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BEFORE THE
PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Commission-Ordered Workshop Regarding Smart Metering Deployment	)))	**Case No. 07-646-EL-UNC**

Supplemental Report of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company -- AMI and Smart/Modern Grid Technologies –

August 14, 2009

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I. Introduction

Pursuant to the Commission's January 21, 2009 Opinion and Order in Case No. 07-551-EL-AIR ("Order"), and its May 21, 2009 Entry in the instant docket ("Entry"), Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company (collectively, "Companies") submitted their preliminary report on Advanced Metering Infrastructure ("AMI") and Smart Grid Technology as requested by Public Utilities Commission of Ohio ("PUCO") on June 1, 2009, with a commitment to supplement that report by August 14, 2009. The supplement is included below.

In its Order, the Commission requested that the Companies conduct a study on AMI that includes "an assessment of potential advanced smart metering technology investments, open-system architecture planning, large-scale AMI deployment, other cost-effective modern/Smart Grid applications, and a cost/benefit analysis of such programs." In its filing on June 1, 2009, the Companies provided information on 1) their guiding principles surrounding Smart/Modern Grid and AMI technologies, 2) the internal corporate organization focused on Energy Efficiency, Smart/Modern Grid technologies and AMI, 3) existing activities specific to these technologies, 4) AMI cost/benefit analysis, and 5) next steps the Companies had planned.

Since June 1, 2009 FirstEnergy utilities have completed two significant plans that involve smart grid and smart metering - the Department of Energy (DOE) Smart Grid Investment Grant application for funding a smart grid modernization initiative[1], which was submitted by FirstEnergy Service Company (FE), and the Pennsylvania ACT 129 Smart Meter Technology Procurement Plan being filed with the Public Utility Commission of Pennsylvania ("PPUC") today by the FirstEnergy Pennsylvania utilities (Metropolitan Edison Company, Pennsylvania Electric Company and Pennsylvania Power Company (collectively "PA Companies"). These reports are attached as Exhibits A and B, respectively.

[1] The DOE Smart Grid Investment Funding Application (Exhibit A) contains: 1) Project Plan, 2) Resumes, 3) Vendor Commitment Letters, and 4) Regulatory Support Letters

These two activities lay the groundwork for Smart Meter and Smart Grid activities going forward. Each of these initiatives are critical to providing the necessary insights into technologies, standards, security, costs, benefits and cost recovery; and to provide the framework for integrating Smart Grid technologies into the operations of the Companies. As noted in the June 1, 2009 report, the assessment of direct costs and benefits of Smart Meter technologies indicates the costs currently exceed benefits. However, technologies and costs have and are expected to change in the short term as acknowledged in Exhibits A and B. The intent of the DOE's Smart Grid funding opportunity is to continue a more detailed analysis of Smart Grid technologies, using funding provided by the federal stimulus grants as well as from state cost recovery mechanisms.

As noted in the Companies' June 1, 2009 filing, open system architecture is being addressed in the IBM/EPRI study that is in progress. No additional results beyond those described in the June 1 report are available. The Companies also noted that an Integrated Distribution Energy Resource Management Study is being conducted by Jersey Central Power & Light (JCP&L), a subsidiary of FE, and, if available, the Companies indicated that they would provide an update of that study in this report. JCP&L prepared and submitted to the New Jersey Board of Public Utilities an Initial Operational Performance Report on July 6, 2009. Due to the confidential and proprietary nature of much of the material in the report, the Companies are not including it as part of this filing. However, the Companies are willing to meet with the Commission or Commission Staff to further review the report.

II. DOE Smart Grid Investment Application – FirstEnergy Smart Grid Modernization Initiative

In its application with the DOE, FE has proposed a $114 million investment in Smart Grid technologies to improve the reliability and interactivity of its electric distribution system in their three-state service area. The application requests federal funding support

of $57 million and recovery of the remaining $57 million of costs through the applicable riders needed for targeted Smart Grid projects in communities served by FirstEnergy electric utility companies. Federal support would help ensure the implementation of the initial Smart Grid investments within each state. In particular, the Ohio implementation of the Smart Grid Modernization Initiative would be conducted in several suburban communities east of Cleveland served by The Cleveland Electric Illuminating Company. The Smart Grid Modernization Initiative within Ohio totals approximately $72 million of the total $114 million initiative and would deliver significant benefits to customers in the Cleveland area through deployment of several technologies – including distribution automation, customer demand response with smart metering, advanced distribution voltage control, advanced protection devices and wireless security. Most notably, 5,000 smart meters will be installed – with the potential to install 39,000 more. The meters will be used in conjunction with new information systems and critical peak pricing initiatives to help customers save money by better managing their electricity use during times of peak demand. This component of the Smart Grid Modernization Initiative will provide the Companies, the Commission, and the DOE with important information on the effectiveness (in terms of customer participation and benefits) and costs associated with demand response through pricing options and incentives. The DOE will use the information provided from the initiative in its assessment of Smart Grid technologies and their societal impacts including, 1) less volatility in electricity prices, 2) avoided electricity sector capital and operating costs, 3) improved reliability, 4) reduced carbon emissions, 5) energy securitization, and 6) sustainable asset utilization. The DOE application also contains Smart Grid technology proposals within Pennsylvania and New Jersey. Metropolitan Edison Company in Pennsylvania would test a voluntary load program for 14,000 customers in the York area to help reduce peak demand through an integrated system that directly controls air conditioners and other customer appliances during periods of high usage. Moreover, expanding on Smart Grid technologies installed earlier this year, JCP&L would use many of the same technologies and features being introduced in Pennsylvania to potentially reduce peak load by 30 megawatts.

III PA ACT 129 Smart Meter Procurement and Implementation Plan

The PA Companies filed with the PPUC, on August 14, 2009, a Smart Meter Technology Procurement and Installation Plan that complies with Pennsylvania Act 129 of 2008 and the PPUC's June 24, 2009 Implementation Order. The study and large scale smart meter deployment contemplated in this plan will further the Companies' understanding of AMI and Smart Grid technology and deployment.

The PA Companies are required by law to develop and submit to the PPUC a procurement and implementation plan for deployment of smart meter technology. Through the process, the Companies will gain a better understanding of the various issues and obstacles surrounding AMI, including technology functionality, system interface capabilities, costs and related benefits, and operational issues, with findings that can be beneficially applied to the Companies' AMI and Smart/Modern Grid planning.

The Pennsylvania plan includes a general long term timeline for full deployment of smart metering over the next 15 years as well as a detailed work plan to study all issues dealing with such deployment during a PPUC authorized grace period of 30 months. During the first 24 months of this grace period (which the Pennsylvania plan refers to as "the Assessment Period") the PA Companies will assess their needs, select the necessary technology, secure vendors, train personnel, install and test support equipment, and establish a cost-effective and strategic deployment schedule consistent with statutory requirements. At the end of the Assessment Period, the Companies will submit to the PPUC a detailed Deployment Plan for its consideration and approval. The Pennsylvania plan also includes a process for early installation of smart meters upon request and in all new construction in advance of system-wide deployment (as required by law); a methodology for cost allocation among various customer classes; and a proposed cost recovery mechanism.

The PA Companies currently expect that the proposed full deployment will occur in a tiered roll out (presumably to high population areas first) to maximize the cost-to-benefit

ratio and to minimize the overall cost to customers. The PA Companies anticipate that deployment of smart metering will follow the timeline set from the Deployment Plan, contingent on PPUC approval and cost recovery.

IV Summary

In pursuing a workable and cost-effective solution for the entire FE transmission and distribution system, FE has embarked upon an AMI/Smart Grid strategy that takes a measured approach throughout its three-state service territory to compile the information necessary to make well-informed business decisions. The knowledge gained and the lessons learned from both the DOE Smart Grid Investment funding opportunity and the Pennsylvania smart metering procurement and installation plan will provide much of this information. Through robust evaluation and analysis, this process will minimize the likelihood of stranded investment in limited technologies, and promote adherence to national smart metering and smart grid standards and policies as they continue to evolve. In response to each of the Commission's specific questions:

- FirstEnergy intends to implement a large-scale AMI deployment through its Pennsylvania Smart Meter Plan and use the information gained for potential future deployments in its three-state service area. In addition the Companies will use the potential 44,000 meter Demand Response Pricing Program within Ohio for determination of costs and benefits of smart metering systems for peak demand reduction.
- Potential advanced metering technology investments and other Smart Grid applications are integral components of the two initiatives and are discussed at length in the filings.
- Open system architecture is being addressed in: 1) the IBM/EPRI study that is in process; 2) the DOE Smart Grid Modernization Initiative including the projects in each of the three states, and 3) the deployment plan proposed in the Pennsylvania Smart Meter Plan.
- As stated in the June 1, 2009 preliminary filing, we have previously completed an AMI cost-benefit study using the McKinsey model and have gained a better

understanding of how to identify and measure societal benefits through the EPRI study commissioned by all of Ohio's electric distribution utilities. Further analyses will be conducted and shared from the Smart Grid Modernization Initiative (EPRI is engaged as the lead partner for their "demonstrated understanding of the diverse requirements for cost benefit analysis and the challenges associated with monetizing expected benefits") and the Pennsylvania smart meter technology procurement and installation plan.

Having submitted this report, the Companies would be pleased to meet with the Commissioners or Commission Staff should they have any questions.

Respectfully submitted,

John E. Paganie

John E. Paganie,
Vice President of Customer Service
and Energy Efficiency

per authorization
JFS

CERTIFICATE OF SERVICE

THIS IS TO CERTIFY that a copy of the Supplemental Report of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company -- AMI and Smart/Modern Grid Technologies was served this 14th day of August, 2009 by electronic mail upon the parties listed below who are included on the Commission's mailing list titled SMARTMETERING@LISTS.PUC.STATE.OH.US.

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EXHIBIT A

FirstEnergy Smart Grid Modernization Initiative Project Plan

(Submitted August 5, 2009)

SMART GRID MODERNIZATION INITIATIVE

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LIST OF FIGURES

1. TECHNICAL FILE—SMART GRID MODERNIZATION INITIATIVE PROJECT PLAN

The goal of the Smart Grid Modernization Initiative is to deploy technologies to improve the operating performance of the local distribution system and encourage customer participation in the control of electric demand.

FirstEnergy Corp. is a diversified energy company headquartered in Akron, Ohio. Its subsidiaries and affiliates are involved in the generation, transmission and distribution of electricity, energy management and other energy-related services. Its seven electric utility operating companies comprise the nation's fifth largest investor-owned electric system, serving 4.5 million customers within 36,100 square miles of Ohio, Pennsylvania and New Jersey. Three of FirstEnergy Corp.'s electric utility operating companies – The Cleveland Electric Illuminating Company (CEI) in Ohio, Metropolitan Edison Company (Met-Ed) in Pennsylvania, and Jersey Central Power & Light Company in New Jersey (JCP&L, together with CEI and Met-Ed, hereinafter referred to as the Companies or FirstEnergy) – are participating in the Smart Grid Modernization Initiative. The Companies, joined by world-class partners, the Electric Power Research Institute (EPRI), Science Applications International Corporation (SAIC), BPL Global, Ltd. (BPLG) and IBM Global Services Integration and Technology Services (IBM), create a team with the breadth and expertise to drive successful completion of this project.

Building on previous work undertaken in conjunction with EPRI and IBM, FirstEnergy's Smart Grid Modernization Initiative will firmly establish the utility and regulatory business case for integrating crosscutting smart grid technologies with existing distribution system infrastructures. Full-system life-cycle costs and benefits will be analyzed to justify recovery of investments, which is pivotal to ensuring expanded deployment across FirstEnergy and supporting deep-market penetration across the United States. Results will illustrate how aging infrastructure will function when combined with smart grid technologies; create a better understanding of issues related to integration among multiple utilities and Independent System Operators; and provide a thorough analysis of associated benefits to customers and the environment. This project will help establish cost-recovery timelines that utilities and regulators can follow to minimize existing barriers and risks related to smart grid technology implementation.

1.1 Project Abstract

The Smart Grid Modernization Initiative deploys technologies to improve the operating performance of the local distribution systems and encourages customer participation in the control of electric demand. **Figure 1.1-1** depicts the Companies' planned technology deployments within each state – the smart grid components vary from utility to utility. For example, the CEI and Met-Ed projects include distribution automation (distribution automation or DA) and volt/VAR control (volt/VAR control or VVC). The JCP&L and Met-Ed projects will deploy an integrated distributed energy resource (IDER or Integrated DER) control platform for direct load control (direct load control or DLC) to enable customer participation in demand reduction. The DLC programs offer the consumer the opportunity to reduce energy costs by participating in peak load reductions called for economic, operational or regulatory reasons. The CEI project will include an Advanced Metering Infrastructure (AMI) deployment near Cleveland, Ohio. Dynamic pricing programs will be instituted with AMI, enabling the consumer to participate in demand reduction and energy efficiency efforts. The unified approach provides the ability to customize to local conditions – operational, geographic, or regulatory – while maintaining a common support architecture and infrastructure for cyber security, communications, data integration and interoperability. The equipment will be installed over a 24-month period; data collection and analysis will continue for an additional 12 months.

This proposal is submitted as an ***Integrated and Crosscutting System Topic*** based on the project's span across several of the Department of Energy (DOE) specified topic areas, including Electric Distribution Systems (distribution automation and volt/VAR control capabilities), Advanced Metering Infrastructure and Customer Systems (direct load control at the customer premise to reduce peak demand).

This proposal is a direct extension of work initiated within FirstEnergy in 2006 with EPRI and subsequently IBM and will leverage the crosscutting nature of different technologies. These include creating pervasive communications and information management to accomplish multiple objectives, integrating control and metering devices to achieve multiple benefits, and demonstrating a compelling value proposition for implementing a comprehensive set of new improvements across the distribution system. This project will provide the credible data necessary for DOE to examine these relationships and

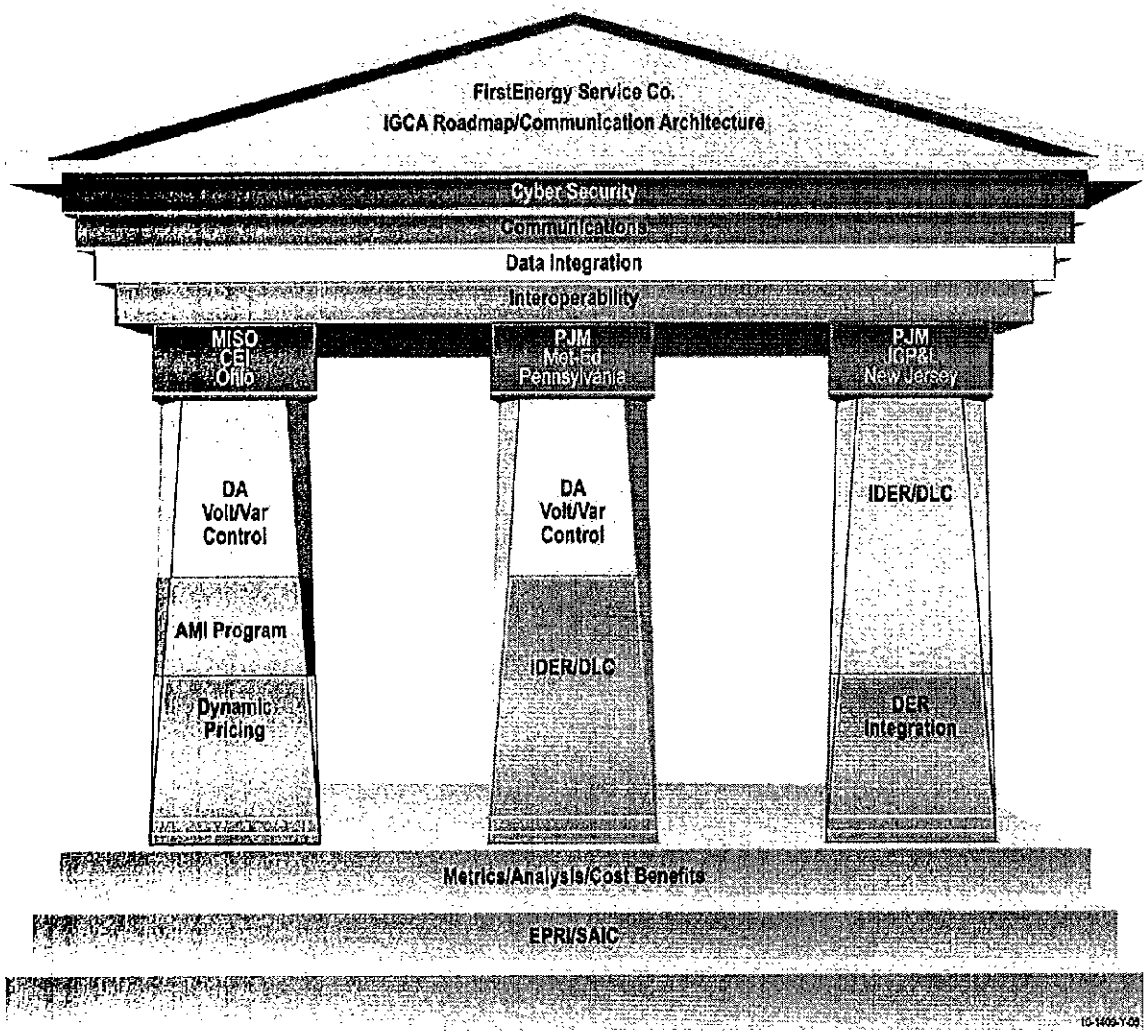

Figure 1.1-1. Integrated Architecture depicting common supporting infrastructure and deployment applications. *(FirstEnergy will request to switch its Ohio electricity transmission assets from the Midwest Independent System Operator to the PJM Interconnect with its other transmission assets. If approved, this would not take effect before June, 2011.)*

the resulting benefits from a cost and economic value perspective. This project will encompass a highly variable set of climatic conditions, existing infrastructure designs and customer control group demographics across Ohio, Pennsylvania and New Jersey, increasing the value of the data collected for DOE.

The Smart Grid Modernization Initiative will promote the objectives of the American Recovery and Reinvestment Act of 2009 (ARRA) by creating and retaining jobs and stimulating economic recovery in a timely manner across the northeastern region. Based on estimates of job creation from the ARRA provided by the Council of Economic Advisors of the Executive Office of the President (May 2009), this $114M project will create approximately 1,239 job-years. In addition, the project will meet the key goals of the DOE Smart Grid Investment Grant program (SGIG); accelerate the modernization of the nation's electric transmission and distribution systems; and promote investments in smart grid technologies, tools, and techniques that increase flexibility, functionality, interoperability, cyber security, situational awareness and operational efficiency.

1.2 Project Tasks and Schedule

The Companies are proposing a high-value integration project that will establish three smart grid reference deployments within their respective service territories, using information and analysis from ongoing smart grid planning efforts. Findings from these deployments will enable the Companies to continuously improve their smart grid deployment plans. The project will benefit the broader industry

as key partners use project information to create objective analysis and meaningful industry reports. Operational information from these regional deployments will provide insight into the impact of various factors on technology-related benefits. The deployments will be implemented to support use case development and implementation in such a way that crosscutting benefits associated with these deployments can be better understood and quantified. A project schedule was developed with a timeline that validated achievement of design, configuration, procurement, installation and testing. A master scheduler coordinated the input from the team to craft a comprehensive Primavera schedule identifying tasks including milestones and interdependencies to ensure that all aspects of the project scope can be completed in a timely fashion. Individual tasks for the successful integration of DA, VVC, Demand Response (DR), IDER, DLC and AMI have been aligned to ensure successful completion within the three-year requirement. **Figure 1.2-1** sets forth a high-level project schedule for the Smart Grid Modernization Initiative with a timeline that begins at DOE approval:

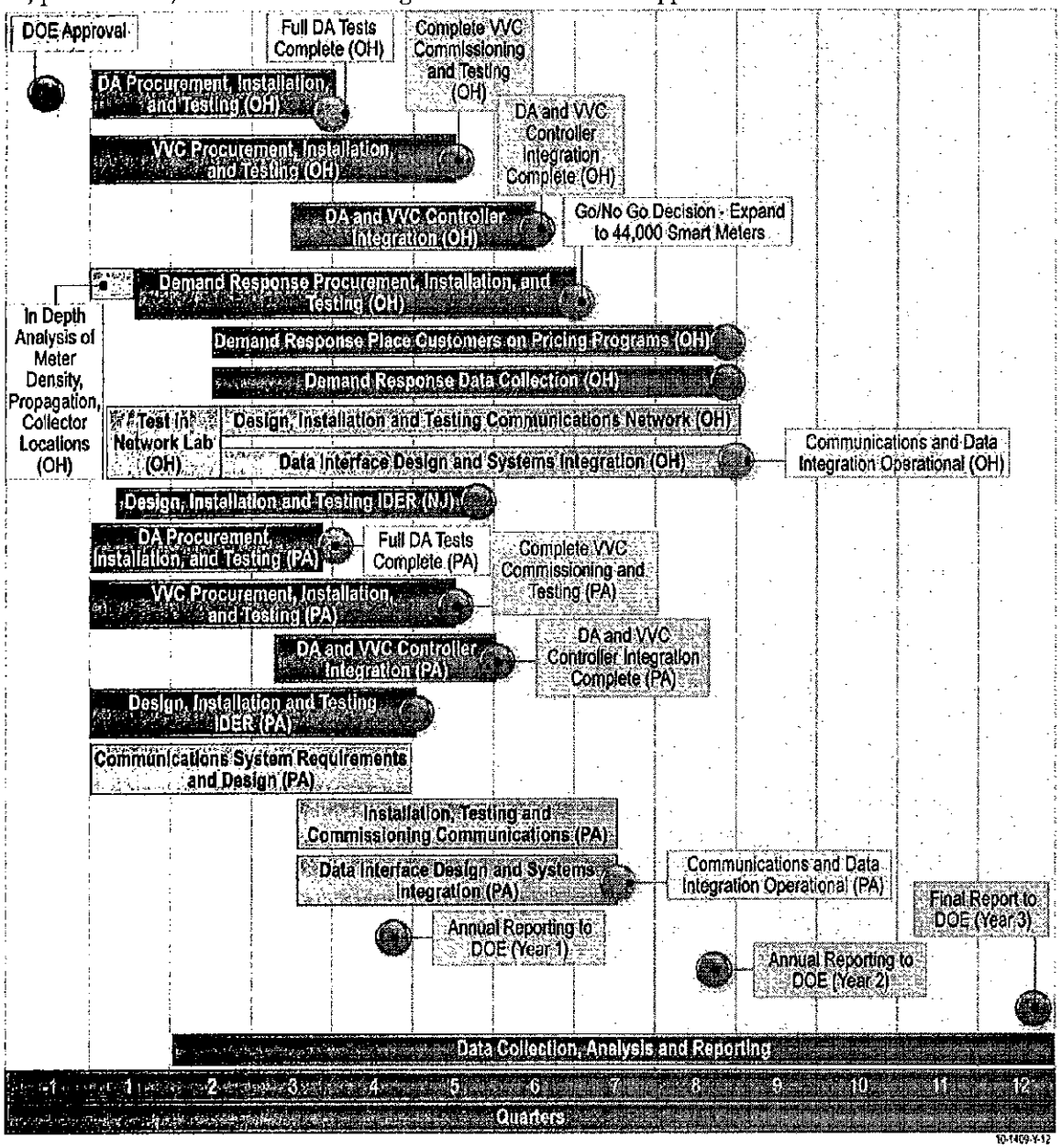

Figure 1.2-1. High-level Smart Grid Modernization project timeline.

To effectively manage the project deployments each integration component has well-defined completion milestones and specific deliverables. Key integration components, milestones and deliverables for each deployment are described below in **Figure 1.2-2.** The Program Manager will compile a complete milestone chart after initiation of the project.

Regulatory Support and Approval

This Smart Grid Modernization Initiative requires the support of the Public Utilities Commission of Ohio (PUCO), the Pennsylvania Public Utility Commission (PAPUC), and the New Jersey Board of Public Utilities (NJBPU, collectively the State Commissions). Such support must include timely regulatory approval to recover all costs incurred that are not otherwise recovered through the DOE grant. The Companies have taken a proactive and collaborative approach in working with, and including input from, the State Commissions to develop this Smart Grid Modernization Initiative. As a result, the Companies have secured letters of support from the State Commissions. Moreover, the PUCO and the NJBPU have encouraged the Companies to file for necessary cost recovery. In the case of the PAPUC, an application for cost recovery was included in Met-Ed's Peak Demand Reduction plan filed with the PAPUC in accordance with P.L. No. 129. The Companies are pleased with the support provided by the State Commissions, and believe that necessary cost recovery will be approved. In addition, the Companies will continue to collaborate with the State Commissions to determine the costs and benefits associated with smart grid technologies.

1.3 Management Plan

1.3.1 Overview of Project Objectives and Scope of Activities

FirstEnergy has assembled a strong cross-functional team to plan, design, implement and manage the Smart Grid Modernization Initiative. A dedicated Program Manager has been assigned overall responsibility for project delivery. Project site deployment will be led by members of FirstEnergy's Energy Delivery Corporate Project Management group (ED Project Group), which has primary responsibility for executing major capital projects. Experienced professionals from the Companies will be designated as dedicated lead resources supporting the Program Manager. FirstEnergy has assigned Tim Richard as Program Manager. He will be directly accountable to executive management on this project.

The ED Project Group will use a portfolio of tested and proven management tools and techniques to achieve integration goals and DOE objectives. In developing the master implementation plan, project team leadership will thoroughly consider, prioritize and integrate the DOE's Smart Grid Investment Grant (SGIG) goals, objectives and functionality requirements. The Program Manager and his team will deliver final implementations to operations staff

Integrated Component	MISO: CEI	MISO: Met-Ed	PJM: JCP&L	Milestones	Deliverables
Distribution Automation	●	●		Full Test Complete	OH-34 Circuits PA-25 Circuits
Automated VVC	●	●	●	Commissioning Complete	OH-34 Circuits PA-25 Circuits
PQ Monitoring	●	●	●	Development of PQ Algorithm	OH-34 Circuits PA-25 Circuits
Circuit Monitoring Sensors		●	●	Physical Integration of Sensors to Circuit	OH-500 Devices NJ-500 Devices
Direct Load Control		●	●	Deployment of Direct Load Control Network	PA-20 MW NJ-30 MW
Integrated DER		●	●	Development of DER Integration API	PA-20,000 Customers NJ-25,000 Customers
AMI	●			Deployment of Meters	5,000 or 44,000 Customers
Pervasive 2-way Communications	●	●	●	Integration of Communications Network	100% Coverage in Target Area

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Figure 1.2-2. Milestones and deliverables for major integration components by state.

at CEI, Met-Ed and JCP&L, and these plans will be managed to support all of the targeted SGIG benefits. The following process will be used to achieve and support DOE crosscutting objectives:

- The technologies specified in this proposal will be implemented to deliver measurable smart grid benefits based on the specific needs and requirements of the Companies.
- Deployment and evaluation of these technologies in various configurations will support, inform and enhance FirstEnergy's smart grid strategy.
- The outcome of these integrated, crosscutting deployments will reflect accurate operational performance and data.

The Program Manager will ensure that the goals of the SGIG program are accomplished in order to accelerate progress toward a modern grid. For example, the Ohio deployment supports the following SGIG goals: 1) enabling informed participation by consumers in retail electricity markets, (2) providing for power quality for a range of needs by all types of customers, (3) optimizing asset utilization and operating efficiency of the electric power system, and (4) anticipating and responding to system disturbances. The Smart Grid Modernization Initiative Program Manager and his team will develop an iterative and collaborative plan to ensure achievement of DOE SGIG crosscutting objectives. **Figure 1.3.1-1** shows the steps involved in taking a single smart grid technology and incorporating it into a crosscutting integration plan.

The key activities to support this iterative and collaborative integration planning process by deployment area are indicated in **Figure 1.3.1-2, Scope of Activities to Support Crosscutting Strategy.**

1.3.2 Overview of Management Approach

The ED Project Group is a department of the corporate organization and reports directly to FirstEnergy's executive management. The ED Project Group is responsible for selected large capital projects and also collaborates with the seven operating companies to ensure all capital projects are completed on schedule and within budget. The FirstEnergy Corp. budget for infrastructure improvements is approximately $600-700 million annually. In 2009, FirstEnergy completed 100% of the summer-critical projects on time and under budget.

As with other selected projects assigned to the ED Project Group, a consistent project management approach will be used to support the overall strategic objectives of the Smart Grid Modernization Initiative. A dedicated Program Manager and three Project Managers have been assigned to the project. The ED Project Group follows a detailed methodology for managing all large projects. Formal project management tools and software are utilized to maintain focus on timelines, costs and outcomes; interim milestones are developed to support all critical path activities.

The Program Manager is chiefly responsible for the execution and project success across the three states identified in this application. Reporting to the Program Manager is an organization led by three state Project Managers, a Project Controller, a Cyber Security Manager, an Interoperability Manager, an Integration Manager and several external industry experts. All of these individuals are required to provide regular updates, metrics and data for analysis and to support decision making. In addition, the Program Manager, along with executive management, will evaluate the need for additional project management services in order to ensure optimal outcomes. Reporting to the Project Managers are Technical Leads who are responsible for execution of the project plan. The Technical Leads and supporting personnel were selected from each of the Companies, and provide broad, company-wide expertise and specific operating area familiarity (see Appendix A for complete resumes).

Going forward, Project Managers and Technical Leads from within FirstEnergy will provide analysis and reporting on a bi-weekly basis in order to provide timely updates to the Program Manager. The analysis and reporting will be based on schedule updates. The Project Managers will compile the information from the Master Scheduler, meet with the Technical Leads, and complete an analysis of

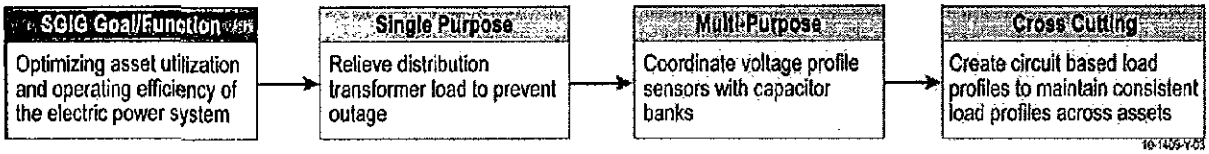

Figure 1.3.1-1. Steps to incorporate smart grid technology into a crosscutting integration plan.

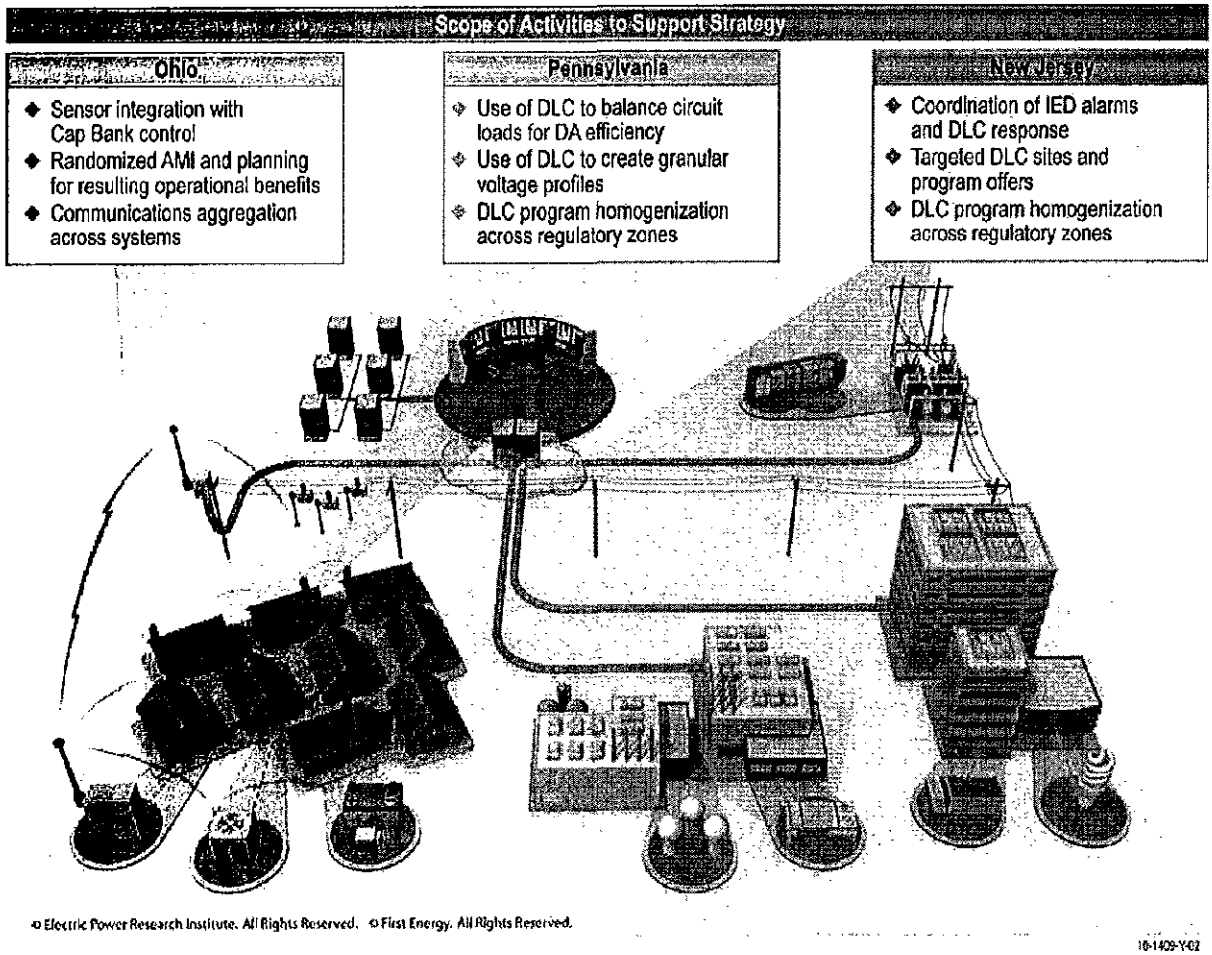

Figure 1.3.1-2. Scope of Activities to Support Crosscutting Strategy

progress. The Project Managers will review the schedule status on a bi-weekly basis with the Program Manager. The Program Manager will meet with appropriate parties in order to address any schedule issues and then report to executive management. See **Figure 1.3.2-1**.

The ED Project Group has established and documented processes for managing this project. For example, process maps are important tools used for maintaining project methodology discipline and output consistency. A series of process maps are available to the Program Manager, describing standard procedures that involve planning, execution and project close-out phases. The following summary describes the overall process:

1. Project Planning.
   - Prepare a detailed project scope statement that defines the project deliverables. The statement clearly defines what the project will accomplish, and forms part of the project plan.
   - Initiate the activities necessary for the development and execution of the project plan. The state Project Managers continue in this role to ensure execution. Throughout this process, a team of individuals from the appropriate cross-functional work areas have collaborated to identify information pertinent to the project scope, schedule, durations, costs, etc.
   - Develop the project schedule, deliverables and milestones to outline the project in sufficient detail so that the project plan can be successfully implemented. The resource plan details each resource type, work support group, vendor and contractor that will perform work on the project. This requires specific estimates of man-hours and personnel requirements.
   - Develop detailed cost estimates for every part of the project. These estimates are developed from quotations for equipment, land or services, as applicable.

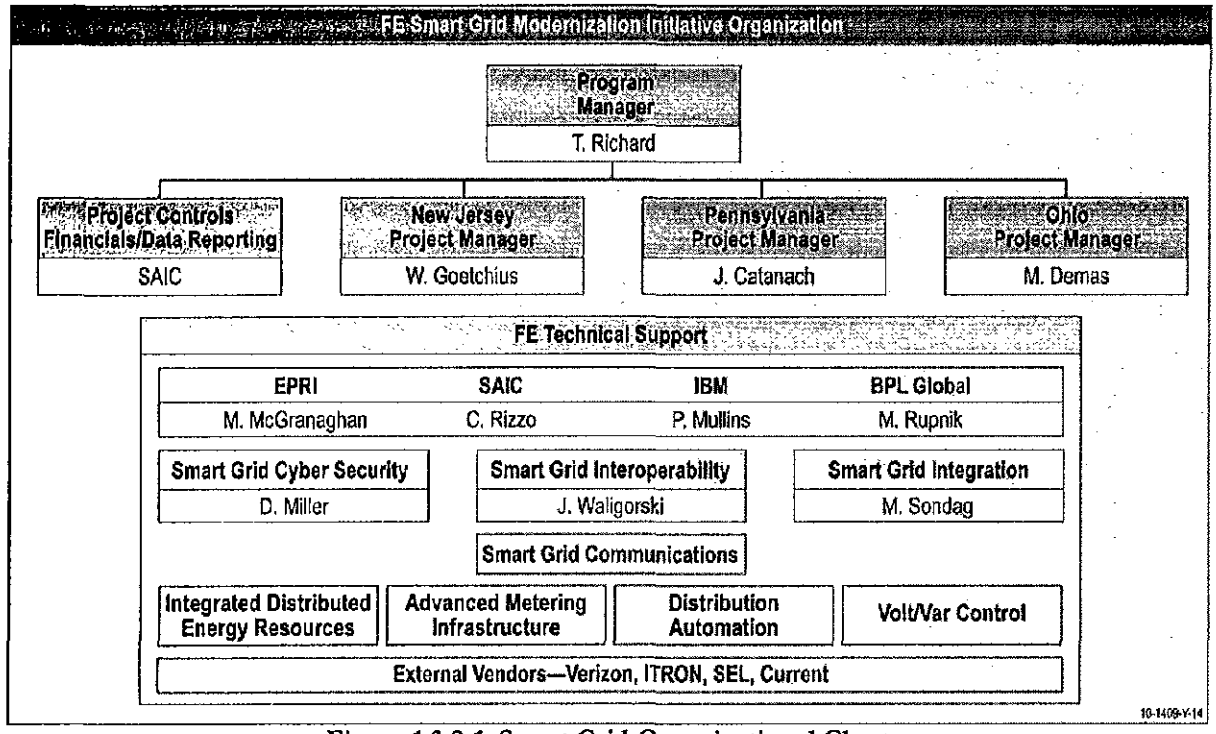

Figure 1.3.2-1. Smart Grid Organizational Chart

2. Scheduling
   - Prepare a detailed formal project plan along with Technical Leads for coordinating, directing and performing the proposed work within budgetary and timeline constraints, which will be reviewed in the project kick-off meeting. The Program Manager, along with the state Project Managers, will ensure that a detailed Critical Path Method (CPM) schedule is prepared, reviewed and agreed upon, which will incorporate strategies to manage multiple parallel project paths. A critical responsibility of the Project Managers is to manage the duration and sequencing of tasks to ensure that sufficient progress has been made and accurate data has been produced to support all interim evaluation processes.
   - The Program Manager appoints a Master Scheduler, who will gather project progress bi-weekly.
3. Project Performance Analysis
   - The state Project Managers will utilize Schedule Performance Index (SPI) in order to forecast changes that will impact project completion dates based on performance. The Cost Performance Index (CPI) will be analyzed as well in order to forecast a new Estimate at Completion (EAC).
   - The state Project Managers will schedule regular performance meetings in order to address performance problems and resolve issues.
4. Problem or Variance Resolution
   - Approve the corrective action plan related to problem or variance resolution. The corrective action plan will be documented in order to capture the cause of the variance.
5. Cost & Schedule Reporting & Tracking
   - Will have FirstEnergy's Business Services Department provide cost information and the Master Scheduler will provide schedule updates for reporting and tracking purposes. The state Project Managers and the Master Scheduler will document progress relative to the approved project baseline.
   - Will have key individuals in FirstEnergy's Business Services Department provide BRIO financial reports at the close of each month. All costs will be collected in FirstEnergy's existing financial management system.

Roles and responsibilities for key members of the project team were established early in the planning phase of this project.

Program Manager – Tim Richard

- The Program Manager is responsible for the overall success of the Smart Grid Modernization

Initiative, ensuring that schedules, budgets and metrics are met, tracked and reported, as required. The Program Manager is responsible for ensuring planning procedures are followed, the schedule and budget is developed, the project performance analysis is conducted and project problems, issues or variances are addressed in order to mitigate project risks.

State Project Manager – Mike Demas, OH; Jim Catanach, PA; Bill Goetchius, NJ

- The state Project Managers are responsible for the daily activities in their states. This includes ensuring that the detailed project schedule, budget and metrics are developed and the long lead equipment has been ordered and will be delivered when needed. The state Project Managers oversee all construction and network implementation.

Project Controller, Financials & Data Reporting

- The Project Controller is the main financial resource for the Program Manager. The Project Controller collects, analyzes and reports financial and other information as well as analyzes and reports on the metrics that are developed by Project Management.

Cyber Security Manager – Don Miller

- The Cyber Security Manager ensures that effective planning and implementation occurs according to applicable laws, policies, standards and guidelines throughout the life cycle. This includes sensitivity assessment during system design making certain related security activities are incorporated into specifications. Mr. Miller is required to provide oversight during vendor and device procurement to evaluate threats and to ensure security testing is performed during system deployment and commissioning.

Interoperability Manager – Joseph Waligorski

- The Interoperability Manager ensures the development of a framework of specifications, protocols and model standards to achieve interoperability. Mr. Waligorski will implement a strategy for seamless integration according to accepted policies and guidelines. Deployments will integrate a vast number of devices and systems including power quality, fault information assessment equipment, controllers, monitors and meters. Oversight is required to make certain completed system installations minimize disruption and sustain compatibility.

Smart Grid Integration Manager – Mark Sondag

- The Integration Manager develops and implements an information and system integration strategy to achieve the smart grid functionality and data collection, analysis, and reporting requirements of the project. Within the context of defined objectives, he will develop use cases which specify required data characteristics, transmission paths and interfaces, which will facilitate identification of suitable protocols, formats, acquisition strategies, and storage requirements required to service identified applications and users. Mr. Sondag will also ensure that open protocols and standards are used and cyber security requirements are observed.

EPRI – Mark McGranaghan

- EPRI will take the lead in developing the data collection plan and coordinating the data collection in support of the project cost-benefit assessment (CBA). EPRI has worked with DOE in the development of a cost-benefit framework that can be applied to smart grid demonstrations and deployments across the country. This framework will be used for EPRI Smart Grid Demonstrations as part of a major initiative and will be coordinated with the assessments for DOE demonstrations and deployments. Initial data collection efforts will focus on defining a baseline for the projects in all three states.

SAIC – Craig Rizzo

- SAIC has been selected to provide engineering, data management and integration, project management, cyber security and other services across the three FirstEnergy deployment projects. SAIC has deep experience in these areas across the utility industry and in other government and commercial sectors, providing management, engineering and other services for hundreds of projects of similar complexity and magnitude.

BPL Global – Mark Rupnik

- BPL Global's role in the project will be to provide its proven Integrated Control Platform as the underlying software platform for the enhanced direct load control and Integrated Distributed Energy Resources solutions. BPL Global will take the lead in the design, integration and deployment of the advanced load control solution.

IBM – Phil Mullins

- IBM will ensure the data integration and communications architecture implemented

conforms to Intelligent Utility Network (IUN) guiding principles, the EPRI Intelligrid program, National Institute of Standards and Technology (NIST) interoperability standards, and the FirstEnergy data integration and communications architecture strategy.

1.3.4 Qualifications of Proposed Organizations and Personnel

FirstEnergy is one of the nation's largest electrical distribution companies and has unparalleled experience executing a project of this size and depth. The ED Project Group is responsible for selected large capital projects typically starting at $1M. With experienced project and cost managers, the ED Project Group has a proven track record on managing projects effectively within the predetermined objectives of cost, schedule and customer expectations. Highly successful project managers have been retained and recruited beyond FirstEnergy and draw from a broad cross-section of the industry including other utilities, large industrial customers and electric generation plants (fossil and nuclear).

First Energy is joined in this effort by a number of nationally known support contractors that bring a wealth of experience to this effort.

- *Science Applications International Corporation*—SAIC is a FORTUNE 500® scientific, engineering, and technology applications company that provides Engineering, IT, Integration, Cyber Security, and other services to public and private clients in national security, energy, critical infrastructure, and health. SAIC has deep domain knowledge in the electric utility and Smart Grid space, and has been selected to provide engineering, data management and integration, cyber security and other services across the three FirstEnergy deployment projects.
- *Electric Power Research Institute*—EPRI is an independent, nonprofit center for public interest energy and environmental research. EPRI brings together members, participants, EPRI's scientists and engineers, and other leading experts to work collaboratively on solutions to the challenges of electric power. These solutions span nearly every area of electricity generation, delivery and use, including health, safety and environment. EPRI is one of the country's foremost research institutes with regard to smart grid benefits analysis.
- *BPL Global, Ltd.*—BPL Global is a smart grid technology company that provides software solutions and services to electric utilities and energy service companies enabling an intelligent grid. BPL Global's solutions enable utilities to more efficiently manage demand, integrate distributed energy resources, improve service reliability, and optimize cost and capital productivity to deliver energy more efficiently and reliably for a greener environment.
- *IBM*—IBM is a global company with a broad range of capabilities, focused on providing business insight and solutions for customers. IBM has a history of working with FirstEnergy to provide technical and business solutions and is in the process of completing data integration and communications architecture to support future smart grid technology deployments. IBM pioneered the Intelligent Utility Network (IUN) to provide a framework within which technology strategies, financial requirements, regulatory compliance, and business needs could be modeled. IBM is a leader in smart grid technology development and deployment and is a highly respected member of the smart grid community.

Qualifications of the Staff Assigned

Program Manager – Tim Richard

Mr. Richard has more than 32 years of experience managing complex projects and large work groups. He is currently Manager, ED Project Management with direct reports of seven project managers and field coordinators. Projects include large transmission lines and substations with support responsibilities to all FirstEnergy Corp.'s operating companies. He manages multiple projects within a total annual budget ranging from $600M - $700M. Prior to this assignment, Mr. Richard was Director, Operations Services for Ohio Edison Company and Pennsylvania Power Company (2004-2008) and responsible for the safe, reliable and cost-effective operation, design, construction and maintenance of the utilities' distribution systems. Areas of responsibility included distribution engineering, line services, dispatching, forestry services and claims services for the entire operating company; annual budget was approximately $135M, with 835 employees serving 1.2M customers. He holds an MBA (Kent State University), BS in Civil Engineering (University of Vermont) and is Registered Professional Engineer in Ohio.

OH Project Manager – Mike Demas

Mr. Demas has over 26 years of electric utility and industry experience. He has been actively managing projects for more than 12 years in the electric utility,

steel, and salt industries and has successfully completed all projects on time and within budget. The electric utility projects include large transmission lines and substations with support responsibilities to three FirstEnergy operating companies. Mr. Demas has a thorough understanding of estimating, scheduling, cost analysis and project management. Mr. Demas manages multiple projects on an annual basis. Current and anticipated assignments from the 2009-2013 Capital Budget consist of 20 projects estimated at approximately $100M. Mr. Demas holds a BS in Business Management (Indiana Wesleyan University).

PA Project Manager – Jim Catanach

Mr. Catanach is a highly skilled management professional with 27 years of experience in the electric utility industry. He excels in managing large strategic projects. Areas of expertise include line operations, customer service, data analysis, technology implementation, and process improvement. Mr. Catanach is a skilled communicator who builds strong and positive working relationships with employees and customers. He holds an MBA (Pennsylvania State University), Beta Gamma Sigma Honor Society, BS in Mechanical and Ocean Engineering (University of Rhode Island) and is a Registered Professional Engineer in Commonwealth of Pennsylvania.

NJ Project Manager – Bill Goetchius

Mr. Goetchius has 26 years of utility experience ranging from Customer Service to Operations Management, Engineering and Project Management. He is responsible for the most complex substation, transmission line and distribution line expansion projects developed at JCP&L. Most recently he has managed a group of project managers who were responsible for an annual project portfolio of over $78M per year.

SAIC Lead – Craig Rizzo

Mr. Rizzo has over 16 years of experience in systems engineering and project management as a military service member and consultant for commercial industry. He has developed smart grid concepts for DOE, worked closely with utility and non-utility stakeholders to overcome smart grid barriers, designed and developed integrated smart grid demonstrations, and managed the development of intelligent transmission operations applications

BPLG Lead – Mark Rupnik

With close to 25 years of experience with Duquesne Light Holdings, Mr. Rupnik is an electric utility veteran with extensive utility knowledge and expertise. During his career at Duquesne Light, he also served from 2004 to 2007 as General Manager of Duquesne Energy Solutions, an energy company subsidiary of Duquesne Light Holdings, Inc. that specializes in the development and operation of "inside the fence" energy facilities as well as the operation of synthetic fuel production facilities. From 2001 to 2004 he held the position of Vice President of Sales and Marketing for DQE Communications. Mr. Rupnik is a graduate of the Advanced Management Program at the Wharton School of the University of Pennsylvania. He also holds an MBA and a BS in electrical engineering from the University of Pittsburgh. Currently Mr. Rupnik is the BPLG GM and SVP, North America.

EPRI Lead – Mark McGranaghan

Mr. McGranaghan is a Director in the EPRI Power Delivery and Markets Sector. His research area responsibilities include distribution, underground distribution, advanced distribution automation, Intelligrid, power quality and security. Research priorities include developing the standards and approaches for implementing an intelligent power system infrastructure to support automation, higher efficiency, improved reliability, and integration of distributed resources and demand response.

IBM Lead – Phil Mullins

Mr. Mullins is a Senior Level Wireless and Pervasive Computing Consultant for IBM Global Service's Integration and Technology Services in Houston, Texas. Mr. Mullins leads the IBM US Service Delivery for Wireless and has 25 members of his team devoted to delivering wireless infrastructure services. Recently he has supported two significant strategic outsourcing opportunities in the utilities industry and is a leading subject matter expert on mobile data connectivity and adaptive computing for this industry.

Smart Grid Cyber Security Lead – Don Miller

Mr. Miller is presently FirstEnergy's Manager IT Security and has more than 23 years of experience in the industry. He is a results oriented IT leader with proven success providing solutions to increase productivity, reduce costs, and improve accuracy, efficiency and accountability. Other employers include Deloitte & Touch, Ernst & Young, Lucent and AT&T Bell Labs. Prior to his present assignment, he developed security architecture and risk assessment tools and managed telecommunication software projects.

Smart Grid Integration Lead – Mark Sondag

Mr. Sondag has over 20 years of experience in program management within manufacturing industries, overseeing plant operations and product development initiatives. He is a FirstEnergy technical support team member assisting in the development of a companywide smart grid program. He has managed pilots and supported standards development in substation data integration, transformer monitoring and synchrophasor application areas. He has been responsible for project team formulation, scope development, and administrative coordination for the current Smart Grid Modernization Initiative.

Smart Grid Interoperability Lead – Joseph Waligorski

Mr. Waligorski has over 25 years of experience in the electric utility industry integrating technology into the T&D system. He led FirstEnergy's Integrated Grid Communication & Automation (IGCA) effort, facilitating the development of FirstEnergy's smart grid roadmap and outlining the FirstEnergy direction and technologies to achieve smart grid vision, receiving an EPRI Technology Transfer Award for this industry model. Mr. Waligorski is Chairman of the Grid App Consortium, a utility group with DOE support to advance development and deployment of smart grid technologies with near-term impacts.

1.3.5 Strategies to Address Risk

FirstEnergy actively manages many forms of risk with potentially significant impacts on a daily basis. To manage project planning and implementation risks, FirstEnergy appoints a risk management team that focuses on the following areas of concern: 1) the scheduling of critical path project activities and awareness as impact dates are approached; 2) the development of contingency plans when the need arises and ongoing contingency analysis management; 3) the application of project controls such as scope, schedule and budget; and 4) the selection and management of project vendors. In addition to contingency plans, individual plans for approvals, audits and project communications will be developed and managed for this project.

The Smart Grid Modernization Initiative spans multiple technologies and comprises three deployments in Ohio, Pennsylvania and New Jersey, respectively. While there are several risks that exist that could impact tasks and schedule, they can be summarized by the following in **Figure 1.3.5-1**.

Key areas of focus for this project have been identified as financial, customer and regulatory. Detailed and cross-functional risk management strategies have been developed for each of these areas as an early project task. When areas of risk are being weighed in the decision-making process, decisions will be prioritized based on the outcome objectives outlined in this proposal.

1.3.6 Organizational Commitment

Figure 1.3.6-1 illustrates our senior management commitment to this initiative.

1.4 Technical Approach to Enabling Smart Grid Functions

1.4.1 Overview of FirstEnergy Crosscutting Regional Integration Proposal

In 2006, FirstEnergy launched the Integrated Grid Communication & Automation Initiative, a strategic and consensus building initiative with a focus on planning and implementing smart grid with disciplined qualification and standardization of smart grid technologies and architectures. The development of an IGCA roadmap was completed in December, 2007 in collaboration with EPRI. The resulting IGCA roadmap and implementation plan represents the planned functionality for data acquisition, integration and automated restoration and optimization utilizing a common and unified network. Under the IGCA plan, FirstEnergy:

1. Established the vision and direction for the future state of its energy delivery system
2. Characterized existing facilities
3. Developed requirements based on cost-justifiable applications
4. Mapped requirements to technologies that were likely to be available for deployment
5. Conducted gap analyses to achieve future vision through technology application
6. Created an IGCA Roadmap and technology and architecture standards

In launching the IGCA, FirstEnergy partnered with EPRI to raise the bar for smart grid strategic planning. FirstEnergy's IGCA roadmap objectives were established in parallel with and fully complementary with the DOE's modern grid characteristics and, as a result the IGCA approach, have been used as a roadmap model for the industry. In fact, key areas that were explored during the IGCA planning process are identical to DOE focus areas for smart grid investment, including standardization and interoperability, security, use of

Risk Identifier	Risk Description	Possibility	Impact	Risk Mitigation Strategy
Resources	◆ Maintaining personnel and skills throughout the project life	HIGH	HIGH	◆ FirstEnergy's Senior Management has committed the Project Management team and associated external subject matter experts for successful support through the life of the project
	◆ Financial recovery of expended costs	MED	HIGH	◆ FirstEnergy's Project Management contains a Controller with the accountability for costs and reporting
Technology	◆ Availability of technology due to increased deployment activities	HIGH	MED	◆ FirstEnergy has already engaged in proactive discussions with Suppliers for securing products and services
	◆ Integration of leading edge technology into operational environment	MED	MED	◆ The project plan includes a test environment for development of implementation and operational deployment procedures
Regulatory	◆ Regulatory support of scope and cost recovery	MED	HIGH	◆ FirstEnergy has proactively engaged each of the State Regulatory entities for the project scope and content
	◆ Collaborative process input to benefits/cost analysis	HIGH	HIGH	◆ FirstEnergy has engaged EPRI for expertise and support in measurement and quantification of benefits and costs
Customer	◆ Customer low acceptance of mandatory demand response	HIGH	HIGH	◆ FirstEnergy has proactively engaged Regulatory support for the proposed demand response programs. The engagement of external expertise for marketing the program is planned
	◆ Customer weak support of costs for Smart Grid advancements	MED	HIGH	◆ FirstEnergy has proactively gained Regulator support for cost recovery of all programs
Operational	◆ Implementation of advancement processes with new technology	HIGH	HIGH	◆ The project plan includes a test environment for development of operational deployment procedures
	◆ Performance of technology within the distribution system	MED	MED	◆ The project plan includes a test environment for technology assessment and integration
	◆ Available Skills and training supportive of Smart Grid technologies	MED	MED	◆ The utilization of the Work Force Development and PSI program supports future skills training requirements

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Figure 1.3.5-1. Risk Table

object modeling, adoptability and scalability. This clearly demonstrates the commonality between the DOE funding objectives and the FirstEnergy strategic approach to smart grid planning and implementation.

In late 2008 FirstEnergy initiated a data integration and communication architecture study in collaboration with EPRI and IBM. This study proposes a reference design for the future FirstEnergy data and communication infrastructure. This architecture is a key aspect of the IGCA Roadmap. It supports the processing of data into useable information and the ability to communicate that information into cross-functional applications. The architecture requires open standards and protocols so that infrastructure implementations based on this architecture can migrate to new transport technologies as they develop. This, in turn, supports technology applications, automation and optimization at all levels of the transmission and distribution system. The flow of information is crucially important to FirstEnergy's plan to develop a platform-independent architecture that provides a foundation for integrating applications and feeding data into those applications.

This crosscutting strategic process will create synergy for FirstEnergy as the smart grid deployment plan continues to mature. The IGCA groundwork will assist FirstEnergy in addressing regional and local differences while developing replicable and readily deployable smart grid solutions and maintaining consistency with industry standards. These include:

- Crosscutting systems based on integration across technologies, geographies, demographics, transmission organizations and commissions, supporting varied business models but producing consistent outcomes.
- Integration of multiple technologies into a single framework, leading to an understanding of relative operational values in one region versus another.

FirstEnergy

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Richard R. Grigg
Executive Vice President and
President, FirstEnergy Utilities

330-384-5838
Fax: 330-384-5909

August 4, 2009

Donna Williams
Contract Specialist
MA-642.2/L'Enfant Plaza Building
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, DC 20585-1615

Re: Letter of Commitment for FirstEnergy Service Company's Application to DE-FOA-0000058 *Smart Grid Investment Grant Program*

Dear Ms. Williams:

I am writing to express FirstEnergy's full support for the smart grid investment projects in Ohio, Pennsylvania and New Jersey that we are seeking funding through the American Recovery and Reinvestment Act of 2009.

This letter of commitment is for a cross-cutting funding application submitted by FirstEnergy Service Company, on behalf of three operating companies - Cleveland Electric Illuminating Company, Metropolitan Edison, and Jersey Central Power & Light, in the above referenced FOA for the *Smart Grid Investment Grant Program.*

This set of projects is designed to provide significant benefits to our customers through the deployment of smart grid technologies. The proposal is intended to demonstrate the increased operational efficiency, functionality, and interoperability achievable with Smart Grid technology deployments across geographically diverse service territories located in three states and two independent system operator (ISO) regions, and is expected to accelerate the adoption of this technology across the entire FirstEnergy system.

FirstEnergy is committed to providing the people and resources needed to ensure project success and manage the data required to satisfy DOE project objectives. We have spoken with our respective regulatory commissions and believe we have the support necessary to execute this very important set of projects. We have also assembled a strong team led by Program Manager, *Tim Richard,* who will have the decision making authority to commit organizational resources needed to support the completion of project tasks, and shall provide overall project direction.

In addition, I will continue to offer my personal support for these projects that will help ensure our distribution infrastructure is better equipped to meet the future energy needs of our customers.

Sincerely,

Richard R Grigg

Figure 1.3.6-1. Organizational Commitment

- Implementation of diverse components according to a common reference design, addressing the most critical of smart grid concerns. These relate to interoperability, data collection/verification, extensibility, broad application of risk-mitigation across whole systems, and application of a cost-benefit framework across these comprehensive systems.
- Adding detail to the crosscutting strategic framework as data from the first strategic deployments is generated. This will enhance FirstEnergy's smart grid implementation, supporting a deployment approach sufficiently flexible to accommodate current and developing requirements, competing technologies and alternate program choices or regulatory directives.
- Specifically, in this deployment the architectural guidelines developed in the IGCA initiative will guide technology selection and the supporting data integration and communications strategy. It will demonstrate the implementation of a common communications infrastructure that supports AMI, DA, VVC, SCADA and DLC with necessary prioritization of data to ensure reliability is maintained.

A guiding principle behind the FirstEnergy strategic approach to smart grid is the leveraging of digital components across all aspects of energy delivery operations. This leveraging allows FirstEnergy to benefit from economies of scale, standardized architectures and corporate-wide sharing of information, and expands FirstEnergy's knowledge base of smart grid functionality. FirstEnergy has made a commitment to use components, standards and protocols that support an open architecture solution that mitigates system obsolescence as new smart grid devices emerge in the marketplace.

With this SGIG application, FirstEnergy is launching the next phase of its industry leadership in strategic smart grid technology deployment and seeking to accelerate the implementation of this technology. Information gathered from the three reference deployments described below will guide the deployment of smart grid integration into FirstEnergy's diverse service territories. In addition to technical findings, critical non-technical issues such as cost, customer awareness and interaction, and regulatory cost recovery will be explored and understood. Operational information from these deployments will provide insight into how technical and non-technical factors impact the potential benefits derived from the technologies. Insight will also be gained with respect to organizational and training requirements for operational support for the future smart grid. This comprehensive approach will support the testing, evaluation, rapid implementation and ongoing support of technologies and approaches identified under the IGCA planning process. This funding will also help to create jobs in Ohio, Pennsylvania and New Jersey.

Figure 1.4.1-1 illustrates how these three deployments will accelerate the assessment of IGCA-highlighted technologies. These technologies will be components of deployment designs that reflect the varied opportunities and circumstances FirstEnergy will encounter in broad smart grid implementation efforts.

1.4.2 Use of Smart Grid Technologies, Tools and Techniques

The three projects selected for this proposal were handpicked to demonstrate a rich diversity of smart grid functionality within separate operating environments to facilitate adoption of these technologies throughout the FirstEnergy system and the interconnections in which they operate. The implementation and deployment of the three projects are contingent upon regulatory approval and timely cost recovery of all project costs not covered under the DOE grant. The deployment plans for each project address key segments, integration interfaces and data exchange points across the energy delivery system. The integration efforts defined in the deployment plans will span fundamental energy delivery segments such as system protection and automation, a centralized integrated control platform, distributed energy resources and an array of "edge of the network" devices. This will be accomplished through a secure and pervasive communications system. In this truly integrated deployment, interacting components will create greater value by supplying additional information that is used to optimize the operation of the components, thus enhancing the reliability and efficiency of the entire system.

At its most fundamental level, the project involves smart grid technologies, tools and techniques that meet the FOA-specified conditions of "qualifying investments," in that it incorporates:

- distribution equipment fitted with monitoring and communications devices to enable smart grid functions…

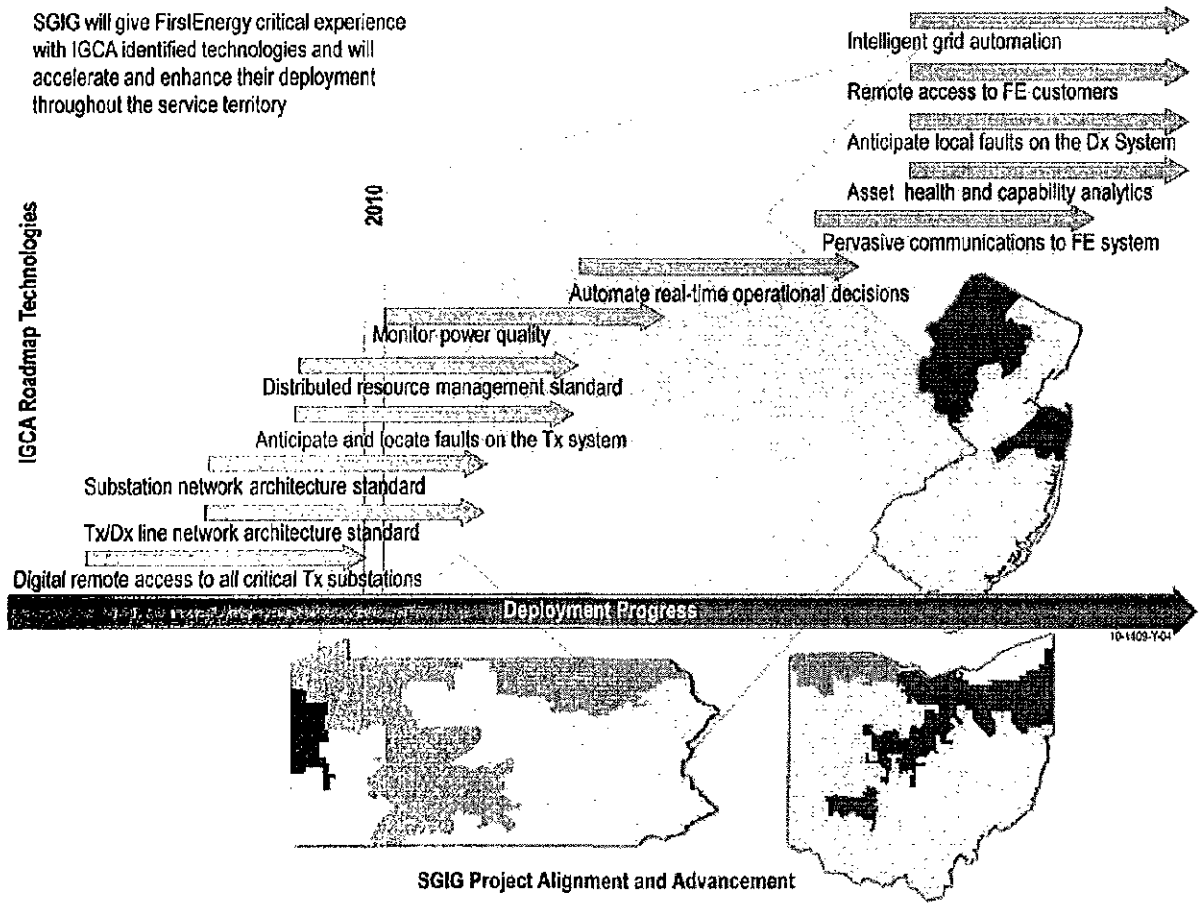

Figure 1.4.1-1. Acceleration of IGCA Identified Field Testing

- metering devices, sensors, control devices and other devices integrated with and attached to an electric utility system...that are capable of engaging in smart grid functions...
- software that enables devices or computers to engage in smart grid functions....

Numerous qualifying smart grid technologies have been selected for implementation in this project. These technologies will be deployed in varying configurations in each of the three deployment sites. This varied deployment approach will enhance the value of information that is generated by the project for delivery to the DOE. Involved technologies are depicted in **Figure 1.4.2-1**.

This crosscutting project will 1) establish three smart grid reference deployments, 2) flexibly implement these reference deployments, and 3) provide industry benefits as resulting information is used to create objective analyses. Establishing fundamental interoperability between functional layers and devices is an absolute pre-condition to further future cross-functional integration. The intent of the project is to produce an integrated system of protection, performance, efficiency and economy that extends across the energy delivery system for multiple stakeholder benefits. This crosscutting integration project will demonstrate how systems can be deployed to accommodate a range of system differences, whether they exist at the control center, system automation level, integration layer or network edge. The project will also produce a wealth of information through the operation of these deployments. The variety of demographics and the mix of technologies, for example, will result in real-world operational information that is needed to accurately judge impacts and benefits of these technology investments. The careful development of design, implementation and operational plans by domain experts, internal and external to FirstEnergy, will create the confidence needed to allow these deployments to serve as models for future implementations across FirstEnergy's entire distribution infrastructure. This, in turn, will lead to a refining of best

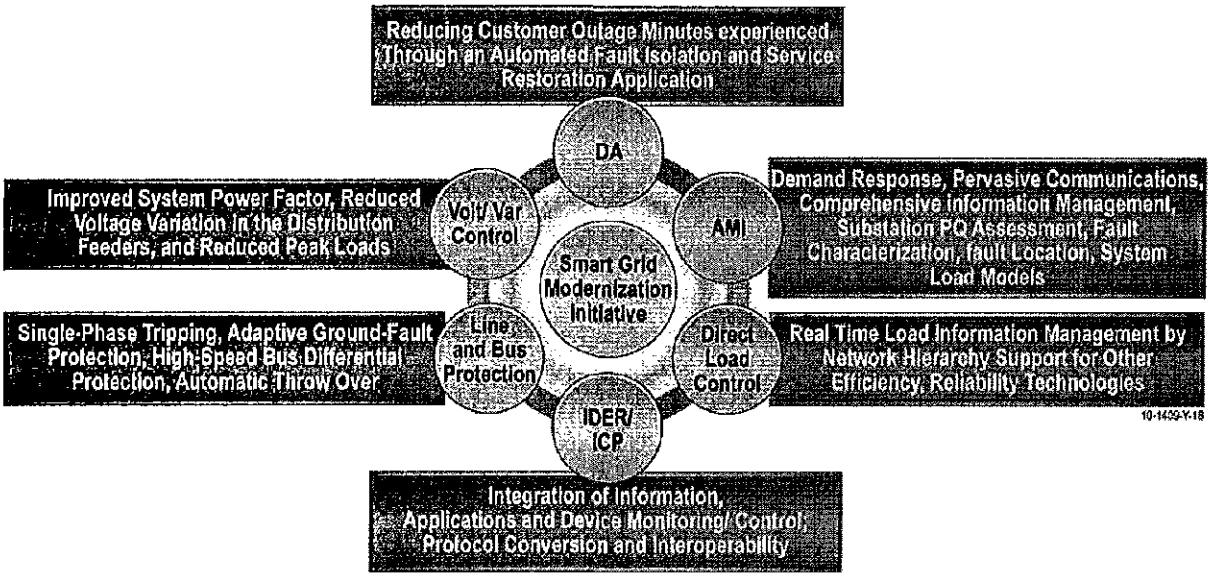

Figure 1.4.2-1. Project Involved Technologies.

practice guidelines as resulting smart grid benefits are sought in additional FirstEnergy service territories.

Figure 1.4.2-2 emphasizes key aspects of the project, including technologies that will be integrated in each deployment area, key benefits that are expected, the verification point for data generated, and how each of these deployments aligns with the DOE's SGIG program objectives.

The Ohio Site Deployment – Situational Analysis

The Ohio site deployment will be executed in a Cleveland suburban area serving a mix of residential and commercial customers on 34 distribution circuits, representing a demand of over 200 MVA. The circuits are serviced from 14 substations, six of which exclusively serve the area. The circuits operate at standard distribution voltage (13.2 GrdY/ 7.62 kV) and are capable of supporting advanced smart grid functionality with minimal infrastructure investment. Customer reliability in the targeted area has been challenged by long circuit lengths and high customer concentrations, making the area particularly suitable for automated restoration.

Currently, line capacitors are manually controlled, resulting in suboptimal voltage control. Substation transformers in the area generally use conventional electromechanical relays, which do not support deployment of advanced protective strategies, remote settings management or data acquisition. Present communications infrastructure in the area consists of leased analog telemetry service supporting SCADA functionality. With only conventional meters installed in this area, FirstEnergy is unable to offer variable pricing arrangements or to monitor response to variable pricing signals, other than by evaluating monthly meter readings. Without power quality-capable metering, the company is unable to evaluate the impact of load disturbances or harmonic-generating control devices. Currently, system models are manually updated, using operating characteristics that are infrequently determined during brief observation windows. Key elements of the proposal include 1) direct enhancement of grid operation and reliability through the integration of distribution automation and protection equipment, 2) pervasive communications and integrated control/metering devices, and 3) design and implementation of enhanced program to customers.

The Ohio Site Deployment – Integrated Deployment

This deployment will produce an integrated system of protection, performance, efficiency and economy that extends across the local energy delivery system, providing multiple stakeholder benefits. Crosscutting protection system coordination will be supported by SCADA-integrated automation platforms, providing a single Regional Dispatch Office (RDO) control point. Key components to be installed include:

- *Distribution Automation*—the DA algorithm has the ability to react autonomously to system disturbances such as faults and non-fault loss of voltage scenarios. It can be manually disabled

Integrated Component	CEI	Met-Ed	JCP&L	Pre-Condition	Action	Post Condition	Point of Verification	SGIG Benefit
Distribution Automation	●	●		Fault Condition	Automated Fault Isolation	Circuit Reconfiguration	Master Controller	Reliability Digital Ops
Automated VVC	●	●		Large Voltage Drop	Automated VVC Response	Reduce Feeder Losses	Circuit, End Point Monitoring	Optimization Digital Ops
Integrated Control Platform		●	●	No Circuit Visibility	Integration of Digital Devices	Circuit Visibility	Operator GUI	Integration Visibility
PQ Monitoring	●	●	●	High Var Loading	Automated VVC Response	Reduce Power Factor	Circuit, End Point Monitoring	Customer Benefits
Circuit Monitoring Sensors	●	●	●	Temporary Fault Condition	Coordinate, Anticipate Fault	Circuit Reconfiguration	Circuit, End Point Monitoring	Reliability Efficiency
Direct Load Control		●	●	Isolated Asset, Circuit Load Stress	Targeted Load Reduction	Load Reconfiguration	Transformer Loading	Customer Participation
Integrated DER		●	●	Poor Asset Utilization	Control DER to Shift Peak	Improved Asset Utilization	Transformer Loading	Integration Diversity
AMI	●			Low Customer Engagement	Price Signal	Customer Engagement	End Point Monitoring	Customer Participation
Pervasive Communications	●	●	●	Lack of System Coordination	Digital Integration	Improved System Coordination	Multiple Points	Enabling Technology

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Figure 1.4.2-2. Planned Project Technology

Ohio Site Deployment Key Baseline Condition	Impact Metrics
SAIDI 30-40% higher than surrounding area	SAIDI variance ≤ 5% of surrounding area
Uncontrolled system VAR requirements 10% ≥ than necessary	Reduction in peak load = 3%
	Improved avg. power factor = .05
No capability to enact verifiable peak load reduction program via end use devices	Reduction of peak demand ≥ 5%

locally and remotely. Service restoration strategy will include single-phase fault isolation, where appropriate, and an automated analysis of load profiles prior to service restoration. The system will provide improved situational awareness and control to the RDO operator by enabling SCADA display and control of substation breakers as well as field devices via the communications system to be installed as part of this project.

- *Voltage Control*—dedicated controller(s) will be installed to control all field devices associated with the VVC algorithm, including the substation load tap changers and capacitor controllers, and 78 line capacitor switches. Bellwether meters will be installed to provide voltage detection as part of the AMI Network.
- *Substation relay-based protective strategies*—single-phase tripping, adaptive ground-fault protection, and high-speed bus differential protection strategies will be implemented at nine of the incorporated substations, using digital relay-based algorithms at the substation.
- *Alternate Pricing Programs/AMI*—will support customer conservation and demand management in this specific project area. AMI will also include a front-end system that collects customer data and interfaces with a hosted meter data management system, providing detailed customer information regarding specific time of usage and the cost associated with that usage. Upon the success of an initial 5,000 meter deployment as described below, the company plans to install approximately 39,000 additional smart meters on residential and commercial customer premises within the geographical boundaries of the deployment. Each meter deployment will be applied to all the identified customers. The initial deployment will allow FirstEnergy to conduct a controlled randomized test of approaches to Critical Peak Pricing and customer participation. Customers will be given the choice of enabling technology to manage their participation. Technologies available will be a programmable thermostat, an in-home display device, or an electronic switch that can be used for direct load control. All customers will be encouraged to initiate Demand Response through the signaling of price alerts. This will allow FirstEnergy to gain understanding of customer response and acceptance of various forms of Demand Response. FirstEnergy is working

with the PUCO (Public Utilities Commission of Ohio) for the regulatory support necessary to ensure customer participation in the initial 5,000 meter roll out, thereby mitigating participation risk and protecting the validity of collected data. These discussions will continue as results are evaluated in a go/no-go decision after the first phase to determine the extent of further implementation. FirstEnergy expects to gain a better understanding of the role customer service will play in ensuring positive reliability and efficiency outcomes as part of the smart grid deployment. A comprehensive communications program to educate consumers about program responsibilities and benefits will support program success and targeted impacts.

- *Communications and Data Infrastructure installation*—will support DA, VVC and AMI functionality while observing relevant security requirements. This infrastructure will support pervasive communications to all systems associated with this initiative. The overall design will accommodate and support integration with legacy infrastructure and will be capable of supporting current and evolving smart grid technologies.
- *Data collection, analysis, and reporting*—includes installation of required data processing infrastructure.

The New Jersey Site Deployment – Situational Analysis

The New Jersey site deployment is the extension of a fully operational pilot project (8 MW) involving integrated distributed energy resources. The pilot project was deployed in 2008 to address a number of operational, reliability and regulatory compliance needs. The system involved three substations in central New Jersey that were characterized by high peak demand and high forecasted load growth. Prior to the pilot deployment, customer reliability on targeted circuits was affected by high segment loads. Unusually high peak demand contributed to low system utilization and compromised both system reliability and efficiency. Regional congestion issues and a growing trend toward exporting generation to neighboring metropolitan areas create poor market dynamics for JCP&L. At the time of the deployment, the New Jersey Energy Master Plan (NJEMP) was being developed, and the NJBPU required filings for mandatory peak load reductions via Demand Response programs. In addition, an existing air conditioner cycling program had experienced severe participant attrition and was operating at only 40% efficiency.

The pre-pilot communications infrastructure consisted only of a leased analog telemetry service supporting SCADA functionality. The existing air conditioner cycling equipment, which ran on one-way paging, and conventional meters installed in the territory provided no interaction with customers. Key elements of the pilot included 1) direct enhancement of grid operation and reliability through the integration of direct load controllers (aggregated capability of providing 8 MW of loading relief); 2) direct enhancement of distribution efficiency and reliability through the deployment of an IDER platform, allowing operators to observe connected devices and gather targeted sensor-generated operations data; and 3) pervasive communications to support near real-time data collection and interaction with participating customers within the three-substation target area.

The New Jersey Site Deployment – Integrated Deployment

The New Jersey site deployment will produce an integrated system of protection, performance, efficiency and economy that extends across the energy delivery system for multiple stakeholder benefits. The expansion will increase the overall controlled load deployment from 8MW to 38MW within the JCP&L service territory. The project also will deliver enhanced capability through the functional expansion of the Integrated Control Platform – a central-

New Jersey Site Deployment Baseline Condition	Impact Metrics
Capability to enact firm/verifiable peak demand reduction ≤ 40% of current program connected load	Firm/verifiable peak reduction = 100% of connected devices
Average load reduction per engaged load controller ≤ .8kW	Avg. load reduction per engaged load controller ≥ 1.5kW
	Reduction in peak load = 3%
Uncontrolled system VAR requirements 10% ≥ than necessary	Improved avg. power factor = .05

ized, cross-functional platform that monitors and manages a range of connected devices. The system provides JCP&L the ability to monitor and control non-critical customer electrical loads in the targeted area through an aggregation hierarchy that starts with customer end use devices and includes circuit, transformer, substation and multi-substation groupings.

JCP&L operators can monitor available load, initiate and manage load reduction events based on program rules, verify operations, detect tampering, and collect data to use in conducting analysis and creating reports. The system provides targeted load control capability, permitting JCP&L to reduce load on feeders or transformers. System capability is leveraged to provide operational and programmatic benefits, such as participation in PJM programs. In addition, having the ability to reduce loads within specific areas enables utility operators to manage power flows.

The smart grid project is designed to provide utility operators with real-time system status based on configurable operations rules. The integrated DER Control Platform will monitor the condition of the local distribution circuits to identify, assess and manage efficiency and reliability requirements at a defined distribution system segment. It will leverage deployment of individual DER components and integrated digital sensors to meet system needs and maximize resource utilization. In addition to increasing the total number of direct load controllers, the expansion project also will create a host environment into which storage technology can be integrated, controlled and optimized. The value of the system's fundamental capability as a host environment to integrate other smart grid technologies is essential – the platform will integrate load, storage, sensors and distributed generation to meet project objectives. In doing so, important lessons will be learned about interoperability, cyber security, logging and verification, customer participation and service, and other cross-functional aspects.

Key components to be installed include:

- *Integrated Control Platform (ICP)*—comprising the enterprise foundation software and associated applications that support and maintain the monitoring, management and control of participating air conditioning units. The platform uses a two-way communications architecture to communicate with each pole-mounted concentrator unit which, in turn, communicates with each air conditioning unit located at participating customer premises. The system also includes a display at the Regional Distribution Operations Center that provides granular status information in real time.
- *Concentrators*—the routing points between the radio wireless mesh network and the ICP server. Each point of control — including direct load controllers and premise temperature sensors — sends, receives and relays data packets to the ICP server either directly to the concentrator or through other points of control or communication repeaters.
- *Direct Load Controller*—a hardware device deployed at customer premises on or near their central air conditioner, water heater, and/or pool pump, which contains meter-grade measuring capabilities that send data and commands through the wireless mesh radio network. It also facilitates communication with the associated air conditioner premise temperature sensor and other controllers and premise temperature sensors as well as with the communications concentrator. The controller executes load reduction commands received from the ICP and measures and transmits information associated with the air conditioner, water heater and pool pump back to the ICP. The controller contains a relay that is wired into the air conditioner, water heater or pool pump control circuit and intercepts the control signal. The integration of the DLC at the customer premise is another opportunity for FirstEnergy to gather valuable data related to program offers, customer interaction and service, and to measure how customer participation impacts the plan for smart grid technology deployment.
- *Communications and Data Infrastructure Installation*—will support DLC and ICP functionality while observing relevant security requirements. This infrastructure will support pervasive communications for all deployed systems. The overall design will accommodate and support integration with legacy infrastructure and will be capable of supporting current and evolving smart grid technologies.
- *Data collection, analysis, and reporting*—includes installation of required data processing infrastructure.

The Pennsylvania Site Deployment – Situational Analysis

The PA site deployment will be on the distribution system serving the north side of York, PA. The

PA Site Deployment Baseline Condition	Impact Metrics
SAIDI currently 30-40% higher than surrounding area Uncontrolled system VAR requirements 10% ≥ than necessary No capability to enact verifiable peak load reduction program via end use devices	SAIDI variance ≤ 5% of surrounding area Reduction in peak load = 3% Improved avg. power factor = .05 Reduction of peak demand ≥ 15%

selected circuit set operates at a standard distribution voltage (13.2 GrdY/ 7.62 kV) and is capable of supporting advanced smart grid functionality with minimal infrastructure investment. The 25 selected circuits serve approximately 17,500 customers comprising 150 MW of load. Customer reliability in the target area is hampered by dense traffic and summer loading conditions, making the area particularly suitable for an integrated distribution automation and demand management smart grid implementation.

Currently, line capacitors are manually controlled, resulting in suboptimal voltage control. Substation transformers in the area generally use conventional electromechanical relays, which do not support deployment of advanced protective strategies, remote settings management or data acquisition. Present communications infrastructure in the area consists of leased analog telemetry service supporting SCADA functionality. Currently there is no communications infrastructure to support customer-based programs for load control or price responsiveness. Key elements of the PA site deployment are: 1) direct enhancement of grid operation and reliability through the integration of distribution automation, VVC and protection equipment; 2) pervasive communications and integrated load controllers and devices; and 3) direct enhancement of distribution efficiency and reliability through the deployment of an integrated DER platform, allowing operators to observe connected devices, gather sensor-targeted operations data, and coordinate granular load control with signals from the distribution protection system.

The Pennsylvania Site Deployment – Integrated Deployment

The PA site deployment will produce an integrated system of protection, performance, efficiency and economy that extends across the energy delivery system for multiple stakeholder benefits. Cross-protection system coordination will be supported by a SCADA-to-Integrated Control Platform integration strategy, providing a single RDO visualization and control point. Key components to be installed include:

- *Distribution Automation*—the DA algorithm has the ability to react autonomously to system disturbances such as faults and non-fault loss of voltage scenarios. It can be manually disabled both locally and remotely. The service restoration strategy will include single-phase fault isolation, where appropriate, and an analysis of load profiles prior to service restoration. The system will provide improved situational awareness and control to the RDO operator by enabling SCADA display and control of substation breakers as well as field devices via the communications system to be installed as part of this project.
- *Voltage Control*—dedicated controller(s) will be installed to control all field devices associated with the VVC algorithm, including the substation load tap changers and capacitor controllers, and the line capacitor switches.
- *Substation relay-based protective strategies*—single-phase tripping, adaptive ground-fault protection, and high-speed bus differential protection strategies will be implemented, using digital relay-based algorithms at the substation.
- *Communications and Data Infrastructure installation*—will support DA, VVC, DLC and ICP functionality while observing relevant security requirements. This infrastructure will support pervasive communications for all deployed systems. The overall design will accommodate and support integration with legacy infrastructure and will be capable of supporting current and evolving smart grid technologies.
- *Data collection, analysis, and reporting*—includes installation of required data processing infrastructure.

The project also will deliver enhanced capability through the functional expansion of the Integrated Control Platform — a centralized, cross-functional platform that monitors and manages a range of connected devices. The system provides Met-Ed the ability to monitor and control non-critical customer electrical loads in the targeted area through an aggregation hierarchy that includes circuit, transformer, substation and multi-substation groupings.

Met-Ed operators can monitor available load; initiate and manage load reduction events based on program rules; verify operations; detect tampering; and collect data to use in conducting analysis and creating reports. The system provides targeted load control capability, permitting Met-Ed to reduce load on feeders or transformers. System capability is leveraged to provide operational and programmatic benefits, such as participation in PJM programs. In addition, having the ability to reduce loads within specific areas enables utility operators to manage power flow.

The smart grid project is designed to provide utility operators with real-time system status based on configurable operations rules. The integrated DER Control Platform will monitor the condition of the local distribution circuit to identify, assess and manage efficiency and reliability requirements at a defined distribution system segment. It will leverage deployment of individual DER components and integrated digital sensors to meet system needs and maximize resource utilization. In addition to increasing the total number of direct load controllers, the expansion project also will create a host environment into which storage technology can be integrated, controlled and optimized. As noted in the integrated DER expansion review above, the value of the system's fundamental capability as a host environment to integrate other smart grid technologies is an essential feature – the platform will integrate load, storage, sensors and distributed generation to meet project objectives. In doing so, important lessons will be learned about interoperability, cyber security, logging and verification, customer participation and service, as well as and other cross-functional aspects.

Key components include:

- *Integrated Control Platform*—comprising the enterprise foundation software and associated applications that support and maintain the monitoring, management and control of participating air conditioning units. The platform uses a two-way communications architecture to communicate with each pole-mounted concentrator unit which in turn communicates with each air conditioning unit located at participating customer premises. The system also includes a display at the Regional Distribution Operations Center that provides granular status information in real time.
- *Concentrators*—provide the routing points between the radio wireless mesh network and the ICP server. Each point of control — including direct load controllers and premise temperature sensors — sends, receives and relays data packets to the ICP server either directly to the concentrator or through other points of control or communication repeaters.
- *Direct Load Controller* — a hardware device deployed at customer premises on or near a central air conditioner, water heater and/or pool pump, which contains meter-grade measuring capabilities that send data and commands through the wireless mesh radio network. It also facilitates communication with the associated air conditioner premise temperature sensor and other controllers and premise temperature sensors as well as with the communications concentrator. The controller executes load reduction commands received from the ICP and measures and transmits information associated with the air conditioner, water heater and pool pump back to the ICP. The controller contains a relay that is wired into the air conditioner, water heater or pool pump control circuit and intercepts the control signal. The integration of the DLC at the customer premise is another opportunity for FirstEnergy to gather valuable data related to program offers, customer interaction and service, and to measure how customer participation impacts the plan for smart grid technology deployment.

1.4.3 Plan to Enable Smart Grid Functions

In both the IGCA roadmap and communications architecture development, FirstEnergy (in conjunction with EPRI, Enernex, and IBM) facilitated and participated in use case workshops to identify and document functional and non-functional requirements for a comprehensive set of smart grid applications, selected for their impact on the supporting communications infrastructure. This set of requirements enables awareness of the total requirements supported by the infrastructure delineated in the roadmap. As each individual application is deployed, the supporting communications infrastructure is built with future requirements in mind to avoid stranded investment.

In the JCP&L pilot, FirstEnergy continued this effort using EPRI's Intelligrid methodology to develop the requirements for pilot-specific use cases. This approach accomplishes several important objectives, including:

- Receiving input and perspective from all project stakeholders for a more complete definition of system performance and use case requirements.

- Focusing on the use of the technology and the planned outcomes that required support.
- Managing all types of operational requirements and supporting a range of performance objectives.

As noted in the Key Baseline Condition and Impact Metrics tables, there are a number of targeted metrics that will be attainable with the implementation of the described technology for each deployment. FirstEnergy is aware, however, that simply deploying technology and tracking data returned from its operation is not adequate to meet the DOE's SGIG requirements. In the FOA, the DOE establishes requirements and objectives related to smart grid functionality. In conjunction with the DOE's funding criteria, the ultimate goal of the project is to deploy, test, assess and plan further implementation of selected technologies, tools and techniques in a true crosscutting environment. When simultaneously deployed, the selected technologies will produce multiple operational benefits. Accordingly, the three systems will be operated, tested and assessed by FirstEnergy using commonly accepted smart grid approaches and in support of the DOE's established criteria. This will be accomplished primarily through the development and operational evaluation of crosscutting use cases. **Figure 1.4.3-1** illustrates the distinction between single-purpose use cases and crosscutting use cases.

A fundamental smart grid principle is that proper planning, implementation and operation support integration of multiple technologies into a cross-functional system will create an overall value that will be greater than the sum of the parts. FirstEnergy will employ a structured approach to leveraging the deployed technology by collaborating on the development of crosscutting use cases that could raise the overall reliability and efficiency outcomes of the project. A significant differentiator of the FirstEnergy project is that the three deployments present the opportunity to evaluate impacts and benefits across three different geographies, all with different regulatory, transmission and recovery structures. Of equal importance is the variety of demographics as well as the opportunity to test customer programs, interfaces and methods of involvement. Among the other benefits of the smart grid, the opportunity for the utility to build customer relationships and improve service through the operational design of these implementations should not be overlooked.

The following crosscutting scenarios illustrate how smart grid technology could be configured and implemented into the three deployments. These scenarios represent the types of planned system component integration strategies that will result in optimized project benefits and system impacts. FirstEnergy will utilize a disciplined methodology to originate, test, assess and refine crosscutting use cases. The range and mix of technologies implemented offer FirstEnergy an excellent opportunity to evaluate those different mixes in various demographics. FirstEnergy will rely on project partner EPRI to provide support in gathering and comparing data across the three deployments so that the drivers and mitigations to impacts and benefits can be better understood.

Scenario #1—IED, DLC support of circuit reconfiguration for DA

Deployed IEDs (intelligent electronic device) measure, monitor, communicate with and control system protection devices. These IEDs identify and isolate fault (whether transient or sustained); and information from IED's can be coordinated in real-time into DLC curtailment profiles to keep loads balanced or to rapidly achieve balance if a fault is anticipated. Continual balance of loads at switching points ensures that DA will produce a valid circuit reconfiguration to avoid a sustained outage.

Scenario #2—DLC identifies out-of-threshold voltage profiles and alarms VVC

Deployed DLC measures site-specific voltage profiles and aggregates for algorithmic assessment. Aggregated voltage profiles that exceed management thresholds result in an alarm triggered by the DLC control software (IDER). Alarm data is sent via an Integrated Control Platform to a master controller for the appropriate capacitor bank; the capacitor bank is switched to reduce voltage levels, restoring service efficiency.

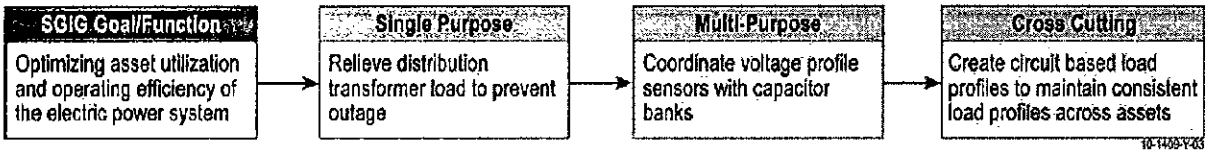

Figure 1.4.3-1. Iterative and Collaborative Integration Planning Process

Scenario #3—Technologies combine to support Asset Utilization

#3a.DLC reduces peak at circuit level

ICP manages non-critical loads (e.g., air conditioner loads) in hierarchies that map to distribution segments and assets. Loading levels for assets, circuits, or substation segments can be pinpointed by the system. Static or dynamic load shedding instructions can be sent to load controllers on the involved circuits for targeted load reduction, improving system asset utilization.

#3b.Circuit monitoring and coordination manages voltage thresholds at key points and coordinates to cap bank hierarchy

Sensors monitor circuits for specific voltage profiles at differing points. Long circuit lengths create uneven voltage profiles from one end of the circuit to the other. Load balancing via AMI or DLC evens the voltage profile across the entire circuit and homogenizes quality of service.

Scenario #4—Technologies combine to support Strategic Load Planning

Integrated end devices — such as AMI (in conjunction with a pricing program), DLC, Permanent Peak Load Shifting (PPLS) devices and storage — manage load to level energy consumption across time periods, reducing peak and leveling overall consumption. Level consumption supports strategic growth which benefits all stakeholders in that level costs can be spread across a longer service timeframe. This ultimately reduces operations and delivery costs without negatively impacting the utility's operation. AMI participation ensures that a controlled randomized study occurs without selection bias so that the results can be extrapolated to a larger roll-out of AMI. In conjunction with the pricing program, this AMI customer participation selection criterion will allow FirstEnergy to test approaches to Critical Peak Pricing (CPP) and solidify AMI reliability as a strategic load planning tool.

1.4.4 Plan for Operating Smart Grid Technologies – Tools and Techniques

The FirstEnergy project team will support collaboration to develop cross-functional technology operating plans that optimize the project capabilities and associated investment. This optimization effort will focus on determining how deployed technology will be operated to maximize impacts and benefits across each participating organization. FirstEnergy will use a systematic approach to ensure shared project knowledge across diverse groups, achieving the highest and best use of deployed technology. This process will involve the reiteration of business objectives and the mapping of required changes to existing business processes to establish a shared business context. For example, as part of the Ohio AMI implementation a key decision point will follow the roll-out and performance evaluation of the first 5,000 meters: the DOE, PUCO and other interested stakeholders will collaborate to review results and modify the integration approach as needed.

As FirstEnergy embarks on the next phase of its long-term plan to implement smart grid technology, it is essential to establish knowledge, relevance and context around the project. It is also important to ensure that involved stakeholders understand the project's aims and objectives as well as the range of benefits that accrue from implementation. For this reason, operations plans will document the history and the objectives of the initiative. The operations plan will be prepared in increments during system implementation, and revised as needed during testing and ongoing system operation. The first version will be produced as early as possible to ensure that operation and maintenance needs are understood and accommodated. The initial version will focus on issues such as staffing, funding and documentation that need to be addressed well in advance of system startup. Details of specific operation and maintenance activities will be added to the plan as they are developed and after each system is fully deployed and its specific characteristics are known. The plan's concept of operations, system requirements and design documents will provide initial guidance to the project team. As specific components are procured and implemented, the plan can be updated and expanded to include more specific information.

Staffing and training for the development and implementation of the operations plan — as well as incremental training of operations personnel implementing the plan — will be well supported by FirstEnergy.

1.4.5 Plan for Expanding Installation and Operation

A fundamental step in extending the deployed project technology further into the FirstEnergy delivery system will be to actively share project knowledge across the FirstEnergy organization. FirstEnergy will initially accomplish this by 1) creating partner teams among the three operating companies involved in the project to share strategies for

implementation and to jointly problem solve; and 2) creating peer review teams comprising representatives from other FirstEnergy service territories to observe and contribute to deployment.

Project partner EPRI will support the creation and implementation of internal and external knowledge sharing plans. These plans will include the documentation of objectives, designs, implementation strategies and findings associated with the project. By supporting FirstEnergy in the management of the internal and external knowledge share process, EPRI will also help fulfill its mission of providing critical data to the industry at large. **Figure 1.4.5-1** indicates methods EPRI will use to extend knowledge-sharing to stakeholder groups.

1.4.6 Plan for Assessing Operational Performance

FirstEnergy's plan for data collection is discussed in Section 1.6. In order to properly gauge operational performance, FirstEnergy will manage its data collection plan for complete and accurate data collection, in compliance with FirstEnergy and industry standards. The central function of this plan will be to 1) track day-to-day data collection efforts, 2) identify anomalies, and 3) support timely and accurate reporting. For example, the data input in the CBA must be accurate so that the value of the deployed technology can be fully understood. In addition to other information, Table 1.4.2-2 Planned Project Technology referenced the related SGIG benefit and the point of verification for each of the selected technology types. This emphasizes FirstEnergy's interest in and commitment to accurately relating the deployed technology's functional capabilities with its associated benefits, as well as achievement of the DOE's intent and interest in creating this funding opportunity.

In order for the benefits of the diverse implementation factors to be fully appreciated in the outcome analysis, performance evaluations must be uniform in terms of process and procedure. To ensure consistent operational efficiency for each deployment, FirstEnergy will develop a Lifecycle Management Plan to ensure that 1) systems are running optimally, 2) the achievable benefits continue to be extracted from the technology, and 3) there are no negative, unintended consequences from the operation of the system that mitigate the value or impact of its deployment and operation.

Key components of the Lifecycle Management Plan include the following:

- *Configuration Management*—this involves the calibration of the implementation and is achieved by:
  - —Identifying functional and physical characteristics of all implementation components, including hardware, firmware and software
  - —Tightly controlling and recording changes that are made to those characteristics
  - —Documenting any and all changes to the process for operating the deployments
- *Performance Verification*—this is the process of verifying that the deployments and underlying components comply with the requirements allocated to them and is achieved by managing the following process:
  - —*Precertification*—determining if each component is ready to be placed into service
  - —*Certification*—determining if each component is performing at certification level

Internal Knowledge Share	
1.	Mechanical drawings
2.	Data exchange points
3.	Business requirements
4.	Performance requirements
5.	Operations procedures
6.	Operations manuals
7.	Performance testing
8.	Project initiation tutorials
9.	Cross functional Use Cases
10.	Cost-Benefit Analsysis Templates
11.	IGCA addendums as appropriate
12.	Cross functional Strategic Planning Groups for further Use Case development

Common Knowledge Share	
1.	Technical descriptions
2.	Functional specifications
3.	Non-functional specifications
4.	White papers and FAQs

Figure 1.4.5-1. Methods to Extend Knowledge Share to Stakeholder Groups

- —*Baseline*—establishing a baseline for operations
- —*Qualification*—measuring the components against their baseline
- —*Verification*—verifying performance within a specified, acceptable range
- —*Monitoring*—verifying parameters that are applied to output data, confirming consistent operation
- —*Self-diagnosis*—exception reporting or alarms that generate recalibration activity
- —*Quality Assurance Procedures*—as the prime funding recipient, FirstEnergy will maintain QA responsibility and have a structured plan to maintain QA compliance.

1.5 Technical Approach to Interoperability and Cyber Security

The Smart Grid Modernization Initiative implements a strategy for seamless integration. Important guidance has been drawn from the Gridwise® Architecture Council's (GWAC) common principles document for an "interoperability framework," which provides a logical organization of the standards needed to ensure interoperability between components of the smart grid. This framework provides a structure for identifying areas of concern and system interdependencies that must be addressed to achieve interoperability. The NIST Interoperability initiative, mandated by Congress in the Energy Independence and Security Act (EISA) of 2007, further coordinates the development of a framework of protocols and model standards to achieve interoperability.

The project will demonstrate true system interoperability, supporting integration across all of the GWAC and NIST-identified "layers," including the organizational, informational and technical layers. Issues such as policymaking, semantics and connectivity are addressed, and serve to organize the many actions needed to attain interoperability. Crosscutting issues, such as security, system preservation and reliability, are relevant to more than one layer of the framework and also will be addressed. The Companies realize that interoperability is an all-encompassing requirement and that a common framework is needed to manage the complex interactions that take place among system operators, transmission and distribution companies, market participants and other electricity stakeholders. A diagram indicating some of these interactions in the AMI and IDER management area is shown in **Figure 1.5-1**.

1.5.1 Interoperability Considerations

1.5.1.1 Information Exchange

In order to fully realize smart grid capabilities, deployments must integrate a vast number of devices and systems. The Smart Grid Modernization Initiative integrates several networks, systems, devices and applications in a secure manner, with little or no inconvenience to the user. Interface relationships that will be implemented are central to smart grid interoperability and include:

- *Data collection devices to engineer*—Power quality and fault information assessment devices will provide circuit information to engineering personnel for evaluation of current and historical circuit service quality and fault information. Both types of information will be measured in the substation with digital relays or other monitoring devices and stored in corporate data warehouses. Engineering personnel also will have the ability to directly access substation data remotely, with the substation data concentrator controlling all remote access to substation equipment through appropriate password protection and/or two-factor authentication.
- *Operator to VVC/DA system controllers*—Continual operator supervision over the VVC controllers is not required, as the VVC system operates autonomously and notifies the operator when interaction is necessary. While not involved with service restoration, the VVC directly and automatically affects dynamic circuit conditions by minimizing substation VAR flows, leveling voltage profiles, and controlling the distribution system voltage setpoints. Control element statuses and current circuit conditions will be continually reported to and accessible by the operator, who will be able to switch between automatic and manual control to adjust set points. Similarly, the DA controllers will be capable of autonomous operation in identifying fault conditions and restoring unaffected portions of distribution circuits to service (although the operator may deactivate the automatic control and choose to manually isolate faulted circuits and restore unaffected ones). Field personnel can disable the DA controller for the area in which they are working by simply placing a piece of equipment in a nonstandard condition. Further system operations or conditions — such as maintenance, equipment tagouts, or nonstandard topologies — may necessitate manual operation. FirstEnergy will deploy

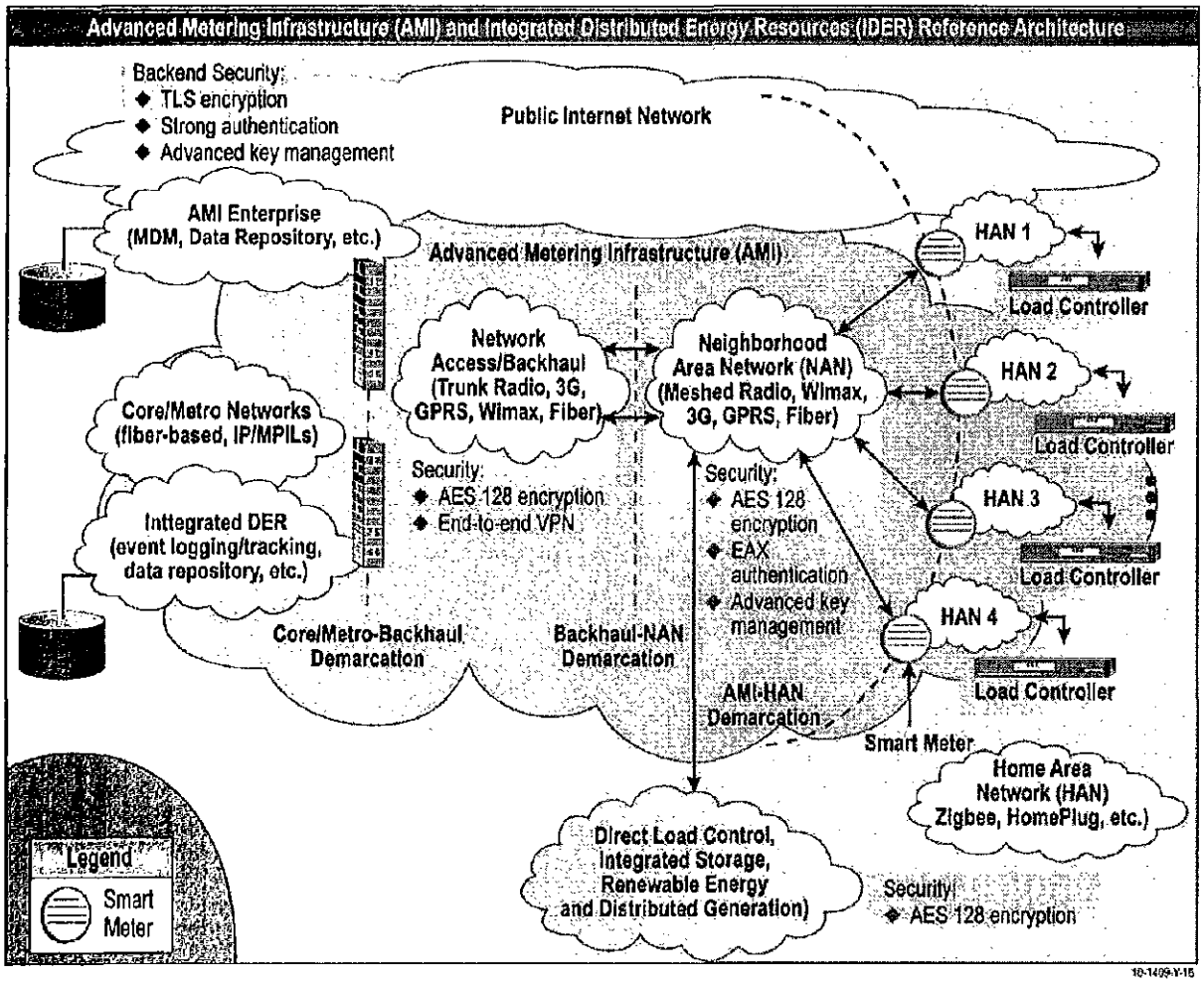

Figure 1.5-1. AMI and IDER reference architecture illustrating system interfaces.

DA controllers capable of accurately reporting control actions taken, current device status, and current system topology. This will provide the operator proper situational awareness.

- *System controllers to field elements*—The system controllers will be capable of monitoring the status of field elements, including device position (open/closed status for capacitor switches and discrete positions for distribution line voltage regulators and tap changers) and communications availability. Monitoring capability will include actual measurements of analog circuit properties such as watts, vars, power factor, voltage, and current. These properties will be reported to the VVC controller and logged in a data archive. In addition to providing status, field devices must promptly respond to commands received from system controllers, enabling required control actions to be completed within required time intervals. Providing adequate response times will ensure that stable operating characteristics are maintained. All device operations, whether initiated in the field or by the VVC, will be logged with date/time stamps.
- *"Edge of the Network" devices to customer*—Customers will be able to access a range of current and historical demand and consumption information directly from "edge of the network" devices that will be deployed as part of this project. These "edge of the network" devices include smart meters in the AMI deployments and direct load controllers in the IDER deployments. With the availability of dynamic pricing data or curtailment program participation, customers can maximize savings during periods of peak demand by managing electrical consumption. A variety of methods to exchange data with the customer will be explored as part of the project. For example, as part of the AMI deployment, the Zigbee SEP (Smart Energy Profile), which appears to be the

leading communications enabling protocol, will be explored. The key is to achieve interoperability and enable customers to choose the most effective technologies and features; the protocol selected will be a nationally recognized standard. Given the relatively early state of HAN technology, standards for all devices and exchange methods that are under consideration as part of these deployments will be diligently reviewed. It is expected that all technologies within the HAN will evolve through competitive markets. Valid current and historic data will be available through a portal site as a component for all customer participation programs, which also will provide online tools for comparing and forecasting energy usage and costs. This data will be updated from each company's own data repository and made accessible to customers and their authorized third parties through the portal site.

1.5.1.2 Interface Specifications

Information is exchanged at the enterprise, substation and device level, and may be bidirectional or unidirectional. Open protocols are utilized between devices (most notably, DNP3, Modbus, and ICCP).

Operational data interfaces will be accommodated for DA Master-Line Reclosers, VVC Master Line Capacitors, DA Master-DA Master, DA VVC Masters, and communications.

Non-operational data interfaces will enable historical event and oscillography data to be periodically archived to a Plant Information (PI) system.

DNP3 will be the protocol of choice, but all equipment deployed must comply with the IEC 61850 protocol, so that a future migration to 61850 will not strand any equipment installed as part of this project. Legacy protocols are not expected to be used in this project; however, interface with legacy protocols will be fully supported. For example, the substation network architecture includes a substation data manager (data concentrator) that can interface with any needed legacy protocols identified for integration. The data concentrator will ensure that the legacy protocols can interface with the industry-standard Ethernet substation network. As depicted in **Figure 1.5.1.2-1**, an intelligent data concentrator is integrated within the communication architecture to support data aggregation, distributed intelligence and system interoperability. The concentrator embraces disparity and converts multiple protocols at the communications aggregation point. Also, the concentrator supports key application functionality by performing the protocol conversion and then time-stamping and pre-processing data so that it can used by other components of the system.

FirstEnergy will place a high priority on any solution that provides open protocols and will require

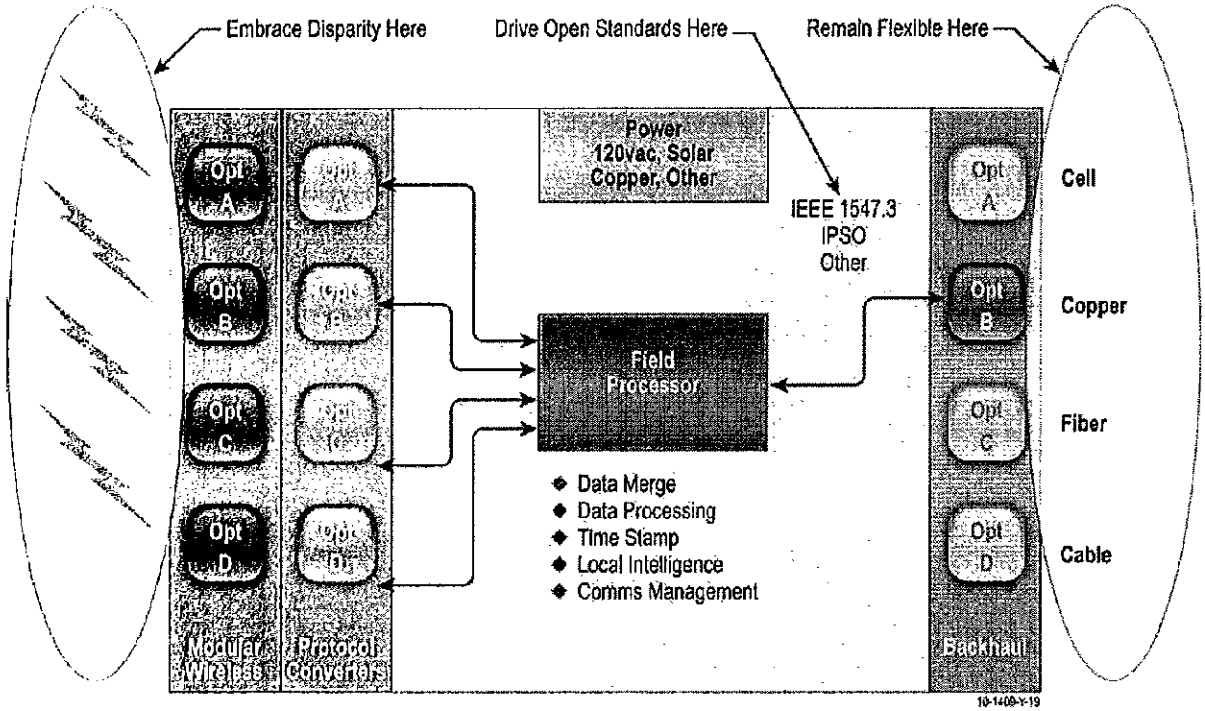

Figure 1.5.1.2-1. IDER intelligent data concentrator diagram

open architectures and protocols beyond the access layer. The system design will mitigate manufacturing risk by specifying protocol management devices that can integrate proprietary solutions in the event that open standards are not fully produced at this level. In addition, FirstEnergy will consider using multiple vendors for large quantity devices in order to minimize project risk.

All interface requirements for device-to-device communication will be tested in a lab environment prior to deployment. The lab facility will simulate, to the extent practical, the field environment to be encountered in project deployment. FirstEnergy presently uses a lab environment at its System Control Center facility, where the company qualifies a variety of substation equipment such as data concentrators, RTUs, power quality devices, intelligent relays, PMUs and wireless communications. FirstEnergy's stage-gate process – a structured step-by-step testing methodology – will be used to ensure thorough testing procedures, and results will be documented as each device interface moves from the testing stage to final deployment.

A multi-level IP-enabled communications network will provide flexible communications to all systems, substations and devices included as part of this demonstration project. This tiered design will provide segregation between the AMI or DLC traffic and the traffic associated with the DA, VVC device and/or other IED communications, or backhaul traffic to the corporate network. The customer device data (e.g. AMI, DLC or other distributed resources) will be concentrated in "collectors" which will then pass the accumulated device data onto the common WAN used by other devices in the project. Suitable security precautions will be taken to protect the SCADA master from cyber security threats. This will be accomplished through the use of serial connections between the substation RTU and the substation WAN router. The WAN will consist of a combination of public and private fiber cable, point-to-point radio and 802.11 wireless technologies. Specific transport architectures will be confirmed during detailed engineering. Quality of Service (QoS) will be implemented to prioritize time-critical functions such as SCADA or DA and VVC. NERC cyber security and FirstEnergy IT security standards will be employed, and their effectiveness in this environment confirmed, as part of this project.

Remote administration (configuration, upgrade and health evaluation) of all intelligent devices will use this IP network to provide electronic access to individual devices. Access will be limited by two-factor authentication and password protection. Operating system and firmware upgrades can be downloaded via this network with proper security and validation mechanisms to ensure accurate implementation of the downloaded firmware, and diagnostic programs can evaluate the health and initiate corrective procedures via this communications link.

The system design recognizes the need to provide fail-safe operation. The failure of any individual component, such as the DA controller, will not inhibit traditional protection mechanisms, and the failure of a smart grid control component will not jeopardize customer service and grid reliability. The DLC system uses fail-safe algorithms that restore connected devices to normal operation. The DLC system also detects tampering, and alternate algorithms are integrated into the control system so that operational objectives are not compromised by tampering. Operations personnel will be notified when any failure of a component or, in the case of the DLC system, abnormality in device operations occurs.

FirstEnergy is familiar with the smart grid interoperability roadmap under development by EPRI and sponsored by the NIST. FirstEnergy will closely follow the progress of this roadmap and ensure that certain emerging standards from this roadmap will be included as they are identified and validated.

1.5.1.3 Failure and Upgrade

A major concern in the deployment of automated control and switching operations on the electric grid is the effect of device failure or software defects in control algorithms. Designs must allow for device failure and mitigate the impact of these failures to maintain grid reliability.

A fail-safe mode ensures that device failure will not cause an electrical outage. Instead, the failure will simply disable the autonomic operation for which the system is designed. In the event of a device failure, the mechanism used by the device to control an electrical switching element must automatically be disabled, and operations personnel must be notified by the device that it has failed and the automatic system is no longer functional.

Redundant devices can be used when reliability requirements for the autonomic switching control are sufficient to justify the extra expense and increased complexity of the additional device.

The smart grid (DA and VVC) masters can be remotely disconnected from the controlled switching devices so that operating system and firmware upgrades can be completed without impacting reliability. Physical disconnects will be installed between the controllers and controlled grid switching devices, enabling device replacement to occur without unintended switching. To minimize system disruption, commissioning of replacement devices will be completed with controlled devices disconnected from DA and VVC (as much as practical).

As part of project testing procedures, software and firmware upgrades will be performed and device replacement scenarios implemented to demonstrate successful operation of the architecture, with minimal impact. For example, the DLC controller unit includes a firmware design that will support field upgrades that can be installed electronically without interruption of system performance.

1.5.1.4 NIST Framework Compatibility

FirstEnergy has developed a strong working relationship with the Electric Power Research Institute (EPRI). The company has participated with EPRI in the development of a FirstEnergy IGCA Roadmap, as well as data integration and communications architecture in support of smart grid technology deployment. During these initiatives, FirstEnergy's subject matter experts collaborated with EPRI (and IBM in the case of data integration and communications architecture) in use case workshops to identify factors and requirements for the deployment of representative smart grid applications.

This background has given FirstEnergy an understanding of smart grid technologies and the need for industry standards that support a broad range of technologies, so that a common communications infrastructure can be used for all deployed applications. FirstEnergy is an active participant in EPRI programs such as Intelligrid, was the first site selected for demonstration in EPRI's Smart Grid Host Site Demonstration Project (JCP&L), and maintains awareness of developing interoperability standards through participation in various industry forums.

The EPRI Report to NIST on the Smart Grid Interoperability Standards Roadmap will serve as a reference document for this project, as well as specific standards descriptions available from standards developing organizations and user communities. Organizations such as AMI-SEC, Open SG, and Open HAN will be used as references for the AMI portion of the project; the IEEE 1547 Standards Group will be used as the reference for distributed resource integration design. Specific standards to be used on this project include:

1. CIP Reliability Standards
2. DNP3
3. Zigbee, Zigbee Smart Energy Profile
4. IEEE 802.3 Ethernet
5. IEEE 802.11 Wireless, TCP/IP; IP v4/6
6. Access Control / Authentication
7. IEEE 1547.3

Additional standards will be identified during more detailed project planning. Conformance to these standards will be an integral part of the engineering process, and implemented standards will be incorporated into future FirstEnergy designs.

FirstEnergy is in the process of validating a standardized substation network architecture, which will be used within substations involved in this project. The substation architecture accommodates existing FirstEnergy standards such as DNP3 and Ethernet and requires compatibility with developing standards such as IEC 61850.

Access-layer communications for "edge of the network" devices will provide an opportunity to validate the reliability of unlicensed radio spectrum for smart grid applications. EPRI has recommended that this issue be investigated as a near-term action for NIST in advancing the interoperability framework. Potential solutions will use the IEEE 802.11 unlicensed spectrum for collector-to-backhaul communications, or unlicensed WiMax. Either option will allow the company to evaluate the performance of this spectrum in supporting smart grid technologies.

1.5.2 Cyber Security

FirstEnergy clearly recognizes national cyber security concerns and the need for established policies and procedures in view of the increasing breadth and sophistication of cyber security threats. As FirstEnergy installs the infrastructure identified in this proposal, appropriate steps will be taken throughout the engineering lifecycle in accordance with established corporate and industry standards to ensure system protection. Detailed information about effective planning of cyber security throughout the system development lifecycle is included in Chapter 8 of NIST Special Publication 800-12 ("Security and Planning in the Computer System Life Cycle").

1.5.2.1 Security in the System Development Life Cycle

Initiation

During system design, a sensitivity assessment will be performed to determine the information security impact related to all equipment involved in this project. This assessment will include information pertaining to:

- Information handled by the system
- Potential damage that may occur through error, unauthorized disclosure or modification, or unavailability of data or the system
- Laws or regulations affecting security
- Environmental considerations
- Security-relevant characteristics of the user community
- Relative internal security standards, regulations and guidelines (§8.4.1.1 of NIST Special Publication 800-12).

This assessment will continue throughout the life-cycle of the project. Additional assessments will be performed when planning system upgrades to determine changes in the system architecture and security impact.

Development/Acquisition

In the testing phase, security requirements will be determined and incorporated into specifications along with related security activities (§8.4.2 of NIST Special Publication 800-12).

System security requirements will follow applicable laws, policies, and standards and guidelines to support the functional needs of the system. These requirements will be examined in accordance with established user groups such as EEI, EPRI, and the Electricity Sector-Information Sharing and Analysis Center (ES-ISAC). The security requirements also will be assessed against, and assimilated into, FirstEnergy programs (such as the FirstEnergy Application Design Methodology [ADM] process), while ensuring compliance with the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) program; Nuclear Energy Institute (NEI) 04-04 Revision 1: Cyber Security Program for Nuclear Power Reactors; and International Organization for Standardization (ISO) 17799. A security risks assessment and cost-benefit analysis will be performed to examine "the assets, threats, and vulnerabilities of the system in order to determine the most appropriate, cost-efficient safeguards (that comply with applicable laws, policy, standards and the functional needs of the system)" (§8.4.2.1 of NIST Special Publication 800-12).

FirstEnergy's security governance group will be involved during the vendor and device selection process. The group will use standardized supply chain procedures and security requirements to ensure information security aspects are evaluated to consider threats from data transmitted through the computer networks used within the project. Devices to be reviewed for security purposes include the data collector host, customer meters, communications between meters and other devices, and in-home devices connected to the meter network. Residual cyber security risks include related security between other FirstEnergy information systems and future changes in information security concerns. Given that security risks potentially change without warning at any time, the FirstEnergy Corporate Security department continually monitors developing security risk profiles and evaluates the need for security strategy revisions to deal with changing threat profiles. If the situation warrants, procedures specified by FirstEnergy's Incident Response Program will be invoked.

As the system is being designed and built, the FirstEnergy security governance group continually monitors the development process and ensures security protections are included to deal with cyber security threats found on these and related systems. Operational practices – including "contingency planning, awareness and training, and preparing documentation" (§8.4.2.3 of NIST Special Publication 800-12) – also will be employed throughout this development/acquisition phase.

Installation and Commissioning

System deployment will require the configuration and installation of security controls, security testing, and accreditation of this project as required by standards. The FirstEnergy Corporate Security department will work with FirstEnergy Information Technology departments and project sponsors to implement end-to-end security across all involved systems.

Security testing will be performed at an individual unit level through integration and complete system testing. Security certification will be performed regularly by an independent third-party in accordance with ISO-17799 and applicable FirstEnergy corporate security standards.

System security accreditation will be authorized through "review of the system, including its management, operational, and technical controls" (§8.4.3.3 of NIST Special Publication 800-12). This

accreditation will implement quality control to determine the best security fit while implementing new project devices in the larger FirstEnergy network. A formal accreditation statement will be issued by management "after deciding on the acceptability of security safeguards and residual risks" (§8.4.3.3 of NIST Special Publication 800-12).

Operation/Maintenance

The operations stage of the system development lifecycle will include "(1) security operations and administration; (2) operational assurance; and (3) periodic re-analysis of the security" (§8.4.4 of NIST Special Publication 800-12). Responsibility for the first of these activities resides with the IT Infrastructure, Technical Security Operations Group (TSOG); responsibility for the second and third resides with the corporate Security Governance Group. As changes occur in this operational phase, FirstEnergy will perform regular system audits to identify risks, vulnerabilities, and impact of potential threats and provide ongoing monitoring of systems and users. As the system environment changes, new threats may emerge. The FirstEnergy Corporate Security department will assess the security risks and develop suitable mitigation plans in accordance with corporate and industry standards.

Annual re-examination of cyber security will be performed through a reaccreditation process, involving "high-level security and management concerns as well as the implementation of the security" (§8.4.4.4 of NIST Special Publication 800-12). More extensive system changes will undergo rigorous analysis and assessment.

1.5.2.2 Concerns and Solutions

This project will support, adopt and implement emerging smart grid security standards. As new technologies and industry practices are defined, FirstEnergy will remain flexible to improve and update the existing implementation of these systems. Any changes or threats of this system will be rapidly addressed through real-time monitoring and routine system auditing. FirstEnergy's patch management programs will be applied to systems in this project to provide additional ability to reach future security requirements.

The operational environment where components in this project will be used ranges from FirstEnergy secured locations to substations and customer premises. The variety in these physical locations will be examined by the FirstEnergy Corporate Security department to physically secure the systems.

1.5.3 Critical Infrastructure Protection (CIP) Standards/Best Practices

FirstEnergy is committed to fully meeting all requirements of NERC CIP Standards CIP-002 through CIP-009. FirstEnergy has established an integrated program across all areas of the business to ensure security and compliance at all NERC CIP Critical Assets. The program is designed to provide transparency through all phases of an asset's lifecycle, from design to end of life.

The importance of continuous compliance and security at all critical assets is stressed at all levels within FirstEnergy. FirstEnergy has established an Executive level steering committee to oversee NERC CIP compliance activities as well as other NERC reliability compliance efforts. General training is provided to all impacted employees as well as contractors. In addition, personnel screenings are conducted on all employees and contractors who have access to critical assets and/or related sensitive information. These programs are designed to establish and maintain a culture of security and compliance at FirstEnergy.

Emerging Standards Support

A key aspect of FirstEnergy's NERC CIP compliance program is our change control process. This process is designed to effectively manage reliability, security and compliance risks and requires active participation from the design, support and operations entities associated with critical assets. All technology deployments associated with critical assets are put through the change control process. Appropriate procedural and technology-based controls are put in place to mitigate security and compliance risks. These controls are continually reviewed and adjusted as needed.

FirstEnergy actively participates in user groups and provides leadership in the industry as it relates to NERC compliance. This participation is leveraged to make sure that FirstEnergy is continually contributing to the overall security of the bulk electric system and is implementing best practices surrounding compliance and security. FirstEnergy participates in industry groups including Transmission Owners and Operators, the Reliability First Group, and the EEI.

1.6 Project Costs and Benefits

The smart grid will bring substantial value to consumers, utilities and society as a result of greater grid operational efficiencies, improved reliability, increased customer engagement, and the integration

of renewable energy. FirstEnergy is aligned with the DOE vision that well-designed projects that are thoroughly evaluated, and the results of which are widely disseminated, will accelerate the wide-scale adoption of smart grid technologies. FirstEnergy has identified advanced methodologies that will be implemented in representative customer and market circumstances. The Companies will meet all DOE data requests for assessing benefits as defined by the CBA framework DOE specifies. It is expected that this CBA framework will apply a robust and universally applicable means for relating the functional capabilities of smart grid projects to specific impacts and benefits. Specifying the functional role of each system configuration provides a means for establishing how its operation reduces costs and/or produces more benefits compared to the technology it replaces.

The appropriateness, quality and granularity of data collected from this and other smart grid projects is critical to ensuring accurate assessments of smart grid costs and benefits. FirstEnergy's plan for data collection will ensure that data collected from the three deployments is complete, accurate and compliant with FirstEnergy and industry standards (e.g. IEEE, NAESB). In conjunction with EPRI, FirstEnergy will accomplish this by the assignment of resources for the development, publishing and implementation of the data collection analysis plan. The plan will track day-to-day data collection efforts, identify and correct data anomalies, and ensure timely and accurate reporting of the results to DOE.

FirstEnergy will leverage expertise from EPRI. FirstEnergy has worked closely with EPRI recently on a DLC pilot program in the JCP&L service territory. This pilot was used by EPRI and DOE to vet the CBA framework at an interim development point. EPRI's role on this project is to ensure that data supporting project costs and the benefits attributable to the three projects is of sufficient detail and of proper integrity and availability to accommodate conducting a convincing CBA. EPRI is uniquely qualified to undertake this role for several reasons, including:

- EPRI demonstrated its understanding of the diverse requirements for CBA and the challenges associated with monetizing expected benefits through its origination of a smart metering benefits assessment framework (see: "Characterizing and Quantifying the Societal Benefits Attributable to Smart Metering Investments," EPRI No. 1017006. July 2008). EPRI is collaborating with DOE to extend this framework to encompass the holistic concept of smart grid.
- EPRI is engaged in research to fully characterize demand and price response behaviors and to develop protocols for monetizing kW and kWh changes attributable to demand response, feedback and efficiency savings.
- EPRI's Intelligrid research initiative has been at the forefront of the development of methods to utilize a functional-based approach to the design of smart grid elements.

DOE has stated that it will create the methodology for goals and cost-benefit investigations during the life of the projects. EPRI's engagement in this initiative will allow early interaction with DOE as this methodology is created. The early activity between EPRI and DOE will ensure that the data collection, integration, analysis and reporting associated with this project align with industry standards and DOE's goals for cost-benefit investigations.

1.6.1 Types of Benefits Expected

This project impacts seven of the eight categories defined by the DOE. **Figure 1.6.1-1** lists these benefits and from which element of the project they emanate.

1.6.2 Project Data Requirements

Data will be collected to support cost-benefit analyses for each of the Companies and to support DOE's CBA activities. **Figure 1.6.2-1** lists some of the anticipated data requirements by technology area and their anticipated use in metrics calculations and benefit assessments. Additional operational data will be collected for the purposes of optimizing performance of DA, DLC, AMI/DR, VVC and supporting communication systems.

FirstEnergy data requirements are driven by cross-functional use cases as discussed in Section 2.4. These use cases will be used to define the major functional benefits attributable to the proposed smart grid technologies. Metrics will be defined to quantify benefits associated with each business case/scenario.

EPRI will develop the data collection plan based on the overall CBA framework, which is under development in cooperation with DOE. Cost tracking, an essential element of the data collection plan will be performed utilizing existing financial management systems such as SAP as detailed in the

#	DOE Benefit Category	Source of Benefit
1	Lower electricity cost Lower peak demand	◆ Reduced peak demand - modify consumer behaviors that shift and reduce demand in response to dynamic pricing signals ◆ Reduced costs to participants from DLC and DR
2	Lower T&D losses	◆ Reduce electricity demand and consumption from VVC system ◆ VVC system that minimizes distribution system losses through optimized VAR management and voltage management
3	Lower O&M costs	◆ DA system lowers operating costs from fault detection/location ◆ Targeted equipment maintenance based on system monitoring & disturbance characterization (e.g. identification of capacitor switching problems)
4	Reduced transmission congestion costs	◆ DLC & DR reduce congestion costs that emanate in PJM Real Time markets
5	Reduced cost of power interruptions	◆ DA system reduces outage durations and number of customers exposed to outages through automated restoration ◆ Fault location reduces duration of outages through faster restoration ◆ Fault location reduces number of outages by locating temporary faults and providing opportunity to perform maintenance to avoid permanent faults ◆ Fewer faults through improved maintenance results in fewer voltage sags impacting sensitive customers
6	Reduced costs from better power quality	◆ VVC system provides improved voltage profiles resulting in optimum equipment performance ◆ PQ problems, like high harmonic distortion, are identified by monitoring system and corrected before customers are impacted
7	Reduced damages from lower GHG/ carbon emissions	◆ Lower electricity consumption from DLC and DR systems ◆ Lower distribution losses from VVC

Figure 1.6.1-1. Anticipated Project Benefits and Related Sources

#	Operational Data Requirement	Use in Metrics & Benefit Calculations
1.0	DA/Advanced Monitoring/Fault Location	
1.1	Outage data from Outage Management Systems	◆ SAIDI calculations, both baselines and changes associated with the smart grid deployments
1.2	O&M costs for fault location/restoration	◆ Calculate decrease in line crew time to locate faults and resolve the problem
1.3	O&M Costs for Distribution and Substation Equipment Maintenance	◆ Calculate reduced maintenance costs and higher availability for equipment from advanced monitoring (capacitors, regulators, reclosers, arresters, etc.)
1.4	Improved Power Quality	◆ Calculate benefit of reduced number of voltage sags impacting sensitive customers ◆ Calculate benefit of identifying and correcting specific PQ problems like high harmonic distortion
2.0	VVC	
2.1	Number of VAR limit violations	◆ Used to identify opportunities to improve system operation through improved system design

Figure 1.6.2-1. Anticipated Data Requirements

#	Operational Data Requirement	Use in Metrics & Benefit Calculations
2.2	Capacitor Failure Rate	◆ Measure benefit of real-time failure notification; improved situational awareness of capacitor usability
2.3	Watt, VAR and ampere profiles with and without VVC control action (individual customer; aggregated at key monitoring locations; total feeder)	◆ Calculate reduced energy use, feeder loading, and VAR impacts of optimizing feeder voltage profiles
2.4	Daily feeder load profiles	◆ Used to establish feeder load baselines without VVC system (the voltage dependency of these load profiles will be determined during the project)
3.0	DLC	
3.1	Load shed during each control event, and duration of event	◆ Event response is measured directly at each customer site by DLC equipment ◆ Will be used to calculate reduction in peak loads on feeders and at substation
3.2	Customer outage minutes reduced during fault conditions	◆ DLC will be used during outage conditions to reduce load and enable feeder reconfiguration, with the goal of serving some of the faulted feeder(s) through adjacent feeder capacity
4.0	AMI/DR	
4.1	Hourly demand peak/off-peak	◆ Used with historical data to calculate credit for off-peak usage from critical peak pricing (CPP) program
4.2	Customer demand during critical peak hours	◆ Used with baseline data to calculate charge for critical peak usage from CPP program
4.3	Hourly consumption data, premise voltage, no-voltage (outage), etc.	◆ These and other data elements will be used to calculate numerous benefit metrics for improved operational efficiencies and outage information

Figure 1.6.2-1. Anticipated Data Requirements (continued)

Management Plan section. This CBA framework will be applied to all smart grid demonstrations that are being sponsored in the EPRI Smart Grid Demonstration Initiative, providing a common assessment method across a variety of different systems and technology implementations. This will include developing Monitoring and Validation (M&V) protocols for all key benefits that are being assessed in the project. The M&V protocols will define data requirements, data collection requirements, and data validation procedures from substation monitoring systems, feeder monitoring (integrated with DA systems), advanced metering systems, and in-home monitoring to assess the response of individual loads. The M&V protocols will provide data to calculate the energy use, demand, and reliability impacts of the technologies being deployed across the three projects. In addition, an industry-wide initiative will develop the M&V protocols to create a library of load models that can be used to calculate benefits as a function of system and load characteristics.

Data from DR and DLC programs (kW curtailed and kWh saved) will be collected at the individual customer level for demand response program participants and corresponding control customers. This data can be evaluated at the individual project level, or readily aggregated to support benefits estimates. Data collected from DA and VVC systems will be at the feeder level to support analysis of individual feeder improvements. This approach supports the eventual calculation of benefits for future system expansion.

FirstEnergy will also provide data needed by DOE to calculate "Customer-Level Metrics" and "Distribution-Level Metrics." For example, the number/percentage of customers and magnitude of load within the Met-Ed and JCP&L service territories served by DLC will be provided.

Data Availability

Some of the requisite data to support cost-benefit analysis is currently available within the Companies, including reliability metrics and peak load metrics

for the feeders planned for DA. Existing and future outage data to support the DA baseline will be housed in the FirstEnergy Outage Management System (OMS) Oracle Database. VVC data will be stored in the PI system, and AMI data will be stored in a Meter Data Management System (MDMS). All data for the IDER/DLC system will be stored within a secure BPL Global-hosted datacenter, and accessible for cost/benefit analysis.

How data will be provided to DOE

FirstEnergy will collect, standardize and aggregate the data, and transfer it to DOE as specified and in the requisite format.

1.6.3 Estimate of Project Costs and Benefits

The benefits attributable to smart grid investments can be categorized as operational cost savings and societal benefits. The former are manifested as reduced costs to the utility and associated stakeholders that ultimately result in lower rates. The latter are the result of changes in consumer behavior attributable to and enabled by the smart grid investment, or due to reliability improvements, which directly benefit customers. **Figure 1.6.3-1** illustrates EPRI's framework for categorizing these benefits in a comprehensive manner. The depicted framework has a specific focus on smart metering. However, it provides a foundation for quantifying the larger scope of smart grid benefits and serves to guide the measurement and analytic requirements for other smart grid technologies.

Figure 1.6.3-2 provides FirstEnergy's characterization of how the expected benefits, by DOE benefit category, will be initially manifested and measured for use in DOE's CBA. FirstEnergy anticipates that these projects will establish that the technologies, when deployed at scale, will produce positive net monetary benefits that are enjoyed by all customers. Moreover, we are confident that the projects themselves will provide net benefits to customers and to the local economy.

The estimated savings will be associated with customers who are directly influenced by the investment. However, other customers (in PJM and other markets) realize benefits from reduced transmission congestion. Moreover, the benefits of reduced capacity requirements for DLC and related demand response will create broader societal benefits. FirstEnergy anticipates that EPRI's expertise will support the DOE CBA methodology and will provide early direction on how to calculate these additional benefits attributable to the project.

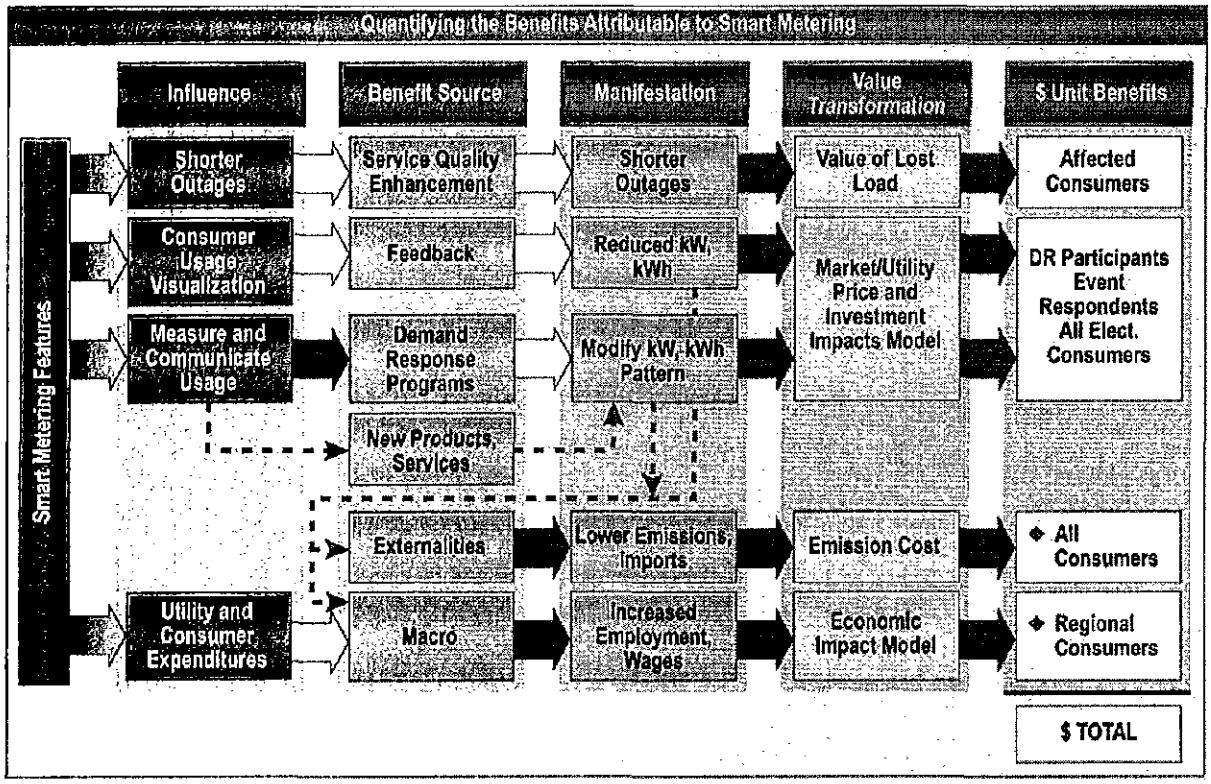

Figure 1.6.3-1. EPRI Framework for Quantifying Smart Metering Benefits

#	Benefit	State	DA	VVC	DLC	DR/AMI	Anticipated Impact
1	Lower peak demand	OH		✓		✓	Up to 120 MW of peak load reduction across PA, OH and NJ, resulting in deferred capital investments for new generation and transmission and lower electricity costs for consumers
		PA	-	✓	✓	-	
		NJ	-	-	✓		
2	Lower T&D losses	OH		✓			Up to 6,000 MWh of energy saved per year
		PA		✓	✓		
		NJ			✓		
3	Lower O&M costs	OH	✓			✓	Reduced O&M through elimination on on-site meter-reading; reduced line crew time to locate system faults
		PA	✓				
4	Reduced transmission congestion costs	NJ					
		OH		✓		✓	Avoided transmission line extension and reinforcement costs. Reduction in PJM marginal energy costs associated with congestion re-dispatch
		PA		✓	✓		
		NJ			✓		
5	Reduced cost of power interruptions	OH	✓				Estimated over 30% SAIDI improvement in the targeted project areas based on historical data
		PA	✓				
6	Reduced costs from better power quality	NJ					
		OH		✓			Estimated over 30% SAIDI improvement in the targeted project areas based on historical data
		PA		✓			
7	Reduced damages as a result of lower GHG/carbon emissions	NJ					
		OH		✓		✓	VVC, DR/AMI and DLC technologies will increase system efficiency and enable energy conservation
		PA		✓	✓		
		NJ			✓		

Figure 1.6.3-2. Anticipated Project Impacts

FirstEnergy will provide data necessary to calculate these benefits. Finally, the benefits associated with the project should be considered in light of what will be realized when the technology is extended at scale to all consumers. FirstEnergy will employ sampling methods to ensure that the results of the project are extensible to a wider population of customers, at FirstEnergy and other utilities.

FirstEnergy expects that the integrated design and deployment of multiple technologies will provide greater benefits than the traditional approach to planning/implementing single-use technologies. For example, DLC will accelerate service restoration following a fault/outage condition during periods of capacity constraint. Additionally, the participation of multiple operating companies will facilitate the continued development of common operating, communications, interoperability and cyber requirements across the FirstEnergy family of companies.

Figure 1.6.3-3 below lists the estimated costs for system design, HW/SW purchase, installation, testing and commissioning of the proposed smart grid systems. In addition to these costs, our final analysis will consider future marginal O&M costs (or savings) resulting from system deployment and any undepreciated costs for legacy hardware or software.

EPRI will work with FirstEnergy in identifying all costs required to complete the CBA effort. This includes establishing the costs associated with the three specific deployments and interpreting and interpolating the results to apply to more extensible projects that involve a larger scale and scope. It is important both to understand the net benefits of the projects themselves, and to be able to project the results to subsequent investments that FirstEnergy and others are expected to make. EPRI's substantial participation throughout this project will ensure that FirstEnergy provides DOE with the timely and

	Description	Scope	Estimated Cost
OH	Distribution Automation	34 feeders	$10.2M
	Volt/VAR Control	21 feeders	$4.5M
	AMI/DR	44,000 meters	$41.2M
	Communications	Backhaul, WAN	$11.0M
PA	Distribution Automation	25 feeders	$8.0M
	Volt/VAR Control	22 feeders	$4.0M
	Direct Load Control	14,000 customers	$13.0M
	Communications	Backhaul, WAN	$1.4M
NJ	Direct Load Control	20,000 customers	$11.6M
	Communications	Backhaul, WAN	$1.0M
All	Project Management	All 3 deployments	$7.0M
	Cyber Security	All 3 deployments	$1.0M
	Data Collection/Analysis/Reporting	All 3 deployments	$1.0M

Figure 1.6.3-3. Estimated Project Costs

insightful data it needs to evaluate FirstEnergy's three projects and compare the results with other projects commissioned by DOE.

1.6.4 Plan for Determining Performance Baseline

Performance analytics for DA will be based on customer impacts such as customer minutes of outage during non-major storm days (with major-storm exclusions as defined by each State's public utility commission). FirstEnergy will employ procedures, following a DA operation, to determine the reduced customer outage minutes and reduced customer interruption frequency. Those values then will be used to calculate the circuit and operating company SAIDI reductions using the IEEE calculation methodology for these reliability metrics.

The baseline for VAR control will be established by measuring VAR performance prior to the implementation of VVC by installing additional metering just after project approval. In addition to directly measuring the improvement in system power factor, this data will be used in power-flow models to calculate the reduction in system losses (I^2R) achieved. The performance of the voltage control scheme will be measured by recording system parameters such as voltage, load, current and VARs at key points on the system. Changes in these parameters during the exercise of different voltage control operating goals will be used to measure the response of the system to the VVC technology. These measures will include peak load reductions and VAR reductions achieved.

For the alternative pricing/AMI deployment, the performance baseline will be provided through a customer control group. Of the 5,000 customers receiving meter installs in the first year of deployment, 1,000 customers will be assigned to the control group and 4,000 will comprise the test group, subject to the enabling AMI Tariff Program. The test group will be further subdivided into two pricing plans to establish the impact of alternative incentives or incentive levels. A program participation amount will be paid to customers not assigned to the control group. The incentive will be based upon the customer's historical summer kWh usage. Customers who do not respond to the economic price signals will be eroding the "savings" they were given at the start of the program. Customers who take significant action to reduce and shift their usage away from high price hours will enjoy further savings.

A performance baseline for DLC will be established through pre-deployment peak load profiles at the targeted substation and feeder peak-load profiles. Additionally, the previously mentioned DLC pilot involving JCP&L and EPRI will provide baseline information for DLC.

Appendix A.
Resumes

FirstEnergy

Tim Richard, Proposed Program Manager
Qualifications to Complete Assigned Tasks
Mr. Richard has more than 32 years of experience managing complex projects and large work groups for Ohio Edison Company and the Pennsylvania Power Company. He is currently Manager, ED Project Management with direct reports of seven project managers and field coordinators. Mr. Richard is responsible for projects which include large transmission lines and substations and he also has reporting responsibilities to all of FirstEnergy Corp's operating companies. He manages multiple projects within a total budget ranging from $600-$700 million. Prior to this assignment, Mr. Richard was Director, Operations Services for Ohio Edison Company and its subsidiary, Pennsylvania Power Company. He was responsible for the safe, reliable and cost-effective operation, design and maintenance of the utilities' distribution systems. Areas of responsibility include distribution engineering, line services, dispatching, forestry services and claims services; annual budget was approximately $135 million, with 835 employees serving 1.2 million customers. Mr. Richard has held operations services accountability for various, increasing areas of responsibility at the Ohio Edison Company and Pennsylvania Power Company over the last 18 years. In addition, he has held various project management, substation design and construction assignments for hundreds of substations with responsibility for both employees and contractors. Other noteworthy projects include managing a portion of the engineering and construction for the W. H. Sammis Plant air quality control project.
Relevance and Significance of Experience to this Smart Grid task area
During his years of experience in distribution operations, Mr. Richard has focused on the continuous improvement of reliability of electric service by advancing the infrastructure and enhancing customer service excellence. He has concentrated on reducing the number of service interruptions, duration of outages and decreasing momentary interruptions during both emergency storm restorations and normal operating conditions. Engineering design improvements have concentrated on optimally configuring circuit protection equipment and devices to accomplish a trend of reliability indices surpassing regulatory and customer expectations.
Education, Training, Certifications
Education: MBA, Kent State University, 1990; BS, Civil Engineering, University of Vermont, 1977
Training: Completed risk mitigation strategy training to evaluate projects for high impact, low probability projects as a comprehensive decision making approach (2008)
Certifications: Registered Professional Engineer in Ohio, PE47782 (1983)
Experience and Expertise
Has 22 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ System Control Center SCADA Control - Responsible for the construction, installation and conversion of Intelligent Electronic Devices (IED) at selected Ohio Edison Company substations requiring Harris/DMP protocol. This infrastructure upgrade was needed to support the consolidation of dispatching offices from nine to three and interfaced with design engineering and both system and distribution dispatching operations. The project required approximately three years to complete. ♦ Mr. Richard was Director, Operations Services and held executive accountability for the consolidation of the three remaining distribution dispatching offices to one regional office, which occurred in 2006. The new regional dispatching office expanded technology which greatly improves line and substation operations and ultimately customer reliability. The project was completed on schedule and within budget, cost approximately $9 million and took two years to complete. ♦ As Director, Operations Services, Mr. Richard held executive accountability to distribution engineering reliability design and operations strategy and implementation for the Ohio Edison Company and the Pennsylvania Power Company. Comprehensive strategies were systematically challenged annually, and evaluated, and impacts were thoroughly understood and justified before design was approved and implementation achieved (17 years)

Work History
Manager, ED Project Management - (presently), FirstEnergy, Manager, ED Corporate Project Management. Direct reports include seven project managers and field coordinators of large transmission and substation projects with support responsibilities to FE operating companies. Annual capital budget range $600M - $700M.
Director, Operations Services – (2008), Ohio Edison Company & the Pennsylvania Power Company. Responsible for the safe, reliable and cost effective operation, design, construction and maintenance of distribution system, which included engineering, line, dispatching, forestry and claims services for the operating company. Annual budget $135M, 835 employees, 1.2M customers.
Director, Operations Services – (2004) Ohio Edison Company, Southern Region. In the Mansfield, Marion and Springfield, Ohio area. Responsible for the safe, reliable and cost-effective operation, design, construction and maintenance of distribution system, which included engineering, line, dispatching, forestry and claims services for the operating company. Annual budget $20M, 150 employees, 70,000 customers.

Mike Demas, Proposed Project Manager, OH

Qualifications to Complete Assigned Tasks

Mr. Demas has over 26 years of electric utility and industry experience. He has been actively managing projects for more than 12 years in the electric utility, steel, and salt industries and holds a 100% success rate in regards to projects completed on time and within budget. The electric utility projects include large transmission lines and substations with support responsibilities to three First Energy operating companies. These projects involve breaker, relay upgrades, SCADA communications, capacitor bank and overhead line installations. Mr. Demas has overseen many SCADA communication upgrades which include the identification of SCADA points, RTU, EMS screen upgrades and leased line installations. He has also overseen the construction of five large capacitor bank installations which were important in VAR control in FirstEnergy's system. He has managed several overhead line projects involving distribution under-build and recloser installations. Mr. Demas has a thorough understanding of estimating, scheduling, cost analysis and project management. Mr. Demas manages multiple projects on an annual basis. Current and anticipated assignments from the 2009-2013 Capital Budget consist of 20 projects estimated at approximately $100M.

Relevance and Significance of Experience to this Smart Grid task area

Mr. Demas' project management experience centers around the management of major projects that involved breaker, relay upgrades, SCADA communications, EMS screen upgrades capacitor bank and overhead line/recloser installations, which is directly related to smart grid objectives of this FirstEnergy's project. Throughout his career, he has ensured that the design, procurement, construction and commissioning for these projects have been completed in a timely manner as to ensure positive results. He has managed projects in three of the seven FirstEnergy operating companies, which includes CEI. He has many valuable contacts that will enhance his ability to deliver a successful smart grid project in Ohio. Mr. Demas has 14 years of experience working in CEI substations, which will be an important asset in managing the Ohio portion of this project.

Education, Training, Certifications

Education: BS, Business Management, Indiana Wesleyan University, 2005

Training: Electrical Fundamentals Training Course, 2009, Project Management Training, FirstEnergy, 2008, Field Coordinator Training, FirstEnergy, 2008, 10-Hour OSHA Training, 2007

Experience and Expertise

Has 12 years of experience performing work that is the same as or relevant to SGIG requirements, as follows:

- Project Manager for the Tangy Substation Project (Ohio Edison) – Add capacity including the addition of a 345/138 kV transformer, (2) 345 kV breakers and (1) 138 kV breaker ($6.5M), started in 2007 and will be completed in 2009.
- Project Manager for the Shinrock-Johnson Area Substation Project (Ohio Edison) – Build 138/69 kV substation with three exits and distribution under-build, ($5.6M), started in 2008 and will be completed in 2011.
- Project Manager for the Glen Gardner Substation (Jersey Central Power & Light) – Add 230 kV capacitor bank ($1.6M), started in 2008 and will be completed in 2010.

Work History

2007 – present, FirstEnergy Corp., Energy Delivery, Corporate Asset & Project Management Department. Manage large substation and transmission projects, spanning the range of activities from conceptual planning to acquiring property and delivering turnkey installations. These projects have an immediate impact on reliability, capacity and flexibility in our system.

1998 – 2007, J.R. Engineering, Inc, Manager, Project Management/Controls. Initiated and managed a Project Management/Project Controls Department. Managed large construction projects in the Steel, Salt and Electric Utility industries. Responsible for large construction projects with very tight deadlines. Responsible for managing six Project Management employees who worked very closely with various industrial clients managing large construction projects to various degrees.

1993 – 1998, Centerior Energy/FirstEnergy, Transmission & Distribution Engineering Work Management Specialist. Distributed the capital budget for Transmission & Distribution Projects. Worked very closely with the Work Management Group in completing time studies, scheduling of workforce and cost tracking. Project Property & Estimating Specialist 1984 – 1992. Prepared Budget Cost Estimates for board approval. Distributed final costs using Cost Accounting functions. Made Capital Vs. Expense determinations. Rate Case support activities.

Bill Goetchius, Proposed Project Manager, NJ
Qualifications to Complete Assigned Tasks
Mr. Goetchius has 26 years of utility experience ranging from Customer Service to Operations Management, Engineering and Project Management. He is General Supervisor, JCP&L Project Management Group and is responsible for the most complex substation, transmission line and distribution line expansion projects developed at JCP&L. Most recently he has managed a group of project managers who were responsible for an annual project portfolio of over $78M per year. Mr. Goetchius was the Line Department Manager where he gained an extensive understanding of line constructability, operation of protection equipment and line devices.
Relevance and Significance of Experience to this Smart Grid task area
Mr. Goetchius was the "Voluntary Load Curtailment Program" Account Executive for the largest Commercial and Industrial Customers with revenues in excess of $500,000 annually. This program provided incentives to customers who reduced Peak Demand through load curtailment or generation. The JCP&L program was an early adopter of advanced metering and two-way communications with real-time pricing information. Manager several programs to install Automated Distribution Reclosers, Distribution Capacitors, Adaptive Relaying and Digital Fault Recorders. These programs directly support smart grid technologies.
Education, Training, Certifications
Education: BS, Industrial Engineering & Technology, Montclair State University, 1976; MS, Industrial Engineering & Engineering Management, New Jersey Institute of Technology, 1997
Training: Advancing Project Management Training, 2009, FERC Standard of Conduct, FirstEnergy, 2009, Field Coordinator Training, FirstEnergy, 2008, Cyber Security Training, FirstEnergy, 2007, System Wide Lead Training, FirstEnergy, 2007, DOT Hazardous Materials Training, Environmental Research Center, 2006, Certificate #CO19616, National Institute Management System, FEMA-Emergency Management Institute, 2006, ASHREA HVAC Design and Installation, 1990, Commercial and Residential Energy Auditing, 1982
Experience and Expertise
Mr. Goetchius has 10 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ ***Automated Distribution Recloser Installation Program,*** Managed Installation of 150 Automated Distribution reclosers between 2007 and 2009 that are interconnected with e-SCAD System through the System Dispatch Control Centers, (JCP&L), ($1.5 million annually) ♦ ***150 MW Distribution Capacitor Program,*** Managed the installation of 150 MW Distribution Capacitors, (JCP&L), ($600,000 annually) ♦ ***Substation Adaptive Relay System,*** Managed the installation of the Substation Adaptive Relay System that controls the Instantaneous Relay Function at over 275 Substations, (JCP&L), ($2 million) ♦ ***Digital Fault Recorder Program,*** Managed the installation of Bulk Digital Fault recorders (DFR) at (5) 230 kV Substations, (JCP&L), ($1 million)
Work History
2009 – Present, General Supervisor, Project Management. Manage a team of Project Managers, Construction Managers and Schedulers in the development of large-scale electrical facilities. Provide guidance and direction to engineering, construction and financial professionals. Manage the design and installation of advanced technologies such as advanced metering, automated capacitors and reclosers and SCADA systems.
2007 – 2009, Manager Project Manager. Manage a team of Project Managers, Construction Managers and Schedulers in the development of large-scale electrical facilities. Provide guidance and direction to engineering, construction and financial professionals. Manage the design and installation of advanced technologies such as advanced metering, automated capacitors and reclosers and SCADA systems.
2002 – 2007, Sr. Customer Service Specialist. Assisted major industrial customers in facility design and

energy conscious design decisions. Marketed hourly energy pricing and advanced energy control systems focusing on programmable controls and usage patterns. Assisted industrial customers in cogeneration decision-making process by performing cost-benefit analysis.
1998 – 2002 , Account Executive/Segment Strategist Customer Relations. Customer service for the Plastics and Chemicals Segment customers. Direct contact with facilities managers to educate them on hourly energy pricing, time-of-day rates. Marketing efforts to promote Automated Controls; assisted large customers in energy supplier selections and educated consumer groups on deregulation that began in New Jersey in 1999. Then continued consumer education efforts to help business groups, Municipalities and consumers on energy deregulation and continuous rate changes.
1995 – 1998, Service Delivery Specialist. Supervised the Operations Line Office in Flemington, NJ with a staff of over 40 technicians that designed and built distribution and transmission facilities. Ensure excellent customer service for over 80,000 customers.
1991 – 1995, Project Specialist. Supervised Engineers in the design of New Electrical Facilities to ensure efficient use of energy and equipment. Customer marketing of efficient air conditioning and appliances and off-peak rates. Marketed cogeneration to help offset increasing energy prices.
1990 – 1991, Commercial Customer Service Representative. Audits of offices, manufacturing and production facilities to improve energy usage and production output. Directed the installation of HVAC controls and motor controls to shift usage to off-peak hours. Recommended modern efficient equipment selections and marketed incentives to offset the capital investment.
1984 – 1990, Residential Builder Representative. Assisted home builders in design of new housing developments to include proper conservation techniques in construction & audited homes when completed to ensure compliance with standards. Marketed the time-of-day rates and installation of water heater controls to shift energy usage to nights and weekends for savings and load shifting.
1992- 1984, Energy Management Representative. Energy audits of homes and businesses and recommended energy Conservation improvements, identified advanced metering and controls to monitor usage and alter patterns. Marketing efforts for time-of-day rates.

James Catanach, Proposed Project Manager, PA
Qualifications to Complete Assigned Tasks
Mr. Catanach will be the onsite Project Manager for the PA deployment. Mr. Catanach is a highly skilled management professional with 27 years of experience in the electric utility industry. He excels in managing large strategic projects that cut across multiple operational areas of the utility, including line operations, customer service, data analysis, technology implementation, and process improvement. Mr. Catanach is a skilled communicator who builds strong and positive working relationships with employees and customers. He has had success developing and implementing new strategies, utilizing technology to improve efficiency and reduce cost.
Relevance and Significance of Experience to this Smart Grid task area
Mr. Catanach has cross-functional utility design, construction and operations experience. His range of qualifications includes identification, evaluation and improvement to life-cycle management of FirstEnergy transmission and distribution assets; leading a team of project managers to ensure that transmission, substation and distribution projects are completed on-time, within scope and on budget. He was responsible for the preparation of the 2010 Capital Portfolio for transmission, substation and distribution projects and presenting it for senior leadership approval. Mr. Catanach has years of experience in planning and reliability, developing projects for the safe and reliable operation of the electric distribution system for two operation centers. He also has lengthy experience managing an organization that retrieved data from two million points across two states. Mr. Catanach has 12 years of experience in managing customer relationships and implementing the company's marketing programs, which included sales, energy conservation, load management, economic development and weatherization programs. Mr. Catanach has developed relationships among plant engineers, facilities managers, and executive leadership of Met-Ed's largest commercial and industrial customers.
Education, Training, Certifications
Education: BS, Mechanical and Ocean Engineering, University of Rhode Island, December 1981; MS, Pennsylvania State University, December 2004; Beta Gamma Sigma Honor Society
Certifications: Registered Professional Engineer, Commonwealth of Pennsylvania, 1989
Experience and Expertise
Mr. Catanach has 27 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ◆ Management of a multi-functional department of 580 employees with an annual operation and maintenance budget of $43 million and a capital budget of $8 million ◆ Management of the distribution line, design and construction process for 3 line shops, 100 union and management employees, 90,000 customers with a capital budget of $6 million and an operations and maintenance budget of $4 million; ◆ Development of national and state guidelines for the installation of meters in a competitive environment, and; ◆ Implementation of Demand Side Management - Appliance Cycling Program in New Jersey.
Work History
2009 – Present, Met-Ed/FirstEnergy, Project and Portfolio Supervisor: Leading at team of two Project Managers and one scheduler to ensure transmission, substation and distribution projects are completed on-time, within scope and on budget. 2009 capital portfolio is $48 million.
2007 – 2009, Met-Ed/FirstEnergy, Asset Strategy Manager: Led an organization of 9 employees to identify, evaluate and improve the life cycle management of FirstEnergy transmission and distribution assets.
2004 – 2007, Met-Ed/FirstEnergy, Planning and Reliability Engineer: Developed projects for the safe and reliable operation of the electric distribution system for two operation centers. Forecasting growth on the electric distribution lines, managing preventative line maintenance programs, and analyzing outages to reduce frequency and duration of outages. Involved in the installation, testing and trouble shooting of SCADA-controlled switches.

2002 – 2004, Met-Ed/FirstEnergy, Customer Support Manager: Managed a department of seven Account Executives for Met-Ed's largest commercial and industrial accounts.
1998 – 2004, GPU, Meter and Meter Reading Services Manager: Managed an organization of 580 of corporate and field employees to retrieve data from two million points across Pennsylvania and New Jersey. Developed and implemented new strategies, utilizing technology that improved efficiency and reduced cost. Integrated two work management systems with SAP enterprise resource planning system. Implemented satellite technology for data retrieval at remote sites. Managed the installation of 1,800 appliance cycling sites in New Jersey. Chaired Forecasting Automated Meter Reading Conference, Palm Springs, CA, February 2001
1993 – 1998, Met-Ed/GPU, Customer Operations Center Manager: Managed an organization of 100 employees to ensure the delivery of safe and reliable electric service. Responsibilities included distribution line operations, emergency service, credit and collection, and meter reading.
1982 – 1993, Met-Ed/GPU, Energy Services Account Executive: Managed customer relationships and implemented the company's marketing programs, which included sales, energy conservation, load management, economic development and weatherization programs. Developed relationships among plant engineers, facilities managers, and executive leadership of Met-Ed's largest commercial and industrial customers.

Joseph Waligorski, Proposed Smart Grid Interoperability Lead
Qualifications to Complete Assigned Tasks
Mr. Waligorski has over 25 years experience in the electric utility industry integrating technology into the T&D system. He led FirstEnergy's Integrated Grid Communication & Automation (IGCA) effort, facilitating the development of FirstEnergy's smart grid roadmap, outlining the FirstEnergy direction and technologies to achieve smart grid vision, receiving an EPRI Technology Transfer Award for this industry model roadmap. Mr. Waligorski is Chairman of the Grid App Consortium, a utility group with DOE support to advance development and deployment of smart grid technologies with near-term impacts.
Relevance and Significance of Experience to this smart grid task area
Mr. Waligorski is a recognized leader in the Smart Grid arena with leadership and experience in Distributed Energy Resource (DER) technologies and applications as well as participation in industry groups. He leads strategic development and applications of the Integrated Distributed Energy Resource (IDER) project at FirstEnergy's Jersey Central Power & Light operating company, which combines 8MW of various DER technologies on an integrated platform providing demand response and an overall visualization of system conditions. Leads FirstEnergy's T&D research and development including strategic development and applications for energy storage and distributed resources as well as sensors and integration of other technologies. He facilitated FirstEnergy's IGCA effort since its inception, establishing the vision and mission, and developing processes and practices for evaluation of candidate technologies. Mr. Waligorski participates and provides leadership in many industry consortia efforts including DOE Smart Grid workshops, NIST Smart Grid Standards Interoperability Interim Roadmap workshops, EPRI industry workshop on Roadmap development and hosted Grid App (Chairman).
Education, Training, Certifications
Education: BS, Electrical Engineering, Michigan State University, 1979
Certifications: Registered Professional Engineer in the State of Ohio
Experience and Expertise
Mr. Waligorski has over 25 years of experience performing work that is relevant to SGIG requirements: ♦ ***JCP&L Integrated Distributed Energy Resources Project. $4.0M, 2008 – Present.*** Strategic Design and Plan development for FirstEnergy's Integrated Distributed Energy Resources (IDER) project. The deployment incorporates 8MW of demand response via two-way communication for direct load control of air conditioning, distribution line sensors, substation and neighborhood electric energy storage, and permanent peak load shift via thermal energy storage. Cross-functional integration of components and their monitoring and control is enabled on a common platform. The system is controlled from the regional dispatching office. It is used for operations support as well as market benefits. This Project was selected as one of the initial three EPRI Board of Directors Smart Grid Demonstration Initiative projects. ♦ ***Integrated Grid Communications and Automation 2006 – 2008*** Led FirstEnergy's Integrated Grid Communications and Automation (IGCA) effort establishing operational smart grid vision and the development of a roadmap for technical evaluation processes. The implementation timeline includes gap assessment studies, pilots, standards, and skills development identification. Facilitated eight-month, cross-organizational expertise collaboration at FirstEnergy Director level for next-decade vision/strategy development. ♦ ***Distributed Resources –*** o ***Canton City Schools Deployment*** - Design, development and execution of installation for Combined Heat & Power (CHP) project integrating multiple technologies to interoperate distributed generation (2-30kw microturbines) with heat recovery equipment to provide heating for the Olympic sized pool and air-conditioning for facility offices. o ***FirstEnergy Microturbine Projects*** – Design and deployment of FirstEnergy's microturbine projects, including coordination of scheduling, contracting, permitting,

construction, and initial startup. Provided design and technical support for successor microturbine deployments at FirstEnergy Subsidiary facilities and pilot installations, including heat recovery CHP and utility interconnection applications, establishing reference design for multiple installations.

- o ***Cuyahoga Valley National Park Fuel Cell Project*** – Design and project oversight for distributed generation project using fuel cells. Resources were interconnected into the distribution system and enabled for data monitoring.

- ♦ ***Substation Expansion Projects $4.0+M*** Designed and engineered multi-component substation construction projects at Dale and Stow Substations to install a new transmission substation (138kv-69kv power transformer) and a substation upgrade (69kv-12.47kv power transformer); Stow involved three underground distribution exits including over 1000 ft of underground duct bank. Reviewed and approved design and materials/equipment. Resolved field problems during construction and performed routine site inspections to assure construction compliance with design.

Work History

2005 – present, FirstEnergy Corporation., Delivery Operations Technical Manager. Manage R&D and industry consortia portfolio to facilitate solutions for T&D grid operations, applications, maintenance, and development of technology solutions. Development and application/demonstration of emerging energy resources and integration through smart grid.

2002 – 2005, FirstEnergy, Sr. Project Engineer/Project Manager. Project management, application development, design, protection, and installation of distributed generation including microturbines, utility interconnection and heat recovery applications. IEEE SCC 21 committee member formulating IEEE P1547 Standard for Distributed Resources Interconnected with Electric Power Systems.

1999 – 2002, FirstEnergy, Project Engineer/Project Manager. Project management and electric design for industrial and utility systems through 138kv. Application development, design, protection, and installation of distributed generation including microturbines, utility interconnection and heat recovery applications.

1998 – 1999, FirstEnergy, Operations Technical Support Engineer. Technical support for FirstEnergy urban underground ducted systems, establish best practices, policies, procedures, field assistance, coordination and development of cable and accessory requirements and installation process, fault location methods, introduce new technologies and techniques, failure analysis and problem identification, resolution recommendation and implementation. (Environmental) Development and implementation of FirstEnergy T&D environmental policies and practices for: PCB handling and disposal; establishment of oil spill control and countermeasure (SPCC) plans for T&D substations and facilities; transportation and disposal of hazardous materials and waste.

1996 – 1998, Ohio Edison Technical Services Dept., Technical Services Operations Engineer. Analysis and development of T&D design standards and material specifications including distribution system MV cable specifications, cable accessories, and 23kv sub-transmission riser structure; Economic Analysis and evaluation for Delaware Airport 138kv Underground project. T&D technical analysis and evaluation of cable requirements and specifications; NESC clearance requirements. Develop T&D policies with company strategy for topics such as Second Source/ Backup Supply

1995 – 1996, Ohio Edison, T & D Engineering Department, Transmission Design Engineer. Substation Design Engineer, 1983-1995. Supervised and directed the development of construction drawings and calculations for substation and transmission line projects; coordinated material acquisition, evaluated equipment and bids, to maintain construction schedules; prepared budget estimates, feasibility studies, and developed new designs; supervised design team of engineers, designers, and drafters; applied NEC and NESC to designs; established, monitored, and maintained engineering and construction schedules for projects; coordinated and resolved field construction problems; monitored and inspected construction activities for adherence to design and specifications; developed insulated cable specifications (600 volt -138kv) for transmission line, substation and generating plant applications; site proposed transmission line and substation facilities; prepared and presented project descriptions.

Donald Miller, Proposed Cyber Security Manager

Qualifications to Complete Assigned Tasks

Mr. Miller is the IT Security Manager and has more than 23 years of experience in the field. He is a results-oriented IT leader with proven success providing solutions to increase productivity, reduce costs, improve accuracy, efficiency, and accountability, and ensure security. Mr. Miller has worked for financial, energy, telecommunications, and industrial companies. He has expertise in identifying and meeting rapidly changing IT/telecommunications needs of large businesses through communication, team building, network analysis, architecture development, implementation, maintenance, management, and training. He is skilled in Security Infrastructure, Architecture, Attack and Penetration Assessment, Web Trust Diagnostic and Risk Assessment.

Relevance and Significance of Experience to this Smart Grid task area

Mr. Miller's extensive knowledge of cyber security technology is a major aspect in accomplishing objectives of the Smart Grid Modernization Initiative and assuring grid reliability is maintained. He has managed the development of security programs and standards at FirstEnergy ensuring IT / telecommunications system risks and corporate data, proprietary information, and intellectual property are secure. Under Mr. Miller's guidance, the IT Security Team governs all cyber security activities at FirstEnergy and insures compliance with all cyber security policies and procedures. Previously as consultant with Ernst & Young, he has performed Attack and Penetration Threat Vulnerability Assessments of Internet Connectivity and Internal IT environments, identifying risks and making recommendations saving clients millions of dollars in potential losses. In a previous assignment, Mr. Miller developed Security Architecture and Risk Assessment Tool for Comerica Bank's first private banking web-based system, providing security, flexibility, and quality web site presentation.

Education, Training, Certifications

Education: BS, Engineering Technology, Kent State University, 1977; MS, Mathematics/Computer Science, Kent State University, 1984; MB, Business Administration–Executive MBA Program, 1995

Experience and Expertise

- Directed teams of 14 in IT Security and Disaster Recovery projects, corporate-wide, for FirstEnergy.
- Ensured security of IT Systems used by 14K endusers at 16 locations, including: 700 Windows Servers - 300 Unix Servers - 12K PCs - Thousands of Software Applications
- Developing business cases for logging and monitoring security tools - Cisco Security Agent, Symantec Antivirus Software, Intrusion Detection and Prevention System (IDS), and Centralized Firewall Log Monitoring and identity management for users logging on and off network
- Principal contributor in the 2008 EPRI Substation Wireless Security Pilot hosted at FirstEnergy, providing oversight and technical guidance in this successful project

Work History

2003 – Present, FirstEnergy, Manager IT Security

2001 – 2003, Deloitte & Touche, Senior Manger

2000 – 2001, Ernst & Young LLP, Senior Manager, Information Security Audit Services(ISAAS)

1999 – 2000, Lucent Technologies, Telecommunications Consultant

Mark Sondag, Proposed Smart Grid Integration Lead
Qualifications to Complete Assigned Tasks
Mr. Sondag has over 20 years experience in program management within manufacturing industries, overseeing plant operations and product development initiatives. He is a FirstEnergy technical support team member assisting in the development of a companywide smart grid program. He has managed pilots and supported standards development in substation data integration, transformer monitoring, and synchrophasor application areas. He has been responsible for project team formulation, scope development, and administrative coordination for the current Smart Grid Modernization project.
Relevance and Significance of Experience to this smart grid task area
Mr. Sondag has substantially contributed to the development of use cases defining Smart Grid functionality, particularly in asset monitoring, communications, and data integration. He has developed a standardized process for conducting technology evaluations and a ten-year plan for developing standards in support of the Smart Grid Roadmap. He has conducted evaluations and developed standards recommendations in the asset management and substation data integration areas.
Education, Training, Certifications
Education: MBA, Portland State University, 1991; BS Chemical Engineering, Iowa State University, 1982
Training: SCADA, Substation and Feeder Automation, Iowa State University, Nov 2007 Leadership Development Program, Center for Creative Leadership, May 2007
Certifications: Professional Engineer, Control Systems, State of Washington
Experience and Expertise
Has two years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ ***Oct 07 – Jun 09*** – directed $500,000 transformer monitoring equipment pilot evaluating four installed systems, resulting in a comprehensive standards recommendation. ♦ ***Oct 07 – Jun 09*** – directed $100,000 substation data concentrator equipment pilot evaluating four systems in a laboratory environment, resulting in a comprehensive standards recommendation. ♦ ***Jun 08 – Aug 09*** – directed a laboratory evaluation of synchrophasor data collection systems, demonstrating methods for collecting, disseminating, and archiving synchrophasor data
Work History
2007-present, FirstEnergy Corp. Assist in development of companywide smart grid program. Managed pilots and supported standards development in substation data integration, transformer monitoring, and synchrophasor application areas. Responsible for project team formulation, scope development, and administrative coordination for the current Smart Grid Modernization project.
2005–2007, Glatfelter, Inc. Managed a specialty paper product line including marketing, product development, and manufacturing operations. Coordinated regional sales teams and managed numerous contracted manufacturing partners. Quadrupled sales within 18 months. Served as operations lead for new product venture involving technology licensed from foreign technology company. Negotiated licensing agreement and developed research, manufacturing, and marketing plans.
2000–2005, MeadWestvaco, Inc. Managed plant operations at a newly acquired remote specialty papers manufacturing facility. Coordinated with corporate support groups to double plant output and substantially improve quality indices. Seamlessly integrated plant workforce into corporate culture. Managed all maintenance operations for a key specialty product manufacturing line, achieving significant safety, production and quality improvements.
1996–2000, Tenneco Packaging, Inc. Directed plant process control and electrical maintenance and engineering. Organized team of process control engineers within a newly created department to reduce process variability and improve quality. Oversaw operations on a key manufacturing line, increasing production by 25% and expanding penetration in a commodity market. Coordinated closely with quality, customer service, and sales associates to satisfy customer expectations.

Mark Rupnik, Proposed BPLG Lead
Qualifications to Complete Assigned Tasks
Mr. Rupnik is an electric utility veteran with nearly 25 years experience in utility operations, practices and communications and has extensive utility knowledge and expertise. During his career at Duquesne Light, he served as General Manager of Duquesne Energy Solutions, an energy company subsidiary of Duquesne Light Holdings, Inc. that specialized in the development and operation of "inside the fence" energy facilities. His project management, operational and integration experience in the monitoring, managing and controlling of the constructed energy facilities correlates directly with the project requirement to interface to and control Distributed Energy Resources (DER). His understanding and experience in electric utility interconnection requirements will further support DER integration. His strong background in communications infrastructure development and deployment will be a key component in assessing and developing the communications infrastructure for the direct load control aspect of the project.
Relevance and Significance of Experience to this Smart Grid task area
Mr. Rupnik's broad experience in utility operations, utility customer interface and communications technology provides a solid background that is directly relevant and significant to the FirstEnergy project objectives. During his tenure at Duquesne Light Company, Mr. Rupnik led teams in the areas of energy facility design, construction, commissioning and operations. He led additional teams in the engineering, design and construction of advanced communications architecture to support utility operations, including interfacing to the existing utility SCADA system. While at Duquesne Light Company, Mr. Rupnik took the lead in an early stage smart grid initiative to install and integrate advanced distribution line sensors, to provide operations with near real time distribution operating information.
Education, Training, Certifications
Education: Advanced Management Program, Wharton School, University of Pennsylvania, 2006; MBA, University of Pittsburgh, 1988; BS, Electrical Engineering, University of Pittsburgh, 1983
Training: Effective Advanced Leadership, 2005, DQE Corporate.
Experience and Expertise
Has 10 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ ***Direct Load Control Deployment – South San Joaquin Irrigation District, $3.0M, 2007 – Present:*** Led the overall project design, customer acquisition, installation and operational aspects of the project. Deployed load control devices to manage residential and commercial peak loads. Managed necessary resources and budget to meet project costs and timeline. ♦ ***Direct Load Control Deployment – Jersey Central Power & Light, $3.0M, 2008 – Present:*** Managed overall project including engineering and design, customer acquisition and equipment installation for approximately 4,000 direct load control devices. Developed and refined processes to enhance project economics. ♦ ***Enhanced Distribution Line Sensor Program – Duquesne Light Company, $500K, 2004 - 2006:*** Managed project for installation of distribution line sensors to deliver enhanced operating data to utility operations personnel for outage detection, outage management and load and feeder capacity management. ♦ ***Enhanced Optical Communications Project – Duquesne Light Company, $4M, 2000 – 2004:*** Developed and managed comprehensive program to deliver enhanced optical communications to multiple substations within the utility's service territory. The deployed communications infrastructure was used for internal substation communication as well as interfaced to SCADA system for operational monitoring and control.
Work History
2007 – Present, BPL Global, Ltd., Senior Vice President and General Manager. Overall responsibility for North American operations and the delivery of BPL Global's smart grid technology, software solutions and services to electric utilities. Direct interaction with major IOUs in smart grid project development,

design and implementation.
2004 – 2007, DQE Communications, Vice President. Overall responsibility for the business, including Sales and Marketing, Engineering, Construction and Operations. DQE Communications is a telecommunications subsidiary of Duquesne Light Holdings, Inc. that owns and operates fiber optic assets within the Pittsburgh Metropolitan Area. Served as project lead with responsibility for smart grid project that included installation of enhanced distribution line sensors.
2004 – 2007, Duquesne Energy Solutions, General Manager. Overall responsibility for Duquesne Energy Solutions' energy and synthetic fuel facilities, including engineering, operations and construction. Duquesne Energy Solutions is an energy services company subsidiary of Duquesne Light Holdings, Inc. Had responsibility for integration and operation of control systems and communications infrastructure for complete systems over a multi-state region.
2000 – 2004, DQE Communications, Vice President Sales and Marketing. Overall responsibility for Sales and Marketing within DQE Communications, a telecommunications subsidiary with fiber optic assets within the Pittsburgh Metropolitan Area. Responsibilities included development of enhanced optical lit services to support utility operations, including SCADA integration.
1998 – 2000, DQE Systems, Director of Operations. Overall responsibility for Operations for DQE Systems, a subsidiary of Duquesne Light Holdings, Inc., that operated multi-utility systems including electric, natural gas, propane, water and wastewater.
1995 – 1998, Duquesne Light Company, Director of Sales. Overall responsibility for the Middle Market accounts ranging in size up to 5MW of peak electrical demand. Responsibilities included account revenue growth, peak load growth management and customer coordination and notification while transitioning through electricity deregulation.

Mark McGranaghan, Proposed EPRI Lead
Qualifications to Complete Assigned Tasks
Mr. McGranaghan is a Director in the EPRI Power Delivery and Markets (PDM) Sector. His research area responsibilities include distribution, underground distribution, advanced distribution automation, Intelligrid, power quality, and security. Research priorities include developing the standards and approaches for implementing an intelligent power system infrastructure to support automation, higher efficiency, improved reliability, and integration of distributed resources and demand response.
Relevance and Significance of Experience to this Smart Grid task area
Responsible for EPRI's Intelligrid program that has provided a foundation for developing the smart grid, including a methodology that has been formalized as an IEC Publicly Available Specification and many contributions to smart grid standards efforts. Organized EPRI's Smart Grid Demonstration Initiative that is being coordinated with many of the DOE demonstration projects, including joint development of the cost benefit assessment framework.
Education, Training, Certifications (applicable to role & related to Smart Grid functions)
Education: BSEE, MSEE in Electrical Engineering, University of Toledo; MBA, University of Pittsburgh
Training: Responsible for organizing IEEE Distribution Automation Tutorial. Mr. McGranaghan has taught courses and workshops in power quality, distribution automation, and smart grids throughout the world – most recently (all 2009) at CIRED Conference in Europe, EPRI PQA/ADA Conference in New York, and IEEE Power Meeting in Calgary.
Experience and Expertise
Has 30 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ ***NIST Interim Smart Grid Standards Roadmap – National Institute of Standards and Technology, $1.5M, 2009, Project Director.*** This project has developed a roadmap for smart grid standards development that builds on the foundation of the EPRI Intelligrid program, the work of the GridWise Architecture Council, and many standards development organizations and alliances. The DOE projects will provide valuable contributions to these standards development priorities. ♦ ***DOE Advanced Monitoring Project – DOE, 2007-2008, $1.0M, Project Manager.*** This project built on a foundation of the Distribution Fault Anticipator research at EPRI and the PQView Software developed by EPRI to develop a National Library of measurement data to support advanced smart grid applications. Prepared a description of the work that was done that is relevant to any of the smart grid tasking. ♦ ***Smart Grid Roadmap Projects for Electric Utilities – various electric utilities including FirstEnergy, Salt River Project, Southern Company, Duke Energy, and We Energies.*** These projects involved working with individual utilities to develop detailed roadmaps for smart grid infrastructure and technology implementation. The projects build on the use case methodology to define requirements and then evaluate these requirements for the future infrastructure against existing technologies and systems to develop the roadmap for technology implementation.
Work History
2003-Present – Electric Power Research Insitute - Director. Manages research in the areas of power quality, distribution, and smart grids.
1998-2003 – Electrotek Concepts – Vice President. Directed business area performing power system studies, research, seminars, and applications development. Leader in the industry in the areas of power quality, distribution systems, renewables integration, and power system analysis.
1988-1998 – McGraw-Edison/Cooper Power - Manager. Directed power system studies, developed training, and developed software for power system analysis.

Craig Rizzo, Proposed SAIC Lead
Qualifications to Complete Assigned Tasks
Mr. Rizzo will manage SAIC Engineering, Program Management and other vendor services provided to the FirstEnergy Smart Grid Modernization Initiative. Mr. Rizzo is a Technical and Program Manager with 16 years of experience implementing and leading systems engineering and analysis projects for the energy and defense industries. He currently is the Manager of Smart Grid Services with SAIC, leading a cross-functional team of power engineers, modelers and optimization experts, developing and deploying smart grid technology solutions for electric utilities, Regional Transmission Organizations and the U.S. Department of Energy. He has designed distribution-level smart grid technology demonstration projects that integrate multiple technologies and systems, including distributed generation, hybrid communications, energy storage, load control and demand response. He is the lead system architect and Project Manager for an intelligent application that applies historic transmission grid performance data to real-time predictive systems, improving generator dispatch and congestion management operations.
Relevance and Significance of Experience to this Smart Grid task area
Mr. Rizzo's breadth of technology integration, systems engineering and project management experience is directly relevant and significant to the objectives of the FirstEnergy project. Under Mr. Rizzo's leadership, the SAIC Smart Grid team has played a key role in the development of smart grid concepts, technology areas, benefits and barriers to broad smart grid adoption. Mr. Rizzo and this team have been strong proponents of an integrated approach to the planning, design and deployment of smart grid systems. He has applied these principles to two smart grid technology demonstration projects co-funded by DOE. The first is a Demonstration Field Test including automation, advanced communications and feeder reconfiguration systems with Allegheny Power and other technology vendors. The second is an advanced Broadband-over-Powerlines project with American Electric Power and technology vendors. Mr. Rizzo has also led the development and design of the West Virginia Super Circuit, $10M Smart Grid project co-funded by Allegheny Power and DOE under the Renewable and Distributed Systems Integration program. Mr. Rizzo's smart grid expertise also covers transmission and central generation systems. He is the lead systems architect and Program Manager for development of an adaptive application providing real-time intelligence to generation dispatch and congestion management operations at a large RTO.
Education, Training, Certifications
Education: BS, Operations Research, U.S. Air Force Academy, 1993; MS, Operations Research, Air Force Institute of Technology, 1998
Training: Strategy for Advancing Internal Leaders, 2008, SAIC Corporate; LD0005 – iLEAD: Staffing Module, 2009, SAIC; Air Force Squadron Officer School (6 weeks Leadership Training), 2000
Experience and Expertise
Mr. Rizzo has 16 years of experience performing work that is the same as or relevant to SGIG requirements, as follows: ♦ ***Modern Grid Strategy Program, DOE/NETL, $10M, 2005 – Present:*** Manage the engineering analysis for DOE's Modern Grid Strategy (MGS) Program that develops smart grid technology deployment and integration strategies for the electric utility industry ♦ Developed and implemented strategies to engage key electric utility, regulatory, consumer and technology vendors for DOE MGS program ♦ Design and develop smart grid cost-benefit methodologies and power system modeling tools to support business case analyses by DOE and electric utilities ♦ ***West Virginia Super Circuit, Allegheny Power, $10M, 2007 – Present:*** Lead the concept development, system design, and requirements development for an integrated smart grid demonstration project that applies automation, multiple communication technologies, distributed generation and storage, and other grid technologies. ♦ ***Adaptive Modeling Systems for Transmission Operations, PJM, $2.5M, 2007 – Present:*** Manage an interdisciplinary project team that is developing a novel intelligent learning capability for the largest Regional Transmission Organization in the US; this toolset will be applied in an

Advanced Control Center to improve the performance of complex generation dispatch operations

- ***Cyber/Physical Security Vulnerability & Risk Assessment Study, DOE/NETL, $.5M, 2004-2005:*** Led analysis of energy sector cyber vulnerability and risk assessment tools available to energy sector asset owners; assessed ability of existing tools to meet industry needs.
- ***Program Manager, Air Force Strategic Planning, $5M, US Air Force, 1998-2001*** - Managed strategic planning efforts involving 12-year modernization strategies for combat aircraft, space and missile systems. He analyzed the technical merits of critical Department of Defense space, communications and control systems.
- ***Technology Evaluation Manager, US Air Force, $30M, 1993-1996*** - Designed and implemented validation methodologies for electronic warfare system modeling efforts, and planned multiple weapon system field and flight tests.

Work History

2004 – Present, SAIC, Manager – Smart Grid Services: Develop and Implement Smart Grid planning and integration strategies for government and commercial utility clients.

2002 – 2004, The BOC Group, Project Manager/Engineer: Managed an $11M engineering project to modernize cryogenic oxygen systems at 850 customer sites; directed risk and reliability assessments of oxygen, carbon dioxide and nitrous oxide systems at customer sites; led engineering design, test and validation of new material and equipment that improved system reliability.

1993 – 2001, US Air Force, Captain: Led multi-disciplinary team of peers and senior officers through development of a $10B, 12-year weapon, communications and space systems modernization plan. Applied and recommended improvements to satellite reliability modeling and forecasting methodologies to optimize launch schedules. Designed validation methodology for electronic combat modeling process that reduced Air Force fighter and bomber aircraft combat vulnerabilities. Directed engineering analysis of multiple F-16 flight tests; applied statistical sampling techniques to reduce flight test requirements

Phillip Mullins, Proposed IBM Lead
Role and Responsibilities
Philip Mullins is a Sr. Managing Consultant in IBM's Integrated Communication Services Product Line, part of IBM Global Technology Services, IBM Global Services. Philip specializes in Wireless and Pervasive Computing, including Enterprise Mobility, Real-time Location Systems and works extensively in "Smart World" initiatives, including Smart Grid and Smart Healthcare.
Qualifications to Complete Assigned Tasks
Philip Mullins has an extensive background in large scale design and implementation services, including early cellular deployment, Land Mobile Radio Systems and Wireless LAN/MAN systems. Philip is the co-developer of the OCCAM methodology (Optimal Comparative Communication Architecture Methodology.
Education, Training, Certifications (applicable to role & related to Smart Grid functions)
Education: USAF Ground Radio, HS Graduate
Training: RF Engineering Principles, Methods and Techniques RF System Design Wireless Local Area Network RF System Design Wireless Metro Area Network -WiMAX, MESH Land Mobile Radio, Digital, Analog, Trunked, Conventional Cellular Infrastructure – GSM, CDMA
Certifications: USAF Combat Communication Systems, Ground Radio Communication Systems, Motorola University – High Performance Teams, Virtual Thinking Expedition, CDMA, GSM, AMPS and TACS Cellular Systems.
Experience and Expertise
Senior Managing wireless and pervasive computing consultant with over 25 years of experience in a host wireless technologies. Served as the Wireless Expert Community Leader for IBM Global Technology Services US. Networking Practice. ♦ IBM Subject matter expert in RF system architecture, design and optimization for a diverse set of industries including; utilities, public safety, education, healthcare and petrochemical. Proven ability to lead large projects as well as serve as a valued and innovative team member and subject matter expert for a variety of technologies, including Wireless Local Area networks, IEEE802.11 A/B/G, Wireless Metro Area Networks, including Wi-MAX and MESH based Architectures, Radio Frequency Identification Technologies and Land Mobile Radio.
Work History
Jan 2009 – Present Major Investor Owned Utility in Northeast United States Communication Strategy for Intelligent Grid Communications and Automation Intiative -Technical Team Leader, Method Leader Project Description: Provide Technical Leadership for the execution of the OCCAM Method (Optimal Comparative Communication Architecture Method). Provide technical leadership and support throughout the engagement.
Nov 2008 – Present Major Privately Held Utility in the Southwest United States Develop a Communication Strategy for AMI and Smart Grid Initiatives -Technical Team Member Project Description: Provide Technical Leadership for the execution of a strategy engagement to support the tactical and strategic requirements of regulatory imposed AMI and opportunistic Smart Grid including, Distribution Automation, Asset Monitoring and Strategic Workforce Communications Provide technical leadership and support throughout the engagement. Support specific analysis and recommendation on key technologies, including Licensed WiMAX, WiFi-Mesh and unlicensed point to multipoint technologies.
April 2008 – Sept 2008 Major Investor Owned Utility in Northeast United States Intelligent Grid Communication Architecture RFP Development and Support -Technical Team Member Project Description: Provide Technical Leadership for the development of an RFP to support the architectural requirements for Smart Gird Communications. Provide technical leadership and support throughout the engagement. Support specific analysis and recommendation on responses.
August 2007 – December 2007 Major Investor Owned Utility in North Eastern, United States of America Communication Strategy for Intelligent Utility Networks (UIN) -Technical Team Leader, Method Leader Project Description: Provide Technical Leadership for the execution of the OCCAM Method (Optimal Comparative Communication Architecture Method). Provide technical leadership and support throughout the engagement. Support specific analysis and recommendation on key emerging technologies, including BPL, Licensed WiMAX, WiFi-Mesh and unlicensed point to multipoint technologies.

March 2007 – July 2007 IBM Global Services -Global Wireless Service Product Line, Houston, Texas, Global Reference Architecture, Digital Communities Subject Matter Expert, Team Member Project Description: Support the development of intellectual capital and work products as per the IBM Global Service Method. Responsible for developing the "Non-Functional Requirement" and "Operational Model" as well as provide subject matter expertise and support for the completed reference architecture.
November 2006 –March 2007 Investor Owned Utility in the Pacific Northwest United States Mobile Workforce Mobility -Consultant/Subject Matter Expert Wireless PvC Project Description: Provide technical consulting and support for a workforce mobility project. Develop and execute end-user experience testing of the mobile platform and connectivity/GPS solution.

Appendix B. Vendor Commitment Letters

FirstEnergy

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

July 29, 2009

Eileen M. Buzzelli
Director, FE Technologies
FirstEnergy Service Company
76 S Main St
Akron OH 44308-1890

Subject: Letter of Support for the FirstEnergy Proposal in Response to the U.S. Department of Energy (DOE) Funding Opportunity Announcement #DE-FOA-0000058 (Smart Grid Investment Grant Program)

Dear Ms. Buzzelli:

The Electric Power Research Institute, Inc. ("EPRI") is pleased to offer this letter of support to participate with FirstEnergy in the smart grid project proposal for Cross Cutting Regional Integration in response to DOE Funding Opportunity Announcement #DE-FOA-0000058 (Smart Grid Investment Grant Program). EPRI supports the goals of this DOE program to verify smart grid technology viability, quantify smart grid costs and benefits and validate new smart grid business models at a scale that can be readily adapted and replicated around the country. EPRI is a nonprofit corporation organized under the laws of the District of Columbia Nonprofit Corporation Act and recognized as a tax exempt organization under Section 501(c)(3) of the U.S. Internal Revenue Code of 1986, as amended, and acts in furtherance of its public benefit mission. The public availability of smart grid demonstration information for research on helping improve the reliability of the nation's grid and the results from that research will be an important part of that effort.

FirstEnergy is a member of the five-year EPRI Smart Grid Demonstration Initiative focused on smart grid regional demonstrations to enable wide-scale integration Distributed Energy Resources (DER) including distributed generation, renewables, storage and demand response (www.smartgrid.epri.com). One of the main objectives of EPRI's initiative is to identify approaches for interoperability and integration that can be used on a system-wide scale to help standardize the use of DER as part of overall system operations and control. The FirstEnergy Cross Cutting Regional Integration project includes the FirstEnergy / Jersey Central Power and Light (JCP&L) Integrated DER Project which has already been selected as an EPRI Smart Grid Demonstration Host-Site as part of this initiative with goals that are very much aligned with the DOE project goals making for a stronger industry collaboration opportunity if awarded.

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Activities that EPRI will support includes, but is not limited to cost-benefit analysis efforts, use case documentation per the IntelliGrid methodology, data analysis and benefits estimation, CO_2 impact assessment and technology transfer.

EPRI has had a long history of participating in many collaboration activities with the utility industry as well in the funding of research projects with DOE. We look forward to participating with FirstEnergy and other team members on the smart grid projects

Yours truly,

Arshad Mansoor

Arshad Mansoor
Vice President
Power Delivery & Utilization

cc: Karen Forsten, EPRI
Mark McGranaghan, EPRI
Matt Wakefield, EPRI

SAIC
From Science to Solutions

LETTER OF COMMITMENT

August 3, 2009

Richard R. Grigg
Executive Vice President and President
FirstEnergy Utilities
76 South Main Street
Akron OH 44308
Email: rgrigg@firstenergycorp.com
Telephone: (330) 384-5838

Re: Letter of Commitment for Funding Opportunity Number: DE-FOA-0000058

Dear Mr. Grigg:

Science Applications International Corporation (SAIC) is pleased to collaborate with FirstEnergy in the above-cited Department of Energy funding opportunity for Smart Grid investments.

SAIC is committed to the goals of the investment project as a vendor providing engineering and administrative support services to FirstEnergy and the project. As a vendor with a history of supplying similar technical and administrative services to FirstEnergy, we are pleased to have the opportunity to continue our support under this important program.

We believe this project with FirstEnergy and other team members that have been assembled for this initiative will provide valuable acceleration of the Smart Grid initiative in FirstEnergy's service territory and improve the capabilities of FirstEnergy customers to reduce demand on the electricity distribution system as well as provide extensive data for analysis by DOE and potential deployment of the beneficial technologies across the US.

Very truly yours,
Science Applications International Corporation

Joseph T. Grumski, P.E., PMP
Senior Vice President and General Manager
Energy, Environment, and Infrastructure Business Unit

301 Laboratory Road • PO Box 2501 • Oak Ridge • TN • 37831
(p) 865-481-4663 • (e) joseph.t.grumski@saic.com

International Business Machines Corporation
6710 Rockledge Drive
Bethesda, MD 20817
301-529-4636

August 3, 2009

Mr. John Paganie
Vice President, Energy Efficiency
FirstEnergy Corporation
76 S. Main Street
Akron, OH 44308

Re: Support for Smart Grid Investment Stimulus Grant for FirstEnergy

Dear Mr. Paganie:

IBM Corporation is committed to assisting FirstEnergy Corporation (FirstEnergy) with consulting services as outlined in this Stimulus Grant. IBM appreciates the opportunity to work with FirstEnergy in advancing the Smart Grid as expressed in the goals and objectives of the DOE funding opportunity announcement.

We are prepared to support FirstEnergy with the following activities:

- Detailed requirements, design, build, testing, and data integration of FirstEnergy's communication system to support its proposed Smart Grid functionality.

In this role, IBM will perform as a vendor in the Smart Grid Stimulus Investment Grant. IBM is prepared to provide the services described above and perform as a contractor to complete the scope of work requested by the grantee.

IBM has the personnel and products to meet the agreed-upon objectives within the dates outlined in the Stimulus Grant.

Sincerely,

Partner
IBM Global Business Services

July 30, 2009

Dear Sir or Madam:

BPL Global, Ltd (BPLG) is presenting this letter of support to the FirstEnergy application for funding under the American Recovery and Reinvestment Act of 2009. BPLG has been working closely with FirstEnergy for more than 2 years in co-developing and implementing smart grid solutions and looks forward to continuing its working relationship with FirstEnergy. Over the past 15 months we have successfully deployed our co-developed solution at FirstEnergy's operating company, Jersey Central Power and Light, as a site for an EPRI Smart Grid Demonstration project and currently provide full support to FirstEnergy for the functioning system. Going forward, we will continue to assist FirstEnergy in its Smart Grid efforts by offering BPL Global's leading portfolio of commercially available smart grid solutions. Upon award of project funding, BPLG will deliver our smart grid solutions through negotiation and execution of a commercial business contract with standard business terms and conditions of software licensing hosting and project deployment. As one of FirstEnergy's reliable and trusted vendors we will help deliver on the Department of Energy goals for interoperability, enhanced energy efficiency, security and job creation.

BPL Global, Ltd. (BPLG) is a smart grid technology company dedicated to leading the transformation of energy efficiency and reliability. The company provides software solutions and services to more than 100 electric utilities and energy service companies around the world enabling an intelligent grid to more efficiently manage demand, integrate distributed energy resources, improve service reliability, and optimize cost and capital productivity. BPL Global partners with local utilities, Internet service providers, equipment suppliers and financiers to create end-to-end solutions integrating the best in software, communications, hardware and managed services to aggressively deploy smart grid solutions around the world. Part of the clean technology sector of the electric utility industry, our applications provide the critical foundation for a coordinated, intelligent grid to deliver energy more efficiently and reliably for a greener environment.

We look forward to working with FirstEnergy on their Smart Grid initiative and supporting the achievement of the nation's energy efficiency goals. If there are any questions please contact our SVP and GM of North America, Mark Rupnik at 412-298-4717 or mrupnik@bplglobal.net.

Sincerely,

Keith Schaefer
President and CEO

www.bplglobal.net

BPL Global, Ltd.
500 Cranberry Woods Drive
Suite 170
Cranberry Township, PA 16066

Keith Schaefer
Chief Executive Officer
M: +1 415 602 2204
E: kschaefer@bplglobal.net

Itron

Knowledge to Shape Your Future

Letter of Commitment

July 22, 2009

Mr. Dana Parshall
Director, Energy Efficiency
FirstEnergy
76 S. Main St.
Akron, OH 04308
(330) 384-5144

Re: Smart Grid Investment Grants, Letter of Commitment

Dear Mr. Parshall:

Itron, Inc. is pleased to provide this Letter of Commitment for FirstEnergy's Smart Grid Investment Grant application in response to the Department of Energy (DOE) Funding Opportunity Announcement DE-FOA-0000058. Itron supports the goals of this DOE program to promote grid modernization, and we understand that FirstEnergy intends to apply for a grant under the program. In support of FirstEnergy's application, Itron, Inc. has provided the requested Smart Grid project information within this Letter of Commitment.

Itron Qualifications

Itron, Inc. is committed to partnering with FirstEnergy to implement AMI, MDM, and Smart Grid monitoring as critical components of FirstEnergy's Smart Grid efforts. For more than 30 years, Itron has delivered solutions to utilities for collecting, managing, and distributing meter data. Today our hardware and software products are used at more than 8,000 electric, gas, and water utilities in 80 countries around the world, including FirstEnergy. Itron has engineering, design, sales, and manufacturing facilities across North America, employing approximately 2,200 employees throughout the U.S. and Canada. Itron manufactures solid-state electricity meters at its state-of-the-art facility in Oconee, South Carolina. This facility recently completed a record deployment of 2.7 million CENTRON® electricity meters at Progress Energy in 18 months. Itron also manufactures meter modules and associated products at its facility in Waseca, Minnesota. Itron's current annual production capacity in Waseca is approximately 4.5 million units, with the capability to increase its capacity to 6.4 million units, if necessary. Itron also manufactures gas and water meters in Owenton, Kentucky and Greenwood, South Carolina, respectively.

In addition to our industry knowledge and experience, Itron has the financial strength to deliver and support our products over the long term. Our 2008 revenues exceeded $1.8 billion, and we invested nearly $100 million of that in research and development for advancement in the Smart Grid and AMI applications. Itron's market capitalization is currently well in excess of $2.0 billion.

We are excited to assist in FirstEnergy's Smart Grid efforts, which will:

- Increase service to customers to reduce energy consumption and lower bills
- Facilitate flexible billing and energy delivery choices reduce energy consumption
- Provide technologies that promote interoperability and standards for cyber security
- Provide the utility with data to reduce power interruptions and improve power quality
- Support the utility and its customers to further reduce Green House Gas and carbon emissions
- Collect, analyze and report on data, experience and progress as an integral part of improving the nation's electrical grid

Itron's capabilities extend beyond delivering hardware and software packages to providing end-to-end solutions that connect utility back offices to end-consumers' homes. A key component of Itron's capabilities is our professional services group, which staffs AMI projects in terms of Program Managers, Project Managers, Technical Engineers, System Designers, Business Consultants and Technical Consultants. Itron will draw from its pool of experienced resources to appropriately staff FirstEnergy's AMI/Smart Grid initiative. Resources are assigned by task and are tracked using standard industry tools, such as Microsoft Project. The roles and responsibilities of Itron's and FirstEnergy's project team will be defined in a mutually agreed upon Statement of Work.

Itron's Commitment and Acknowledgements

In support of FirstEnergy's grant application, Itron, Inc. hereby commits as follows:

- Itron, Inc. is committed to supporting FirstEnergy's project in every way possible, including but not limited to:
    - Providing appropriate management, financial, manufacturing and other capacity, as applicable to ensure timely delivery of equipment and services as well as to fulfill its contractual commitments;
    - Providing a project implementation team that is competent and experienced and that meets all of FirstEnergy's requirements;
    - Providing a product and/or services for delivery to FirstEnergy that is commercially available; and
    - Complying with FirstEnergy's stated schedule for implementation
- Itron, Inc. is familiar with and is committed to supporting the DOE's goals expressed for implementation of Smart Grid, including compliance with DOE and NIST standards and cyber security efforts.

Under this initiative, Itron would provide:

- Smart Meters – Itron OpenWay® CENTRON meters have been fully tested and certified for deployment in four of the largest AMI deployments in North America. These meters are fully equipped for the expansion of smart rates as already vetted by FirstEnergy. These are readily available in all meter forms for both residential single phase and commercial polyphase

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Liberty Lake, WA 99019 fax 509-891-3355
www.itron.com toll-free 800-635-5461

Itron

Knowledge to Shape Your Future

installations. Currently, there are 14 million OpenWay CENTRON electric meters under contract for deployment in several projects across North America.

- Communications Infrastructure – The OpenWay RF LAN meshing technology provides both Smart Metering and in-home automation for Demand Response and customer conservation programs. The mid-tier communications network to be utilized to communicate with devices connected to the distribution system such as reclosures, voltage regulators and capacitor bank controllers. Itron has radically progressed the delivery and maturity of this communication platform with tens of thousands of these devices now installed in the field.
- Head End Collection Engine – The OpenWay Collection Engine manages operations and provides network and device management.
- Meter Data Management – The Itron Enterprise Edition™ System can be integrated to provide advanced metering services and create a seamless interface between both FirstEnergy's legacy applications as well as the future installations of SAP CIS. Our work with the SAP Lighthouse Council has already provided an opportunity for us both to conceptually realize how these two applications can work together.
- Security – Itron has introduced the most extensive security available in an AMI/Smart Grid application. Our partnerships with Certicom and Industrial Defender have allowed us to construct a security architecture that is compliant with these devices under the CIPs cyber asset guidelines.

Itron, Inc. hereby authorizes FirstEnergy to include this Letter of Commitment as part of any application it may make with respect to the Smart Grid Investment Grant.

Sincerely,

David Arkley
Itron Divisional CFO

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July 17, 2009

Beth Tomasoni
Supervisory Contract Specialist
MA-642/L'Enfant Plaza Building
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, DC 20585-1615

RE: First Energy's Application to DE-FOA-0000058

Dear Ms. Tomasoni:

This letter is submitted in support of First Energy's proposal to the DOE in response to Funding Opportunity Announcement #DE-FOA-0000058 for the *Smart Grid Investment Grant Program.* Schweitzer Engineering Laboratories, Inc. (SEL) intends to participate with First Energy in this proposal. SEL is committed to providing the manufacturing plant and workforce capacity to meet the needs of First Energy as described in the proposal, which includes delivery of recloser controls, hardened computers and engineering services. For more information on SEL, please see the Statement of Qualifications document that is included as an addendum to this letter.

SEL products and services will support the Smart Grid goals of First Energy through distribution automation, providing real-time data and communications in a reliable and efficient manner. This will increase the overall efficiency of the First Energy system.

First Energy and SEL have been doing business together since 1990. For nineteen years, First Energy has purchased SEL products. In turn, SEL provides unmatched customer service and technical support, and a no-questions-asked 10-year warranty. In our company history, we have never charged a customer for any repair, for any reason. All of SEL's relays, communications processors, computers, recloser controls, and meters are manufactured in the US in Pullman, Washington at our state-of-the-art facility. We are committed to helping our customers improve the reliability of their power systems.

SEL's commitment to this project is contingent on the favorable acceptance and approval for funding of the proposal by DOE, and the execution of a definitive agreement with regard to SEL's role in this project. For SEL to participate, the project must also meet basic environmental, financial, engineering, archeological compliance requirements of SEL. Upon reaching this agreement, SEL commits to providing the technical support needed to assist First Energy to successfully collect and analyze the data needed for project deliverables to DOE.

If you have any questions about this information, please contact Kim Jackson, Sales and Customer Service Business Manager, at 509-334-8766.

Best Regards,

Erik C. Newman
Vice President, Sales and Customer Service

verizon

August 6, 2009

Mr. Richard W. Grigg
Executive Vice President and President, FirstEnergy Utilities
76 South Main Street
Akron, Ohio 44308

Re: FirstEnergy Application of SmartGrid Funding Opportunity Announcement

Dear Mr. Grigg:

Verizon Communications supports FirstEnergy's application for funding under the American Recovery and Reinvestment Act of 2009. Verizon looks forward to continuing its close working relationship with FirstEnergy in support of FirstEnergy's Smart Grid efforts by offering Verizon's extensive portfolio of high quality commercially available wireline and wireless communications services. Verizon stands ready to provide these services as one of FirstEnergy's reliable and trusted vendors and help FirstEnergy deliver on the Department of Energy SmartGrid goals for interoperability, enhanced energy efficiency and security.

Verizon Communications Inc. (NYSE:VZ), headquartered in New York, is a global leader in delivering broadband and other wireless and wireline communications services to mass market, business, government and wholesale customers. Verizon Wireless operates America's most reliable wireless network, serving more than 87 million customers nationwide. Verizon's Wireline operations provide converged communications, information and entertainment services over the nation's most advanced fiber-optic network. The wireline business also includes Verizon Business, which delivers innovative and seamless business solutions to customers around the world. A Dow 30 company, Verizon employs a diverse workforce of more than 235,000 and last year generated consolidated operating revenues of more than $97 billion.

We look forward to working with FirstEnergy on their Smart Grid initiative and supporting the achievement of our nation's energy efficiency goals. If there are any questions please contact Robert Heffron at 703-886-3442 or Robert.heffron@verizonbusiness.com.

Sincerely,

Robert Heffron
Verizon
Manager, Utility Vertical Market

current®

July 17, 2009

Mr. Mark Sondag
FirstEnergy Corporation
76 South Main Street
Akron, Ohio 44308

Re: *Letter of Support for FirstEnergy Corp. Application to DE-FOA-0000058*

Dear Mr. Sondag:

CURRENT Group, LLC, hereafter referred to as "CURRENT", is pleased to provide a letter of support for FirstEnergy Corp.'s application for funding under Topic Area "Electric Distribution Systems" of the above referenced FOA for the *Smart Grid Investment Grant Program.*

CURRENT is committed to partnering with FirstEnergy Corp. to implement electric distribution systems Smart Grid system optimization functions as a vendor for FirstEnergy Corp.'s Smart Grid efforts. We are excited to assist in FirstEnergy Corp.'s Smart Grid efforts, which will accomplish the following:

- Maximize the efficiency of the electric distribution system by reducing line losses and *optimizing voltage levels*
- Add voltage control as a demand response resource to reduce dependency on consumer behavior for addressing peak-demand scenarios
- Provide technologies that promote interoperability and standards for cyber security
- Support the utility and its customers to reduce Green House Gas and carbon emissions through the optimization of the electric distribution system
- Collect, analyze and report on data, experience and progress as an integral part of improving the nation's electrical grid

CURRENT will provide Smart Grid sensors/analytics and its Volt/VAR control and Dynamic Voltage Optimization applications to achieve the objectives for FirstEnergy Corp. in compliance with the federal Smart Grid Investment Grant Program.

The electric distribution system optimization through Volt/VAR control and Dynamic Voltage Optimization is very important to CURRENT and FirstEnergy Corp. It will showcase CURRENT's Smart Grid system optimization products in a regional deployment in a major metropolitan area in the Midwest region. As a leading Smart Grid solutions company, with deployments in Boulder, Colorado as part of the SmartGridCity™ project for Xcel Energy and in the Dallas metropolitan area for Oncor Electric Delivery, CURRENT's products and services meet all seven of the DOE's requirements for funding eligibility. CURRENT has manufactured and deployed over 35,000 sensing and communications devices for deployment in the United States and will utilize contract manufacturing in compliance with ARRA to provide all the hardware for the FirstEnergy Corp. Smart Grid project.

20420 Century Boulevard | Germantown, MD 20874 | P: (301)944-2700 | F: (301)944-2701
www.currentgroup.com

current®

CURRENT's Smart Grid solution satisfies the interoperability and cyber security requirements in the Funding Opportunity Announcement for the Smart Grid Investment Grant Program. CURRENT uses open-standards and protocols in its hardware and software to enable easy integration and interoperability with utility devices and systems. For example, CURRENT supports multiple industry standard communication protocols, such as DNP 3.0 and SNMPv3, to communicate with utility devices, and CIM to integrate with a utility enterprise bus. CURRENT also offers device and system integration services to ensure interoperability between systems and devices before they are deployed in the field, and to trouble-shoot any potential issues. To ensure the security of its solutions, CURRENT uses IP-based security provisions, such as IP-Sec and AES-128 bit encryption, at multiple network layers. CURRENT's software and hardware are remotely upgradable to make certain that CURRENT's security policies continually reflect industry "best practices".

CURRENT commits to partner with FirstEnergy Corp. by providing any technical support or other services needed to enable the successful collection, analysis and presentation of data required for project deliverables as part of the Smart Grid Investment Grant Program. CURRENT will provide the applicable manpower and resources enumerated in the Application as part of its effort to ensure successful completion of its portion of Project.

As the Senior Vice President of CURRENT in charge of Business Solutions, I can commit our resources to meet FirstEnergy Corp.'s deployment schedule and technical requirements. If CURRENT is selected, I will serve as senior executive sponsor to ensure all the project tasks are completed on schedule and within budget.

If you have any questions regarding CURRENT's commitment and support of the Application, please do not hesitate to contact me by phone at (585) 486-0366 or by email at msquier-dow@currentgroup.com.

Sincerely,

Mae Squier-Dow
Senior Vice President, Business Solutions

20420 Century Boulevard | Germantown, MD 20874 | P: (301)944-2700 | F: (301)944-2701
www.currentgroup.com

Appendix C. Regulatory Support Letters

FirstEnergy

TED STRICKLAND
GOVERNOR
STATE OF OHIO

August 4, 2009

The Honorable Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Re: Letter of Support for First Energy's Application for Smart Grid Grant Program DO-FOA-0000058

Dear Secretary Chu,

I am writing in support of a major employer in Ohio, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy is headquartered in Akron, Ohio. Its seven electric utility operating companies comprise the nation's fifth largest investor-owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. As part of a larger application to DOE that involves projects in all three states, FirstEnergy is requesting support for its Ohio Smart Grid Modernization Project – a three-year, $72 million effort to deploy a variety of smart grid technologies in a mixed residential and commercial suburban area of Cleveland.

Initially, the project will improve system reliability and efficiency in the targeted area while providing 44,000 customers with an opportunity to reduce energy costs through active management of their electricity usage. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most importantly, this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. And, by carefully analyzing system life-cycle costs and benefits, the project will justify recovery of the significant investments needed to ensure deep market penetration across the U.S.

77 SOUTH HIGH STREET • 30TH FLOOR • COLUMBUS, OHIO 43215-6117 • 614.466.3555 • FAX: 614.466.9354

Project benefits include:

- Reduced peak demand through greater customer awareness of, and participation in, demand response programs
- Increased reliability by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions from fewer field maintenance and repair trips

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

As one of the nation's largest producers and users of retail electricity, Ohio offers a valuable testing ground for smart grid technology. As you will see in their respective applications, each of our investor-owned utilities is applying for grant funds under this program. Each of them has a different customer base and a different approach to smart grid, based on market specific conditions. Together the requests represent the opportunity to help millions of consumers and to provide invaluable lessons for the nation's grid technology, and I support them all.

Thank you for your consideration and please do not hesitate to call me if you would like further information on this important project.

Sincerely,

Ted Strickland

Ted Strickland
Governor, State of Ohio

Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, PA 17105-2063
August 6, 2009

Secretary 717-787-2814

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Re: DE-FOA-0000058
Recovery Act – Smart Grid Investment Program

Dear Secretary Chu:

I am writing in support of a major employer in Pennsylvania, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058). With the passage of PA Act 129, electric distribution companies of Pennsylvania are required to develop, in coordination with stakeholders and the PA Public Utility Commission, a Smart Meter Technology Procurement and Installation Plan. This application proposes to use ARRA funds build on the requirements of PA Act 129 and increase the development and deployment of Smart Grid technologies.

FirstEnergy's seven electric utility operating companies comprise the nation's fifth largest investor - owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania, and New Jersey. As part of a larger application to DOE that involves projects in all three states, Pennsylvania DEP supports the Intelligrid City Project – a $30 million effort to reduce customer load by 20 megawatts through a voluntary control program involving 50,000 distribution customers in the York, PA, area.

The project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable FirstEnergy's Met-Ed operating company to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also will help improve system reliability and efficiency and alleviate grid constraints. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most important, this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. And, by carefully analyzing system life-cycle costs and

benefits, the project will justify recovery of the significant investments needed to ensure deep market penetration across the U.S.

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs.
- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually.
- Lower operations and maintenance costs.
- Reduced emissions – from fewer field maintenance and repair trips.

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

Please feel free to contact me at 717-783-3004 should you wish to discuss this project in greater detail.

Sincerely,

John Hanger

John Hanger
Secretary

cc: Carl Bauer

State of New Jersey
OFFICE OF THE GOVERNOR
PO BOX 001
TRENTON NJ 08625-0001

JON S. CORZINE
Governor

August 6, 2009

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue
Washington, DC 20585-1000

Dear Secretary Chu:

I am writing to support the applications of our four investor-owned electric public utility companies: Public Service Electric & Gas, Atlantic City Electric, Rockland Electric Company (a Consolidated Edison Inc. company), Jersey Central Power and Light (a First Energy Corporation) for a stimulus grant under the United States Department of Energy's Smart Grid Investment Grant Program (DE-FOA-0000058).

The New Jersey Board of Public Utilities (NJBPU) is the State agency that regulates the rates and services for these four investor-owned utility companies. My office, in partnership with the NJBPU is aggressively pursuing the adoption of smart grid technologies throughout our electricity infrastructure. We recognize that these developing smart grid technologies offer an opportunity to bring our electricity infrastructure into the 21st century. The benefits of this modernization will benefit end users, and the environment.

These projects will yield tangible benefits. They will improve the reliability of our electricity infrastructure and ensure cyber security for one of the most critical electric corridors in the United States. It will also establish a communications backbone that will be needed for a variety of smart grid applications in the future, including AMI, green circuits, distributed renewable energy projects, and plug-in hybrid electric vehicles.

These projects are prime candidates for stimulus funding. They will create jobs, improve the reliability of the grid, and fortify our security. My administration remains committed to smart grid deployment, and we look forward to working with the DOE staff on this effort.

Thank you for your consideration.

Sincerely,

JON S. CORZINE

United States Senate

WASHINGTON, DC 20510

August 4, 2009

The Honorable Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu,

We write in support of the grant application submitted by FirstEnergy Corporation for funding in the Smart Grid Investment Grant Program, DE-FOA-0000058, which was created and funded in the American Recovery and Reinvestment Act of 2009.

It is our understanding that FirstEnergy Corporation's plan 'Ohio Smart Grid Modernization Project ' would benefit over 44,000 FirstEnergy customers, as well as accelerate the achievement of a modernized electric distribution system. It will enable measurable benefits in terms of reliability and electric energy conservation which are added incentives to promote economic development in the region. The technology will also provide customers with new tools to actively manage their electric usage and costs while reducing greenhouse gas emissions.

FirstEnergy officials indicate that the project is structured to enable interoperability among different smart devices and systems across the grid, to maintain the highest standards of cyber security, and to provide performance data to the Smart Grid Information Clearinghouse. This project phase of the grid is geographically designed to reach multiple constituencies, including a significant cross-section of commercial/industrial customers and residential users, comprised of varying incomes and diverse ethnic groups.

Federal funding for this project will create and retain highly skilled jobs at FirstEnergy and the service providers required to build and manage a sophisticated smart grid. The modernized electric infrastructure will assist the region in attracting new businesses that value electric reliability and the ability to manage costs.

Please give all due consideration to FirstEnergy Corporation's application for funding. We respectfully ask that your office keep our staffs informed on the status of the application. Should there be any questions, please have your staff contact Linda Greenwood, Grants Coordinator for the Office of George Voinovich at (419) 259-3895, or Jesse Gannon in the Office of U.S. Senator Sherrod Brown at (216)522-7272.

Sincerely,

George Voinovich
United States Senator

Sherrod Brown
United States Senator

ROBERT P. CASEY, JR.
PENNSYLVANIA

COMMITTEES:
AGRICULTURE, NUTRITION, AND FORESTRY
FOREIGN RELATIONS
HEALTH, EDUCATION, LABOR, AND PENSIONS
SPECIAL COMMITTEE ON AGING
JOINT ECONOMIC

United States Senate

WASHINGTON, DC 20510

August 4, 2009

The Honorable Doctor Steven Chu
Secretary
United States Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary Chu:

It is my understanding that FirstEnergy Corp. has applied for funding through the Smart Grid Investment Grant Program of the Department of Energy as allocated by the American Recovery and Reinvestment Act of 2009. The purpose of this letter is to urge you to give full and fair consideration to this proposal.

It is my understanding that FirstEnergy Corp. serves approximately 4.5 million customers in Pennsylvania, Ohio, and New Jersey. I have been advised that FirstEnergy Corp. would use the grant money to employ smart grid technologies, as part of it "Pennsylvania Intelligrid City Project." I have been further advised that this project is designed to reduce energy by 20 megawatts through a voluntary control program involving more than 45,000 customers in the area of York, Pennsylvania. As it appears, this project would improve system reliability, lower peak demand, increase efficiency, lower maintenance costs, and reduce emissions.

Thank you in advance for the consideration of my views. Please include this letter in the official record of the application. Consistent with all applicable laws, rules and regulations, I also respectfully request that you keep me informed of the status of this grant application. Finally, if you have any questions, comments or concerns, please feel free to contact me or my staff at (215) 405-9660.

Sincerely,

Bob Casey, Jr.

Robert P. Casey, Jr.
United States Senator

ROBERT MENENDEZ
NEW JERSEY

COMMITTEES:
BANKING, HOUSING, AND URBAN AFFAIRS
BUDGET
ENERGY AND NATURAL RESOURCES
FINANCE
FOREIGN RELATIONS

United States Senate

WASHINGTON, DC 20510–3005

528 SENATE HART OFFICE BUILDING
WASHINGTON, DC 20510
(202) 224–4744

ONE GATEWAY CENTER
11TH FLOOR
NEWARK, NJ 07102
(973) 645–3030

208 WHITE HORSE PIKE
SUITE 18–19
BARRINGTON, NJ 08007
(856) 757–5353

August 6, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu,

I am writing in support of a constituent and major employer in New Jersey, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy is requesting funding for its New Jersey NJ Smart Grid proposal – a $12 million project to reduce customer load by 30 megawatts through a voluntary control program involving 20,000 customers served by FirstEnergy's Jersey Central Power & Light (JCP&L) utility.

The project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable JCP&L to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also will help improve system reliability and efficiency and alleviate grid constraints. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most important, this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. And, by carefully analyzing system life-cycle costs and benefits, the project will justify recovery of the significant investments needed to ensure deep market penetration across the U.S.

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs
- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions – from fewer field maintenance and repair trips

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

I urge you to support this vital project, and I thank you in advance for your consideration.

Sincerely,

ROBERT MENENDEZ
United States Senator

Congress of the United States
Washington, DC 20515

August 5, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave. S.W.
Washington, DC 20585

Dear Secretary Chu,

We are writing in support of a constituent and major employer in Ohio, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy is headquartered in Akron, Ohio. Its seven electric utility operating companies comprise the nation's fifth largest investor- owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. As part of a larger application to DOE that involves projects in all three states, FirstEnergy is requesting support for its Ohio Smart Grid Modernization Project – a three-year, $62 million effort to deploy a variety of smart grid technologies in a mixed residential and commercial suburban area of Cleveland.

Initially, the goal of the project is to improve system reliability and efficiency in the targeted area while providing 44,000 customers with an opportunity to reduce energy costs through active management of their electricity usage. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most importantly, we understand that this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. And, by carefully analyzing system life-cycle costs and benefits, the intent of the project is to justify recovery of the significant investments needed to ensure deep market penetration across the U.S.

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs
- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions – from fewer field maintenance and repair trips

Overall, we believe this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

We encourage you to give this project strong consideration, and we thank you in advance for your time.

Very truly yours,

Steven C. LaTourette, M.C.

Marcia L. Fudge, M.C.

BILL PASCRELL, JR.
8TH DISTRICT, NEW JERSEY

2464 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-5751
(202) 225-5782 FAX

ROBERT A. ROE FEDERAL BUILDING
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PATERSON, NJ 07505
(973) 523-5152
(973) 523-0637 FAX

http://pascrell.house.gov
bill.pascrell@mail.house.gov

Congress of the United States
House of Representatives

COMMITTEE ON WAYS AND MEANS
SUBCOMMITTEE ON HEALTH
SUBCOMMITTEE ON OVERSIGHT

COMMITTEE ON HOMELAND SECURITY
SUBCOMMITTEE ON BORDER, MARITIME AND GLOBAL COUNTERTERRORISM
SUBCOMMITTEE ON EMERGENCY COMMUNICATIONS, PREPAREDNESS, AND RESPONSE
SUBCOMMITTEE ON MANAGEMENT, INVESTIGATIONS AND OVERSIGHT

August 5, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu:

I am writing in support of a constituent and employer in New Jersey, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy's seven electric utility operating companies comprise the nation's fifth largest investor- owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. FirstEnergy is requesting support for its New Jersey NJ Smart Grid proposal – a $12 million project to establish a voluntary control program involving 20,000 customers served by FirstEnergy's Jersey Central Power & Light (JCP&L) utility.

The project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable JCP&L to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also could help improve system reliability and efficiency and alleviate grid constraints. In addition, the project could serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

I thank you in advance for your strong consideration of this project.

Sincerely,

Bill Pascrell, Jr.
Member of Congress

RUSH HOLT
Twelfth District, New Jersey

1214 Longworth Building
Washington, D.C. 20515
202-225-5801
Fax 202-225-6025

50 Washington Road
West Windsor, NJ 08550
609-750-9365
Fax 609-750-0618

http://holt.house.gov

Congress of the United States

Chair
Select Intelligence Oversight Panel
Committee on Appropriations

Committee on Education
and Labor

Permanent Select Committee
on Intelligence

Committee on Natural Resources

August 4, 2009

The Hon. Steven Chu,
Secretary, Department of Energy
1000 Independence Avenue S.W.
Washington, D. C. 29585

Dear Secretary Chu:

I write in support of First Energy Corp.'s application for funding under Topic Area 6, "Integrated and/or Crosscutting Systems" for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy Corp. is a diversified energy company headquartered in Akron, Ohio. Its operating utility, JCP&L, supplies electric service to one million customers in 13 New Jersey counties, including much of the 12th Congressional District I represent. Its employees are my constituents and its service is vital to the stability and growth of this area.

First Energy is requesting support for its New Jersey NJ Smart Grid proposal --a $12 million project to reduce customer load by 30 megawatts through a voluntary control program involving 20,000 customers served by JCP&L. The project will employ smart grid technologies , such as distribution automation equipment and two-way communications, to enable JCP&L to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features will also help improve system reliability and improvements throughout FirstEnergy's regulated footprint.

I encourage the Department of Energy to give FirstEnergy's application for grant funds attention and support. If you have any questions, or need further information, please contact me at my New Jersey office at (609) 750-9365.

Sincerely,

Rush Holt

RUSH HOLT
Member of Congress

RH/gk

JOHN H. ADLER
THIRD DISTRICT, NEW JERSEY
http://adler.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515-3003

COMMITTEE ON FINANCIAL SERVICES
Subcommittee on Capital Markets, Insurance and Government Sponsored Enterprises
Subcommittee on Domestic Monetary Policy and Technology
Subcommittee on Oversight and Investigations

COMMITTEE ON VETERANS' AFFAIRS
Subcommittee on Economic Opportunity
Subcommittee on Oversight and Investigations

August 6, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu,

I am writing in support of a constituent and major employer in New Jersey, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058) offered through the Department of Energy (DOE).

FirstEnergy's seven electric utility operating companies comprise the nation's fifth largest investor-owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. As part of a larger application to DOE that involves projects in all three states, FirstEnergy is requesting support for its New Jersey Smart Grid proposal – a $12 million project to reduce customer load by 30 megawatts through a voluntary control program involving 20,000 customers served by FirstEnergy's Jersey Central Power & Light (JCP&L) utility.

The project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable JCP&L to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also will help improve system reliability and efficiency and alleviate grid constraints. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most importantly, this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. Also, by carefully analyzing system life-cycle costs and benefits, the project will justify recovery of the significant investments needed to ensure deep market penetration across the United States.

Washington Office
1223 Longworth House Office Building
Washington, DC 20515
(202) 225-4765
(202) 225-0778 FAX

Toms River Office
247 Main Street
Toms River, NJ 08753-7468
(732) 608-7235
(732) 608-7268 FAX

Marlton Office
28 North Maple Avenue
Marlton, NJ 08053-3021
(856) 985-2777
(856) 985-2788 FAX

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs
- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions – from fewer field maintenance and repair trips

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

I urge you to support this vital project, and I thank you in advance for your consideration.

Sincerely,

John Adler
Member of Congress

ENERGY AND COMMERCE COMMITTEE:
HEALTH SUBCOMMITTEE
CHAIRMAN
ENVIRONMENT AND HAZARDOUS MATERIALS SUBCOMMITTEE
TELECOMMUNICATIONS AND THE INTERNET SUBCOMMITTEE
NATURAL RESOURCES COMMITTEE:
FISHERIES, WILDLIFE AND OCEANS SUBCOMMITTEE
DEMOCRATIC POLICY COMMITTEE:
COMMUNICATIONS CHAIR
http://www.house.gov/pallone

FRANK PALLONE, JR.
6TH DISTRICT, NEW JERSEY

Congress of the United States
House of Representatives
Washington, DC 20515–3006

REPLY TO:
WASHINGTON OFFICE:
☐ 237 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-3006
TELEPHONE: (202) 225-4671
DISTRICT OFFICES:
TOLL-FREE NUMBER:
(888) 423-1140
☐ 504 BROADWAY
LONG BRANCH, NJ 07740
(732) 571-1140
☐ 67/69 CHURCH STREET
KILMER SQUARE
NEW BRUNSWICK, NJ 08901
(732) 249-8892

August 6, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu:

I am writing in support of a constituent and major employer in New Jersey, FirstEnergy Corp., as it seeks funding under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy's seven electric utility operating companies comprise the nation's fifth largest investor- owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. As part of a larger application to DOE that involves projects in all three states, FirstEnergy is requesting support for its New Jersey NJ Smart Grid proposal – a $12 million project to reduce customer load by 30 megawatts through a voluntary control program involving 20,000 customers served by FirstEnergy's Jersey Central Power & Light (JCP&L) utility.

The project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable JCP&L to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also will help improve system reliability and efficiency and alleviate grid constraints. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most important, this project will help DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project will showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment. And, by carefully analyzing system life-cycle costs and benefits, the project will justify recovery of the significant investments needed to ensure deep market penetration across the U.S.

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs

- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions – from fewer field maintenance and repair trips

Overall, this project will help eliminate existing barriers to smart grid development while creating new ways for utilities and regulators to work together in achieving cost-effective, technology driven improvements to our nation's electricity infrastructure.

I urge you to support this vital project, and I thank you in advance for your consideration.

Sincerely,

Frank Pallone Jr.

Frank Pallone, Jr.
MEMBER OF CONGRESS

The Public Utilities Commission of Ohio

Ted Strickland, Governor
Alan R. Schriber, Chairman

Monitoring marketplaces and enforcing rules to assure safe, adequate, and reliable utility services.

Commissioners
Ronda Hartman Fergus
Valerie A. Lemmie
Paul A. Centolella
Cheryl Roberto

August 4, 2009

Secretary Steven Chu
United States Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Dear Secretary Chu:

As the state agency with regulatory oversight over Ohio's investor owned electric utilities, the Public Utilities Commission of Ohio (PUCO) would like to offer its strong support of FirstEnergy's Smart Grid Investment Grant Program (DE-FOA-000058) application.

FirstEnergy's smart grid deployment and its pricing proposal are aligned with the state's recently enacted electricity law, Senate Bill 221. The PUCO supports the development of retail pricing that reflects the varying costs of providing electric service. FirstEnergy's proposal includes a menu of time differentiated default prices to be offered to all of the customers in their proposal. Consistent with the PUCO's and Department of Energy's (DOE) desire to maximize the benefits from smart grid investments, an assessment of FirstEnergy's first year results will facilitate adjustments based on lessons learned during the project implementation.

Ohio's law also requires the development of distribution performance standards. FirstEnergy's smart grid plan is designed to significantly improve distribution reliability and will provide a foundation for job creation by companies that require a high level of power reliability.

On January 21, 2009, the PUCO issued an order that created a rider providing the mechanism for recovery of the company's reasonable smart grid and advanced metering infrastructure costs. In this order, the PUCO also directed FirstEnergy to work with the PUCO staff to complete its assessment of smart grid and advance metering deployment options. On March 25, 2009, the PUCO approved an agreement that FirstEnergy will work with the PUCO staff and other interested parties to develop critical peak, time-of-day and real-time pricing tariffs.

The Smart Grid Investment Grant funding would be a key factor for accelerating deployment of advance metering in the FirstEnergy service territory. Additionally, we feel that this project supports the job creation, economic stimulus and energy infrastructure objectives of the ARRA and the Smart Grid Investment Grant Program. My colleagues and I encourage the DOE to look favorably upon FirstEnergy's application and recognize the PUCO's commitment to FirstEnergy's smart grid initiatives.

Sincerely,

Alan R. Schriber
Chairman

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P.O. BOX 3265, HARRISBURG, PA 17105-3265

IN REPLY PLEASE
REFER TO OUR FILE

August 5, 2009

The Honorable Dr. Steven Chu
Secretary of Energy
United States Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Chu,

We are writing to express our support for the grant application submitted by FirstEnergy Corp. for its Pennsylvania Intelligrid City Project. FirstEnergy's request for funding is under Topic Area 6, "Integrated and/or Crosscutting Systems," for the Smart Grid Investment Grant Program (DE-FOA-0000058).

FirstEnergy's seven electric utility operating companies comprise the nation's fifth largest investor-owned electric system, serving 4.5 million customers within a 36,100-square-mile area of Ohio, Pennsylvania and New Jersey. As part of a larger application to the Department of Energy (DOE) that involves projects in all three states, FirstEnergy is requesting support for its Pennsylvania Intelligrid City Project – a $30 million effort to reduce customer load by 20 megawatts through a voluntary control program involving 50,000 distribution customers in the York, Pennsylvania area.

We understand that the project will employ smart grid technologies – such as distribution automation equipment and two-way communications – to enable FirstEnergy's Met-Ed operating company to directly control customer devices such as air conditioners and pool pumps. While lowering peak demand, these features also will help improve system reliability and efficiency and alleviate grid constraints. In addition, the project will serve as a model for similar improvements throughout FirstEnergy's regulated footprint.

Most importantly, this project has the potential for helping DOE establish a strong business case for regulated utilities across the nation to implement crosscutting smart grid technologies on their distribution system infrastructures. The project is expected to showcase the operational efficiencies that will result from smart grid technologies, as well as the key benefits that these technologies can bring to customers and the environment.

Project benefits include:

- Reduced peak demand – through greater customer awareness of, and participation in, demand response programs
- Increased reliability – by avoiding an estimated 4 million customer outage minutes annually
- Lower operations and maintenance costs
- Reduced emissions – from fewer field maintenance and repair trips

Overall, this project is intended to help eliminate existing barriers to smart grid development and achieve cost-effective, technology driven improvements to our nation's electricity infrastructure. As such, it is consistent with our expectations of how federal stimulus funds can have a positive effect on the utility infrastructure in Pennsylvania. We commend FirstEnergy for its initiative in implementing the Pennsylvania Intelligrid City Project and reiterate our support for its federal stimulus grant application.

Sincerely,

James H. Cawley
Chairman

Tyrone J. Christy
Vice Chairman

Kim Pizzingrilli
Commissioner

Wayne E. Gardner
Commissioner

Robert F. Powelson
Commissioner

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES

In the Matter of the Verified Petition of **Jersey Central Power & Light Company** Concerning a Proposal for Four Small Scale/Pilot Demand Response Programs for the Period Beginning June 1, 2009	**BPU DOCKET NO. EO08050326** **EO08080542** **STIPULATION OF SETTLEMENT**

TO THE HONORABLE BOARD OF PUBLIC UTILITIES:

APPEARANCES:

Marc B. Lasky, Esq. (Morgan, Lewis & Bockius LLP, attorneys) for the Petitioner, Jersey Central Power & Light Company

Ami Morita, Esq., Deputy Public Advocate, and **Diane Schulze, Esq.**, Assistant Deputy Public Advocate, Department of the Public Advocate, Division of Rate Counsel (**Ronald K. Chen, Esq.**, Public Advocate, **Stefanie A. Brand, Esq.**, Director)

Jessica L. Campbell, Esq. and **Alex Moreau, Esq.**, Deputy Attorneys General, for the Staff of the New Jersey Board of Public Utilities (**Anne Milgram, Esq.**, Attorney General of New Jersey)

Steven Goldenberg, Esq. (Fox Rothschild LLP, attorneys) for the Intervenor, Enerwise Global Technologies, Inc.

This Stipulation of Settlement ("Stipulation") is hereby made and executed as of the 6th day of August, 2009, by and among Jersey Central Power & Light Company ("JCP&L" or the "Company"), the Staff of the Board of Public Utilities ("Staff") and the New Jersey Department of the Public Advocate, Division of Rate Counsel ("Rate Counsel") (collectively, the "Parties"), in settlement of the elements of the above-captioned proceeding addressed in this Stipulation.

The Parties do hereby join in recommending that the Board of Public Utilities ("Board") issue an Order approving this Stipulation, based upon the following stipulations:

Background

By Order dated July 25, 2008[1], the Board approved a Stipulation of Settlement ("IDER Pilot Stipulation") among the Company, Staff and Rate Counsel, providing for, among other things, the implementation by JCP&L of a new Integrated Distributed Energy Resource ("IDER") pilot program designed to deliver approximately 8 MW of new Demand Response ("DR") by June 1, 2009, 5 MW of which was to be derived from residential customers and 3 MW of which was to be derived from small to medium commercial and industrial ("C&I") customers.

By Order dated July 1, 2008 ("July 1 Order"), the Board, pursuant to L.2007, c.340, sec.13(a) (codified as N.J.S.A. 48:3-98.1(a)(3) and sometimes referred to as "RGGI"), directed the State's four electric distribution companies ("EDCs"), including JCP&L, to submit proposals to the Board, by August 1, 2008, for DR programs to be implemented for the period beginning June 1, 2009[2]. On August 1, 2008, JCP&L filed its petition pursuant to the July 1 Order, along with supporting testimony and schedules (collectively, the "August 1 DR Filing"), proposing four separate small scale/pilot DR programs aggregating 83 MW of DR, which, together with the 8 MW from the IDER pilot program and 2 MW to be derived from certain Basic Generation Service ("BGS") rate design changes, were designed to achieve the JCP&L goal of 93 MW of DR beginning June 1, 2009 set forth in the July 1 Order. One of the four proposed DR programs

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[1] *In the Matter of the New Jersey Direct Load Control Program Proposal – Jersey Central Power and Light*, BPU Docket No. ER07060375, Order Adopting Stipulation of Settlement (July 25, 2008).

[2] *In The Matter of Demand Response Programs for the Period Beginning June 1, 2009 -- Electric Distribution Company Programs*, BPU Docket No. EO08050326 (July 1, 2008).

was an expansion of the IDER pilot program ("IDER Expansion") to produce an additional 15 MW of DR by June 1, 2009, 11 MW of which is targeted to be derived from residential customers and 4 MW of which is targeted to be derived from C&I customers.

By Order dated September 22, 2008[3], the Board suspended the procedural schedule relating to the EDCs' August 1, 2008 DR filings, including JCP&L's August 1 DR Filing, and directed Board Staff to meet with each of the EDCs and with Rate Counsel to reach agreement on those programs which could be reviewed in time for June 2009 implementation and which programs would require extended review. Based on those discussions, by letter dated September 26, 2008, Board Staff memorialized the agreement among JCP&L, Rate Counsel and Staff that only the Company's proposed IDER Expansion should be considered for implementation by June 2009, which was subsequently reflected in the March 12, 2009 Order designating Commissioner Joseph L. Fiordaliso as the presiding officer for this case.

The Board's RGGI Order[4] set forth certain minimum filing requirements for all RGGI filings. By letter dated August 29, 2008 (inadvertently bearing a 2009 date) ("Deficiency Letter"), the Director of the Board's Division of Energy notified JCP&L of certain deficiencies in the August 1 DR Filing. On January 27, 2009, the Company provided additional information in response to the Deficiency Letter, and by letter dated February 26, 2009, Staff notified JCP&L that the August 1 DR Filing was deemed complete with respect to the proposed IDER Expansion, effective January 27, 2009.

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[3] *In The Matter of Demand Response Programs for the Period Beginning June 1, 2009 – Electric Distribution Company Programs*, BPU Docket No. EO08050326, EO08080541, EO08080542, EO08080543, EO08080544 (September 22, 2008).

[4] *In The Matter Of Electric Public Utilities And Gas Public Utilities Offering Energy Efficiency And Conservation Programs, Investing In Class I Renewable Energy Resources, And Offering Class I Renewable Energy Programs In Their Respective Service Territories On A Regulated Basis Pursuant To N.J.S.A.* 48:3-98.1, BPU Docket No. EO08030164 (May 12, 2008).

By Order dated July 1, 2009[5], the Board approved a Stipulation of Settlement among the Company, Staff and Rate Counsel setting a procedural schedule for addressing the proposed IDER Expansion and in which JCP&L agreed to waive the 180-day review period provision of RGGI solely in connection with the IDER Expansion. By Order dated July 14, 2009[6], signed by Commissioner Fiordaliso as presiding officer for this case, a procedural schedule was set for addressing the three small scale/pilot DR programs, other than the IDER Expansion, included in the August 1 DR Filing.

Afternoon and evening public hearings with respect to the IDER Expansion were held in Morristown, New Jersey on October 30, 2008. One member of the public made a statement at the afternoon hearing. No members of the public made a statement at the evening hearing.

Stipulation

The undersigned Parties DO HEREBY STIPULATE AND AGREE as follows with respect to the proposed IDER Expansion:

1. Building on the momentum gained in implementing the IDER pilot program, as described in the Board-approved IDER Pilot Stipulation, JCP&L will expand the IDER program to add an anticipated additional 15 MW of DR pursuant to the schedule set forth in paragraph 2 below. As more fully described in the IDER Pilot Stipulation, IDER is a co-development effort between JCP&L and BPL Global, Ltd. and is designed to integrate customers

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[5] *In the Of the Verified Petition of Jersey Central Power & Light Company Concerning a Proposal for Four Small Scale/Pilot Demand Response Programs for the Period Beginning June 1, 2009*, BPU Docket Nos. EO08050326, EO08080542 (July 1, 2009).

[6] *In The Matter of Demand Response Programs for the Period Beginning June 1, 2009 – Electric Distribution Company Programs* and *In the Of the Verified Petition of Jersey Central Power & Light Company Concerning a Proposal for Four Small Scale/Pilot Demand Response Programs for the Period Beginning June 1, 2009*, BPU Docket Nos. EO08050326, EO08080542 (July 14, 2009).

and their electric equipment with smart grid utility operations, initially by focusing on integrating load management devices for both residential and commercial customers into system operations. Participants will have IDER load control technology installed in their facilities providing JCP&L with the ability to monitor, through two-way communications, and control non-critical customer electrical loads such as air conditioning, hot water heaters and pool pumps. Details about the IDER Expansion are set forth in Appendix A hereto.

2. The Company will deploy the 15 MW IDER Expansion direct load control equipment in a phased approach, with the first 5 MW installed by the end of February 2010 with the goal of registering this load in the PJM 2010 summer programs. An additional 5 MW are to be deployed between March and September 2010 and the final 5 MW are to be deployed between October 2010 and February 2011 with the goal of registering the entire 15 MW in the 2011 PJM summer programs.

3. The deployment of the IDER Expansion will be ongoing and continuous to avoid delays that would increase the cost of deployment. As part of this deployment, the Company will use its best efforts to economically coordinate equipment purchases with expected installations in order to minimize inventory and cost with respect to all aspects of the IDER Expansion, including the timing of the purchase of equipment for C&I customers. The Company will not purchase any C&I equipment for the IDER Expansion until all C&I equipment purchased for the IDER pilot program has been deployed. JCP&L will develop a plan for evaluating the deployment and operation of the IDER Expansion and, if necessary, corrective actions will be identified. Any such evaluation plan and corrective actions will be discussed in collaboration with Board Staff and Rate Counsel.

4. IDER pilot program operations are continuing through the 2009 peak season. JCP&L will provide the interim Assessment Report on the IDER pilot program that is due by the end of 2009, as discussed in Attachment B to the IDER Pilot Stipulation ("2009 Pilot Assessment Report"), by no later than November 1, 2009. The outline of the 2009 Pilot Assessment Report is set forth in Appendix B hereto.

5. Based on preliminary findings relative to system operational performance in connection with JCP&L's IDER pilot program, and assumptions and projections regarding future costs and revenues as of the date of this Stipulation, the Parties agree that the IDER Expansion appears to be cost-effective, with the Total Resource Cost cost/benefit analysis showing a ratio of not less than 1.08 based on those assumptions and projections. Therefore, the Parties support implementation of the 15 MW IDER Expansion in a phased approach as described in paragraph 2 above. However, in order to provide additional assurances, any Party to this Stipulation may request in writing, within 15 business days of receipt of the 2009 Pilot Assessment Report, that a proceeding be initiated before the Board to determine whether further deployment of the IDER Expansion should be halted. JCP&L may respond through a filing with the Board within five business days of receipt of such a written request and the Parties will use their best efforts to conduct that proceeding, including appropriate discovery (which may be accomplished through discovery conferences in addition to or in place of written discovery), evidentiary hearings and briefing, so as to close the record in time for a Board decision at a February 2010 agenda meeting. Absent any such request from any Party, the Parties support the continued deployment of the IDER Expansion pursuant to paragraph 2 above.

6. JCP&L will register the IDER Expansion capacity as a PJM Interruptible Load for Reliability resource and/or as DR in PJM reliability pricing model auctions and/or in

other appropriate PJM capacity programs/markets and will also register the IDER Expansion in appropriate PJM energy markets, as it is deployed, consistent with PJM registration procedures. JCP&L shall apply any credits and/or payments that it receives from PJM or any other source associated with the IDER Expansion to reduce program costs, as discussed in paragraph 9 below.

7. On February 17, 2009, the federal American Recovery and Reinvestment Act of 2009 (ARRA) (Pub. L. No. 111-5) was signed into law by President Barack Obama. The Company is filing a proposal under the Department of Energy's ("DOE") Funding Opportunity Announcement for the Smart Grid Investment Grant program for funding of an additional 15 MW of IDER technology deployment, beyond the IDER Expansion, although JCP&L cannot provide any assurances that it will receive a DOE grant. Because ratepayer funding of the IDER Expansion, as provided for in this Stipulation, supports such proposal to DOE, even if such a DOE grant is obtained it will not offset any IDER Expansion costs. If funding or credits are obtained from any subsequent state or federal program for the IDER Expansion and, consistent with applicable law, are applied directly to reduce IDER Expansion costs, as opposed to funding further deployment of IDER technology beyond the IDER Expansion, such offset shall be reflected in the annual Rider RRC true-up.

8. Based on the budget for the IDER Expansion, the total revenue requirement over the 10-year recovery period for the IDER Expansion, as discussed in paragraph 10 below, is $11.9 million.

9. The Parties agree that JCP&L will recover its actual incremental reasonable and prudent costs for the IDER Expansion through a component of Rider RRC – RGGI Recovery Charge, or through a comparable Rider mechanism approved by the Board. The Rider will provide for an equal per kWh charge applicable to all customers in all customer

classes, whether full service BGS customers or delivery service shopping customers. Any associated revenues received from PJM or any other source in connection with the IDER Expansion will be applied to reduce the costs of the Expansion to be recovered through the Rider.

10. The Rider will be implemented on the first day of the month following JCP&L's initial expenditure on the IDER Expansion, but not sooner than October 1, 2009 and not later than January 1, 2010, and will recover the all-in costs associated with the IDER Expansion, including the amortization of any capital investments with a return at a rate equal to JCP&L's overall pre-tax cost of capital as determined in its last rate case (11.61%). The investment on which the return is calculated will reflect the impact of deferred income taxes. The RRC rate for the IDER Expansion will be based on a revenue requirement reflecting a six year amortization of the IDER Expansion investment and will initially be structured to produce revenues of approximately $2.1 million annually. The initial per kWh Rider RRC charge for the IDER Expansion and the associated bill impacts are set forth in Appendix C hereto. The proposed Tariff sheet for Rider RRC is attached as Appendix D hereto.

11. The Rider will provide for deferred accounting with interest on over- and under-recoveries at a rate equal to the interest rate on two-year constant maturity Treasuries as published in the Federal Reserve Statistical Release on the first day of each month (or the closest day thereafter on which rates are published), plus sixty basis points, but shall not exceed the overall rate of return for JCP&L as authorized by the Board. The interest rate shall be reset each month. Additionally, the calculation shall be based on the net of tax beginning and end average monthly balance. The Company shall accrue simple interest on any over- or under-recovered balance, with an annual roll-in to the RRC balance at the end of each reconciliation period.

12. The IDER Expansion component of Rider RRC will be reviewed, trued-up and modified in an annual filing that JCP&L will make with the Board. The cost effectiveness of the IDER Expansion will be reviewed in the future annual filings using actual data. Each annual filing will contain a reconciliation of JCP&L's actual recoveries and actual revenue requirements for the prior period. Each annual filing will also contain a forecast of revenue requirements for the upcoming 12-month period that shall be based on the Company's overall pre-tax cost of capital as determined in its last rate case. Such annual filings will take into account the outcome of any proceeding initiated pursuant to paragraph 5 above. The first such filing will include actual data through June 2010, with annual filings thereafter.

13. In addition to any reports contemplated by paragraph 4 above, JCP&L will provide monthly reports concerning the IDER Expansion comparable to the monthly reports provided with respect to the IDER pilot program and including information about any load reduction events that occurred during the month. In addition, the Company will provide annual reports by the end of each year, commencing the end of 2010, with respect to the IDER pilot program and the IDER Expansion, which will follow the outline set forth in Appendix B hereto. The Company will consult with Board Staff and Rate Counsel on the report outline for the annual reports as appropriate, including information with respect to the IDER deployment's impact on energy delivery operations and reliability as it becomes available.

14. To the extent relevant, the impacts of the IDER pilot program and the IDER Expansion shall count towards achievement of the demand response targets set forth in New Jersey's Energy Master Plan and the Board's Order dated January 28, 2009 in Docket No. EO08121065.

15. Costs associated with the IDER pilot program will continue to be recovered in Rider SCC without modification to the existing recovery mechanism.

Conclusion

16. The Parties agree that this Stipulation contains mutual balancing and interdependent clauses and is intended to be accepted and approved in its entirety. In the event any particular provision of this Stipulation is not accepted and approved in its entirety by the Board, or is modified by a court of competent jurisdiction, then any Party aggrieved thereby shall not be bound to proceed with this Stipulation and shall have the right, upon written notice, to be provided to all other Parties within ten (10) days after receipt of any such adverse decision, to litigate all issues addressed herein to a conclusion. More particularly, in the event this Stipulation is not adopted in its entirety by the Board in an appropriate Order, or is modified by a court of competent jurisdiction, then any Party hereto is free, upon the timely provision of such written notice, to pursue its then available legal remedies with respect to all issues addressed in this Stipulation, as though this Stipulation had not been signed.

17. The Parties agree that this Stipulation shall be binding on them for all purposes herein.

18. It is specifically understood and agreed that this Stipulation represents a negotiated agreement and has been made exclusively for the purpose of this proceeding. Except as expressly provided herein, (i) no Party waives any rights it possesses under any prior Stipulation, except where the terms of this Stipulation supersede such prior Stipulation, and (ii) the Parties shall not be deemed to have approved, agreed to, or consented to any principle or methodology underlying or supposed to underlie any agreement provided herein in total or by

specific item. The Parties further agree that this Stipulation is in no way binding upon them in any other proceeding, except to enforce the terms of this Stipulation.

19. This Stipulation may be executed in any number of counterparts, each of which shall be considered one and the same agreement, and shall become effective when one or more counterparts have been signed by each of the Parties.

WHEREFORE, the Parties hereto have duly executed and do respectfully submit this Stipulation to the Board and recommend that the Board issue a Final Decision and Order adopting and approving this Stipulation in its entirety in accordance with the terms hereof.

Jersey Central Power & Light Company

By: _____
Marc B. Lasky
Morgan, Lewis & Bockius LLP

Dated: 8/6/09

Anne Milgram,
Attorney General of New Jersey
Attorney For
Staff of The Board of Public Utilities

By: _____
Alex Moreau
Deputy Attorney General

Dated: 08/06/09

Ronald K. Chen
Public Advocate of New Jersey

Stefanie A. Brand
Director, Rate Counsel

By: _____
Diane Schulze
Assistant Deputy Public Advocate

Dated: _____

specific item. The Parties further agree that this Stipulation is in no way binding upon them in any other proceeding, except to enforce the terms of this Stipulation.

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WHEREFORE, the Parties hereto have duly executed and do respectfully submit this Stipulation to the Board and recommend that the Board issue a Final Decision and Order adopting and approving this Stipulation in its entirety in accordance with the terms hereof.

Jersey Central Power & Light Company

By: _____
Marc B. Lasky
Morgan, Lewis & Bockius LLP

Dated: _____

Anne Milgram,
Attorney General of New Jersey
Attorney For
Staff of The Board of Public Utilities

By: _____
Alex Moreau
Deputy Attorney General

Dated: _____

Ronald K. Chen
Public Advocate of New Jersey

Stefanie A. Brand
Director, Rate Counsel

By: Diane Schulze
Diane Schulze
Assistant Deputy Public Advocate

Dated: 8/6/09

State of New Jersey
BOARD OF PUBLIC UTILITIES
TWO GATEWAY CENTER
NEWARK, NEW JERSEY 07102

Victor A. Fortkiewicz
Executive Director
Tel. # (973) 648-4852
Fax # (973) 648-2409

August 3, 2009

Ms. Donna Williams
Contract Specialist
Office of Headquarters Procurement – MA-64
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1615

Dear Ms. Williams:

On behalf of the New Jersey Board of Public Utilities (NJBPU), I welcome welcome the submittal from FirstEnergy Corp on behalf of Jersey Central Power & Light (JCPL) to the United States Department of Energy's (DOE) Funding Opportunity Announcement for the Smart Grid Investment Grant (DE-FOA-0000058). The FOA is a merit-based, competitive solicitation for projects to receive federal financial assistance for up to 50% of eligible project costs. It is my understanding that all applicants to this FOA need to provide commitment letters from other third party funders.

The NJBPU is the State agency that regulates the rates and services for JCPL and could be considered the third party funder for JCPL. While the NJBPU has not received JCPL's actual FOA submittal, the NJBPU endorses principles of Smart Grid deployment. New Jersey's Energy Master Plan, released last year after being coordinated by the NJBPU, states that "smart grid technologies… provide the State with an opportunity to modernize the electrical grid to a 21st century infrastructure that will enable a wide array of benefits to the end users, the environment and the utilities."

The NJBPU will act expeditiously to evaluate the current filing before the NJBPU which forms the basis for the portion of the FOA submittal from JCPL. The NJBPU commends the DOE for its efforts in releasing these Smart Grid FOAs and we look forward to working with you.

Sincerely,

Victor A. Fortkiewicz
Executive Director

EXHIBIT B

Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company Docket No. M-2009-2123950 Smart Meter Technology Procurement and Installation Plan

(Submitted August 14, 2009)

Bradley A. Bingaman, Esq.
(610) 921-6203
(610) 939-8655 (Fax)

August 14, 2009

VIA PERSONAL DELIVERY

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company and Pennsylvania Power Company for Approval of Smart Meter Technology Procurement and Installation Plan Docket No. M-2009-2123950

Dear Secretary McNulty:

Metropolitan Edison Company ("Met-Ed"), Pennsylvania Electric Company ("Penelec") and Pennsylvania Power Company ("Penn Power") (collectively, the "Companies") hereby submit an original and nine (9) copies of the above-mentioned Joint Petition for Approval of Smart Meter Technology Procurement and Installation Plan, and related documents. This filing is being submitted in accordance with Section 2807(f) of the Public Utility Code, 66 Pa. C.S. § 2807(f), and the Commission's Implementation Order entered June 24, 2009, in the matter of Smart Meter Procurement and Installation, at Docket No. M-2009-2092655.

In addition to the enclosed Joint Petition and the instant Transmittal Letter, this filing includes the following documents: the Companies' Smart Meter Technology Procurement and Installation Plan; Met-Ed/Penelec/Penn Power Statement No. 1: Testimony of John E. Paganie; Met-Ed/Penelec/Penn Power Statement No. 2: Testimony of Robert Mills; and Met-Ed/Penelec/Penn Power Statement No. 3: Testimony of Raymond I. Parrish.

A CD containing the complete filing in PDF format is also enclosed herewith.

Please contact me should you have any questions regarding this matter.

Very truly yours,

Bradley A. Bingaman

dlm
Enclosures

cc: As per Certificate of Service

Via Personal Delivery:
The Honorable James H. Cawley, Chairman
The Honorable Tyrone J. Christy, Vice Chairman
The Honorable Kim Pizzingrilli, Commissioner
The Honorable Wayne E. Gardner, Commissioner
The Honorable Robert F. Powelson, Commissioner
The Honorable Veronica A. Smith, Chief Administrative Law Judge
Robert F. Young, Esq., Law Bureau
Paul T. Diskin, Fixed Utility Services
Wayne Williams, Bureau of CEEP

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company and Pennsylvania Power Company for Approval of Smart Meter Technology Procurement and Installation Plan	:	Docket No. M-2009-2123950

JOINT PETITION OF METROPOLITAN EDISON COMPANY, PENNSYLVANIA ELECTRIC COMPANY AND PENNSYLVANIA POWER COMPANY

Kathy J. Kolich
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Counsel for:
Metropolitan Edison Company,
Pennsylvania Electric Company and
Pennsylvania Power Company

Dated: August 14, 2009

In accordance with the Implementation Order entered June 24, 2009, by the Pennsylvania Public Utility Commission ("Commission") in the Matter of Smart Meter Procurement and Installation at Docket No. M-2009-2092655[1], Metropolitan Edison Company ("Met-Ed"), Pennsylvania Electric Company ("Penelec") and Pennsylvania Power Company ("Penn Power") (collectively, the "Companies") hereby file this Joint Petition with the Commission requesting approval of the attached Smart Meter Technology Procurement and Installation Plan ("Plan") of the Companies and authorization for each of the Companies to implement proposed tariff riders for cost recovery purposes, as described herein.

In support of this Joint Petition, the Companies state as follows:

I. INTRODUCTION AND BACKGROUND

1. On October 15, 2008, Governor Rendell signed House Bill 2200 into law as Act 129 of 2008 ("Act 129"). Act 129 became effective on November 14, 2008, and imposed new requirements on Pennsylvania's electric distribution companies ("EDCs") in the areas of energy efficiency and conservation, smart meters, electricity procurement and alternative energy sources.

2. Among other things, Act 129 directed that EDCs with at least 100,000 customers must file smart meter technology procurement and installation plans with the Commission for approval on or before August 14, 2009. 66 Pa. C.S. § 2807(f)(1) and (6) . Pursuant to Act 129, the EDC plan must describe the smart meter technologies the EDC proposes to install:

[1] *Smart Meter Procurement and Installation*, Docket No. M-2009-2092655 (Implementation Order entered June 24, 2009) ("Implementation Order").

- Upon request from a customer at the customer's expense, 66 Pa. C.S. § 2807(f)(2)(i);
- In new building construction, 66 Pa. C.S. § 2807(f)(2)(ii); and
- In accordance with a depreciation schedule not to exceed 15 years, 66 Pa. C.S. § 2807(f)(2)(iii).

3. On June 24, 2009, the Commission issued its Implementation Order establishing standards each plan must meet and providing guidance on the procedures to be followed for submittal, review and approval of all aspects of each smart meter plan. The Implementation Order also established minimum smart meter capability and guidance on the Commission's expectations for deployment of smart meters. Specifically, the smart meter plans must address: 1) the Companies' current deployment of smart meter technology; 2) a plan for future deployment, complete with dates for key milestones and measurable goals; 3) the Companies' plans for meeting certain specific milestones during the 30-month grace period, including a status reporting plan, and a plan to distribute interval data meters and access to interval data upon customer request; 4) certain meter functionality; 5) data access and EDI capabilities; and 6) costs and cost recovery.

4. On July 16, 2009, the Commission convened a stakeholder meeting to address the following issues: 1) to obtain feedback from EDCs on their ability to provide the information requested in the Implementation Order on cost-benefit information; 2) to determine whether publicly available information is available on those issues; 3) to determine whether smart meter companies can share cost data; and 4) to gather input on whether a common template would be feasible to illustrate costs and savings information in the August 14 filings. At the meeting, it was recognized that the cost-benefit data available to each EDC as it prepared for the August 14

filing may differ. Several companies indicated that the filings would provide overall cost estimates, but that assessment and selection of technologies and vendors will not have occurred prior to August 14. Therefore, those EDCs will make supplemental filings during the 30-month grace period established in the Implementation Order to provide additional cost information and details of benefits.

5. Following the passage of Act 129, the Commission conducted an extensive process in implementing the new law. The Companies have been active participants in the Commission's efforts and have worked with the Commission and other interested parties to develop the rules and processes associated with this endeavor.

6. The Companies hereby respectfully submit for approval their Plan pursuant to Act 129 and the Commission's Implementation Order. The Plan outlines the Companies' strategies and programs in order to implement and deploy smart meters in accordance with Act 129. The Plan includes a proposed tariff rider to be utilized by each company that would establish a Smart Meter Technology Charge Rider ("Tariff Rider") to be utilized to recover the costs associated with the Companies' Plan.

7. Documentation and testimony supporting the Companies' Plan is provided and attached hereto. Specifically, Mr. John E. Paganie (Met-Ed/Penelec/Penn Power Statement No. 1) provides a summary and overview of the Companies' Plan and process utilized to develop the Plan. Mr. Robert Mills (Met-Ed/Penelec/Penn Power Statement No. 2) describes and discusses the Plan and key milestones. Mr. Raymond I. Parrish (Met-Ed/Penelec/Penn Power Statement No. 3) provides an overview of the Companies' proposals to recover the costs associated with the Plan through new tariff riders for each of the Companies. The Companies reserve the right to introduce and offer additional witnesses during this proceeding, as needed.

8. Met-Ed, Penelec and Penn Power specifically request that the Commission approve the Plan and authorize the Companies to implement the proposed tariff riders, as described herein. The Companies are asking the Commission to approve, as part of the approval of the Plan, both the proposed recovery mechanism and the recovery of costs of the Assessment Period described herein (currently estimated at $29.5 million) through such mechanism.

II. PLAN

A. Overview of the Plan:

General

9. Met-Ed, Penelec and Penn Power have coordinated certain efforts across the Pennsylvania service territories of each of the Companies in order to achieve cost efficiencies and develop a consistent plan to begin implementing across the service territories of all three Companies to procure and install smart meter technology. The continued coordinated efforts of the Companies will result in a comprehensive plan, consistent with the Implementation Order, which will enable the Companies to meet the objectives of Act 129. The Companies' Plan includes both a general long-term time line based on information currently available and a more detailed short-term plan to be implemented during the 30-month grace period.

10. The Companies have selected by competitive bid and entered into a contract with Black & Veatch Corporation ("Black & Veatch"), to assist the Companies with the development of the Plan.

11. Rather than submitting three separate plans, the Companies, given that they are part of an integrated distribution system, are submitting a single comprehensive plan that applies to all three Companies.

Current Deployment

12. The Companies' current deployment of smart meter technology consists of the MV-90 commercial and industrial system. This technology is a proven, low-cost, solution for interval data collection, management and analysis and can be used as a data collection engine that interfaces to existing data management and analysis tools. It can also be used as an end-to-end interval data collection and management solution both currently and in the interim during the comprehensive implementation of smart metering technology.

Assessment Period Plan

13. The Companies' long-term plan anticipates a 15-year full scale deployment of smart metering across the Companies' service territories. The full deployment will occur in a tiered roll out to maximize the cost to benefit ratio and to minimize the cost to customers. Consistent with the Implementation Order and in order to develop a plan to accomplish the full deployment, the Companies' will utilize the first 24 months ("Assessment Period") of the 30-month grace period authorized by the Commission to create a business plan resulting in the submission of a deployment plan to the Commission.

14. Throughout the Assessment Period, the Companies will assess needs, select technology, secure vendors, train personnel, install and support test equipment and establish a detailed meter deployment schedule consistent with the requirements of Act 129. At the end of the Assessment Period, the Companies will submit to the Commission a supplement to the Plan ("Deployment Plan") to set forth in detail the Companies' plan for the full scale deployment of smart meters.

15. The Companies' needs and technology assessment will begin by evaluating its service territory characteristics. The Companies serve approximately 1.3 million customers over

22,000 square miles in Pennsylvania. Due to the service territories' diversity and differences, a one-size-fits-all approach may not be feasible. Therefore, a comprehensive and detailed assessment analysis prior to selecting the proper smart metering technologies that best meet the needs of the Companies' customers in a cost effective manner is necessary. This evaluation will include the completion of major steps which are described in detail in the Companies' Plan.

16. A technology assessment of the requisite smart meter functionality is also necessary to evaluate potential vendors and equipment. The Companies' Plan includes an example of a preliminary evaluation form to be used when assessing potential vendors which includes all of the smart meter functional requirements set forth in the Implementation Order. The Companies intend to hire a consultant to assist with the needs and technology assessment.

17. Vendor selection will be based on the results of the needs and technology assessments. The Companies anticipate that the vendor and technology selection process will start in September, 2010 and continue for almost ten months. The major steps to be completed during this time period are set forth in the Companies' Plan.

18. The Companies will also conduct an evaluation of the current legacy systems to assess network design. The network design task is expected to commence in January, 2011 and be completed before the end of 2013. The details associated with the network design task and major steps to be completed are set forth in the Companies' Plan.

19. The Companies view training and organizational readiness needs as an on-going task throughout the implementation of the Plan. The Companies anticipate performing a formal assessment of employee skill sets during the grace period. Some of the significant steps surrounding organizational readiness and the development of a training plan are set forth in greater detail in the Companies' Plan.

20. The specific details surrounding the establishment of plans for installation, testing and rollout will be developed during the Assessment Period and included in the Deployment Plan. The Companies will perform a technical trial, which will involve the deployment and testing of 5,000 to 10,000 smart meters prior to December 31, 2013, and will consist of two major components: 1) an AMI test lab; and 2) a pre-implementation assessment and upgrade. Details regarding the technical trial, AMI test lab and pre-implementation assessment and upgrade are discussed in detail in the Companies' Plan. Following the proper testing of the selected technology, the Companies will commence the build out of the necessary infrastructure with a minimum of an additional 60,000 meters expected to be installed in order to "de-bug" the system prior to full deployment. Presently, the Companies anticipate that the more densely populated areas within their respective service territories will receive partial to full scale smart meter deployment earlier than the 15-year target completion date.

21. The Companies will work with the Electronic Data Exchange Working Group and submit no later than January 1, 2010, a proposal for EDI capabilities, including planned target dates for testing and certification.

Deployment of Meters

22. During the 30-month grace period, the Companies intend to continue to deploy MV 90 interval meters for such requests by industrial or large commercial customers pursuant to the Implementation Order. The Companies will assess various options for residential customer needs during the Plan review and approval process to select a meter technology that provides the requisite data as identified in the Implementation Order based on various criteria, including customer costs.

23. While the long-term plan anticipates a 15-year full scale, 100% deployment of smart meter technology throughout the Companies' three service territories, as discussed in more detail in the Plan, after the 30-month grace period and during the network system build out, the Companies will provide smart meters based on customer requests and for all new construction. The type of meter will be based on the nature of information desired, such as a meter with a communication card to provide for price signals for real-time pricing or a meter with a network card to provide pulse data for time-of-use rates.

24. In order to obtain a smart meter during the post-grace period, the customer must agree to pay the incremental costs of installing the meter. Inasmuch as the Companies have not yet selected the smart meter technology to be utilized, any estimate of incremental costs is premature. The Companies will submit for review and approval by the Commission any incremental cost estimates at a later date, understanding that such approval must be granted before the expiration of the grace period.

System-wide Deployment

25. The system-wide deployment of smart meter technology will be included in the Companies' supplemental Deployment Plan that will be submitted to the Commission within 24 months of this Plan being approved.

26. The Deployment Plan will include, among other things: 1) a detailed long-term time line, with key milestones; 2) a smart meter solution; 3) the costs of such a solution, along with an assessment of benefits; 4) a network design solution; 5) a communications architecture design solution; 6) a training assessment and proposed curriculum; 7) a cost recovery forecast; 8) a transition plan including communications to employees and customers; and 9) a detailed tiered roll out plan. Key milestones for the Companies' long-term plan are set forth in greater detail in

the Companies' Plan. A more detailed and specific timeline for deployment will be provided in the Companies' supplemental Deployment Plan that will be submitted to the Commission within 24 months of this Plan being approved (currently anticipated to be on or about April 1, 2012).

B. Costs and Smart Meter Technologies Charge Rider:

Costs

27. At the present time, the Companies' estimate the total cost to deploy smart meters throughout the three company service territories, in accordance with the requirements in Act 129, to be approximately $330 million to $400 million, not including operation and maintenance expenses. Pursuant to the Commission's direction in its Implementation Order (Implementation Order, at 31), and due to the fact that the Companies are not able to provide definitive cost data at this time, the Companies request permission, as part of the Commission's approval of the Plan, to file such cost data at a later time. This initial cost estimate will be updated after more specific data is gathered during the studies, evaluations and assessments that will be performed during the Assessment Period. Specifically, the Companies will provide this cost data in its supplemental Deployment Plan filing that will be submitted to the Commission after the Assessment Period, on or about April 1, 2012.

28. The present, initial estimate of the costs expected to be incurred during the Assessment Period is approximately $29.5 million. These reasonable and prudent costs include test lab costs, equipment costs, computer hardware and software, professional consulting fees and other labor and expenses. The Companies propose to allocate the costs of the Assessment Period based on the existing metered customers of each company. The Companies are requesting approval to recover these Assessment Period costs through the cost recovery mechanism described herein.

Cost Recovery

29. Currently, absent a cost recovery rider, the FirstEnergy Companies do not have a mechanism available to recover the costs associated with developing and implementing a smart meter plan. Pursuant to Act 129 (66 Pa.C.S. § 2807(f)(7)), the Companies are proposing to recover on a full and current basis from customers, through a reconcilable adjustment clause under 66 Pa. C.S. §1307, all reasonable and prudent costs incurred in the development, provision and management of the Plan.

30. In this Joint Petition, and as part of the Plan filing, the Companies are seeking approval to establish proposed tariff riders (i.e., Smart Meter Technologies Charge Rider) as a mechanism to recover the costs incurred during the planning and implementation of the Plan on a current cost basis, as budgeted by each of the Companies and allocated based on the existing metered customers of each company. The proposed tariff riders are described in detail in the testimony of Mr. Parrish and attached as testimony exhibits marked as Met-Ed/Penelec/Penn Power Exhibits RIP-1 through RIP-3.

31. The proposed cost-recovery tariff mechanism included in the Companies' Plan, and in accordance with 66 Pa. C.S. §1307, will ensure full and current recovery of prudent and reasonable costs to fund the development, provision and management of the Plan.

32. The rates resulting from the Smart Meter Technologies Charge Riders ("SMT-C") will be expressed as a monthly customer charge and will be billed on that basis. The SMT-C rates will be calculated and stated separately for the residential, commercial, and industrial customer classes.

33. The Companies are proposing that the SMT-C for each company become effective for service rendered on or after April 1, 2010. The initial rate will include

administrative costs incurred to date plus the budget estimate for the initial 12 months of costs associated with the Assessment Period. Costs will be allocated to the Companies and to each customer class based on the number of metered customers.

34. The Companies are not proposing specific SMT-C rates at this time. The proposed tariff riders have placeholders for the applicable residential, commercial and industrial SMT-C rates that would be effective April 1, 2010, through March 31, 2011. These rates will not be calculated until after the Companies' Plan and costs associated with the Plan, including the recovery of the currently estimated $29.5 million that will be incurred during the Assessment Period, have been reviewed and approved by the Commission. The computation of the Companies' initial SMT-C rates and tariff supplements to be effective April 1, 2010, through March 31, 2011, will be filed within 30 days of the Commission's final order approving the Companies' Plan.

35. Pursuant to the tariff rider, a Smart Meter Technologies Charge ("SMT-C") shall be applied as a monthly customer charge during a billing month to customers served under the tariff. Some of the highlights of the rider include:

- The SMT-C rates shall be calculated separately for each customer class according to the provisions of the rider;
- The SMT-C rates shall be effective April 1, 2010;
- The SMT-C rates shall be filed with the Commission by March 1 of each year and shall become effective the following April 1, and shall remain in effect for a period of one-year, unless revised on an interim basis subject to the approval of the Commission;

- The Companies may request Commission approval of interim revisions to the SMT-C rates to become effective 30 days from the date of filing, if it is determined that not changing the SMT-C rate would result in a material over-or-under-collection of all recoverable costs during the SMT-C Computational Year;
- The Companies shall file an annual report of collections under the rider within 30 days following the conclusion of each SMT-C reconciliation year; and
- Application of the SMT-C rates shall be subject to annual review and audit by the Commission.

36. To recover the capital costs associated with the future deployment of smart meter technologies, the Companies are proposing that the capital structure be based on Met-Ed's and Penelec's normalized capital structures of 51% long-term and 49% common equity as determined in Met-Ed's and Penelec's most recent distribution base rate case proceeding at Docket Nos. R-00061366 and R-00061367. These capital ratios are also proposed to be applicable to Penn Power. The Companies are proposing that a common equity rate of 10.1% representing the allowed return on common equity as specified in the proceedings cited above be utilized in the weighted average monthly return on smart meter related capital expenditures.

37. The Companies are proposing that the existing meters recovered in the Companies' current distribution rates that become obsolete due to replacements by smart meters would continue to be depreciated over the remaining lives per the respective Company's Annual Depreciation Reports as filed with and approved by the Commission pursuant to 52 Pa. Code §§ 73.1 -73.9. As part of subsequent distribution base rate case proceedings before the

Commission, each Company will explore the need for accelerated depreciation of the obsolete meters replaced under the Companies' Plan.

38. Following Commission approval, the Companies request that the Commission authorize the Companies to implement the proposed tariff riders for each Company to become effective on April 1, 2010, and to incorporate the respective riders into the retail electric service tariffs of Met-Ed, Penelec and Penn Power.

C. Procedural Timeline:

39. In accordance with the Commission's Implementation Order, the Companies anticipate the following procedural timeline to address the plan:

The Companies file Smart Meter Procurement and Installation Plan	August 14, 2009
Comments of Interested Parties	September 25, 2009
Technical Conference(s)	October 2009
Evidentiary Hearing(s), if necessary	November 2009
ALJ Initial Decision	By January 29, 2010
Exceptions	20 days after issuance of Initial Decision
Reply Exceptions	10 days after Exceptions are due

D. Miscellaneous:

40. As demonstrated in the attached Plan and testimony, the Companies' Plan is consistent with Act 129 and the Commission's Implementation Order and is in the public interest.

41. The Companies' have developed a Plan that will best meet the needs, demands and challenges unique to each of the Companies' service territories, while, at the same time, operate in a manner that is both cost and time effective.

42. The Companies' Plan will implement a deployment and installation schedule that best balances the overall efficiency and timeliness of the smart meter installations with the costs incurred.

43. The Joint Petitioner's attorneys in this matter are identified below. All correspondence, notices, documents, orders or other communications with respect to the above-captioned proceedings should be sent to Kathy J. Kolich, with a copy (electronic if possible) to Bradley A. Bingaman at the addresses provided below.

III. CONCLUSION

WHEREFORE, the Companies respectfully request that the Commission issue an Order approving the attached Smart Meter Technology Procurement and Installation Plan submitted by Met-Ed, Penelec and Penn Power, and authorizing Met-Ed, Penelec and Penn Power to implement their respective Smart Meter Technologies Charge Riders and Smart Meter Technology rates, effective on April 1, 2010.

Respectfully submitted,

Dated: August 14, 2009

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company and Pennsylvania Power Company for Approval of Smart Meter Technology Procurement and Installation Plan	:	**Docket No. M-2009-2123950**

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true and correct copy of the foregoing document upon the individuals listed below, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

Service via Personal Delivery, as follows:

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