BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Ohio Power Company to Initiate Phase 2 of its gridSMART Project and to Establish the gridSMART Phase 2 Rider	)))))	**Case No. 13-1939-EL-RDR**

APPLICATION

1. Ohio Power Company[1] ("AEP Ohio" or the "Company") is an electric light company as that term is defined in §§4905.03 and 4928.01 (A) (7), Ohio Rev. Code. and, as such, is subject to the jurisdiction of the Public Utilities Commission of Ohio ("Commission").

2. In AEP Ohio's first electric security plan proceeding, the Company proposed and was granted approval for gridSMART Phase 1, a smart grid deployment project within AEP Ohio's service territory. In its order in that proceeding, the Commission authorized AEP Ohio to establish the gridSMART Rider, subject to annual true-up and reconciliation. *In the Matter of the Application of Ohio Power Company for Approval of its Electric Security Plan; and an Amendment to its Corporate Separation Plan*, Case No. 08-918-EL-SSO, *et al.*, Opinion and Order, at 37-38 (March 18, 2009) ("ESP I Order"). In the ESP I Order, the Commission noted the benefits of the gridSMART project:

[1] By Order issued on March 7, 2012 in Case No. 10-2376-EL-UNC, the merger of Columbus Southern Power Company with and into Ohio Power Company was approved effective December 31, 2011. Accordingly, references herein to Ohio Power Company or AEP Ohio, the surviving entity after the merger, include the predecessor interests of Columbus Southern Power Company.

> [I]t is important that steps be taken by the electric utilities to explore and implement technologies...that will potentially provide long-term benefits to customers and the electric utility. GridSMART Phase 1 will provide CSP with beneficial information as to implementation, equipment preferences, customer expectations, and customer education requirements.… More reliable service is clearly beneficial to CSP's customers. The Commission strongly supports the implementation of AMI and DA, with HAN, as we believe these advanced technologies are the foundation for AEP-Ohio providing its customers the ability to better manage their energy usage and reduce their energy costs.

Id. at 34-35.

3. In its order in AEP Ohio's second electric security plan proceeding, the Commission reaffirmed its conviction as to the benefits of the gridSMART project and directed the Company to continue gridSMART Phase 1 and to initiate Phase 2 of the gridSMART project. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan,* Case No. 11-346-EL-SSO*, et al.*, Opinion and Order, at 62-63 (August 8, 2012) ("ESP II Order") ("The Company shall file its proposed expansion of the gridSMART project, gridSMART Phase 2, as part of a new gridSMART application. . . .").

4. Through this application, AEP Ohio presents its proposed expansion of the gridSMART project – gridSMART Phase 2 – and seeks to establish the gridSMART Phase 2 Rider as the mechanism for recovering any gridSMART project investment beyond Phase 1, as contemplated by the Commission in the ESP II Order.

5. Phase 2 will build upon AEP Ohio's successful gridSMART Phase 1 experience. Phase 2 will be comprised of Advanced Metering Infrastructure ("AMI") for

approximately 894,000 customers across urban and suburban areas of the Company's service territory; Distribution Automation Circuit Reconfiguration ("DACR") for approximately 250 priority circuits; and Volt/VAR Optimization ("VVO") for approximately 80 circuits. Attachment A provides additional detail on the equipment and technology proposed as part of Phase 2 and discusses the demonstrated success, cost-effectiveness, feasibility, and customer acceptance of the proposed technology.

6. AEP Ohio proposes that the gridSMART Phase 2 Rider become effective on January 1, 2014 and operate similarly to the Company's current gridSMART Rider. On an annual basis, the Company would make a filing with the Commission to true-up and reconcile the actual costs of investments placed in-service and the revenues collected under the rider during the prior period. A projection of the revenue requirement for the gridSMART Phase 2 project over the next five years is set forth in Attachment B.

7. In its order in the Company's most recent gridSMART Rider proceeding, the Commission authorized the Company to recover, with certain adjustments, the loss associated with the disposition of electro-mechanical meters replaced as a result of AMI equipment installation. *In the Matter of the Application of Ohio Power Company to Update Its gridSMART Rider*, Case No. 12-509-EL-RDR, Finding and Order, at 3-6 (October 3, 2012). The Company has included as a program expense in the gridSMART Phase 2 Rider the net book value of the electro-mechanical meters to be replaced as a part of the gridSMART Phase 2 project. The Company proposes to expense the loss as it occurs and to recover the loss over five years.

8. In its order in AEP Ohio's 2010 long-term forecast proceeding, the Commission noted that the Company remains obligated to invest $20 million in a project

benefitting the Company's ratepayers. *In the Matter of the Long-Term Forecast Report of Ohio Power Company and Related Matters*, Case No. 10-501-EL-FOR, *et al.*, Opinion and Order, at 27-28 (January 9, 2013). AEP Ohio proposes to satisfy this outstanding obligation by investing $20 million in VVO technology as part of the gridSMART Phase 2 project. The Company is willing to expand the investment in VVO technologies to up to $40 million if appropriate for energy efficiency benchmark compliance. VVO technology provides a direct benefit to AEP Ohio's customers: it enables a reduction of the average voltage that each customer on a circuit receives, thereby reducing customers' annual energy consumption. Although the Commission has indicated that investment in Volt/VAR technologies should be included only within the Company's distribution investment rider ("DIR"), the Commission has also recognized that such technology "enhances or is necessary for grid smart technology to operate properly and efficiently." ESP II Order at 62. Because VVO technology plays an important, if not essential, role in the Company's gridSMART program, it is logical and appropriate to recover VVO investment through the gridSMART Phase 2 Rider.

9. Attachment C provides additional detail on the expected benefits of the gridSMART Phase 2 project and discusses how AEP Ohio proposes to verify those benefits.

10. As reflected in Attachment A, the Company proposes an average monthly rate cap for rate impact purposes during the first five years of the gridSMART Phase 2 Rider. Any costs incurred above the amount associated with a given year's cap would still be available for recovery in a subsequent period.

11. Because the authority to make this filing results from the Commission's ESP II Order, and because the application and attachments include sufficient detail on the equipment and technology proposed as part of the gridSMART Phase 2 project and discuss the demonstrated success, cost-effectiveness, feasibility, and customer acceptance of the proposed technology, AEP Ohio does not believe a hearing in this matter is required or needed. Instead, the Company requests the Commission establish an opportunity for the filing of comments and reply comments similar to the method currently in place for the Company's gridSMART Rider.

12. The proposed expansion of the gridSMART project will build upon AEP Ohio's successful gridSMART Phase 1 experience and deliver the benefits of the gridSMART project to a broader and more diverse customer base. The proposals in this application are just and reasonable and were contemplated by the Commission as part of the Company's ESP. Therefore, AEP Ohio respectfully requests that the Commission approve this application for the initiation of Phase 2 of the gridSMART project and the establishment of the gridSMART Phase 2 Rider, effective January 1, 2014.

Respectfully submitted,

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gridSMART® Phase 2 Business Case

Introduction

American Electric Power ("AEP") has been actively engaged in planning, deploying, and evaluating smart grid technologies and programs across the 11-state AEP System since 2007. AEP's gridSMART® initiative integrates a suite of advanced grid technologies into the existing electric network that can improve service quality and reliability, lower energy consumption, and save money. The new technologies can help AEP improve efficiencies, identify and respond to outages more quickly, and better monitor and control the operation of the distribution grid.

AEP Ohio's ("Ohio Power Company" or the "Company") gridSMART® Phase 1 project was designed to evaluate a broad scope of potential smart grid technologies on a smaller scale in order to guide subsequent deployment plans. AEP Ohio has not only gained valuable experience in the performance of these technologies, but also in the operation of communication interfaces and how to optimize the processes to deliver on the benefits envisioned. This experience prepares AEP Ohio for a more efficient and effective implementation as it deploys select technology and process improvements to the broader scale and more diverse customer base proposed in Phase 2.

The following benefits have been achieved as a result of AEP Ohio's Phase 1 in the deployment area:

1. Improved safety for AEP Ohio employees
2. Operational efficiencies through real-time information and remote operations
3. Fewer number of customer outage events
4. Reduced number of customers experiencing sustained (>5 minutes) outages
5. Faster restoration times for sustained outages (>5 minutes)
6. Demand reduction through new tariff offerings and the education of customers regarding energy costs and use of technology
7. Improved energy efficiency and demand reduction with Volt/VAR Optimization ("VVO")
8. Improved customer satisfaction
9. Improved access to meter reading data

As we reflect on the successes of our gridSMART Demonstration Project, we have analyzed what others in our industry have already achieved with their Smart Grid deployments, recognizing that many others are extending these Smart Grid benefits to their customers at a much faster pace and have dramatically increased customer satisfaction. In numerous cases, large Electric Utility companies have deployed Smart Grid modernizations to their entire customer base. AEP Ohio believes that a gridSMART expansion enables a fundamental change in the way we operate, serving as the necessary foundation upon which we will provide more reliable service and greater efficiency opportunities for our customers in the future. Going forward, it is the intent of AEP Ohio

to continue to extend elements of the gridSMART® program throughout the AEP Ohio service territory, starting with the proposed Phase 2 project as further defined through this submittal.

gridSMART® Phase 2 will build upon AEP Ohio's successful gridSMART® Phase 1 experience. The project will be comprised of Advanced Metering Infrastructure ("AMI") for approximately 894,000 customers across urban and suburban areas; Distribution Automation Circuit Reconfiguration ("DACR") for approximately 250 priority circuits; and Volt/VAR Optimization ("VVO") for approximately 80 circuits. AEP Ohio is targeting a deployment timeline of approximately four years for all three technologies as proposed. In addition to extending the benefits of AMI, DACR, and VVO achieved in Phase 1 to a larger base of customers, it is envisioned that Phase 2 also will provide the following benefits:

1. Support for a more robust customer choice market by enabling customer access to information, improved data for market settlement, and potential for time-differentiated rate design offerings.
2. Reduced uncollectible revenue, theft and consumption on inactive meters through automated remote disconnect and continuous usage data availability.
3. Enhanced customer service and satisfaction (e.g., through faster, remote service connection).
4. Better information to customers concerning their electricity usage, enabling them to conserve energy, save money, and help to protect the environment.

gridSMART® Phase 2 is built upon proven technologies and solutions that have been implemented in gridSMART® Phase 1 and broadly deployed in the market. This document describes the benefits, costs, and rate impacts for gridSMART® Phase 2 as well as examples of benefits achieved by other utilities who have deployed AMI, VVO, and Distribution Automation ("DA") reliability solutions similar to DACR, plus examples of customer acceptance of utility smart grid programs.

AEP Ohio gridSMART® Roadmap

As technology advances, the electric utility industry has the opportunity to enhance the way it does business to provide both customer and utility benefits. AEP Ohio's gridSMART® strategy takes advantage of these technology advancements. It is the Company's vision that these technology improvements will yield customer satisfaction layered upon a foundation of utility efficiencies.

The Company has approximately 1,533,000 meters installed throughout its service territory. Of this total, AEP Ohio has converted approximately 132,000 meters to AMI. The converted meters are providing the expected benefits. The current AMI technology is proven for urban deployment areas, typically with meters in relatively close proximity to one another.

This proposal for Phase 2 includes the next step for AMI deployment. In Phase 2, the Company expects to convert an additional 894,000 meters to AMI bringing the total to just over one million AMI meters. AEP Ohio has 200,000 customers with automated

meter reading, not associated with this proposal, and an additional 302,000 customers for which an advanced metering plan is still under review. The Company will continue to carefully evaluate meter and networking technologies to determine how best to serve these customers in the most cost-effective manner possible while delivering maximum benefits. If the AMI technology continues to advance and a rural AMI solution becomes more cost effective, the Company may reevaluate the plan regarding rural meter technology. Overall, the Company envisions all meters to be replaced with an advanced meter technology over the next 4-6 years.

Of the approximate 1,600 total distribution circuits within AEP Ohio, the Company has deployed DACR on 70 circuits in Phase 1. These circuits are providing the expected benefits. When a fault occurs, DACR automatically reconfigures the associated circuits to restore power to customers in non-faulted zones on a circuit. Circuits that have a physical connection to other circuit(s) or are adjacent to other circuits are candidates for deployment where reliability could be enhanced through the installation of the DACR technology. Each DACR installation provides added reliability and operational enhancements. Currently, the Company has targeted approximately 450 circuits with these physical characteristics that should yield solid reliability benefits through the deployment of DACR. Phase 2 proposes installing this technology on approximately 250 distribution circuits that result in the greatest reliability or operational benefits. The remaining circuits could be proposed to be deployed under a gridSMART® Phase 3 at a later date or under the Distribution Investment Rider, if approved by the Commission.

The Company has also deployed VVO on 17 distribution feeders at five substation feeders as part of Phase 1. The formal evaluation of these circuits indicated the technology provided the expected results. The VVO technology the Company intends to deploy takes advantage of Conservation Voltage Reduction ("CVR") in addition to Volt-Amp Reactive ("VAR") or reactive power optimization. This combination improves the overall efficiency of the circuit as the majority of the electrical loads on a distribution system will consume less energy as the voltage is reduced. Currently, the Company has targeted approximately 80 circuits for VVO deployment as part of Phase 2. The targeted circuits are expected to yield significant benefits. Additional circuits that are considered good candidates for VVO could then be proposed for deployment under a Phase 3 plan at a later date or under the Distribution Investment Rider, if approved by the Commission or under the Energy Efficiency ("EE") program if needed to meet required objectives.

Benefits

DACR Benefits

Reliability

AEP Ohio's gridSMART® Phase 2 DACR is designed to improve outage identification and restoration times, and to enhance storm hardening with enhanced visibility in the areas where the systems are deployed.

In Phase 1, through the deployment of DACR on 70 circuits, AEP Ohio was able to reduce Customer Minutes of Interruption ("CMI") by 1,861,441 minutes, improving reliability for 22,427 customers in 2012. While weather conditions are the primary driver for changes in SAIFI and CAIDI, AEP Ohio can attribute some improvements of these indices from the DACR deployment. In 2012, all customers on the 70 DACR circuits experienced a SAIFI of 1.228 as compared to 1.429 without DACR deployed on the same 70 circuits – an improvement of 14.1 percent. Similarly, all customers on the 70 DACR circuits experienced a SAIDI of 161.5 as compared to 178.3 without DACR deployed on the same 70 circuits – an improvement of 9.4 percent. Importantly, these results were realized prior to more recent efforts to optimize the system with initial 2013 results significantly more favorable than those experienced in 2012.

Phase 2 will deploy DACR technology on approximately 250 circuits that have the characteristics of being best positioned to yield reliability improvements. This deployment is targeted to reduce CMI by up to 30 percent over the 3-year average for the deployed circuits, which is approximately the midpoint of the achieved CMI reductions reported by the US Department of Energy ("DOE") in December 2012 for utilities that had prior experience with automated feeder switching. This could yield more than 21 million CMI per year on circuits serving more than 330,000 customers in the project areas.

In addition to the reliability benefits described above, the systems also enable crew labor savings, up to 2 hours per event, and in some instances avoid service calls entirely. Both of these situations provide opportunities for AEP Ohio to perform additional proactive work on circuits in need of service, further enhancing reliability.

Economic Output

Improved system reliability has significant impact on economic output too. Based on the "Cost of Power Interruptions to Electricity Consumers in the United States, Ernest Orlando Lawrence Berkeley National Laboratory" (2006), AEP Ohio estimates that DACR could reduce societal costs by approximately $71 million per year through the reduction of outages experienced by customers.

AMI Benefits

AMI Financial Benefits

gridSMART® Phase 1 has demonstrated several operational benefits. For instance, by installing AMI meters, AEP Ohio was able to eliminate 100 percent of the meter reading routes (187 routes) in the area where AMI was deployed. AMI also enabled AEP Ohio to reduce costs associated with meter operations activities. For example, through the use of remote service switch capabilities that enable secure connection and disconnection of electric service to customer premises from the utility back office, AEP Ohio was able to reduce field visits associated with standard move in/move out orders. The combined

meter reading and meter operations savings totaled approximately $860,000 ($6.50 per meter per year).

For Phase 2, the per-meter savings are projected to be higher because meters are less geographically concentrated in Phase 2 than in Phase 1, and Phase 2 projections include labor inflation. These efficiencies are projected to ramp to approximately $6-$7 million in annual utility benefits.

Category	**Phase 1 result**	**Phase 2 projection**
AMI Meters	132,000	894,000
Meter Reading and Meter Operations Savings (annual)	$860,000 ($6.50/meter)	$6,000,000-$7,000,000 ($6.71-7.83/meter)

Credit, collections and revenue enhancements through earlier theft detection, lower consumption on inactive meters and greater billing accuracy are projected to lead to an additional $8-$10 million in annual utility benefits. Of that benefit, $1.5-$2 million annually is operational savings from use of the remote service switch specifically for credit disconnects. It is important to note that the benefits associated with automated credit disconnects require a PUCO waiver for the current process that requires on-site customer interaction. The PUCO would need to consider whether and how the rules would be adjusted to allow for credit disconnects, considering all stakeholder options.

AMI Additional Benefits

AMI offers a host of important benefits that have not been monetarily quantified in the business case, such as:

1. Improved data for billing
2. Better customer service and satisfaction
3. Reduced outages
4. Improved crew and meter reader safety
5. Reduced environmental impact

With automated meter reads, AMI nearly eliminates estimated bills, leading to greater billing accuracy. AMI has been proven to yield a typical monthly read rate of 99.9 percent as compared to the AEP Ohio average of 96.9 percent across its entire system. With automated meter reads and a higher read rate, AMI helps to nearly eliminate estimated monthly consumer electricity usage, leading to greater billing accuracy and improved customer satisfaction.

AMI leads to better service and customer satisfaction. For instance, when a customer wishes to terminate service, the AMI meter can be read remotely and a final bill sent without delays caused by manual reads. Similarly, AMI meters equipped with a remote service switch enable power to be turned on or off remotely. As a result, a customer moving in can have service turned on in minutes, rather than waiting days.

AMI also provides the customer with the ability to view their energy consumption on a more granular level; typically multiple data points per day will be provided. This data can be useful for a customer providing better understanding of their consumption behavior. The availability of this data can also enable customers to participate in programs such as enhanced demand response ("DR") or time-differentiated pricing tariffs that might be offered by DR or CRES providers. AEP Ohio envisions that DR or CRES providers will take the lead role in these enhanced customer program offerings. As the auction market develops, AEP Ohio will evaluate filing for a supplemental simple time-differential Standard Service Offering (SSO) rate option. Such programs are designed to reduce peak demand, thereby allowing customers to benefit through savings. Additionally, Home Area Network ("HAN") devices can be used by the customer to better utilize the data and pricing signals to control their consumption activity. The proposed AEP Ohio gridSMART® Phase 2 will deploy AMI meters with communication modules to enable in-home communication from the meter. AEP Ohio views its role as a provider of the metering infrastructure that enables the offering of these programs by market participants.

Customer programs like the gridSMART® Phase 1 SMART Shift, two-tier time-of-day tariff could provide significant net benefit to customers. If DR or CRES providers offered similar programs to Phase 2 AMI customers, the estimated net customer benefits, assuming 5 percent penetration and 10 percent peak load reduction across all AEP Ohio customers, could be approximately $4 to $6 million in annual customer savings.

In addition to the benefits previously described, AMI provides billing and call center efficiencies that will enable staff to address more inquiries and to do so faster. Customers should experience fewer billing issues from continual meter reads and the elimination of estimated meter reads through AMI, and call center representatives will have real-time access to meter data which will help them discuss actual usage information with customers. When a customer calls about power loss, the real-time access also will enable call center representatives to determine whether the power loss is due to an outage or to an issue on the customer side of the meter, such as a blown house breaker fuse.

From a reliability perspective, when an AMI meter detects a loss of voltage, a message is sent indicating the customer has lost power. Messages that successfully reach AEP Ohio's internal systems can be used in conjunction with customer telephone calls to predict the extent of the outage. Also, meters can be queried (pinged/polled) to get an indication of whether a customer has power. This indication can be useful to troubleshoot customer issues and to verify restoration following an outage.

From a safety perspective, because crews can remotely determine whether a meter has power, crew exposure and safety is improved. Also, due to AMI, fewer meter readers will be required in the field, which will reduce physical meter reading efforts and, thus, will reduce safety issues. AEP Ohio estimates that incidents and severity days associated with meter reading will be reduced by 72 percent relative to the past two years' performance.

With remote capabilities, the number of miles driven by metering and service personnel will be reduced by an estimated 440,380 miles annually. In addition, there are some environmental benefits associated with reduced vehicle emissions as a result of reduced vehicle miles traveled with 186,556 metric tons of CO_2 avoided annually. These estimates are based on reductions experienced during AEP Ohio's gridSMART® Phase 1.

The above benefits from customer programs, billing and call center efficiencies, reduced personal injuries, and other operational savings together could represent an estimated $39 million in incremental net present value.

VVO Benefits

Efficiency Benefits

AEP Ohio's gridSMART® Phase 2 VVO is designed to realize a reduction in energy consumption where deployed, and a reduction in peak demand on circuits where VVO is deployed.

Voltage standards exist in the electric utility industry, such as ANSI C84.1, that mandate an acceptable voltage range at the secondary of the distribution transformer. VVO enables a reduction of the average voltage that each customer on the circuit receives, thereby reducing the annual energy consumption of the feeder while maintaining the quality of service to the end-use customer. Based on results obtained through field demonstrations, AEP Ohio estimates that a 3 percent reduction in energy consumption and a 2 to 3 percent reduction in peak demand can be obtained on those circuits on which the technology is deployed.

Other Benefits

Along with the expected efficiency benefits, the technology associated with VVO also provides VAR support, offsetting the need for Generation and Transmission resources to provide VARs. VVO also promotes a "self-healing" grid by maintaining acceptable voltages after a "self-healing" event has occurred. The technology required for VVO will also augment other technologies to improve visibility into system performance and circuit automation.

Costs

DACR Costs

DACR costs are primarily capital costs from equipment and installation, and an O&M component associated with operating and maintaining this equipment. As for DACR, AEP Ohio requested its existing vendors to provide an estimate of updated costs to help in evaluating the cost effectiveness of potential future deployments. The costs included

in this business case are current and will be updated annually as actuals are incurred For Phase 2, AEP Ohio is estimating $427,000 in total capital cost per deployed DACR circuit through the life of the technology. This cost represents an increase of approximately $37,500 per circuit relative to Phase 1, due to adding functionality in order to improve load transferability. Operating and Maintenance expense is estimated at 3% of the total capital investment through the life of the technology.

AMI Costs

To generate an accurate estimate of AMI costs, AEP Ohio asked its existing vendors of key system elements to provide an estimate of updated costs to help in initially evaluating the cost effectiveness of potential future deployments. The costs included in this business case are current and will be updated annually as actuals are incurred.

AMI costs will be driven largely by capital expenditures for meters, meter communications equipment, and labor for meter installation. Ongoing operating costs, primarily consists of incremental back office staff to operate the systems. In direct dollar terms, the Phase 1 average cost per meter installed (a combined average for single phase and poly-phase including all related project expenses including associated communication infrastructure) for AMI was $210. For Phase 2, AEP Ohio is estimating $180 per installed meter, a reduction of approximately 17 percent.

In addition, the existing meters to be replaced will have a net book value ("NBV") of approximately $72 million. As part of this filing, AEP Ohio seeks to recover the NBV costs, as they are incurred, as a Phase 2 program expense over the term of the rider.

VVO Costs

VVO costs are primarily capital costs from equipment and installation, and an O&M component associated with operating and maintaining this equipment. For Phase 2, AEP Ohio is estimating approximately $250,000 in total capital cost per deployed VVO circuit through the life of the technology. Operating and Maintenance expense is estimated at 3% of the total capital investment through the life of the technology.

Along with the capital and O&M cost associated with the VVO technology deployment, this type of energy efficiency technology also provides significant customer energy and bill savings benefits. Even though the technology is installed on the distribution system, VVO is an energy efficiency program that directly reduces demand and energy for AEP Ohio customers. Like more traditional energy efficiency programs, VVO should qualify for recovery of all distribution lost revenues and shared savings, and the VVO energy efficiency savings should count towards AEP Ohio's energy efficiency targets. AEP Ohio anticipates the approval for recovery in AEP Ohio's 2015-2017 Energy Efficiency filing. The lost distribution revenue should be recovered for all customer rate classes not currently covered in the pilot decoupling adjustment mechanism and shared savings should be approved in the same manner as other measurable programs in the current and future approved energy efficiency plans.

In Case No. 10-501-EL-FOR, the Commission denied the Company's request to determine there is a need for the Turning Point Solar Project. As part of that order, the Commission reiterated that the Company had committed to spend $20 million on that investment and ordered AEP Ohio to do so by the end of 2013. The Commission directed that the benefits of the $20 million investment flow through to the Company's rate payers. The Company is proposing to invest $20 million in VVO which if approved for this investment, will allow the Company to optimize approximately 80 circuits. AEP Ohio is currently evaluating it future needs associated with meeting its Energy Efficiency (EE) legislative mandates and may request up to another 80 VVO circuits as a separate filing if needed to meet these EE targets.

In Case No. 11-346-EL-SSO, the Commission determined that VVO was not necessarily a part of gridSMART® as it could be installed without the presence of gridSMART® technologies but recognized that it enhances or is necessary for gridSMART® technology to operate properly and efficiently (Case No. 11-346-EL-RDR Opinion and Order at 62). The Company proposes to install $20 million of VVO as part of the gridSMART® Phase 2 rider filing. VVO benefits the customers by reducing usage up to 3 percent as determined through the gridSMART® Phase 1 pilot. This benefit will be realized by customers by reducing usage and as such reducing the charges to be realized in the future.

Rate Impacts

The table below reflects the first five years of customer impact assuming the same mechanics of the Phase 1 rider with the exception of changing the recovery of investments from an "as spent" to an "in service" basis as the Commission directed in its August 8, 2012 Opinion and Order in Case No. 11-346-EL-SSO (page 63). The table also reflects, fully loaded costs, and 7-year depreciation for AMI and 30-year depreciation for DACR and VVO.

Average Monthly Rate Impact $		
	Residential	Non-Residential
Year 1	0.42	1.74
Year 2	1.75	7.19
Year 3	2.34	9.64
Year 4	2.75	11.31
Year 5	2.90	11.93
Average	2.03	8.36
Average monthly bill in 2012	127.93	Varies
Average Increase	1.6%	Varies

Based on the average AEP Ohio Residential monthly customer bills for 2012, the average monthly bill increases represent 1.6 percent. Due to such wide varieties in usage and operational characteristics, the non-residential impact will vary for each customer class. Based on the cash flows of the proposed project plan and associated capital deployment, the average monthly Residential rate impacts will not exceed $1.00 in year 1, $2.25 in year 2, $2.75 in year 3, $3.00 in year 4 and $3.25 in year 5. The average monthly non-Residential rate impacts will not exceed $3.50 in year 1, $9.00 in year 2, $10.75 in year 3, $11.50 in year 4 and $13.25 in year 5.

Benefit/Cost Analysis

As described above, Phase 2 involves a variety of benefits and costs. Those have been evaluated over a 15-year period, and the delta between benefits and costs reflects the customer impact. Each metric is shown below with two different views: the Cash View (or nominal view) and the Net Present Value ("NPV") View.

For the comprehensive benefits and costs for the three technologies, the Cash View shows a net of $860 million benefit and benefit-cost ratio of 2.8. The NPV shows a net of $346 million benefit and a benefit-cost ratio of 2.0.

	CASH VIEW		**NET PRESENT VALUE VIEW****	
15 Year Benefits	O&M: Capital: Energy / Capacity: Reliability:* **TOTAL:**	$193 million $ 1 million $115 million $1.016 billion $1.325 billion	O&M: Capital: Energy / Capacity: Reliability:* **TOTAL:**	$100 million $ 1 million $ 59 million $519 million $679 million
15 Year Costs	O&M: Capital: **TOTAL:**	$136 million $329 million $465 million	O&M: Capital: **TOTAL:**	$ 77 million $256 million $333 million
15 Year Customer Impact	Net Cash Flows: Benefit/Cost Ratio:	$860 million 2.8	Net Cash Flows: Benefit / Cost Ratio:	$346 million 2.0

* Based on the "Cost of Power Interruptions to Electricity Consumers in the United States, Ernest Orlando Lawrence Berkeley National Laboratory" (2006)

* * The Cash View reflects the nominal estimated expenditures and benefits related to the Phase II implementation. The Net Present Value (NPV) is calculated using an After Tax Weighted Average Cost of Capital (WACC) of 7.69%.

Proven Solutions and Technologies

gridSMART® Phase 2 represents a fundamental change in the way AEP Ohio operates and enables new technologies, and is based on proven solutions that have been deployed across the United States.

For example, the Edison Foundation estimates that 36 million Smart Meters already had been installed by May 2012, and several utilities have already completed large-scale AMI deployments such as Florida Power & Light, CenterPoint, Sacramento Municipal Utility District, and Southern Company. AEP's subsidiary AEP Texas is also deploying 1 million AMI meters, with 80 percent currently installed. Many of these and other utilities are achieving tangible benefits. The December 2012 U.S. DOE SGIG Program AMI report ("Operations and Maintenance Savings From Advanced Metering Infrastructure – Initial Results") shows reductions in meter operations costs of 13 to 77 percent and reductions in miles driven, fuel consumed and CO_2 emission of 12 to 59 percent.

AMI has also enabled numerous dynamic pricing programs. For example, Oklahoma Gas & Electric ("OGE") has enrolled approximately 76,000 customers in its AMI-based demand response program, which resulted in a 67 megawatt reduction in peak demand in 2012 and an average $191 savings in energy costs per participating customer.

Reliability applications like DACR are widely deployed and generating benefits as well. For example, the U.S. DOE reported in December, 2012, that approximately 30 utilities that had deployed automated feeder switching. Among the approximately 300 feeders where operators had previous experience with automated feeder switching, CMI was reduced 11 to 56 percent.

VVO is a proven commercial technology with multiple suppliers providing solutions to accomplish similar goals. AEP Ohio proposes to implement a technology similar to the Phase 1 deployment. VVO technology is being deployed at three AEP Ohio affiliates in Indiana, Oklahoma, and Kentucky.

The above examples highlight how technologies like those in the gridSMART® initiative have been broadly proven in the field, reducing the technology risks associated with AEP Ohio achieving its target benefits.

Customer Acceptance

The gridSMART® technologies not only are proven to be technically a success, but also widely accepted by customers. Customers who participated in gridSMART® Phase 1 and participated in AMI-enabled consumer programs rated their overall satisfaction with AEP Ohio seven percent higher than did AEP Ohio customers overall.

A public outreach and education plan will play a key role in the successful implementation of Phase 2. Similar to the successful strategy used in Phase 1, a multi-

pronged communications approach will engage key community thought leaders, customers and other targeted audiences by providing timely and thorough information regarding the overall project, timeline, rollout and benefits of the technologies. An outreach plan that clearly communicates transparency with communities and customers will be developed and used to ensure acceptance, which ultimately will lead to higher customer satisfaction.

Other utilities across the US have reported strong acceptance of Smart Grid technology, such as:

- Sacramento Municipal Utility District ("SMUD") has deployed approximately 600,000 AMI meters and has reported high customer satisfaction. As SMUD reported, "Customer satisfaction drove the project. Throughout, SMUD maintained customer satisfaction levels in the mid-90th percentile. Ongoing surveys measure customer satisfaction with the meters, the installation process and the associated communications. The complaint rate was only 0.09 percent."
- OGE has deployed approximately 780,000 AMI meters and has enrolled over 76,000 participants to its AMI-based dynamic pricing demand response program called SmartHours. 94 percent of customers said they were likely to recommend the program to friends and family.
- Memphis Light Gas and Water ("MLGW") conducted a survey after its AMI pilot with "95 percent saying they would recommend the smart meter experience to a friend."

At a macro level, JD Power and Associates reported higher customer satisfaction with AMI. They found that customer satisfaction among customers with smart meters "averages 667 (on a 1,000-point scale), 43 points higher than among customers whose homes are not equipped with smart meters."

Another successful key to achieving customer acceptance is offering an alternative to the limited number of customers who have concerns with AMI meters. AEP Ohio supports providing the customer an opportunity to "opt-out" of receiving an AMI meter and retaining a standard meter. If a customer opts-out they would incur all expenses associated with manual meter reading so that these costs are not paid for by other customers. AEP Ohio appreciates the PUCO initiative for "opt-out" rulemaking and the Company has provided comments on the initial version of the rule. AEP Ohio will comply the future PUCO ruling related with AMI meter opt-outs.

Security and Privacy

Through the gridSMART Demonstration Project, AEP Ohio implemented innovative advancements in the cyber security arena including an enhanced state of the art Cyber Security Operations Center (CSOC) in partnership with the U.S. Department of Energy and vendors. Providing advanced security checks and balances, this CSOC monitors and identifies vulnerabilities 24/7 to ensure grid security.

Customers can be assured that the safety and security of their information is protected by extensive and dedicated resources. Recognized as an innovator with its industry threat sharing integration functionality, this CSOC continuously gathers and shares threat information with peer utilities and government agencies.

Privacy issues have garnered customer attention, though the Company notes that the issue of customer privacy is not a new concept introduced by the deployment of the smart grid. The Company is supportive of the PUCO's continued efforts to ensure the protection of customer information and commented on consumer privacy in Case No. 11-277-GE-UNC.

The electric utility industry in Ohio has traditionally collected, used, and protected significant amounts of sensitive customer information. For example:

- The nature of information necessary to conduct utility business includes personally identifiable information (PII) such as social security numbers and related credit information.
- Utilities have routinely collected interval metering information for decades for larger commercial and industrial customers as part of administering and billing tariffs that rely on such information and for operating its business.
- Interval metering data on select residential and smaller commercial and industrial customers has been collected and utilized for decades in order to develop and monitor customer load profiles necessary for system resource planning and the proper allocation of costs. This data is not substantially different than that which is collected by newer smart meters.

Therefore the collection, use, and protection of proprietary and confidential data have occurred in some form almost since AEP Ohio's inception. The Company has always fulfilled the obligation to maintain the confidentiality of this information, as well as the trust of their customers, without notable exception.

The current legislative and regulatory rules provides for protection of customer data privacy, regardless of how that information is gathered by the utility. AEP Ohio treats customer consumption data collected through the smart grid with the same high level of protection required by these legislative and regulatory expectations.

The proposed Phase 2 deployment will continue these efforts and strive to improve security and privacy customer protection. We will utilize dedicated security and privacy experts to review the technology and equipment to ensure strict standards are met. We will place emphasis on building security and privacy into the deployment as well as creating a system to evaluate that these standards remain as the technologies go into service.

Conclusion

AEP Ohio's gridSMART® Phase 2 project, based on proven and accepted technology solutions, will extend the benefits demonstrated in Phase 1 and deliver additional benefits to a broader set of customers. Through Phase 2 AMI, the Company expects to drive

significant financial benefits through AMI and enable a variety of additional benefits that positively impact customer service such as customer satisfaction; meter field personnel safety; regional economic output and reduced environmental impacts. It also will help enable DR and CRES providers to offer valuable customer programs. Phase 2 DACR is expected to improve CMI where the system is deployed, which will help avoid millions of dollars of potential lost economic productivity annually. Phase 2 VVO is expected to generate significant efficiencies that translate to customer savings. Overall, the rate impact on customers is expected to be low, just 1.6 percent on average.

Attachment B
YEAR 1

gridSMART Phase 2

CSP - gridSMART Incremental Investment	Estimated gridSMART Spending	Annual Carrying Charge	gridSMART Revenue Requirement	
O&M (AMI, VVO, DACR)	$ 6,648,975		$ 6,648,975	
Capital - 7 Year Life- AMI		$ 3,033,097	$ 3,033,097	(a)
Capital - 30 Year Life - VVO		$ 172,960	$ 172,960	(b)
Capital - 30 Year Life - DACR		$ 558,729	$ 558,729	(b)
		Total	$ 10,240,801	
		Tax Gross Up Rate	100.859%	
		Revenue Requirement	$ 10,328,781	
		Loss on Removal of meters	$ -	
		Total Revenue Requirement	$ 10,328,781.1	
Residential Base Distribution	$ 406,542,657.87	Residential Revenue Requirement	$ 6,448,907	
Non-Res Base Distribution	$ 244,589,408.48	Non-Res Revenue Requirement	$ 3,879,874	
		Residential Customers 1,273,961	5.06	
		Non-Residential Customers 186,129	20.85	
		Residential Customers Monthly Rate	$ 0.42	
		Non-Residential Customers Monthly Rate	$ 1.74	

(a) AMI Assets (account 370.16) are Capitalized on Purchase and have 7 year life.
(b) VVO & DA Assets (account 362-station equipment) are capitalized after 6 months and have 30 year life.

Notes:
ROR from Renee Hawkins Rate of Return Summary Modified ESP Case 11-346-EL-SSO

Attachment B
YEAR 2

gridSMART Phase 2

CSP - gridSMART Incremental Investment	Estimated gridSMART Spending	Annual Carrying Charge	gridSMART Revenue Requirement
O&M (AMI, VVO, DACR)	$ 7,496,589		$ 7,496,589
Capital - 7 Year Life- AMI		$ 13,684,537	$ 13,684,537
Capital - 30 Year Life - VVO		$ 1,722,817	$ 1,722,817
Capital - 30 Year Life - DACR		$ 5,085,669	$ 5,085,669
		Total	$ 27,989,612
		Tax Gross Up Rate	100.859%
		Revenue Requirement	$ 28,230,074
		Loss on Removal of meters	$ 14,539,444
		Total Revenue Requirement	$ 42,769,518.4
Residential Base Distribution	$ 406,542,657.87	Residential Revenue Requirement	$ 26,703,697
Non-Res Base Distribution	$ 244,589,408.48	Non-Res Revenue Requirement	$ 16,065,821
		Residential Customers 1,273,961	20.96
		Non-Residential Customers 186,129	86.32
		Residential Customers Monthly Rate	$ 1.75
		Non-Residential Customers Monthly Rate	$ 7.19

(a) AMI Assets (account 370.16) are Capitalized on Purchase and have 7 year life.
(b) VVO & DA Assets (account 362-station equipment) are capitalized after 6 months and have 30 year life.

Notes:
ROR from Renee Hawkins Rate of Return Summary Modified ESP Case 11-346-EL-SSO

Attachment B
YEAR 3

gridSMART Phase 2

CSP - gridSMART Incremental Investment	Estimated gridSMART Spending	Annual Carrying Charge	gridSMART Revenue Requirement
O&M (AMI, VVO, DACR)	$ 8,610,621		$ 8,610,621
Capital - 7 Year Life- AMI		$ 20,050,781	$ 20,050,781
Capital - 30 Year Life - VVO		$ 3,488,464	$ 3,488,464
Capital - 30 Year Life - DACR		$ 10,250,285	$ 10,250,285
		Total	$ 42,400,151
		Tax Gross Up Rate	100.859%
		Revenue Requirement	$ 42,764,417
		Loss on Removal of meters	$ 14,539,444
		Total Revenue Requirement	$ 57,303,860.9
Residential Base Distribution	$ 406,542,657.87	Residential Revenue Requirement	$ 35,778,401
Non-Res Base Distribution	$ 244,589,408.48	Non-Res Revenue Requirement	$ 21,525,460
		Residential Customers 1,273,961	28.08
		Non-Residential Customers 186,129	115.65
		Residential Customers Monthly Rate	$ 2.34
		Non-Residential Customers Monthly Rate	$ 9.64

(a) AMI Assets (account 370.16) are Capitalized on Purchase and have 7 year life.
(b) VVO & DA Assets (account 362-station equipment) are capitalized after 6 months and have 30 year life.

Notes:
ROR from Renee Hawkins Rate of Return Summary Modified ESP Case 11-346-EL-SSO

Attachment B
YEAR 4

gridSMART Phase 2

CSP - gridSMART Incremental Investment	Estimated gridSMART Spending	Annual Carrying Charge	gridSMART Revenue Requirement
O&M (AMI, VVO, DACR)	$ 9,605,920		$ 9,605,920
Capital - 7 Year Life- AMI		$ 22,264,705	$ 22,264,705
Capital - 30 Year Life - VVO		$ 5,127,073	$ 5,127,073
Capital - 30 Year Life - DACR		$ 15,267,102	$ 15,267,102
		Total	$ 52,264,799
		Tax Gross Up Rate	100.859%
		Revenue Requirement	$ 52,713,813
		Loss on Removal of meters	$ 14,539,444
		Total Revenue Requirement	$ 67,253,257.2
Residential Base Distribution	$ 406,542,657.87	Residential Revenue Requirement	$ 41,990,434
Non-Res Base Distribution	$ 244,589,408.48	Non-Res Revenue Requirement	$ 25,262,823
		Residential Customers 1,273,961	32.96
		Non-Residential Customers 186,129	135.73
		Residential Customers Monthly Rate	$ 2.75
		Non-Residential Customers Monthly Rate	$ 11.31

(a) AMI Assets (account 370.16) are Capitalized on Purchase and have 7 year life.
(b) VVO & DA Assets (account 362-station equipment) are capitalized after 6 months and have 30 year life.

Notes:
ROR from Renee Hawkins Rate of Return Summary Modified ESP Case 11-346-EL-SSO

Attachment B
YEAR 5

gridSMART Phase 2

CSP - gridSMART Incremental Investment	Estimated gridSMART Spending	Annual Carrying Charge	gridSMART Revenue Requirement
O&M	$ 8,092,872		$ 8,092,872
Capital - 7 Year Life		$ 24,707,401	$ 24,707,401
Capital - 30 Year Life - VVO		$ 5,430,612	$ 5,430,612
Capital - 30 Year Life - DACR		$ 17,693,769	$ 17,693,769
		Total Revenue Requirement	$ 55,924,654
		Tax Gross Up Rate	100.859%
		Revenue Requirement	$ 56,405,110
		Loss on Removal of meters	$ 14,539,444
		Total Revenue Requirement	$ 70,944,554.0
Residential Base Distribution	$ 406,542,657.87	Residential Revenue Requirement	$ 44,295,142
Non-Res Base Distribution	$ 244,589,408.48	Non-Res Revenue Requirement	$ 26,649,412
		Residential Customers 1,273,961	34.77
		Non-Residential Customers 186,129	143.18
		Residential Customers Monthly Rate	$ 2.90
		Non-Residential Customers Monthly Rate	$ 11.93

(a) AMI Assets (account 370.16) are Capitalized on Purchase and have 7 year life.
(b) VVO & DA Assets (account 362-station equipment) are capitalized after 6 months and have 30 year life.

Notes:
ROR from Renee Hawkins Rate of Return Summary Modified ESP Case 11-346-EL-SSO

Benefit	Estimate Savings (15 year cash view total in millions)	Verification Approach	Mechanism for the customers to obtain the benefit
Benefits included in the Benefit / Cost Analysis			
Meter Reading and Meter Operational Labor Savings	$ 83	Compare Annual Meter Reading and Meter Operational Budgets to the Pre-deployment Budget	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Credit and Collections Operational Labor Savings	$ 21	Compare Annual Credit and Collections Operational Budgets to the Pre-deployment Budget	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer credit disconnect and reconnect fees as an outcome of filing future Distribution rate cases
Reduction in Uncollectible Revenue Through Use of Remote Disconnect - Estimate Based on Industry Analysis and Internal Uncollectible Revenue.	$ 49	Compare Annual Uncollectible Revenue Write-off to the Pre-deployment data; performance is prone to other economic factors that will not allow for pure measure	Company Savings - Flow back to customers through a future Uncollectible Revenue Rider that the company plans to file separate from this gridSMART Phase 2 filing
Reduction in Theft (Estimate Based on Industry Benchmarking)	$ 35	Compare Annual Theft of Energy revenue savings, though some savings will be unidentifiable	Increase Company Revenue (Wires Only) Flow Through to Customers
Reduction in Consumption on Inactive Meters - Estimate Based on Industry Benchmarking	$ 6	No Verification method possible	Increase Company Revenue (Wires Only) Flow Through to Customers
Customer Savings associated with VVO benefits	$ 115	Compare annual voltage reduction by circuit to pre-deployment data	Customer Benefit
Distribution Automation Circuit Reconfiguration Outage Reduction	$ 1,016	Compare annual Customer Minutes of Interruption for DACR circuits to pre-deployment data; performance is prone to weather impacts that will not allow for pure measure	Customer Benefit
TOTAL	$ 1,325		
Other Benefits			
Customer savings associated with participating in TOU programs	$ 63	Compare updated pricing to projected participation rate expectations.	Customer Benefit
Billing Labor Benefits (soft saving benefits from industry saving models -- allows staff to reallocate to higher priority tasks)	$ 2	Compare number of annual No-Bill workflows created for AMI customer and compare to the predeployment quantity.	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Call Center Labor Benefits (soft saving benefits from industry saving models -- allows staff to reallocate to higher priority tasks)	$ 1	No Verification method possible	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Long-Term Capacity Planning Labor / Non-Labor Capital Savings Due to Superior AMI Data Quality (soft saving benefits from industry saving models -- allows staff to reallocate to higher priority tasks)	$ 10	Shift of resources to other required work - no verification	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Short-Term Capacity Planning Labor / Non-Labor Capital Savings Due to Superior AMI Data Quality (soft saving benefits from industry saving models -- allows staff to reallocate to higher priority tasks)	$ 1	Shift of resources to other required work - no verification	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Capacity Planning Labor / Non-Labor O&M Savings Due to Superior AMI Data Quality (soft saving benefits from industry saving models -- allows staff to reallocate to higher priority tasks)	$0.2	Shift of resources to other required work - no verification	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
Injury Reduction - Reduction in liability / lost work days	$ 1	Compare OSHA recordable and severity rates to pre-deployment data	Customers will see this benefit by AEP Ohio having lower ongoing costs which yield lower customer rates as an outcome of filing future Distribution rate cases
TOTAL	$ 77		

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Case No(s). 13-1939-EL-RDR

Summary: Application of Ohio Power Company to Initiate Phase 2 of its gridSMART Project and to Establish the gridSMART Phase 2 Rider electronically filed by Mr. Yazen Alami on behalf of Ohio Power Company