FILE

23

FirstEnergy

RECEIVED-DOCKETING DIV

2009 JUN -2 AM 10:57

PUCO

76 South Main Street
Akron, Ohio 44308

Kathy J. Kolich
Senior Attorney

330-384-4580
Fax: 330-384-3875

Via Federal Express
and Facsimile (614-466-0313)

June 1, 2009

Ms. Renee J. Jenkins
Director, Administration Department
Secretary to the Commission
Docketing Division
The Public Utilities Commission of Ohio
180 East Broad Street
Columbus, OH 43215-3793

Dear Ms. Jenkins:

Re: Report of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company – AMI and Smart/Modern Grid Technologies -- Case No. 07-646-EL-UNC

Enclosed for filing, please find the original and fifteen (15) copies of the above-referenced document. Please file the enclosed Report, time-stamping the two extras and returning them to the undersigned in the enclosed envelope.

Thank you for your assistance in this matter. Please contact me if you have any questions concerning this matter.

Very truly yours,

Kathy J Kolich

kag
Enclosures

cc: Parties of Record

This is to certify that the images appearing are an accurate and complete reproduction of a case file document delivered in the regular course of business
Technician AM Date Processed 6/2/09

67127 v1

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**

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

June 1, 2009

Kathy J. Kolich (0038855)
Senior Attorney
FirstEnergy Service Company
76 South Main Street
Akron, Ohio 44308
Phone: 330-384-4580
Fax: 330-384-3875

On behalf of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company

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

Table of Contents

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

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") submit their report on Advanced Metering Infrastructure ("AMI") and Smart Grid Technology.[1]

In its Order, the Commission directed the Companies to 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." (Order, p. 45.) The study was to be submitted by June 1, 2009. (Id.) In response to the Companies' request for an extension of this deadline so as to allow them to obtain the results of certain studies and plans in progress, the Commission's Entry directed the Companies to submit a preliminary study by June 1, 2009, with a supplement to this study filed with the Commission by August 14, 2009. The Commission further directed that the preliminary study should include "information such as which potential advanced metering technology investments would be studied, how open system architecture would be addressed in the study, which 'other' cost effective modern/smart grid applications may be included in the study, how the cost benefit analysis would be conducted and what the overall methodology of the study would be." (Entry, p. 4.) Each of these issues is addressed below.

II. Background

FirstEnergy Corp. ("FirstEnergy") is a diversified energy company headquartered in Akron, Ohio. In addition to the Companies, FirstEnergy owns three regulated electric utilities in Pennsylvania (Metropolitan Edison Company, Pennsylvania Electric Company and Pennsylvania Power Company) and Jersey Central Power and Light Company in New Jersey. These seven electric utility operating companies comprise the nation's fifth largest investor-owned electric system, based on 4.5 million customers served within a 36,100 square-mile area of Ohio, Pennsylvania and New Jersey. A breakdown for each of the Ohio Companies as of December, 2008 is set forth below:

---

[1] For purposes of this report, the terms "Smart Grid," "Modern Grid" and "AMI" or "Smart Metering" have distinct meanings. "Smart Grid" is defined as the incorporation of digital technologies and 2-way communication that facilitates improved situational awareness of grid assets, automates reliability and efficiency procedures, and enhances customer energy management, while "Modern Grid" is defined as foundational distribution system standardization and modernization actions necessary to realize the full benefits of Smart Grid. "AMI" or "Smart Metering" refers to a single functional aspect of the Smart Grid that includes a two way system of providing price and/or control signals and measuring and communicating time sensitive usage and/or demand.

	Ohio Edison	CEI	Toledo Edison	Total
Residential Cust.	924,740	667,604	273,631	1,865,975
Commercial Cust.	112,613	84,909	37,603	235,125
Indust. Cust.	905	2,245	208	3,358
Totals	1,038,258	754,758	311,442	2,104,458
Square Miles	5,763	1,554	2,124	9,441
Meters	1,049,070	770,563	311,106	2,130,739

Because FirstEnergy serves customers in Ohio, Pennsylvania and New Jersey through an integrated transmission and distribution system, any decisions surrounding AMI and Smart Grid technology must be made in a manner that produces a cost effective solution that best fits this system, consistent with the laws and regulations in three states.

Of the three states in which FirstEnergy provides service, only Pennsylvania has a statutory mandate to implement a Smart Meter plan. This mandate is set forth in H.B. 2200 (which is commonly referred to as Act 129, set forth in 2008, Oct. 15, P.L. 1592, No. 129 §2). Act 129 requires all major Pennsylvania electric distribution companies to present by August 14, 2009 to the Pennsylvania Public Utility Commission ("PPUC") a smart meter technology procurement and implementation plan for deployment of smart meter technology in accordance with a depreciation schedule not to exceed fifteen years. As a result of this mandate much of FirstEnergy's recent analysis and planning surrounding AMI technology has been focused around this Pennsylvania mandate and timeline.

III. FirstEnergy's Guiding Principles Surrounding Smart/Modern Grid and AMI

FirstEnergy has created a general plan to assess Smart/Modern Grid and AMI technologies. Underlying this plan are the following principles:

- A full scale deployment of Smart/Modern Grid and/or AMI requires a significant capital investment. Therefore, FirstEnergy is approaching the decision on whether and how to proceed with such projects in the same manner as it would for any major capital intensive project, including the performance of due diligence so as to have the most current and complete information available upon which to base its business decisions, with specific focus on net overall benefits available to customers, who, after all, are responsible for paying for these investments and programs.

- Because AMI is a single component of an overall Smart Grid, certain upgrades to the Companies' existing infrastructure such as its delivery, communication, billing and computer systems, are necessary before effective implementation of AMI can be accomplished.

- AMI and Smart Grid technologies are in their infancy. No established standards or protocols currently exist and it is expected that there will be federal policy and extensive industry wide standards developed in these areas in the near future.[2] Moreover, because of the fact that this technology is in its infancy and AMI/Smart Grid is a cornerstone in the President's national energy policy, it is expected that the functionality of this technology will improve over a relatively short period of time. Based on the current status of this technology, FirstEnergy does not believe that it is in the best interest of its customers to be early "out of the blocks" on a comprehensive implementation plan, instead taking a measured approach to evaluate and test various AMI/Smart Grid technologies. The last thing the Companies desire is to have selected a technology that is later abandoned in favor of another.[3] Such a decision would needlessly increase costs and delay implementation of the appropriate technology.

- Based on the preliminary cost-benefit analyses that are more fully discussed later in this report, the Companies believe that the significant costs associated with a large scale deployment of AMI or Smart/Modern Grid substantially outweigh benefits available from such deployment at this time, especially given the current state of the economy.

- The government is providing stimulus funding for certain projects in the Smart/Modern Grid and AMI areas. The Companies are actively pursuing such funding for selected projects, the details of which will be the subject of a separate filing with the Commission on or before July 1, 2009. (Entry, p. 4.) Should the Companies be successful in their bid for such funds and/or the Commission allows full and current recovery of costs incurred in these areas, the Companies may choose to accelerate certain aspects of their AMI/Smart Grid plans in Ohio.

- Notwithstanding the current costs and the state of the technology, FirstEnergy believes that both will improve over a relatively short period of time. Accordingly, it is proceeding with various studies in preparation for a full or partial deployment of AMI/Smart Grid should conditions warrant. These various studies, the results of which are intended to apply as much as possible throughout all three states in which FirstEnergy serves, are the subject of this report.

---

[2] In an April 8, 2009 press release, EPRI announced that it was selected by the National Institute of Standards and Technology (NIST), an agency of the Department of Commerce, to facilitate the development of a smart grid interoperability roadmap for the electricity sector which, according to EPRI "will be a major step toward harmonizing interoperability standards for the Smart Grid. It is intended to ensure that different vendors' products will work together effectively, and that consensus standards should drive down the cost of components and systems, reduce the risk of early obsolescence and spur innovation."

[3] To borrow an example from the media sector, the Companies seek to avoid selecting a "Betamax" technology if the industry should migrate to a "VHS" technology.

IV. Internal Corporate Structure

FirstEnergy has taken steps to focus on AMI and Smart/Modern Grid technology, as well as energy efficiency, demand response and alternative energy resources. First, it has modified its operating structure, creating a separate department that is charged with adopting and implementing cost effective solutions to improve customer service and operational efficiency in the areas of conservation, regulated services and demand side management, which under FirstEnergy's structure includes investment in and optimization of Smart Grid technology. In order to incorporate future customer needs into overall customer service, the vice president responsible for customer service is now also overseeing this new department.

Second, in 2007, it began a corporate-level initiative called "IGCA" (Integrated Grid Communications and Automation), leveraging approximately 20 individuals representing a broad cross section of the FirstEnergy organization[4], and charging them with the development of FirstEnergy's approach for analyzing, and, if justified, adopting Smart Grid technologies. Its mission is to (i) leverage technology to proactively minimize the impact of, and with a conceptual long term vision to eliminate, all customer service interruptions associated with unplanned energy delivery equipment outages; (ii) to plan, maintain and operate the system to achieve optimal levels of performance; and (iii) expand cost effective customer service offerings through AMI. This group has been charged with (i) setting the Smart/Modern Grid and AMI vision and strategy; (ii) conducting Smart/Modern Grid and AMI studies, pilots and projects; (iii) approving, monitoring and evaluating Smart/Modern Grid and AMI studies, pilots and projects; (iv) maintaining when possible, a consistent technology among the seven service territories served by FirstEnergy utilities; (v) identifying and addressing gaps in the comprehensive strategy, developing and revising it as necessary; and (vi) clearly understanding the costs and benefits and associated customer impacts resulting from deployment of alternative technologies.

In conjunction with the Electric Power Research Institute ("EPRI"), the IGCA team developed an extensive plan ("Roadmap") that highlights key "use cases"[5], technology requirements, and initial milestone decision points for the process as it unfolds over the next ten years.[6] Through the development of this Roadmap, FirstEnergy identified numerous studies and/or pilots, referred to as "initiatives," that it has performed or may perform to gain a better understanding of issues such as the functionality of various equipment, costs and interfacing requirements associated with the applicable aspect of

---

[4] In addition to the executive sponsors, all vice presidents, a steering committee has been established, representing Energy Delivery (T&D operations), Planning, Maintenance, Operations, Asset Management, IT, New Technologies, Energy Efficiency and Customer Service, which oversees IGCA strategic direction and activities.

[5] A "use case" is a process used to establish the business and technical requirements of an application.

[6] Due to confidentiality and copyright issues, this plan is not available for public release. Instead, a summary discussion is set forth later in this report.

Smart/Modern Grid and AMI being studied. These initiatives are discussed in Section V(A) below.

FirstEnergy also actively participates in rulemakings, workshops and research in all of the aforementioned areas, helping to shape the future of the next generation of electric service through open architecture and uniform industry standards. For example, in mid-2008, it hosted a Smart Grid Forum in conjunction with EPRI to share roadmap processes and to create an opportunity for utilities to collectively address common smart grid interests and requirements and to promote the standards and protocols of Smart Grid technology. Additionally, it is participating in various collaborative activities, including (i) the on-going EPRI Intelligrid research program to advance smart grid development and application of the use case methodology that started several years ago; (ii) the recently launched NIST/EPRI Smart Grid Interim Roadmap development workshop; and (iii) the on-going Common Information Model ("CIM") workshop, in which participants work to develop new industry standards and protocols for standardizing information exchange on, and interoperability of, the electric system. Moreover, FirstEnergy has participated for a number of years in EPRI's development and evaluation of advanced sensor technologies for transmission lines, substations and distribution systems, with a number of ongoing demonstrations installed on FirstEnergy transmission and distribution facilities.

In addition to the foregoing activities, FirstEnergy is actively participating in various research projects involving, among other things, distributed energy resource ("DER"), energy storage and plug-in hybrid electric vehicle ("PHEV") technologies. The DER studies, which are being done in conjunction with EPRI, involve industry efforts to advance the integration of distributed energy resources, such as direct load control and control of third party-owned generation, into the grid and to develop applications and interfaces for operation. These efforts evaluate the use of DER alternatives to conventional grid solutions for transmission and peak capacity additions. A major pilot in this area is discussed in Section V(D) below. The energy storage studies focus on the development of storage technology applications. FirstEnergy is currently working with vendors to define energy storage specifications and is collaborating with EPRI and Grid Apps, a DOE supported industry consortia, with energy storage demonstrations at FirstEnergy facilities. The PHEV studies, which are being done with a major car manufacturer, focus on the evaluation of the environmental benefits, assessment of distribution impacts and the development, testing and deployment of PHEVs. FirstEnergy is also supporting studies of the regional economic benefits to the greater Cleveland area and a transportation electrification roadmap.

FirstEnergy's rate department is also working with interested parties in Ohio and other states to develop critical peak, time of use, real time and/or other time sensitive pricing mechanisms. These efforts in Ohio are the subject of a separate filing in Docket No. 08-935-EL-SSO, being made concurrent with the filing of this report.

V. FirstEnergy Smart/Modern Grid and AMI Activities to Date

Since making a presentation at a Commission workshop on December 13, 2007 on its AMI Cost-Benefit Analysis under the McKinsey Model, FirstEnergy has continued or commenced several distinct studies involving Smart/Modern Grid and AMI technology: (1) The Roadmap and related initiatives discussed above; (2) Demand Response Programs; (3) Open Architecture Study; (4) an Integrated Distributed Energy Resources management study; (5) AMI cost-benefit studies; and (6) a large scale AMI deployment plan. Each is discussed below.

A. The Roadmap

As indicated above, in conjunction with EPRI, the IGCA team developed a plan to investigate various aspects of Smart Grid technology, including AMI. A vision and milestone summary of this Roadmap ("Summary") is attached to this report as Exhibit A. It should be noted that the Roadmap, and thus the Summary, is a dynamic document that changes based on various conditions, including the state of the economy, the state of technology and the ability to timely recover all costs associated with deployment. Its purpose is not to set forth a time line in which each task will be completed. Rather, its predominant purpose is to show the critical path to follow and the estimated time periods for completion.

The Roadmap establishes three distinct phases in the process of establishing Smart Grid: (i) Acquire; (ii) Analyze; and (iii) Automate, through four stages of delivery: (a) Transmission; (b) Substation; (c) Distribution; and (d) Customer Premises and provides guidance for the development of system infrastructure requirements and steps necessary to accomplish the vision. It incorporates pilots that FirstEnergy had in progress and identifies new pilots that it may implement in order to develop a Smart Grid.

Smart Grid Technology – Acquire Grid Information

The Smart Grid operates using information acquired from various sensors through the system from the generator to the customer premises. While some of these sensors already exist, a significant number of others, as well as new sensor technologies, will need to be added to provide information at additional locations. The additional sensors will likely include more sophisticated customer meters, fault detection, location and isolation devices and system condition indicators. The information collected by these sensors must be communicated to the right place for decision-making (automatic or otherwise.) Hence another key element in the acquisition of information is the communication architecture and systems. In fact, it is the advancement in communication technology that has provided the impetus for Smart Grid, enabling rapid collection of information through medias such as cellular radio, power line carrier, fiber optic cables, mesh RF, WiFi, and Wi-Max at rapidly declining costs and increased capacity.

Smart Grid Technology – Analyze Grid Information

The actual analysis will include load flow modeling of feeder and substation buses, allowing for a myriad of contingency analyses and possible reconfigurations of the sub-grid to respond to faults, loads, reactive power and distributed generation. It is this analytical capability that brings "intelligence" to the Smart Grid, implementing automated decision making that will allow the grid to self-heal when necessary, optimize utilization, and extend asset life and/or prevent failure by sensing conditions leading to imminent failure and communicating them just in time.

Although it is sometimes overlooked in the high-level discussions around Smart Grid, the analysis function is appropriate to single out and study separately, as it will often involve separate software and different vendors. There is a key architectural decision to be made surrounding the size of the analytical area. The current thinking is that if Smart Grid involves the full range of sensors and controls, the system would have to be broken up into manageable sub-grids that would operate relatively autonomously while being coordinated at an aggregate level with the overall network.

Smart Grid – Automate Grid Operations

The information that is gathered and analyzed by the Smart Grid must lead to decisions that improve the operation of the grid. Therefore, the final step is automation. To accomplish this step, the grid must have numerous devices capable of changing the flow of electricity (including reactive power) in response to changing conditions. Typically envisioned in this scheme is an automated switch that opens or closes as needed to reconfigure a feeder or bus, as well as capacitors, voltage regulators, meters, and appliance and distributed generation controllers at the end use points.

Certain decisions must be made prior to the automation phase. For example, the appropriate data integration and communication architecture must be determined. Clearly, the architecture of the Smart Grid has many options and the industry has not yet determined which is the most appropriate. Indeed, it is quite likely that various systems will be used in various circumstances, suggesting that some type of hybrid architecture may be optimal. Since the system cannot be rolled out overnight, various aspects of the grid may have to operate without "smart" capabilities for a period of time.

These principles form the basis for the Roadmap, which was developed in several distinct steps. First, the IGCA group created the following objectives in the following areas, focusing first on upgrading the overall transmission and distribution system and then addressing remote capabilities with customers:

- *Digital remote access to all critical transmission substations*: Establish a digital communications link to each critical transmission substation that allows communication to multiple substation devices on the same physical communications link.
- *Transmission and distribution line network architecture standard*: Establish a standard electrical and communications architecture and equipment options for specific transmission and distribution line measurement and automation requirements.
- *Substation network architecture standard*: Establish a standard electrical and communications architecture and equipment options for specific transmission and distribution substation requirements.
- *Distributed resource management standard*: Establish a standard electrical and communications architecture and operating practices for the management of distributed grid resources.
- *Anticipate and locate faults on the transmission system*: Establish the ability to proactively identify faults on the transmission system and inform operating units of the fault location(s).
- *Monitoring power quality*: Establish the ability to measure power quality parameters in real time and provide summary individual displays and reports to appropriate FirstEnergy decision makers.
- *Automate real-time operational decisions*: Provide grid intelligence and decision making capability to automatically perform necessary switching and reconfiguration actions to mitigate or eliminate system disturbances.
- *Useful communications throughout the FirstEnergy system*: Establish addressable real-time communications for all active electrical and communications grid elements on a common communications infrastructure.
- *Asset health and capability analytics*: Acquire and analyze grid asset information and provide real-time and summary reports/displays that monitor and evaluate asset conditions and capabilities.
- *Anticipate and locate faults on the distribution system*: Establish the abilty to proactively identify faults on the distribution system and inform operating units of the fault location(s).
- *Remote access to all FirstEnergy customers*: Establish real-time communications links to all FirstEnergy customers.
- *Intelligent grid automation*: Establish the necessary electrical and communications grid platform that allows the grid to become self healing and self analyzing, providing necessary feedback to FirstEnergy operating and support groups for continual review and planning purposes.

From the above objectives, the IGCA group developed a list of use cases, which defined FirstEnergy's significant AMI/Smart Grid requirements and functionality. The initial set of use cases includes:

1) Transmission Fault Location
2) Phasor Measurement Unit Data Collection and Management

3) System Wide Power Quality Monitoring, Integration with Asset Management
4) Asset Condition Monitoring
5) Real Time State Estimation
6) Distribution Fault Location
7) Distribution System Management with automated reconfiguration
8) Distribution State Estimation (performance optimization)
9) Web-based Energy Use Information for Customers
10) Real Time pricing information for Customers
11) Monitoring and Management of Distributed Resources

These use cases are not meant to identify and describe every application or technology requirement but were chosen because of their importance to the impact on the required systems needed to achieve the end state.

Based on these use cases, the IGCA developed a list of initiatives that it either has performed or intends to perform in order to gain a better understanding in each of the above areas. This list is periodically updated, adjusting it based on information gained through the work performed in the prior phase. These initiatives, which represent various pilots and projects, are considered to be proprietary to the Company and are not for public dissemination.

Generally, these initiatives are included in six broad categories: (i) Fault Location; (ii) Equipment Monitoring; (iii) Distribution Automation; (iv) Data Integration; (v) Communications; and (vi) Energy Efficiency and Demand Response. Through these initiatives, FirstEnergy will obtain information on various aspects of AMI and Smart Grid, including the functionality of equipment in each of the aforementioned areas, data collection and analysis, integration with new and legacy systems, 2-way communication technology, in-home technology for customer use, and automation on the grid.

Before FirstEnergy adopts any new technology or process being studied in the initiatives, it must be validated through a Stage Gate Process, which is flowcharted on attached Exhibit B. This process involves six stages. Stage 1 is the discovery stage in which ideas are generated and research is performed. Stage 2 is the Scoping stage. Assuming that the project in question meets the use case requirements, FirstEnergy performs market research, establishes clear project objectives, and evaluates potential technologies. If the project meets the necessary criteria, it moves to Stage 3, where the Business Case is developed, including, among other things, assessments of operational benefits and risk, costs and training. If approved by management, the project moves to Stage 4, the Bench Test. In this stage a test plan is developed, evaluation criteria are established, and integration issues are addressed. Stage 5 involves a field test. In this stage, site selection is made, test plans are developed, schedules and costs are established, and training and system integration is analyzed. And finally, if the project passes the field test, it advances to Stage 6, which is where technology choices are narrowed and implementation plans are created. Because of the interdependence on the results of the other AMI/Smart Grid

initiatives in progress or to be implemented, as well as the overall state of technology in these areas, FirstEnergy has not yet selected specific technologies.

B. Ohio Demand Response Program

- In an effort to gain a better understanding of customer's acceptance of load control devices and how they can be integrated into the Companies' distribution system, FirstEnergy, in conjunction with the Ohio Office of Consumers' Counsel, launched a Programmable Thermostat ("PT") Program in Ohio. This program, which started in the fall of 2007, offers eligible customers a free programmable thermostat that can be used to achieve year-round energy savings. As of May 2009, over 11,000 customers are participating. The current program utilizes a two-way paging communications system to achieve direct load control of summer residential air conditioning.[7] Through the thermostats' two-way communication platform, FirstEnergy is able to access verifiable real-time information associated with customer behavior, including:

    - The number of customers participating in a load curtailment event,
    - The length of time of a customer's participation in a load curtailment event,
    - The number of customers opting out of a load curtailment event, and
    - The number of customers utilizing the programming features of the thermostat.

The customers also have the ability to program the thermostat remotely through an internet website.

Based on the results achieved over the past two years, the Companies have determined that customers are interested in controlling their load. However, given that the thermostats are provided at no cost to the customer, it is unclear whether they are willing to incur costs to do so. The Companies intend to further pursue this issue through market research.

C. Open Architecture Study

In conjunction with EPRI and International Business Machines, Inc. ("IBM"), FirstEnergy is studying the communication and data requirements of Smart Grid/AMI, which also addresses open architecture issues. IBM is in the process of analyzing and developing an optimum architecture, which will support deployment planning and system development. The deployed infrastructure will take data collected from the Smart Grid applications and convert it into useful data that improves reliability and efficiency, and provides customers with more information so as to allow them to better manage their electric costs and consumption.

[7] The Companies intend to expand this project, using a new prototype thermostat that includes a zigbee chip which can be used to develop a mesh network to control other devices in the home. In addition, the prototype thermostat communicates over a broadband internet system, which will add more flexibility and capability to the program, which in turn should lead to more participants.

The key deliverables from this plan will include:

- A data architecture/data warehouse strategy;
- An optimal supporting communications architecture which defines communications and security requirements;
- A high level cost analysis for full implementation;
- Risk assessments; and
- Open architecture and uniform industry standards assessment

It is expected, but not guaranteed, that the results of this study will be available in early August. If available, the Companies will include a summary of these results in their supplemental report that will be submitted on August 14, 2009.

D. Integrated Distributed Energy Resource Management Study

In conjunction with EPRI, FirstEnergy, in late 2008, commenced a pilot in Jersey Central Power and Light Company's service territory in which they will integrate distributed energy resources (such as direct load control, energy storage and control of third party-owned distributed generation) into an electric distribution utility's distribution system operations. It also will include other technologies such as advanced sensors for grid monitoring and control and an integrated control platform to monitor the available manageable customer load to initiate load shed events on targeted circuits. This pilot is one of three regional EPRI demonstrations selected to integrate distributed power generation, energy storage and demand response technologies into grid operations. It will focus on peak load reduction activities during the summer of 2009, with preliminary results available by the end of the summer. The pilot, which has been approved by the New Jersey Board of Public Utilities ("BPU") targets approximately 3500 residential customers in high growth areas of New Jersey with controllable load, and represents approximately 8 megawatts. A request to expand this pilot is currently pending before the BPU for approval. If approved, the controllable load would be expanded from 8 to 15 megawatts, and 3 megawatts and 5 megawatts of energy storage and permanent peak load shifts, respectively, would be introduced. The results from this pilot will provide FirstEnergy with important information to support applications of new Smart Grid pilots in other FirstEnergy service territories.

Although there are no results yet available, it is anticipated that they will be provided to the New Jersey Board of Public Utilities late this summer. If available, these results will also be provided to the Commission in the Companies' supplemental report that will be filed on August 14, 2009.

E. AMI Cost-Benefit Analysis

The Companies have performed two separate cost-benefit AMI studies. The first, which was done at the request of the Commission under the McKinsey model, was presented at a Commission sponsored workshop on December 13, 2007. As indicated in this 2007 presentation, AMI costs include more than the cost of the meter. Of the total endpoint

cost, which was then estimated to be approximately $240 per end point, 45% of the cost is attributable to the meter; 20% to network communication; 9% to IT software and integration; 15% to installation; and 11% to project management. (Dec. 13, 2007 Presentation, p. 9.) Using the McKinsey model, the costs outweigh the benefits by approximately $196 million over a seven year deployment period, and $199 million over a four year deployment period. (Id. at 11.)[8]

Inasmuch as the McKinsey model did not factor in societal benefits, the Companies, in conjunction with the other Ohio electric distribution companies, sponsored an EPRI study that focused on the identification and measurement of societal benefits arising from AMI technology. A copy of this report has already been provided to the Commission. Several basic conclusions can be drawn from this report. First, societal benefits accrue primarily as a result of actions undertaken by consumers. Therefore, AMI serves as an enabler, rather than a cause for societal benefits. Second, societal benefits are difficult to measure, requiring subjectivity when calculating the value of many of these benefits. And third, regardless of the amount attributable to the specific societal benefit, the electric distribution utility receives little or no direct cost savings from them, thus still requiring the vast majority of AMI costs to be borne by the customer.

F. Pennsylvania AMI Deployment Project

As previously discussed, FirstEnergy's Pennsylvania electric distribution utilities are required by law to develop and submit to the PPUC by August 14, 2009 a smart meter technology procurement and implementation plan for deployment of smart meter technology throughout their respective service territories in accordance with a depreciation schedule not to exceed 15 years of the PPUC's approval of such plan. The Companies will utilize this process to 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 that will be applied to an Ohio AMI/Smart Grid plan as appropriate.

The following are several of the key areas that Pennsylvania electric distribution companies are to consider:[9]

- General implementation plan that provides for full implementation of smart meters in accordance with a depreciation schedule not to exceed 15 years
- Plan for early installation of smart meters upon request and in new construction in advance of system-wide deployment
- Methodology for cost allocation among the various customer classes

[8] A more recent review of published detailed business cases, especially in California and Texas, had an average deployment cost of $250 per meter. This average, if used by the Companies, would represent a capital investment of approximately $528 million, thus slightly increasing the costs and the resultant deficits.

[9] The Commission solicited comments on its requirements for the plan, which have yet to be formally addressed. Therefore, all of these plan requirements are still subject to change.

- A proposed cost recovery mechanism
- Interfacing issues between AMI and other smart grid applications, Home Area Network (HAN) technology and other potential "add ons."
- Cost analyses
- Technology assessments

Inasmuch as the FirstEnergy Pennsylvania smart meter plan is still being developed and is not yet public, a copy of the final plan will be provided to this Commission in its supplemental report that will be filed on August 14, 2009.

While the Companies intend to gain much of their understanding of AMI technology and related issues from the implementation of the Pennsylvania AMI plan, they anticipate performing certain AMI related activities in Ohio, provided that they obtain federal funding and/or full and current recovery of the costs incurred. More details surrounding potential AMI/Smart Grid activities in Ohio will be provided in the Companies' August 14, 2009 supplemental report.

VI. Next Steps

Long term, FirstEnergy intends to continue to follow the Roadmap and pursue the related initiatives as conditions warrant. Between the date of this filing and August 14, 2009, the Companies intend to:

- Continue to participate in research, rulemakings and workshops that address AMI and Smart/Modern Grid technologies and protocols.
- Continue with the completion and implementation of its Pennsylvania AMI plan that will be filed on August 14, 2009.
- Continue to pursue government funding opportunities, which will be more fully addressed in a separate filing that will be made with this Commission on or before July 1, 2009.
- Continue to work with interested parties to further develop critical peak, time of use and other time sensitive pricing products, which are more fully discussed in a separate filing being filed in Docket No. 08-935-EL-SSO concurrent with this report.

Future activities related to AMI and Smart Grid beyond August 14, 2009 will be included in the Companies August 14, 2009 supplemental report.

VII. Summary

In sum, the Companies, as part of an enterprise solution for the entire FirstEnergy transmission and distribution system, have embarked upon an AMI/Smart Grid strategy that takes a measured approach, undertaking various studies, pilots and projects throughout its three state service territory so as to gather the information necessary to make well-informed business decisions. It intends to continue to perform the initiatives derived from the Roadmap as conditions warrant, perhaps accelerating certain aspects of

this plan should government funding and/or full and timely recovery of costs be made available. While the various studies are being performed in individual states within FirstEnergy's three state service territory, FirstEnergy will utilize the information gained from each study and apply it to AMI/Smart Grid strategies in each of the three states as appropriate.

In response to each of the Commission's specific questions, FirstEnergy intends to implement a large scale AMI deployment through its Pennsylvania Smart Meter Project. Future AMI plans in Ohio will be addressed in the Companies' August 14, 2009 supplemental report. Potential advanced metering technology investments and other Smart Grid applications involve those being studied in the various initiatives, as identified in the use cases, as well as through the Demand Response program launched in Ohio. Open system architecture is being addressed in both the IBM/EPRI study and within the business case contemplated in the Pennsylvania Smart Meter deployment plan, as well as through FirstEnergy's participation in various workshops, rulemakings and research projects. The Companies have 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. Other cost analyses are part of the various studies discussed above that are in progress.

Having submitted this report, the Companies would be pleased to meet with Commissioners or Commission Staff should they have any questions. Alternatively, the Companies will be prepared to address questions surrounding this preliminary report during the June 15, 2009 technical conference.

Respectfully submitted,

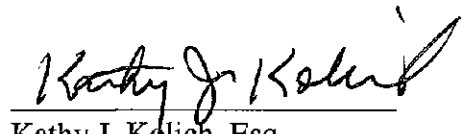
John E. Paganie /KSK

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

June 1, 2009

CERTIFICATE OF SERVICE

THIS IS TO CERTIFY that a copy of the Preliminary Report of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company on AMI and Smart/Modern Grid Technology was served this 1st day of June by electronic mail upon the parties listed below who are included on the Commission's mailing list titled SMARTMETERING@LISTS.PUC.STATE.OH.US.



Kathy J. Kolich, Esq.

mark.shanahan@AQDA.STATE.OH.US
bob.hearn@ARCADIANNETWORKS.COM
jeff.tolnar@BPLGLOBAL.COM
cparsons@CANNONTECH.COM
scott@CNT.ORG
astar@CNTENERGY.ORG
dave.mulder@CURRENTGROUP.COM
jbolin@CURRENTGROUP.COM
JGibson@CURRENTGROUP.COM
jeff.westhoven@DAS.STATE.OH.US
bwarden@ECHELON.COM
mpieniazek@ECSNY.COM
ptyno@ECSNY.COM
erich@ENEREX.COM
bperlman@ENERNOC.COM
kschisler@ENERNOC.COM
shussam@ENERNOC.COM
waligorskij@firstenergycorp.com
Frank.Hoss@GE.COM
Mark.Hura@GE.COM
Thomas.Zarbaugh@GE.COM
mzsmith@GRIDPOINT.COM
dan.pfeiffer@ITRON.COM
Rajan.Kaul@ITRON.COM
dan.johnson@PUC.STATE.OH.US
dan.shields@PUC.STATE.OH.US
john.williams@PUC.STATE.OH.US
dkearns@SANDC.COM
greg.harrington@SENSUS.COM
john.sotak@SENSUS.COM
russ.hamilton@SENSUS.COM

chickman@SITECONTROLS.COM
jonathan.ziegler@TRILLIANTNETWORKS.COM
scott.mossbrooks@TRILLIANTNETWORKS.COM
BBoyd@TWACS.COM
victor.b.sitton@US.ELSTER.COM
Clark.Pierce@US.LANDISGYR.COM
dan.delurey@WEDGEMERE.COM
bhodges@ZIGBEE.ORG
william.adams@BAILEYCAVALIERI.COM
professional1218@NEO.RR.COM
marmstrong@BRICKER.COM
darnold@OFBF.ORG
jlgallo@AEP.COM
Peter.Baker@PUC.STATE.OH.US
quanetta.batts@PUC.STATE.OH.US
hblake@US.IBM.COM
jmbradbury@DUKE-ENERGY.COM
burkholderj@firstenergycorp.com
tom.byrne@ITRON.COM
rik.cahaan@PUC.STATE.OH.US
mcarboy@SIGNALHILL.COM
jecarr2@AEP.COM
paul.centolella@PUC.STATE.OH.US
jclark@MWNCMH.COM
cleaver@OCC.STATE.OH.US
DCleverdon@PSC.DC.GOV
lcolton@ECHELON.COM
tmcunningham@AEP.COM
MDay@TWACS.COM
kristie.deiuliis@KEMA.COM
sjdias@AEP.COM
lldieck@AEP.COM
mdortch@KRAVITZLLC.COM
ad18@CASE.EDU
maurice.faison@PRACTICALSOLUTIONS.COM
ronnie.fergus@PUC.STATE.OH.US
John.Finnigan@CINERGY.COM
john.finnigan@DUKE-ENERGY.COM
lee.garry@PUC.STATE.OH.US
timfgates@GMAIL.COM
segwayenergy@YAHOO.COM
mworigitonga@HOTMAIL.COM
gonzalez@OCC.STATE.OH.US
Andrew.Grandjean@PUC.STATE.OH.US
sgreene@BPLGLOBAL.NET
mike.gribler@DUKE-ENERGY.COM

cathy.guth@PUC.STATE.OH.US
khaines@KRAVITZLLC.COM
kevin.hall@DPLINC.COM
Kevin.hall.@DPLINC.COM
ahardesty@LSC.STATE.OH.US
haugh@OCC.STATE.OH.US
haydenm@firstenergycorp.com
rmhayes@AEP.COM
cindy.hiles@PUC.STATE.OH.US
david.hodgden@PUC.STATE.OH.US
hotz@OCC.STATE.OH.US
hussingg@FIRSTENERGYCORP.COM
dhyland@COMVERGE.COM
mlino@SASLLP.COM
ioriod@FIRSTENERGYCORP.COM
rajan.kaul@ITRON.COM
rkeen@OUCC.IN.GOV
jill.kocher@PUC.STATE.OH.US
victork@CA-CONSULTING.US
kjkolich@FIRSTENERGYCORP.COM
pmkramarz@AEP.COM
paul.laurent@PUC.STATE.OH.US
Jim.Lemke@CINERGY.COM
Valerie.lemmie@PUC.STATE.OH.US
alopez@QUICKSOLUTIONS.COM
kelly.mabra@PUC.STATE.OH.US
Dick_Martin@SELINC.COM
Donald.mason@PUC.STATE.OH.US
taylor.mattox@PUC.STATE.OH.US
doris.mccarter@PUC.STATE.OH.US
Tamara.McIntosh@DUKE-ENERGY.COM
Will.McNamara@US.KEMA.COM
blmeeks@SBCGLOBAL.NET
jmiller@HORIZONENERGYGROUP.COM
jrmiller@FIRSTENERGYCORP.COM
ted.mitchell@CELLNETHUNT.COM
Thomas.Myers@US.KEMA.COM
SNorton@CPP.ORG
stnourse@AEP.COM
seouellette@firstenergycorp.com
Christina.Panoska@DEVELOPMENT.OHIO.GOV
AParonish@OUCC.IN.GOV
Christine.Pirik@PUC.STATE.OH.US
PMPoli1@AOL.COM
polip@MICHIGAN.GOV
sam@MWNCMH.COM

tuwana.reaves@PUC.STATE.OH.US
dplrdr@AOL.COM
dreinhard@CALFEE.COM
miresnik@AEP.COM
drinebolt@OHIOPARTNERS.ORG
danielripchensky@YAHOO.CA
sromeo@SASLLP.COM
dmroush@AEP.COM
asatchwell@OUCC.IN.GOV
sawmiller@OCC.STATE.OH.US
greg.scheck@PUC.STATE.OH.US
eschlaf@ICC.ILLINOIS.GOV
Jim_Schnegg@SELINC.COM
alan.schriber@PUC.STATE.OH.US
jim.schweitzer@PUC.STATE.OH.US
greta.see@PUC.STATE.OH.US
dona.seger-lawson@DPLINC.COM
Jon.Seubert@AVISTACORP.COM
dashepard@AEP.COM
Daniel.Shields@PUC.STATE.OH.US
klsloneker@AEP.COM
small@OCC.STATE.OH.US
Matthew.Smith@CINERGY.COM
william.d.snow@SPRINT.COM
Alissa.Stephens@DPLINC.COM
lisa.stewart@PUC.STATE.OH.US
Dane.Stinson@BAILEYCAVALIERI.COM
Janet.Stoneking@DEVELOPMENT.OHIO.GOV
janet.stoneking@PUC.STATE.OH.US
strouk@PJM.COM
mariner.taft@PUC.STATE.OH.US
jeffrey.teuscher@DPLINC.COM
theo@THETASQUARED.COM
mary.vance@PUC.STATE.OH.US
jvandonkelaar@EMTEC.ORG
Michael.Vecchi@CELLNETHUNT.COM
kawall@PPLWEB.COM
MarketResearch@PPLWEB.COM
Elizabeth.Watts@DUKE-ENERGY.COM
connie.wilcox@DPLINC.COM
ck@ETHREE.COM

[End of service list]

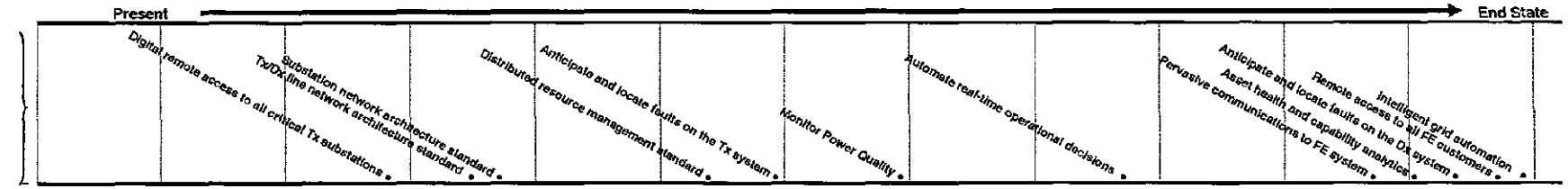
EXHIBIT A
CASE 07-646-EL-UNC

FirstEnergy Integrated Grid Communications and Automation Initiative

Vision and Milestone Summary

The Vision: Energy delivery system automation will enhance and automate the control and restoration and provide real-time situational awareness of the health, configuration and utilization of the transmission, substation and distribution infrastructure which will maximize availability of the energy delivery system to our customers

Mission Statement: Leverage technology to proactively minimize the impact of, and with a long term goal to eliminate, all customer service interruptions associated with unplanned energy delivery equipment outages and to plan, maintain and operate the system to achieve optimal levels of performance and provide information to customers so as to allow them to better manage their electric costs and consumption.



Digital remote access to all critical Tx substations:
The establishment of a digital communications link to each critical transmission substation that allows communications to multiple substation devices on the same physical communications link.
2009 Supporting Initiatives: 1; 4; 5; 6; 10; 11; 12; 14

Anticipate and locate faults on the Tx system:
Establish the ability to proactively identify faults on the transmission system and inform operating units of the fault location(s).

Automate real-time operational decisions:
Provide grid intelligence and decision-making capability to automatically perform necessary switching and reconfiguration actions to mitigate or eliminate system disturbances.
2009 Supporting Initiatives: 1-14

Anticipate and locate faults on the Dx system:
Establish the ability to proactively identify faults on the distribution system and inform operating units of the fault location(s).
2009 Supporting Initiatives: 2; 5; 7; 9; 10; 11; 12; 13; 14

Intelligent grid automation: Establish the necessary electrical and communications grid platform that allows the grid to become self-healing and self analyzing, providing necessary feedback to FE operating and support groups for continual review and planning purposes.

Substation network architecture standard:
The establishment of a standard electrical and communications architecture and equipment options for specific transmission and distribution substation requirements.
2009 Supporting Initiatives: 1-8; 10-16

Monitor power quality: Establish the ability to measure power quality parameters in real time and provide summary/individual displays and reports to appropriate FE decision makers.

Pervasive communications to FE system:
Establish addressable real-time communications for all active electrical and communications grid elements on a common communications infrastructure.

Remote access to all FE customers:
Establish real-time communications links to all FE customers.

Tx/Dx line network architecture standard:
The establishment of a standard electrical and communications architecture and equipment options for specific transmission and distribution line measurement and automation requirements.
2009 Supporting Initiatives: 1-15

Distributed resource management standard:
The establishment of a standard electrical and communications architecture and operating practices for the management of distributed grid resources
2009 Supporting Initiatives: 5; 9; 12; 13; 14; 17; 21

Asset health and capability analytics:
Acquire and analyze grid asset information and provide real-time and summary reports/displays that monitor and evaluate asset condition and capabilities.
2009 Supporting Initiatives: 3; 4; 5; 8; 9-16

Business Value

Acquire grid information
Acquire the information necessary to develop greater situational awareness, increase the efficiency of gathering grid information and reduce the time required to identify grid problems; Have the ability to communicate with all grid elements

Analyze grid information
Develop/acquire and apply tools (in-house and industry-developed) to analyze grid information and manage grid assets; Better understand and improve the efficiency of grid operation; Move from reactive to proactive resolution of grid issues.

Automate grid operations
Automate corrective actions on grid; Enable the ability to remotely operate grid devices and automatically reconfigure the grid in a timely manner; Install technologies that will further reduce or eliminate customer outages; Create customized service levels for customers.

EXHIBIT B
CASE 07-646-EL-UNC

FirstEnergy
Smart Grid Stage-Gate Pilot Process Diagram