Confirmation of site needs and area	5	25-Jun-12	28-Jun-12											
FR-12-1030	Property search (size based on building at site needs det...	10	30-Jun-12	10-Jul-12											
FR-12-1040	Initial property selection	10	11-Jul-12	20-Jul-12											
FR-12-1110	Zoning analysis	10	21-Jul-12	30-Jul-12											
FR-12-1120	Geotechnical investigation	10	21-Jul-12	30-Jul-12											
FR-12-1130	Survey & title commitment analysis	10	21-Jul-12	30-Jul-12											
FR-12-1140	Easement and encumbrance analysis	10	21-Jul-12	30-Jul-12											
FR-12-1150	Site concept plan evaluation	10	21-Jul-12	30-Jul-12											
FR-12-1160	Property procurement & closing (based on favorable due ...	10	31-Jul-12	08-Aug-12											
FR-12-1310	Design Contracting	10	10-Aug-12	19-Aug-12											
FR-12-1320	Schematic Design: Cost Estimate	30	20-Aug-12	19-Sep-12											
FR-12-1330	Schematic Design: Preliminary meetings with City & otha...	30	20-Sep-12	19-Oct-12											
FR-12-1340	Design Development: Design Development Cost Estimate	60	20-Aug-12	19-Oct-12											
FR-12-1350	Construction Documents	32	20-Oct-12	20-Nov-12											
FR-12-1360	Issue Construction Documents for Bidding	0		20-Nov-12											
FR-12-1370	Submit for Building Permit	30	20-Nov-12	21-Dec-12											
FR-12-1380	Bidding & scope reviews	86	21-Nov-12	20-Feb-13											
FR-12-1385	Award Construction Contracts	0		20-Feb-13											
FR-12-1390	Contractor submittals and reviews by design professional	110	21-Feb-13	11-Jun-13											
FR-12-1410	Mobilization	1	12-Jun-13	12-Jun-13											
FR-12-1420	Property clearing and grubbing	7	13-Jun-13	19-Jun-13											
FR-12-1430	Site work and mass grading	10	20-Jun-13	29-Jun-13											
FR-12-1440	Site Utilities	26	30-Jun-13	26-Jul-13											
FR-12-1450	Foundation excavation, forming, pouring and backfill	27	26-Jul-13	21-Aug-13											
FR-12-1460	Building structure erection	120	20-Aug-13	20-Dec-13											
FR-12-1465	Site Work (Pavin etc...)	20	22-Mar-14	10-Apr-14											
FR-12-1470	Building exterior enclosure	20	21-Dec-13	12-Jan-14											
FR-12-1480	Mechanical, Electrical, Plumbing & Fire Protection (MEP)...	20	13-Jan-14	02-Feb-14											
FR-12-1490	Interior framing	20	03-Feb-14	22-Feb-14											
FR-12-1500	Interior finishes	15	23-Feb-14	08-Mar-14											
FR-12-1510	MEP Trim	15	10-Mar-14	24-Mar-14											
FR-12-1520	Systems start-up and testing	10	25-Mar-14	03-Apr-14											
FR-12-1530	Equipment & Technology Installation	18	04-Apr-14	21-Apr-14											
FR-12-1540	Substantial Completion	0		21-Apr-14											
FR-12-1550	Punch list & walk through	31	22-Apr-14	22-May-14											
FR-12-1555	Final Completion	0		22-May-14											

**I.D.3: 2012 Program Budget**

Pursuant to Section 16-108.5(b) of the Act, ComEd will invest in training facility construction or upgrade projects totaling an estimated \$2.7 million under the 2012 Plan.

Figure I.D.3 presents the estimated 2012 budget for the Training Facilities program to be accounted for under the 2012 Plan.<sup>1</sup>

**FIGURE I.D.3: TRAINING FACILITIES 2012 CAPITAL BUDGET UNDER PLAN**

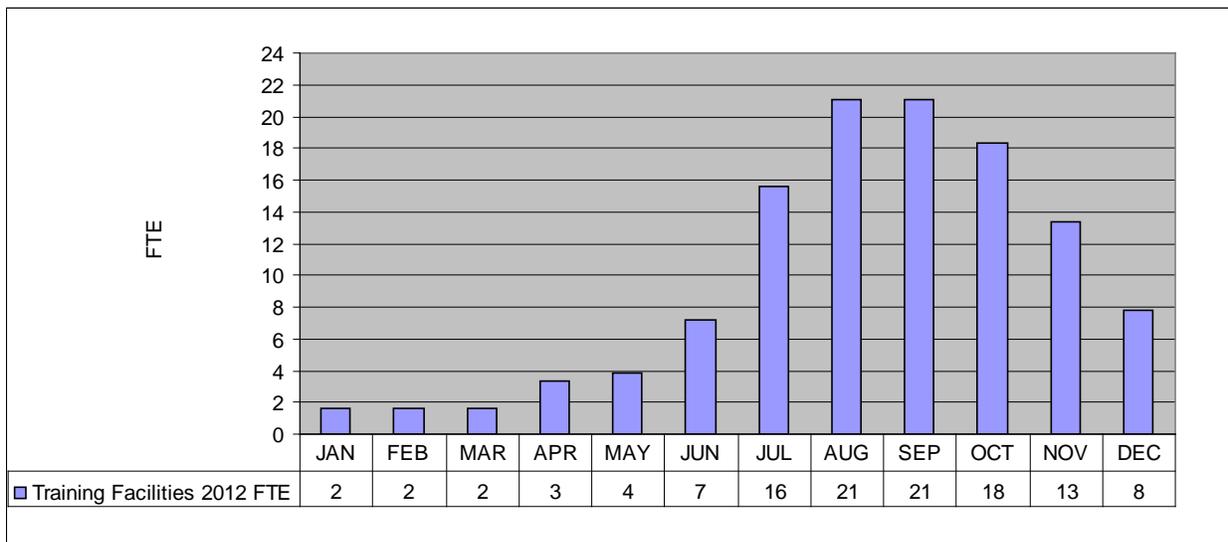


<sup>1</sup> Although the 2012 Plan includes capital investments of \$2.7 million in Training Facilities, plus associated expenses, pursuant to Section 16-108.5(b) of the Act, this does not limit ComEd’s ability to make additional capital investments in Training Facilities through baseline capital investments at ComEd’s discretion.

**I.D.4: 2012 Program FTEs**

Figure I.D.4 presents the estimated FTEs to perform the scheduled 2012 scope of work for the Training Facilities program. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.D.4: TRAINING FACILITIES 2012 FTES**



## **SECTION I.E: Wood Pole Inspection, Treatment and Replacement**

### **I.E.1: 2012 Program Scope**

The 2012 Wood Pole Inspection, Treatment and Replacement program entails inspection and required treatment of an estimated 133,400 poles. Based on ComEd's past inspection experience, about 2,500 pole replacements or reinforcements are estimated to be identified from the inspections in 2012.

### **I.E.2: 2012 Program Schedule**

Figure I.E.2 presents the estimated 2012 schedule to complete the Wood Pole Inspection, Treatment and Replacement program. Estimates of cost, units of work, and schedules for that work may evolve over time. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following tasks:

- Ramp-up period
- Establish work priority for the calendar year
- Perform inspections
- Perform scoping and configuration analysis for pole treatments or replacements
- Perform design tasks, procure material, and identify required outages in schedule
- Planning (develop work packages and secure permits)
- Construction – replace, treat or reinforce poles
- Liven circuits

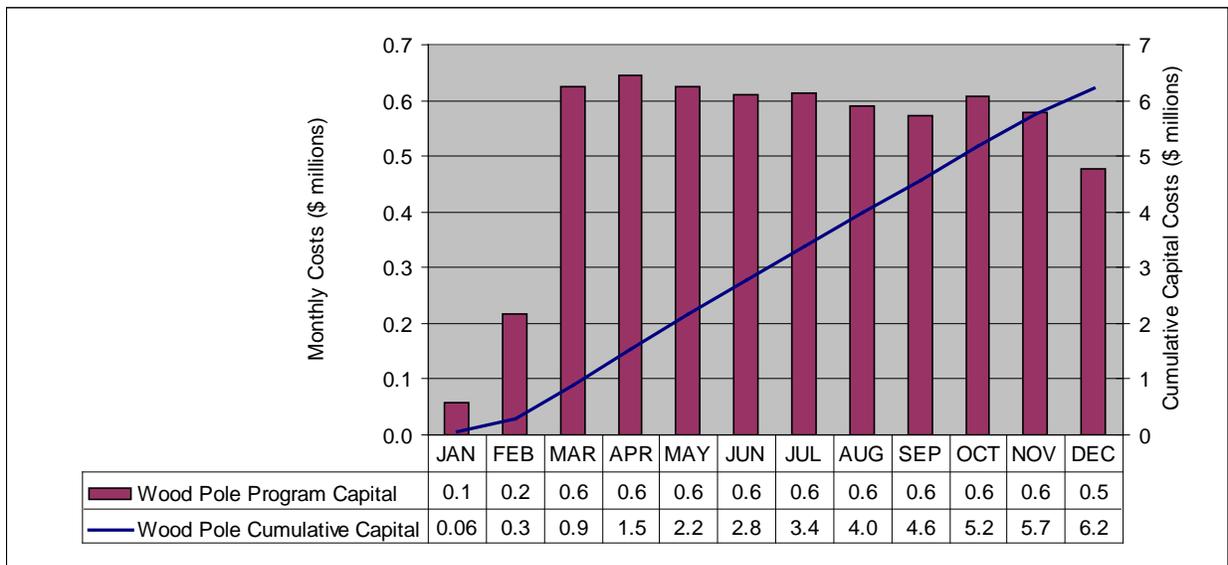
**FIGURE I.E.2: WOOD POLE INSPECTION, TREATMENT AND REPLACEMENT 2012 SCHEDULE**

Activity ID	Activity Name	Cal. Days	Start	Finish	2012			2013			2014			2015			2016			2017
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
<b>ComEd Infrastructure Investment Plan</b>					1233	01-Jan-12	20-Oct-16													
<b>Wood Pole Inspection, Treatment, &amp; Replace...</b>					1233	01-Jan-12	20-Oct-16													
WP1-12-1-0001	Mobilization Ramp Up	180	01-Jan-12	01-Jul-12																
WP1-12-1-0100	Work Priority - Reinforce for 2012	0	01-Jan-12																	
WP1-12-1-0200	Inspect Poles for 2012 - 3rd Q	90	01-Jan-12	01-Apr-12																
WP1-12-1-0300	Scope for 2012 - 3rd Q	90	01-Feb-12	30-Apr-12																
WP1-12-1-0400	Construction - Reinforcing for 2012 - 3rd Q	180	01-Apr-12	30-Sep-12																
WP1-12-1-0500	Design / Procure / Planning - Replacement for 2012 - 3rd Q	90	01-Apr-12	30-Jun-12																
WP1-12-1-0600	Construction - Replacement for 2012 - 3rd Q	180	01-Jul-12	03-Jan-13																
WP1-12-2-0200	Inspect Poles for 2012 - 4th Q	90	01-Apr-12	30-Jun-12																
WP1-12-2-0300	Scope for 2012 - 4th Q	90	01-May-12	31-Jul-12																
WP1-12-2-0400	Construction - Reinforcing for 2012 - 4th Q	180	01-Jul-12	03-Jan-13																
WP1-12-2-0500	Design / Procure / Planning - Replacement for 2012 - 4th Q	90	01-Jul-12	30-Sep-12																
WP1-12-2-0600	Construction - Replacement for 2012 - 4th Q	180	01-Oct-12	04-Apr-13																
WP1-12-3-0200	Inspect Poles for 2013 - 1st Q	90	01-Jul-12	30-Sep-12																
WP1-12-3-0300	Scope for 2013 - 1st Q	90	01-Aug-12	30-Oct-12																
WP1-12-3-0400	Construction - Reinforcing for 2013 - 1st Q	180	01-Oct-12	04-Apr-13																
WP1-12-3-0500	Design / Procure / Planning - Replacement for 2013 - 1st Q	90	01-Oct-12	03-Jan-13																
WP1-12-3-0600	Construction - Replacement for 2013 - 1st Q	180	02-Jan-13	02-Jul-13																
WP1-12-4-0200	Inspect Poles for 2013 - 2nd Q	90	01-Oct-12	03-Jan-13																
WP1-12-4-0300	Scope for 2013 - 2nd Q	90	01-Nov-12	04-Feb-13																
WP1-12-4-0400	Construction - Reinforcing for 2013 - 2nd Q	180	02-Jan-13	02-Jul-13																
WP1-12-4-0500	Design / Procure / Planning - Replacement for 2013 - 2nd...	90	02-Jan-13	02-Apr-13																
WP1-12-4-0600	Construction - Replacement for 2013 - 2nd Q	180	01-Apr-13	30-Sep-13																
WP2-13-1-0100	Work Priority - Reinforce for 2013	0	01-Oct-12																	

### I.E.3: 2012 Program Budget

Figure I.E.3 presents the estimated 2012 capital budget for the Wood Pole Inspection, Treatment and Replacement program. ComEd estimates the 2012 program cost to be capital investments of \$6 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

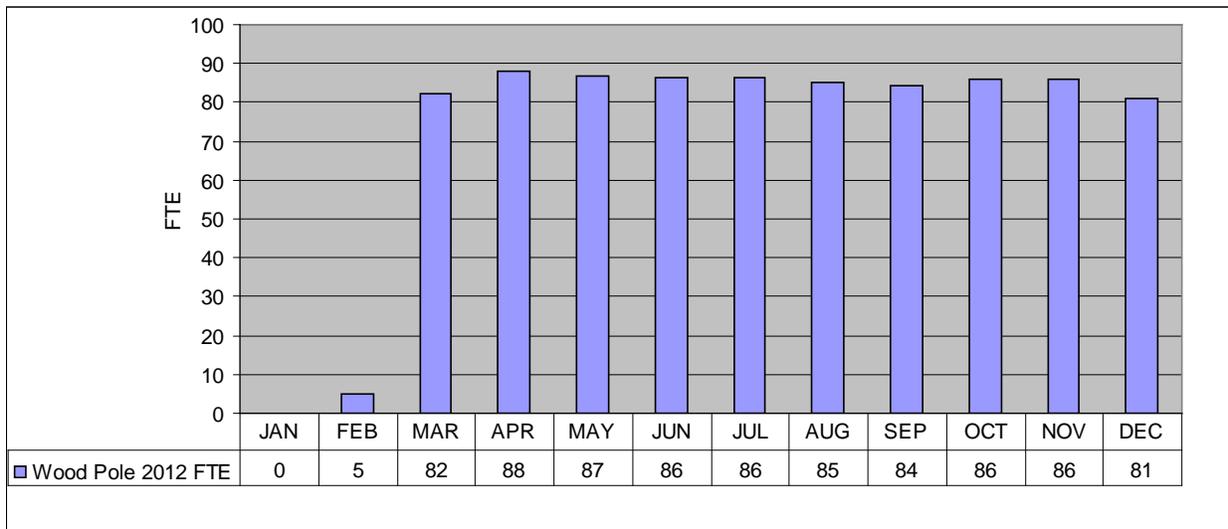
**FIGURE I.E.3: WOOD POLE INSPECTION, TREATMENT AND REPLACEMENT 2012 CAPITAL BUDGET**



**I.E.4: 2012 Program FTEs**

Figure I.E.4 presents the estimated FTEs to perform the scheduled scope of work for the Wood Pole Inspection, Treatment and Replacement program in 2012. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.E.4: WOOD POLE INSPECTION, TREATMENT AND REPLACEMENT 2012 FTES**



## I.E.5: Program Units

### Wood Pole Inspection

Figure I.E.5 shows the estimated quantity of wood poles to be inspected in 2012. This chart will serve as a tracking mechanism over the course of the year, and reflects the scope of work planned to be accomplished as well as the scope of work left to be performed. It is estimated that approximately 133,400 wood poles will be inspected in 2012. Estimates of cost, units of work, and schedules for that work may evolve over time.

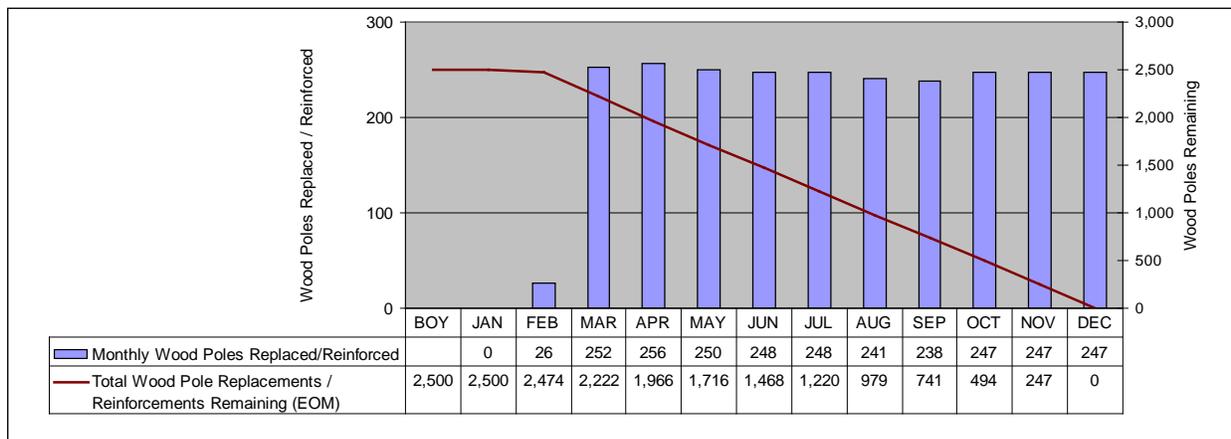
**FIGURE I.E.5: WOOD POLE INSPECTION UNITS**



Wood Pole Replacement/ Reinforcement

Figure I.E.6 shows the estimated quantity of wood poles to be replaced or reinforced in 2012. This chart will serve as a tracking mechanism over the course of the year, and reflects the scope of work planned to be accomplished as well as the scope of work left to be performed. It is estimated that approximately 2,500 wood poles will be replaced or reinforced in 2012. Estimates of cost, units of work, and schedules for that work may evolve over time. This estimate is based on assumptions concerning inspection results which will be adjusted over time as actual data become available. Early estimates of wood pole replacement / reinforcements such as these, therefore, contain a high degree of uncertainty and are not intended to reflect firm scope.

**FIGURE I.E.6: WOOD POLE REPLACEMENT/REINFORCEMENT UNITS**



## **SECTION I.F: Storm Hardening**

### **I.F.1: 2012 Program Scope**

Storm hardening is designed to further reduce the susceptibility of certain circuits to storm-related damage, including but not limited to high winds, thunderstorms, and ice storms. Improvements may include, but are not limited to, overhead to underground conversion, installation of tree-resistant cable, additional vegetation management and other engineered solutions. This program is aimed at hardening facilities in accordance with the directives of Section 16-108.5(b) of the Act, and is not directed at any defect or failure to properly design, engineer, construct, or maintain the existing system.

Additionally, while storm hardening is designed to further reduce the susceptibility of circuits to storm-related damage, it does not make circuits immune to damage from storms or other sources.

Circuits will be prioritized based on each circuit's historical susceptibility to storm-related damage and the ability to provide the greatest customer benefit upon completion of the improvement.

For a circuit to be eligible for improvement, ComEd's ability to maintain proper tree clearances surrounding the overhead circuit must not have been impeded by third parties.

Considerations for storm hardening of circuits include, but are not limited to:

- Mainline Circuits - (Focus on circuits with the highest customer storm impact)
  - 4 kV and 12kV overhead circuits

- Prioritized by weighted reliability (SAIFI, Customers Served) and vegetation scores from 2008 to 2011
- Circuits with fewer than 500 customers
- Engineering review for determining targeted mainline portions and hardening solution
- Circuit Taps- (Focus on circuits with pocket area storm duration impact)
  - 4kV and 12kV overhead circuits
  - Prioritized by weighted reliability (SAIFI, customer Interruptions) and vegetation scores from 2008 to 2011
  - Circuit tap must meet vegetation outage and CAIDI gates
  - Engineering review for determining tap portions and hardening solutions (e.g., URD, spacer cable, and enhanced trimming)

The 2012 scope for this program will consist of prioritizing circuits and identification of appropriate hardening solutions for each, and addressing 2012 priority circuits.

## **I.F.2: 2012 Program Schedule**

Figure I.F.2 presents the estimated schedule to complete the Storm Hardening program. Estimates of cost, units of work, and schedules for that work, may evolve over time. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Ramp-up period

- Establish priority for the calendar year
- Perform scoping and configuration analysis; review sequence for capacity issues
- Perform design tasks, procure material, and identify required outages in schedule
- Planning (develop work packages and secure permits)
- Construction – Install conduit when required
- Construction – Cable terminal pole work
- Construction – Install cable / overhead conductor / other engineered solutions
- Test cable / conductor and liven

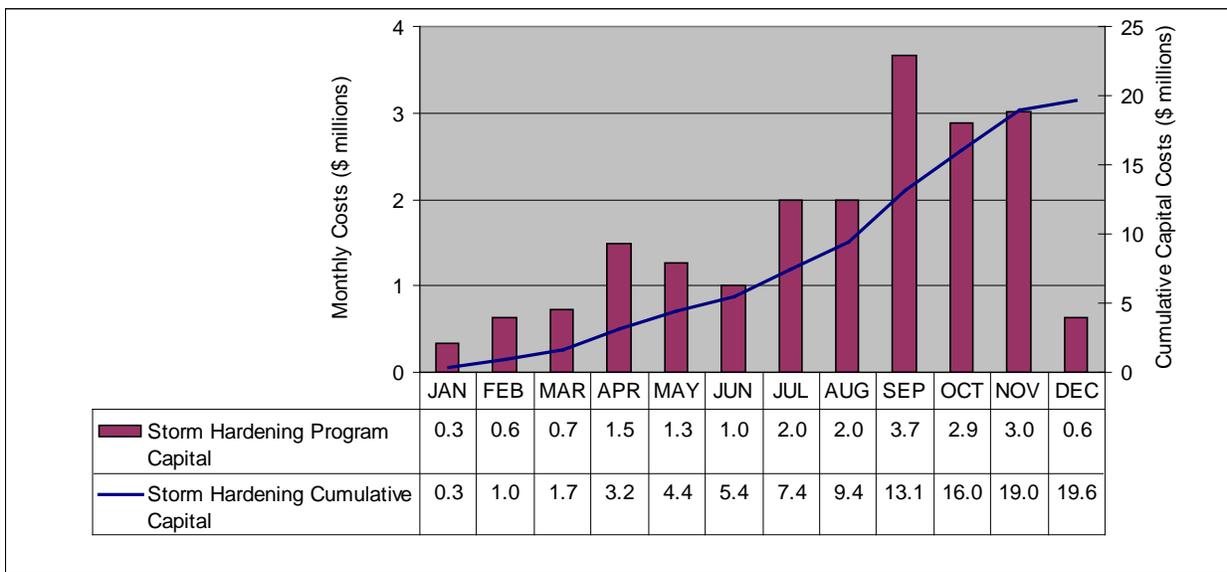
**FIGURE I.F.2: STORM HARDENING 2012 SCHEDULE**

Activity ID	Activity Name	Cal. Days	Start	Finish	2012	2013	2014	2015	2016	2017
					Q	Q	Q	Q	Q	Q
<b>ComEd Infrastructure Investment Plan</b>										
<b>Storm Hardening</b>										
		1233	01-Jan-12	26-Oct-16						
FT1-12-1-0001	Mobilization Ramp Up	180	01-Jan-12	01-Jul-12	■					
FT1-12-1-0100	Work Priority 2012	0	01-Jan-12	01-Jul-12	◆					
FT1-12-1-0150	Work Scope - 2012 3rd Q	90	01-Jan-12	01-Apr-12	■					
FT1-12-1-0200	Design / Procure / Outage - 2012 3rd Q	90	01-Feb-12	30-Apr-12	■					
FT1-12-1-0250	Work Planning - 2012 3rd Q	90	01-Apr-12	30-Jun-12	■					
FT1-12-1-0300	Construction - Overhead - 2012 3rd Q	180	01-Jul-12	03-Jan-13	■					
FT1-12-2-0150	Work Scope - 2012 4th Q	90	01-Apr-12	30-Jun-12	■					
FT1-12-2-0200	Design / Procure / Outage - 2012 4th Q	90	01-May-12	31-Jul-12	■					
FT1-12-2-0250	Work Planning - 2012 4th Q	90	01-Jul-12	30-Sep-12	■					
FT1-12-2-0300	Construction - Overhead - 2012 4th Q	180	01-Oct-12	04-Apr-13	■					
FT1-12-3-0100	Work Priority 2013	0	01-Apr-12	01-Jul-12	◆					
FT1-12-3-0150	Work Scope - 2013 1st Q	90	01-Jul-12	30-Sep-12	■					
FT1-12-3-0200	Design / Procure / Outage - 2013 1st Q	90	01-Aug-12	30-Oct-12	■					
FT1-12-3-0250	Work Planning - 2013 1st Q	90	01-Oct-12	03-Jan-13	■					
FT1-12-3-0300	Construction - Overhead - 2013 1st Q	180	02-Jan-13	02-Jul-13	■					
FT1-12-4-0150	Work Scope - 2013 2nd Q	90	01-Oct-12	03-Jan-13	■					
FT1-12-4-0200	Design / Procure / Outage - 2013 2nd Q	90	01-Nov-12	04-Feb-13	■					

### I.F.3: 2012 Program Budget

Figure I.F.3 presents the estimated 2012 capital budget for the Storm Hardening program. ComEd estimates the 2012 program cost to be capital investments of \$20 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

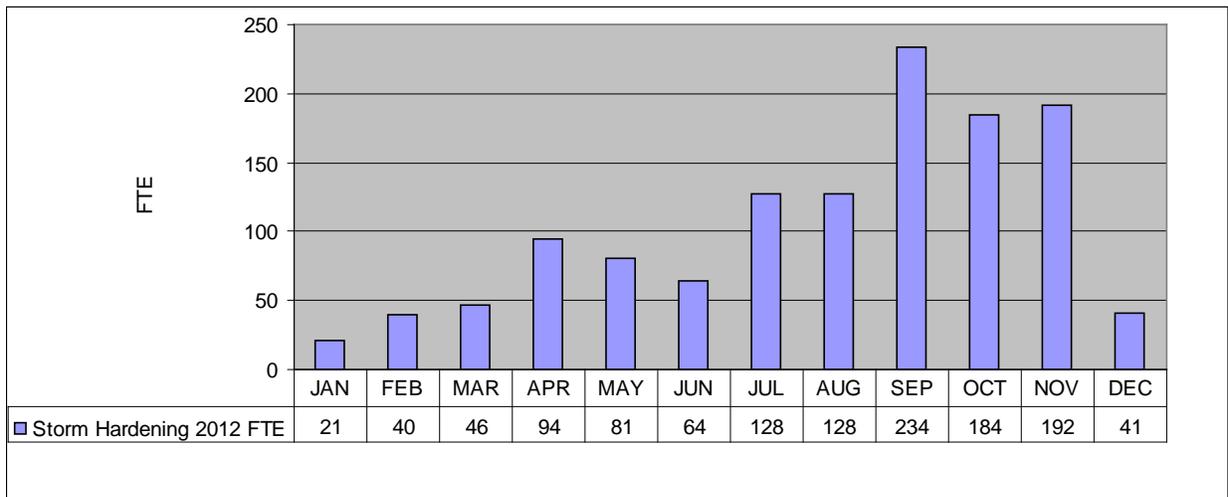
**FIGURE I.F.3: STORM HARDENING 2012 CAPITAL BUDGET**



**I.F.4: 2012 Program FTEs**

Figure I.F.4 presents the estimated FTEs to perform the scheduled 2012 scope of work for the Storm Hardening program. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE I.F.4: STORM HARDENING 2012 FTES**



## **SECTION II: SMART GRID-RELATED INVESTMENTS**

### **SECTION II.A: Distribution Automation**

#### **II.A.1: 2012 Program Scope**

Distribution Automation (“DA”) technology uses “sectionalizing” devices and remote communications to detect issues on the distribution system and automatically re-route power, accordingly, to minimize the number of customers impacted. This is commonly referred to as the self-healing nature of the Smart Grid.

The ComEd DA technologies include:

- Field sectionalizing devices to detect and isolate faults at various segments of the distribution system;
- A radio system to remotely transmit and relay control functions and indicate the status of various system parameters; and
- The computer systems that control, operate, monitor and store the data for the DA system.

The DA program targets installing DA field devices, and also encompasses the replacement of the older 900 MHZ radio system with a new higher security system that meets newly-established government regulations. In addition, the older 34kV field devices will be upgraded to the newer Intelli-team (“IT-2”) software to allow for better flexibility with fault isolation and operation with the new radio system.

The DA program includes the planned installation of an estimated 470 new DA devices in 2012.

## **II.A.2: 2012 Program Schedule**

Figure II.A.2 presents the estimated schedule to complete the DA 2012 scope. Estimates of cost, units of work, and schedules for that work, may evolve over time. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Ramp-up period
- Establish priority for the calendar year
- Perform scoping
- Perform design tasks, procure material, and identify required outages in schedule
- Planning (develop work packages and secure permits)
- Construction – install reclosers
- Construction – install radios, repeaters
- Test and liven

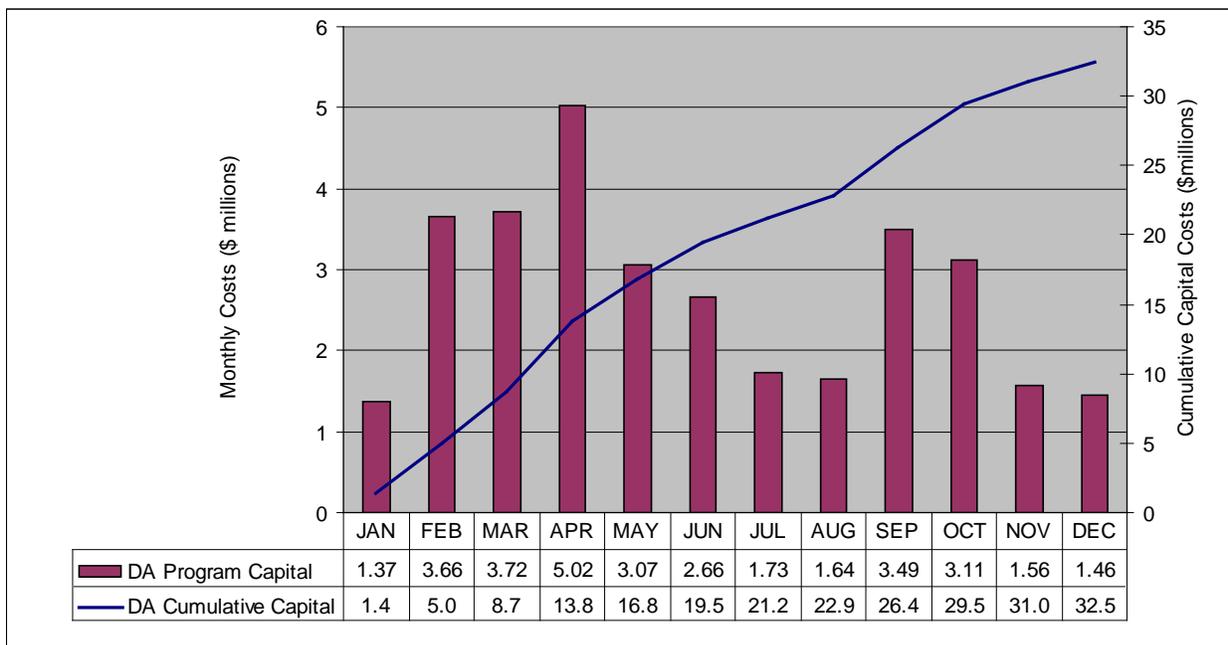
**FIGURE II.A.2: DISTRIBUTION AUTOMATION 2012 SCHEDULE**

Activity ID	Activity Name	Cal. Days	Start	Finish	2012	2013	2014	2015	2016	2017
					Q	Q	Q	Q	Q	Q
<b>ComEd Infrastructure Investment Plan</b>										
<b>Distribution Automation</b>										
DA1-12-1-0001	Mobilization Ramp Up	180	01-Jan-12	01-Jul-12						
DA1-12-1-0100	Work Priority for 2012	0	01-Jan-12	01-Jan-12						
DA1-12-1-0200	Scoping (Schema, Relay Setting Order & Repeater) for 2...	90	01-Jan-12	01-Apr-12						
DA1-12-1-0300	Design/ Procuro/ Outaga for 2012 - 3rd Q	90	01-Mar-12	30-May-12						
DA1-12-1-0400	Planning for 2012 - 3rd Q	90	01-May-12	31-Jul-12						
DA1-12-1-0600	Construction - Reclosers for 2012 - 3rd Q	180	01-Jul-12	03-Jan-13						
DA1-12-1-0650	Construction - Install Radio / Repeater for 2012 - 3rd Q	180	01-Jul-12	03-Jan-13						
DA1-12-1-0700	Testing & Livening for 2012 - 3rd Q	180	01-Aug-12	03-Feb-13						
DA1-12-2-0200	Scoping (Schema, Relay Setting Order & Repeater) for 2...	90	01-Apr-12	30-Jun-12						
DA1-12-2-0300	Design/ Procuro/ Outaga for 2012 - 4th Q	90	01-Jun-12	30-Aug-12						
DA1-12-2-0400	Planning for 2012 - 4th Q	90	01-Aug-12	30-Oct-12						
DA1-12-2-0600	Construction - Reclosers for 2012 - 4th Q	180	01-Oct-12	04-Apr-13						
DA1-12-2-0650	Construction - Install Radio / Repeater for 2012 - 4th Q	180	01-Oct-12	04-Apr-13						
DA1-12-2-0700	Testing & Livening for 2012 - 4th Q	180	01-Nov-12	05-May-13						
DA1-12-3-0200	Scoping (Schema, Relay Setting Order & Repeater) for 2...	90	01-Jul-12	30-Sep-12						
DA1-12-3-0300	Design/ Procuro/ Outaga for 2013 - 1st Q	90	01-Sep-12	02-Dec-12						
DA1-12-3-0400	Planning for 2013 - 1st Q	90	01-Nov-12	04-Feb-13						
DA1-12-3-0600	Construction - Reclosers for 2013 - 1st Q	180	02-Jan-13	02-Jul-13						
DA1-12-3-0650	Construction - Install Radio / Repeater for 2013 - 1st Q	180	02-Jan-13	02-Jul-13						
DA1-12-3-0700	Testing & Livening for 2013 - 1st Q	180	01-Feb-13	01-Aug-13						
DA1-12-4-0200	Scoping (Schema, Relay Setting Order & Repeater) for 2...	90	01-Oct-12	03-Jan-13						
DA1-12-4-0300	Design/ Procuro/ Outaga for 2013 - 2nd Q	90	01-Dec-12	04-Mar-13						
DA1-12-4-0400	Planning for 2013 - 2nd Q	90	01-Feb-13	01-May-13						
DA1-12-4-0600	Construction - Reclosers for 2013 - 2nd Q	180	01-Apr-13	30-Sep-13						
DA1-12-4-0650	Construction - Install Radio / Repeater for 2013 - 2nd Q	180	01-Apr-13	30-Sep-13						
DA1-12-4-0700	Testing & Livening for 2013 - 2nd Q	180	01-May-13	30-Oct-13						
DA2-13-1-0100	Work Priority for 2013	0	01-Oct-12	01-Oct-12						

### II.A.3: 2012 Program Budget

Figure II.A.3 presents the estimated 2012 capital budget for the DA program. ComEd estimates the program cost to be capital investments of \$33 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

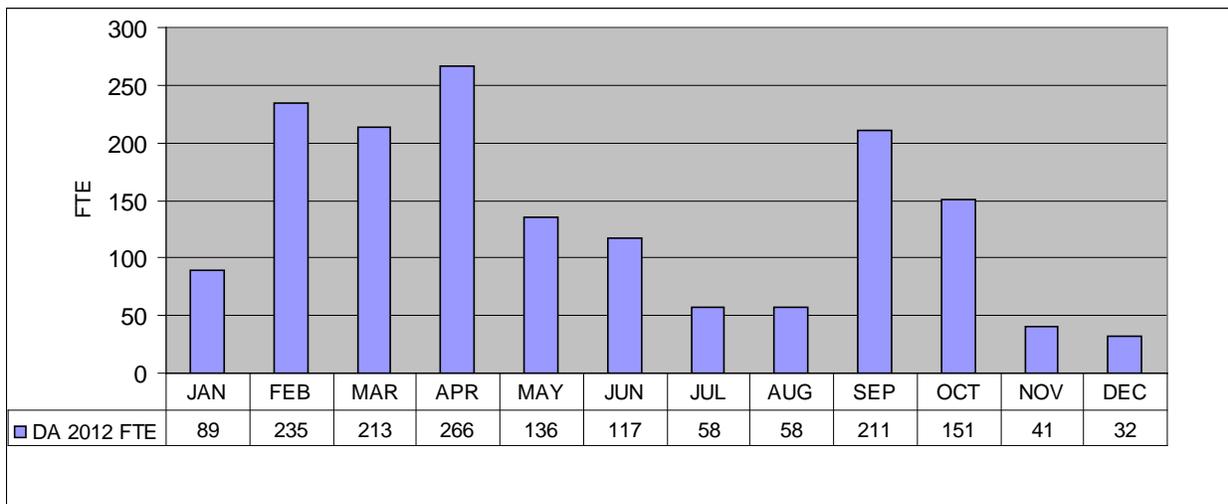
**FIGURE II.A.3: DISTRIBUTION AUTOMATION 2012 CAPITAL BUDGET**



## II.A.4: 2012 Program FTEs

Figure II.A.4 presents the estimated FTEs required to perform the scheduled 2012 scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

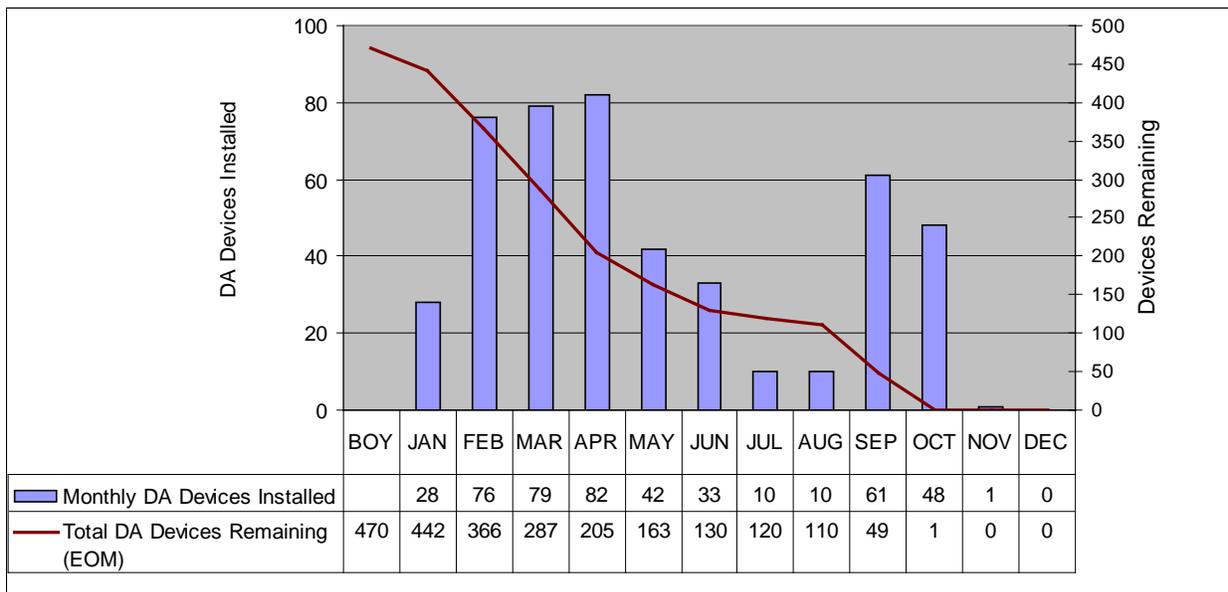
**FIGURE II.A.4: DISTRIBUTION AUTOMATION 2012 FTES**



## II.A.5: 2012 Program Units

Figure II.A.5 shows the estimated quantity of DA devices to be installed in 2012. This chart will serve as a tracking mechanism over the course of the year, and reflects the scope of work to be accomplished, as well as the scope of work left to be performed. It is estimated that approximately 470 DA devices will be installed in 2012. Estimates of cost, units of work, and schedules for that work may evolve over time.

**FIGURE II.A.5: DISTRIBUTION AUTOMATION 2012 UNITS**



## **SECTION II.B: Substation Micro-Processor Relay Upgrades**

### **II.B.1: 2012 Program Scope**

This program is planned to modernize ten ComEd substations, including upgrade of electro-mechanical protective relays to modern microprocessor-based devices, replacement of aging circuit breakers, enabling two-way communications between ComEd's control center and each substation, and installation of technology to remotely monitor the health of ComEd's largest assets, its transformers. This program provides for fault detection, remote asset monitoring, improved site security, and dynamic voltage regulation. Partial upgrades may be applied across the service territory. ComEd has over 250 transmission-fed substations, and over 800 substations in total.

The 2012 scope of work for this program includes upgrade of one substation, and initial design and engineering for two substations that are planned for upgrade in 2013.

### **II.B.2: 2012 Program Schedule**

Figure II.B.2 presents the estimated schedule to complete the Substation Micro-Processor Relay Upgrade 2012 scope of work. Estimates of cost, units of work, and schedules for that work may evolve over time. The schedule consists of high level tasks for the scope of work associated with the 2012 Plan, including the following key tasks:

- Ramp-up period
- Establish priority for the calendar year
- Perform scoping

- Perform design tasks, procure material, and identify required outages in schedule
- Relay and protection schemes
- Planning tasks
- Construction – install conduit, breakers, monitoring, micro-processor relays
- Test and liven

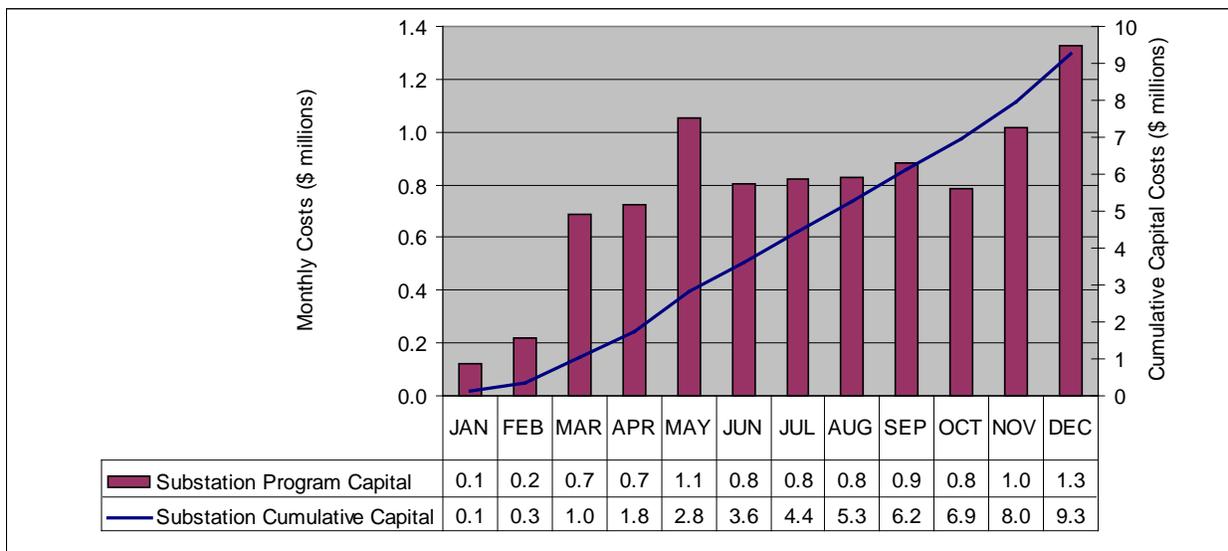
**FIGURE II.B.2: SUBSTATION UPGRADE 2012 SCHEDULE**

Activity ID	Activity Name	Cal. Days	Start	Finish	2012		2013		2014		2015		2016		2017
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
<b>ComEd Infrastructure Investment Plan</b>		1548	01-Jan-12	04-Jan-18											
<b>Substation Micro-Processor Relay Upgrades</b>		1548	01-Jan-12	04-Jan-18											
IS1-12-1-0001	Program Mobilization & Ramp Up	180	01-Jan-12	01-Jul-12	■										
IS1-12-1-0010	Mobilization - Intl. Sub. #1	12	05-Mar-12	16-Mar-12		■									
IS1-12-1-0020	AGDC Panel Install - Intl. Sub. #1	47	05-Mar-12	20-Apr-12		■									
IS1-12-1-0030	Develop Work Scope - Intl. Sub. #2	60	17-Jan-12	16-Mar-12	■										
IS1-12-1-0040	Develop Work Scope - Intl. Sub. #3	60	17-Jan-12	16-Mar-12	■										
IS1-12-1-0050	Schedule 2013 Transmission Outages	0	30-Mar-12	30-Mar-12			■								
IS1-12-1-0060	Remote Terminal Work - Intl. Sub. #1	5	30-Apr-12	04-May-12			■								
IS1-12-1-0070	Transmission Line Outage Related Work - Intl. Sub. #1	32	30-Apr-12	01-Jun-12			■								
IS1-12-1-0080	Design & Engineer - Intl. Sub. #2	70	30-Mar-12	06-Jun-12			■								
IS1-12-1-0090	Design & Engineer - Intl. Sub. #3	70	30-Mar-12	06-Jun-12			■								
IS1-12-1-0100	Construction - Substation Outages Suspended	91	01-Jun-12	31-Aug-12				■							
IS1-12-1-0110	Non-Outage Related Work - Intl. Sub. #1	47	01-Jun-12	18-Jul-12				■							
IS1-12-1-0120	Schedule 2013 Distribution Bus Outages	0	29-Jun-12	29-Jun-12				■							
IS1-12-1-0130	Procure Long Lead-Times - Intl. Sub. #2	8	22-Jun-12	29-Jun-12				■							
IS1-12-1-0140	Issue & Review Construction Drawings - Intl. Sub. #2	35	17-Aug-12	21-Sep-12					■						
IS1-12-1-0150	Procure Long Lead-Times - Intl. Sub. #3	8	22-Jun-12	29-Jun-12				■							
IS1-12-1-0160	Issue & Review Construction Drawings - Intl. Sub. #3	35	17-Aug-12	21-Sep-12					■						
IS1-12-1-0170	Bus Outage Related Work (Bus Relays, Trans Monitoring...	88	01-Sep-12	30-Nov-12					■						
IS1-12-1-0180	Final Wiring & Commissioning - Intl. Sub. #1	26	01-Dec-12	26-Dec-12						■					
IS1-12-1-0190	Develop Relay & SCADA Settings - Intl. Sub. #2	107	24-Sep-12	13-Jan-13						■					
IS1-12-1-0200	Develop Dashboard - Intl. Sub. #2	49	01-Nov-12	21-Dec-12							■				
IS1-12-1-0210	Develop Relay & SCADA Settings - Intl. Sub. #3	107	24-Sep-12	13-Jan-13							■				
IS1-12-1-0220	Develop Dashboard - Intl. Sub. #3	49	01-Nov-12	21-Dec-12								■			

### II.B.3: 2012 Program Budget

Figure II.B.3 presents the estimated 2012 capital budget for the Substation Micro-Processor Relay Upgrade program. ComEd estimates the 2012 program cost to be capital investments of \$9 million, plus associated expenses. Estimates of cost, units of work, and schedules for that work may evolve over time.

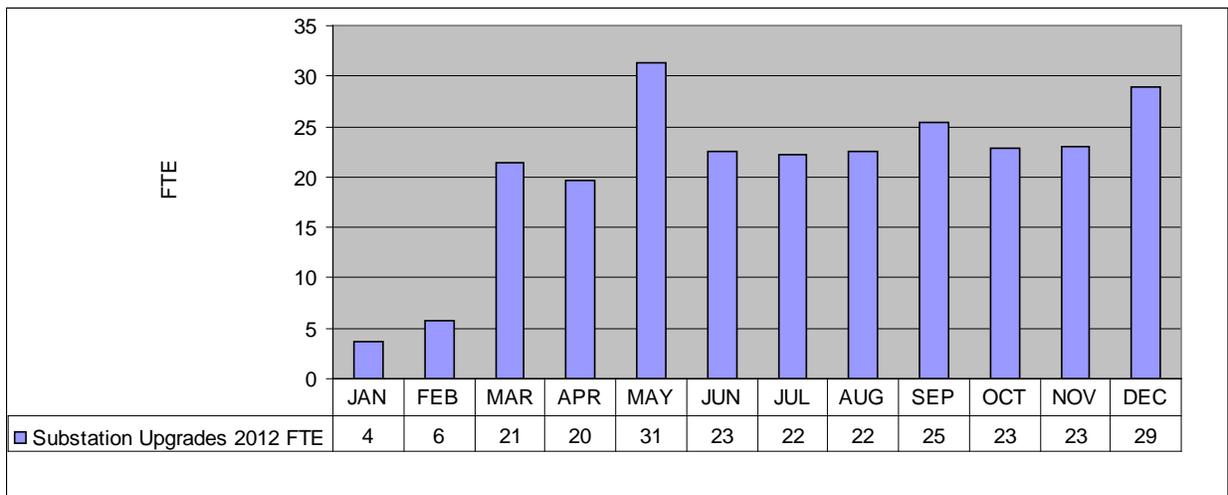
**FIGURE II.B.3: SUBSTATION UPGRADE 2012 CAPITAL BUDGET**



## II.B.4: 2012 Program FTEs

Figure II.B.4 presents the estimated FTEs required to perform the scheduled 2012 scope of work. FTEs have been calculated by taking the estimated worker-hours to execute the scope of work and dividing by 2,080. Job classifications may include, but are not limited to, engineers, technicians, work planners, finance support, safety support, scheduling support, legal support and craft.

**FIGURE II.B.4: SUBSTATION UPGRADE 2012 FTES**



## **SECTION II.C: Smart Meters**

ComEd will install retail Smart Meters across its entire service territory over a 10-year period. Deployment of Smart Meters will occur pursuant to the Advanced Metering Infrastructure Deployment Plan (“AMI Plan”) to be filed with the Commission no later than April 23, 2012. Prior to ComEd’s filing, ComEd will review its proposed AMI Plan with the Smart Grid Advisory Council. Although the AMI Plan is currently under development, in general ComEd expects at this time that Smart Meter installs pursuant to the AMI Plan will begin in the 3rd quarter of 2012, ending in 2021.

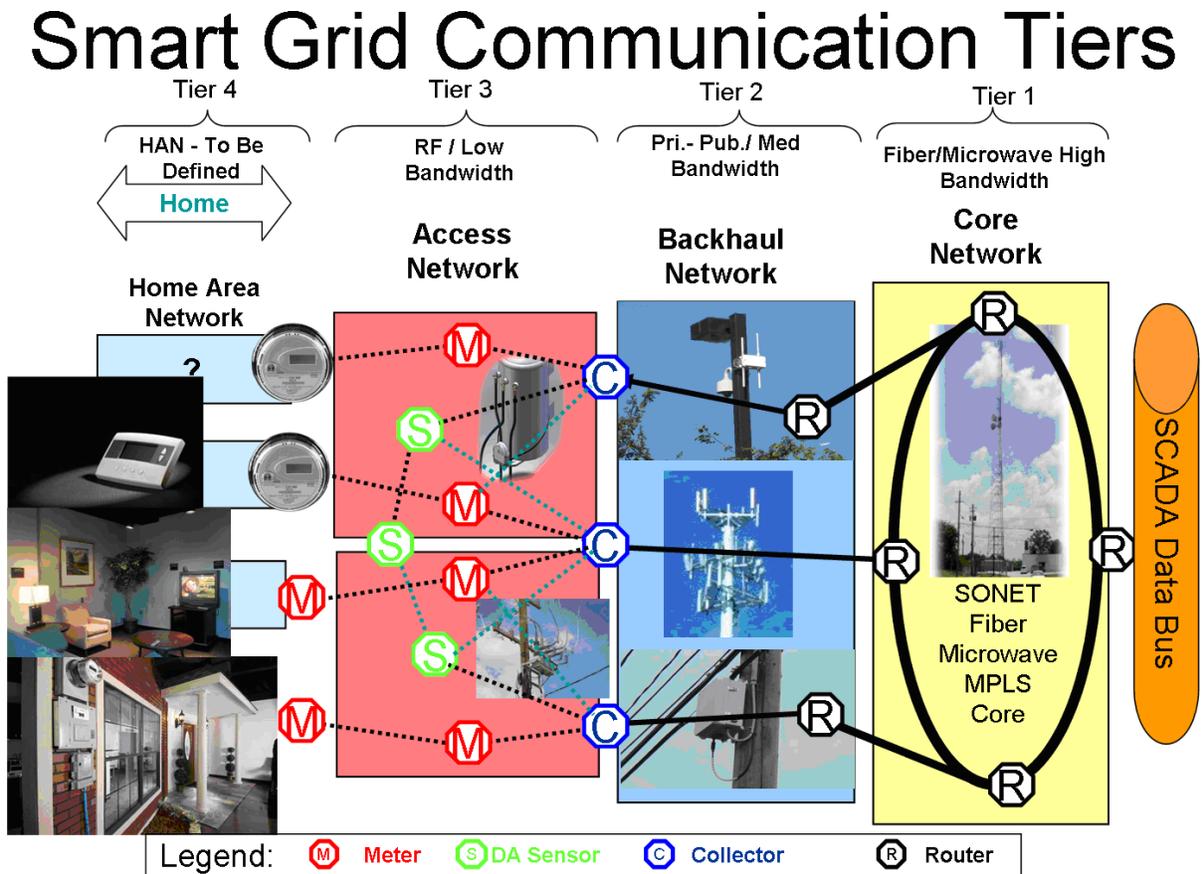
## **SECTION II.D. Associated Cyber Secure Data Communications Network**

Communications infrastructure forms the foundation platform for enabling Smart Grid technologies and applications as it transcends each functional area of the Smart Grid. Consequently, the ComEd Smart Grid Communications Infrastructure will provide a secure tiered, robust and deterministic communications architecture with adequate capacity to meet the current and foreseeable future performance requirements of the Smart Grid Application portfolio.

A cyber-secure communications infrastructure is a system that includes and implements a robust security model that is aligned with industry best practices and existing security standards (such as NISTIR 7628 developed by the National Institute of Standards and Technology). The security model will address confidentiality, integrity, availability and non-repudiation of data transport through the network.

Figure II.D depicts the high-level architecture for the four tiers of the proposed ComEd communication network that would support Smart Grid communication.

**FIGURE II.D: SMART GRID COMMUNICATION TIERS**





Activity ID	Activity Name	Weeks	Start	Finish	2012				2013				2014				2015				2016				2017				2018				2019				2020				2021											
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4												
	Design (Quarterly Cycle)	1030	01-Apr-12	19-Apr-16	[Gantt bar]																																															
	Construction - Reinforce (Quarterly Cycle)	1104	01-Apr-12	20-Jul-16	[Gantt bar]																																															
	Construction - Replace (Quarterly Cycle)	1106	01-Jul-12	20-Oct-16	[Gantt bar]																																															
	<b>Storm Hardening</b>	1222	01-Jan-12	20-Oct-16	[Gantt bar]																																															
	<b>Storm Hardening</b>	1222	01-Jan-12	20-Oct-16	[Gantt bar]																																															
	Work Priority (Yearly Cycle)	890	01-Jan-12	12-Jul-15	[Gantt bar]																																															
	Scoping (Quarterly Cycle)	225	06-Oct-14	17-Jan-16	[Gantt bar]																																															
	Design, Procure & Install (Quarterly Cycle)	1038	01-Feb-12	18-Feb-16	[Gantt bar]																																															
	Work Planning (Quarterly Cycle)	1038	01-Apr-12	19-Apr-16	[Gantt bar]																																															
	Construction OH (Quarterly Cycle)	1106	01-Jul-12	20-Oct-16	[Gantt bar]																																															
	<b>Distribution Automation</b>	1182	01-Jan-12	20-Aug-16	[Gantt bar]																																															
	<b>DA Devices</b>	1182	01-Jan-12	20-Aug-16	[Gantt bar]																																															
	Work Priority (Yearly Cycle)	854	01-Jan-12	05-Jul-14	[Gantt bar]																																															
	Scoping (Quarterly Cycle)	965	01-Jan-12	12-Oct-15	[Gantt bar]																																															
	Design / Procure (Quarterly Cycle)	370	01-Mar-12	15-Dec-15	[Gantt bar]																																															
	Planning (Quarterly Cycle)	374	01-May-12	18-Feb-16	[Gantt bar]																																															
	Construction (Quarterly Cycle)	1040	01-Jul-12	20-Jul-16	[Gantt bar]																																															
	Testing & Learning (Quarterly Cycle)	1041	01-Aug-12	20-Aug-16	[Gantt bar]																																															
	<b>Substation Micro-Processor Relay Upgrades</b>	1039	17-Jan-12	04-Jan-16	[Gantt bar]																																															
	<b>Intelligent Substations</b>	1039	17-Jan-12	04-Jan-16	[Gantt bar]																																															
	Scoping & Design (Quarterly Cycle)	1029	20-Mar-12	29-Jun-15	[Gantt bar]																																															
	Design & Procure (Quarterly Cycle)	1291	17-Jan-12	23-Jan-17	[Gantt bar]																																															
	Conduit & Prep (Quarterly Cycle)	1505	05-Mar-12	04-Jan-16	[Gantt bar]																																															
	<b>Smart Meters</b>	2054	02-Jan-12	24-Dec-21	[Gantt bar]																																															
	<b>AMI Smart Meters</b>	2054	02-Jan-12	24-Dec-21	[Gantt bar]																																															
	Work Priority (Yearly Cycle)	0	02-Jan-12	03-Jan-12	[Gantt bar]																																															
	AP & Relay Install	2324	02-Jul-12	22-Jun-21	[Gantt bar]																																															
	Meter Exchanges	2410	07-Sep-12	24-Dec-21	[Gantt bar]																																															
	Facilities	2332	05-Jul-12	07-Jul-21	[Gantt bar]																																															

Table A.1 presents a summary of the 2012 Plan's estimated total capital budget by program, and Figure A.2 presents the estimated total capital budget by month associated with the 2012 Plan. Note that the costs by month shown in Figure A.2 exclude costs for the Smart Meter Program, which will be included in ComEd's AMI Plan.

**TABLE A.1: 2012 PLAN CAPITAL COSTS BY PROGRAM**

<b>Program</b>	<b>Capital Total</b>
<i>URD Injection and Replacement Program</i>	\$59
<i>Mainline Cable System Refurbishment and Replacement Program</i>	\$44
<i>Ridgeland 69kV Cable Program</i>	\$8
<i>Training Facilities Program</i>	\$3
<i>Wood Pole Program</i>	\$6
<i>Storm Hardening Program</i>	\$20
<b>Total Reliability-Related Investments</b>	<b>\$139</b>
<i>Distribution Automation Program</i>	\$32
<i>Substation Micro-Processor Relay Upgrade Program</i>	\$9
<i>Smart Meter Program</i>	\$52
<b>Total Smart Grid Related Investments</b>	<b>\$94</b>
<b>Total 2012 Plan Investments</b>	<b>\$233</b>

**FIGURE A.2: 2012 PLAN CAPITAL COSTS**

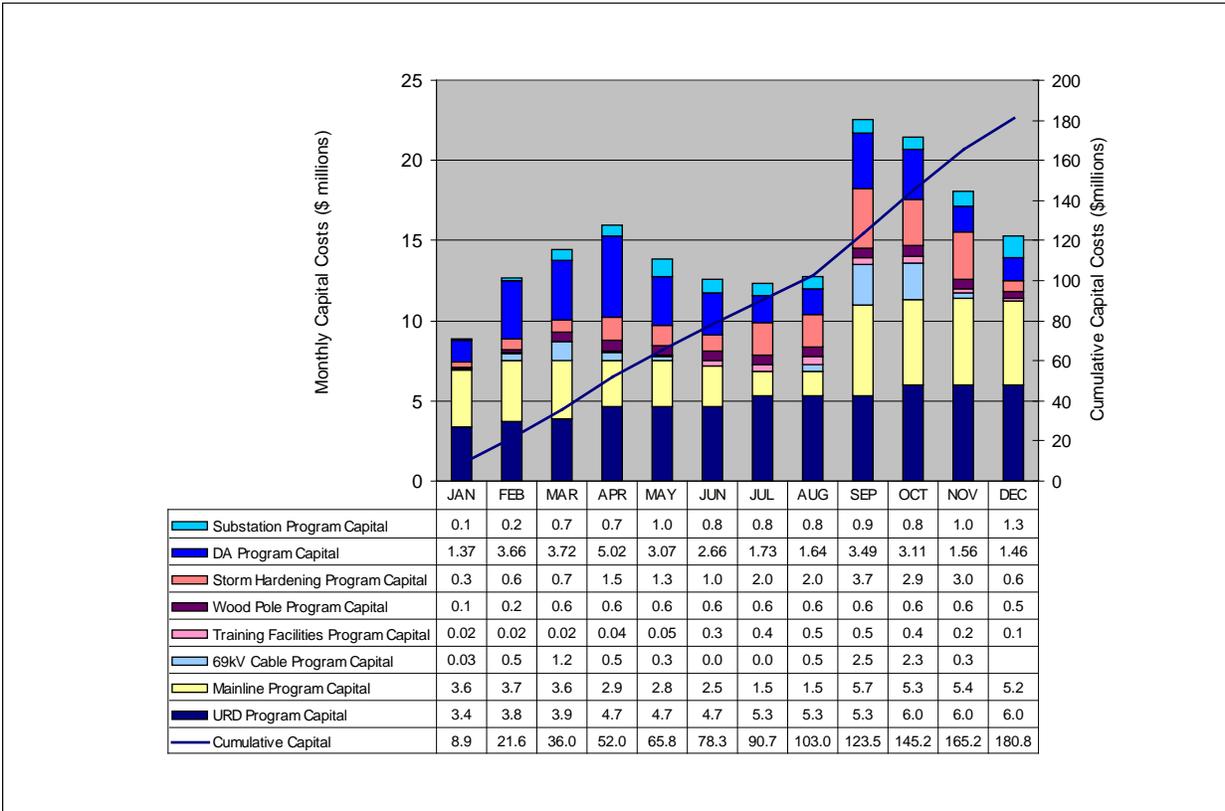


Figure A.3 presents the total estimated FTEs to execute the scheduled scope of work associated with the 2012 Plan. The estimated FTEs shown in Figure A.3 do not, however, include any induced FTEs.

**FIGURE A.3: 2012 PLAN FTES**

