

West Penn Power Company

d/b/a Allegheny Power



Pennsylvania Act 129

Smart Meter Technology Procurement and Installation Plan

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Pennsylvania Public Utility Commission
Docket No. M-2009-2123951



This document is Allegheny Power's Smart Meter Technology Procurement and Installation Plan ("SMIP") filing.

This document provides detail about Allegheny Power's proposed Smart Meter program, Smart Meter infrastructure, technology-based tools, and the costs for these technologies which underpin many of the Energy Efficiency & Conservation (EE&C) and Demand Response (DR) programs, measures, and rate offerings described in the Company's EE&C and DR filing on June 30, 2009.

This document describes how Allegheny Power will use technology to enable customers to monitor and effectuate changes in their usage to manage their energy bills. This dynamic, customer-driven demand response not only creates economic benefit for individual customers but also places significant downward pressure on regional electricity wholesale capacity and energy prices creating a larger region-wide economic and social benefits.

This document also takes customers to a future where Demand Side Management (DSM) programs, focused on both energy efficiency and conservation and demand response, are enabled by new technology investments that best meet customer lifestyles, behaviors, and electricity needs.

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1. OVERVIEW OF THE PLAN

West Penn Power Company d/b/a Allegheny Power (“Allegheny Power” or “Allegheny” or “Company”) is a Pennsylvania electric distribution company (“EDC”) providing service in southwestern, south-central and northern Pennsylvania. Allegheny Power serves approximately 715,000 customers in Pennsylvania in an area of about 10,400 square miles with a population of approximately 1.5 million. Allegheny Power is a wholly owned subsidiary of Allegheny Energy, Inc. Allegheny Power and Allegheny Energy, Inc., have corporate headquarters at 800 Cabin Hill Drive, in the City of Greensburg, Westmoreland County, Pennsylvania.

On October 15, 2008, Governor Edward Rendell signed Act 129 of 2008 (“Act 129”), to be effective November 14, 2008. Act 129 requires EDCs with at least 100,000 customers in Pennsylvania to file a Smart Meter Technology Procurement and Installation Plan (“SMIP” or “the Plan”). As directed by Act 129 the Pennsylvania Public Utility Commission (“Commission” or “PUC”) entered an Implementation Order on June 24, 2009 at Docket No. M-2009-2092655 establishing standards for EDC Smart Meter Technology Procurement and Installation Plans under Act 129.

During the past several years, and as part of a nationwide trend, Pennsylvania’s citizens and businesses have faced rising prices without the ready ability to decrease their energy use or control costs. The Company’s Energy Efficiency & Conservation (“EE&C”) and Demand Response (“DR”) filing of June 30, 2009 (“EE&C and DR Plan”) responds to this issue by providing Allegheny Power customers with robust energy conservation and efficiency tools enabling customers to reduce their electricity consumption and demand with the concomitant opportunity to save money. The measures, programs and rate offerings described in Allegheny Power’s EE&C and DR Plan filed on June 30, 2009, rely on Smart Metering Infrastructure (SMI) in helping customers modify their energy use with the aim of reducing overall consumption and decreasing peak demand for electricity.

Allegheny Power is pleased to submit this proposal for Smart Metering Infrastructure deployment for Commission approval in compliance with Act 129 and as fulfillment of the expectations and requirements of the EE&C and DR Plan. This proposal includes:

- A summary of existing Company system characteristics,
- A recommended system architecture and technology and proposed technology,
- A deployment plan, including a timeline for implementation,
- The results of a cost/benefit analysis,
- A recommended cost recovery mechanism.

Allegheny Power is fully committed to bring Smart Metering Infrastructure capabilities and its benefits to the energy consumers of the Commonwealth of Pennsylvania. The lack of contemporary information and communication functionality has been a key factor in preventing

utilities from moving to 21st century business functionality among thriving American industries. In addition, societal and environmental benefits from Smart Metering Infrastructure can accrue through reduced emissions, moderated demand growth, and a reduced operational footprint and complexity.

Allegheny Power looks forward to meeting as soon as possible with the Commission and/or Commission staff to answer any questions and resolve any outstanding details necessary to allow approval of the Company's Smart Metering Infrastructure cost recovery and deployment proposals. In anticipation of that approval, the Company intends to continue to move ahead with detailed planning and development on a timeline that will allow meter installation to begin in early 2010.

1.1. Demand Response and the Smart Metering Infrastructure

Many of the data, communications, systems control, and appliance control capabilities discussed in this filing are enabled by a group of technologies often described as Smart Meter Infrastructure. The Company provides significant detail about the Smart Meter, Smart Meter Infrastructure, technology-based tools, and the costs for these technologies which underpin many of the EE&C and DR programs, measures, and rate offerings described in the EE&C and DR Plan filed on June 30, 2009.

This filing also provides more significant detail into how Allegheny Power will enable customers to monitor and effectuate changes in their usage to manage their energy bills. In turn, the dynamic, customer-driven demand response not only creates economic benefit for individual customers but also places significant downward pressure on regional electricity wholesale capacity and energy prices creating a larger region-wide economic and social benefits. Finally, this proposal and plan for Smart Metering Infrastructure deployment also takes customers to a future where Demand Side Management (DSM) programs, focused on both energy efficiency and conservation and demand response, are enabled by new technology investments that best meet customer lifestyles, behaviors, and electricity needs.

The Company believes that Smart Meters, Smart Metering Infrastructure and a set of complementary designed rates and tariffs are essential components of the Company's Plan to meet the mandated consumption and demand reduction targets ordered by Act 129. Well-designed rate structures, implemented in conjunction with Smart Metering Infrastructure, will provide customers the opportunity to change their energy usage behavior based on price signals in the electricity market. Where the EE&C and DR Plan filed on June 30, 2009 concentrates on the description of the Company's EE&C and DR programs, measures, and rate concepts, this Smart Metering Infrastructure deployment plan proposal provides additional description and detail about the Company's compliance with the requirements of Act 129 related to Smart Metering technology.

While strongly emphasizing innovation, Allegheny Power's proposed Smart Metering Infrastructure plan is designed to provide proven technology that enables pragmatic, actionable

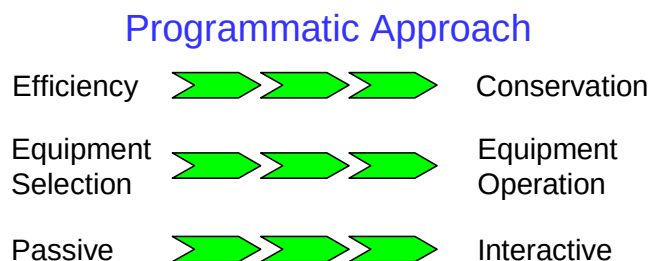
results that achieve targets ordered by Act 129 and the EE&C and DR targets that are likely to be mandated in the near future. Furthermore, Allegheny Power's plans include the necessary revisions to business processes, policies and procedures and organizational structure to operate the new technologies both efficiently and effectively in our interactions internally and with customers and other affected external entities such as CSPs. Ultimately, Allegheny Power's success in achieving Act 129 goals relies on the combined ability of rates and programs and technology to influence customer behavior and choices about electricity consumption in homes and businesses

The Company's EE&C and DR Plan filing also assumes the approval and deployment of Smart Metering Infrastructure plus the use of several new technologies, such as web portals, in-home displays, programmable controllable thermostats, along with the application of email, text messaging, EDI and other innovative tools to provide new, innovative ways of communicating with customers and influencing their behavior.

To be more specific, each of Allegheny Power's EE&C and DR measures and programs designed and submitted in the EE&C and DR Plan filed on June 30, 2009 was developed with the imperative that customers would: 1) be provided with a participation incentive; 2) be provided with near real-time information upon which to undertake decision or action; and/or 3) be provided the necessary measurements, control systems, and equipment to receive full benefit in choosing to participate. To this end, the Company's planned technology and non-technical infrastructure and utility business operations must have new capabilities. These new and broad reaching capabilities include, but are not limited to, the capability to:

- 1) Provide multiple means of communicating with customers and registering customer sign ups for the various programs through a web portal, through a customer service representative, and through the integrated voice response system.
- 2) Provide for campaign management for each of the programs.
- 3) Provide for measurement of individual compliance to terms of the programs.
- 4) Provide for billing adjustments for various rates, tariff and pricing incentives.
- 5) Provide for service adjustments and additions to customer and account records
- 6) Provide new types of customer service and customer care that are significantly and materially different from the customer care of the past.
- 7) Provide for ongoing reporting of the effectiveness of each EE&C and DR program or measure.
- 8) Provide for continuous improvement in approved EE&C and DR programs and provide for the ability to improve the design of future programs.

The figure below illustrates Allegheny Power's programmatic approach to driving customer behavior changes using Smart Metering Infrastructure and other related central infrastructure. Please note that the continuum moves from passive customer participation to interactive customer participation, while the program offerings move from targeting equipment efficiency to targeting more efficient appliance and equipment operation.

Figure 1. Project Approach

To enable this behavioral transformation, Allegheny Power believes that customers must be provided not just more information, but more real-time information, on which to base operating decisions. Allegheny Power believes that monthly electric bill presentment that provides only aggregated historical consumption and cost data is not a sufficient communication medium and motivator to incent customer behavior change at a scale and scope required to achieve Act 129 EE&C and DR targets. For example, the ability to view the projected costs for individual appliances, such as air conditioning and clothes washing, will enable customers to understand the consequences of their specific electricity consumption and demand decisions and to react to prices in real-time in a way that is concrete and meaningful. Such specific information is also proven to directly impact future decisions, making desirable customer behavior changes durable.

In consideration of the above, Allegheny Power urges the Commission to approve the Company's Smart Metering Technology Procurement and Installation Plan by January 29, 2010, as this timely approval is essential for the Company to deploy Smart Metering Infrastructure and meet all of the requirements of Act 129.

1.2. Security

Allegheny Power recognizes the security of the nation's generation, transmission and distribution systems is paramount. Allegheny Power also has obligations to its customers and shareholders to protect its own infrastructure and assets and its own and customers' data. Allegheny Power has therefore designed its Smart Meter Architecture to fully address security considerations and provides appropriate physical and software security at each point of vulnerability including prevention of unauthorized access to the meter, access to the field data collection systems and to the local and wide area networks. Industry standard techniques for user authentication and encryption will be implemented.

1.3. Stakeholder Meetings

Allegheny Power conducted fourteen stakeholder meetings to solicit stakeholder input and feedback regarding the development of the Company's Act 129 EE&C and DR Plan and the SMIP. The stakeholder process also included numerous informal meetings and discussions which provided the Company with valuable input on the Plans. At the early meetings Allegheny

Power representatives described the EE&C and DR Plan, plus developed elements of this SMIP, with emphasis on the interest of the particular invitees to the stakeholder meeting. In addition, Allegheny Power met two times with Commission Staff to provide preliminary reviews of both Plans for feedback.

In the later meetings, Allegheny Power representatives described more details around the reliance of the installation of smart meters and related technologies to the success of the EE&C Plan.

Stakeholder Meeting Summary:

- April 8, 2009 – Harrisburg (All interested stakeholders)
- April 23, 2009 – Greensburg (Municipalities)
- May 5, 2009 – Uniontown (Low-Income)
- May 7, 2009 – Butler (Low-Income)
- May 11, 2009 – Harrisburg (Rates)
- May 12 & 13, 2009 – Latrobe, Chamber Fest (Residential, low income, and small business customer survey conducted)
- May 13, 2009 – Greensburg (Government)
- June 3, 2009 – Harrisburg (All)
- June 5, 2009 – Lewisburg (Seda-Cog)
- June 10, 2009 – Greensburg (Government)
- June 11, 2009 – Harrisburg (Pre-filing presentation - EE&C and DR)
- July 21, 2009 – Camp Hill (Review of SMIP)
- July 22, 2009 – Connellsville (Collective bargaining review of EE&C and SMIP)
- August 6, 2009 – Harrisburg (Pre-filing presentation - SMIP)

The Company looks forward to continuing in collaborative efforts with the Commission, customers and other parties to ensure the success of the Plan.

1.4. Selection of System Configuration

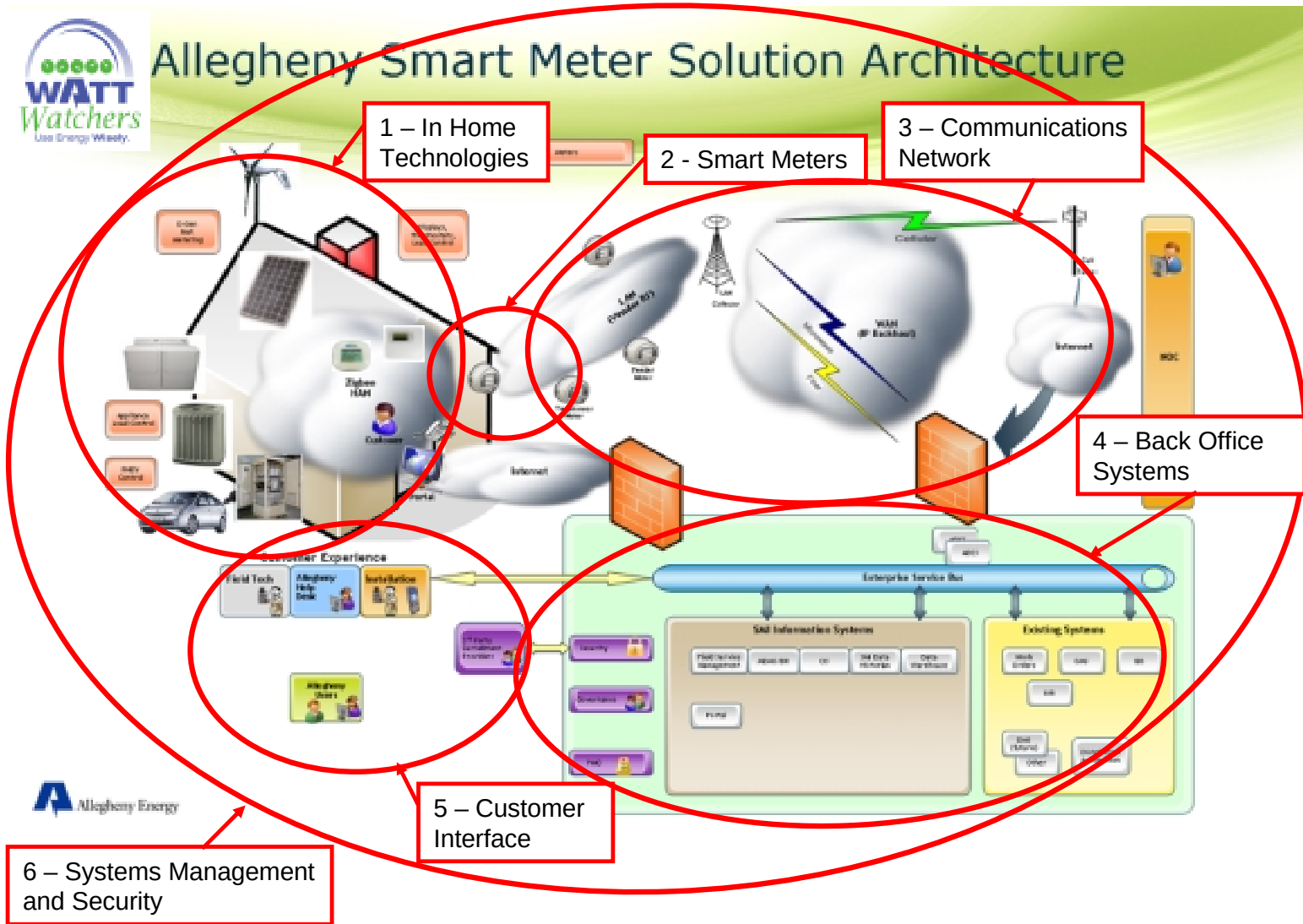
Allegheny Power has designed its plan as a cost-effective tool that provides customers the infrastructure to participate in a myriad of EE&C programs, while providing them detailed information on their usage, which can subsequently change consumer behavior. Utilizing stakeholder input and feedback has made it possible for Allegheny Power to provide visibility and insight into the Plan while modifying the Plan to increase its potential for success.

Allegheny Power conducted an in-depth examination of its geographic, demographic, and customer characteristics and designed its SMI to meet the unique and specific needs of its customers and its service territory. :

- Allegheny Power has approximately 720,000 customer meters operating today in Pennsylvania. Most residential premises receive electric delivery service from Allegheny Power. Any Smart Metering Infrastructure solution must address the possibility that the company may be required to read or may desire to read signals from other metering systems deployed by Allegheny Power or potentially deployed by other utility companies.
- Although a portion of the Company's Pennsylvania service territory includes areas of medium meter density, the meter-density in most areas is relatively low, increasing time and effort for Smart Metering Infrastructure installation and maintenance.
- Much of the terrain in the service territory is challenging for construction of the necessary communications infrastructure.
- Allegheny Power currently uses, and plans to use in the future, meters from a number of manufacturers, rather than relying on a single supplier.
- Allegheny Power has some experience with interval meters for large commercial and industrial customers, and experience with a small amount of drive-by/walk-by automated meter reading (AMR) and Power Line Carrier full remote meter reading technology
- Allegheny Power has a small number of customers on time-of-use demand rates today, with the largest number being large commercial and industrial customers

As a result, Allegheny Power proposes the following Smart Metering Infrastructure (Described further in 2.2.1 *Allegheny Power SMI Architecture*) consisting of the six essential components depicted in the following architecture diagram.

Figure 2. SMI Infrastructure



1. **In Home Technologies** – Home Area Network and In Home Devices that display consumption and pricing information and connect and control appliances, thermostats, hybrid vehicles, home generation, etc.
2. **Smart Meter** – Connects the Home Area Network to the Electric System using standard wireless communications and a multi-supplier standard. Takes readings at configurable intervals (15-60 minutes) and transmits them to utility back office systems. Includes remote connect/disconnect capability that potentially enables the utility to quickly restore service.
3. **Communications Network** – Connects the Smart Meters to the core systems using secure RF wireless, microwave and fiber communications.
4. **Back Office Systems** – Collects, stores, processes, and manages information transmitted to and generated by users, In Home Devices, and Smart Meters. Calculates and issues bills.
5. **Customer Interface** – Provides ability for customers and authorized third parties to interact and better manage their electric usage via In Home Devices (e.g. thermostats), Interactive Voice Response system or web portal.
6. **Systems Management and Security** – The processes and tools to manage the components to ensure reliability and service levels and to ensure the entire Smart Meter Infrastructure is secure.

1.5. Smart Meter Technology Procurement and Installation Plan

The basic demand response program concept is that Smart Metering and associated equipment will be installed to convey energy consumption and price information to customers to enable them to better control their energy consumption and their electricity bills. In order to meet its demand reduction targets in 2013, it is necessary for Allegheny Power to install Smart Meters and associated Smart Metering Infrastructure, with installation beginning in early 2010.

1.6. Customer and Societal Benefits

Central to the selection of the proposed Smart Metering Infrastructure is the potential for significant future customer and societal benefits, also described further in Section 5 COST AND BENEFITS. These are derived from the enhanced usage collection, communications, and process integration capabilities provided or enabled by the proposed Smart Metering Infrastructure deployment. The long-term use of Smart Metering Infrastructure for time-of-use pricing will allow customers to adjust consumption decisions based on the day-to-day and hour-to-hour price of electricity and its impact on their bills. This will benefit society in two key ways:

Demand Response. Moving usage away from periods of high demand and price will defer the need for the construction of new generation capacity.

Energy Conservation. Reducing usage overall can have substantial environmental and social benefits. Reduced usage could also lower carbon emissions.

With Smart Metering Infrastructure deployment Allegheny Power's customers can expect:

- New demand-side options, including load management, load aggregation, and rate choices. These choices include and highlight Allegheny Power's EE&C and DR Programs filed with the Commission in the EE&C and DR Plan on June 30, 2009.
- The near total elimination of the need to visit customer premises to read meters.
- More confidence in their bills and better answers to billing questions, due to the near-elimination of any estimated read and sources of billing errors, and the ability for customer service representatives to retrieve the customer's recent, detailed, interval-based consumption history.
- The reduction of physical visits to initiate or final bill electric service.
- Improved outage response and outage information, because Smart Metering Infrastructure will help the Company locate the cause of an interruption, verify restoration status, and improve the accuracy of outage data.
- Access to their own individual interval-based energy usage data and other energy audit and analytical information through the Internet via a Company web portal.
- Reduced potential for equipment damage, because low voltage and low power conditions will be detected.

With Smart Metering Infrastructure everyone will benefit from:

- Fewer Company vehicles on the road, which will eliminate associated emissions and increase Company manpower efficiency.
- The use of Smart Metering Infrastructure to optimize the transmission and distribution system, which offers the potential to reduce losses, optimizes construction, and/or improves service reliability.

1.7. System Costs and Savings

Section 5 COST AND BENEFITS outlines the costs and savings of the Company's proposed Smart Metering Infrastructure system configuration.

The capital cost of implementing Smart Metering Infrastructure in the Company's Pennsylvania service territory, assuming installation of meters begins in early 2010, is expected to be \$482 million. Included in this estimate are a combined \$410 million for new Smart Meters and installation, communication network system, IT infrastructure and other costs, including the

MDMS system, implementation of Smart Metering Infrastructure applications and integration, and \$71 million for CIS modernization.

Cost savings will begin for a particular area as soon as the meters and communications network are complete, and as soon as the Back Office Systems are ready. The savings is currently estimated to be approximately \$43 million over the initial 5-year period. Savings and utility benefits will primarily occur in the areas of meter reading, billing, outage management and response, the customer service center, under-registration, and energy diversion. These savings benefits are further described in Section 5 COST AND BENEFITS.

1.8. Deployment Plan

Allegheny Power will continue planning and development of Smart Metering Infrastructure, as shown in Section 2.3 *Smart Meter Deployment Process*, in order to begin meter installation in early 2010 to be completed by the end of 2014. Generally, meters will be installed on a service-center-by-service-center basis throughout the Company's Pennsylvania territory. However, Allegheny Power is planning to ensure that the meter deployment strategy best meets the needs of the service territory, is time effective, and is reasonable and prudent such that EE&C and DR targets legislated in Act 129 are met. Further details of the Company's deployment plan are contained in Section 2.3.

1.9. Cost Recovery

In Section 4 COST RECOVERY MECHANISM, the Company describes the specific surcharge mechanism to recover the return of and on capital and the necessary investments made to develop and deploy Smart Metering Infrastructure throughout its Pennsylvania service territories, and to recover net O&M costs and savings. This will provide an appropriate incentive to deploy a fully capable Smart Metering Infrastructure system, and provide Allegheny Power with the necessary assurance that prudently incurred costs will be recovered on a timely basis.

2. THE PLAN

In response to Act 129 and the related Commission's Implementation Order, Allegheny launched a team comprised of internal business and technology personnel to competitively select technology partners to assist Allegheny Power in the development of a plan to comply with Act 129. Following a competitive bidding process, Allegheny Power engaged EDS, an HP Company, a world-recognized technology and consulting firm with a dedicated Smart Metering practice, to assist in research and analysis to develop a reasonable and prudent Smart Metering Infrastructure. The principal aspects of this work were (1) the identification of (i) the goals for Smart Metering Infrastructure in conjunction with EE&C and DR programs and (ii) the costs and benefits of an effective and efficient Smart Metering system, (2) the identification of appropriate technology, and (3) planning for significant business and operational change driven by Smart Metering, the analysis that reflects these findings about the critical relationship between Allegheny Power's proposed Smart Metering Infrastructure and the Company's EE&C and DR programs and measures is set forth in the following section describing the Smart Meter Plan.

From extensive review and design effort of Smart Metering Infrastructure, the Company believes that Smart Metering will provide a basis for customer cost-savings, customer service improvement and productivity changes in many areas of customer operations as well as enabling benefits for customers, the environment, and society generally. The primary change in utility operations will be the substitution of automated reading of electric meters for manual meter reading. Other customer service goals expected to be realized with the implementation of Smart Metering Infrastructure include substantial reduction in (i) the number of estimated bills issued and the reduction in customer contacts regarding estimated usage, (ii) disputes regarding responsibility for service left "hot" after a customer vacates a premises and before a new customer requests service, and (iii) more frequent and granular consumption information that is expected to enable customers to participate in energy conservation and demand response in accord with Act 129 and facilitate many other uses that improve the regulated utility and its service to customers.

Through the Customer Interfaces in the new Smart Meter Infrastructure, the Company also anticipates that all customers, their energy consultants, Curtailment Service Providers in the PJM Load Management Programs, and Conservation Service Providers ("CSP") will have access to usage information from the Smart Metering Infrastructure in a convenient form and without distinction. Again, with the enhanced usage information available to customers, Curtailment Service Providers, and CSPs, customers will in turn make more informed energy choice, participate in demand response programs. Through the new and updated Back Office systems planned for implementation as part of the Smart Meter Infrastructure, particularly the Meter Data Management System, the Demand Response Management System and the Customer Information System, customers will be able to participate in Time Of Use rates and Real Time pricing and benefit from more accurate and timely billing.

Additionally, the Smart Meter Infrastructure is also expected to provide the Company with enhanced distribution system information relating to power outages and restoration, power quality, and meter tampering, as well as facilitating participation in energy management programs through manual action by customers, preprogramming, or remote control. Such facilitation is consistent with the United States Department of Energy's recommendations developed as a result of the federal Energy Policy Act of 2005 and the price-responsive load programs of the PJM Interconnection, L.L.C. (PJM).

Allegheny Power is fully committed to bring Smart Metering Infrastructure capabilities and its benefits to the energy consumers of the Commonwealth of Pennsylvania. The lack of contemporary information and communication functionality has been a key factor in preventing utilities from moving to 21st century business functionality. In addition, societal and environmental benefits from Smart Metering Infrastructure can accrue through reduced emissions, moderated demand growth, and a reduced operational footprint and complexity.

In this plan, the Company proposes to install Smart Metering Infrastructure throughout its Pennsylvania service territory with deployment completed in 2014.

2.1. Goals for the Plan

Allegheny Power has established the following goals for its Smart Meter Implementation Plan:

- Compliance with Act 129 Smart Meter requirements for Smart Meter implementation
- Compliance with Commission Implementation Order entered June 24, 2009
- Attainment of the EE&C and DR targets legislated in Act 129
- Prudent and timely expenditure of funds
- Provide a technical foundation for future conservation and Demand Response targets and programs

Since Act 129 requires Allegheny Power to implement Smart Meters and to attain the following specific Consumption and Demand Response targets:

<u>Target</u>	<u>Date</u>
1% Consumption reduction	May 31, 2011
3% Consumption reduction	May 31, 2013

4.5% Peak Demand reduction

May 31, 2013

Allegheny Power plans to use the Smart Meters to provide the technology required to support the EE&C and DR programs that will enable attainment of the Act 129 targets.

Allegheny Power proposes to meet the energy efficiency and conservation requirements of Act 129 with a portfolio of 22 EE&C and DR programs, and rate offerings, including 11 for the residential sector, six for the small commercial and industrial sector, four for the large commercial and industrial sector, and one for government, school and non-profit customers, with nine of the proposed programs enabled by Smart Metering Infrastructure. Allegheny Power's EE&C and DR measures and programs have been designed with a sufficiently broad scope and variety to provide opportunity for all of the Company's Pennsylvania customers to participate and benefit. Many of the Company's EE&C and DR measures and programs provide customers with rebates or other direct incentives that not only encourage participation but also foster positive behavioral change with the installation of Smart Metering Infrastructure that in turn creates lasting economic, environmental, and societal benefits.

During the past several years and as part of a nationwide trend, Pennsylvania's energy-consuming citizens and businesses have faced rising prices without the ready ability to decrease their energy use or control costs. The Company's EE&C and DR filing responds to this issue by providing Allegheny Power customers with robust energy conservation and efficiency tools, including the proposed Smart Metering Infrastructure, enabling customers to reduce their electricity consumption and demand with the concomitant opportunity to save money. The measures, programs and rate offerings described in the EE&C and DR filing are all supported or enabled by Smart Metering Infrastructure and will help customers adjust their energy use with the aim of reducing overall consumption and decreasing peak demand for electricity.

Smart Metering Infrastructure will educate customers on their energy usage and the true cost of electricity, and will enable customers to monitor and effectuate changes in their usage to manage their energy bills. This dynamic, customer-driven demand response not only creates economic benefit for individual customers but also places significant downward pressure on regional electricity wholesale capacity and energy prices creating a larger region-wide economic and social benefits. The SMIP also takes customers to a future where Demand Side Management (DSM) programs, focused on both energy efficiency and conservation and demand response, are enabled by new technology investments that best meet customer lifestyles, behaviors, and electricity needs. Smart metering systems allow customers to be more aware of their energy usage so that they can make more conscious decisions about how to use their energy. By having access to more timely information on their energy usage customers can link the consumption decision to real time, real life activities.

Nine of the programs proposed in the EE&C and DR filing are enhanced by and/or rely on the installation of Smart Meters and Smart Metering infrastructure as well as new rate structures

and tariffs. The Company believes that Smart Meters, Smart Metering infrastructure and a set of complementary designed rates and tariffs are essential components of the Company's EE&C and DR to meet the mandated consumption and demand reduction targets mandated by Act 129. Well-designed rate structures, implemented in conjunction with Smart Metering infrastructure, will allow customers the opportunity to change their energy usage behavior based on price signals in the electricity market. The technology will also be able to verify customer compliance with a variety of electricity consumption guidelines and agreements with Allegheny Power established by rates and other EE&C and DR programs. The list below provides some of the potential benefits from Smart Metering Infrastructure specific to EE&C and DR initiatives:

- Increased utility EE and DR participation
- Expanded product offerings from competitive retailers
- Avoided capacity costs
- Avoided energy costs
- Enable demand-side generation technologies
- Facilitate revolutionary technologies like plug-in-hybrid electric vehicles and on-site renewable generation
- Conservation effect on energy usage from direct feedback
- Accelerate adoption of more efficient devices and technologies

Ultimately, the Company's success in achieving Act 129 goals relies on the combined ability of rates, programs and technology to influence customer behavior and choices about electricity consumption in homes and businesses. From years of experience, the Company knows that each customer will think about, behave and react differently to energy price signals based on individual choice, preference for comfort, or personal/business need. Allegheny Power plans to use a combination of technical and non-technical solutions to influence customer choice and behavior. In the non-technical sphere, the company will use various public media to educate and inform customers of the Company's EE&C and DR programs and rate offerings to achieve customer participation. In the technological realm, the EE&C and DR filing relies on the approval and deployment of Smart Meters and Smart Metering infrastructure plus the use of several new technologies, such as web portals, in-home displays, programmable controllable thermostats, along with the application of email, text messaging and other social networking tools to provide new, innovative ways of communicating with customers and influencing their behavior. The Company's proposed programs and rate offerings, in conjunction with the installation of Smart Metering infrastructure, provides the complete framework required to produce real energy savings and environmental benefits. The Company is hopeful that the SMIP will be reviewed and approved by January 29, 2010 in order for the Company to meet its goals mandated by Act 129, and energy conservation and DR targets that are likely to be

mandated in the future. The following tables illustrate the Demand and Energy goals mandated by Act 129:

Table 1. Energy Consumption Forecasts and Mandated Reductions

Table 1. Energy Consumption Forecasts and Act 129 Mandated Consumption Reductions as Measured in Megawatt-Hours			
EDC	Forecast	1% Reduction	3% Reduction
Duquesne	14,085,512	140,855	422,565
Met-Ed	14,865,036	148,650	445,951
Penelec	14,399,289	143,993	431,979
Penn Power	4,772,937	47,729	143,188
PPL	38,214,368	382,144	1,146,431
PECO	39,386,000	393,860	1,181,580
West Penn	20,938,650	209,387	628,160
Total	146,661,792	1,466,618	4,399,854

Table 2. Average Historical Peak Loads and Mandated Reductions

Table 2. Average Historical Peak Loads and Act 129 Mandated Peak Demand Reductions as Measured in Megawatts		
EDC	Load	4.5% Reduction
Duquesne	2,518	113
Met-Ed	2,644	119
Penelec	2,395	108
Penn Power	980	44
PPL	6,592	297
PECO	7,899	355
West Penn	3,496	157
Total	26,524	1,193

The proposed EE&C and DR measures, programs, and rate offerings are as shown in the following chart and those that are enabled by Smart Metering Infrastructure are described as follows:

Table 3. Proposed EE&C and DR Measures, Programs and Rate Offerings

Program Name	Energy Efficiency & Conservations	Demand Response	Enabled by Smart Metering Infrastructure	Residential	Residential - Low Income	Small Commercial & Industrial	Large Commercial & Industrial	Governmental & Non-Profit
Residential Energy Star & High Efficiency Appliance Program	X			X	X	X	X	X
Compact Fluorescent Lighting (CFL) Rewards Program	X			X	X	X	X	X
Residential HVAC Efficiency Program	X			X	X			
Residential Home Performance Program	X			X	X			
Residential Low Income Home Performance Check-Up Audit & Appliance Replacement Program	X				X			
Residential Low Income Joint Utility Usage Management Program	X				X			
Residential Low Income Room Air Conditioner Replacement Measure	X				X			
Residential Efficiency Rewards Rate	X		X	X	X			
Commercial HVAC Efficiency Program	X					X	X	X
Commercial Lighting Efficiency Program	X					X	X	
Governmental/Non-Profit Lighting Efficiency Program	X							X
Custom Technology Applications Program	X					X	X	X
Programmable Controllable Thermostat (PCT) Program		X	X	X	X	X		X
Pay Ahead Smart Service Rate	X		X	X	X	X	X	X
Commercial and Industrial Drives Program	X					X	X	X
Custom Applications Program	X						X	
Customer Load Response Program		X	X			X	X	X
Distributed Generation Program		X	X			X	X	X
Contracted Demand Response Program		X	X			X	X	X
Critical Peak Rebate (CPR) Rate		X	X	X	X	X		X
Time of Use (TOU) Rate with Critical Peak Pricing Rate	X	X	X	X	X	X		X
Hourly Pricing Option (HPO) Rate	X	X	X	X	X	X		X

Each of the programs that are enabled by the Smart Meter Infrastructure, as shown in the above table, is described below.

2.1.1. Residential Efficiency Rewards Rate

The Residential Efficiency Rewards Rate is a rate offering that encourages residential customers to lower their energy consumption from historical levels through a credit/discount on their bill based on their actual reduction in their energy use. Customers that sign up for this program and lower their energy consumption over a set period of time from the historical period would receive a credit on their electric bill. This rate offering could be competitively neutral to allow customers to continue to pay the same generation charge as on utility-provided default service or from an electric generation supplier.

2.1.2. *Programmable Controllable Thermostat (PCT) Program*

The primary purpose of the Programmable Controllable Thermostat (PCT) Program is to automate demand response through direct load control of central air conditioners for residential and small commercial and industrial and governmental/non-profit customers. Smart Metering and associated equipment will be installed to provide communications to the thermostat, thus providing direct load control. Customer response to energy prices may also be automated and/or manual. This program may utilize one of the time-of-use or hourly priced option rates that are being developed.

2.1.2.1. *Pay Ahead (Smart) Service Rate*

The Pay Ahead (Smart) Service Rate is a billing option that provides customers with a better understanding of their electric usage, by providing them with information regarding their energy consumption relative to their Pay in Advance account balance, to support their energy use awareness and support their energy efficiency initiatives. Pay Ahead Smart Service requires the installation of a Smart Meter and the associated in-home/in-facility display to provide customers with their energy consumption relative to their Pay in Advance account balance. The Pay Ahead Smart Service Rate is voluntary and is only available to customers that are receiving utility-provided default service and would include all utility charges. Anticipated voluntary participants will be those with high consumption, high bill complaints and college students.

2.1.3. *Customer Load Response Program*

The Customer Load Response Program is focused on reducing kW demand by providing load management services to small and large commercial and industrial, and governmental/non-profit customers. Under this program, Allegheny Power will act as a “Curtailement Service Provider” in the PJM Load Management Programs and call events to meet a portion of the demand reduction requirements. In addition, Allegheny Power would also act as a Curtailement Service Provider with PJM Interconnection, L.L.C. (“PJM”), to leverage and enroll customer’s load curtailment into PJM’s capacity markets during peak load hours.

2.1.4. *Distributed Generation Program*

The Distributed Generation Program is focused on reducing kW demand by deploying customer-owned standby generation. Under this program, Allegheny Power would contract with a third party dispatchable generation provider that would operate, maintain and dispatch a customer’s standby generator. In addition, the vendor can provide new standby generation to customers under an operating leasing arrangement that provides customers with an alternative to using capital money for a standby generator in addition to adding to the amount of dispatchable generation resources. The vendor would dispatch the generation to meet a portion of the demand reduction requirements during peak load hours. Based on typical operating scenarios, standby generators are typically used less than 500 hours per year, with 100 of those hours being used for demand response events, with the remaining hours being used by the customer for planned maintenance and/or unplanned outages. In addition, Allegheny will explore the use of

alternative fuels such as bio-diesel, or waste methane/landfill gas for these generators. Allegheny will ensure all permitting requirements are adhered to in this program.

2.1.5. *Contracted Demand Response Program*

Under the Contracted Demand Response Program, a third party would be contracted to market, recruit, contract and reconcile demand response contracts with participating customers. The contracted Curtailment Service Provider would be responsible for calling events and dispatching demand resources to meet a portion of the demand reduction requirements during peak load hours. This program would be used in conjunction with the Customer Load Response Program.

2.1.6. *Critical Peak Rebate (CPR) Rate*

The Critical Peak Rebate (CPR) Rate encourages residential, commercial, industrial, government, school, and non-profit customers under 500 kW to lower their demand and energy consumption during on-peak periods by providing a rebate based on their demand reduction during peak load hours. CPR could be competitively neutral to allow customers to continue to pay the same generation charge as on utility-provided default service or from an electric generation supplier. CPR relies on the installation of a Smart Meter to track the customer's demand during peak hours, and the addition of an in-home/in-facility display improves customer notification and communication regarding peak periods. Participants will receive additional information to assist them in controlling their demand and their electric bills.

2.1.7. *Time of Use (TOU) with Critical Peak Pricing Rate*

TOU rates reflect the cost of serving customers during different time periods, but do not change as frequently as hourly. TOU encourages residential, commercial, industrial, government, school, and non-profit customers under 500 kW to lower their demand and energy consumption during on-peak periods by charging a higher price that reflects the higher cost of serving customers, and charging lower prices during off-peak periods that reflects the lower cost of serving customers. TOU also includes critical peak pricing which is designed to address the short-term need to reduce demand at the time of the system peak by charging prices significantly higher than other periods. Critical peak pricing periods will vary in frequency and duration using predefined or notified peak hours, but will balance the need to keep the period as short as possible to effectively allow customers to reduce demand or shift usage to lower cost periods. TOU is voluntary and is only available to customers that are receiving utility-provided default service. TOU relies on the installation of a Smart Meter to track the customer's demand and energy usage during the various TOU periods, and the addition of an in-home/in-facility display improves customer notification/communication regarding peak periods.

TOU is offered as an optional service and does not replace the default service program approved by Commission Order entered July 25, 2008 at Docket No. P-00072342.

2.1.8. Hourly Pricing Option (HPO) Rate

The Hourly Pricing Option (HPO) Rate reflects the different cost of energy during each hour and encourages residential, commercial, industrial, government, school, and non-profit customers under 500 kW to lower their demand and energy consumption during high priced periods and/or shift usage to low priced periods. Billing for the HPO is calculated from the PJM hourly market pricing for the Allegheny Power Zone, and includes the price of energy, capacity, ancillary services, alternative energy compliance, and any other Federal Energy Regulatory Commission and/or PJM charge directly related to the HPO, as adjusted for taxes. Participants can receive a daily updated approximation of their monthly bill to date (since last bill) and an approximation of their electricity cost for the prior day. The HPO is voluntary and is only available to customers that are receiving utility-provided default service. The HPO requires the installation of a Smart Meter to track the customer's hourly energy consumption, and the addition of an in-home/in-facility display improves customer communications regarding their energy consumption and billing.

The HPO is offered as an optional service and does not replace the default service program approved by Commission order entered July 25, 2008 at Docket No. P-00072342.

Allegheny Power strongly believes its approach to EE&C and DR programs, including those enabled by Smart Metering Infrastructure, maximizes potential energy savings. The Company's portfolio of EE&C and DR measures and programs addresses each major energy consuming appliance, system or process across the full spectrum of both customers' usage and customer segments. A key element in the design of the Company's proposed EE&C and DR programs is to provide incentives to customers that elect to install more efficient end-use devices. Changing how customers use energy is the ultimate objective. A logical progression in changing customer behavior is first a focus on the deployment of more efficient equipment. Then, over time, the focus shifts to the manner in which equipment or appliances are operated. A crucial tool in effecting customer change in behavior is providing customers with information on how they use energy in conjunction with energy prices. Allegheny Power's EE&C and DR Plan rely on the availability of Smart Metering Infrastructure to provide customers with this knowledge.

Despite the many demonstrable benefits of customer participation in beneficial EE&C and DR behaviors, Allegheny Power believes, however, that incentive programs are a logical and necessary first step to initiate market transformation and progress towards meeting the mandated reductions under Act 129. Once vendors increase their stock of high-efficiency appliances, or no longer stock standard efficiency appliances (which is reported to have resulted from rebate programs in California), and customers more consistently choose high-efficiency appliances, rebates may be reduced, reallocated to new initiatives such as those encouraging customer behaviors, or eliminated. Finally, the proliferation of Smart Meter and Smart Grid technology will result in lower costs for the infrastructure, and the market transformation may be completed with the deployment of highly interactive interfaces in customer homes and businesses, that deliver detailed information on individual appliance usage and cost, and real-time pricing information, the extent of which is limited only by budget and imagination.

To catalyze market transformation and meet EE&C and DR targets mandated by Act 129, Allegheny Power is proposing several EE&C and DR programs and rate offerings that require the installation of Smart Metering and Smart Metering infrastructure. The “National Assessment of Demand Response Potential” by the U.S. Federal Energy Regulatory Commission (FERC) shows that the tremendous economic and environmental gains from demand response will be best realized if consumers – particularly residential consumers – respond to real-time price signals. The report concludes that the greatest potential for demand response gains will come when consumers have advanced metering technology that allows them to respond to dynamic pricing, or real-time price signals. As described above, the programs and rate offerings proposed by Allegheny Power that rely on the Smart Metering and Smart Metering infrastructure, or a portion thereof, are:

1. Programmable Controllable Thermostat (PCT),
2. Customer Load Response
3. Contracted Demand Response, and
4. Distributed Generation.

The rate offerings that rely on Smart Metering and Smart Metering infrastructure include:

1. Residential Efficiency Rewards
2. Pay Ahead Smart Service,
3. Critical Peak Rebate (CPR),
4. Time of Use (TOU) with Critical Peak Pricing, and
5. Hourly Pricing Option (HPO)

The Company plans to file these rate options in mid-2010 for an effective date in first quarter 2011.

The following tables show the Program Summaries of the Company’s proposed EE&C and DR plan, including the projected Demand and Energy savings:

Table 4. Program Summaries

Table 4: Program Summaries

o Add additional rows to list more

	Program Name	Program Market	Program Two Sentence Summary	Program Years Operated	Net Lifetime MWh Savings	Net Peak Demand kW Savings	Percentage of Portfolio and Total Lifetime MWh savings	
Residential Portfolio Programs (exclusive of Low Income)	<i>Compact Fluorescent Lighting (CFL) Rewards Program</i>	All residential customers	A rebate program that encourages the purchase of single and multipack CFL's. Mail-in rebates and point-of-sale discounts (where possible) will be offered.	4	627,810	339	39%	9%
	<i>Critical Peak Rebate (CPR) Rate</i>	All residential customers with Smart Metering	A rebate rate offering that encourages customers to lower their energy demand during peak load hours by offering a rebate based on their actual energy demand.	3	2,497	9,513	0%	0%
	<i>Residential Energy Star and High Efficiency Appliance Program</i>	All residential customers	A rebate program that encourages the purchase of certain appliances that meet or exceed Energy Star or other efficiency ratings, through mail-in rebates.	4	440,219	19,894	27%	7%
	<i>Residential Home Performance Program</i>	Single family or multifamily residential dwelling units.	A program that educates customers on EE&C and improves overall home performance by promoting and providing the installation of standard EE&C measures. Includes three home energy audit options. Encourages additional qualified measures through mail-in rebate.	4	462,042	6,418	29%	7%
	<i>Programmable Controllable Thermostat (PCT) Program</i>	All residential customers with Smart Metering	A program that provides automated demand response and reduces energy usage during peak load hours through the direct load control of air conditioners. Customers will receive a credit on their bill for participation in this program.	3	2,497	9,513	0%	0%
	<i>Residential HVAC Efficiency Program</i>	All residential customers with air conditioners or heat pumps.	A rebate program that encourages customers to purchase high efficiency air conditioners or heat pumps. Mail-in rebates will be offered for central air conditioners or heat pumps that exceed certain efficiency ratings.	4	69,152	5,515	4%	1%
	<i>Residential Efficiency Rewards Rate</i>	All residential customers with Smart Metering	A rate offering that encourages customers to lower their energy consumption from historical levels. Customers will be provided a credit/discount on their bill based on their actual reduction in energy usage.	3	11,023	959	1%	0%
	<i>Pay Ahead Smart Service Rate</i>	All residential customers with Smart Metering	A billing option that provides customers with a better understanding of their energy usage and the impact on their electric bill. Customers will be provided information regarding their energy usage and account balance to support customer efficiency initiatives.	3	4,724	411	0%	0%
	Totals for Residential Sector				1,619,964	52,563	100%	24%
Residential Low-Income Sector Programs	<i>Residential Low Income Home Performance Check-Up Audit & Appliance Replacement Program</i>	Residential customers up to 150% of the federal poverty level.	A program that educates customers on EE&C and improves overall home performance by providing the installation of EE&C measures. Includes replacement of refrigerators and room air conditioners that meet certain qualifications.	4	36,427	1,193	26%	1%
	<i>Residential Low Income Joint Utility Usage Management Program</i>	Residential customers up to 200% of the federal poverty level.	A program that leverages resources and funding to provide comprehensive energy saving measures and weatherization services to low income customers through partnership with gas utilities.	4	101,868	1,210	72%	2%
	<i>Residential Low Income Room Air Conditioner Replacement Measure</i>	Residential Low Income Usage Reduction Program (LIURP) customers.	A program that provides replacement of room air conditioners meeting certain qualifications as an add-on to the Company's existing Low Income Usage Reduction Program.	4	4,010	351	3%	0%
	Totals for Low-Income Sector				142,305	2,753	100%	2%
Governmental / Non-Profit Portfolio Programs	<i>Governmental/Non-Profit Lighting Efficiency Program</i>	All government, school and non-profit customers with lighting.	A rebate program that encourages customers to upgrade lighting systems to more efficiency lighting technologies. Mail-in rebates and/or product buy-downs will be offered for certain lighting replacements or installations including CFL's, T8, LED Exit Signs and LED Traffic Signals.	4	588,345	7,962	100%	9%
	Totals for Gov't/NP Sector Programs				588,345	7,962	100%	9%

	Program Name	Program Market	Program Two Sentence Summary	Program Years Operated	Net Lifetime MWh Savings	Net Peak Demand kW Savings	Percentage of Portfolio and Total Lifetime MWh savings	
Commercial/ Industrial Small Portfolio Programs	Commercial HVAC Efficiency Program	Small commercial and industrial and governmental/non-profit customers with air conditioners or heat pumps.	A rebate program that encourages customers to purchase high efficiency air conditioners or heat pumps. Mail-in rebates will be offered for central air conditioners or heat pumps that exceed certain efficiency ratings.	4	60,246	2,522	2%	1%
	Commercial Lighting Efficiency Program	Small and large commercial and industrial and governmental/non-profit customers with lighting.	A rebate program that encourages customers to upgrade lighting systems to more efficiency lighting technologies. Mail-in rebates will be offered for certain lighting replacements or installations including T8, T5, LED Exit Sign and Occupancy Sensors.	4	3,047,224	42,701	94%	46%
	Contracted Demand Response Program	Small and large commercial and industrial customers and governmental/non-profit customers.	A program that provides demand response with participating customers through a third party demand response provider. Customers will receive payment for their participation in demand response events.	0	0	0	0%	0%
	Custom Technology Applications Program	Small and large commercial and industrial customers and governmental/non-profit customers.	An incentive program that encourages energy and demand reductions by providing incentives for qualified projects that improve energy efficiency of customer processes and applications.	3	127,876	2,235	4%	2%
	Time of Use (TOU) with Critical Peak Pricing Rate	Small commercial and industrial customers and governmental/non-profit customers, with Smart Metering.	A rate offering that encourages customers to lower their demand and energy consumption during on-peak and peak load periods by charging a higher price during these periods and a lower price during off-peak periods, that reflects the cost of serving customers during these periods.	3	7,638	2,856	0%	0%
	Hourly Pricing Option (HPO) Rate	Small commercial and industrial customers and governmental/non-profit customers, with Smart Metering.	A rate offering that encourages customers to lower their demand and energy consumption during higher priced periods and/or shift usage to lower priced periods. Billing is calculated from the PJM hourly market pricing for the AP zone.	3	1,348	504	0%	0%
	Totals for C/I Small Sector					3,244,333	50,817	100%
Commercial/ Industrial Large Portfolio Programs	Custom Applications Program	Large commercial and industrial customers with at least 2,500,000 kWh's energy usage per year.	An incentive program that encourages energy and demand reductions by providing incentives for qualified projects that improve energy efficiency of customer processes and applications.	3	901,721	11,793	82%	13%
	Customer Load Response Program	Small and large commercial and industrial customers and governmental/non-profit customers, with Smart Metering.	A program that provides demand response with participating customers by contracting with customers for load reduction during peak load hours. Customers will receive payment for their participation in Company demand response events.	3	8,074	59,494	1%	0%
	Distributed Generation Program	Small and large commercial and industrial customers and governmental/non-profit customers, with stand-by generation resources.	A program that provides demand response with participating customers by deploying customer-owned standby generation during peak load hours. The Company will contract with a third party dispatchable generation provider to operate, maintain and dispatch a customer's standby generator.	3	2,830	28,500	0%	0%
	Commercial and Industrial Drives Program	Small and large commercial and industrial customers and governmental/non-profit customers.	A rebate program that improves customer process efficiency by applying variable frequency drives to existing applications or process loads. Mail-in rebates will be offered for qualifying installations.	4	185,456	2,446	17%	3%
	Totals for C/I Large Sector					1,098,082	102,233	100%
Total for Plan					6,693,027	216,328		100%

2.2. System and Service Area Considerations

Allegheny Power currently has 1500 meters at commercial accounts and 3000 AMR meters at very remote customers that transmit readings to Allegheny Power. None of these meters meet the definition of Smart Meter in the Implementation Order of June 24, 2009.

To comply with Act 129 and the Implementation Order, Allegheny Power has to install new Smart Meters at all of the approximately 720,000 existing and all new customers in its Pennsylvania service territory. To support two-way communications with those meters, Allegheny Power needs to build a new and secure telecommunications network. To capture and manage the interval data from the meters and to manage two-way communications to and from the meters, Allegheny Power needs to implement new IT applications. To support Time of Use rates and Real-Time Pricing and also to integrate the Campaign Management System needed to promote and enroll customers in the new programs described in the EE&C and DR, Allegheny Power will need to purchase and install new CIS (Customer Information System) capabilities. Additionally, Allegheny Power will have to create or modify several business processes.

Such an extensive amount of change requires rigorous project management and a central program management office to coordinate wide-ranging simultaneous activity over a period of several years.

To meet its Act 129 legislated consumption and demand response targets, Allegheny Power has developed its SMIP to implement Smart Meters on a schedule that ensures they are deployed in time to support Allegheny Power's EE&C and DR programs that were proposed in the Company's EE&C and DR filing of June 30, 2009. The following chart illustrates the estimated energy and demand savings of these programs:

Estimated Energy & Demand Savings Targets				
PROGRAM YEAR	ANNUAL ENERGY SAVINGS (MWh)	PROGRAM ENERGY SAVINGS (MWh)	ANNUAL DEMAND SAVINGS (MW)	PROGRAM DEMAND SAVINGS (MW)
2009	0	0	0.0	0.0
2010	3,255	3,255	54.7	54.7
2011	10,613	10,613	83.0	83.0
2012	26,763	26,763	111.8	111.8

The programs that rely on or are fully enabled by Smart Metering significantly contribute towards the Company meeting the consumption and demand response targets of Act 129, with 83 MW of demand response towards the Company's goal of 157 MW. This represents 53% of the goal.

Allegheny Power has performed a diligent assessment of the requirements stipulated in Act 129, the Smart Meter Procurement and Installation Implementation Order of June 24, 2009 (“Implementation Order”) and requirements in the areas of security, reliability and operational efficiency to develop its SMIP and its associated costs.

The major phases and their schedule are:

Table 5. Major Phases

Phase Description	Year	Cumulative total of Smart Meters deployed by end of year
Plan and begin construction of test meter and LAN field trials and smart meter lab Requirements Definition, Selection and Design Activities for the Enterprise Service Bus, Meter Data Management System Planning, business process blueprinting and design of Customer Information System Modernization Requirements Definition, Selection and Design Activities for the Identity Management System Selection and Procurement of CIS Systems Integrator Selection and Procurement of Smart Meter Systems Integrator Plan business process redesign RFP Process to select vendors and develop final costing	2009	
Meter and telecommunication Network field trials Security Systems Implementation MDMS Implementation	2010	91,162
Smart Meter Deployment CIS Implementation Customer and 3 rd party web portal and EDI Implementation	2011	385,458
Smart Meter Deployment Demand Response Management Implementation Outage Management Integration	2012	609,613
Smart Meter Deployment	2013	703,603
Final year of Smart Meter Deployment	2014	725,248

2.2.1. Allegheny Power SMI Architecture

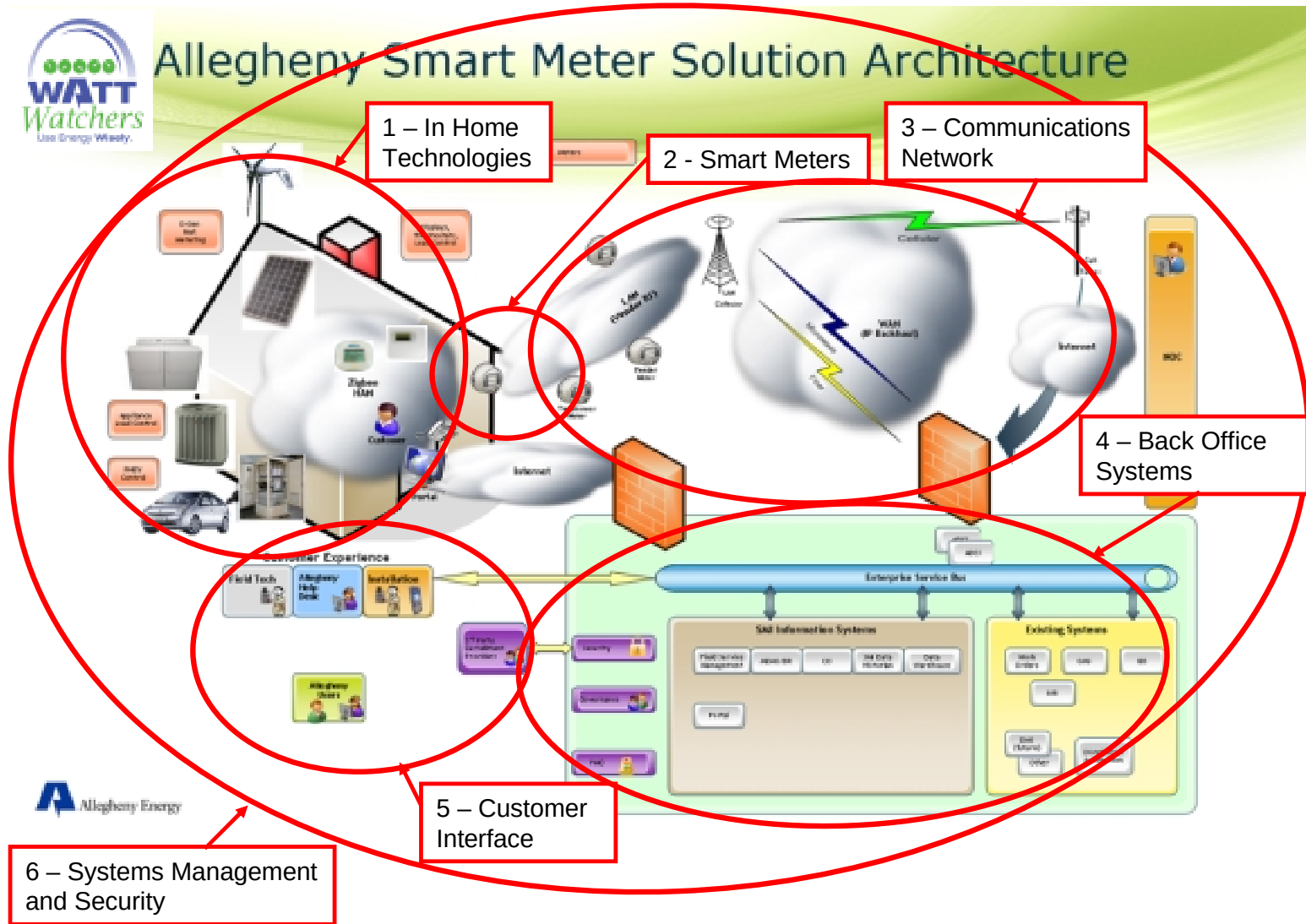
Allegheny developed the following guiding principles in the design of the SMI to meet the goals of Act 129 of:

- Providing an infrastructure to meet the EE&C and DR goals of the Act.
- Providing support for the implementation and ongoing support for the EE&C and DR programs developed by Allegheny.
- Address business process needs and requirements through application of appropriate new technologies
- Enhance the customers’ experience and provide easy, but secure, access to information

- Meeting the smart meter system technology goals.
- Provide protection for Allegheny Power's and customers' information
- Build an SMI architecture that is open (based on standards), flexible, and scalable
- Build for expansion.
- Ensure that there is no known restriction on ability to support future EE&C and DR programs.
- Ensure that there is no known restriction on capability for future Smart Grid enhancements.
- Minimize the deployment costs.
- Optimize the design to minimize future support costs.

The architecture design has six major components, as depicted in Figure 1.

Figure 1. Allegheny Smart Meter Solution Architecture



1. **In Home Technologies** – In Home Displays, Programmable Communicating Thermostats, and Load Control Devices
2. **Smart Meters** – Advanced meters (an electrical meter) that identify consumption in more detail than a conventional meter; and optionally, but generally, communicates that information via some network back to the local utility for monitoring and billing purposes (telemetry).
3. **Communications Network** – including Local and Wide Area Network Technology including towers, concentrators, head end units, switches, routers, protocol systems and other enabling software
4. **Back Office Systems** – including Customer Information System, a Meter Data Management System, a Meter Test Database, and a Work Management System.
5. **Customer Interface** – comprised of the hardware, software and security required to provide near real time energy consumption information to customers and authorized third parties as required by Act 129. It is extremely important that we focus on the customer experience and the information that is presented to the customer. Dimensions such as user authentication, security administration, information presentation, etc., are all very critical elements of the user interface.
6. **Systems Management and Security** – System Management encompasses a large set of systems, protocols, and processes that enable Allegheny Power to manage all of the technology in a manner that is consistent with good business practice, secure, and to meet the requirements of Act 129. One of the major elements of the overall system management is the security of the system. Allegheny Power has taken several steps to ensure the security of the solution across each of the dimensions of the solution.

In summary, Allegheny Power's current situation in respect of each component of the required SMI Architecture is:

1. **In Home Technologies** – none in place today.
2. **Smart Meters** – none in place today.
3. **Network** – RF network for meter communications to existing Wide Area network is not in place today. The Wide Area Network is in place but needs upgrades to support Smart Meter data traffic.
4. **Back Office Systems** – Meter Data Management System needs to be implemented; Meter Test Database - not in place and needs to be implemented; CIS – needs to be

replacement to meet Act 129 requirements; Outage management and Work Management Systems need upgrades to meet Act 129 requirements; Demand Response Management system needs to be implemented.

5. **Customer Interface** – a web portal needs to be implemented for customer and 3rd parties to access meter data.
6. **Systems Management and Security** – existing network management tools need to be upgraded, new security systems need to be implemented to protect the access to the network and to customer data.

2.2.2. *Customer Distribution and Topography Considerations*

Allegheny Power service territory is varied in terms of topography and customer density. This poses challenges for Allegheny Power's SMIP.

The mainly rural nature of the territory results in the following impacts:

- Relatively small amount of customers concentrated in urban/suburban areas and large areas of low density customer base increases the difficulties and costs of establishing a reliable telecommunications network to communicate with each Smart Meter
- Higher costs of Smart Meter installation due to distance between service points

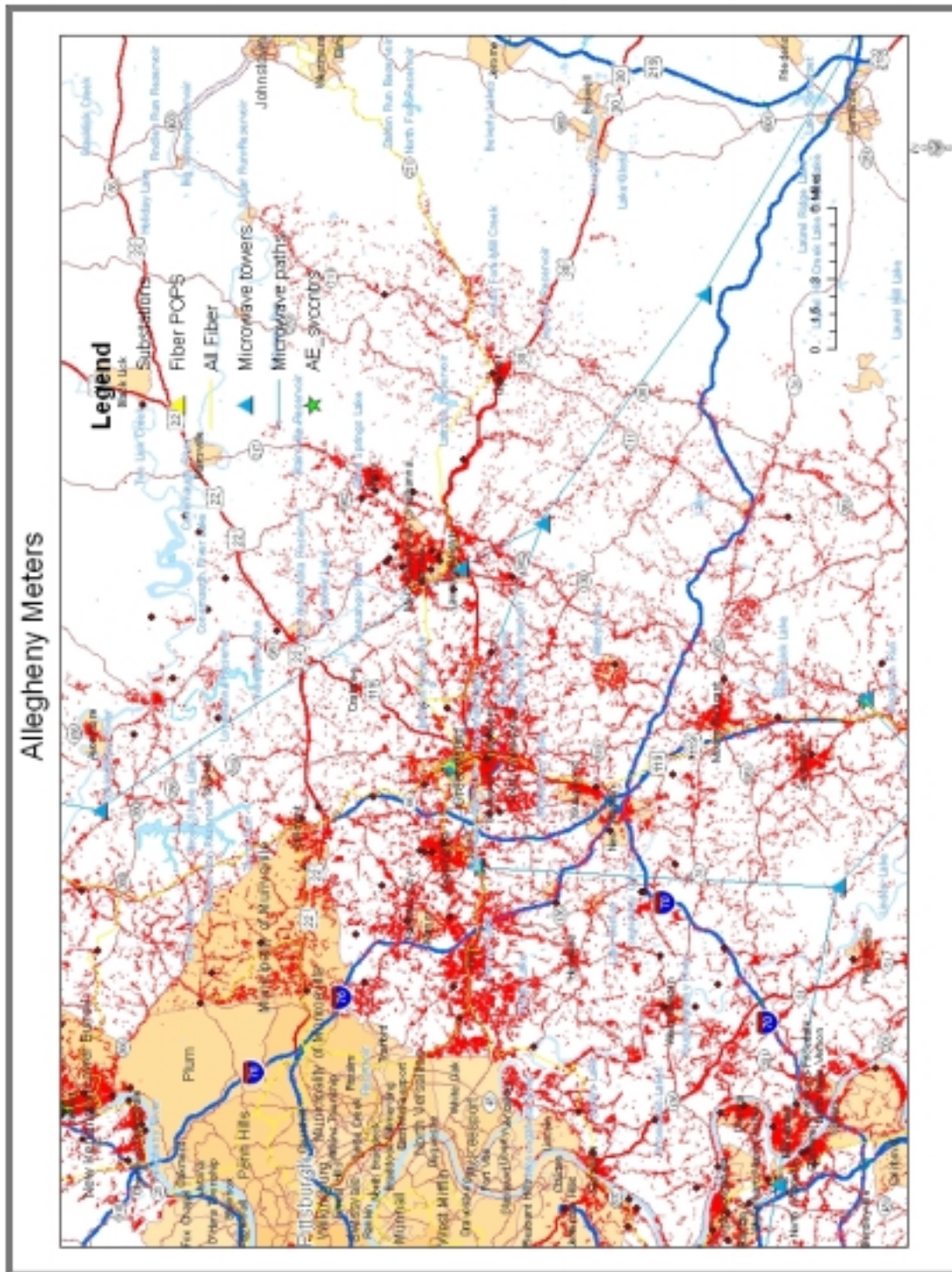
Table 6. Allegheny Pennsylvania Energy Customers

Allegheny Customer Segmentation				
Customers per sq. mi	% of customers	% of service territory	Square mi	Residential customers
> 500	13%	1%	123	79,644
500 - 159	41%	9%	1,082	256,205
160 - 39	32%	23%	2,809	193,237
10 - 39	12%	33%	4,061	71,065
< 10	2%	34%	4,117	11,914

All of Allegheny Power's customers will require meter replacement to comply with the Act 129 requirements, as well as changing several meter and meter data related business processes.

Allegheny Power's service territory is approximately 11,000 square miles, serving 619,088 residential, and 95,917 commercial and industrial customers. Meter readers are the primary method of collecting monthly consumption data. As with much of Pennsylvania, the Company's service territory is dominated by dispersed suburban and rural customers with significant remote (hunting camp) locations. Some of the remote locations have one-way Automated Meter Reading capability.

The three major services types, residential, commercial and industrial, are supported by service centers distributed throughout the service territory. Meters in the Westmoreland County Area are represented in Figure 2.

Figure 2. Allegheny Power Meter Density - Westmoreland County

2.2.3. Summary of Allegheny Power's current deployment of smart meter technology

Presently, Allegheny has approximately 1,500 meters on large commercial and industrial sites that are remotely read via phone line or cellular service. These meters provide load profile recording and many also provide power quality information.

Also, there are approximately 3,000 meters on very rural services (e.g., hunting camps) that provide automated meter readings via power-line carrier. None of the existing meters are considered Smart Meters. No LAN currently exists for meters. The existing Allegheny Microwave and Fiber communication infrastructure in the PA service territory is included in the WAN design. The Microwave system will require upgrading to a digital technology.

2.3. Smart Meter Deployment Process

Allegheny Power has adopted a five-year plan to deploy Smart Meters across its Pennsylvania territory. To reduce risk, the Company will conduct field trials of key elements of its Smart Meter technologies before the full deployment starts. The field trials will include In Home technologies, Smart Meters and the Communications Network.

Allegheny Power has developed an implementation plan that has multiple activity streams that must be performed in parallel to successfully implement Smart Meters and attain the EE&C and DR targets legislated in Act 129. The Company will implement rigorous program management, quality assurance and change management processes to ensure prudent and cost-effective use of resources and adherence to the schedule.

The schedule is driven by multiple factors:

- The need to attain the Act 129 targets,
- The need to sequence the deployment of meters in adequate quantities early enough to support the programs in the EE&C and DR while being cost effective,
- The ease and speed with which the Radio Frequency LAN (RF LAN) network for Smart Meter telecommunications can be deployed,
- The need to retrain key staff,
- The implementation dates of the new IT systems required.

2.3.1. Schedule

The schedule for SMI deployment in the Company's service territory is marked by the complexity of sequencing multiple, parallel activity streams.

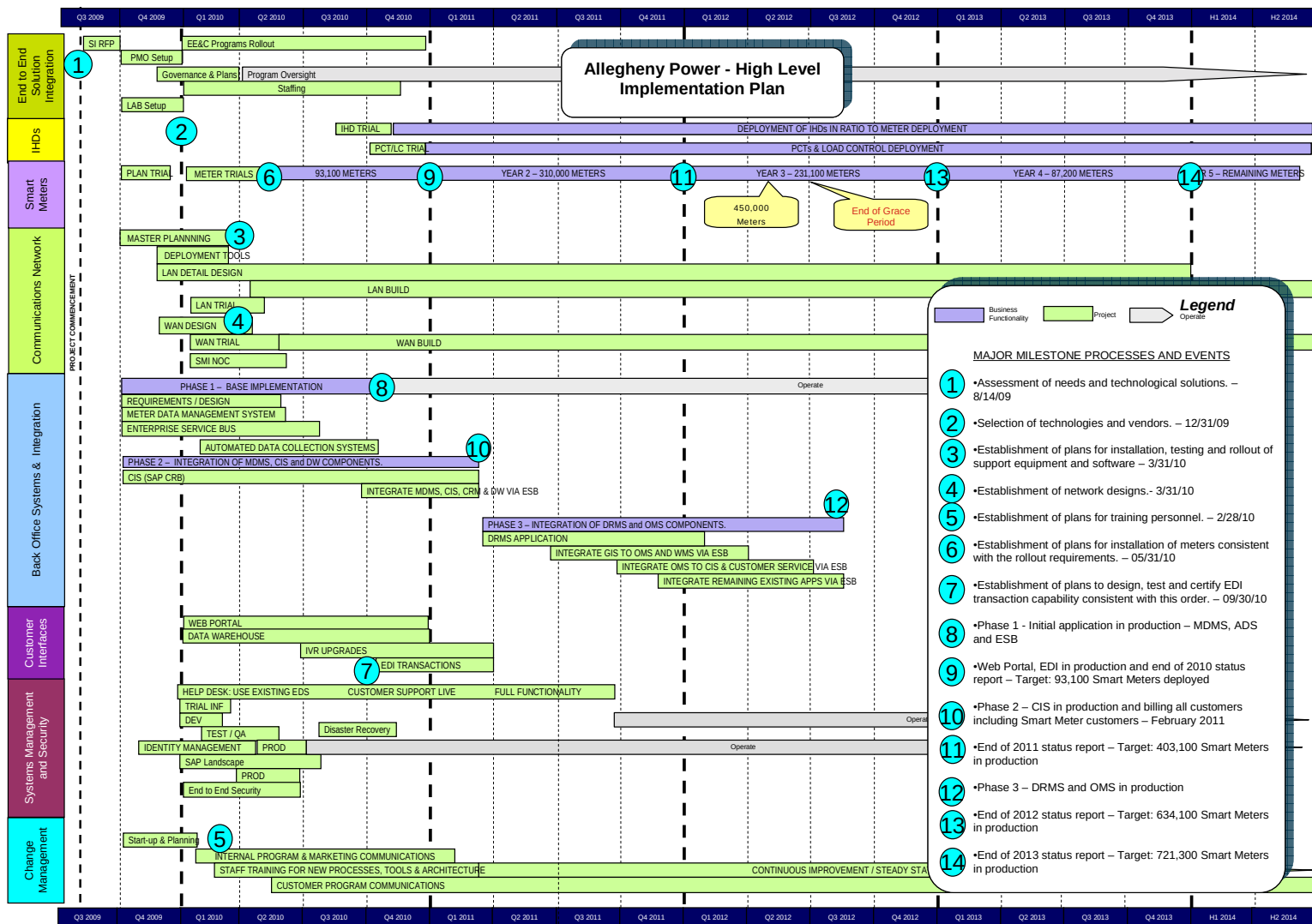
The schedule addresses the following streams:

- In Home Device deployment
- Smart Meter deployment
- Communications Network including:

- LAN deployment for Smart Meter telecommunications
 - WAN deployment/upgrade for Smart Meter telecommunications
- Back office systems changes
- Customer Interfaces - Website and portal changes, IVR and EDI
- Systems management and Security
- Change Management including business process redesign and training ; and
- Overall Program management

Additionally, the schedule envisions rolling out new technology and new or updated back office and customer facing systems in three phases. The following figure illustrates the complexity, sequence and timing of the multiple, parallel activity streams for deploying SMI. The major project milestones are shown.

Figure 3. High Level Implementation Plan



The milestones shown on the plan are:

- Assessment of needs and technological solutions. – 8/14/09
- Selection of technologies and vendors. – 12/31/09
- Establishment of plans for training personnel. – 2/28/10
- Establishment of plans for installation, testing and rollout of support equipment and software – 3/31/10
- Establishment of network designs.- 3/31/10
- Establishment of plans for installation of meters consistent with the rollout requirements. – 05/31/10
- Establishment of plans to design, test and certify EDI transaction capability consistent with this order. – 09/30/10
- Phase 1 - Initial application in production – MDMS, ADCS and ESB – Q4 2010
- Web Portal, EDI in production and end of 2010 status report – Target: 93,100 Smart Meters deployed – Q1 2011
- Phase 2 – CIS in production and billing all customers including Smart Meter customers – February 2011
- End of 2011 status report – Target: 403,100 Smart Meters in production – Q1 2012
- Phase 3 – DRMS and OMS in production – Q3 2012
- End of 2012 status report – Target: 634,100 Smart Meters in production – Q1 2013
- End of 2013 status report – Target: 721,300 Smart Meters in production – Q1 2014

2.3.1.1. Early Commission Approval of Initial Phase SMIP Activities

Allegheny Power's SMIP is designed to enable smart meter related EE&C programs proposed to meet Act 129's mandated energy consumption and peak demand reductions in 2011 and 2013. With that in mind, work must commence to begin modifications to systems required to support both the EE&C programs and the Smart Meter capabilities required by programs needed to meet the Act 129 energy and peak reduction targets. In particular, specific planning, procurement, and critical design activities must be completed in 2009, and early 2010, in order to achieve these implementations since certain components have a 6-18 month lead time associated with their development.

Specifically, the following table details the 2009 and early 2010 activities and expenditures contemplated in Allegheny's SMIP:

Smart Meter System Component	Activity	Estimated 2009 and Jan 2010 expenditures (in \$millions)
Meters Network In Home Devices	Plan and begin construction of test meter and LAN field trials and smart meter lab	6.3
Back Office Applications	Requirements Definition, Selection and Design Activities for the following applications ▪ Enterprise Service Bus ▪ Meter Data Management System	5.2
	Planning, business process blueprinting and design of Customer Information System Modernization	17.4
Security	Requirements Definition, Selection and Design Activities for the Identity Management System	0.3
Program Management	Selection and Procurement of CIS Systems Integrator	0.8
	Act 129 planning and filing preparation	2.4
	Selection and Procurement of Smart Meter Systems Integrator	0.5
	Smart Meter Program Management and Systems Integration	0.5
	Plan business process redesign	0.4
Total 2009 and Jan 2010 Planned Expenditures		33.8

Each of these 2009 activities are considered essential structural components to the effective and efficient implementation of Smart Meter Technology as defined in Act 129. In particular:

Meters / Network / In Home Device - While described more fully in this section and section 2.4, this field trial activity is required to test and validate the selected Smart Meters and Communications Network before starting the full deployment. This progression will support

the legislated requirements while mitigating risk. After successful field trials, the full deployment of Smart Meters across the Company's Pennsylvania territory will begin in 2010.

Back Office Applications - The specific functions of the MDMS, ESB and CIS are more fully described in section 2.4. As documented there, each is an essential component to Allegheny's overall smart meter technology system required by Act 129. Each application has an approximate 12 to 18 month lead time to properly procure, design, test and implement.

Security - The 2009 security activities support the activities being performed in the Meters / Network / In Home Device areas. Specifically, the planning of the field trials will require design of specific elements of the model to ensure a secure network.

Program Management - Due to the long implementation time for the CIS Modernization project and the need for the new CIS to be in production in early 2011, Allegheny Power conducted an evaluation and selection of process in 2009 for a CIS Systems Integrator. Also in 2009, to prepare the filings required by Act 129, Allegheny Power contracted external consultants to assist the Company's team in planning and preparing the two filings. Given the complexity of the SMIP, Allegheny plans to hire an expert systems integrator to assist execution. The associated expenditures in 2009 will be for procurement assistance from an expert consultant who will assist in the development of an RFP and selection of a Systems integrator. The Smart Meter Program Management and Systems Integration expenditure is the estimated cost of the selected systems integrator's services for January 2010. Additionally, long lead time smart metering business process redesign will be initiated in 2009. Both activities will ultimately be required to meet the Smart Meter requirements of Act 129.

These preliminary tasks are core implementation steps that must be taken regardless of which smart meter or smart meter vendors are ultimately selected. The major cost components of the plan remain in the future and will not be commenced until the Commission has reviewed and approved all elements of the SMIP. Although Allegheny Power requests review and approval of these estimated costs, the surcharge to collect these costs would not operate until final Commission approval of the SMIP was obtained. Therefore advanced Commission review and approval of these steps and expenditures is reasonable and should be provided.

2.3.1.2. Development and Installation Grace Period

The Implementation Order offers EDCs a "grace period" of 30 months from Commission approval of the SMIP to permit each EDC time to fully deploy their Communications Network. During the grace period, Allegheny Power will provide interval meters to customers that request them and to newly constructed properties. When the Communications Network reaches these

interval meters that were installed during the grace period, they will be converted to communicate with the Company via that network.

2.3.1.2.1. Change Management

Allegheny Power's plans include the necessary revisions to business processes, policies and procedures and organizational structure to operate the new technologies both efficiently and effectively in our interactions internally and with customers and other affected external entities such as CSPs. Current business processes with meter data interactions require extensive creation, revision, or phase-out. Business process change and training includes ITO professional services to learn the system and be able to provide system support, Company representatives to train on operating and supporting the SMI. Customer education includes Smart Meter and IHD awareness publications and communications.

2.3.1.3. System Wide Deployment

2.3.1.3.1. Tiered Rollout Phases

The SMI implementation plan includes an overall approach to the smart meter project deployment that is premised on the Company's capture of SMI functionality in a rapid, progressive and controlled manner. This will comprise of a set of field trials to test and validate the selected Smart Meters and Communications Network before starting the full deployment. This progression will support the legislated requirements while mitigating risk.

The Field Trials project will manage a series of trials that will allow us to validate technology while maintaining the focus on the legislated date. The trials will be divided into logical groupings based on meter family, service type (residential, commercial, and industrial) and geography.

After successful Field Trials, the full deployment of Smart Meters across the Company's Pennsylvania territory will begin.

Table 7 – Deployment Phases provides an outline of the program phases, content and their timing.

Table 7. Deployment Phases

Phase	Functionality	Timing
1	First Field Trial	2010
2	Second Field Trial	2010
3	> 500 meters per square mile areas	2010
4	500 – 159 meters per square mile areas	2011
5	160 - 39 meters per square mile areas	2012
6	10 - 39 meters per square mile areas	2013
7	< 10 meters per square mile areas	2014

For a more detailed understanding of how these phases provide structure to the overall SMI deployment, please refer to the High Level Implementation plan provided in the introduction to this section.

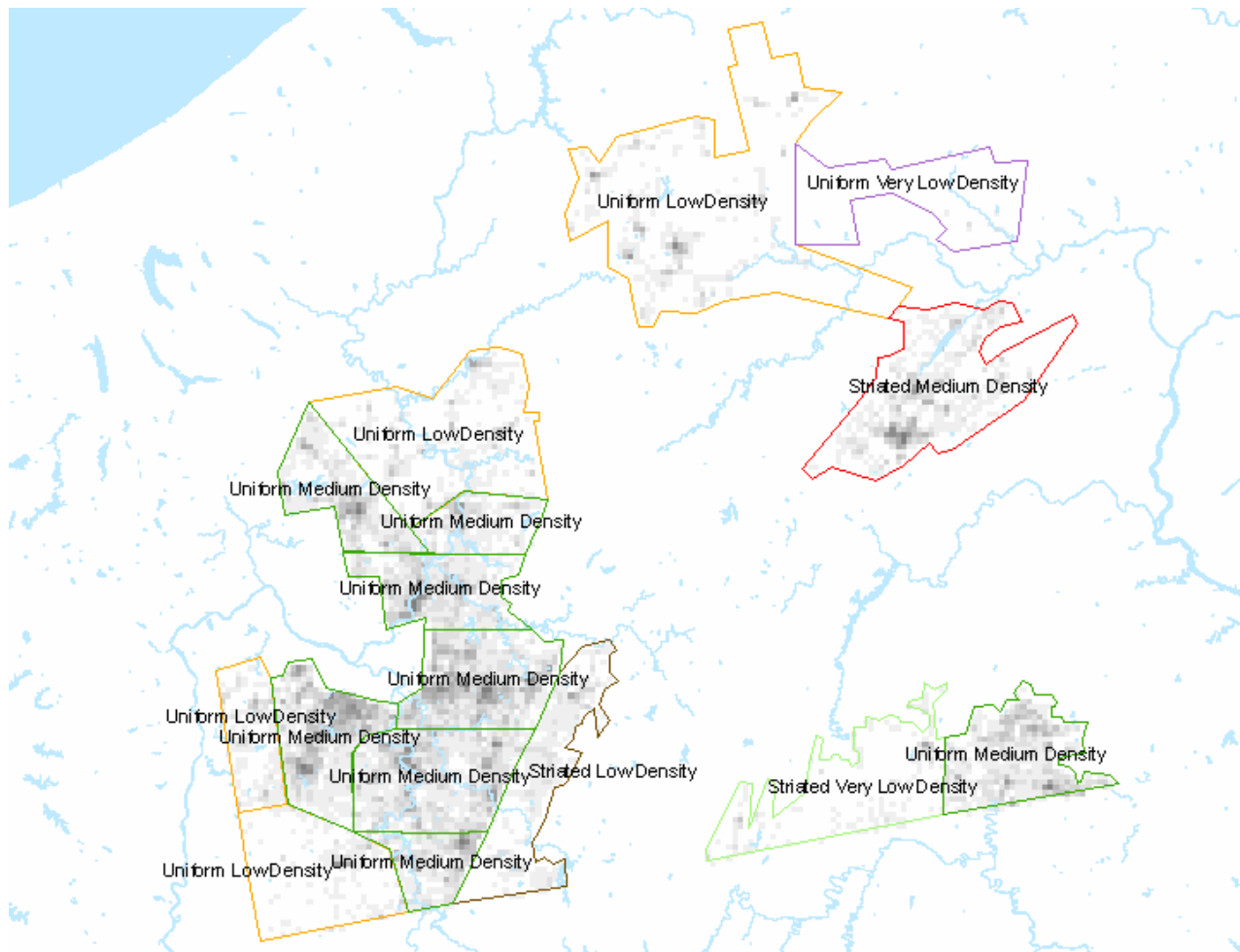
2.3.1.3.2. Sequence of Deployment

To ensure most cost-effective use of capital and resources, Allegheny Power will sequence the deployment of Smart Meters and the associated LAN primarily based on customer density. To facilitate an understanding of the number and of meter and IHD deployment within the Company's Pennsylvania service territory, and the impacted geographies, please reference the included Table 8– Allegheny Customer Deployment Strategy below.

Table 8. Allegheny Customer Deployment Strategy

Customers per sq. mi	Percent of customers	Percent of service territory	Square mi	Residential customers	Meters Installed per Month
> 500	13%	1%	123	79,644	15,000
500 - 159	41%	9%	1,082	256,205	24,000
160 - 39	32%	23%	2,809	193,237	19,000
10 - 39	12%	33%	4,061	71,065	7,000
< 10	2%	34%	4,117	11,914	1,000

The concentrations of the Company's customers across its service territory can be seen clearly in Figure 4, the Allegheny Service Customer Meter Density Map. The deployment of Smart meters will focus firstly on the areas of highest density to ensure the largest number of customers can be connected to the Communications Network as early as possible.

Figure 4. Allegheny Service Customer Meter Density Map

2.3.1.3.3. Meter Deployment Process

For this filing, Allegheny Power obtained pricing from a set of industry vendors to be able to estimate the costs of meter deployment and installation.

The Company plans to complete meter deployment in the Allegheny Power Pennsylvania service territories, using a contracted workforce from an installation contractor. Deployment is anticipated to commence in 2010 and be completed by 2014. During this timeframe 640,366 residential and 99,208 commercial and industrial meters are projected to be installed.

The installation contractor will be responsible for the establishment, implementation, and management of the following main project sub-processes:

- Meter Installation
- Data Exchange
- Reporting

- Work Order Management System and Handheld Devices
- Inventory Management
- Disposal of retired meters
- Call Center Management, Dispatching and Claims

2.3.2. In Home Devices Installation/Deployment Plan

The In Home Devices are key to providing information to customers to achieve the required changes in consumer behavior to achieve the consumption and Demand Response reductions.

Allegheny Power considered two approaches for the distribution of IHDs. This first approach is a “proactive inclusion” approach, in which IHDs are distributed to all customers in the Company’s Pennsylvania service territory. The second approach is a “reactive inclusion” approach, in which IHDs are distributed only to customers who request one. Industry experience indicates that the reactive technique, as it relates to customer adoption, requires more effort in terms of reminders if the customer has not communicated a request (an analogy could be made to magazine subscription renewals). By contrast, the proactive approach ensures that the Company will send the customer an IHD within a designated time period unless they “opt out” of the IHD program. This places more IHDs directly in the hands of the consumer and pre-configures higher participation in EE&C and DR Programs.

Allegheny Power has concluded that to achieve the Act 129 legislated consumption and Demand Response targets, a proactive approach will be required. Allegheny Power’s SMIP therefore includes providing and installing an IHD for each consumer unless the consumer opts-out of the IHD program. The Company will use an installation contractor to install the IHDs. This non-discriminatory approach of providing IHDs to all customers ensures that all customers will have access to their usage data and pricing information even if they do not make use of the Internet.

The following EE&C and DR programs are targeted at 100 percent of the residential customers and will require IHDs. A 100% deployment of IHDs is required to ensure all customers can choose to participate in EE&C and DR programs.

- Residential Efficiency Rewards
- Critical Peak Rebate (CPR) based DR Program
- Critical Peak Pricing (CPP)
- Hourly Pricing Option (HPO)
- Pay Ahead Electric Service

The PCT-based DR program targets 13 percent of the residential customers. The Company also assumes that there will be an equal number of load control devices for the PCT based DR Programs.

2.3.3. Communications Network Installation/Deployment Plan

To ensure the most cost-effective use of capital and resources, Allegheny Power will sequence the deployment of Smart Meters and associated LAN network based on customer density. The network has two components, the LAN (Local Area Network) that the meters use to communicate with the existing Allegheny Power WAN (Wide Area Network).

2.3.3.1. Field Trials

Field Trials for the Communications Network Installation/Deployment Plan will begin early in 2010, and will be used to validate and, where necessary, adjust the network specification assumptions contained in this filing. Specifically, Field Trials will seek to validate or identify the following the:

- Best LAN technology to use in actual locations
- LAN design methodology
- Best WAN system design approaches to use in given conditions
- LAN and WAN performance standards
- System reliability
- System deployment methodologies

Field trials for the Communications Network will proceed in the following overlapping phases:

- LAN and WAN design (identification of what types of concentrators will be used, where they are to be placed, and how they will be backhauled)
- Procurement of long lead-time equipment and backhaul services
- Installation of head-end systems and LAN and WAN infrastructure
- Installation of meters
- Acquisition and analysis of results

Following telecommunications deployment best practice the WAN will be built out before the LAN such that components of the network such as communication concentrators can be fully configured and tested from the head-end components as they are deployed. Though much of the Communications Network will use Allegheny Power's existing WAN backhaul, some of the WAN may be provisioned through third party leased services.

The estimated duration of the Field Trial Phase for Communications Network Installation/Deployment is four to six months. Following completion of the field trials, any trial component that is not sufficiently effective will be removed and its service replaced with a permanent installation of the appropriate design standard.

2.3.3.2. System-wide Network Design and Deployment

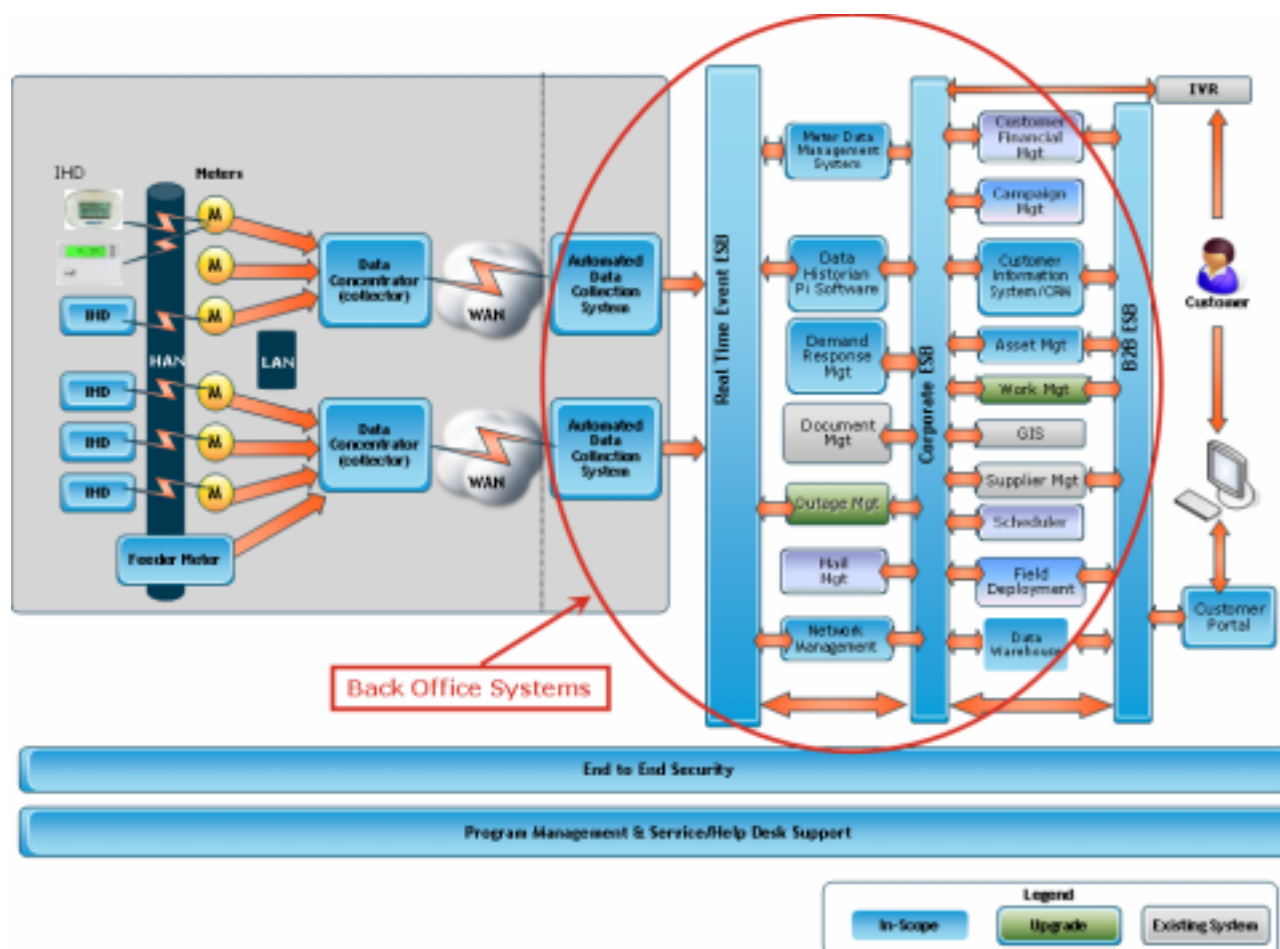
Following completion of Field Trials, the design of the entire Smart Metering infrastructure can begin. This phase will follow a process similar to the field trials. To the extent practical, the WAN will be put into place prior to deployment of the LAN, and the LAN will be in place before installation of the Smart Meters. Where necessary, a temporary leased WAN backhaul may be required while the WAN is designed and installed.

System-wide deployment of the Communications Network will proceed on the following:

- Collection of meters in the highest density areas first, where greatest cost-efficiency and EE&C and DR results are anticipated.
- Completion of all Allegheny Power Pennsylvania service regions and contiguous service areas together. This takes full advantage of component concentrator capacity and WAN backhaul installed as part of any earlier network deployment, streamlines further deployment and installation processes by minimizing travel, and minimizes service areas maintaining several operations procedures simultaneously.
- Collection of meters in areas with the least variegated terrain.
- Collection of meters in areas with the greatest opportunity to use existing Allegheny Power infrastructure assets (towers and existing bandwidth).

2.3.4. Back Office Systems Deployment

Deployment of a Smart Metering Infrastructure will require many changes to Allegheny Power's current system architecture back office systems.

Figure 5. Overview of Smart Meter Applications

The SMI uses a system of modular back office and customer facing IT components that are best in class – i.e., mitigating risk while being cost competitive. These back office and customer facing IT components must be modular, scalable, and leverage industry standard integration processes, technologies, and toolsets in order to provide the full functionality to support current SMI needs, as well as future technology innovations.

To understand the importance of back office and customer facing IT components in the SMI it is useful to think about data and information flows across the SMI. In general, meter data collected from the meters, and communications from the In Home Devices (IHD), must feed data to back office systems. Messages from Allegheny Power on prices and, signals to trigger load reductions must in turn be sent to the meters and IHDs.

To manage the data flows from the meters, through the communications network, to the back office systems and back; and to use that data to manage peak demand and communicate pricing information, the Company must have the capability to process that data efficiently. In several

cases this means that the Company requires new back office IT systems to support the Smart Meters and IHDs.

The following paragraphs briefly list and describe the new Back Office and Customer Facing Systems proposed by the Company:

The Automated Data Collection Systems (ADCS), also known as head-end systems, manage communication to the meters. One ADCS is required for each Smart Meter brand implemented. This is a new system required for Act 129.

The Meter Data Management System (MDMS) acts as the universal translator to communicate with the proprietary head-end systems. Thus, the back office systems (such as the Customer Information System) do not need to know which ADCS or ADCS “language” they need to speak in order to communicate with the meter or the in-home devices. The MDMS also performs data edits and validation and aggregates interval meter readings before passing the aggregated data to the Customer Information System (CIS) for billing purposes. This is a new system required for Act 129.

The Customer Information System (CIS) must be capable of supporting Time of Use Rates, Real Time Pricing, added data to record customer sign up to new EE&C and DR programs and support increased two-way customer communications. Allegheny Power’s current CIS is not capable of being cost effectively enhanced and so the implementation of a modern CIS is required. The CIS will also include new modules to perform Customer Relationship Management and Demand Response Management both of which are needed to support the EE&C and DR programs proposed in the Company’s EE&C and DR.

An upgraded Outage Management System and the Geographic Information System and Work Order Management System must also be integrated with the MDMS in order to share data and initiate energy instructions down through the head end system. These existing systems must be upgraded to support Act 129.

Allegheny Power has evaluated the number of systems integration points needed between these back office systems and has concluded that the most effective way to integrate the back office and customer facing IT infrastructure is to adopt a Service Oriented Architecture (SOA) and an Enterprise Service Bus (ESB). The SOA approach and ESB infrastructure will make integration of all the new and updated back office systems more efficient and cost effective. It will allow these systems to share data and information quickly and seamlessly and enable the utility to deliver better customer service, better SMI system performance, and better operations.

2.3.5. *Customer Interface*

The *Customer Interface* provides customers and third parties (e.g. CSPs) with access to information that is key to achieving the changes of behavior required to meet Allegheny Power's Act 129 legislated targets.

Customers and authorized third parties, such as CSPs, will need access to Smart Meter data and, in some cases, the ability to communicate with In Home Devices. In addition to accessing usage data via the IHD when they have physical access to the IHD, Allegheny Power has concluded that two main channels – Internet and telephone -- will be used by its customers to access usage data and communicate with their IHDs.

Allegheny Power's SMIP includes costs to upgrade both Internet and telephone to meet the requirements of Act 129.

Additionally, for authorized commercial operators, such as CSPs, the Company will provide EDI access to Smart Meter data.

To provide the access and functions needed for Internet access, Allegheny Power will implement a new Web Portal system to provide secure access for customers, CSPs and other authorized parties to usage data from Smart Meters. To provide access via the telephone, the Company will upgrade its existing Interactive Voice Response System.

These channels will require access to Smart Meter usage data. This data is stored in the MDMS which is the Company's main usage data store but also a key operational system managing communications to and from the Smart Meters. The MDMS is optimized for high performance. To support ad hoc customer queries of usage data, the Company will implement a new data warehouse that will be accessed via the Web Portal and the IVR system.

2.3.6. *Systems Management and Security*

To prepare for managing the new Smart Meter Infrastructure, Allegheny Power plans to implement Configuration Management systems to manage the new devices, their locations and their software and firmware levels. To ensure that the new infrastructure is secured from unauthorized access and misuse, a new Identity Management system will be installed early in the project. This will ensure that only recognized customers and authorized third parties, such as CSPs, can access Smart Meter usage data.

2.4. *Smart Metering Technology*

As directed in "**Part C. Smart Meter Capabilities**" (p. 15) of the Implementation Order:

"Act 129 defines smart meter technology as including metering technology capable of bidirectional communication that records electricity usage on at least an hourly basis, including related electric distribution system upgrades to enable the technology. 66 Pa.C.S. § 2807(g). The Act further states that the smart meter technology must provide customers with direct access to and use of price and consumption information, to include, (1) direct information on their hourly consumption, (2) enable time of use rates and real time price programs, and (3)

effectively support the automatic control of electricity consumption by, the customer, the EDC or a third party, at the customer's request. 66 Pa.C.S. § 2807(g)."

The technology to provide the ACT 129 Smart Metering capabilities is described in this section of the SMIP.

2.4.1. Technology Assessment

Allegheny developed the following guiding principles in the design of the SMIP:

- Meet the goals of Act 129 in terms of:
 - Meeting the smart meter system technology goals;
 - Providing support for the implementation and ongoing operation of current and future Energy Efficiency and Conservation and Demand Response programs developed by Allegheny Power;
 - Providing an infrastructure to meet the Energy Efficiency and Conservation and Demand Response goals of the Act.
- Build a secure SMI architecture that is open (based on standards), flexible, and scalable.
- Build for expansion:
 - Include future EE&C and DR programs;
 - Provide capability for future Smart Grid enhancements.
- Minimize the initial deployment costs.
- Optimize the design to minimize future support costs.

2.4.1.1. Open Standards

The components for the architecture were carefully chosen with a high preference for products that incorporate open standards, the metering technologies needed to support ANSI C.12.19 and C.12.22 standards, along with WPA security standards. The HAN, LAN and WAN components support applicable encryption, compression and security standards. The back-office software needed to support identity management security software, as well as web services standards, including the utilities industry standards of MultiSpeak 4.0®.

2.4.1.2. Support for EE&C and DR Programs

The design of the architecture can be traced back to a business and technical requirements outlined by Allegheny Power in response to Act 129. A business process (use case) was developed for each program and each step of the process was mapped to the architecture to show each device, network and system impacted. This ensured that the architecture supports the proposed EE&C and DR programs. In addition, other programs (which are not currently

proposed) follow this same process to demonstrate the architecture's flexibility to adapt to new, yet unapproved, EE&C and DR programs.

2.4.1.3. Requirements process

The process utilized to identify the requirements for the SMIP included:

- **Identified the business and technical requirements directly from Pennsylvania Act 129** - The business requirements were driven primarily to achieve the EE&C and DR goals outlined in the Act. In addition, technical requirements for the Smart Meters and Smart Metering systems were identified.
- **Identified the business and technical requirements directly from Pennsylvania PUC Implementation Order** - The detailed technical and project requirements from the Implementation Order were identified and used in developing Allegheny Power's SMIP. A summary of the Implementation Order requirements and how Allegheny Power's SMIP addresses each one is provided in Section 6. Allegheny Power's Smart Metering Infrastructure is a necessary investment given the requirements of Act 129. In fact, deployment of SMI according to Allegheny Power's proposed timeline wherein rollout of Smart Metering and Smart Metering Infrastructure commences in 2010 and is complete by the end of 2014 ensures that:
 - the Company will be in compliance with Act 129, and the requirement to develop and file time of use rates by January 1, 2011, and each of the EE&C and DR programs proposed in the Company's EE&C and DR Plan filed on June 30, 2009 that rely on Smart Metering and Smart Metering infrastructure are timely implemented and can deliver energy savings and demand response benefits – this is particularly crucial for the EE&C and DR rates offerings including: Residential Efficiency Rewards, Pay Ahead Smart Service, Critical Peak Rebate (CPR), Time of Use (TOU) with Critical Peak Pricing, and Hourly Pricing Option (HPO), and as well as the demand response programs
 - the Company can enable all customers the opportunity to participate in and benefit from Smart Metering and Smart Metering Infrastructure and the EE&C and DR programs, and
 - the Company can avoid labor up-charges and the risk of potentially escalating costs stemming from deployment rework or technology glitches (ordinarily worked out in the field trials) associated with a shorter or hastier deployment

However, the SMI is also a reasonable investment because the Company's Plan for deploying SMI ensures that there will soon be in place a durable capability to promote energy efficiency and conservation, effectively encourage participation in demand response, lower ratepayer energy costs over the long term, lower bills for many customers across each of the customer segments, and improve customer service, through providing customers access to timely and additional usage and price information that empowers them to make informed energy choices

and decisions for their homes and businesses. Customers will additionally benefit by third parties who will provide additional services to customers that leverages SMI and the access to energy usage and price information that it will provide.

- Allegheny Power further believes that Smart Metering and Smart Metering Infrastructure are transformative technologies that will simultaneously transform utility customers from passive purchasers of commodity into active participants in energy efficiency and conservation and demand response, and equally, transform utilities from suppliers of a commodity to educators and partners in enabling and supporting customer behavioral and economic choices for mutual benefit and the benefit of society as a whole.
- Finally, while a fully quantified cost-benefit analysis is the best available tool for evaluating the merits of a robust Smart Meter Infrastructure business case and the Company's Plan, it should not be the only consideration by the Commission in deciding whether Allegheny Power's SMI is in the public interest. The overall benefits of the SMI project are in many cases uncertain or difficult to quantify as is the case with many advanced or new technologies, and all parties will learn from the experience as the technologies are deployed and incorporated with business processes. All the ways in which this long-term technology investment will change utility operations and deliver benefits to customers and the Commonwealth cannot be entirely predicted in advance. For these reasons, while cost-benefit analysis should be considered, it should not be the only consideration. Allegheny Power therefore concludes that deployment of a comprehensive Smart Meter Infrastructure according to this Plan is in the public interest, is required to comply with Act 129 and empowers all parties to make better and informed energy and environmental decisions both now and in the future.

Plan Compliance

- **Determined requirements of the specific EE&C and DR programs** — As each EE&C and DR program was identified, the business and technical requirements for each program were identified and validated.
- **Held workshops** — In each impacted organizational area of Allegheny Power's current business, workshops were held involving a cross-departmental representative of leaders and users to determine additional business and technical requirements.
- **Summarized requirements** — These requirements were summarized into a traceability matrix that cross-references these requirements to current processes, future use cases, and systems.
- **Mapped requirements to the Smart Meter architecture** — The requirements matrix was then mapped to the architecture to ensure that all requirements are accounted for in the design, and that the architecture could support the desired business and technical functionality.

The affected business representatives from each area signed off on the requirements as being complete.

2.4.1.4. *Assessment of technologies and vendors*

As technology changes and improves, new products continue to enter the Smart Meter marketplace.

To prepare this SMIP including cost estimates, Allegheny Power reviewed a large number of candidate technologies and vendors for most of the off the shelf components required. The number of products on the market is vast and only products with major market presence and experience are consulted in preparing the SMIP. The examples list below is not intended to be a complete list of all available products.

The products were not evaluated for a final selection, only for suitability as candidates for Allegheny Power's SMIP and to obtain list prices to use in estimating the total cost for this SMIP filing. The prices used in developing Allegheny Power's SMIP cost estimates are not intended to be final prices.

The following table is a sample of some of the possible vendors and example products Allegheny Power used for estimating purposes.

Table 9. Sample of Possible Vendors and Example Products

Smart Meter Architecture Major Components	Architecture Component	Illustrative Examples of Vendors (listed alphabetically)
1. In Home Technologies	In Home Devices: In Home Display (IHD), Programmable Communicating Thermostats (PCT), Load Control Devices (LCD)	Comverge
		Honeywell
		LS Research
		Rainforest Automation
		Tendril
2. Smart Meters	Residential, Commercial and Industrial Electric Meters	Elster Integrated Solutions
		General Electric Company
		Itron
		Landis+Gyr
		Sensus Metering Systems
3. Communication Network	Local Area Network (LAN) with Automated Data Collection System (ADCS) Also known as Head-end Systems	Aclara
		Elster Integrated Solutions
		Itron
		Landis+Gyr
		Sensus Metering Systems
		Trilliant
	Wide Area Network (WAN)	AT&T
		Verizon
4. Back Office Systems	Enterprise Service Bus (ESB)	Oracle
		TIBCO

Smart Meter Architecture Major Components	Architecture Component	Illustrative Examples of Vendors (listed alphabetically)
	Automated Data Collection System (ADCS)	See 3. Communications Network as the ADCS has to be compatible with Smart Meters installed.
	Meter Data Management System (MDMS)	Ecologic Analytics Itron E-Meter
	Customer Information System (CIS)	SAP
	Campaign Management	SAP
	Demand Response Management (DR)	SAP
	Outage Management System (OMS)	Upgrade current software and hardware
	Work Management System (WMS)	Upgrade current software
	Geographical Information System (GIS)	Upgrade current software
5. Customer Interfaces	Web Site and Portal	Oracle Aclara
	Business Intelligence Data Warehouse (BI, DW)	SAP
	Interactive Voice Recognition System (IVR)	Upgrade current system
6. Systems Management and Security	Network Management	Solar Winds Orion
	Identity Management	Sun ID Manager RSA Federated ID Manager

Final product selection for system wide deployment:

- Since the architecture is designed to be open and flexible in order to take advantage of new technology as it emerges, products may be substituted for the illustrated products.
- Following the detailed design, vendors and products will be chosen through Allegheny Power's formal Procurement Process which will be open to qualified bidders.
- Smart Meters, HAN/LAN/WAN and ADCS vendor and products will participate in a field trial to test and determine optimum combination of products for the Allegheny service territory.

2.4.2. ***In Home Technologies Assessment***

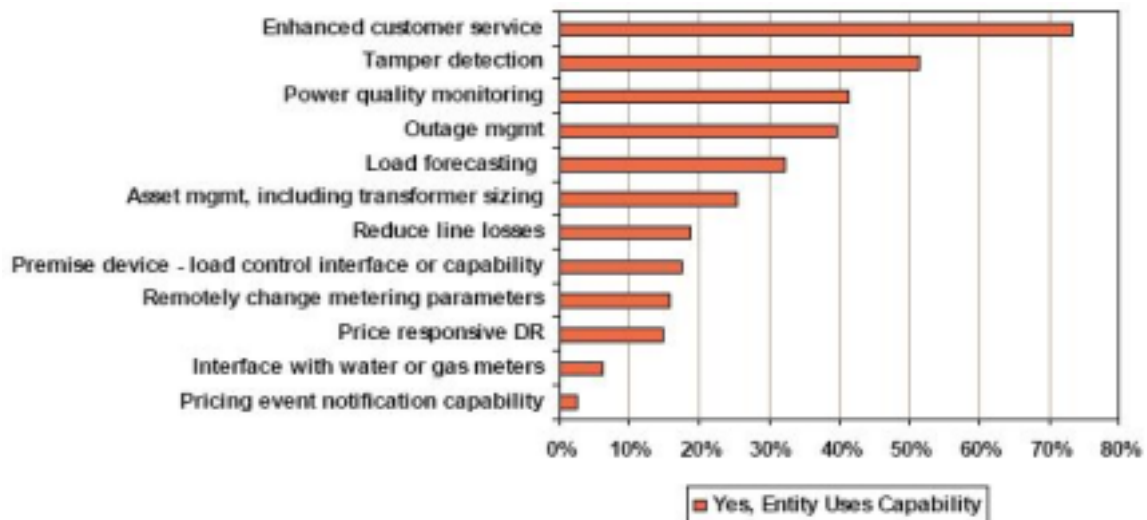
To achieve the Act 129 legislated targets, Allegheny Power needs to provide all customers with near real-time information on their electricity consumption and its price. To comply with the implementation order, Allegheny Power needs to provide customers with access to their consumption data from their Smart Meters. The In Home Devices are one of the channels that give customers access to that data. The other channels are described in the “Customer Interfaces” section of this SMIP.

Through IHDs, the Company can educate the consumers, in near real-time, on how much energy is used in their homes, as well as how much that energy costs. Consumers can then make more informed decisions on their consumption habits in an effort to practice conservation and/or save money. This information will enable the customers to make timely and informed decisions on how and when they choose to use electricity. Allegheny Power therefore proposes to install an in Home Device in each customer location.

In recent years, the manufacturers of In Home Devices have increasingly adopted the ZigBee communications protocol and the devices have become more functional. Allegheny Power plans to provide a new Smart Meter for every home and business for each of Allegheny Power’s approximately 715,000 customers in Pennsylvania. This meter will have a ZigBee home area network card that interfaces with up to four devices. An in-home display device that displays near real-time usage and energy costs is included for each residential customer. The home area network (HAN) also supports a programmable communicating thermostat and/or load control devices (or a load control center if more than four devices are required).

2.4.2.1. **Benefits of In-Home Displays**

- **Energy Conservation:** Consumers who receive feedback will likely reduce their energy consumption overall; feedback is the link that makes clear cause and effect. For example, once consumers see how much energy and money is consumed by running a dryer or wash machine, they are more likely to change when they use them.
- **TOU/CCP/Load Shifting:** Consumers on Time-Of-Use (TOU) rates may be more likely to shift use from peak to off-peak times if they have near real-time feedback on energy use.
- **Residential Inclining Block Pricing Structure Support:** Residential consumers on an inclining block rate structure will have the ability to see if they are nearing the point in the billing where they will be charged second block prices.
- **Increased Consumer Satisfaction:** According to surveys conducted by Federal Energy Regulatory Commission (FERC) in 2006, specifically asking organizations who have installed SMI systems to identify the main SMI features they used, over 70 percent reported “Enhanced customer service.” The least often reported was “pricing event notification capability.” Other uses that received a relatively high percentage of usage were tamper detection and power quality monitoring.

Figure 6. Reported Use of Smart Metering

Source: FERC Assessment of Demand Response & Smart Metering, August 2006

Consumers in programs by other utilities report high satisfaction, often citing the increased control they have over their energy costs when they have the display units.

There are several classes of In Home Devices available today.

1. **In-Home Display (IHD)** is an energy consumption energy display device that will be located inside the customer premise and will display near real-time information to the user. Security keys bind specific devices to the premise smart meter and prevent unauthorized access to the devices and meter.
2. **Load Control Devices (LCD)** can provide direct load control at a specific appliance or power outlet within the home, such as for an air conditioner, pool pump, water heater, and others.
3. **Programmable Communicating Thermostats (PCT)** combine the flexibility of central air conditioning thermostats, with the ability to control air conditioner usage to heat and cool homes in a more energy efficient manner.
4. **Gateways** enable communication between Smart Energy devices inside a home, and provide the customer access to a web portal or other IP-connected services.

2.4.3. Smart Meter Assessment

2.4.3.1. Minimum Smart Meter technology capabilities.

Allegheny Power assessed the currently available Smart Meter technologies in respect to the metrology and functionality of the meters, and the Smart Meter's telecommunications capabilities. This ensured that the Smart Meters can meet the requirements specified in the Implementation Order and can communicate with Allegheny Power's back office systems using a type of telecommunications that will be cost-effective and reliable in the topography of Allegheny Power's Pennsylvania service territory.

The Smart Meter is a solid-state device used for measuring electrical energy consumption. The meter incorporates a design that combines a base metrology with a variety of registers or options. The metrology portion of the meter contains all measurement circuitry and calibration information, while optional modules contain the register functionality and communication mediums.

The most important concept is that the overall architecture is open, modular, and scalable, so that Allegheny can incorporate best of class components as needed throughout the meter lifecycle.

The planned SMI system calls for the replacement of substantially all residential and commercial meters with Smart Meters that provide full Smart Metering functionality including:

- The accurate measurement of kilowatt hours and kilowatt demand,
- The ability to implement time differentiated rates,
- The ability to support interval data,
- The ability to support on-demand reads,
- Outage detection functions,
- Tamper and low voltage alarm capability, and
- Capability for remote turn-on and shut-offs (performing an on-demand read at turn-on and shut-off to facilitate change of owners and move in / move out situations). This functionality can be potentially provided through a combination of meter and network communications functionality.

The Smart Meter Technology Procurement and Installation Plan objectives and solution approach, listed in the table below, include requirements of the Act 129, Commission guidance and directives, customer value and service, Allegheny Power's business and operational practices, and industry best practices.

Table 10. Approach to Meeting Implementation Order Directives

Implementation Order Directives	Plan Approach
PA Act 129 Compliance	Specify meter requirements based on Pennsylvania's Act 129 including: - Bidirectional data communications. - Recording usage data on at least an hourly basis once per day. - Providing customers with direct access to and use of price and consumption information. - Providing customers with information on their hourly consumption. - Enabling time of use rates and real time price programs. - Supporting the automatic control of the customer's electric consumption.
Implementation Order Smart Meter Capabilities	The Smart Meter Plan is based on meters capable of meeting all of the 14 required and 2 optional Act 129 Smart Meter capabilities
Smart Meter Deployment	Four-year system wide deployment plan following a field trial
Customer Request for Early Installation	Smart Meter with stand alone communications
New Construction Early Installation	Regions anticipating highest growth are prioritized in system wide deployment. In the short term utilize customer requested early installation stand-alone communications.
Conservation and Energy Efficiency And Demand Reduction Programs	The entire Smart Meter system will drive conservation and efficiency within Allegheny as well as with their customers. From the IHD displays to the selection of meters and concentrators, conservation and efficiency has been designed in. The ability to provide Time-Of-Use (TOU), Critical Peak Pricing (CPP), and Residential Demand Management (DR) to customers will be a first for Allegheny.
Access to Smart Meter Data	In addition to in-home display of Smart Meter Data, both consumer and third party access via the portal is supported
Operational Efficiency	The plan identifies components which are best of class in their specific functional areas, yet adhere to industry standards for integration across their functional boundaries.
Revenue Protection	Tamper detection is a complex analytical process involving customer load profile data, advanced transformer and feeder metering and powerful analysis and reporting toolsets.
Customer Service Improvements	The IHD, Customer Portal and SAP CRM environments will be the most visible customer service improvements. However, the engines behind those improvements will be the Smart Metering infrastructure which creates communicates and processes all the data that these front-end systems present. - Outage and restoration notifications. - Power quality management
Environmental and Social Benefits	Allegheny will enable numerous environmental impact and social benefits through this Smart Meter Program. The Smart Meter technology will enable the measurement of hourly energy consumption, the first step in any improvement plan.

Generally, the prominent electric meter vendors are moving toward conforming to ANSI C12.19 (for meter data), C12.22 (network interface) standards and Smart Profile 2.0 (in-home device data). Unfortunately, the industry has not yet achieved a sufficient level of maturity for a universal plug-and-play-like capability. However, several major vendors do have products available now or will have them by the end of 2010.

The planned Smart Meter Architecture allows for the integration of in-home devices, meters, concentrators and ADCS systems from numerous vendors while adhering to industry-accepted standards.

In the beginning of the implementation phase, Allegheny Power will conduct field trials with a limited number of customers, but with diverse density and geography challenges. The field trials will be part of the detailed evaluation and selection of the final Smart Meter products, available at the time of implementation, to validate assumptions and holistically select the meter, network, and automated data collection system to provide the optimum value to Allegheny Power's customers.

For cost/benefit analysis purposes, detailed planning is assumed to begin in early 2010, and procurement is assumed to be complete in 2014. Following the field trials, system wide installation of meters is expected to start late in 2010. The expected life of the planned system is nominally 20 years.

The meter costs include the initial purchase price for all electric meters. The meter installation costs include the cost to install the new meters, replacement of defective meter sockets, engineering and procurement services and grace period temporary meters. Vendor supplied indicative industry pricing is used to form the basis of the cost estimate. The O&M cost is the annual operating and maintenance expense associated with maintaining and repairing the Smart Meters above and beyond current O&M costs.

The Smart Meters will allow Allegheny to achieve certain estimated savings, presented in Section 5 Cost and Benefits. The most obvious benefit of implementing Smart Metering is the elimination of manual meter reading expenses while improving usage data collection for billing accuracy. An important consequential benefit of Smart Metering is a reduction in the number of vehicles used for meter reading related purposes. The corresponding reduction in emissions will provide a significant environmental benefit to Pennsylvania.

Smart Meters can help improve outage response efficiency by reducing the time spent locating the cause of an interruption. Smart Meter-generated outage alarms can help focus restoration response efforts on targeted areas, and restoration alarms produced by Smart Meter systems can reduce the need for customer callbacks to verify restoration status. Smart Meters can help determine the impact of completed restoration activities, identifying the customers who have been returned to service and the customers for whom problems still remain to be solved.

To the extent that Smart Meters may improve the efficiency with which the Company responds to outages, facilitate customer return to service, and provide more accurate information

concerning the status of the outage both internally and externally, this will help both customers and the community at large.

Studies show that electromechanical meters will begin to run slow with aging, leading to an inaccurate record of total energy usage. Over time, this unmeasured energy accumulates. The solid-state meters included in the SMIP should more accurately record energy usage and, therefore, are expected to reduce loss charges to the overall customer population.

Energy diversion is a problem that creates customer inequity and leads to higher utility bills for responsible customers. The planned SMIP solution will include the capability to produce tamper alarms that will warn the Company of potential irregularities and theft of service situations that should be investigated. While indications are that diversion is relatively low at Allegheny, the Company believes that the ability to identify and address potential theft is an SMI benefit that should be pursued.

SMI is expected to provide additional opportunities for improvements in Allegheny business practices that are not expected to directly produce savings. These include:

- Load Research. SMI will significantly improve the Company's ability to perform effective load research needed to design new rates, implement demand response programs, and develop load forecasts. Analysis of load shapes by customer class may assist the companies in performing hedging and energy reconciliation functions that improve market efficiency.

The potential for new billing services such as flexible bill due dates and time-differentiated rates:

- Access to detailed data which will increase awareness of energy usage and demand
- The potential to actively participate in load management and load aggregation programs
- Potential access to value-added services developed by third parties based on the availability of this new data
- Reduced potential for equipment damage, prevented by voltage and low power alarms.

Eventually, the most beneficial aspects of the implementation of the planned SMI system may prove to be the environmental benefits associated with the enablement of programs which result in the more efficient use of energy and the deferral of new generation requirements. The planned SMI system will help minimize the cost of energy and permit customers to access various demand response programs that improve system load factor and help to defer the construction of new facilities.

The planned SMI system will have a minimal ecological or environmental impact when compared to any generation alternative and provides a basis for dialogue with all external stakeholders around the establishment of a viable conservation culture. Among the societal benefits engendered through the deployment of the planned SMI system may be greater choices in the customers' ability to monitor their own energy use to become more energy efficient and to consider the tradeoffs between the cost and time of energy use.

Full-scale demand response program predicated on the implementation of various rate incentives, including time-differentiated rates, cannot be effectively implemented without the implementation of the advanced metering capabilities of SMI. The full benefits of demand response cannot be achieved unless the Company is able to implement new programs that encourage load shifting, curtailment and other features whose effectiveness must be verified through SMI.

The planned SMI system's enhancement of conservation-focused initiatives has direct and obvious environmental benefits. As a primary enabler of conservation benefits, the ecological footprint of the planned system is not significant when compared with the alternative of developing new energy supplies. The implementations of demand response programs will help to defer construction of new facilities that otherwise add additional pollutants and take up valuable land resources.

2.4.3.2. *New Construction and Customer Request for Early Installation*

For locations or customers requiring a new meter before the system wide deployment, the Company will provide and install a smart meter with the ability to record interval usage data. Bi-directional communication will be available via cell phone data link or available phone line to the Company data operations center when back office systems become available.

2.4.3.3. *Third parties direct meter access*

The SMI provides frequent usage data transmissions to billing systems for timely accessibility through the portal or EDI transactions by customers and third parties. In addition, raw usage data is transmitted to in home devices for display to the consumer.

2.4.3.4. *Minimum smart meter technology capabilities.*

Since none of the current Company meters provide the directed smart meter capabilities, the SMI plan is to replace all revenue meters with Smart Meters with capabilities corresponding to the service tier. At least three tiers of meter capability are anticipated based on service type:

- Tier 1 for accounts without people includes all directed capabilities except net metering, and HAN interface
- Tier II for all residential and small commercial accounts includes all directed capabilities
- Tier III for all large commercial and industrial accounts includes all directed capabilities plus additional load profile data, extensive power quality management, excluding service switches (not available for three phase service).

-

2.4.3.5. *Grace period milestones*

During the Grace period preparatory activities begin with detailed design and planning based on the Smart Metering Architecture. Planning activities include:

- Preliminary master planning for deployment ,

- Formal procurement,
- Training for meter operations and maintenance personnel,
- Conducting a field trial of the meters and communications network, evaluating results, and updating the master plan, and
- Accelerated system wide network and meter deployment.

2.4.3.6. *Operational Efficiency*

Matching cost-effective meters to each service type requires flexibility in the overall architecture and component interoperability. This is based on widely supported standards, product maturity, and vendor flexibility. The best value can be achieved by being vendor-agnostic, in line with Allegheny Power's plan to treat the meter as a commodity.

Smart Meters provide diagnostic status and alerts via the local display and over the network by allowing some meter problems to be proactively discovered and diagnosed over the network increasing efficiency and consumer satisfaction.

2.4.3.7. *System wide rollout*

System wide rollout of the meters is presented in section 2.3 - *Smart Meter Deployment Process* and guided by the following principles:

- Product integration is driven by Smart Metering Architecture
- Product implementation is controlled by master plan
- Product selection is optimized by field trials
- Product cost is minimized by competitive bidding

2.4.3.8. *Pay-Ahead Smart Service option*

Residential Smart Meters are equipped with a service switch and include support for potential pay-ahead programs at no additional cost for the Smart Meter.

2.4.3.9. *Remote disconnect/reconnect*

All single-phase meters will be purchased with under glass services switches; the incremental cost of this option is approximately \$40 per meter for system wide deployment.

To build customer acceptance an initial trial may be proposed for remote reconnection only to demonstrate significant benefits including:

- Avoiding after hours reconnection overtime expense due to late payment,
- Move in costs can be avoided while improving timeliness of service availability and customer satisfaction.

2.4.3.10. Data intervals

The driver for defining the data interval length is the TOU programs. A 60-minute interval for residential and a 15-minute interval for large industrial customers are assumed to be adequate for anticipated TOU programs, however, a 5-minute interval is supported by the meter for industrial TOU programs if desired in the future, at no additional cost.

60-minute interval is an industry norm for residential applications due to data processing and storage considerations. Since all meters will be replaced, only 5-60 minute interval capable devices will be considered for the system wide deployment.

2.4.3.11. Ensuring billing data retrieval

Historically the industry default for usage data storage is 35 days which is based on coverage of a complete billing cycle. Thirty-five days allows ample time for extensive repair of any communication failure and is the minimum storage offered by Smart Meter vendors at no additional cost.

2.4.3.12. Protocols and standards

Industry standards for smart meter functions include:

- ANSI C12.1 Electric Meters Code for Electricity Metering
- ANSI C12.18 Protocol Specification for ANSI Type 2 Optical Port
- ANSI C12.19 Utility Industry End Device Data Tables
- ANSI C12.20 0.2% & 0.5% Accuracy Class Meters
- ANSI C12.22 Protocol Specification for Interfacing to Data Communication Networks
- ZigBee Alliance Smart Energy Profile (2.0 pending)

Generally, the prominent electric meter vendors are moving toward conforming to ANSI C12.19 (for meter data), C12.22 (network interface) standards and Smart Profile 2.0 (in-home device data). Unfortunately, the industry has not yet achieved a sufficient level of maturity for a universal plug-and-play-like capability. However, several major vendors do have products available now or will have them by the end of 2010.

2.4.3.13. Upgradeability

Smart meters are standards based for long-term future compatibility with upgrades and new products as they become available. In the near term, Smart Metering products are remote firmware upgradeable over the communications network to support anticipated feature upgrades and security patches. Currently the meters have the ability to expand usage data collection to include water and gas meters with only water and gas meter upgrades and possibly some network coverage upgrade.

2.4.3.14. Voltage monitoring

All residential meters are equipped to sense voltage swings outside a pre-set threshold and include results in the subsequent data transmission. Existing high-end meters with a power quality measurement feature provides significant advantage in locating and correcting power quality issues for industrial customers. Three phase C&I meters include power quality management measurements including:

- Current Voltage
- Minimum Voltage
- Maximum Voltage
- Average Voltage
- Brownout Detection
- Over Class-Rated Amps
- Current and Line Frequency Measurement
- Momentary Outage Detection
- Monitored values can be retrieved on demand for confirmation

2.4.4. Communications Assessment

The communication network is the backbone of the SMI connecting customer premise devices to a central data collection point located in the operations center.

A bi-directional communication network is typically a greater communications challenge requiring more network equipment, and therefore greater cost, to implement and maintain an acceptable level of network capability and reliability.

The proposed SMI communication architecture employs wired and wireless communications networks for retrieving usage data multiple times per day, plus outage, restoration, tamper and power quality alarms, in near real time.

Customer premise devices such as IHDs, PCTs and LCDs have wireless peer-to-peer Home Area Network (HAN) communications to a smart meter for raw usage data, TOU rates, and CPP notifications.

Smart Meters have wireless peer-to-peer communications to a data concentrator, located on poles, in substations, and other structures. The data concentrator serves as the “backhaul take out points” between the local and the Wide Area Network (WAN).

Using a variety of transmission methods such as fiber optic, microwave, and frame relay telecommunication networks, the WAN transfers the data to and commands from the operations center.

2.4.4.1. Establishment of Network Designs

The SMIP objectives and solution approach listed in the table below, Approach to Meeting Implementation Order Directives, include requirements of the Act 129, PUC guidance and directives, customer value and service, Allegheny Power’s business and operational practices, and industry best practices.

Table 11. Approach to Meeting Implementation Order Directives

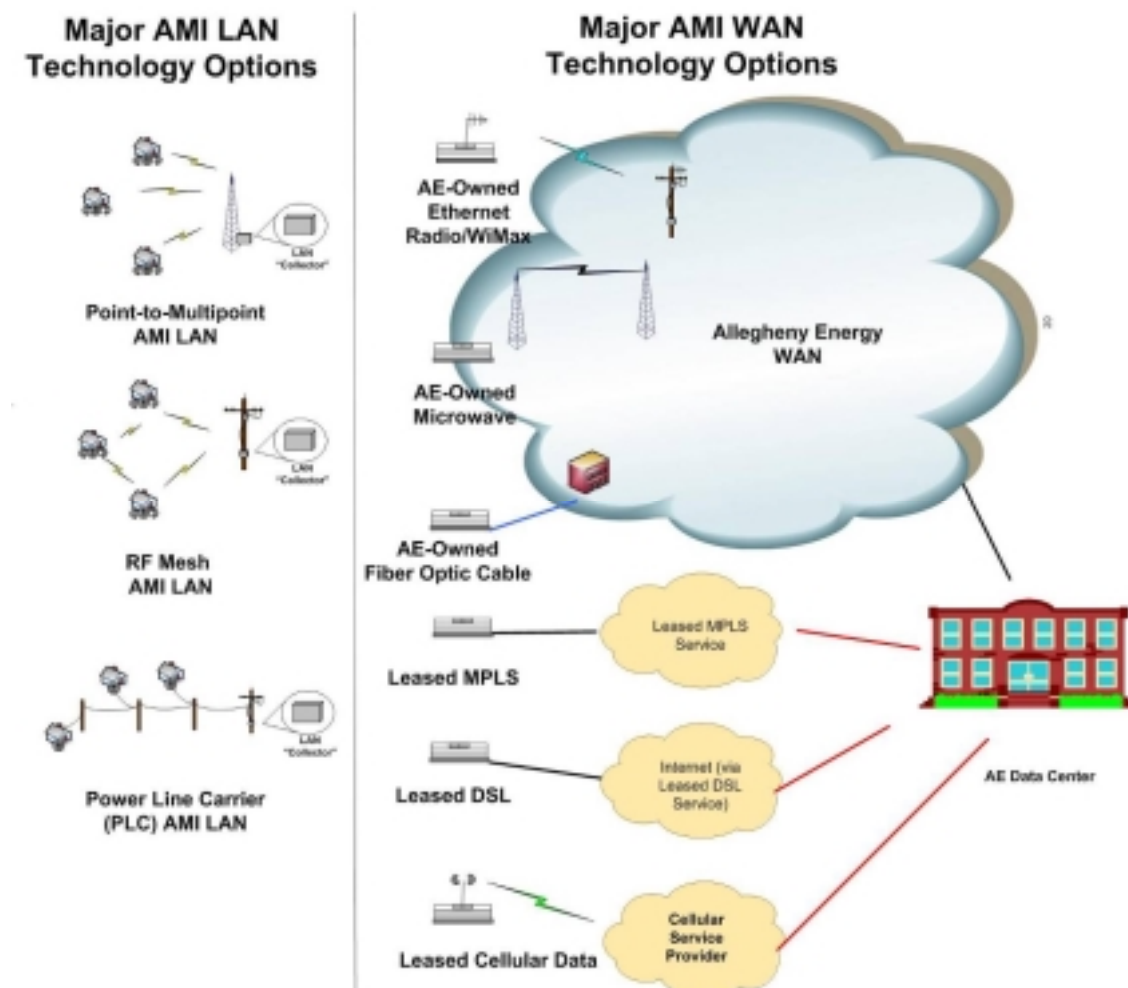
Implementation Order Directives	Plan Approach
PA Act 129 Compliance	Specify meter requirements based on Pennsylvania's Act 129 including: - Bidirectional data communications. - Providing customers with direct access to and use of price and consumption information. - Providing customers with information on their hourly consumption. - Enabling time of use rates and real time price programs. - Supporting the automatic control of the customer's electric consumption.
Implementation Order Smart Meter Capabilities	The Smart Meter Plan is based on networks capable of supporting all of the required and optional Act 129 Smart Meter capabilities
Smart Meter Deployment	Four-year system wide deployment plan following a field trial
Access to Smart Meter Data	In addition to in-home display of Smart Meter Data, both consumer and third party access via the portal is supported
Operational Efficiency	The plan identifies components which are best of class in their specific functional areas, yet adhere to industry standards for integration across their functional boundaries.
Customer Service Improvements	The IHD, Customer Portal and SAP CRM environments will be the most visible customer service improvements. However, the engines behind those improvements will be the Smart Metering infrastructure which creates, communicates and processes all the data that these front-end systems present. - Outage and restoration notifications. - Power quality management

Figure 7 Network Communications Overview- shows a high-level overview of how data is gathered from meters and passed back to the corporate data center in a network. The process begins with the meters passing their data back to centralized "concentrator" devices. The concentrator forwards the data back to the ADCS equipment in the data operations center.

The Local Area Network (LAN) is defined as the means by which meters communicate to a data-concentrating device. Although the LANs primary function is to communicate with meters, it may also be used to communicate with non-meter devices such as Smart-Grid, Distribution Automation (DA), and other instrumentation and automation equipment.

The Wide Area Network (WAN) is broadly defined as the means by which data is carried "backhauled" from the concentrators back to its intended destination at the data center. As illustrated in the right hand side of Figure 7 Network Communications Overview, simply stated, any means of data transport to and from the concentrators back to the head-end equipment at the data center is considered part of the WAN.

Figure 7. Network Communications Overview



As specified in the Act, all distribution customers will have access to the same advanced metering infrastructure on a non-discriminatory basis.

The Company operates over a wide range of geographies and demographics and a single LAN communications product may not be economic to deploy even when economies of scale and standardization are factored into the analysis. As a result, hybrid systems, using two or more LAN technologies, are planned to be deployed in portions of the service area with different geographic and demographic characteristics.

A two-way hybrid communication network that supports the meters and SMI applications with near real-time communications capability will allow the Company to optimize the benefits offered to customers throughout the service territory by utilizing multiple RF wireless communications technologies for optimum cost and coverage in diverse service geographies and customer density areas. This deliberate hybrid architecture choice enhances long-term

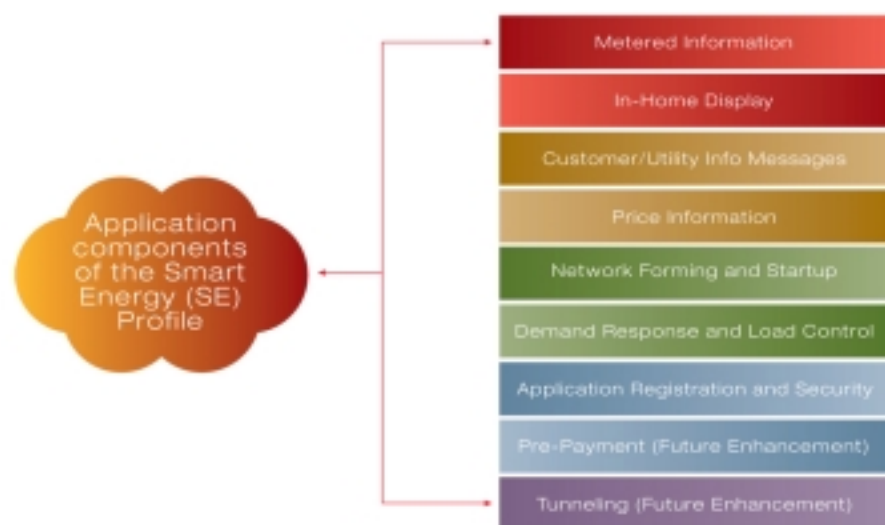
communication resilience to inevitable technology changes and upgrades through inherent vendor diversity and opens standard principles ensuring maximum usefulness of this investment.

Communication technologies have the capability to support a wide range of SMI functions including hourly interval reads, on-demand reads, outage management integration, tamper detection alarming, and low voltage alarming with minimal time latency (less than 5 minutes). This performance will support current and expected future SMI functionally with the exception of distribution automation, which requires the real-time transfer of critical switching information between distributed network devices.

The Home Area Network (HAN) portion relates to the communication network that will be within the premises and facilitates the communication between the meter and the IHD. The HAN can be expandable to support future devices that support the HAN Technology, like Programmable Communicating Thermostat (PCTs), smart appliances, Load Control Devices (LCDs), and others.

The IHD industry is evolving towards categorizing the level of functionality of each device against a standard Smart Energy Profile (SEP). The SEP contains a number of functional blocks or capabilities. The figure that follows depicts the components supplied by the ZigBee Smart Energy Profile:

Figure 8. Smart Energy Application Components



The Smart Meters implemented by Allegheny Power will be required to have a secure two-way communication interface for IHDs and HAN devices registered with the utility itself. This interface may carry various data types including, sensitive data, confidential data, and control data and hence secure communications is important. The ZigBee SEP has a security implementation that protects the meter and the communications between the meter and HAN devices when these are configured as a Utility Private HAN. Each IHD or HAN device that is to communicate with the ESP will be required to join the Utility Private HAN.

Allegheny Power will provide and install the ZigBee-compliant IHD it considers most suitable based on the enrollment of the customer in specific EE&C and DR programs. At minimum, each customer will receive an In Home Display to communicate consumption and price signals.

A closely related component of the SMI communications network is the Automated Data Collection System (ADCS) which hosts the SMI network management applications. The SMI network management applications perform several important functions including the management of the SMI communications network, scheduling and collection of meter readings and coordination of routine customer and meter data changes to ensure that all meters are read. SMI vendors provide the system controller as part of their SMI solution. In hybrid systems, more than one network management application may be hosted by a single ADCS.

A Home Area Network (HAN) is required in addition to the LAN/WAN communication capability for the smart meter technology to provide customers with direct access to and use of price and consumption information, to include: (1) direct information on their hourly consumption, (2) enable time of use rates and real time price programs, and (3) effectively support the automatic control of electricity consumption by, the customer, the EDC or a third party, at the customer's request. Alternative customer access is discussed later in the Access to Smart Meters and Data Capabilities section.

For cost/benefit analysis purposes, detailed planning is assumed to begin in early 2010, and procurement is assumed to be complete in 2014. Following the field trials, system-wide installation of communication networks is expected to start late in 2010. The expected life of the planned system is nominally 20 years.

More detail concerning the capital and O&M costs is provided in Section 5 Cost and Benefits and deployment details can be found in Section 2.3- Smart Meter Deployment Process.

The communication costs include the initial purchase price for all communications equipment, installation, upgrades to existing analog networks, engineering and procurement services. Vendor supplied indicative industry pricing is used to form the basis of the cost estimate. The O&M cost is the annual operating and maintenance expense associated with maintaining and repairing the communication network and beyond current O&M costs.

The most significant benefit of two-way communication is the timely dissemination of usage and pricing data between the Company and the consumer in support of EE&C and DR programs with accurate feedback for usage behavioral changes leading to cost and environmental benefits. Near real-time communication may enable new third party services to further assist the consumer in conserving energy while maintaining an acceptable standard of comfort and convenience.

The communications network O&M cost is the annual operating and maintenance expense associated with maintaining and repairing the SMI communications network. The category includes the maintenance of the home area network (HAN), local area network (LAN) and the wide area network (WAN), tower lease expense, network management upgrades, leased backhaul, and the hardware maintenance expense.

The following are the key capabilities of the IHDs and HAN:

Secure Two-way Communication with the Meter

The Energy Services Portal (ESP) within the meter is required to be a secure two-way communication interface for HAN devices registered with the retailer or the utility itself. This interface may carry various data types including, sensitive data, confidential data, and control data and hence secure communications is important. The ZigBee SEP has a security implementation that protects the meter and the communications between the meter and HAN devices when these are configured as a **Utility Private HAN**. Each HAN device that is to communicate with the ESP is required to join the Utility Private HAN.

Direct Access to Usage Data

One of the main requirements for energy conservation is a better-informed consumer. With more timely and detailed information at the hands of consumers, customers will make better choices about energy usage and conservation. With direct data access, consumers do not need to wait until the next bill to see how changes in their usage have affected the cost of energy. The HAN provides access to the interval energy data in the meter, the current demand and retail tariff data. There are a range of HAN devices that may use this data including IHDs, consumer's computers, energy management systems and smart appliances.

Load Control

Using load control to shift load from peak periods to other times has financial benefits for customers and the industry. In addition to controlled loads that are wired directly to SMI meters, load control can be achieved via the HAN. Air conditioning is a major peak load that can potentially be controlled through the HAN. Air conditioning demand can be reduced by a range of means including cycling compressors, limiting power levels, or increasing the setting of the thermostat. HAN devices within the consumer's premise can be used to achieve such load control through direct or indirect means. For example central air conditioning systems could be controlled through HAN-connected programmable controllable thermostats (PCTs).

Supports Distributed Generation

Distributed generation systems are small-scale power generation technologies used to provide an alternative to or an enhancement of the traditional electric power system. As more homes and business become "green" it is anticipated that retailers and distributors will need to support distributed generation sources such as solar panels, small wind turbines. The HAN can be used to read metering on the output of such small-scale power generation.

Supports Water and Gas Metering

The HAN ESI may also communicate with gas and water meters and propagate their data through the HAN (e.g., to an IHD) or through the Smart Meter network for transfer to an appropriate entity (e.g. a retailer or distributor could gather water meter information and pass that information to the water utility).

Provide a growth platform for future products which leverage HAN and meter data

Beyond information delivery and basic demand response the HAN should have the capability to support the next generation of applications including distributed generation, Plug-in hybrid electric vehicles, and other metering applications as the technology, information, and capabilities of the HAN matures.

In the beginning of the Grace Period during the implementation phase, several activities will be conducted in preparation for full deployment. See the Implementation plan in Section 2.3.1.2 for a discussion of: *Development and Installation Grace Period*.

- Master planning, an overall detailed master plan defining network technology choices, dependencies, and design;
- Formal procurement, solicitation and contracting activities for acquiring SMI services and components;
- Field trial, final technology testing, evaluation, and personnel training of SMI components;
- Accelerated network and meter deployment, complete system wide deployment by EOY 2014.

These planning activities establish governing principles to future proof the short-term implementation, long-term upgrades of the SMI in a reasonable and prudent manner:

- Product integration driven by Smart Metering Architecture,
- Product implementation controlled by master plan,
- Product selection optimized by field trials, and
- Product cost minimized by competitive bidding.

Reliability and Maintainability - As with the LAN, the scale of the extension of the WAN to concentrators and the potential for the backhaul to be used by many other critical corporate applications as well (substation communications, Smart Grid, etc) make it essential that each link be essentially trouble-free with a planned reliability of 99.5 percent.

Cost-efficiency - Preference is given to technologies and design strategies which make full use of existing Allegheny infrastructure where available. Allegheny has also indicated a preference for trading ongoing operational expenditures for one-time capital expenditures to the extent practical.

Potential for shared use with other corporate applications - Deployment of Smart Metering infrastructure requires that a great deal of WAN connectivity be extended throughout much, if not virtually all, of Allegheny Power's service area. It would be highly beneficial to choose backhaul forms used for transport of widely distributed non-Smart Metering infrastructure applications, such as substation automation and Smart Grid devices.

The communication architecture embraces a number of regulations, standards:

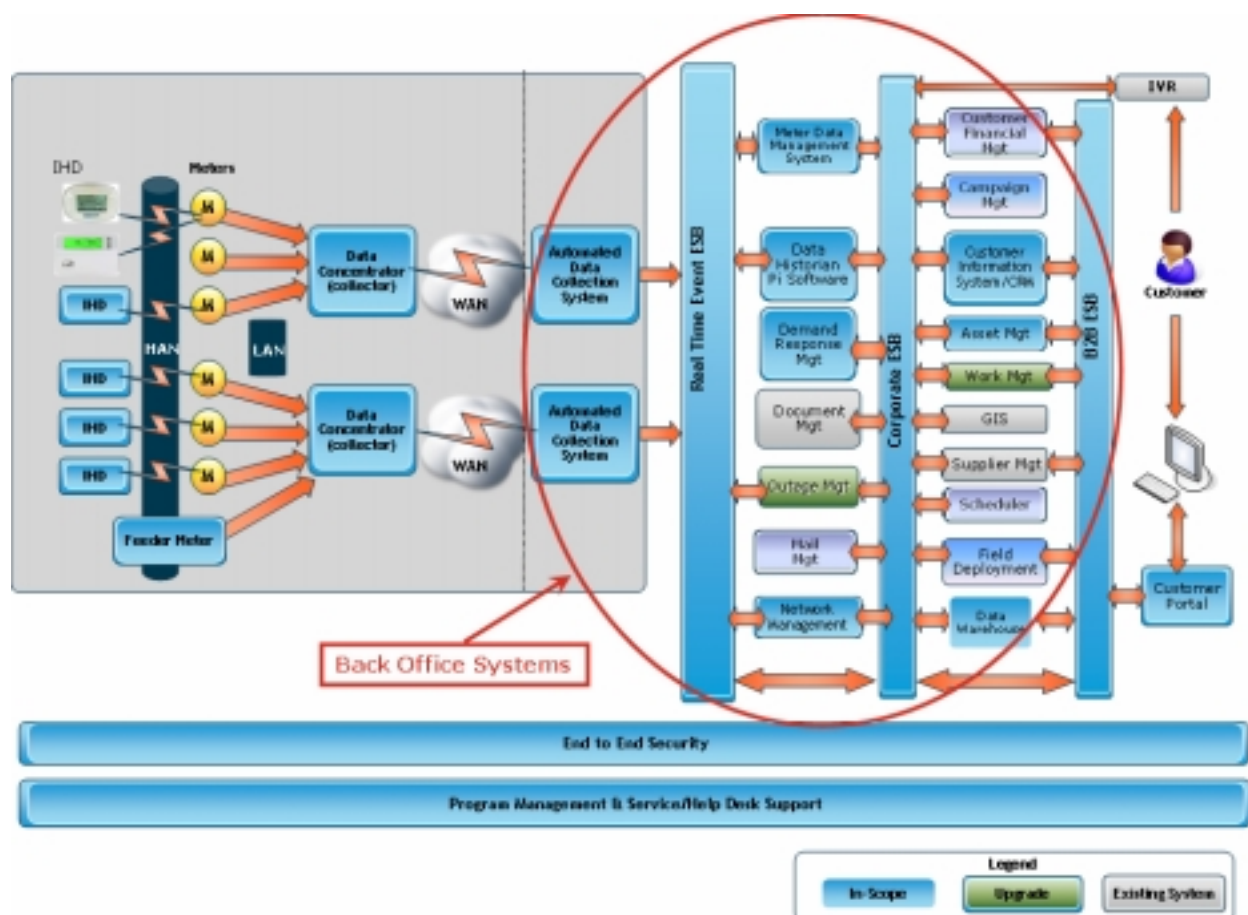
- IEEE 802.15.4 - Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)
- FCC Part 15 Class B - Applicable FCC Regulations.
- NERC CIP - WAN equipment and configurations will support all appropriate security measures (including physical security, encryption, and authentication) to meet government regulation requirements, and as needed to prevent intrusion into or disabling of the WAN or any devices connected to it.

- ZigBee Smart Profile 2.0 - For communications related to efficiency, usage, price, and messaging, compliant with OpenHAN standards. ZigBee is a low power, wireless mesh networking open standard based on the IEEE 802.15.4-2006 standard for wireless personal area networks. The plan includes the ZigBee SEP v2.0 as the HAN interface standard for SMI meters for the statewide Smart Metering Infrastructure (SMI) rollout. It was considered important to have one HAN technology for SMI meters to ensure interoperability of HAN devices across the state and to encourage the development of HAN networks and devices that enables secure and easy-to-use wireless communication between utilities and devices in customer's homes. The SEP connects thermostats, in-home displays, smart appliances, and other load control devices to the smart meter to improve energy management in the home.
- UtilitySMI OpenHAN Task Force - The plan also includes standard requirements defined by different organizations responsible for defining, driving and establishing base technology implementations.

Smart Metering architecture requires all products to be remote firmware upgradeable over the communications network to support future function addition and changes without replacing system components. Functions can be expanded with only the addition of capacity. For example the ability to expand usage data to include water and gas meters with only water and gas meter upgrades and possibly some network coverage upgrade.

2.4.5. *Back Office Systems Assessments*

Deployment of a Smart Metering Infrastructure as described in the preceding section will require many changes to Allegheny Power's current IT systems architecture and back office systems.

Figure 9. Overview of Back Office Systems

The Smart Meter (SM) architecture adopted by Allegheny Power uses a system of modular components that are best in class in mitigating risk while being cost competitive. These components must be modular, scalable, and leverage industry standard integration processes, technologies, and toolsets to provide the full functionality to support current SM needs, as well as future technology innovations.

The Smart Meter architecture adopted by Allegheny Power for its SM implementation is vendor-agnostic. This allows Allegheny Power to select from many different vendors and products to integrate the most cost-effective combination of meters, concentrators, and back-office systems.

Meter data collected from the meters, and communications from the In Home Devices (IHDs), must feed data to back office systems. The back office systems will use this data to validate readings, alert for potential outages, perform billing calculations and update customer records. Messages from Allegheny Power's Demand Response Management System must be sent to the meters and IHDs.

The data flows from the meters, through the communications network, to the back office systems. Several of these systems are new and are required to support the Smart Meters and IHDs.

The Automated Data Collection Systems (ADCS), also known as head-end systems, manage communication to the meters. One ADCS is required for each Smart Meter brand implemented. This is a new system required for Act 129.

The Meter Data Management System (MDMS) acts as the universal translator to communicate with the proprietary head-end systems. Thus, the back office systems (such as the Customer Information System) do not need to know which ADCS or ADCS “language” they need to speak in order to communicate with the meter or the in-home devices. The MDMS also performs data edits and validation and aggregates interval meter readings before passing the aggregated data to the Customer Information System (CIS) for billing purposes. This is a new system required for Act 129.

The Customer Information System (CIS) must be capable of supporting Time of Use Rates, Real Time Pricing, added data to record customer sign up to new EE&C and DR programs and support increased two-way customer communications. Allegheny Power’s current CIS is not capable of being cost effectively enhanced and so the implementation of a modern CIS is required.

The CIS will also include modules to perform Customer Relationship Management and Demand Response Management.

Outage Management System, Geographic Information System and Work Order Management System must also be integrated with the MDMS in order to share data and initiate energy instructions down through the head end system. The Outage Management System must be upgraded to support Act 129.

A Customer Portal is required to provide self-enrollment in EE&C and DR programs and customer and permitted third party access to meter data and to meters. The portal will need to have rapid access to meter data without impacting Allegheny Power’s operations, so it will access a copy of the meter data stored in a Data Warehouse. The portal and data warehouse are new systems.

The Interactive Voice Response System will require a capacity upgrade to accept more calls from customers.

Allegheny Power has evaluated the amount of systems integration needed between these back office systems and have concluded that the most effective way to integrate them is by adoption of a Service Oriented Architecture (SOA) and an Enterprise Service Bus. This will make it easy for all these systems to share the data quickly and seamlessly.

Each of the Smart Meter Applications is discussed in further detail in the following pages.

2.4.5.1. *Automated Data Collection System*

The Automated Data Collection System (ADCS) is the communications and application processing head end for the metering system. It provides scheduled and on-demand data collection, network management for the underlying SMI system, system security support, and system management. It also enables remote control of many features in the endpoints (whether in-home devices or the meters) as well as providing an industry standard interface with the utility's enterprise systems.

An ADCS provides the core functions:

- Meter data collection
- Meter network management
- Device control
- Secure communication
- Firmware management
- SMI network management and monitoring
- Reporting, logging, and audit
- Communication to in-home device (IHD) and Smart Grid-enabling devices

ADCS interacts directly with the Meter Data Management System (MDMS) and most of the data collection and control functions of the ADCS are enabled through the MDMS. The MDMS is then integrated to the other back office systems and is the system of records for all meter related information.

At present, Allegheny does not have a Smart Meter Infrastructure. Multiple Smart Metering technologies are deployed for C&I and Transmission points measurements which are read by handheld readers on a monthly schedule:

- Itron MV-90 systems
- DB-Microware/Neptune FieldNet systems
- Hunt command center

Allegheny Power evaluated several ADCS candidates.

The criteria categories for easy analysis are:

- **Functional** - This includes all evaluation criteria that relate to ADCS relevant functionality of the product (such as two-way communication, ability to do on-demand reads, execute connect/disconnect operations, and ability to do firmware updates)
- **Product** - This evaluates the characteristics of the product, such as architecture maturity, reliability, scalability, and performance. This is a good indicator of product maturity and reliability.

- **Company** - This is the evaluation of the vendor, since the strength, growth, and maturity of the vendor are critical decision factors in the product selection.

The ADCS must be selected in conjunction with the SM LAN technology. The vendors LAN technology and the ADCS are still tightly coupled. Although some interoperability is possible, the products have not reached a level of maturity and standardization that allows for seamless interoperability.

The ADCS should be deployed before starting to deploy the LAN network, and before deploying the first Smart Meter for the following reasons:

- It facilitates meter provisioning.
- ADCS can be a useful tool for diagnostics of the SMI LAN and end-points.
- It enables collection of data almost immediately.

The ADCS selection is critical, but secondary to, and highly dependent on, SM networking and metering technology selection.

In conjunction with the LAN evaluation which found that two different RF network technologies are needed to provide reliable telecommunications coverage for Allegheny Power's service territory, Allegheny Power concluded it will require two ADCSs, one per LAN technology used.

2.4.5.2. Meter Data Management System

The Meter Data Management System is a critical component of all Smart Meter and/or Smart Metering Infrastructure deployments. The MDMS performs a number of critical operational functions that include the storage of the meter data (that includes interval meter data) and also the overall management of the meter data network. This function is especially required where multiple metering technologies are utilized within the utility. The most fundamental role of an MDMS is to provide a central repository of meter data for large numbers and types of metering devices. This repository would be the system of record for all meter data and would be the central point of aggregation for meter data coming from disparate meter head end systems.

The MDMS then acts as the universal translator to the various metering head-end systems so the system users do not need to know how metering technology is used in the field to access a particular meter. This functionality allows the metering technology to be treated as more of a commodity and allows the utility to take advantage of new emerging metering technology (even during deployment).

The validation, editing, and estimating function (VEE) is the final important piece of functionality that an MDMS provides. This functionality supports a set of rules (usually set by the appropriate public utilities commission) to validate interval and anchor meter readings, provide rules for estimates of missing or errant reads and, as a last resort, allows for editing of meter reads. This functionality requires a great deal of processing power.

The MDMS needs to be a real time operational system to ensure its performance is not affected by customer queries for meter data. A data warehouse will store copies of the meter data to isolate the reporting function from the operational functionality of the MDMS. Moving the data to a data warehouse for reporting and analysis allows the MDMS to concentrate on the operational aspects of accepting meter reads into the database, managing the meter network, and doing VEE.

A number of fully functional MDMS products on the market today have the functionality necessary for Allegheny Power's Smart Meter architecture.

Currently, Allegheny obtains interval data on only a portion of their overall meters and the data from these meters is collected via MV-90. The collected data is processed through the Metered Interval Processing (MIP) system which is a legacy mainframe interval data repository for revenue, engineering, substation, system inter- and intra-connection data, power station, and load research data. The raw data is retained in MIP and is passed to the LODESTAR database. The LOADSTAR Customer Suite is used to perform complex billing including real-time hourly pricing, load profiling and settlement, revenue forecasting, rate analysis and load analysis. LOADSTAR also provides tools used to perform validation, editing, and estimation (VEE) on this interval data using user-configured VEE rules.

Both MIP and LOADSTAR are used to generate reports used by the engineering and financial community at Allegheny. MIP is used for generating mostly list-type and data-dump reporting as well as substation analysis. LOADSTAR is used for generating load analysis, industrial customer and wholesale energy contract billing and PJM market settlement data.

As observed above, the current interval data environment requires three separate distinct systems to accumulate, store, process, and use interval data. Analysis concludes that the current Allegheny systems are not able to handle the volume of interval data expected from the entire Allegheny meter population. Furthermore, the changes required to increase the functionality to meet the Act 129 and Allegheny requirements for a Smart Meter program would not be cost-effective to implement. Therefore, Allegheny Power intends implementing an MDMS that can perform all the above functions.

Multiple candidate products were reviewed and several were found to meet Allegheny Power's requirements.

2.4.5.3. Customer Information Systems

The Customer Information Systems is a keystone of smart meter infrastructure. Moving to a Smart Metering infrastructure (SMI) as defined in Act 129 places certain new requirements for customer relationship and billing (CRB) functionality. New billing determinants, new energy efficiency conservation (EE&C) and demand response (DR) programs, and new customer interactions all place additional stress on an existing Customer Information System (CIS). Although the implementation of a robust MDMS can reduce CIS stress related to preparing estimated bills and calculating billing determinants, the new requirements generally require a robust, modern CIS.

Allegheny Power's current CIS was evaluated against Act 129 requirements. Allegheny's legacy CIS was developed in the 1970s and has been subjected to multiple additional requirements that have stretched its capabilities to its limits. To add requirements for Time of Use rates and Real Time Pricing was estimated and proved to be not cost-effective compared to migrating to a new off-the shelf CIS.

The current state of Allegheny Power's CIS system in use today is as follows:

- Completely custom to and maintained by Allegheny;
- Originally installed into production in the 1970s and undergone several major changes including the rewrite of the Customer Service Representatives' interface;
- Is built upon an aging legacy technical platform – COBOL, CICS and runs on the mainframe;
- Increasingly more difficult to maintain;
- Analysis indicates that market availability of skill sets necessary to maintain is declining.

According to Gartner, an industry IT analyst group, "AMI/Demand Response programs require costly retrofits of legacy CIS applications to enable the rollout of the time-of-use and real-time pricing products to residential mass-market customers." (Gartner, May 2008.)

As part of its Act 129 planning efforts, Allegheny Power formed a team of experts to analyze the situation and determine if it was more cost effective to modify the existing legacy CIS system or migrate to a modern system. The team was launched in early 2009, and completed this analysis using an external expert (Quintel Strategy Consulting).

The conclusion of the team was that the total cost of ownership of the modified legacy CIS system over a nine-year period was more costly than implementing the modern CIS solution. The primary elements of Act 129 which drove this conclusion include:

- Smart Meter Technology
- Time of use rates
- Real time pricing
- Customer Portals

Additionally, Allegheny Power's Customer Service Representatives will need an information system that provides access to this same information in order to service customers.

The modernized CIS will be one of the primary components that will enable Allegheny to efficiently:

- support customer requests and inquiries of the utility regarding their service and billing,
- estimate, calculate and track customer usage and billing information including the support for time of use rates and real time pricing
- provide customers direct access to billing and payment information over the Internet

Allegheny Power plans to complete the replacement of its CIS platform by February 2011.

In the interim, modifications to the legacy CIS to meet the EE&C target requirements for 2010 are required. Due to the time constraints required by the targets, this solution requires the existing system to be modified to support the EE&C programs that will support the EE&C reduction requirements. These modifications are also incorporated into the CIS Modernization effort and are part of the plan.

2.4.5.4. Campaign Program Management

Based on Pennsylvania's Act 129, Allegheny will be required to implement, maintain, manage, monitor, and report results to the Commission on various energy efficiency and conservation (EE&C) programs designed to produce reductions in the amount of energy consumed by customers within the Allegheny service territory. To achieve the desired energy savings, the Company anticipates that these EE&C programs will require customer enrollment, modifications, and terminations for Allegheny Power's foreseeable future. To support this endeavor, Allegheny will need a robust campaign program management system.

Campaign program management includes design, execution, coordination, optimization, and monitoring of EE&C and other marketing campaigns. Marketing and demand management professionals can create targeted, personalized campaigns across all company communications channels to address the EE&C program requirements. Allegheny staff can design communications streams, including the ability to trigger events based on customer responses and agreements. In addition campaign program management allows for monitoring campaign results at the program, product, customer, and conservation services provider levels.

Currently, Allegheny has no automated campaign management. Enrolling customers is performed through identification through the current CIS and other disparate systems. Monitoring and measurement are both manual processes that require information to be retrieved from many sources within the organization that is both costly from a resource perspective and susceptible to errors.

Allegheny Power needs a Campaign Management System that addresses the multiple phases of a campaign:

- Planning and development
- Execution
- Measurement and analysis.
- Reporting

Allegheny Power plans to implement a Campaign Management capability as part of its CIS modernization mentioned above. This module satisfies all the requirements identified above and can be fully integrated into the defined SMI framework. From a cost standpoint, since the module is already licensed, the only costs to be incurred would be for integration services.

2.4.5.5. Demand Response Management System (DRMS)

To achieve the energy reduction guidelines identified in Act 129 and based on certain demand response (DR) programs enabled by Smart Meter Technology by Allegheny, it is necessary for Allegheny to implement, manage, monitor and report results to the Commission on those DR plans designed to encourage customers to reduce the amount of energy consumed within the Pennsylvania service territory. Successful demand response management requires the following:

- End-to-end process management support
- Program fulfillment and enabling technology
- Customer messaging and device signaling for critical events
- Analytical feedback for forecasting and reporting internally and externally
- Managing change of device updates, program updates, and customer updates

Currently, Allegheny has no automated demand response management function for planning, establishing, monitoring, measuring or reporting on their demand response programs. To comply with Act 129, Allegheny will require more control in their demand response programs hence more sophisticated DMRS functionality will be required.

The DRMS provides Allegheny with a mechanism to manage customers' demand in response to certain conditions. During critical periods of high demand or in a dynamic pricing environment, the DRMS is required to recognize the price events and accurately record the customer behavior via their usage. The same data generated by this process can be used to better plan for future demand response strategies based on customer responsiveness to pricing signals.

In the marketplace today, there are a few commercial-off-the-shelf DRMS products. The functionality necessary to support Allegheny Power's DR programs include the following:

- Full end-to-end integration and bi-directional communications to support customer sign-up via web portal, IVR and customer service representatives, send event notifications through the MDMS to the meter end points, appropriately respond to customer overrides, and retrieve usage information
- Ability to support Critical Peak Pricing (CPP) on either a manual set up basis or through a system of configurable business rules, and the ability to generate or process billing determinants
- Ability to track and manage load control events
- Ability to monitor and report performance of demand response events

Allegheny Power will implement the most cost-effective product that provides the necessary functionality.

2.4.5.6. Outage Management System

Allegheny Power, with many other utilities, faces challenges in outage management due to limitations of the Outage Management System (OMS) solutions deployed today:

- Utilities and OMS solutions are still dependent on customers to report outages
- Device prediction accuracy - Utility data show that up to 30 percent of the single customer calls are not classified as outages
- Detection and verification of nested outages - Nested outages can go un-noticed for several hours during severe storms
- Crews management and utilization - Crews dispatched to the incorrect location or return trips for nested outages are costly to the utility

With the deployment of SMI, Allegheny Power has the ability for network operators to proactively manage large and complex networks in a more advanced manner. Today's SMI technology capabilities allow the network operators to:

- Ping any device or meter at any time
- Ping a meter and verify a no-light call
- Evaluate the entire circuit or feeder
- Provide the network operator with prediction validation
- Provide additional information for locating the faulted device
- Provide outage restoration verification
- Identify potential nested outages
- Improve network operator system visualization

Once the OMS software is integrated with the SMI system, the network operations personnel can automatically ping the customer and verify the meter status of the meter. If the customer's meter pings in-service, the call and order can be cancelled. This avoids a crew being dispatched to the site. While this may be the simplest use of Smart Metering Infrastructure, it has the biggest overall impact in the end and can eliminate dispatching a crew approximately 30 percent of the time.

After restoration or partial restoration activities are completed, the network operators can verify restoration accuracy at the customer level. The crew will verify that the interrupted device was repaired and returned to normal. The OMS system, along with SMI, automatically pings the meters involved in the outage. This action will verify a restoration result regarding "no-power" on an individual customer basis. If, for instance, the customer pings as still being out of service, the OMS prediction process will start over and a nested outage will be created for additional follow-up action while the crew is still in the area. This is a significant improvement to the overall restoration efforts and customer satisfaction level.

Allegheny Power currently has an Outage Management System that cannot make use of data from Smart Meters.

The OMS system currently used by Allegheny would need to be upgraded to a more current version to provide the above capabilities.

Due to the close relationship and dependency between the OMS and Geographical Information System (GIS) for analysis and visualization of outage locations, Allegheny Power plans to implement the adapters needed for integration of the OMS and GIS.

Since Act 129 does not explicitly require that the Outage Management System be linked to outage data from the Smart Meters, the Company has included the associated costs as optional.

2.4.5.7. *Work Management System*

Allegheny Power uses a Work Management System to support the following activities:

- Records, dispatches, and completes planned, emergency, new connection, and maintenance service orders reported by other systems such as OMS or IVR
- Communicates design data, schedule work, completed compatible units (CU), and facility information to the Mobile Work Management (MWM) System Communicates up-to-date design CUs to the AM/FM GIS.

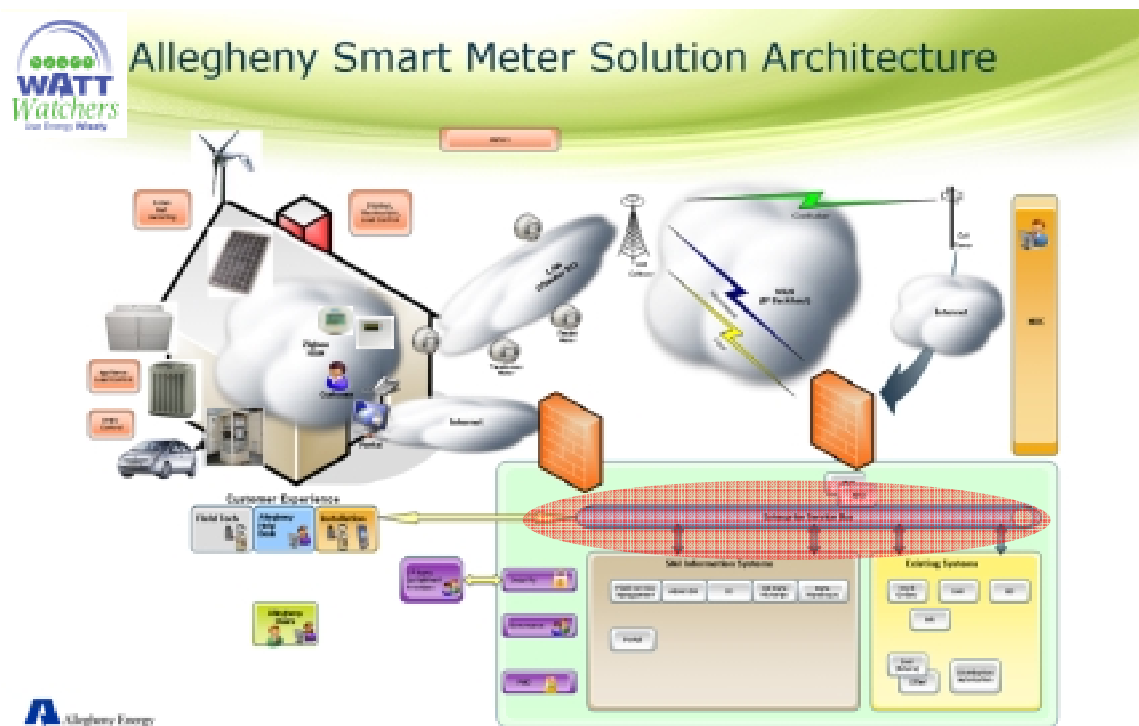
The current Work Management System is not capable of supporting integration with the data that can be received from Smart Meters to assist in work planning.

Allegheny Power will need to integrate the Work Management System with the Smart Meter Infrastructure.

2.4.5.8. *Enterprise Service Bus (ESB)*

The ESB is the infrastructure component in SMI that brings all the disparate back-office vendor systems together into a cohesive SMI Solution. An ESB's job is to give systems access to services provided by other systems, regardless of location, protocol, transport, interface technology, security domains, syntactical mismatches, and semantic differences. This means that ESBs must support many interface and transport protocols and data formats, and it also means they must provide conversions between interface protocols, between transport protocols, and between data formats. ESBs also route requests based on data; support request and response, notification, publish and subscribe, and other interaction styles; and integrate with a range of commercial directories and security models.

An ESB has the ability to chain operations together to create individual "message flows" and "process orchestrations." This allows developers to string services together, one service providing the input to the next, without having to build the flow logic into the services themselves. Such a capability greatly simplifies building of new interactions between systems, or changing existing interactions, and thus shortens development and testing time and provides cost-savings compared to the older technique of application specific point-to-point interfaces directly between the different back office systems.

Figure 10. Role of ESB in the SMI Architecture

Allegheny Power currently has no Enterprise Service Bus. Each system has unique interfaces developed for it to interact with each other system when there is a need for systems to pass, or share, data. Allegheny Power will have over 100 new interfaces/system interactions that have been identified at this point to make the SMT work. An ESB is the most cost effective way to implement and manage communications between the various systems.

Allegheny Power evaluated the most cost-effective way to integrate all the components and systems that are required to support Smart Meters and DR programs. The resulting Smart Meter Architecture will include an ESB to optimize data traffic and simplifies software development, maintenance and enhancement.

2.4.6. Customer Interfaces

To achieve Act 129 legislated Consumption and Demand Response reduction targets, customers need to have access to their usage data and easy access to other information such as: available programs, energy usage and audit tools, rate information and program enrollment. Allegheny Power envisions three main channels for customers to interact with the Company – the In Home Display, the Web Portal and the Interactive Voice Response System. The IHDs are described in the Section 2.4.2 *In Home Technologies Assessment*. The Web Portal and IVR are described below. IVR and the Web are not mutually exclusive, but have different strengths. Both will be needed for effective customer communication.

Additionally, Allegheny Power will provide the required customer and authorized third party access to Smart Meter data and meters through its web portal.

Allegheny Power has planned to retain usage data for five years for access through the Customer interfaces and will provide the usage date within 24 hours of its capture by the Smart Meter. The Customer Interface systems will be designed to operate on a 24/7 basis.

2.4.6.1. Web Portal

The Web plays a large part in influencing customer behavior and providing customers with access to consumption and rate information and the ability to act on that information.

The Web will provide the tools required for customers, or third parties they designate, to evaluate and enroll in EE&C and DR programs, access meter data and establish two-way communication with their own IHDs.

The portal is a specialized Web site that provides customers and other external entities with direct, secure, and personalized access to enterprise resources. The introduction of a portal will divide the Allegheny site into two sections:

- a public site available to all interested parties and
- a secure site available to Allegheny Power's customers, partners, and suppliers.

Portal users must register (or be registered) and log in to access Allegheny Power's resources. Only data and functions appropriate to each user will be exposed through the portal.

Allegheny Power's Act 129 portal will contain the following components:

- **Customer usage** - Customers view their recent and historical usage, including interval usage, and costs.
- **Customer self service** - Customers report an outage; view outage and event information; initiate work requests; start, stop, and transfer service; enter meter readings; verify payments; enroll in plans; and opt-in or opt-out of DR events. Most of these functions are available today as part of the public Web site. Implementation in the portal simplifies user data entry since the portal will automatically link users with their accounts. After portal implementation, self-service functions in the public Web site should be removed.
- **Customer Pay Ahead** - Customers Pay in Advance bills, and view their Pay in Advance balance and history.
- **Customer conservation tools** - Customers conduct online home energy audits, with the system storing audit data for subsequent retrieval, and have access to various calculators.
- **Third-party delegation** - Customers delegate account, meter data and demand response functions to third parties.
- **CSPs access** - CSPs will access information to which they have been granted access.

Portal security will be addressed through an Identity Management system to prevent unauthorized access to customer data and the Company's internal systems.

Allegheny Power will implement a web portal to provide secure access for customers and authorized third parties to access Smart Meter data, enroll in EE&C and DR programs and perform other administrative functions.

2.4.6.2. *Interactive Voice Response IVR*

Interactive Voice Response (IVR) technology is an important customer communications technology.

Allegheny has a modern and highly functional IVR system that was implemented in 2007. It supports 140 inbound ports and 20 outbound ports. The inbound ports are sufficient for current load. Current outbound capacity is exceeded during outage events; overflowing to the Call Center or to Dispatch outside Call Center hours (Monday through Friday, 7:00 a.m. to 6:00 p.m.). Allegheny does not have a robust outbound notification solution.

Allegheny Power has concluded that the implementation of Smart Meters will require several changes to call scripts, some software upgrades and that the increased load requires greater capacity. The changes will arise firstly from the increased number of calls, and the different purpose for the calls, during the IHD and Smart Meter deployment; and, secondly, from customers who use the IVR as their preferred channel to query their usage data or to enroll in new EE&C and DR programs. Increased outbound call volumes to contact customers who are scheduled for IHD and Smart Meter deployment will require the addition of an outbound call management product. Changes will also be required to interfaces between the IVR and the back office systems.

Additional call center load is expected to require two additional call center agents.

2.4.6.3. *Business Intelligence and Data Warehouse*

A Data Warehouse is a repository of business data that is used for reporting and analysis. Business intelligence (BI) systems enable the stored data to be used as information to gain new insights into the business which can improve decision quality and speed. The high volume of data generated by Smart Meters will be made accessible to customers and authorized third parties. The primary repository of Smart Meter data is the MDMS. However, the MDMS is a critical real-time production system that manages communications to meters, Validation, Edits and Estimation and billing aggregation. All these functions are mission critical, so a Data Warehouse will be used to retain a copy of meter data for access by customers and third parties.

Allegheny has an assortment of data warehouses for various purposes but none that are currently in production are adequate for the data volumes and anticipated number of customer queries once Smart Meters are implemented. Allegheny has licenses for SAP Business Intelligence, SAP Business Warehouse, and SAP Business Objects.

To address the requirements of Act 129, Allegheny Power plans to implement the data warehouse and associated business intelligence tools.

2.4.6.4. *Electronic Data Interchange*

The Implementation Order specifies that the EDCs must provide EDI transactions for third parties to send and receive data.

Allegheny Power currently performs many EDI transactions per year and Allegheny Power will provide EDI transactions for authorized third parties to access Smart Meter data.

2.4.6.5. *Access to Smart Meters and Data*

The Implementation Order requires Allegheny to provide access to permit authorized third parties to access Smart Meter data and the Smart Meters. To perform functions such as:

- Query readings data
- Issue instructions to IHDs
- Obtain reports on consumption

Allegheny Power does not currently provide such access to its systems.

Allegheny Power will provide access to Smart Meter data and for customers or third parties designated by customers, from the internet via the Customer Portal. This access will be protected through Allegheny Power's cyber security for the SM infrastructure. Additionally, Allegheny Power will provide for EDI transactions to accomplish the same results for authorized commercial entities.

2.4.7. *System and Security Management*

2.4.7.1. *Systems Management*

Allegheny Power has concluded the vast increase in the network size, when the approximately 720,000 Smart Meters are added, and the corresponding increase in data traffic will overwhelm the current network management operations and tools. Allegheny Power has therefore included in its SMIP the cost to implement a new network management tool to ensure that:

- Data communications can be monitored to identify and correct any failing components (For example, if a communications node fails, it may not be possible to communicate with all meters without automated action to reroute communications)
- Data traffic is flowing smoothly and reaching destinations according to required service levels (For example, to provide meter data on a timely basis to customers and third parties, as required by Act 129)

Some of the tools required to manage the systems are referenced in other sections of the filing. For example, configuration management software is included in the security section and asset management is part of the back office systems.

2.4.7.2. Security

Allegheny Power recognizes the security of the nation's generation, transmission and distribution systems is paramount. Allegheny Power also has obligations to its customers and shareholders to protect its own infrastructure and assets and its own, and customer, data. Allegheny Power has therefore designed its Smart Meter Architecture to fully address security considerations and provides appropriate physical and software security at each point of vulnerability: prevention of unauthorized access to the meter, access to the field data collection systems and to the local and wide area networks.

2.4.7.2.1. Security Risk Assessment

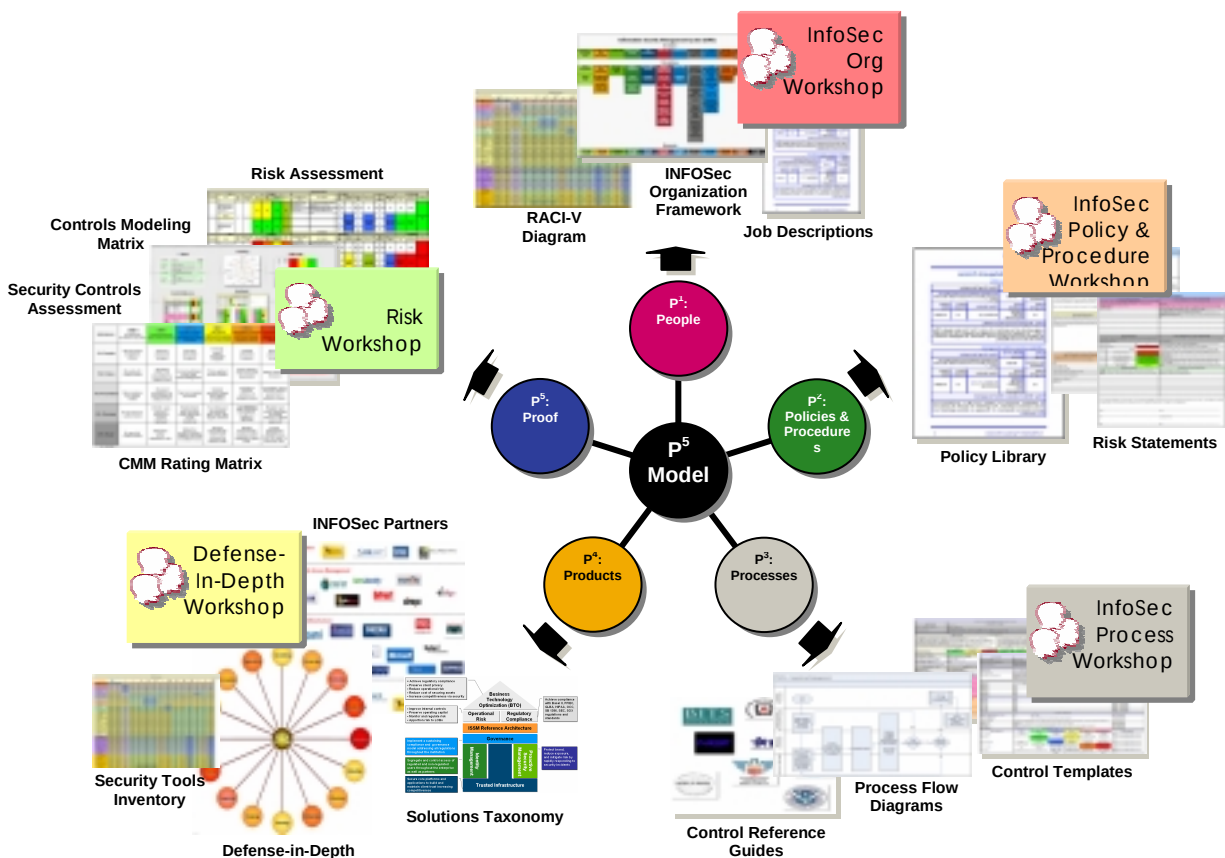
The issue of cyber-security has escalated dramatically in the past 5 years as a priority for consumer, commercial, public, private and government entities throughout the world. The reasons for this level of attention to security issues are varied and global:

- Increased incidents of international and domestic terrorism targeted against the United States.
- An increase in the number of countries with government-sponsored information warfare initiatives.
- Pressures within the electric power industry to downsize, streamline, automate and cut costs to maintain profit margins.
- Instability in the electric power utility job market, caused by deregulation and mergers, creating disgruntled employees and ex-employees.
- Instability in the electric power service caused by deregulation and increased competition, creating disgruntled customers.
- Public access to transmission system data.
- Rapid growth of a computer-literate population and widespread dissemination of hacker-tool libraries.
- Increased electronic theft, recreational hacking and "hacktivism" (i.e., the destruction of electronic assets for a political or socioeconomic cause).
- The increased network interconnections between previously isolated control systems.
- Increased dial-in and network access to remote substations through public communication services (e.g., public phones, Internet).

- The shift from proprietary mainframe-based computer control systems to distributed systems using open protocols and standards (e.g. TCP/IP and UCA over Ethernet LANs/WANs).

In order to ensure no organizational domains were omitted from review by Allegheny Power, an industry best-practices security review methodology was used as an outline. While methodology is typically used to perform very detailed enterprise level cyber-security assessments it remained valid as a guide for the high-level analysis required to create the initial SMIP. It is expected that when the project moves to the detailed design phase (expected subsequent to PUC approval) this methodology will be further leveraged to identify detailed security requirements.

Figure 11. HP EDS P5 Security Methodology



Cyber-security of the existing Allegheny IT network as well as of the newly proposed Smart Meter Infrastructure has been considered throughout this design. From the In Home Displays, Meters, and Customer Portals that exist in the customer environment all the way through to the integration with existing Customer, Outage and Meter Data Management Systems security is “designed-in” throughout. Security is implemented through various physical, electrical,

telecommunications and information technology mechanisms at each level of technology component within the overall solution. Examples are:

- Physical: meters are sealed with mount-locking rings and security tags; LAN concentrators are mounted high on towers and poles out of physical reach in secure NEMA enclosures; proprietary LAN communications hardware are not publicly available; WAN communications hardware are housed in secure utility locations
- Electrical: meters have tamper switches and can detect reversal in socket; IHDs are sealed tamper-resistant units; LAN communications modules are sealed under-glass during meter manufacture, meter metrology processing is separate and distinct from meter communications processing; meter configuration data and status is remotely monitored
- Telecommunications: meters use compressed and encrypted proprietary signaling to regional concentrators; IHDs pair only with their assigned meter using ZigBee 2.0 secure communications; LAN communications use frequency hopping spread spectrum (FHSS) low power signaling;
- Information Technology: meter provisioning and asset registration is double-blind and unique; WAN communications leverages Internet Protocol (IP) over multiple media types with multiple hardware and software security mechanisms; all IT processing subscribes to industry standard Authentication/Authorization model with role-based-security assignments; information security is the protection of information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction.¹ Secure systems provide the following assurances:
 - Authenticity - Actors (automated and human) on the network are who they claim to be. One way to compromise authenticity is through a “man-in-the-middle attack.” Authenticity is implemented through authentication mechanisms such as login and certificates.
 - Integrity - Data is protected from unauthorized modification or destruction. Integrity is implemented through mechanisms such as access control.
 - Confidentiality - Data is disclosed only to actors with access rights. One way to compromise confidentiality is through packet sniffing on the network. Confidentiality is implemented through mechanisms such as access control and encryption.
 - Availability - Access to systems by qualified actors is provided when requested. One way to compromise availability is through a denial of service attack. Availability is typically implemented through redundancy.
 - Accountability - Every action with consequences can be audited to determine action, actor, time, and means. Accountability is typically implemented through audit logging.

¹ http://www.law.cornell.edu/uscode/html/uscode44/usc_sec_44_00003542----000-.html

2.4.7.3. *How security is addressed in SMIP*

The Allegheny Power SMIP provides security at every tier of the architecture.

The following matrix shows how each security concern is addressed at each tier of the SMI architecture. The ultimate solution should be evaluated in a similar fashion

Table 12. Security Concerns and SMI Architecture

	Authenticity	Integrity	Confidentiality	Availability	Accountability
IHD / HAN	Smart Energy Profile key	message integrity validation	AES-128	HA configuration (multiple load-balanced instances with failover)	Audit log in IHD back-office application
Meter	PKI device authentication; password protected configuration interface	No local control interface	AES-128 or 256; SSH	Last-gasp notification; self-monitoring; tamper alert	Audit events sent to head-end; forwarded to MDMS
LAN	Password controls on each device; managed by ADCS	Anti-tampering features on each device	AES-128; keys managed by ADCS; frequency agility; ANSI C12.22 encrypts passwords over the wire	Tamper flags on concentrators	
WAN ²	Vendor-specific	Vendor-specific	Vendor-specific	Vendor-specific	Vendor-specific
ADCS	Authentication against LDAP	Role-based access control	AES-128, SSL	HA configuration (multiple load-balanced instances with failover)	Audit log of all operations with timestamp, user, change,
MDMS	Authentication against LDAP	Role-based access control	Internal access only		Audit log with timestamp, user, change, accessed via ad-hoc query

² WAN security is vendor-specific and technology-dependent.

SAP back-office apps	Authentication against LDAP	Role-based access control	Internal access only		Audit log with timestamp, user, change, accessed via ad-hoc query
Portal	Certificate, Authentication against LDAP	Role-based access control	SSL	Clustered configuration	Access log (audit log is responsibility of back-office system)

2.4.7.4. *Security Solutions Proposed*

The Allegheny Power SMIP provides for the following:

1. **IDM:** It is recommended that a single enterprise level Identity Management solution be implemented at Allegheny Energy and that this solution/product be leveraged for the SMIP operational and back office systems.
2. **SAML SSO:** Security Access Markup Language Single Sign-On is an architecture and protocol for ensuring user identity across web-based applications.
3. **LDAP:** Light-weight Directory Access Protocol is an application level protocol used for directory service management and security administration. Implementing a production scalable LDAP is necessary to support the multiple security domains required for Act 129 infrastructure.
4. **Reverse Proxy:** The existing Allegheny Energy Linux/Apache reverse proxy system was sized for approximately 500 users when it was installed in 2003. The system is load balanced between Greensburg and Fairmont and is setup for disaster recovery. The system is currently overloaded (600+ users) and the hardware is obsolete. This system should be replaced with a robust production-class high availability system that is appropriately sized for the current Allegheny load plus anticipated organic growth.
5. **ESB:** Enterprise Service Bus technology enables data, system and process integration as well as orchestration of complex events. Implicit in ESB integration is a common security model which can support authentication and authorization across disparate applications and system types.
6. **Intrusion Detection System (IDS) and Intrusion Prevention System (IPS):** Products are in place for the legacy Allegheny WAN and LAN. It is recommended that the current IPS be expanded to monitor the incoming subnet of WAN circuits from all the concentrators.
7. **Enterprise Security Event Monitoring (ESEM):** ESEM is responsible for collecting, analyzing and storing different types of logs such as security event logs from servers, firewalls, routers, switches, etc. Based on certain criteria, ESEM can flag certain log entries as alerts which will be forwarded to a security monitoring team. While Allegheny Power

currently does not have an ESEM product in place it is recommended that they pursue an ESEM product implementation.

8. **CMDB:** Configuration Management Database is an automated dynamic repository of detailed device information for every device and component assembled into an information system. CMDBs are an integral part of the ITIL processes which support Service Management. The CMDB must be flexible, adaptable and accessible and incorporate all SMIP components as well as traditional IT components.
9. **Patch Management:** Defined set of processes and tools to manage the software patch/version level of all electronic devices on the network. Incorporated also is the organizational governance required to support Patch Management. Device patch management is a function of the individual Automated Data Collection Systems (ADCS) which each provide inventory and status reports of firmware and patches information and allow for the programmatic scheduling and management of software patches to all LAN devices. This functionality is incorporated in the SMIP proposal.
10. **Asset Management:** Repository/system to record the non-IT characteristics (location, owner, procurement history, contract information, financial status, etc.) for all assets within the enterprise. This functionality is in the SAP application suite.

Allegheny Power is confident that its security solutions included in its SMIP will protect against unauthorized access to meters, data and back office systems.

3. QUALITY ASSURANCE, INTERNAL EVALUATION AND AUDIT

Allegheny Power's proposed Smart Metering plan is comprehensively designed to meet the current and ongoing needs of the Company in complying with the SMIP Implementation Order and Act 129. As with most of the Company's capital programs, the Smart Meter Program has a robust approach to quality assurance wherein the Company will work to ensure that the Smart Metering Infrastructure will satisfy Company requirements, the requirements of Act 129 and provide benefit to the customer and society in a manner that is systematic and reliable. In general, the Quality Assurance approach focuses on two key principles. First, the Smart Meter Infrastructure will be deployed in a manner that is fit and suitable for purpose and that the deployment is fundamentally right the first time. Allegheny Power's quality assurance program will measure and help to ensure cost effective program performance, customer service and inform future changes prior-to, during, and following Smart Meter Infrastructure Deployment in the Company's Pennsylvania service territories.

Second, in addition to the approach to quality assurance, Allegheny Power has a structured robust approach to the governance of the Smart Meter Infrastructure program. This approach begins with sponsorship of the program by Allegheny Power's management. In addition, a Company Governance Committee that includes Allegheny Power's Vice President of Distribution, Executive Director of Customer Services and Chief Information Officer, will sponsor the Company's Smart Meter Infrastructure Deployment.

Following suit with typical Company operations protocol, Allegheny Power will also use its Enterprise Program Office processes to ensure the timeline for Smart Meter Infrastructure deployment is met.

Further, in order to mitigate business, operational and technology risk, the Company plans to hire Smart Meter Infrastructure experienced external resources, consultants and equip equipment suppliers to assist in the execution and program management aspects of the Smart Meter Technology program. This includes hiring a proven, reputable system integrator to oversee and handle the bulk of the technology and systems deployment effort. Procurement for Plan services is the responsibility of the Program Managers with guidance and assistance from the Procurement group. All services are competitively bid per company business practice. Approvals of contracts and purchase requisitions follow the company approval-limit business practice. Service and supply agreements with these expert external resources will be subject to performance-based payment arrangements, service levels agreements and/or milestone oriented deliverable provisions intended to achieve the project outcomes and on-time delivery.

Finally, the Allegheny Power Audit Services group will be used to verify the Company's compliance with this proposed plan. All applicable SOX Controls and Business Practices will be followed and a review and/or audit will be completed annually.

4. COST RECOVERY MECHANISM

Section 2807(f) (7) of the Pennsylvania Public Utility Code provides:

“An electric distribution company may recover reasonable and prudent costs of providing smart meter technology under paragraph (2) (ii) and (iii), as determined by the commission. This paragraph includes annual depreciation and capital costs over the life of the smart meter technology and the cost of any system upgrades that the electric distribution company may require to enable the use of the smart meter technology which are incurred after the effective date of this paragraph, less operating and capital cost savings realized by the electric distribution company from the installation and use of the smart meter technology. Smart meter technology shall be deemed to be a new service offered for the first time under section 2804(4) (vi). An electric distribution company may recover smart meter technology costs:

- (i) through base rates, including a deferral for future base rate recovery of current basis with carrying charge as determined by the commission;*
- or*
- (ii) on a full and current basis through a reconcilable automatic adjustment clause under section 1307.”*

In accordance with §2807(f) (7), Allegheny Power has elected to recover smart meter technology costs on a full and current basis through a reconcilable automatic adjustment clause under §1307. Recovery of smart meter technology is proposed to occur via a separately stated non-bypassable line-item bill surcharge entitled Smart Meter Technology (“SMT”) Surcharge, which will include:

1. A return of and on capital costs, based on the Company’s pre-tax cost of capital. This return compensates the Company for its financing costs associated with capital costs.

Forecasted capital costs will be depreciated/amortized over the estimated useful book lives of the investment. The estimated useful tax lives is used to determine accumulated deferred income taxes, which is an adjustment to the revenue requirement. AFUDC will be accrued at the Company’s post-tax cost of capital when a capital cost occurs prior to its in-service date.

Capital costs include items such as In Home Technologies, Smart Meters, Communication Network (hardware and software), Back Office Systems (software), Customer Interfaces (software), and Systems Management and Security (software). Capital costs are classified and, if necessary, subdivided into various asset types for recovery over the estimated useful lives, with associated labor, travel and facilities included with the related asset type. The book and tax depreciation lives are based upon input from external sources and internal/external subject matter experts, and are as follows:

<u>Asset Type</u>	<u>Book Life</u>	<u>Tax Life</u>
In Home Technologies	5 years	10 years
Smart Meters	10 years	10 years
Hardware	5 years	5 years
Software (without CIS)	5 years	3 years
Software (with CIS)*	7 years	3 years

**CIS is SAP-based software, which will have a 7 year book life when it goes into service*

2. Forecasted incremental Operating & Maintenance (“O&M”) costs as incurred.

O&M costs include items such as labor, software maintenance and license fees, leasing costs, and depreciation of existing meters.

3. Forecasted savings associated with deployment of the Company’s proposed SMIP.

Forecasted savings is an offset to O&M costs and includes benefits associated with customer service, distribution operations, revenue enhancement, and CIS-related benefits. The Company does not have any forecasted capital savings (from amounts currently collected in rates) that are associated with the proposed SMIP.

4. Annual reconciliation mechanism to true-up forecasted revenues and costs with actual revenues and costs, as more fully described later.

4.1. Revenue Requirement

Listed below are Allegheny Power’s projected total costs and benefits for the period of 2009 through 2014:

Capital (\$000)	2009	2010	2011	2012	2013	2014	TOTAL
Smart Metering & Infrastructure	\$ 8,086	\$ 144,037	\$ 115,504	\$ 79,197	\$ 41,590	\$ 21,811	\$ 410,225
CIS	\$ 14,426	\$ 42,136	\$ 14,833	\$ 0	\$ 0	\$ 0	\$ 71,395
Subtotal	\$ 22,512	\$ 186,173	\$ 130,338	\$ 79,197	\$ 41,590	\$ 21,811	\$ 481,620

O&M (\$000)	2009	2010	2011	2012	2013	2014	TOTAL
Smart Metering & Infrastructure	\$ 2,352	\$ 21,285	\$ 31,240	\$ 30,141	\$ 26,161	\$ 27,145	\$ 138,324
Smart Metering & Infrastructure Benefit:	\$ 0	\$ (1,216)	\$ (4,567)	\$ (7,198)	\$ (8,361)	\$ (8,700)	\$ (30,043)
CIS	\$ 817	\$ 3,113	\$ 3,034	\$ 4,001	\$ 4,051	\$ 4,138	\$ 19,154
CIS Benefits	\$ 0	\$ 0	\$ (3,149)	\$ (3,256)	\$ (3,372)	\$ (3,487)	\$ (13,265)
Depreciation of Existing Meters	\$ 0	\$ 3,885	\$ 5,180	\$ 5,180	\$ 5,180	\$ 5,180	\$ 24,604
Subtotal	\$ 3,169	\$ 27,067	\$ 31,737	\$ 28,867	\$ 23,658	\$ 24,274	\$ 138,773

Total (\$000)	\$ 25,681	\$ 213,240	\$ 162,075	\$ 108,065	\$ 65,248	\$ 46,086	\$ 620,393
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A revenue requirement is calculated for the above costs, which is allocated to the various customer classes based upon costs specific to a customer class and general costs that are allocated across certain customer classes. The three major customer classes are described below:

1. Residential Class

- Tariff No. 39, Schedule 10 – Residential rate schedule available to all residential service customers.

2. Non-Residential Class

- Tariff No. 39, Schedule 20 – General Service rate schedule available to all non-residential customers, but designed for customers with a billing demand under 100 kW.
- Tariff No. 39, Schedule 22 – General Service rate schedule available to churches and schools. Schedule 22 was closed to new customers as of August 30, 1979.
- Tariff No. 39, Schedule 23 – Athletic field lighting service. Schedule 23 was closed to new customers as of August 28, 1985.
- Tariff No. 39, Schedule 24 – Fair and carnival service, and other enterprises of a similar temporary nature.
- Tariff No. 39, Schedule 30 – Mid-size commercial and industrial rate schedule available to customers with a billing demand of 100 kW or greater.
- Tariff No. 39, Schedule 40 – Large industrial rate schedule available to customers with a billing demand of 2,000 kW or greater, with a service voltage of 25 kV or greater.
- Tariff No. 39, Schedule 41 – Large industrial rate schedule available to customers with a billing demand of 2,000 kW or greater, with a service voltage of 25 kV or greater. Schedule 41 was closed to new customers as of December 31, 1998.
- Tariff No. 39, Schedule 44 – Large interruptible industrial rate schedule available to customers with a billing demand of 5,000 kVA or greater, with a service voltage of 25 kV or greater. Schedule 44 was closed to new customers as of December 31, 1998.
- Tariff No. 39, Schedule 46 – Large industrial rate schedule available to customers with a billing demand of 30,000 kVA or greater, with a service voltage of 25 kV or greater. Schedule 46 was closed to new customers as of December 31, 1998.
- Tariff No. 39, Schedule 86 – Alternative generation service for small power producers and cogenerators.
- Tariff No. 37 – Service to Pennsylvania State University's main campus at University Park in State College, Pennsylvania.

3. Street Lighting Class

- Tariff No. 39, Schedules 51, 52, 53, 54, 55, 56, 57, 58, 59 and 71. Customers served under these schedules are not metered.

Capital and O&M costs associated with In Home Technologies are allocated entirely to the Residential Class since this technology is currently planned for residential customers.

Smart Meter costs have been developed into three categories of residential, non-residential, and general. Therefore, residential Smart Meter capital and O&M costs are allocated entirely to the Residential Class, and non-residential Smart Meter capital and O&M costs are allocated entirely to the Non-Residential Class. The general Smart Meter capital and O&M costs are proportionally split between the Residential and Non-Residential classes based upon the number of customer connections since these types of costs do not vary based upon customer usage or size.

With the exception of CIS costs, all other capital and O&M costs are proportionally split between the Residential and Non-Residential classes based upon the number of customer connections since these types of costs do not vary based upon customer usage or size.

Since the Street Lighting Class is not metered, the only category of costs this class receives is associated with CIS since this system performs the billing function for the Company. As a result, the CIS capital and O&M costs are proportionally split between the Residential, Non-Residential and Street Lighting classes based upon the number of customer connections since these types of costs also do not vary based upon customer usage or size.

Forecasted savings as an offset to O&M costs associated with deployment of the Company's proposed SMIP are allocated using the above methodology, with savings specific to a customer class allocated to that specific customer class, and general savings allocated across all applicable customer classes. As with the capital and O&M costs, forecasted savings is allocated based upon the number of customer connections since these types of savings do not vary based upon customer usage or size.

Since the Company intends to replace its existing metering over a five-year period with Smart Meters, the Company proposes to increase its depreciation expense to a level that will allow it to fully depreciate its existing metering plant over a five-year period from April 2010 through March 2015. This period is similar to the period over which the Company intends to replace its existing metering with Smart Meters and avoids stranding the recovery of its existing metering investment. The Company proposes to recover the additional depreciation expense, which is the amount in excess of the current level, through the SMT Surcharge until such time when the Company files a base rate case before the Commission and new retail rates are approved. Once the new retail rates go into effect the Company proposes to roll the additional depreciation expense into its base rates.

The allocated revenue requirement is calculated as a fixed rate per month by dividing the allocated revenue requirement by the number of customer connections, respective to the three customer classes of Residential, Non-Residential and Street Lighting. The allocated revenue

requirement is applied to all Pennsylvania customer connections of the Company, with the exception of CIS costs and benefits. Since CIS is a billing system that is, and will continue to be, used by all Allegheny Power regulated utility companies, only 48% of the CIS costs and benefits are applied to the Company's Pennsylvania customer connections. The 48% value is calculated as the proportion of the Company's customer connections in Pennsylvania as compared to the total customer connections for Allegheny Power's regulated utility companies in Pennsylvania, Maryland and West Virginia. Virginia is excluded from the calculation based upon Allegheny Power's pending sale of that distribution business, but the percentage will be recalculated in the event the Virginia sale is not successful.

A fixed rate per month is used in lieu of a volumetric rate since different customers within the same customer class should not bear a disproportionate responsibility for SMIP costs that are non-volumetric in nature.

4.2. Smart Meter Technology Surcharge

Since the Company has requested expedited Commission approval of its proposed SMIP, the SMT Surcharge is requested to begin in February 2010 and continue unchanged for 16-months through May 2011. Beginning June 2011, the SMT Surcharge will continue unchanged for 12-month periods of June through May of the following year. A rate change to the SMT Surcharge in June of each year is also in synchronization with the June rate change date for the Company's proposed EE&C Surcharge in its EE&C and DR Plan filing of June 30, 2009.

Subject to the annual reconciliation mechanism described below, the SMT Surcharge for each rate schedule/tariff is provided below. Although surcharge rates will continue beyond May 2014, the information provided below provides a snapshot of the best available estimates at this time.

Tariff Classification	SMT Surcharge \$ / month			
	Feb 2010 thru May 2011	June 2011 thru May 2012	June 2012 thru May 2013	June 2013 thru May 2014
Tariff No. 39, Schedule 10	\$ 5.86	\$ 14.34	\$ 15.57	\$ 15.77
Tariff No. 39, Schedule 20	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 22	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 23	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 24	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 30	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 40	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 41	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 44	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 46	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Schedule 86	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 37	\$ 5.94	\$ 13.90	\$ 14.57	\$ 14.20
Tariff No. 39, Lighting*	\$ 0.27	\$ 1.40	\$ 1.28	\$ 1.15

*Schedules 51, 52, 53, 54, 55, 56, 57, 58, 59 & 71

Allegheny Power will submit to the Commission by January 30 of each year for a change in the SMT Surcharge rates for the upcoming June 1. The change to the SMT Surcharge rates will be based on a forecasted revenue requirement for the twelve-month period of the upcoming June and running through May of the following year, along with an annual reconciliation mechanism for prior year revenues and costs. The forecasted revenue requirement will include a return of and on capital investments, and the net of incremental O&M costs and savings associated with deployment of the Company's SMIP, as adjusted for gross receipts tax and the Commission assessment fee. The annual reconciliation mechanism for prior year revenues and costs will include:

1. Actual revenues billed through December of the prior year, as adjusted for removal of gross receipts tax and the Commission assessment fee;
2. Actual costs incurred through December of the prior year, which will include actual O&M costs and a corrected capital revenue requirement to reflect actual capital costs, the most recently available pre-tax cost of capital from the prior year, and any changes/updates to depreciation and accumulated deferred income taxes; and
3. The difference between the above two amounts, as adjusted for gross receipts tax and the Commission assessment fee.

The exception to the above annual reconciliation mechanism will occur for the filing due by January 30, 2011 since this filing will include 2009 costs along with 2010 costs, with capital cost recovery reflective of the pre-tax cost of capital of the corresponding year.

Commission approval of this annual reconciliation mechanism to ensure dollar for dollar recovery of all prudently incurred costs will allow the Company to utilize regulatory accounting to properly match surcharge revenue with the program costs. Allegheny Power is requesting authorization for regulatory accounting to track on a dollar for dollar basis the amounts to be recovered on a deferred basis for any under-collections, or refunded on a deferred basis any over-collections, that may occur throughout the lifespan of the surcharge.

Attached as an appendices to this SMIP filing is a pro-forma tariff for Tariff No. 39 and Tariff No. 37 describing the proposed SMT Surcharge, which is provided in accordance with 66 Pa. C.S. §§ 1307 and 2807.

Allegheny Power respectfully requests Commission approval to begin surcharge recovery effective on one day's notice on the portions of the plan the Commission has approved.

5. COST AND BENEFITS

The assessment of the cost-effectiveness of a Smart Metering Infrastructure is a complex undertaking for several reasons. First and foremost, cost estimates depend on the identification of the ideal metrology and, more importantly, the communications system or systems and the MDMS to be employed. Choosing among the available systems requires an expert understanding of how each possible component would be arrayed across the specific topography and meter locations in a utility's service territory in order to provide the desired degree of timeliness and consistency in the communication of meter data. Additionally, various technologies are available for some of the components of the Smart Metering Infrastructure. As more utilities examine, explore, and deploy Smart Metering Infrastructure, additional technology changes will be made based on each utility's unique requirements. Utilities are driving some of these changes, such as expanded memory for time-of-use data accumulation, which are now being incorporated as a standard meter offering and are specified by Allegheny Power in this Plan.

Further still, the pricing of electronic and communications equipment has generally moved downward in recent years. For example, until recently, the incorporation of a service switch as part of the under-the-glass meter electronics would have increased the cost of such a meter by several hundred dollars. Today, many meter vendors are estimating costs that are less than half of this amount. If these trends continue, it is possible that the meters implemented over the term of this proposal may incorporate differing equipment and/or capabilities with costs that are lower than those extant today. It is Allegheny Power's intent to continually monitor the evolution of Smart Metering Infrastructure technology, and to incorporate any changes including technology and/or costs that are determined to be reasonable and prudent.

The fundamental need to efficiently and accurately gather data at every metered service delivery point is critical to building an effective, flexible, scalable and extensible Smart Metering Infrastructure. However, unless the utility and its customers can derive more benefit from Smart Metering than the automation of its meter-reading function alone, the incremental cost of a Smart Metering Infrastructure makes the business case economics of such a system an extreme challenge. Hence, justification for the incremental capital investments required for the Smart Metering Infrastructure have been sought by identifying and quantifying, where possible, the potential benefits that can be derived from a Smart Metering Infrastructure.

Hence, in developing the Smart Metering Infrastructure business case, the Company examined the various technology choices and their suitability within the Company's Pennsylvania service territory considering meter locations, electric network distribution characteristics, population of electric meters, and the costs of the components of the Smart Metering solution. The Company used an internally developed comprehensive cost model to identify and quantify the detailed costs of all components of the Smart Metering Infrastructure. In a similar manner, the utility benefits that the Smart Metering Infrastructure enable have been, where identified, quantified with the use of the industry recognized AMI Model published by McKinsey & Company. The

key utility benefits quantified through this model include: i) customer service benefits, ii) distribution operations benefits, and revenue enhancement benefits.

While the McKinsey & Company AMI Model was primarily used to identify and quantify the utility benefits of the SMIP, Allegheny Power also used the McKinsey & Company AMI Model to provide a value assessment representation of the costs and benefits specific to the deployment of Smart Metering Infrastructure, by including costs from the Company's comprehensive cost model. The Company has estimated the overall cost to implement the SMIP to be \$620 million over a five year deployment period. O&M expenses are estimated to be \$139 million net of benefits of \$43 million. Capital expenditures are estimated to be \$482 million.

Despite the complexities of developing the business case, Allegheny Power proposes that Smart Metering Infrastructure is a worthy investment especially considering the significant: i) benefits to the customer, ii) benefits to the market and society generally and, iii) benefits to Company operations. Though some of the benefits of Smart Metering Infrastructure, particularly the societal benefits are difficult to measure; the Company strongly believes that the overall, total benefits of Allegheny Power's Smart Metering Infrastructure including the customer and society benefits, in addition to the benefits to the Company will exceed the total capital costs sought in recovery.

Allegheny Power has developed the Smart Meter Infrastructure Plan and the deployment strategy in a manner that benefits customers, meets the needs of the service territory, is time effective, and is reasonable and prudent such that the requirements and targets legislated in Act 129 are achieved. This section describes the costs and benefits of the Smart Metering Infrastructure considering the unique dimensions of Allegheny Power's Pennsylvania service territory.

5.1.1. Cost Analysis

Specifically, the cost analysis was carried out by: i) developing a comprehensive set of Smart Meter Infrastructure requirements, ii) mapping these requirements to existing Company component technology and software capabilities, iii) obtaining pricing from vendors, and iv) estimating the Smart Meter Infrastructure deployment costs as they are expected to be applicable specifically to the Company's Pennsylvania service territories. Consistent with Act 129 requirements, technology manufacturers' representations and the regulatory filings made by other utilities regarding expected equipment life, the Company's cost analysis has assumed a meter equipment life of 10 years, a communications infrastructure life of 5 years, and an information technology hardware life of 5 years. The analysis also assumes a 5-year deployment schedule.

The summary results of the cost model are found in Appendix C of this Plan.

5.1.2. *Benefit Analysis*

In the assessment of benefits that are enabled by Smart Metering Infrastructure, the Company identified economic realization opportunities in utility, societal and customer benefit categories. This section of the filing focuses on the utility benefits. The utility benefit savings were grouped into the categories of Customer Service, Distribution Operations and Revenue Enhancement as categorized and presented by the McKinsey & Company AMI Model. To the extent that additional benefits are realized through deployment of Smart Metering Infrastructure, Allegheny Power plans to include these in future filings to true-up the actual costs/benefits associated with implementation.

The summary results of the McKinsey & Company AMI Model are found in Appendix B of this Plan.

5.1.3. *Company Operating Benefits*

Company Operating Benefits for Smart Metering Infrastructure include:

- *Customer Service Benefits*

- Automation of Meter Reading: Smart Meter Infrastructure would eliminate on-cycle manual meter reading and associated costs. The benefit value includes all direct meter-reading labor expense, supervisory labor expense, vehicles, equipment and other miscellaneous materials reduced by any costs incurred by the Company which may retain and retrain meter readers and equipment, e.g. Vehicles for other field operations functions.
- Reduction of Handling Time for Call Center Calls: Customer Service Representatives' access to on-demand data could reduce call-handling time.
- Reduction of Call Center Contacts for Bill-Related Calls: Estimated meter reads often generate customer calls associated with billing issues. With monthly, daily, or more frequent reads from Smart Meter Infrastructure, these missed reads and associated estimated bills can be reduced; thereby decreasing customer call volume, call duration time, and call center agent time spent handling these billing inquiries.
- Reduction of Off-Cycle Reads: Because Smart Metering Infrastructure can provide daily and on-demand reads, follow-up costs related to meter checks and re-reads can be reduced.
- Reduction of Estimated Bills: Smart Meter Infrastructure provides improved meter read accuracy, which can reduce costs associated with estimated and inaccurate reads, and the ability to confirm meter operability remotely. Reducing the number of estimated bills can reduce the cost to handle bill-related investigations and complaints outside the call center.

- **Reduction of Compensation/Claims for Meter Reading:** Utility costs for workers' compensation associated with injuries incurred by employees during meter reading can be reduced upon adoption of Smart Meter Infrastructure.
- **Reduction of Field Service Orders:** Smart Metering Infrastructure will enable Allegheny Power to avoid field service visits triggered by questionable estimated readings.

- ***Distribution Operations Benefits***

- **Reduction of Nested-Outage Restoration Time:** Smart Meter Infrastructure can be used to more effectively dispatch service crews for premises-level outage restoration, particularly when customers are affected by multiple-cause events. For instance, a fault can create an outage that affects many customers. Upon correction of the fault, the utility may incorrectly assume that all affected customers are restored. However, there can be occasions where an additional failure occurred during the outage that affects only a subset of originally affected customers. In situations like these, Smart Meter Infrastructure provides the utility with the ability to determine the status of service to a customer's meter. Therefore, the additional crew field time associated with these restoration activities, which may include a re-dispatch to the area, can be reduced. Additional strategic benefits (e.g., improved regulatory response, improved customer satisfaction and public perception) would also be expected to accrue but are more difficult to quantify.
- **Deferral of Metering Capital Costs:** Deployment of Smart Meter Infrastructure defers the capital costs associated with replacement of meters and other manual meter-reading equipment (e.g., vehicles) that would otherwise have been required. This capital deferral is offset by the annual failure rate of newly installed Smart Meter Infrastructure (e.g., meters and telecommunications).
- **Reduction of False Outage Dispatches:** With real-time voltage sensing capability, Smart Meter Infrastructure can provide system dispatchers with the ability to reduce unnecessary single-call trouble dispatches that are due to issues that can be isolated to the customer's side of the meter.
- **Increased Revenue Due to Reduced Outage Restoration Time:** Smart Meter Infrastructure outage restoration reporting functionality can be expected to reduce total time for service restoration, thus reducing the time customers are out of service and the possibility of lost revenue during outage events. Additional strategic benefits (e.g., improved regulatory response, improved customer satisfaction, and public perception) would also be expected to accrue but are more difficult to quantify.
- **Reduction of Long-Term Outage Response Time:** A Smart Meter Infrastructure communications system can be used to query individual meters (or meter status in the

meter data collection system) to achieve a level of knowledge about power outage status. After major events, this capability could be utilized along with other Smart Meter Infrastructure-related data, to reduce long-term outage restoration activities, thereby decreasing the cost of using mutual aid crews.

- **Increased Customer Participation in Demand-Response Programs:** Smart Meter Infrastructure can provide increased visibility to energy consumption data to facilitate customer acceptance and increased participation in load management programs. For example, two-way communications can enable the Company to signal customers to take voluntary, manual load reduction actions or to automatically adjust customer equipment. While Smart Meter Infrastructure does not provide the Company with the ability to postpone specific transmission and distribution (T&D) projects, the increased load management participation and associated peak load reduction will generally improve system optimization and help to defer T&D work over the long run

- ***Revenue Enhancement Benefits***

- **Increased Revenue Due to Improvement in Meter Accuracy:** Solid-state electric meters do not generally under-record with age, and, therefore, average meter accuracy will improve as electro-mechanical meters are replaced. Moreover, solid-state meters fail more conspicuously than electro-mechanical meters and are, therefore, more readily identified.
- **Reduction of Revenue Losses from Unoccupied Premises:** With the ability to perform daily or more frequent readings, consumption from premises that are supposed to be unoccupied can be more quickly identified and addressed. This is expected to limit utility exposure to write-offs of charges for consumption registered on “inactive” advancing meters on accounts finalized after customers inform the utility they are moving out.

5.1.4. Societal and Customer Benefits

Many cost reductions resulting from the implementation of Smart Metering Infrastructure are expected to accrue to customers, the market, and to society, rather than to the utility. While many of these benefits are significant, they do not directly provide operational efficiencies to the Company or constitute a contribution to operational benefits. Some of the benefits include:

- **Avoided Capacity Costs due to Increased Load Management Participation:** Smart Meter Infrastructure can provide increased visibility to energy consumption data to facilitate customer acceptance and increased participation in load management programs. For example, two-way communications can enable notification (either day-ahead or otherwise) to customers that can then take manual or automatic load reduction actions. This increased load management participation and associated peak load reduction is expected to result in the avoidance of capacity and peak energy procurement (or

postponement of generation construction requirements) costs that would otherwise be required to serve peak load. Reductions in wholesale market clearing prices may also result.

- **Avoided Capacity Costs by Managing Unforeseen Changes in End-use Devices** that would accelerate the Requirements for New Generation: New technologies may be very energy intensive and have wide acceptance in a very short time frame. Some of the consumer “wildcard” technologies on the horizon for electricity include plug-in transportation alternatives, microbiological controls (for air quality or water filtration), and home entertainment. While none of these may provide the challenges/opportunities of the proliferation of the window air conditioning unit, it is important to recognize that Smart Meter Infrastructure technology can play an important role in enabling demand-side technologies and choice and in controlling the impacts of new loads.
- **Decreased Customer Costs Due to Improved Outage Management:** Smart Meter Infrastructure allows a more effective dispatch of service crews to restore service in the event of an outage, thus reducing outage time. The customer costs include out-of-pocket cost items by class of customer. Residential costs include the cost of batteries, flashlights, candles, and the need to buy prepared food. Commercial customers costs are based on, inter alia, work interruptions. Societal costs include wages and overtime for additional emergency personnel that may be required to protect businesses, direct traffic, and carry out other functions.
- **Decreased Electric Demand and Load that would Improve Environmental Conditions:** By facilitating greater customer participation in load reduction and demand management programs, Smart Meter Infrastructure can help reduce peak loads coincident with the Company system peaks. This reduction in peak load, in turn, displaces generating units’ run-time, thereby decreasing the amount of pollutants discharged by peaking units.
- **Increased Customer Utilization of eCommerce Channels:** Smart Meter Infrastructure and supporting systems can help increase customer utilization of eCommerce and decrease overall customer service costs. By supporting the provision of daily and interval energy data via an Internet portal for customer viewing, Smart Meter Infrastructure is expected to increase customer interest in and use of eCommerce channels for other purposes.

5.1.5. Findings

Allegheny Power’s Smart Metering Infrastructure is a necessary investment given the significant customer, societal and utility benefits and the requirements of Act 129. In fact, deployment of SMI according to Allegheny Power’s proposed timeline wherein rollout of Smart Metering and Smart Metering Infrastructure commences in 2010 and is complete by the end of 2014 ensures that:

- the Company will be in compliance with Act 129, and the requirement to develop and file time of use rates by January 1, 2011, and
- each of the EE&C and DR programs proposed in the Company's EE&C and DR Plan filed on June 30, 2009 that rely on Smart Metering and Smart Metering infrastructure are timely implemented and can deliver energy savings and demand response benefits – this is particularly crucial for the EE&C and DR rates offerings including: Residential Efficiency Rewards, Pay Ahead Smart Service, Critical Peak Rebate (CPR), Time of Use (TOU) with Critical Peak Pricing, and Hourly Pricing Option (HPO), and as well as the demand response programs including the Programmable Communicating Thermostat (PCT) Program, Customer Load Response Program, Contracted Demand Response Program and the Distributed Generation Program.
- the Company can enable all customers the opportunity to participate in and benefit from Smart Metering and Smart Metering Infrastructure and the EE&C and DR programs, and
- the Company can avoid labor up-charges and the risk of potentially escalating costs stemming from deployment rework or technology glitches (ordinarily worked out in the field trials) associated with a shorter or hastier deployment.

However, the SMI is also a reasonable investment because the Company's Plan for deploying SMI ensures that there will soon be in place a durable capability to promote energy efficiency and conservation, effectively encourage participation in demand response, lower ratepayer energy costs over the long term, lower bills for many customers across each of the customer segments, and improve customer service, through providing customers access to timely and additional usage and price information that empowers them to make informed energy choices and decisions for their homes and businesses. Customers will additionally benefit by third parties who will provide additional services to customers that leverages SMI and the access to energy usage and price information that it will provide. In addition to the utility and customer benefits, SMI will provide additional Societal Benefits.

Allegheny Power further believes that Smart Metering and Smart Metering Infrastructure are transformative technologies that will simultaneously transform utility customers from passive purchasers of commodity into active participants in energy efficiency and conservation and demand response, and equally, transform utilities from suppliers of a commodity to educators and partners in enabling and supporting customer behavioral and economic choices for mutual benefit and the benefit of society as a whole.

Finally, while the cost-benefit analysis aides in evaluating the merits of a Smart Meter Infrastructure business case; it should not be the only consideration by the Commission in deciding whether Allegheny Power's SMI is in the public interest. The overall benefits of the SMI project are in many cases uncertain or difficult to quantify as is the case with many advanced or new technologies, and all parties will learn from the experience gained as the technologies are deployed and incorporated within business processes. All the ways in which this long-term technology investment will change utility operations and deliver benefits to customers and the Commonwealth cannot be completely or entirely predicted in advance. For these reasons,

while cost-benefit analysis should be considered, it should not be the only consideration. Allegheny Power therefore concludes that deployment of a comprehensive Smart Meter Infrastructure according to this Plan is in the public interest, is required to comply with Act 129 and empowers all parties to make better and informed energy decisions both now and in the future.

6. PLAN COMPLIANCE

In its SMIP Implementation Order issued, June 24, 2009, the Commission specified a number of directives to the EDCs. Allegheny Power has considered each of these directives in detail and has addressed each explicitly in the design of the SMI and in its SMIP Master Implementation Plan. In the section below, Allegheny Power enumerates the Commission's directives and provides a description of the Company's Compliance with such directives.

6.1 Summary of Directives

Reference Implementation Order Page 2. "Each EDC smart meter plan must describe the smart meter technologies the EDC proposes to install, upon request from a customer at the customer's expense, in new construction and in accordance with a depreciation schedule not to exceed 15 years. 66 Pa.C.S. §§ 2807(f) (1) and (2)."

The plan is compliant with the directive; see section 2.4.3.2 for *New Construction and Customer Request for Early Installation* details.

Reference Implementation Order Page 2. "The Act also establishes a requirement for EDCs to make available to third parties direct meter access and electronic access to meter data by third parties, upon customer consent. 66 Pa.C.S. § 2807(f) (3)."

The plan is compliant with the directive; see section 2.4.3.3 for *Third parties direct meter access* details.

Reference Implementation Order Page 2. "The Act further defines minimum smart meter technology capabilities. 66 Pa.C.S. § 2807(g)."

The plan is compliant with the directive; see section 2.4.3.1 for *Minimum Smart Meter technology capabilities*. details.

Reference Implementation Order Pages 3-4. "Each smart meter plan shall include: a summary of the EDCs current deployment of smart meter technology, if any; a plan for future deployment, complete with dates for key milestones and measurable goals; and such other information as is required by this Order."

The plan is compliant with the directive; see section 2.3.1.2 for *Development and Installation Grace Period* details.

Reference Implementation Order Pages 7-8. “The Commission also directs all covered EDCs to include in their smart meter procurement and installation plan filing a proposal for meeting specific milestones within this 30 month grace period. Each covered EDC must include a justification and its plan for meeting the following milestones:

- **Assessment of needs and technological solutions.**
- **Selection of technologies and vendors.**
- **Establishment of network designs.**
- **Establishment of plans for training personnel.**
- **Establishment of plans for installation, testing and rollout of support equipment and software.**
- **Installation, testing and rollout of support equipment and software.**
- **Establishment of plans to design, test and certify EDI transaction capability consistent with this order.**
- **Establishment of plans for installation of meters consistent with the rollout requirements described below.**

Each plan must include a schedule to meet each of these milestones, as well as specific reporting deadlines when the EDC will provide this Commission with reports on the status of its plan.”

The plan is compliant with the directive; see section 2.3.1 for *Schedule* and plans details.

Reference Implementation Order Page 9. “Therefore, the Commission has established a period of up to 30 months for each EDC to assess its needs, select technology, secure vendors, train personnel, install and test support equipment and establish a detailed meter deployment schedule consistent with the statutory requirements. This grace period will commence upon Commission approval of an EDCs smart meter plan.”

The plan is compliant with the directive; see section 2.3.1 for *Schedule* details.

Reference Implementation Order Page 10. “The Commission directs each covered EDC to include in its smart meter plan a proposal to install individual smart meters in advance of the EDCs system-wide deployment and after the network installation grace period. This proposal should include an itemization of the incremental costs.”

The plan is compliant with the directive; see section 2.4.3.2 for *New Construction and Customer Request for Early Installation* details.

Reference Implementation Order Pages 11-12. “Therefore, the Commission expects the EDCs to provide a plan for supporting these programs in such a manner that does not require unreasonable or imprudent costs.”

Reference Implementation Order Pages 12-13. “Therefore, the Commission directs each covered EDC to include in its smart meter plan a proposal for deployment of smart meters in new construction. Such a proposal should include a plan to identify new developments and construction early enough to incorporate it into the system-wide deployment proposal. The EDCs shall detail their system-wide deployment plans to the Commission, including any type of tiered rollout the company proposes, as well as the associated costs and benefits incurred from such a rollout. This system wide plan should also incorporate a coordination element with the new construction deployment component.”

The plan is compliant with the directive; see section 2.4.3.2 for *New Construction and Customer Request for Early Installation*. details.

Reference Implementation Order Page 14. “The EDCs shall detail their system-wide deployment plans to the Commission, including any type of tiered rollout the company proposes, as well as the associated costs and benefits incurred from such a rollout.”

The plan is compliant with the directive; see section 2.3.1.3 for *System Wide Deployment* details.

Reference Implementation Order Pages 16-17. “Therefore, the Commission directs that a covered EDCs smart meter technology must support the following capabilities:

To aid in understanding of this filing and Company’s comprehensive Master Implementation Plan, the 14 required and 2 optional Smart Meter Capabilities specified in the Implementation Order are presented individually with the Company’s response in the following subsections

1. Two Way (bi-directional communication)

All meters discussed in this filing have bi-directional data communications. All are capable of the following:

- Sending data - for example, an interval reading to the utility.
- Receiving data - for example, an instruction to trigger an activity in an In Home Device, such as a price signal, received from the utility.
- Sending data - for example, an instruction to trigger an activity in an In Home Device, such as a price signal, to an In Home Device.
- Receiving data - for example, an acknowledgment of an instruction from an In Home Device.

All In-Home Devices are capable of providing bidirectional communication.

The two-way communications expectation defines the Smart Meter Infrastructure (SMI) to Home Area Network (HAN) interface and creates and enables all other capabilities within the system. This interface will carry various data types including sensitive data, confidential data,

and control data. Appropriate levels of security must be provided for these types of communications. Security is critical; the security implementation protects utility and consumer assets, while enabling the next generation of applications and capabilities.

The Local Area Network (LAN) supports, with adequate bandwidth and latency, bi-directional communications with the network-enabled meters (residential and Commercial & Industrial (C&I)).

Aggregate 7x24x365 reliability of Wide Area Network (WAN) communications to all concentrators is 99.5 percent, with no concentrator having less than 99 percent reliability regardless of its relative insignificance. To the extent practical, networks are designed so that service restorations and failover to backup routes all take place automatically.

The ADCS support bidirectional communication to end devices. Additionally ADCS has the ability to prioritize message types, supports various communication patterns, such as broadcast, request/response (on-demand reads), publish/subscribe (schedule reads), and events/alerts.

2. Remote disconnection and reconnection.

Disconnect enabled meters, factory equipped with an internal disconnect switch rated 200 A (both continuous and load interrupting), allows for remote, fast response disconnect and reconnect of the customer load to and from the service. A meter that has been remotely disconnected remains energized and continues to monitor and record consumption (i.e. zero consumption for each interval).

The ADCS supports the future remote disconnection and reconnection functionality. However, the functionality is disabled in the ADCS until approved for use for security reasons.

In the future, the MDMS may deliver remote disconnection and reconnection service orders issued to the appropriate ADCS.

The plan is compliant with the directive; see section 2.4.3.9 for *Remote disconnect/reconnect* details.

3. Ability to provide 15 minute or shorter interval data to customers, EGSs, third parties and the regional transmission organization (“RTO”) on a daily basis, consistent with the data availability, transfer and security standards adopted by the RTO.

The load profile records data on a block-interval basis. The interval length is programmable from 5-to-60 minutes. The interval length is the same for all channels and is independent of the interval length for demand quantities. Generally, the industry currently uses intervals of 60 minutes or higher for residential and 15 minutes for large commercial and industrial customers.

The ADCS collects usage information as configured at the meter and provides it to the MDMS via the Enterprise Service Bus.

The data storage capacity of the ADCS is initially sized for 60 minute intervals and can be increased in the future to accommodate intervals as short as desired without replacing the system.

The plan is compliant with the directive; see section 2.4.3.10 for *Data intervals* details.

4. A minimum of hourly reads delivered at least once per day.

Meters can be configured to capture usage at midnight each day, and then send out the usage data in a programmable random interval before midnight the next day. However; the preferred method is for meters to transmit several times daily (i.e. every 4 hours) for energy and load profile data to improve data transfer success reliability greater than 99 percent.

The ADCS is capable of accepting scheduled readings at any desired rate. The capability exists in the ADCS, but is enabled by the meters, LAN, WAN and other business processes.

The data storage capacity of the ADCS is initially sized for six daily reads and can be increased in the future to accommodate as many reads as desired without replacing the system.

5. On board meter storage of meter data that complies with nationally recognized non proprietary standards such as ANSI C12.19 and C12.22 tables.

The Commission agrees that protocols should be focused at a high level, such as IEEE 802.15.4, and therefore, directs compliance with this standard. The Commission also encourages EDCs to adopt other open protocols and standards that enhance interoperability that are developed subsequent to this order, to the extent available at the time the vendor contract is solicited.

Load profile functionality is available in residential and commercial meter types through the use of ANSI C12.19 table sessions. Tier reads of all tiers held within a commercial-type meter are also made available through the head-end.

In addition to the traditional electric meter standards, Table 1 – Smart Meter Regulations and Standards lists standards most relevant to the Plan.

Table 1. Smart Meter Regulations and Standards

Regulation or Standard	Subject
FCC Part 15 Class B	Applicable FCC Regulations
ANSI C12.1	Electric Meters Code for Electricity Metering
ANSI C12.18	Protocol Specification for ANSI Type 2 Optical Port
ANSI C12.19	Utility Industry End Device Data Tables

ANSI C12.20	0.2% & 0.5% Accuracy Class Meters
ANSI C12.22	Protocol Specification for Interfacing to Data Communication Networks
IEEE 802.15.4	Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)

Currently, many network communication protocols are available, including 802.11 (WiFi), 802.3 (Ethernet), 802.15.1 (BlueTooth), 802.15.4/ZigBee, cellular, and HomePlug. However, since Smart Energy Profile (SEP) reflects most of the common on-the-market smart meter data into the HAN interface, the IHDs devices are based on an open global standard, which consist of IEEE 802.15.4, ZigBee Stack and Application Layer “Profile.”

The ADCS supports the ratified industry standards in both meter-side communications and back-office communications.

6. Ability to upgrade these minimum capabilities as technology advances and becomes economically feasible. The Commission, therefore, directs that EDC smart meter plans identify capabilities that have the potential to be upgraded without complete system replacement as technology advances and becomes economically feasible.

Emphasis is placed on Smart Meters with remotely configurable components.

An example of an additional capability that is available without complete system replacement is the ability to communicate with other devices such as compatible gas and water meters.

Beyond information delivery and basic demand response, the utility should expect the HAN to support next generation of applications including distributed generation, plug-in hybrids and other metering applications as the technology, information, and capabilities of the HAN matures. By supporting open standards, it is expected many vendors will be able to bring capabilities and innovation to bear on the HAN market.

The LAN has the capability to be expanded to provide adequate bandwidth, latency, equipment compatibility, and reliability to support additional non-Smart Metering infrastructure applications, such as Distribution Automation and Smart Grid, as either an equal or a secondary function. The LAN technology should support collection of water and gas meter data as well, should a later requirement add the capability (at increased cost) in some areas.

The WAN is designed to be readily upgradeable and expandable to meet projected increases in bandwidth and other performance requirements.

The ADCS is built around a modular and scalable architecture. As requirements change or new technology becomes available, it can be enabled in the ADCS by changing the relevant modules without significant impact to other components of the overall solution.

In support of system upgrades, the Work management System includes:

- Work management (reactive operations/maintenance)
- Asset management (planned and proactive maintenance)

- Mobile workforce management and other related capabilities
- Incorporating historical real-time data (for example, supervisory control, data acquisition, and metering).

7. Ability to monitor voltage at each meter and report data in a manner that allows EDC to react to the information.

Voltage quality, and power quality in general, is monitored and sampled over a controllable period of time. The sampled voltage registers are compared to minimum and maximum voltage thresholds. If the minimum voltage is lower than the sag threshold, the voltage sag bit is set. If the maximum voltage is higher than the high threshold, the voltage high bit is set. The bit is cleared when the voltage average window resets. The meter can be configured to alarm or record the conditions for analysis.

The ADCS will collect this information from the meters and provide it to up-stream systems via the ESB.

The MDMS monitors and reports voltage fluctuations.

8. Remote programming capability.

All meters have the ability to download new firmware features and bug fixes to the on-board EEPROM and then issue a command to re-program the meter microprocessor.

The HAN Smart Profile 2.0 technology supports remote programming and upgrade of firmware at end-point locations “over-the-air” through the LAN.

The LAN technology supports remote programming and upgrade of firmware at end-point locations “over-the-air” through the LAN.

The ADCS has capabilities to support remote programming of SMI and in-home devices. This includes configuration management, firmware upgrades, and other remote capabilities.

9. Communicate outages and restorations.

Should a meter detect an outage, an autonomous alarm is generated and directed to the Outage Management System. Typically power fail and restore messages are transmitted as a priority alert.

The LAN technology, overall architecture, and system design is sufficiently distributed so that no single point of failure causes system degradation severe enough that the system no longer serves its intended purpose. Furthermore, LAN communication should enter any fail-over modes automatically upon occurrence of a fault, and return to normal service automatically upon clearing of any underlying faults (such as loss of power).

WAN performance is adequate to support communications during restoration of wide-area power outages.

Means of active monitoring and remote management of WAN devices will be provided to enable timely detection and correction of outages and intrusion attempts.

Backup power and other redundant equipment is provided to critical network equipment, and as required to support use of Smart Metering infrastructure for outage detection and management.

The ADCS has the capabilities to receive outage and last-gasp events and propagate them to MDMS.

The technology also supports the ability to ping meter and multicast energy status requests to groups of meters to confirm restoration efforts.

The MDMS Outage Validation and Restoration Engine is specifically designed to handle the high volumes of outage and restoration notifications that are generated by the SMI system. All of the outage-related information is then combined with the MDMSs knowledge of the electrical network topology (obtained through synchronization with the GIS).

The OMS receives from the MDMS a reduced volume of information that still accurately conveys the true outage extent of outages for resolution.

10. Ability to support net metering of customer generators.

All meters are capable of net metering measurement and display of delivered, received, and net energy (kWh).

The inherent functionality of the MDMS supports net metering of distributed generation via system configuration of consumption measurement values.

11. Support automatic load control by EDC, customer and third parties, with customer consent.

Meters have the ability to pass Smart Profile messages to in-home devices for automatic load control.

Load control is the concept of load being deferrable and a load control device has the capability to limit the duty cycle of equipment under control. Certain devices within the consumer's premise (e.g., PCTs, electric pumps) can be used to shed load through direct and indirect control. A capability to interface and integrate with load control systems enables the utility's value position and as such, is critical that the capability be extended to the HAN.

The ADCS supports load control functionality. Automation is achieved in conjunction with other back-office systems, such as CIS, WMS, and MDMS.

12. Support time of use and real time pricing programs.

A Time-of-Use (TOU) schedule defines switch times for various rate tiers for different day types during different seasons throughout the year for energy and demand and supports Critical Peak Pricing (CPP).

The meter can be configured to store Time of Use data locally at the meter. The meter provides four regular rates, a critical peak rate, and a total rate. Each rate will consist of up to three channels of data.

The meter supports a critical peak override feature, in which a secure command can be sent to set a start time and duration for a critical peak override. The energy that accumulates during these hours will be accumulated in the special critical peak rate.

With direct data access, consumers do not need to wait until the end of the month to see how changes in their usage (such as Time-Of-Use and Real-Time Pricing) have affected their bills, and with energy usage profiled in smaller increments; consumers can see the impact of changing their energy usage patterns.

The inherent functionality of the MDMS supports the following capabilities.

- The ability to configure the MDMS to allow for items such as:
 - Interval data at the minute, hour, day and month level
 - Multiple validation, editing and estimations (VEE) rules
 - Meter consumption measurements (such as kWh, kW, kVAR, kVARh)
 - Time-of-use periods (such as peak, on peak, off peak, shoulder)
- The ability to support various rate structures such as the rates measures and concepts proposed by the Company in its EE&C AND DR filing on June 30, 2009 and other rate structures including, but not limited to:
 - Time of use (TOU)
 - Real time pricing (RTP) plans
 - Critical peak pricing (CPP)
 - Complex rate structures

The Customer Information System will be replaced in order to implement the requirements in the following areas:

- Bill production
- Rates management
- Usage management
- Meter management
- Work management
- Customer account management
- Bill calculations

The functionality along with the identified road-mapped enhancements supports the SMI architecture and will allow Allegheny Power to fully implement the smart meter functionality required by Act 129.

The campaign management system supports the establishment of multiple EE&C programs. Additionally, the system enables multiple conservation service providers (CSPs) to be established and linked to multiple plans.

The campaign management system, as identified, stores the data associated with each EE&C program. Campaign management supports monitoring and measurement of the various programs to provide the necessary reporting required by Act 129 by retrieving data from applications across the SMI architecture.

13. Provide customer direct access to consumption and pricing information. EDC smart meters to have a capability to provide raw near real time consumption data through a HAN or similarly capable method with open protocols; this data should be made available to customers or their designated third parties within 48 hours.

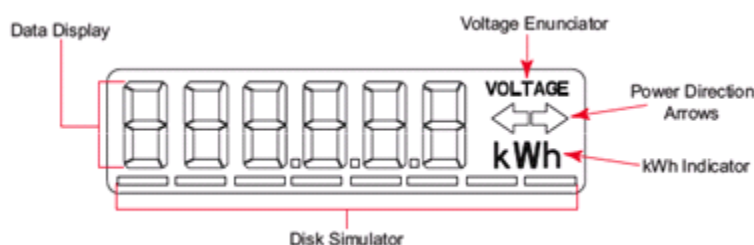
The customer has direct access to the consumption and pricing information in three methods:

- Via in-home displays (see Section 2.2 In-Home Devices for details)
- Via the Portal (see Section 3.9 Customer Portal and 3.10 IVR for details)
- Via the meter display

Residential Meters Register Display

The residential meter has two register channels available. Based on meter configuration, any two of the six display quantities can be stored in these registers and presented via the six-digit liquid crystal display (LCD).

Figure 12. Example Meter Register



- Available Display Quantities include the following:
 - kWh-delivered
 - kWh-received
 - kVARh-delivered
 - kVARh-received
 - kVAh-delivered
 - kVAh-received

All IHDs support and display TOU and RTP information

ADCS Capability

The ADCS core function is to collect consumption information and provide it to the MDMS, the system of record for all consumption data. The system of records pricing is CIS, billing, or rate management system. The information from all these sources is collected and presented to the customer via a portal or other presentment infrastructure.

ADCS, in conjunction with other back-office systems, is capable of service limiting and Pay in Advance service programs.

The MDMS stores meter data for extended periods in an online and archived manner.

Customers and third parties can gain secure and standards-based access to data via the web portal or through a web-services interface. The MDMS provides two-way communication for sending directives to and retrieving data from the end point or meter. Retrieved data will be returned via a secure channel such as a web portal, web services, or other reporting mechanisms to the requesting party.

Both customers and CSPs can gain access to program data via the web portal or through a web services interface. Retrieved data will be returned via a secure channel such as a web portal, web services, or other reporting mechanisms to the requesting party.

A self-service Web Portal provides the most direct way to implement both customer consent and third party data provisioning including the following:

- Ability to view current and historical usage, and billing data online in an easily understandable form
- Ability to respond to DR events using fast and meaningful access to information sufficient to make the right decision
- Ability to easily review premise energy usage characteristics and model possible changes through online energy audits and calculators
- Ability to easily participate in pre-payment plans

EE&C programs also use the IVR as a familiar communications channel. IVR services include the following:

- Ability for customers to enroll in DR programs
- Provide next DR event notification
- Allow customers to opt in or out of next DR event
- Pay in Advance bill
- Obtain shutoff terms
- Obtain Pay in Advance balance in dollars, KWh, and estimated days/hours/minutes remaining based on historical consumption and time of last update
- Notify customer of unusual usage event
- Notify customer of outage event
- Notify Pay in Advance customer of threshold event
- Enroll for event notification
- Determine whether circuit is on or off

Allegheny Power will implement the necessary EDI transactions for the exchange of monthly, billing quality, interval usage data at the meter level with authorized commercial and governmental entities. Allegheny Power already supports EDI transactions for Billing and Supply Chain processes. These current EDI transactions are processed by the current mainframe legacy CIS. As part of the CIS Modernization Project the existing EDI transactions will be moved to the new SAP CRB/CRM environment. Allegheny Power's Smart Meter Implementation Plan includes implementation of all updated and new EDI transactions in February 2011.

Business Intelligence (BI) / Data Warehouse (DW) capabilities support the reporting requirements of Act 129 and tuning programs to more effectively achieve the goals of the Act.

A DW supports BI and usage historical to assure adequate performance both for inbound data collection and for queries performed by consumers and third parties via the portal.

Both customers and third-party conservation service providers will be represented in Identity and Access Management, and that the access control implementation needs to understand the relationship between third parties and affiliated customers.

With over 700,000 potential customer users, the portal requires self-service registration, and self-service user id and password management. Third-party user provisioning also is supported.

Reference Implementation Order Page 20. Commission requires that EDCs smart meter plans incorporate provisions ensuring that all billing data is retrieved before data is overwritten and recoverable following communication outages.

To prevent loss of data in the event of communications failure, all meters use non-volatile memory for load profile data storage in excess of 35 days.

Reference Implementation Order Page 18. Therefore, we have removed support for service limiting, and prepaid service as a minimum capability requirement. This does not preclude EDCs from including these capabilities; however, an EDC cannot employ these capabilities unless it is approved by the Commission and consistent with regulations governing such programs, such as 52 Pa. Code § 56.17.

Several components make up a complete Pay in Advance system at the Smart Metering System Level:

- The plan includes endpoint meters with service disconnect and configurable Pay in Advance (countdown) profiles
- The plan includes Smart Meters LAN, Concentrators, WAN and ADCS capable of supporting communication of Pay in Advance data and status

- The plan includes Integrated MDMS and Customer Information System (CIS) (billing), with the potential capability of Pay in Advance processes implemented
- Payment Processing system potentially integrated with CIS, which would enable Allegheny to accept payments (credit, debit, cash, etc.) and post to customer accounts

ADCS, in conjunction with other back-office systems, is capable of service limiting and Pay in Advance service programs.

However, the functionality is **disabled in the ADCS until approved for use** for security reasons.

The plan is compliant with the directive; see section 2.4.3.8 for *Pay-Ahead Smart Service option* details.

Reference Implementation Order Page 18. Therefore, the Commission will require that smart meters have a capability to remotely disconnect and reconnect service as it provides the ability to increase safety, efficiency and cost benefits.

The plan is compliant with the directive; see section 2.4.3.9 for *Remote disconnect/reconnect* details.

Reference Implementation Order Page 20. The Commission will therefore require that EDC smart meter plans demonstrate how the need for 15 minute or shorter data intervals will be met.

The plan is compliant with the directive; see section 2.4.3.10 for *Data intervals* details.

Reference Implementation Order Page 20. Therefore, rather than reference a specific number of days, the Commission requires that EDC smart meter plans incorporate provisions ensuring that all billing data is retrieved before data is overwritten and recoverable following communications outages.

The plan is compliant with the directive; see section 2.4.3.11 for *Ensuring billing data retrieval* details.

Reference Implementation Order Page 21. The Commission agrees that protocols should be focused at a high level, such as IEEE 802.15.4, and therefore, directs compliance with this standard.

The Commission also encourages EDCs to adopt other open protocols and standards that enhance interoperability that are developed subsequent to this order, to the extent available at the time the vendor contract is solicited.

The plan is compliant with the directive; see section 2.4.3.12 for *Protocols and standards* details.

Reference Implementation Order Pages 21-22. The Commission, therefore, directs that EDC smart meter plans identify capabilities that have the potential to be upgraded without complete system replacement as technology advances and becomes economically feasible.

The plan is compliant with the directive; see section 2.4.3.13 for *Upgradeability* details.

Reference Implementation Order Page 22. The Commission, therefore, will require that smart meters have a capability to support the ability to monitor voltage.

The plan is compliant with the directive; see section 2.4.3.14 for *Voltage monitoring* details.

Reference Implementation Order Page 24. Therefore, the Commission directs that all covered EDCs must provide at least the following access to their smart meters and data:

- 1. Non-discriminatory access for retail electric suppliers and third parties, such as EGSs, and conservation and load management service providers;**
- 2. Open, non proprietary two way access for electric suppliers and third parties, such as EGSs, and conservation and load management service providers; and**
- 3. Full electronic access to customers and their representatives to meter data upon customer consent.**

The plan is compliant with the directive; see section 2.4.6.5 for *Access to Smart Meters and Data* details.

Reference Implementation Order Page 24. The Commission further directs that each EDC plan must address standards and formats for electronic data communications with customers and third parties.

The plan is compliant with the directive; see section 2.4.6.4 for *Electronic Data Interchange* details.

Reference Implementation Order Page 25. EDCs shall identify in their plans target dates for the testing and certification of these EDI transactions with their business partners in order to meet the smart metering implementation deadline as specified in this Order.

The plan is compliant with the directive; see section 2.4.6.4 for *Electronic Data Interchange* details.

Reference Implementation Order Page 27. Therefore, we direct EDCs to adhere to common industry and communications standards for providing consumers direct access to smart meters and data pursuant to this Order.

The plan is compliant with the directive; see section 2.4.6.5 for *Access to Smart Meters and Data* details.

Reference Implementation Order Page 29. In order to determine what these costs are, each EDC will document all costs relating to its smart meter deployment and installation plan. These costs will include both capital and expense items relating to all plan elements, equipment and facilities, as well as an analysis of all related administrative costs. More specifically, these costs would include, but not be limited to, capital expenditures for any equipment and facilities that may be required to implement the smart meter plan, as well as depreciation, operating and maintenance expenses, a return component based on the EDCs weighted cost of capital, and taxes. Administrative costs would include, but not be limited to, incremental costs relating to plan development, cost analysis, measurement and verification, and reporting. In addition, the plan should include cost estimates for testing, upgrades, maintenance and personnel training. The EDC must also provide sufficient support to demonstrate that all such costs are reasonable and prudent with respect to its smart meter plan. Consistent with Section 315(a), the burden of proof shall be on the EDC. 66 Pa.C.S. § 315(a).

The plan is compliant with the directive; see section 5 for COST AND BENEFITS details.

Reference Implementation Order Pages 29-30. Specifically, we direct that the plan filing shall quantify the costs to deploy and operate smart meter technology that is capable of the following minimum requirements set forth in 66 Pa.C.S. § 2807(g):

- Bidirectional data communications.
- Recording usage data on at least an hourly basis once per day.
- Providing customers with direct access to and use of price and consumption information.
- Providing customers with information on their hourly consumption.
- Enabling time of use rates and real time price programs.
- Supporting the automatic control of the customer's electric consumption.

The plan is compliant with the directive; see section 5 for COST AND BENEFITS details.

Reference Implementation Order Page 30: In addition, each plan filing shall include the individual incremental costs for deploying and operating the following smart meter technology capabilities:

- Ability to remotely disconnect and reconnect.

- **Ability to provide 15 minute or shorter interval data to customers, EGSs, third parties and an RTO on a daily basis, consistent with the data availability, transfer and security standards adopted by the RTO.**
- **On board meter storage of meter data that complies with nationally recognized non proprietary standards such as ANSI C12.19 and C12.22 tables.**
- **Open standards and protocols that comply with nationally recognized non proprietary standards, such as IEEE 802.15.4.**
- **Ability to upgrade these minimum capabilities as technology advances and becomes economically feasible.**
- **Ability to monitor voltage at each meter and report data in a manner that allows an EDC to react to the information.**
- **Ability to remotely reprogram the meter.**
- **Ability to communicate outages and restorations.**
- **Ability to support net metering of customer generators.**

Capability Description	Estimated Costs	Expected Benefits
Ability to remotely disconnect and reconnect.	\$ 40 per residential meter, for a cost of \$25,125,680 on 653,142 deployed meters through 2015.	Reduction in reconnection overtime costs
Ability to provide 15 minute or shorter interval data to customers, EGSs, third parties and an RTO on a daily basis, consistent with the data availability, transfer and security standards adopted by the RTO.	Included in base meter capability, no incremental cost.	Enables TOU, HOU and CPP rate implementations for C&I customers
On board meter storage of meter data that complies with nationally recognized non proprietary standards such as ANSI C12.19 and C12.22 tables.	Included in base meter capability, no incremental cost.	Enables competitive meter procurement.
Open standards and protocols that comply with nationally recognized non proprietary standards, such as IEEE 802.15.4.	Included in base meter capability, no incremental cost.	Enables competitive meter procurement.
Ability to upgrade these minimum capabilities as technology advances and becomes economically feasible.	Included in base meter capability, no incremental cost.	Potential avoidance of meter replacement to acquire technology advances.
Ability to monitor voltage at each meter and report data in a manner that allows an EDC to react to the information.	Included in base meter, network, and ADCS and MDMS capability. (Costs are included in the amount shown for outages and	Reduced potential for equipment damage, because low voltage and low power conditions will be detected

Capability Description	Estimated Costs	Expected Benefits
	restorations below.)	
Ability to remotely reprogram the meter.	Included in base meter capability, no incremental cost.	Avoidance of cost for dispatching a technician to reprogram each individual meter
Ability to communicate outages and restorations.	Included in base meter, network, ADCS, and MDMS capability. Upgrade OMS, WMS, and GIS is \$2,068,900	Reduction of Nested-Outage Restoration Time Reduction of False Outage Dispatches: Reduction of Long-Term Outage Response Time Increased Revenue Due to Reduced Outage Restoration Time Decreased Customer Costs Due to Improved Outage Management. A preliminary estimate indicates an operational savings of approximately \$200,000 per year.
Ability to support net metering of customer generators.	Included in base meter, network, ADCS, and MDMS capability.	Improved customer satisfaction.

The plan is compliant with the directive; see section 5 for COST AND BENEFITS details.

Reference Implementation Order Page 31. The Commission will allow each EDC to develop a reconcilable adjustment clause tariff mechanism in accordance with 66 Pa.C.S. § 1307 and include this mechanism in its smart meter plan.

The plan is compliant with the directive; see section 4 for COST RECOVERY MECHANISM details.

Reference Implementation Order Page 32. The Commission will require that all measures associated with an EDCs smart metering plan shall be financed by the customer class that receives the benefit of such measures.

Any costs that can be clearly shown to benefit solely one specific class should be assigned wholly to that class.

The plan is compliant with the directive; see section 4 for COST RECOVERY MECHANISM details.

Reference Implementation Order Page 33. The Commission believes the EDCs should install smart meters in a manner that coincides with the full depreciation of existing meters, so as to minimize the stranded costs. However, in the event that there are stranded costs that need to be recovered the Commission agrees with EA, PECO and Duquesne that the EDCs should be allowed to seek recovery of those costs through an accelerated depreciation schedule, to be included in the EDCs cost recovery plan.

The plan is compliant with the directive; see section 4 for COST RECOVERY MECHANISM details.

7 APPENDICES

A. Glossary

Acronym	Term
ADCS	Automated Data Collection System (ADCS)
AE	Allegheny Energy (AE)
AMI	Advanced Metering Infrastructure (AMI)
AMR	Automated or Automatic Meter Reading (AMR)
AP	Allegheny Power (AP)
BI	Business Intelligence (BI)
C&I	Commercial and Industrial (C&I)
CIS	Customer Information System (CIS)
CPP	Critical Peak Pricing (CPP)
CPR	Critical Peak Rebate (CPR)
CRB	Customer Relationship And Billing (CRB)
CSP	Conservation Service Providers (CSP)
CU	Compatible Units (CU)
DA	Distribution Automation (DA)
DR	Demand Reduction (DR), Demand Response (DR)
DRMS	Demand Response Management System (DRMS)
DSM	Demand Side Management (DSM)
DW	Data Warehouse (DW)
EDC	Electric Distribution Company (EDC)
EE&C	Energy Efficiency & Conservation (EE&C)
ESB	Enterprise Service Bus (ESB)
ESEM	Enterprise Security Event Monitoring (ESEM);
ESP	Energy Services Portal (ESP)
FERC	U.S. Federal Energy Regulatory Commission (FERC)
FHSS	Frequency Hopping Spread Spectrum (FHSS)
GIS	Geographical Information System (GIS)
HAN	Home Area Network (HAN)
HPO	Hourly Pricing Option (HPO)
IDS	Intrusion Detection System (IDS)

Acronym	Term
IHD	In Home Devices (IHD), In Home Display (IHD)
IPS	Intrusion Prevention System (IPS)
IVR	Interactive Voice Recognition (IVR)
kVAh	Thousands of Volt-Ampere Hours (kVAh)
kVARh	Thousands of Volt-Ampere-Reactive Hours (kVARh)
kWh	Thousands of Watt Hours (kWh)
LAN	Local Area Network (LAN)
LCD	Load Control Device (LCD), Liquid Crystal Display (LCD)
LP	Load Profile (LP)
MAC	Medium Access Control (MAC)
MDMS	Meter Data Management System (MDMS)
MIP	Metered Interval Processing (MIP)
MWM	Mobile Work Management (MWM)
NERC CIP	North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) requirements
OMS	Outage Management System (OMS)
PCT	Programmable Controllable Thermostat (PCT)
PHY	Physical Layer (PHY)
PJM	PJM Interconnection, L.L.C. (PJM)
PLC	Power Line Carrier (PLC)
POP	Point Of Presence (POP)
PUC	Public Utility Commission (PUC)
RF	Radio Frequency (RF) communications
RTO	Regional Transmission Organization (RTO)
RTP	Real Time Pricing (RTP)
SEP	Smart Energy Profile (SEP)
SMI	Smart Metering infrastructure (SMI)
SMIP	Smart Meter Technology Procurement and Installation Plan (SMIP)
SOA	Service Oriented architecture (SOA)
T&D	Transmission and Distribution (T&D)
TCP/IP	Transmission Control Protocol/Internet Protocol (TCP/IP)
TOU	Time Of Use (TOU)
VEE	Validation, Editing, And Estimating (VEE)
WAN	Wide Area Network (WAN)

Acronym	Term
WMS	Work Management System (WMS)
WPAN	Wireless Personal Area Networks (WPAN)

B. Benefits Analysis – McKinsey Model

Project and Financial Summary - Representative

AMI BUSINESS CASE MODEL - PROJECT AND FINANCIAL SUMMARY

For EOY 2009 \$ '000 unless otherwise shown

Project description				
Technology				
Deployment period	5 Years			
Electric Meters with AMI	715,005 meters			
Deployment pace	580 meters/day			
Project Financial Indicators				
NPV	Electric	\$	(431,440.9)	
Cost and Benefits Summary				
Capital Expenditures	Electric	Capital	Per Meter	% Total Capital
	Meters	\$ 71,051.7	\$ 99.37	17%
	Network	\$ 38,576.8	\$ 53.95	9%
	Installation	\$ 65,651.1	\$ 91.82	15%
	IT Integration and Software	\$ 253,581.2	\$ 354.66	59%
	Total Capital	\$ 428,860.7	\$ 599.80	100%
Annual O&M Expense		\$ 28,150.7	\$ 39.37	
Annual Benefits	Customer Service	\$ 12,156.3	\$ 17.00	91%
	Distribution Operations	\$ 591.3	\$ 0.83	4%
	Revenue Enhancement	\$ 202.1	\$ 0.28	2%
	Avoided Capital	\$ 386.1	\$ 0.54	3%
	Total Benefits	\$ 13,335.8	\$ 18.65	100%

AMI BUSINESS CASE MODEL - CAPITAL COST AND BENEFITS

For EOY 2009 \$ '000 unless otherwise shown

		Year 1 2010	Year 2 2011	Year 3 2012	Year 4 2013	Year 5 2014
Capital Expenditures						
	Electric					
	Meters	\$ 8,931.0	\$ 28,831.8	\$ 21,960.2	\$ 9,208.0	\$ 2,120.6
	Network	\$ 9,251.0	\$ 15,803.4	\$ 7,066.2	\$ 5,188.2	\$ 1,267.9
	Installation	\$ 8,025.6	\$ 26,329.1	\$ 21,079.4	\$ 8,277.7	\$ 1,939.3
	Sub-total Electric	\$ 26,207.6	\$ 70,964.3	\$ 50,105.8	\$ 22,674.0	\$ 5,327.9
	IT Integration and Software	\$ 183,366.5	\$ 49,402.6	\$ 10,977.2	\$ 6,667.7	\$ 3,167.2
	Total	\$ 209,574.1	\$ 120,366.9	\$ 61,083.1	\$ 29,341.7	\$ 8,495.0
O&M Expense						
	Total O&M Expense	\$ 29,882.1	\$ 27,969.8	\$ 28,413.0	\$ 28,412.4	\$ 28,430.6
	O&M expense per installed meter per month	\$ 27.32	\$ 6.05	\$ 3.88	\$ 3.37	\$ 3.27
Benefits						
	Customer Service					
	Electric	\$ 960.0	\$ 4,093.1	\$ 6,551.3	\$ 7,632.9	\$ 7,943.7
	Distribution Operations					
	Electric	\$ 74.8	\$ 288.4	\$ 457.7	\$ 535.0	\$ 559.0
	Revenue Enhancement					
	Electric	\$ 181.3	\$ 185.3	\$ 189.3	\$ 193.5	\$ 197.8
	Avoided Capital					
	Electric	\$ 373.0	\$ 449.3	\$ 509.2	\$ 536.9	\$ 545.1
	Total	\$ 1,589.1	\$ 5,016.1	\$ 7,707.5	\$ 8,898.3	\$ 9,245.6
	Benefits per installed meter per month	\$ 1.45	\$ 1.08	\$ 1.05	\$ 1.05	\$ 1.06

AMI BUSINESS CASE MODEL - NET PRESENT VALUE CALCULATION

For EOY 2009 \$ '000 unless otherwise shown

		Year 1 2010	Year 2 2011	Year 3 2012	Year 4 2013	Year 5 2014
Electric						
	Benefits	\$ 1,216.0	\$ 4,566.8	\$ 7,198.4	\$ 8,361.4	\$ 8,700.5
	O&M Expense	29,882.1	27,969.8	28,413.0	28,412.4	28,430.6
	Taxes Other than Income Taxes	-	-	-	-	-
	EBITDA	\$ (28,666.0)	\$ (23,403.0)	\$ (21,214.7)	\$ (20,051.0)	\$ (19,730.1)
	Depreciation and Amortization	1,297.2	5,484.9	8,674.5	10,012.0	10,320.0
	EBIT	\$ (29,963.2)	\$ (28,887.9)	\$ (29,889.2)	\$ (30,063.0)	\$ (30,050.1)
	Income Taxes	(12,432.8)	(11,986.6)	(12,402.1)	(12,474.2)	(12,468.8)
	EBIT after Taxes	\$ (17,530.4)	\$ (16,901.3)	\$ (17,487.1)	\$ (17,588.8)	\$ (17,581.2)
	Depreciation	1,297.2	5,484.9	8,674.5	10,012.0	10,320.0
	Capital Expenditures	209,201.1	119,917.6	60,573.9	28,804.8	7,949.9
	Interest Expense	-	-	-	-	-
	Other Income	-	-	-	-	-
	Deferred Income Taxes	383.9	2,168.0	5,161.8	5,884.7	4,416.2
	Unlevered Free Cash Flow	\$ (225,050.4)	\$ (129,166.0)	\$ (64,224.7)	\$ (30,496.9)	\$ (10,795.0)
	NPV	\$ (431,440.9)				

Summary of Customer Service Savings

AMI BENEFITS - SUMMARY OF CUSTOMER SERVICE SAVINGS						
		Year 1 2010	Year 2 2011	Year 3 2012	Year 4 2013	Year 5 2014
<i>For EOY 2009 \$ '000 unless otherwise shown</i>						
O&M Savings						
Electric						
	Meter Reading Savings	\$ 932.9	\$ 3,993.4	\$ 6,394.3	\$ 7,450.3	\$ 7,753.5
	Billing Savings	12.7	54.5	87.5	102.2	106.6
	Credit & Collections (C&C) Savings	0.7	2.8	4.5	5.2	5.5
	Call Center(s) Savings	8.7	37.4	60.0	70.0	73.1
	Miscellaneous Savings	5.0	5.0	5.0	5.0	5.0
	Description					
	Description					
	Description					
	Total Electric O&M Savings	\$ 960.0	\$ 4,093.1	\$ 6,551.3	\$ 7,632.9	\$ 7,943.7
	Total O&M Savings	\$ 960.0	\$ 4,093.1	\$ 6,551.3	\$ 7,632.9	\$ 7,943.7
Capital Savings						
	Electric	\$ 6.8	\$ 29.4	\$ 46.2	\$ 52.8	\$ 53.8
	Total Capital Savings	\$ 6.8	\$ 29.4	\$ 46.2	\$ 52.8	\$ 53.8

Summary of Distribution Operations Savings

AMI BENEFITS - SUMMARY OF DISTRIBUTION OPERATIONS SAVINGS						
		Year 1 2010	Year 2 2011	Year 3 2012	Year 4 2013	Year 5 2014
<i>For EOY 2009 \$ '000 unless otherwise shown</i>						
O&M Savings						
Electric						
	Remote System Monitoring Savings	\$ 44.6	\$ 191.4	\$ 307.2	\$ 358.7	\$ 374.1
	Meter Inventory Operations Savings	16.4	70.7	114.2	135.5	142.8
	Distribution Asset Management	10.0	10.0	10.0	10.0	10.0
	Miscellaneous Meter Reads	3.8	16.4	26.3	30.8	32.1
	Description					
	Description					
	Description					
	Description					
	Total Electric O&M Savings	\$ 74.8	\$ 288.4	\$ 457.7	\$ 535.0	\$ 559.0
Capital Savings						
Electric						
	Remote System Monitoring Savings -	\$ -	\$ -	\$ -	\$ -	\$ -
	Meter Inventory Operations Savings	16.2	69.9	113.0	134.1	141.3
	Distribution Asset Management	350.0	350.0	350.0	350.0	350.0
	Description					
	Description					
	Description					
	Description					
	Total Electric Capital Savings	\$ 366.2	\$ 419.9	\$ 463.0	\$ 484.1	\$ 491.3

Summary of Revenue Enhancement

AMI BENEFITS - SUMMARY OF REVENUE ENHANCEMENT						
		Year 1 2010	Year 2 2011	Year 3 2012	Year 4 2013	Year 5 2014
<i>For EOY 2009 \$ '000 unless otherwise shown</i>						
Electric						
	Improved Theft Detection and Recovery	\$ -	\$ -	\$ -	\$ -	\$ -
	Increased Meter Accuracy	-	-	-	-	-
	Unregistered Meters	-	-	-	-	-
	Other Unmetered Usage, Theft, Meter Inaccuracy	181.3	185.3	189.3	193.5	197.8
	Description					
	Total Electric	\$ 181.3	\$ 185.3	\$ 189.3	\$ 193.5	\$ 197.8
	Total Revenue Enhancement	\$ 181.3	\$ 185.3	\$ 189.3	\$ 193.5	\$ 197.8

C. Cost Analysis

Grand Total	2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2010	2011	2012	2013	2014	TOTAL
Total: Develop and Deploy	\$760,000	\$7,205,734	\$26,765,789	\$29,344,730	\$39,479,617	\$39,722,894	\$9,720,623	\$115,504,211	\$79,197,365	\$41,589,784	\$21,811,102	\$410,224,937
Total: Operate and Maintain	\$1,900,000	\$451,750	\$3,931,782	\$3,946,649	\$61,188,942	\$6,607,592	\$609,863	\$31,239,665	\$30,141,427	\$261,160,847	\$27,144,749	\$138,323,668
Grand Total	\$2,660,000	\$7,757,484	\$30,700,571	\$32,291,379	\$45,688,559	\$46,330,476	\$10,330,486	\$146,743,877	\$109,338,752	\$267,750,631	\$48,955,851	\$548,548,605

Description	2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2010	2011	2012	2013	2014	TOTAL
IDS												
Field Trials Meters												
Meters												
Field Trials LAN												
Field Trials WAN												
Field Trials WAN												
IT Infrastructure												
MDMS												
ADCS												
Web site												
Security												
Portal												
IVR												
BI + DW												
OMS-WMS-GIS												
ESB												
SI - ESB												
Cross - Overst PMO, Solution Implementation team, Process Redesign												
RFP for SI												
Travel expenses												
Facilities (\$200k in Implementation line)												
SI ADCS												
Total: Develop and Deploy	\$760,000	\$7,205,734	\$26,765,789	\$29,344,730	\$39,479,617	\$39,722,894	\$9,720,623	\$115,504,211	\$79,197,365	\$41,589,784	\$21,811,102	\$410,224,937

Description	2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2010	2011	2012	2013	2014	TOTAL
IDS												
Field Trials Meters												
Meters												
Field Trials LAN												
Field Trials WAN												
Field Trials WAN												
IT Infrastructure												
MDMS												
ADCS												
Web site												
Security/Full												
Portal												
IVR												
BI + DW												
OMS-WMS-GIS												
ESB												
SI - ESB												
Phase 1 PMO												
Total: Operate and Maintain	\$1,900,000	\$451,750	\$3,931,782	\$3,946,649	\$61,188,942	\$6,607,592	\$609,863	\$31,239,665	\$30,141,427	\$261,160,847	\$27,144,749	\$138,323,668

D. CIS Modernization Project

CIS Modernization Financial Summary (\$000)

Cash Flow (\$000)	2009	2010	2011	2012	2013	2014	Total
Implement							
Capital	12,557	40,150	14,833	-	-	-	67,541
One-time	340	2,288	728	-	-	-	3,355
Subtotal Implement Project Costs	12,897	42,438	15,561	-	-	-	70,896
On-going	-	-	2,306	4,001	4,051	4,138	14,495
Total - Project costs	12,897	42,438	17,867	4,001	4,051	4,138	85,392
Additional Expenditures for EE&C & Web development	2,196	2,661	-	-	-	-	4,857
Third party intermediary costs	150	150	-	-	-	-	300
Subtotal	15,243	45,249	17,867	4,001	4,051	4,138	90,549
Implementation savings	-	-	3,149	3,256	3,372	3,487	13,265
TOTAL	15,243	45,249	14,718	745	679	650	77,284

E Cost Recovery Mechanism Supporting Documentation

WEST PENN POWER CO.

	Description	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011	2012	2013	2014	TOTAL
Capital	IHDs - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,816,500	\$5,816,500	\$23,455,900	\$28,345,000	\$18,988,500	\$15,457,500	\$97,879,900
	Field Trials Meters - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$1,296,900	\$1,296,900	\$0	\$0	\$0	\$0	\$0	\$0	\$2,593,800
	Field Trials Meters - Non-Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$407,988	\$407,988	\$0	\$0	\$0	\$0	\$0	\$0	\$815,976
	Field Trials Meters - General	\$0	\$0	\$0	\$0	\$0	\$0	\$628,665	\$628,665	\$0	\$0	\$0	\$0	\$0	\$0	\$1,257,330
	Meters - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,890,700	\$3,890,700	\$33,849,090	\$26,067,690	\$9,856,440	\$1,945,390	\$79,496,970
	Meters - Non-Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,223,963	\$1,223,963	\$9,526,800	\$7,084,300	\$2,664,400	\$625,840	\$22,346,266
	Meters - General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,294,324	\$2,294,324	\$5,754,504	\$4,668,729	\$999,133	\$324,600	\$16,325,633
	Field Trials LAN - Hardware	\$0	\$0	\$500,000	\$500,000	\$500,000	\$1,000,000	\$278,955	\$278,955	\$0	\$0	\$0	\$0	\$0	\$0	\$3,057,911
	LAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$208,441	\$208,441	\$9,124,882	\$5,639,862	\$4,245,241	\$1,022,288	\$20,448,156
	Field Trials WAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$524,206	\$524,206	\$0	\$0	\$0	\$0	\$0	\$0	\$1,048,412
	WAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,575,940	\$1,575,940	\$1,575,940	\$6,678,526	\$1,426,306	\$942,993	\$245,632	\$13,022,276
	IT Infrastructure-Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$2,327,119	\$2,327,119	\$2,327,119	\$2,327,119	\$1,242,000	\$174,000	\$174,000	\$174,000	\$11,072,475
	MDMS - Software	\$0	\$0	\$0	\$1,387,578	\$374,078	\$374,078	\$848,657	\$848,657	\$0	\$0	\$0	\$0	\$0	\$0	\$3,833,048
	Sensus + Itron ADCS - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$2,573,680	\$2,573,680	\$0	\$0	\$0	\$0	\$0	\$0	\$5,147,360
	Web site - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,000,000	\$2,174,467	\$0	\$0	\$0	\$0	\$6,174,467
	Security (full) - Software	\$0	\$0	\$0	\$0	\$100,000	\$100,000	\$0	\$0	\$0	\$0	\$1,245,000	\$391,500	\$301,500	\$114,000	\$2,252,000
	Portal - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,643,333	\$0	\$0	\$0	\$8,643,333
	IVR - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$260,000	\$260,000	\$307,400	\$0	\$0	\$0	\$827,400
	BI + DW - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$452,300	\$452,300	\$452,300	\$452,300	\$4,555,200	\$63,600	\$63,600	\$63,600	\$6,555,200
	OMS WMS GIS - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,068,900	\$2,068,900	\$0	\$0	\$0	\$0	\$2,068,900
	TIBCO - ESB - Software	\$0	\$0	\$0	\$1,500,000	\$0	\$0	\$10,072,125	\$10,072,125	\$10,072,125	\$10,072,125	\$0	\$0	\$0	\$0	\$41,788,500
	SI & PMO - ESB - Labor	\$0	\$40,000	\$40,000	\$290,000	\$290,000	\$290,000	\$5,523,320	\$5,523,320	\$5,523,320	\$5,523,320	\$0	\$0	\$0	\$0	\$23,043,280
	Costs - Overall PMO, Solution imp team, Process Redesign - Labor	\$0	\$0	\$0	\$100,000	\$100,000	\$100,000	\$1,689,175	\$1,689,175	\$1,689,175	\$1,689,175	\$5,768,700	\$3,109,800	\$1,957,800	\$796,900	\$18,679,900
	RFP for SI - Labor	\$0	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$500,000
	Travel Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$1,957,465	\$1,957,465	\$1,957,465	\$1,957,465	\$4,628,660	\$2,007,665	\$1,175,928	\$834,696	\$16,476,812
	Facilities	\$0	\$0	\$0	\$0	\$0	\$0	\$20,390	\$20,390	\$20,390	\$48,215	\$20,913	\$12,249	\$8,695	\$17,633	\$171,633
	SI & PMO ADCS - Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$598,000	\$598,000	\$598,000	\$598,000	\$676,000	\$208,000	\$208,000	\$208,000	\$3,692,000
	CIS - Hardware	\$2,315,964	\$1,641,535	\$1,641,535	\$1,879,899	\$2,355,825	\$3,212,814	\$10,279,638	\$10,510,748	\$9,960,600	\$10,064,304	\$14,833,359	\$0	\$0	\$0	\$66,696,220
	CIS - Software	\$123,878	\$123,878	\$123,878	\$123,878	\$123,878	\$758,878	\$390,925	\$390,925	\$0	\$539,000	\$0	\$0	\$0	\$0	\$2,698,118
	Total	\$2,439,842	\$1,905,413	\$2,405,413	\$5,881,355	\$3,943,762	\$5,935,770	\$39,869,508	\$41,676,558	\$51,870,373	\$52,756,443	\$130,337,570	\$79,197,365	\$41,589,784	\$21,811,102	\$481,620,277

	Description	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011	2012	2013	2014	TOTAL
O&M	IHDs - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$199,200	\$199,200	\$1,158,700	\$1,894,781	\$2,229,891	\$2,589,011	\$8,070,783
	Field Trials Meters - General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$48,000	\$192,000	\$192,000	\$192,000	\$192,000	\$816,000
	Meters - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$33,000	\$176,550	\$287,100	\$328,900	\$825,550
	Meters - Non-Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$37,733	\$37,733	\$8,598	\$42,428	\$67,458	\$75,666	\$270,617
	Meters - General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,223,767	\$1,223,767	\$8,001,800	\$7,222,800	\$3,674,000	\$3,761,200	\$25,107,333
	Field Trials LAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$273,944	\$273,944	\$273,944	\$273,944	\$0	\$0	\$0	\$0	\$1,095,774
	LAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$516,784	\$516,784	\$516,784	\$516,784	\$1,525,131	\$1,782,443	\$2,030,236	\$2,183,624	\$8,555,002
	Field Trials WAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$25,991	\$25,991	\$0	\$0	\$0	\$0	\$0	\$0	\$51,982
	WAN - Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$14,867	\$14,867	\$14,867	\$285,730	\$421,559	\$568,706	\$604,142	\$604,142	\$1,924,739
	IT Infrastructure-Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$49,465	\$49,465	\$49,465	\$49,465	\$382,420	\$392,420	\$392,420	\$392,420	\$1,757,540
	MDMS - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$48,000	\$48,000	\$48,000	\$393,000	\$393,000	\$393,000	\$393,000	\$393,000	\$1,764,000
	Sensus + Itron ADCS - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$166,150	\$166,150	\$166,150	\$166,150	\$664,600	\$664,600	\$664,600	\$664,600	\$3,323,000
	Web site - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$290,800	\$290,800	\$1,295,733	\$1,295,733	\$1,295,733	\$1,295,733	\$5,764,533
	Security (full) - Software	\$0	\$0	\$0	\$1,750	\$0	\$0	\$1,750	\$1,750	\$1,750	\$1,750	\$413,450	\$1,508,100	\$2,309,100	\$2,606,850	\$8,846,250
	Portal - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,126,000	\$2,126,000	\$2,126,000	\$2,126,000	\$8,504,000
	IVR - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$227,020	\$435,020	\$435,020	\$435,020	\$1,532,080
	BI + DW - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$104,466	\$104,466	\$104,466	\$104,466	\$464,503	\$464,503	\$464,503	\$464,503	\$2,275,875
	OMS WMS GIS - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$371,050	\$371,050	\$371,050	\$371,050	\$371,050	\$1,855,250
	TIBCO - ESB - Software	\$0	\$0	\$0	\$0	\$0	\$0	\$1,880,483	\$1,880,483	\$1,880,483	\$7,521,930	\$7,521,930	\$7,521,930	\$7,521,930	\$7,521,930	\$37,606,650
	SI & PMO - ESB - Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$1,404,000	\$1,404,000	\$1,404,000	\$1,404,000	\$5,616,000	\$2,961,500	\$715,100	\$715,100	\$15,623,700
	SI & PMO ADCS - Labor	\$0	\$0	\$0	\$0	\$0	\$0	\$130,000	\$130,000	\$130,000	\$130,000	\$559,000	\$475,000	\$423,000	\$423,000	\$2,400,000
	Phase I PMO - Labor	\$0	\$1,750,000	\$150,000	\$150,000	\$150,000	\$150,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,350,000
	Depreciation of Existing Meters	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,294,934	\$1,294,934	\$1,294,934	\$5,179,738	\$5,179,738	\$5,179,738	\$5,179,738	\$24,603,754
	Customer Service Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$240,001	\$240,001	\$240,001	\$240,001	\$4,093,081	\$6,551,293	\$7,632,869	\$7,943,684	\$27,180,930
	Distribution Operations Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$18,692	\$18,692	\$18,692	\$18,692	\$288,432	\$457,719	\$535,940	\$559,036	\$1,914,994
	Revenue Enforcement Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$45,319	\$45,319	\$45,319	\$45,319	\$185,266	\$189,342	\$193,507	\$197,764	\$847,156
	CIS - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$258,276	\$266,024	\$274,005	\$282,225	\$1,080,530
	CIS - Non-Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$89,168	\$91,843	\$94,599	\$97,437	\$373,047
	CIS - General	\$379,628	\$129,628	\$54,628	\$54,628	\$99,443	\$99,443	\$722,043	\$1,588,624	\$134,445	\$667,736	\$231,826	\$1,102,508	\$1,047,288	\$1,030,145	\$7,342,011
	Total	\$379,628	\$1,879,628	\$204,628	\$206,378	\$249,443	\$249,443	\$4,502,279	\$6,678,662	\$7,466,775	\$8,419,115	\$31,737,006	\$28,867,453	\$23,657,853	\$24,274,486	\$138,772,774

WEST PENN POWER CO.
IHDs - Residential
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
10	10.00%	18.00%	14.40%	11.52%	9.22%	7.37%	6.55%	6.55%	6.56%	6.56%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
2010	Jan-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	7,233.18	-	-	-	\$ -
	Aug-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	21,699.55	-	-	-	\$ -
	Sep-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	36,165.91	-	-	-	\$ -
	Oct-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	50,632.28	-	-	-	\$ -
	Nov-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	65,098.64	-	-	-	\$ -
	Dec-10	1,938,833.33	-	-	-	-	-	-	-	-	-	-	-	-	79,565.01	-	-	-	\$ -
2011	Jan-11	1,954,658.33	-	-	-	-	-	-	-	-	-	-	-	-	96,033.31	-	-	-	\$ -
	Feb-11	1,954,658.33	-	15,898,744.55	-	-	-	-	-	144,534.04	-	-	-	-	-	15,898,744.55	(59,972.23)	7,919,386.16	\$ 87,068.48
	Mar-11	1,954,658.33	-	17,853,402.88	-	-	-	264,979.08	-	164,080.62	-	-	-	-	-	17,588,423.81	(18,105.93)	16,704,545.09	\$ 448,634.65
	Apr-11	1,954,658.33	-	19,808,061.21	-	-	-	297,556.71	-	185,799.05	-	-	-	-	-	19,245,525.42	28,266.23	18,422,054.76	\$ 500,095.19
	May-11	1,954,658.33	-	21,762,719.55	-	-	-	330,134.35	-	210,232.38	-	-	-	-	-	20,870,049.40	78,017.80	20,110,629.43	\$ 551,240.90
	Jun-11	1,954,658.33	-	23,717,377.88	-	-	-	362,711.99	-	238,155.97	-	-	-	-	-	22,461,995.74	129,700.45	21,769,881.70	\$ 602,057.64
	Jul-11	1,954,658.33	-	25,672,036.21	-	-	-	395,289.63	-	270,733.61	-	-	-	-	-	24,021,364.45	181,383.11	23,397,221.87	\$ 652,526.82
	Aug-11	1,954,658.33	-	27,626,694.55	-	-	-	427,867.27	-	309,826.78	-	-	-	-	-	25,548,155.51	230,362.24	24,990,632.65	\$ 702,622.97
	Sep-11	1,954,658.33	-	29,581,352.88	-	-	-	460,444.91	-	358,693.23	-	-	-	-	-	27,042,368.93	272,582.57	26,546,734.63	\$ 752,308.93
	Oct-11	1,954,658.33	-	31,536,011.21	-	-	-	493,022.55	-	423,848.51	-	-	-	-	-	28,504,004.72	301,285.30	28,060,120.76	\$ 801,525.27
	Nov-11	1,954,658.33	-	33,490,669.55	-	-	-	525,600.19	-	521,581.43	-	-	-	-	-	29,933,082.87	302,952.82	29,520,652.85	\$ 850,165.60
	Dec-11	1,954,658.33	-	35,445,327.88	-	-	-	558,177.83	-	717,047.26	-	-	-	-	-	31,329,543.37	237,032.33	30,901,295.70	\$ 897,917.41
2012	Jan-12	2,362,083.33	-	35,445,327.88	2,362,083.33	-	-	590,755.46	-	531,679.92	19,684.03	-	-	-	-	33,100,871.24	253,377.25	32,460,412.10	\$ 947,636.52
	Feb-12	2,362,083.33	-	35,445,327.88	4,724,166.67	-	-	630,123.52	-	531,679.92	41,157.51	-	-	-	-	34,832,831.05	277,147.26	34,232,113.40	\$ 1,006,483.27
	Mar-12	2,362,083.33	-	35,445,327.88	7,086,250.00	-	-	669,491.58	-	531,679.92	64,778.35	-	-	-	-	36,525,422.81	307,451.33	35,971,426.23	\$ 1,064,973.94
	Apr-12	2,362,083.33	-	35,445,327.88	9,448,333.33	-	-	708,859.63	-	531,679.92	91,023.72	-	-	-	-	38,178,646.51	343,200.47	37,677,360.57	\$ 1,123,097.63
	May-12	2,362,083.33	-	35,445,327.88	11,810,416.67	-	-	748,227.69	-	531,679.92	120,549.76	-	-	-	-	39,792,502.16	383,033.41	39,348,691.28	\$ 1,180,840.87
	Jun-12	2,362,083.33	-	35,445,327.88	14,172,500.00	-	-	787,595.74	-	531,679.92	154,293.81	-	-	-	-	41,366,989.75	425,199.94	40,983,862.63	\$ 1,238,186.57
	Jul-12	2,362,083.33	-	35,445,327.88	16,534,583.33	-	-	828,963.80	-	531,679.92	193,661.86	-	-	-	-	42,902,109.29	467,366.47	42,580,832.72	\$ 1,295,112.27
	Aug-12	2,362,083.33	-	35,445,327.88	18,896,666.67	-	-	866,331.85	-	531,679.92	240,903.53	-	-	-	-	44,397,860.77	506,265.97	44,136,801.25	\$ 1,351,587.18
	Sep-12	2,362,083.33	-	35,445,327.88	21,258,750.00	-	-	905,699.91	-	531,679.92	299,955.61	-	-	-	-	45,854,244.19	536,997.87	45,647,684.40	\$ 1,407,566.41
	Oct-12	2,362,083.33	-	35,445,327.88	23,620,833.33	-	-	945,067.96	-	531,679.92	378,691.72	-	-	-	-	47,271,259.56	551,394.59	47,106,948.10	\$ 1,462,978.12
	Nov-12	2,362,083.33	-	35,445,327.88	25,982,916.67	-	-	984,436.02	-	531,679.92	496,795.89	-	-	-	-	48,646,906.87	533,120.94	48,502,340.98	\$ 1,517,687.61
	Dec-12	2,362,083.33	-	35,445,327.88	28,345,000.00	-	-	1,023,904.08	-	531,679.92	733,004.22	-	-	-	-	49,987,106.13	433,171.37	49,801,192.66	\$ 1,571,335.69
2013	Jan-13	1,582,375.00	-	35,445,327.88	28,345,000.00	1,582,375.00	-	1,063,172.13	-	425,343.93	425,175.00	13,186.46	-	-	-	50,506,389.00	515,937.10	50,721,341.80	\$ 1,620,820.19
	Feb-13	1,582,375.00	-	35,445,327.88	28,345,000.00	3,164,750.00	-	1,089,545.05	-	425,343.93	425,175.00	27,571.69	-	-	-	50,999,218.95	603,676.94	51,312,611.00	\$ 1,653,693.72
	Mar-13	1,582,375.00	-	35,445,327.88	28,345,000.00	4,747,125.00	-	1,115,917.96	-	425,343.93	425,175.00	43,395.44	-	-	-	51,465,675.99	695,794.01	51,882,182.94	\$ 1,686,328.71
	Apr-13	1,582,375.00	-	35,445,327.88	28,345,000.00	6,329,500.00	-	1,142,290.88	-	425,343.93	425,175.00	60,977.38	-	-	-	51,905,760.10	791,558.75	52,429,394.42	\$ 1,718,717.86
	May-13	1,582,375.00	-	35,445,327.88	28,345,000.00	7,911,875.00	-	1,168,663.80	-	425,343.93	425,175.00	80,757.07	-	-	-	52,319,471.31	890,059.25	52,953,424.71	\$ 1,750,852.15
	Jun-13	1,582,375.00	-	35,445,327.88	28,345,000.00	9,494,250.00	-	1,195,036.71	-	425,343.93	425,175.00	103,362.42	-	-	-	52,706,809.59	990,123.05	53,453,231.60	\$ 1,782,720.12
	Jul-13	1,582,375.00	-	35,445,327.88	28,345,000.00	11,076,625.00	-	1,221,409.63	-	425,343.93	425,175.00	129,735.34	-	-	-	53,067,774.96	1,090,186.85	53,927,447.23	\$ 1,814,306.73
	Aug-13	1,582,375.00	-	35,445,327.88	28,345,000.00	12,659,000.00	-	1,247,782.55	-	425,343.93	425,175.00	161,382.84	-	-	-	53,402,367.41	1,188,062.04	54,374,195.63	\$ 1,845,591.35
	Sep-13	1,582,375.00	-	35,445,327.88	28,345,000.00	14,241,375.00	-	1,274,155.46	-	425,343.93	425,175.00	200,942.22	-	-	-	53,710,586.95	1,280,465.70	54,790,741.05	\$ 1,876,543.91
	Oct-13	1,582,375.00	-	35,445,327.88	28,345,000.00	15,823,750.00	-	1,300,528.38	-	425,343.93	425,175.00	253,688.05	-	-	-	53,992,433.57	1,361,926.32	55,172,706.27	\$ 1,907,116.29
	Nov-13	1,582,375.00	-	35,445,327.88	28,345,000.00	17,406,125.00	-	1,326,901.30	-	425,343.93	425,175.00	332,806.80	-	-	-	54,247,907.27	1,421,500.85	55,151,884.00	\$ 1,937,218.24
	Dec-13	1,582,375.00	-	35,445,327.88	28,345,000.00	18,988,500.00	-	1,353,274.21	-	425,343.93	425,175.00	401,044.30	-	-	-	54,477,008.05	1,426,360.14	55,786,388.16	\$ 1,966,609.15
2014	Jan-14	1,288,125.00	-	35,445,327.88	28,345,000.00	18,988,500.00	1,288,125.00	1,379,647.13	-	340,275.15	340,140.00	284,827.50	10,734.38	-	-	54,385,485.92	1,593,857.00	55,941,355.56	\$ 1,994,685.83
	Feb-14	1,288,125.00	-	35,445,327.88	28,345,000.00	18,988,500.00	2,576,250.00	1,401,115.88	-	340,275.15	340,140.00	284,827.50	22,444.60	-	-	54,272,495.04	1,765,403.01	56,008	

WEST PENN POWER CO.
Field Trials Meters - Residential
In-Service at Capital Addition

Book Life	10	Years (3, 5, 7, 10, 15 or 20) >>	Tax Life	10	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Book Life Months	120				10.00%	18.00%	14.40%	11.52%	9.22%	7.37%	6.55%	6.55%		6.55%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	-
2010	Jan-10	432,300.00	432,300.00	-	-	-	-	3,602.50	3,602.50	-	-	-	-	-	-	432,300.00	(1,494.80)	215,402.60	\$ 2,368.21
	Feb-10	432,300.00	864,600.00	-	-	-	-	7,532.50	7,532.50	-	-	-	-	3,602.50	-	860,997.50	(3,125.50)	644,338.60	\$ 10,686.58
	Mar-10	432,300.00	1,296,900.00	-	-	-	-	7,205.00	11,895.50	-	-	-	-	10,807.50	-	1,286,092.50	(5,055.15)	1,069,454.67	\$ 18,962.96
	Apr-10	432,300.00	1,729,200.00	-	-	-	-	10,807.50	16,658.83	-	-	-	-	21,615.00	-	1,707,585.00	(7,483.08)	1,480,569.64	\$ 27,195.34
	May-10	432,300.00	2,161,500.00	-	-	-	-	14,410.00	22,062.58	-	-	-	-	36,025.00	-	2,125,475.00	(10,658.40)	1,907,459.26	\$ 35,381.27
	Jun-10	432,300.00	2,593,800.00	-	-	-	-	18,012.50	28,238.30	-	-	-	-	54,037.50	-	2,539,762.50	(14,901.44)	2,319,838.83	\$ 43,517.61
	Jul-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	75,652.50	-	2,518,147.50	(17,649.68)	2,512,679.44	\$ 49,240.27
	Aug-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	97,267.50	-	2,496,532.50	(20,397.92)	2,488,316.20	\$ 48,972.41
	Sep-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	118,882.50	-	2,474,917.50	(23,146.16)	2,463,952.96	\$ 48,704.56
	Oct-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	140,497.50	-	2,453,302.50	(25,894.39)	2,439,569.72	\$ 48,436.70
	Nov-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	162,112.50	-	2,431,687.50	(28,642.63)	2,415,226.49	\$ 48,168.84
	Dec-10	-	2,593,800.00	-	-	-	-	21,615.00	28,238.30	-	-	-	-	183,727.50	-	2,410,072.50	(31,390.87)	2,390,863.25	\$ 47,900.98
2011	Jan-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	205,342.50	-	2,388,457.50	(38,565.93)	2,364,286.60	\$ 47,608.79
	Feb-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	226,957.50	-	2,366,842.50	(45,740.98)	2,335,496.55	\$ 47,292.26
	Mar-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	248,572.50	-	2,345,227.50	(52,916.04)	2,306,706.49	\$ 46,975.73
	Apr-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	270,187.50	-	2,323,612.50	(60,091.09)	2,277,916.43	\$ 46,659.20
	May-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	291,802.50	-	2,301,997.50	(67,266.15)	2,249,126.38	\$ 46,342.66
	Jun-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	313,417.50	-	2,280,382.50	(74,441.21)	2,220,336.32	\$ 46,026.15
	Jul-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	335,032.50	-	2,258,767.50	(81,616.26)	2,191,546.27	\$ 45,709.62
	Aug-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	356,647.50	-	2,237,152.50	(88,791.32)	2,162,756.21	\$ 45,393.09
	Sep-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	378,262.50	-	2,215,537.50	(95,966.37)	2,133,966.15	\$ 45,076.57
	Oct-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	399,877.50	-	2,193,922.50	(103,141.43)	2,105,176.10	\$ 44,760.04
	Nov-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	421,492.50	-	2,172,307.50	(110,316.49)	2,076,386.04	\$ 44,443.51
	Dec-11	-	2,593,800.00	-	-	-	-	21,615.00	38,907.00	-	-	-	-	443,107.50	-	2,150,692.50	(117,491.54)	2,047,595.99	\$ 44,126.98
2012	Jan-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	464,722.50	-	2,129,077.50	(121,437.82)	2,020,420.32	\$ 43,828.20
	Feb-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	486,337.50	-	2,107,462.50	(125,384.10)	1,994,859.04	\$ 43,547.17
	Mar-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	507,952.50	-	2,085,847.50	(129,330.38)	1,969,297.76	\$ 43,266.14
	Apr-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	529,567.50	-	2,064,232.50	(133,276.67)	1,943,736.47	\$ 42,985.11
	May-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	551,182.50	-	2,042,617.50	(137,222.95)	1,918,175.19	\$ 42,704.08
	Jun-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	572,797.50	-	2,021,002.50	(141,169.23)	1,892,613.91	\$ 42,423.06
	Jul-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	594,412.50	-	1,999,387.50	(145,115.51)	1,867,052.63	\$ 42,142.03
	Aug-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	616,027.50	-	1,977,772.50	(149,061.79)	1,841,491.35	\$ 41,861.00
	Sep-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	637,642.50	-	1,956,157.50	(153,008.07)	1,815,930.07	\$ 41,579.97
	Oct-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	659,257.50	-	1,934,542.50	(156,954.35)	1,790,368.79	\$ 41,298.94
	Nov-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	680,872.50	-	1,912,927.50	(160,900.63)	1,764,807.51	\$ 41,017.91
	Dec-12	-	2,593,800.00	-	-	-	-	21,615.00	31,125.60	-	-	-	-	702,487.50	-	1,891,312.50	(164,846.91)	1,739,246.23	\$ 40,736.88
2013	Jan-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	724,102.50	-	1,869,697.50	(166,210.17)	1,714,976.46	\$ 40,470.05
	Feb-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	745,717.50	-	1,848,082.50	(167,573.43)	1,691,998.20	\$ 40,217.42
	Mar-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	767,332.50	-	1,826,467.50	(168,936.69)	1,669,019.94	\$ 39,964.79
	Apr-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	788,947.50	-	1,804,852.50	(170,299.95)	1,646,041.68	\$ 39,712.15
	May-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	810,562.50	-	1,783,237.50	(171,663.22)	1,623,063.42	\$ 39,459.52
	Jun-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	832,177.50	-	1,761,622.50	(173,026.48)	1,600,085.15	\$ 39,206.89
	Jul-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	853,792.50	-	1,740,007.50	(174,389.74)	1,577,106.89	\$ 38,954.26
	Aug-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	875,407.50	-	1,718,392.50	(175,753.00)	1,554,128.63	\$ 38,701.63
	Sep-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	897,022.50	-	1,696,777.50	(177,116.26)	1,531,150.37	\$ 38,449.00
	Oct-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	918,637.50	-	1,675,162.50	(178,479.52)	1,508,172.11	\$ 38,196.37
	Nov-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	940,252.50	-	1,653,547.50	(179,842.78)	1,485,193.85	\$ 37,943.74
	Dec-13	-	2,593,800.00	-	-	-	-	21,615.00	24,900.48	-	-	-	-	961,867.50	-	1,631,932.50	(181,206.04)	1,462,215.59	\$ 37,691.11
2014	Jan-14	-	2,593,800.00	-	-	-	-	21,615.00	19,929.03	-	-	-	-	983,482.50	-	1,610,317.50	(180,506.47)	1,440,268.74	\$ 37,449.82
	Feb-14	-	2,593,800.00	-	-	-	-	21,615.00	19,929.03	-	-	-	-	1,005,097.50	-	1,588,702.50	(179,806.90)	1,419,353.31	\$ 37,219.86
	Mar-14	-	2,593,800.00	-	-	-	-	21,615.00	19,929.03	-	-	-	-	1,026,712.50	-	1,567,087.50	(179,107.34)	1,398,437.88	\$ 36,989.91
	Apr-14	-	2,593,800.00	-	-	-	-	21,615.00	19,929.03	-	-	-	-	1,048,327.50	-	1,545,472.50	(178,407.77)	1,377,522.45	\$ 36,759.96
	May-14	-	2,593,800.00	-	-	-	-	21,615.00	19,929.03	-	-								

WEST PENN POWER CO.
Meters - Residential
In-Service at Capital Addition

Book Life		Years (3, 5, 7, 10, 15 or 20) >>										Tax Life										
Book Life Months	10											10	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	120												10.00%	18.00%	14.40%	11.52%	9.22%	7.37%	6.55%	6.55%	6.56%	6.55%
Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$			
2009	Jan-09																		\$			
	Feb-09																		\$			
	Mar-09																		\$			
	Apr-09																		\$			
	May-09																		\$			
	Jun-09																		\$			
	Jul-09																		\$			
	Aug-09																		\$			
	Sep-09																		\$			
	Oct-09																		\$			
	Nov-09																		\$			
	Dec-09																		\$			
2010	Jan-10																		\$			
	Feb-10																		\$			
	Mar-10																		\$			
	Apr-10																		\$			
	May-10																		\$			
	Jun-10																		\$			
	Jul-10	1,296,900.00	1,296,900.00						21,615.00						1,296,900.00		(8,968.82)	643,965.59	7,079.98			
	Aug-10	1,296,900.00	2,593,800.00					10,807.50	47,553.00					10,807.50	2,582,992.50		(24,215.81)	1,923,353.93	31,953.52			
	Sep-10	1,296,900.00	3,890,700.00					21,615.00	79,975.50					32,422.50	3,858,277.50		(48,431.63)	3,184,311.28	56,624.42			
	Oct-10	1,296,900.00	5,187,600.00					32,422.50	123,205.50					64,845.00	5,122,755.00		(86,100.67)	4,423,250.10	81,053.25			
	Nov-10	1,296,900.00	6,484,500.00					43,230.00	188,050.50					108,075.00	6,376,425.00		(146,191.77)	5,633,443.78	105,166.04			
	Dec-10	2,820,757.50	7,781,400.00	16,924,545.00				54,037.50	317,740.50					162,112.50	7,619,287.50		(255,611.37)	6,796,954.48	129,765.58			
2011	Jan-11	2,820,757.50	7,781,400.00	2,820,757.50				64,845.00	116,721.00	23,506.31				226,957.50	10,375,200.00		(296,890.13)	1,725,993.00	160,781.60			
	Feb-11	2,820,757.50	7,781,400.00	5,641,515.00				88,351.31	116,721.00	49,149.56				315,308.81	13,071,606.19		(319,055.58)	11,438,430.24	214,109.39			
	Mar-11	2,820,757.50	7,781,400.00	8,462,272.50				111,857.63	116,721.00	77,357.14				427,166.44	15,816,506.06		(353,171.75)	14,125,942.46	267,163.15			
	Apr-11	2,820,757.50	7,781,400.00	11,283,030.00				135,363.94	116,721.00													

WEST PENN POWER CO.
WAN - Hardware
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
5	20.00%	32.00%	19.20%	11.52%	11.52%	5.76%	0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$	
2009	Jan-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Feb-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Mar-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Apr-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	May-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jun-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jul-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Aug-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Sep-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Oct-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Nov-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Dec-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
2010	Jan-10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Feb-10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Mar-10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Apr-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	1,959.78	-	-	-	\$ -	
	May-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	5,879.34	-	-	-	\$ -	
	Jun-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	9,798.90	-	-	-	\$ -	
	Jul-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	13,850.07	-	-	-	\$ -	
	Aug-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	17,769.63	-	-	-	\$ -	
	Sep-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	21,689.19	-	-	-	\$ -	
	Oct-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	25,608.75	-	-	-	\$ -	
	Nov-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	29,528.31	-	-	-	\$ -	
	Dec-10	525,313.42	-	-	-	-	-	-	-	-	-	-	-	-	33,447.87	-	-	-	\$ -	
2011	Jan-11	556,543.80	-	-	-	-	-	-	-	-	-	-	-	-	38,542.67	-	-	-	\$ -	
	Feb-11	556,543.80	-	6,038,982.91	-	-	-	-	-	109,799.69	-	-	-	-	-	-	6,038,982.91	(45,559.73)	2,996,711.59	\$ 32,946.89
	Mar-11	556,543.80	-	6,595,526.72	-	-	-	100,649.72	-	-	-	-	-	100,649.72	-	-	6,494,877.00	(53,974.97)	6,217,162.61	\$ 169,003.36
	Apr-11	556,543.80	-	7,152,070.52	-	-	-	109,925.45	-	-	-	-	-	109,925.45	-	-	6,941,495.36	(63,673.14)	6,659,362.13	\$ 183,140.79
	May-11	556,543.80	-	7,708,614.33	-	-	-	119,201.18	-	-	-	-	-	119,201.18	-	-	7,378,837.99	(75,295.73)	7,090,682.24	\$ 197,158.60
	Jun-11	556,543.80	-	8,265,158.13	-	-	-	128,476.91	-	-	-	-	-	128,476.91	-	-	7,806,904.89	(89,667.48)	7,510,389.83	\$ 211,048.74
	Jul-11	556,543.80	-	8,821,701.94	-	-	-	137,752.64	-	-	-	-	-	137,752.64	-	-	8,226,690.08	(107,888.06)	7,917,522.71	\$ 224,800.63
	Aug-11	556,543.80	-	9,378,245.74	-	-	-	147,028.37	-	-	-	-	-	147,028.37	-	-	8,635,211.50	(131,496.99)	8,310,761.26	\$ 238,399.76
	Sep-11	556,543.80	-	9,934,789.55	-	-	-	156,304.10	-	-	-	-	-	156,304.10	-	-	8,999,338.34	(162,803.57)	8,688,181.08	\$ 251,824.98
	Oct-11	556,543.80	-	10,491,333.35	-	-	-	165,579.83	-	-	-	-	-	165,579.83	-	-	9,426,451.21	(205,656.62)	9,046,703.10	\$ 265,042.42
	Nov-11	556,543.80	-	11,047,877.16	-	-	-	174,855.56	-	-	-	-	-	174,855.56	-	-	9,808,103.44	(267,753.80)	9,380,554.10	\$ 277,988.63
	Dec-11	556,543.80	-	11,604,420.96	-	-	-	184,131.29	-	-	-	-	-	184,131.29	-	-	10,180,515.96	(372,188.06)	9,674,338.77	\$ 290,494.33
2012	Jan-12	118,858.83	-	11,604,420.96	118,858.83	-	-	193,407.02	-	309,451.23	1,980.98	-	-	-	-	10,105,967.77	(421,160.84)	9,746,567.41	\$ 300,564.17	
	Feb-12	118,858.83	-	11,604,420.96	237,717.65	-	-	195,388.00	-	309,451.23	4,142.05	-	-	-	-	10,029,438.60	(470,208.35)	9,622,018.59	\$ 301,175.81	
	Mar-12	118,858.83	-	11,604,420.96	356,576.48	-	-	197,368.98	-	309,451.23	6,519.23	-	-	-	-	9,950,928.45	(519,420.25)	9,495,369.22	\$ 301,764.37	
	Apr-12	118,858.83	-	11,604,420.96	475,435.31	-	-	199,349.96	-	309,451.23	9,160.53	-	-	-	-	9,870,437.31	(568,906.15)	9,366,519.68	\$ 302,328.73	
	May-12	118,858.83	-	11,604,420.96	594,294.13	-	-	201,330.94	-	309,451.23	12,132.00	-	-	-	-	9,787,965.20	(618,803.03)	9,235,346.67	\$ 302,867.55	
	Jun-12	118,858.83	-	11,604,420.96	713,152.96	-	-	203,311.92	-	309,451.23	15,527.97	-	-	-	-	9,703,512.11	(669,287.04)	9,101,693.62	\$ 303,379.10	
	Jul-12	118,858.83	-	11,604,420.96	832,011.78	-	-	205,292.90	-	309,451.23	19,489.93	-	-	-	-	9,617,078.04	(720,593.03)	8,965,355.04	\$ 303,861.13	
	Aug-12	118,858.83	-	11,604,420.96	950,870.61	-	-	207,273.88	-	309,451.23	24,244.28	-	-	-	-	9,528,626.99	(773,049.79)	8,826,049.10	\$ 304,310.53	
	Sep-12	118,858.83	-	11,604,420.96	1,069,729.44	-	-	209,254.86	-	309,451.23	30,187.23	-	-	-	-	9,438,266.95	(827,150.51)	8,683,364.82	\$ 304,722.70	
	Oct-12	118,858.83	-	11,604,420.96	1,188,588.26	-	-	211,235.84	-	309,451.23	38,111.15	-	-	-	-	9,345,889.94	(883,717.16)	8,536,644.61	\$ 305,090.68	
	Nov-12	118,858.83	-	11,604,420.96	1,307,447.09	-	-	213,216.82	-	309,451.23	49,997.03	-	-	-	-	9,251,531.94	(944,393.70)	8,384,655.51	\$ 305,400.64	
	Dec-12	118,858.83	-	11,604,420.96	1,426,305.92	-	-	215,197.80	-	309,451.23	73,768.80	-	-	-	-	9,155,192.97	(1,014,112.00)	8,224,109.61	\$ 305,616.52	
2013	Jan-13	78,582.79	-	11,604,420.96	1,426,305.92	78,582.79	-	217,178.78	-	185,670.74	38,034.82	1,309.71	-	-	-	9,016,596.98	(1,017,363.64)	8,070,157.15	\$ 305,904.89	
	Feb-13	78,582.79	-	11,604,420.96	1,426,305.92	157,165.57	-	218,488.49	-	185,670.74	38,034.82	2,738.49	-	-	-	8,876,691.27	(1,020,664.67)	7,927,629.97	\$ 305,647.61	
	Mar-13	78,582.79	-	11,604,420.96	1,426,305.92	235,748.36	-	219,798.21	-	185,670.74	38,034.82	4,310.15	-	-	-	8,735,475.85	(1,024,074.40)	7,783,714.02	\$ 305,375.06	
	Apr-13	78,582.79	-	11,604,420.96	1,426,305.92	314,331.14	-	221,107.92	-	185,670.74	38,034.82	6,056.43	-	-	-	8,592,950.71	(1,027,665.28)	7,638,343.44	\$ 305,086.52	
	May-13	78,582.79	-	11,604,420.96	1,426,305.92	392,913.93	-	222,417.63	-	185,670.74	38,034.82	8,021.00	-	-	-	8,449,115.86	(1,031,527.88)	7,491,436.71	\$ 304,781.09	
	Jun-13	78,582.79	-	11,604,420.96	1,426,305.92	471,496.72	-	223,727.35	-	185,670.74	38,034.82	10,266.22	-	-	-	8,303,971.30	(1,035,778.65)	7,342,890.32	\$ 304,457.63	
	Jul-13	78,582.79	-	11,604,420.96	1,426,305.92	550,079.50	-	225,037.06	-	185,670.74	38,034.82	12,885.65	-	-	-	8,157,517.03	(1,040,572.87)	7,192,568.40	\$ 304,114.66	
	Aug-13	78,582.79	-	11,604,420.96	1,426,305.92	628,662.29	-	226,346.77	-	185,670.74	38,034.82	16,028.96	-	-	-	8,009,753.04	(1,046,127.92)	7,040,284.64	\$ 303,750.11	
	Sep-13	78,582.79	-	11,604,420.96	1,426,305.92	707,245.08	-	227,656.49	-	185,670.74	38,034.82	19,958.10	-	-	-	7,860,679.34	(1,052,769.86)	6,885,767.30	\$ 303,361.00	
	Oct-13	78,582.79	-	11,604,420.96	1,426,305.92	785,827.86	-	228,966.20	-	185,670.74	38,034.82	25,196.95	-	-	-	7,710,295.93	(1,061,042.13)	6,728,581.64	\$ 302,942.56	
	Nov-13	78,582.79	-	11,604,420.96	1,426,305.92	864,410.65	-	230,275.91	-	185,670.74	38,034.82	33,055.23	-	-	-	7,558,602.80	(1,072,031.63)	6,567,912.48	\$ 302,485.82	
	Dec-13	78,582.79	-	11,604,420.96	1,426,305.92	942,993.43	-	231,585.63	-	185,670.74	38,034.82	48,771.79	-	-	-	7,405,599.96	(1,088,999.04)	6,401,586.05	\$ 301,966.89	
2014	Jan-14	20,469.36	-	11,604,420.96	1,426,305.92	942,993.43	20,469.36	232,895.34	-	111,402.44	22,820.89	25,146.49	341.16	-	-	7,193,173.99	(1,058,632.29)	6,225,571.31	\$ 301,341.43	
	Feb-14	20,469.36	-	11,604,420.96	1,426,305.92	942,993.43	40,938.73	233,236.49	-	111,402.44	22,820.89	25,146.49	713.33	-	-	6,980,406.86	(1,028,278.41)	6,043,335.07	\$ 299,679.02	
	Mar-14	20,469.36	-	11,604,420.96	1,426,305.92	942,993.43	61,408.09	233,577.65	-	111,402.44	22,820.89	25,146.49	1,122.71	-	-	6,767,298.57	(997,952.84)	5,860,737.09	\$ 298,012.63	
	Apr-14	20,469.36	-	11,604,420.96	1,426,305.92	942,94														

WEST PENN POWER CO.
IT Infrastructure-Hardware
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
5	20.00%	32.00%	19.20%	11.52%	11.52%	5.76%	0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
2010	Jan-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	2,893.92	-	-	-	\$ -
	Feb-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	8,681.75	-	-	-	\$ -
	Mar-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	14,469.59	-	-	-	\$ -
	Apr-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	20,257.43	-	-	-	\$ -
	May-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	26,045.26	-	-	-	\$ -
	Jun-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	31,833.10	-	-	-	\$ -
	Jul-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	38,998.27	-	-	-	\$ -
	Aug-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	44,186.11	-	-	-	\$ -
	Sep-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	49,973.94	-	-	-	\$ -
	Oct-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	55,761.78	-	-	-	\$ -
	Nov-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	61,549.61	-	-	-	\$ -
	Dec-10	775,706.25	-	-	-	-	-	-	-	-	-	-	-	-	67,337.45	-	-	-	\$ -
2011	Jan-11	103,500.00	-	-	-	-	-	-	-	-	-	-	-	-	72,984.30	-	-	-	\$ -
	Feb-11	103,500.00	-	10,009,847.51	-	-	-	-	-	181,997.23	-	-	-	-	-	10,009,847.51	(75,517.02)	4,967,165.24	\$ 54,610.74
	Mar-11	103,500.00	-	10,113,347.51	-	-	-	166,830.79	-	184,067.23	-	-	-	166,830.79	-	9,946,516.71	(82,669.02)	9,899,089.09	\$ 275,664.82
	Apr-11	103,500.00	-	10,216,847.51	-	-	-	168,555.79	-	186,387.23	-	-	-	335,386.58	-	9,881,460.92	(90,059.61)	9,827,624.50	\$ 276,604.11
	May-11	103,500.00	-	10,320,347.51	-	-	-	170,280.79	-	188,954.73	-	-	-	505,667.38	-	9,814,680.13	(97,808.08)	9,754,136.68	\$ 277,521.16
	Jun-11	103,500.00	-	10,423,847.51	-	-	-	172,005.79	-	191,911.87	-	-	-	677,673.17	-	9,746,174.34	(106,067.81)	9,678,489.29	\$ 278,414.47
	Jul-11	103,500.00	-	10,527,347.51	-	-	-	173,730.79	-	195,361.87	-	-	-	851,403.96	-	9,675,943.55	(115,043.30)	9,600,503.39	\$ 279,282.06
	Aug-11	103,500.00	-	10,630,847.51	-	-	-	175,455.79	-	199,501.87	-	-	-	1,026,859.75	-	9,603,987.75	(125,020.86)	9,519,933.57	\$ 280,121.25
	Sep-11	103,500.00	-	10,734,347.51	-	-	-	177,180.79	-	204,676.87	-	-	-	1,204,040.54	-	9,530,306.96	(136,429.94)	9,436,421.96	\$ 280,928.09
	Oct-11	103,500.00	-	10,837,847.51	-	-	-	178,905.79	-	211,576.87	-	-	-	1,382,946.33	-	9,454,901.17	(149,986.32)	9,349,395.94	\$ 281,696.30
	Nov-11	103,500.00	-	10,941,347.51	-	-	-	180,630.79	-	221,926.87	-	-	-	1,563,577.13	-	9,377,770.38	(167,121.50)	9,257,781.86	\$ 282,414.06
	Dec-11	103,500.00	-	11,044,847.51	-	-	-	182,355.79	-	242,626.87	-	-	-	1,745,932.92	-	9,298,914.59	(182,130.08)	9,158,716.69	\$ 283,049.91
2012	Jan-12	14,500.00	-	11,044,847.51	14,500.00	-	-	184,080.79	-	294,529.27	241.67	-	-	1,930,013.71	-	9,129,333.80	(238,059.30)	8,999,029.50	\$ 283,019.25
	Feb-12	14,500.00	-	11,044,847.51	29,000.00	-	-	184,322.46	-	294,529.27	505.30	-	-	2,114,336.17	-	8,959,511.34	(283,997.63)	8,783,394.10	\$ 280,890.15
	Mar-12	14,500.00	-	11,044,847.51	43,500.00	-	-	184,564.13	-	294,529.27	795.30	-	-	2,298,900.29	-	8,789,447.21	(329,956.01)	8,567,502.45	\$ 278,758.22
	Apr-12	14,500.00	-	11,044,847.51	58,000.00	-	-	184,805.79	-	294,529.27	1,117.53	-	-	2,483,706.08	-	8,619,141.42	(375,947.82)	8,351,342.40	\$ 276,623.35
	May-12	14,500.00	-	11,044,847.51	72,500.00	-	-	185,047.46	-	294,529.27	1,480.03	-	-	2,668,753.54	-	8,448,593.96	(421,989.77)	8,134,898.89	\$ 274,485.36
	Jun-12	14,500.00	-	11,044,847.51	87,000.00	-	-	185,289.13	-	294,529.27	1,894.31	-	-	2,854,042.67	-	8,277,804.84	(468,103.35)	7,918,152.84	\$ 272,344.05
	Jul-12	14,500.00	-	11,044,847.51	101,500.00	-	-	185,530.79	-	294,529.27	2,377.64	-	-	3,039,573.46	-	8,106,774.05	(514,317.20)	7,701,079.17	\$ 270,199.13
	Aug-12	14,500.00	-	11,044,847.51	116,000.00	-	-	185,772.46	-	294,529.27	2,957.64	-	-	3,225,345.92	-	7,935,501.59	(560,671.43)	7,483,643.50	\$ 268,050.24
	Sep-12	14,500.00	-	11,044,847.51	130,500.00	-	-	186,014.13	-	294,529.27	3,682.64	-	-	3,411,360.04	-	7,763,987.46	(607,226.22)	7,265,795.70	\$ 265,896.81
	Oct-12	14,500.00	-	11,044,847.51	145,000.00	-	-	186,255.79	-	294,529.27	4,649.31	-	-	3,597,615.84	-	7,592,231.67	(654,081.84)	7,047,455.54	\$ 263,737.97
	Nov-12	14,500.00	-	11,044,847.51	159,500.00	-	-	186,497.46	-	294,529.27	6,099.31	-	-	3,784,113.29	-	7,420,234.21	(701,438.33)	6,828,472.60	\$ 261,572.06
	Dec-12	14,500.00	-	11,044,847.51	174,000.00	-	-	186,739.13	-	294,529.27	8,999.31	-	-	3,970,852.42	-	7,247,995.09	(749,898.87)	6,608,445.80	\$ 259,394.67
2013	Jan-13	14,500.00	-	11,044,847.51	174,000.00	14,500.00	-	186,980.79	-	176,717.56	4,640.00	241.67	-	4,157,833.21	-	7,075,514.29	(747,665.87)	6,412,972.33	\$ 257,487.24
	Feb-13	14,500.00	-	11,044,847.51	174,000.00	29,000.00	-	187,222.46	-	176,717.56	4,640.00	505.30	-	4,345,055.67	-	6,902,791.84	(745,441.98)	6,242,599.14	\$ 255,855.76
	Mar-13	14,500.00	-	11,044,847.51	174,000.00	43,500.00	-	187,464.13	-	176,717.56	4,640.00	795.30	-	4,532,519.79	-	6,729,827.71	(743,238.15)	6,071,969.71	\$ 254,221.47
	Apr-13	14,500.00	-	11,044,847.51	174,000.00	58,000.00	-	187,705.79	-	176,717.56	4,640.00	1,117.53	-	4,720,225.59	-	6,556,621.92	(741,067.75)	5,901,071.86	\$ 252,584.23
	May-13	14,500.00	-	11,044,847.51	174,000.00	72,500.00	-	187,947.46	-	176,717.56	4,640.00	1,480.03	-	4,908,173.04	-	6,383,174.46	(738,947.49)	5,729,890.57	\$ 250,943.87
	Jun-13	14,500.00	-	11,044,847.51	174,000.00	87,000.00	-	188,189.13	-	176,717.56	4,640.00	1,894.31	-	5,096,382.17	-	6,209,485.34	(736,898.85)	5,558,406.73	\$ 249,300.18
	Jul-13	14,500.00	-	11,044,847.51	174,000.00	101,500.00	-	188,430.79	-	176,717.56	4,640.00	2,377.64	-	5,284,792.96	-	6,035,554.54	(734,950.48)	5,386,595.28	\$ 247,652.89
	Aug-13	14,500.00	-	11,044,847.51	174,000.00	116,000.00	-	188,672.46	-	176,717.56	4,640.00	2,957.64	-	5,473,465.42	-	5,861,382.09	(733,142.51)	5,214,421.82	\$ 246,001.62
	Sep-13	14,500.00	-	11,044,847.51	174,000.00	130,500.00	-	188,914.13	-	176,717.56	4,640.00	3,682.64	-	5,666,967.96	-	5,686,967.96	(731,535.08)	5,041,836.23	\$ 244,345.82
	Oct-13	14,500.00	-	11,044,847.51	174,000.00	145,000.00	-	189,155.79	-	176,717.56	4,640.00	4,649.31	-	5,851,535.34	-	5,512,312.17	(730,228.48)	4,868,758.28	\$ 242,684.61
	Nov-13	14,500.00	-	11,044,847.51	174,000.00	159,500.00	-	189,397.46	-	176,717.56	4,640.00	6,099.31	-	6,040,932.79	-	5,337,414.71	(729,423.26)	4,696,037.57	\$ 241,016.33
	Dec-13	14,500.00	-	11,044,847.51	174,000.00	174,000.00	-	189,639.13	-	176,717.56	4,640.00	8,999.31	-	6,230,571.92	-	5,162,275.59	(729,721.08)	4,530,772.97	\$ 239,336.98
2014	Jan-14	14,500.00	-	11,044,847.51	174,000.00	174,000.00	14,500.00	189,880.79	-	106,030.54	2,784.00	4,640.00	241.67	6,420,452.71	-	4,986,894.79	(698,109.43)	4,380,669.93	\$ 237,823.51
	Feb-14	14,500.00	-	11,044,847.51	174,000.00	29,000.00	14,500.00	190,122.46	-	106,030.54	2,784.00	4,640.00	505.30	6,610,575.17	-	4,811,272.34	(666,506.89)	4,216,775.40	\$ 236,483.15

WEST PENN POWER CO.
MDMS - Software
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
3	33.33%	44.45%	14.81%	7.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Oct-09	1,387,578.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5,176.62	-	-	\$ -
	Nov-09	374,078.00	-	-	-	-	-	-	-	-	-	-	-	-	-	11,748.81	-	-	\$ -
	Dec-09	374,078.00	-	-	-	-	-	-	-	-	-	-	-	-	-	14,539.95	-	-	\$ -
2010	Jan-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	17,225.65	-	-	\$ -
	Feb-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	19,336.36	-	-	\$ -
	Mar-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	21,447.08	-	-	\$ -
	Apr-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	23,557.80	-	-	\$ -
	May-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	25,668.51	-	-	\$ -
	Jun-10	282,885.67	-	-	-	-	-	-	-	-	-	-	-	-	-	27,779.23	-	-	\$ -
	Jul-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
	Aug-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
	Sep-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
	Oct-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
	Nov-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
	Dec-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,841.98	-	-	\$ -
2011	Jan-11	-	-	-	-	-	-	-	-	-	-	-	-	-	31,177.96	-	-	-	\$ -
	Feb-11	-	-	4,209,757.87	-	-	-	-	-	127,555.66	-	-	-	-	-	4,209,757.87	(52,927.31)	2,078,415.28	\$ 22,850.82
	Mar-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	70,162.63	-	4,139,595.24	(76,741.69)	4,109,842.05	\$ 115,347.66
	Apr-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	140,325.26	-	4,069,432.61	(100,556.06)	4,015,865.05	\$ 114,314.45
	May-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	210,487.89	-	3,999,269.97	(124,370.44)	3,921,888.04	\$ 113,281.23
	Jun-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	280,650.52	-	3,929,107.34	(148,184.82)	3,827,911.03	\$ 112,248.02
	Jul-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	350,813.16	-	3,858,944.71	(171,999.20)	3,733,934.02	\$ 111,214.80
	Aug-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	420,975.79	-	3,788,782.08	(195,813.58)	3,639,957.01	\$ 110,181.58
	Sep-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	491,138.42	-	3,718,619.45	(219,627.95)	3,545,980.00	\$ 109,148.37
	Oct-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	561,301.05	-	3,648,456.82	(243,442.33)	3,452,002.99	\$ 108,115.15
	Nov-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	631,463.68	-	3,578,294.19	(267,256.71)	3,358,025.98	\$ 107,081.94
	Dec-11	-	-	4,209,757.87	-	-	-	70,162.63	-	127,555.66	-	-	-	701,626.31	-	3,508,131.56	(291,071.09)	3,264,048.97	\$ 106,048.72
2012	Jan-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	771,788.94	-	3,437,968.93	(326,661.65)	3,164,183.87	\$ 104,950.77
	Feb-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	841,951.57	-	3,367,806.29	(362,252.20)	3,058,430.68	\$ 103,788.08
	Mar-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	912,114.20	-	3,297,643.66	(397,842.76)	2,952,677.49	\$ 102,625.39
	Apr-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	982,276.84	-	3,227,481.03	(433,433.32)	2,846,924.31	\$ 101,462.71
	May-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,052,439.47	-	3,157,318.40	(469,023.88)	2,741,171.12	\$ 100,300.02
	Jun-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,122,602.10	-	3,087,155.77	(504,614.44)	2,635,417.93	\$ 99,137.33
	Jul-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,192,764.73	-	3,016,993.14	(540,205.00)	2,529,664.74	\$ 97,974.64
	Aug-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,262,927.36	-	2,946,830.51	(575,795.56)	2,423,911.55	\$ 96,811.96
	Sep-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,333,089.99	-	2,876,667.88	(611,386.11)	2,318,158.36	\$ 95,649.27
	Oct-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,403,252.62	-	2,806,505.25	(646,976.67)	2,212,405.17	\$ 94,486.58
	Nov-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,473,415.25	-	2,736,342.61	(682,567.23)	2,106,651.98	\$ 93,323.90
	Dec-12	-	-	4,209,757.87	-	-	-	70,162.63	-	155,936.45	-	-	-	1,543,577.88	-	2,666,179.98	(718,157.79)	2,000,998.79	\$ 92,161.21
2013	Jan-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,613,740.52	-	2,596,017.35	(710,602.98)	1,916,718.28	\$ 91,235.70
	Feb-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,683,903.15	-	2,525,854.72	(703,048.18)	1,854,110.45	\$ 90,547.37
	Mar-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,754,065.78	-	2,455,692.09	(695,493.37)	1,791,502.63	\$ 89,859.03
	Apr-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,824,228.41	-	2,385,529.46	(687,938.57)	1,728,894.80	\$ 89,170.70
	May-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,894,391.04	-	2,315,366.83	(680,383.76)	1,666,286.98	\$ 88,482.37
	Jun-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	1,964,553.67	-	2,245,204.20	(672,828.96)	1,603,679.15	\$ 87,794.04
	Jul-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,034,716.30	-	2,175,041.57	(665,274.15)	1,541,071.33	\$ 87,105.70
	Aug-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,104,878.93	-	2,104,878.93	(657,719.35)	1,478,463.50	\$ 86,417.37
	Sep-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,175,041.57	-	2,034,716.30	(650,164.54)	1,415,855.68	\$ 85,729.04
	Oct-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,245,204.20	-	1,964,553.67	(642,609.73)	1,353,247.85	\$ 85,040.71
	Nov-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,315,366.83	-	1,894,391.04	(635,054.93)	1,290,640.03	\$ 84,352.38
	Dec-13	-	-	4,209,757.87	-	-	-	70,162.63	-	51,955.43	-	-	-	2,385,529.46	-	1,824,228.41	(627,500.12)	1,228,032.20	\$ 83,664.04
2014	Jan-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,455,692.09	-	1,754,065.78	(609,173.53)	1,170,810.27	\$ 83,034.93
	Feb-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,525,854.72	-	1,683,903.15	(590,846.94)	1,118,974.23	\$ 82,465.02
	Mar-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,596,017.35	-	1,613,740.52	(572,520.35)	1,067,138.19	\$ 81,895.12
	Apr-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,666,179.98	-	1,543,577.88	(554,193.76)	1,015,302.14	\$ 81,325.22
	May-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,736,342.61	-	1,473,415.25	(535,867.17)	963,466.10	\$ 80,755.31
	Jun-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,806,505.25	-	1,403,252.62	(517,540.58)	911,630.06	\$ 80,185.41
	Jul-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,876,667.88	-	1,333,089.99	(499,213.99)	859,794.02	\$ 79,615.51
	Aug-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	2,946,830.51	-	1,262,927.36	(480,887.40)	807,957.98	\$ 79,045.60
	Sep-14	-	-	4,209,757.87	-	-	-	70,162.63	-	25,995.25	-	-	-	3,016,993.14					

WEST PENN POWER CO.
Sensus + Itron ADCS - Software
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
3	33.33%	44.45%	14.81%	7.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
2010	Jan-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	3,200.53	-	-	-	\$ -
	Feb-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	9,601.60	-	-	-	\$ -
	Mar-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	16,002.66	-	-	-	\$ -
	Apr-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	22,403.73	-	-	-	\$ -
	May-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	28,804.79	-	-	-	\$ -
	Jun-10	857,893.33	-	-	-	-	-	-	-	-	-	-	-	-	35,205.86	-	-	-	\$ -
	Jul-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
	Aug-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
	Sep-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
	Oct-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
	Nov-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
	Dec-10	-	-	-	-	-	-	-	-	-	-	-	-	-	39,266.08	-	-	-	\$ -
2011	Jan-11	-	-	-	-	-	-	-	-	-	-	-	-	-	41,023.96	-	-	-	\$ -
	Feb-11	-	-	5,539,199.62	-	-	-	-	-	167,837.75	-	-	-	-	-	5,539,199.62	(69,641.76)	2,734,778.93	\$ 30,067.11
	Mar-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	92,319.99	-	5,446,879.63	(100,976.72)	5,407,730.39	\$ 151,774.46
	Apr-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	184,639.99	-	5,354,559.64	(132,311.68)	5,284,075.44	\$ 150,414.96
	May-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	276,959.98	-	5,262,239.64	(163,646.64)	5,160,420.48	\$ 149,055.45
	Jun-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	369,279.97	-	5,169,919.65	(194,981.59)	5,036,765.53	\$ 147,695.94
	Jul-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	461,599.97	-	5,077,599.66	(226,316.55)	4,913,110.58	\$ 146,336.44
	Aug-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	553,919.96	-	4,985,279.66	(257,651.51)	4,789,455.62	\$ 144,976.93
	Sep-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	646,239.96	-	4,892,959.67	(288,986.47)	4,665,800.67	\$ 143,617.43
	Oct-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	738,559.95	-	4,800,639.67	(320,321.43)	4,542,145.72	\$ 142,257.92
	Nov-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	830,879.94	-	4,708,319.68	(351,656.39)	4,418,490.76	\$ 140,898.42
	Dec-11	-	-	5,539,199.62	-	-	-	92,319.99	-	167,837.75	-	-	-	923,199.94	-	4,615,999.69	(382,991.35)	4,294,835.81	\$ 139,538.91
2012	Jan-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,015,519.93	-	4,523,679.69	(429,821.41)	4,163,433.31	\$ 138,094.23
	Feb-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,107,839.92	-	4,431,359.70	(476,651.47)	4,024,283.26	\$ 136,564.36
	Mar-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,200,159.92	-	4,339,039.71	(523,481.53)	3,885,133.20	\$ 135,034.50
	Apr-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,292,479.91	-	4,246,719.71	(570,311.59)	3,745,983.15	\$ 133,504.63
	May-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,384,799.91	-	4,154,399.72	(617,141.65)	3,606,833.10	\$ 131,974.77
	Jun-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,477,119.90	-	4,062,079.72	(663,971.71)	3,467,683.05	\$ 130,444.91
	Jul-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,569,439.89	-	3,969,759.73	(710,801.76)	3,328,532.99	\$ 128,915.04
	Aug-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,661,759.89	-	3,877,439.74	(757,631.82)	3,189,382.94	\$ 127,385.18
	Sep-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,754,079.88	-	3,785,119.74	(804,461.88)	3,050,232.89	\$ 125,855.31
	Oct-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,846,399.87	-	3,692,799.75	(851,291.94)	2,911,082.84	\$ 124,325.45
	Nov-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	1,938,719.87	-	3,600,479.76	(898,122.00)	2,771,932.78	\$ 122,795.59
	Dec-12	-	-	5,539,199.62	-	-	-	92,319.99	-	205,181.19	-	-	-	2,031,039.86	-	3,508,159.76	(944,952.06)	2,632,782.73	\$ 121,265.72
2013	Jan-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,123,359.86	-	3,415,839.77	(935,011.44)	2,522,018.01	\$ 120,047.94
	Feb-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,215,679.85	-	3,323,519.77	(925,070.83)	2,439,638.63	\$ 119,142.23
	Mar-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,307,999.84	-	3,231,199.78	(915,130.22)	2,357,259.25	\$ 118,236.52
	Apr-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,400,319.84	-	3,138,879.79	(905,189.60)	2,274,879.87	\$ 117,330.81
	May-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,492,639.83	-	3,046,559.79	(895,248.99)	2,192,500.49	\$ 116,425.11
	Jun-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,584,959.82	-	2,954,239.80	(885,308.38)	2,110,121.11	\$ 115,519.40
	Jul-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,677,279.82	-	2,861,919.81	(875,367.76)	2,027,741.73	\$ 114,613.69
	Aug-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,769,599.81	-	2,769,599.81	(865,427.15)	1,945,362.35	\$ 113,707.98
	Sep-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,861,919.81	-	2,677,279.82	(855,486.54)	1,862,982.97	\$ 112,802.28
	Oct-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	2,954,239.80	-	2,584,959.82	(845,545.92)	1,780,603.59	\$ 111,896.57
	Nov-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	3,046,559.79	-	2,492,639.83	(835,605.31)	1,698,224.21	\$ 110,990.86
	Dec-13	-	-	5,539,199.62	-	-	-	92,319.99	-	68,362.96	-	-	-	3,138,879.79	-	2,400,319.84	(825,664.69)	1,615,844.83	\$ 110,085.15
2014	Jan-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,231,199.78	-	2,307,999.84	(801,550.57)	1,540,552.21	\$ 109,257.36
	Feb-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,323,519.77	-	2,215,679.85	(777,436.44)	1,472,346.35	\$ 108,507.48
	Mar-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,415,839.77	-	2,123,359.86	(753,322.31)	1,404,140.48	\$ 107,757.60
	Apr-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,508,159.76	-	2,031,039.86	(729,208.18)	1,335,934.61	\$ 107,007.72
	May-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,600,479.76	-	1,938,719.87	(705,094.05)	1,267,728.75	\$ 106,257.84
	Jun-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,692,799.75	-	1,846,399.87	(680,979.92)	1,199,522.88	\$ 105,507.97
	Jul-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,785,119.74	-	1,754,079.88	(656,865.79)	1,131,317.02	\$ 104,758.09
	Aug-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,877,439.74	-	1,661,759.89	(632,751.67)	1,063,111.15	\$ 104,008.21
	Sep-14	-	-	5,539,199.62	-	-	-	92,319.99	-	34,204.56	-	-	-	3,969,439.89	-	1,569,439.89</			

WEST PENN POWER CO.
Web site - Software + Security (full) - Software + Portal - Software
In-Service Feb 2011

Book Life		Tax Life												Years (3, 5, 7, 10, 15 or 20) >>								
Book Life	Months	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019											
Book Life Months	60	33.33%	44.45%	14.81%	7.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%											
Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$			
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -			
	Nov-09	100,000.00	-	-	-	-	-	-	-	-	-	-	-	-	373.07	-	-	-	\$ -			
	Dec-09	100,000.00	-	-	-	-	-	-	-	-	-	-	-	-	1,119.21	-	-	-	\$ -			
2010	Jan-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	Feb-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	Mar-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	Apr-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	May-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	Jun-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,503.41	-	-	-	\$ -			
	Jul-10	1,333,333.33	-	-	-	-	-	-	-	-	-	-	-	-	6,544.97	-	-	-	\$ -			
	Aug-10	1,333,333.33	-	-	-	-	-	-	-	-	-	-	-	-	16,493.47	-	-	-	\$ -			
	Sep-10	1,333,333.33	-	-	-	-	-	-	-	-	-	-	-	-	26,441.97	-	-	-	\$ -			
	Oct-10	724,822.33	-	-	-	-	-	-	-	-	-	-	-	-	34,120.31	-	-	-	\$ -			
	Nov-10	724,822.33	-	-	-	-	-	-	-	-	-	-	-	-	39,528.48	-	-	-	\$ -			
	Dec-10	724,822.33	-	-	-	-	-	-	-	-	-	-	-	-	44,936.65	-	-	-	\$ -			
2011	Jan-11	824,027.78	-	-	-	-	-	-	-	-	-	-	-	-	51,968.93	-	-	-	\$ -			
	Feb-11	824,027.78	-	8,253,070.05	-	-	-	250,068.02	-	-	-	-	-	-	-	8,253,070.05	(103,761.97)	4,074,654.04	\$ 44,798.16			
	Mar-11	824,027.78	-	9,077,097.83	-	-	-	137,551.17	-	137,551.17	-	-	-	-	-	8,939,546.66	(161,845.28)	8,463,504.73	\$ 230,601.88			
	Apr-11	824,027.78	-	9,901,125.61	-	-	-	151,284.96	-	308,049.36	-	-	-	-	-	9,612,289.48	(226,892.32)	9,081,549.27	\$ 251,130.67			
	May-11	824,027.78	-	10,725,153.39	-	-	-	165,018.76	-	342,380.42	-	-	-	-	-	10,271,298.49	(300,485.88)	9,678,104.89	\$ 271,423.21			
	Jun-11	824,027.78	-	11,549,181.16	-	-	-	178,752.56	-	381,615.92	-	-	-	-	-	10,916,573.72	(384,660.99)	10,251,362.67	\$ 291,459.60			
	Jul-11	824,027.78	-	12,373,208.94	-	-	-	192,486.35	-	427,390.66	-	-	-	-	-	11,548,115.14	(482,131.00)	10,798,948.43	\$ 311,213.74			
	Aug-11	824,027.78	-	13,197,236.72	-	-	-	206,220.15	-	482,320.35	-	-	-	-	-	12,165,922.77	(596,694.64)	11,317,606.13	\$ 330,649.84			
	Sep-11	824,027.78	-	14,021,264.50	-	-	-	219,953.95	-	550,982.46	-	-	-	-	-	12,769,996.60	(734,049.96)	11,802,587.39	\$ 349,715.69			
	Oct-11	824,027.78	-	14,845,292.28	-	-	-	233,687.74	-	642,531.95	-	-	-	-	-	13,360,336.64	(903,693.73)	12,246,294.77	\$ 368,327.76			
	Nov-11	824,027.78	-	15,669,320.05	-	-	-	247,421.54	-	779,856.18	-	-	-	-	-	13,936,942.88	(1,124,619.50)	12,634,483.14	\$ 386,329.44			
	Dec-11	824,027.78	-	16,493,347.83	-	-	-	261,155.33	-	1,054,504.64	-	-	-	-	-	14,499,815.32	(1,453,807.89)	12,929,165.40	\$ 403,303.07			
2012	Jan-12	32,625.00	-	16,493,347.83	32,625.00	-	-	274,889.13	-	610,941.09	906.16	-	-	-	-	14,257,551.19	(1,593,623.61)	12,854,967.50	\$ 416,221.11			
	Feb-12	32,625.00	-	16,493,347.83	65,250.00	-	-	275,432.88	-	610,941.09	1,894.70	-	-	-	-	14,014,743.31	(1,733,623.89)	12,472,523.50	\$ 412,560.14			
	Mar-12	32,625.00	-	16,493,347.83	97,875.00	-	-	275,976.63	-	610,941.09	2,982.09	-	-	-	-	13,771,391.68	(1,873,849.74)	12,089,330.68	\$ 408,890.93			
	Apr-12	32,625.00	-	16,493,347.83	130,500.00	-	-	276,520.38	-	610,941.09	4,190.30	-	-	-	-	13,527,496.30	(2,014,351.30)	11,705,343.47	\$ 405,212.99			
	May-12	32,625.00	-	16,493,347.83	163,125.00	-	-	277,064.13	-	610,941.09	5,549.54	-	-	-	-	13,283,057.17	(2,155,191.24)	11,320,505.47	\$ 401,525.70			
	Jun-12	32,625.00	-	16,493,347.83	195,750.00	-	-	277,607.88	-	610,941.09	7,102.96	-	-	-	-	13,038,074.29	(2,296,450.12)	10,934,745.05	\$ 397,828.27			
	Jul-12	32,625.00	-	16,493,347.83	228,375.00	-	-	278,151.63	-	610,941.09	8,915.27	-	-	-	-	12,792,547.66	(2,438,235.37)	10,547,968.23	\$ 394,119.66			
	Aug-12	32,625.00	-	16,493,347.83	261,000.00	-	-	278,695.38	-	610,941.09	11,090.06	-	-	-	-	12,546,477.28	(2,580,697.40)	10,160,046.08	\$ 390,398.46			
	Sep-12	32,625.00	-	16,493,347.83	293,625.00	-	-	279,239.13	-	610,941.09	13,808.54	-	-	-	-	12,299,863.15	(2,724,061.80)	9,770,790.61	\$ 386,662.60			
	Oct-12	32,625.00	-	16,493,347.83	326,250.00	-	-	279,782.88	-	610,941.09	17,433.17	-	-	-	-	12,052,705.27	(2,868,704.56)	9,379,901.03	\$ 382,908.77			
	Nov-12	32,625.00	-	16,493,347.83	358,875.00	-	-	280,326.63	-	610,941.09	22,870.19	-	-	-	-	11,805,003.64	(3,015,377.69)	8,986,813.32	\$ 379,130.78			
	Dec-12	32,625.00	-	16,493,347.83	391,500.00	-	-	280,870.38	-	610,941.09	33,744.04	-	-	-	-	11,556,758.26	(3,166,337.17)	8,590,023.52	\$ 375,312.08			
2013	Jan-13	25,125.00	-	16,493,347.83	391,500.00	25,125.00	-	281,414.13	-	203,555.40	14,501.81	697.85	-	-	-	11,300,469.13	(3,140,337.73)	8,275,276.24	\$ 372,395.39			
	Feb-13	25,125.00	-	16,493,347.83	391,500.00	50,250.00	-	281,832.88	-	203,555.40	14,501.81	1,459.13	-	-	-	11,043,761.24	(3,114,480.42)	8,044,706.11	\$ 370,279.18			
	Mar-13	25,125.00	-	16,493,347.83	391,500.00	75,375.00	-	282,251.63	-	203,555.40	14,501.81	2,296.55	-	-	-	10,786,634.61	(3,088,796.82)	7,813,559.31	\$ 368,156.62			
	Apr-13	25,125.00	-	16,493,347.83	391,500.00	100,500.00	-	282,670.38	-	203,555.40	14,501.81	3,227.01	-	-	-	10,529,089.23	(3,063,325.56)	7,581,800.73	\$ 366,027.33			
	May-13	25,125.00	-	16,493,347.83	391,500.00	125,625.00	-	283,089.13	-	203,555.40	14,501.81	4,273.78	-	-	-	10,271,125.10	(3,038,114.88)	7,349,386.95	\$ 363,890.84			
	Jun-13	25,125.00	-	16,493,347.83	391,500.00	150,750.00	-	283,507.88	-	203,555.40	14,501.81	5,470.09	-	-	-	10,012,742.22	(3,013,226.84)	7,116,262.80	\$ 361,746.55			
	Jul-13	25,125.00	-	16,493,347.83	391,500.00	175,875.00	-	283,926.63	-	203,555.40	14,501.81	6,865.79	-	-	-	9,753,940.59	(2,988,744.17)	6,882,355.90	\$ 359,593.64			
	Aug-13	25,125.00	-	16,493,347.83	391,500.00	201,000.00	-	284,345.38	-	203,555.40	14,501.81	8,540.62	-	-	-	9,494,720.21	(2,964,782.69)	6,647,566.97	\$ 357,431.04			
	Sep-13	25,125.00	-	16,493,347.83	391,500.00	226,125.00	-	284,764.13	-	203,555.40	14,501.81	10,634.16	-	-	-	9,235,081.08	(2,941,516.14)	6,411,751.23	\$ 355,257.15			
	Oct-13	25,125.00	-	16,493,347.83	391,500.00	251,250.00	-	285,182.88	-	203,555.40	14,501.81	13,425.55	-	-	-	8,975,023.20	(2,919,234.09)	6,174,677.03	\$ 353,069.43			
	Nov-13	25,125.00	-	16,493,347.83	391,500.00	276,375.00	-	285,601.63	-	203,555.40	14,501.81	17,612.63	-	-	-	8,714,546.57	(2,898,515.64)	5,935,910.02	\$ 350,863.09			
	Dec-13	25,125.00	-	16,493,347.83	391,500.00	301,500.00	-	286,020.38	-	203,555.40	14,501.81	25,986.79	-	-	-	8,453,651.19	(2,881,098.17)	5,694,291.98	\$ 348,625.41			
2014	Jan-14	9,500.00	-	16,493,347.83	391,500.00	301,500.00	9,500.00	286,439.13	-	101,846.42	4,831.76	11,168.06	263.86	-	-	8,176,712.06	(2,811,252.57)	5,469,006.25	\$ 346,567.29			
	Feb-14	9,500.00	-	16,493,347.83	391,500.00	301,500.00	19,000.00	286,597.46	-	101,846.42	4,831.76	11,168.06</										

WEST PENN POWER CO.
TIBCO - ESB - Software
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
3	33.33%	44.45%	14.81%	7.41%	0.00%		0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$	
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Oct-09	1,500,000.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5,596.03	-	-	\$ -	
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,192.06	-	-	\$ -	
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,192.06	-	-	\$ -	
2010	Jan-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	23,926.15	-	-	\$ -	
	Feb-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	48,976.79	-	-	\$ -	
	Mar-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	74,027.43	-	-	\$ -	
	Apr-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	99,078.07	-	-	\$ -	
	May-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	124,128.71	-	-	\$ -	
	Jun-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	149,179.34	-	-	\$ -	
	Jul-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	178,104.80	-	-	\$ -	
	Aug-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	203,155.44	-	-	\$ -	
	Sep-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	228,206.07	-	-	\$ -	
	Oct-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	253,256.71	-	-	\$ -	
	Nov-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	278,307.35	-	-	\$ -	
	Dec-10	3,357,375.00	-	-	-	-	-	-	-	-	-	-	-	-	-	303,357.99	-	-	\$ -	
2011	Jan-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	326,660.43	-	-	\$ -	
	Feb-11	-	-	44,106,845.44	-	-	-	-	-	1,336,437.42	-	-	-	-	-	-	44,106,845.44	(554,534.66)	21,776,155.39	\$ 239,414.62
	Mar-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	735,114.09	-	43,371,731.35	(804,044.75)	43,059,998.69	\$ 1,208,530.68	
	Apr-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	1,470,228.18	-	42,636,617.26	(1,053,554.85)	42,075,374.51	\$ 1,197,705.38	
	May-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	2,205,342.27	-	41,901,503.17	(1,303,064.94)	41,090,750.32	\$ 1,186,880.08	
	Jun-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	2,940,456.36	-	41,166,389.08	(1,552,575.04)	40,106,126.14	\$ 1,176,054.78	
	Jul-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	3,675,570.45	-	40,431,274.99	(1,802,085.13)	39,121,501.95	\$ 1,165,229.48	
	Aug-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	4,410,684.54	-	39,696,160.90	(2,051,595.23)	38,136,877.77	\$ 1,154,404.18	
	Sep-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	5,145,798.63	-	38,961,046.81	(2,301,105.32)	37,152,253.58	\$ 1,143,578.88	
	Oct-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	5,880,912.73	-	38,225,932.72	(2,550,615.41)	36,167,629.40	\$ 1,132,753.58	
	Nov-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	6,616,026.82	-	37,490,818.63	(2,800,125.51)	35,183,005.21	\$ 1,121,928.28	
	Dec-11	-	-	44,106,845.44	-	-	-	735,114.09	-	1,336,437.42	-	-	-	7,351,140.91	-	36,755,704.54	(3,049,635.60)	34,198,381.02	\$ 1,111,102.98	
2012	Jan-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	8,086,255.00	-	36,020,590.44	(3,422,528.13)	33,152,065.62	\$ 1,099,599.42	
	Feb-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	8,821,369.09	-	35,285,476.35	(3,795,420.67)	32,044,059.00	\$ 1,087,417.61	
	Mar-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	9,556,483.18	-	34,550,362.26	(4,168,313.20)	30,936,052.38	\$ 1,075,235.80	
	Apr-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	10,291,597.27	-	33,815,248.17	(4,541,205.73)	29,828,045.76	\$ 1,063,053.99	
	May-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	11,026,711.36	-	33,080,134.08	(4,914,098.26)	28,720,039.13	\$ 1,050,872.18	
	Jun-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	11,761,825.45	-	32,345,019.99	(5,286,990.79)	27,612,032.51	\$ 1,038,690.37	
	Jul-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	12,496,939.54	-	31,609,905.90	(5,659,883.32)	26,504,025.89	\$ 1,026,508.56	
	Aug-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	13,232,053.63	-	30,874,791.81	(6,032,775.85)	25,396,019.27	\$ 1,014,326.75	
	Sep-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	13,967,167.72	-	30,139,677.72	(6,405,668.38)	24,288,012.65	\$ 1,002,144.94	
	Oct-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	14,702,281.81	-	29,404,563.63	(6,778,560.91)	23,180,006.03	\$ 989,963.13	
	Nov-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	15,437,395.90	-	28,669,449.54	(7,151,453.44)	22,071,999.40	\$ 977,781.32	
	Dec-12	-	-	44,106,845.44	-	-	-	735,114.09	-	1,633,791.07	-	-	-	16,172,510.00	-	27,934,335.45	(7,524,345.98)	20,963,992.78	\$ 965,599.51	
2013	Jan-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	16,907,624.09	-	27,199,221.36	(7,445,192.10)	20,082,009.36	\$ 955,902.68	
	Feb-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	17,642,738.18	-	26,464,107.27	(7,366,038.23)	19,426,049.15	\$ 948,690.83	
	Mar-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	18,377,852.27	-	25,728,993.17	(7,286,884.35)	18,770,088.93	\$ 941,478.97	
	Apr-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	19,112,966.36	-	24,993,879.08	(7,207,730.48)	18,114,128.72	\$ 934,267.12	
	May-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	19,848,080.45	-	24,258,764.99	(7,128,576.60)	17,458,168.50	\$ 927,055.26	
	Jun-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	20,583,194.54	-	23,523,650.90	(7,049,422.73)	16,802,208.28	\$ 919,843.41	
	Jul-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	21,318,308.63	-	22,788,536.81	(6,970,268.85)	16,146,248.07	\$ 912,631.55	
	Aug-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	22,053,422.72	-	22,053,422.72	(6,891,114.98)	15,490,287.85	\$ 905,419.70	
	Sep-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	22,788,536.81	-	21,318,308.63	(6,811,961.10)	14,834,327.64	\$ 898,207.84	
	Oct-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	23,523,650.90	-	20,583,194.54	(6,732,807.23)	14,178,367.42	\$ 890,995.99	
	Nov-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	24,258,764.99	-	19,848,080.45	(6,653,653.35)	13,522,407.20	\$ 883,784.13	
	Dec-13	-	-	44,106,845.44	-	-	-	735,114.09	-	544,351.98	-	-	-	24,993,879.08	-	19,112,966.36	(6,574,499.48)	12,866,446.99	\$ 876,572.28	
2014	Jan-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	25,728,993.17	-	18,377,852.27	(6,382,486.52)	12,266,916.32	\$ 869,980.83	
	Feb-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	26,464,107.27	-	17,642,738.18	(6,190,473.55)	11,723,815.19	\$ 864,009.79	
	Mar-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	27,199,221.36	-	16,907,624.09	(5,998,460.59)	11,180,714.06	\$ 858,038.75	
	Apr-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	27,934,335.45	-	16,172,510.00	(5,806,447.62)	10,637,612.94	\$ 852,067.70	
	May-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	28,669,449.54	-	15,437,395.90	(5,614,434.66)	10,094,511.81	\$ 846,096.66	
	Jun-14	-	-	44,106,845.44	-	-	-	735,114.09	-	272,359.77	-	-	-	29,404,563.63	-	14,702,281.81	(5,422,421.70)			

WEST PENN POWER CO.
IVR - Software
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Book Life	5
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Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
3	33.33%	44.45%	14.81%	7.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
2010	Jan-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Feb-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Mar-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Apr-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	May-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jun-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -
	Jul-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	323.33	-	-	-	\$ -
	Aug-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	969.98	-	-	-	\$ -
	Sep-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	1,616.63	-	-	-	\$ -
	Oct-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	2,263.28	-	-	-	\$ -
	Nov-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	2,909.94	-	-	-	\$ -
	Dec-10	86,666.67	-	-	-	-	-	-	-	-	-	-	-	-	3,556.59	-	-	-	\$ -
2011	Jan-11	25,616.67	-	-	-	-	-	-	-	-	-	-	-	-	4,062.33	-	-	-	\$ -
	Feb-11	25,616.67	-	586,935.41	-	-	-	-	-	17,784.14	-	-	-	-	-	586,935.41	(7,379.26)	289,778.07	\$ 3,185.92
	Mar-11	25,616.67	-	612,552.08	-	-	-	9,782.26	-	18,637.95	-	-	-	-	-	602,769.82	(11,053.80)	585,636.09	\$ 16,220.94
	Apr-11	25,616.67	-	638,168.75	-	-	-	10,209.20	-	19,586.62	-	-	-	-	-	618,177.29	(14,944.82)	597,474.25	\$ 16,778.04
	May-11	25,616.67	-	663,785.41	-	-	-	10,636.15	-	20,053.97	-	-	-	-	-	633,157.81	(19,101.52)	608,644.38	\$ 17,327.79
	Jun-11	25,616.67	-	689,402.08	-	-	-	11,063.09	-	21,873.59	-	-	-	-	-	647,711.38	(23,587.18)	619,090.25	\$ 17,869.58
	Jul-11	25,616.67	-	715,018.75	-	-	-	11,490.03	-	23,296.60	-	-	-	-	-	661,838.02	(28,486.13)	628,738.05	\$ 18,402.60
	Aug-11	25,616.67	-	740,635.41	-	-	-	11,916.98	-	25,004.20	-	-	-	-	-	675,537.70	(33,916.48)	637,486.55	\$ 18,925.73
	Sep-11	25,616.67	-	766,252.08	-	-	-	12,343.92	-	27,138.71	-	-	-	-	-	688,810.45	(40,055.36)	645,188.16	\$ 19,437.35
	Oct-11	25,616.67	-	791,868.75	-	-	-	12,770.87	-	29,984.72	-	-	-	-	-	701,656.25	(47,197.99)	651,606.68	\$ 19,934.86
	Nov-11	25,616.67	-	817,485.41	-	-	-	13,197.81	-	34,253.74	-	-	-	-	-	714,075.10	(55,934.83)	656,299.27	\$ 20,413.39
	Dec-11	25,616.67	-	843,102.08	-	-	-	13,624.76	-	42,791.78	-	-	-	-	-	726,067.01	(68,037.25)	658,085.02	\$ 20,859.97
2012	Jan-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	712,015.31	(75,165.08)	647,439.99	\$ 21,169.88
	Feb-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	697,963.61	(82,292.92)	626,260.45	\$ 20,937.03
	Mar-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	683,911.91	(89,420.76)	605,080.91	\$ 20,704.17
	Apr-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	669,860.20	(96,548.60)	583,901.37	\$ 20,471.32
	May-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	655,808.50	(103,676.44)	562,721.83	\$ 20,238.46
	Jun-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	641,756.80	(110,804.28)	541,542.30	\$ 20,005.61
	Jul-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	627,705.10	(117,932.12)	520,362.76	\$ 19,772.75
	Aug-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	613,653.40	(125,059.95)	499,183.22	\$ 19,539.90
	Sep-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	599,601.70	(132,187.79)	478,003.68	\$ 19,307.04
	Oct-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	585,550.00	(139,315.63)	456,824.14	\$ 19,074.18
	Nov-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	571,498.30	(146,443.47)	435,644.60	\$ 18,841.33
	Dec-12	-	-	843,102.08	-	-	-	14,051.70	-	31,229.91	-	-	-	-	-	557,446.59	(153,571.31)	414,465.06	\$ 18,608.47
2013	Jan-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	543,394.89	(152,058.28)	397,605.95	\$ 18,423.12
	Feb-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	529,343.19	(150,545.26)	385,067.27	\$ 18,285.26
	Mar-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	515,291.49	(149,032.23)	372,528.60	\$ 18,147.41
	Apr-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	501,239.79	(147,519.20)	359,989.92	\$ 18,009.56
	May-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	487,188.09	(146,006.18)	347,451.25	\$ 17,871.70
	Jun-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	473,136.39	(144,493.15)	334,912.57	\$ 17,733.85
	Jul-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	459,084.69	(142,980.13)	322,373.90	\$ 17,595.99
	Aug-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	445,032.98	(141,467.10)	309,835.22	\$ 17,458.14
	Sep-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	430,981.28	(139,954.08)	297,296.55	\$ 17,320.28
	Oct-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	416,929.58	(138,441.05)	284,757.87	\$ 17,182.43
	Nov-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	402,877.88	(136,928.02)	272,219.19	\$ 17,044.57
	Dec-13	-	-	843,102.08	-	-	-	14,051.70	-	10,405.28	-	-	-	-	-	388,826.18	(135,415.00)	259,680.52	\$ 16,906.72
2014	Jan-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	374,774.48	(131,744.67)	248,220.49	\$ 16,780.72
	Feb-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	360,722.78	(128,074.34)	237,839.12	\$ 16,666.59
	Mar-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	346,671.07	(124,404.02)	227,457.74	\$ 16,552.45
	Apr-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	332,619.37	(120,733.69)	217,076.37	\$ 16,438.31
	May-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	318,567.67	(117,063.36)	206,694.99	\$ 16,324.18
	Jun-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	304,515.97	(113,393.04)	195,313.62	\$ 16,210.04
	Jul-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	290,464.27	(109,722.71)	185,932.25	\$ 16,095.91
	Aug-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	276,412.57	(106,052.38)	175,550.87	\$ 15,981.77
	Sep-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	262,360.87	(102,382.06)	165,169.50	\$ 15,867.63
	Oct-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	248,309.17	(98,711.73)	154,788.12	\$ 15,753.50
	Nov-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	234,257.46	(95,041.40)	144,406.75	\$ 15,639.36
	Dec-14	-	-	843,102.08	-	-	-	14,051.70	-	5,206.16	-	-	-	-	-	220,205.76	(91,371.08)	134,025.37	\$ 15,525.22

WEST PENN POWER CO.
BI + DW - Software
In-Service Feb 2011

Book Life	5
Book Life Months	60

Years (3, 5, 7, 10, 15 or 20) >>

Tax Life	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
3	33.33%	44.45%	14.81%	7.41%	0.00%		0.00%	0.00%	0.00%	0.00%

Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$	
2009	Jan-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Feb-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Mar-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Apr-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	May-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jun-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Jul-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Aug-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Sep-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Oct-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Nov-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
	Dec-09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	
2010	Jan-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	562.46	-	-	-	\$ -	
	Feb-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	1,687.39	-	-	-	\$ -	
	Mar-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	2,812.32	-	-	-	\$ -	
	Apr-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	3,937.24	-	-	-	\$ -	
	May-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	5,062.17	-	-	-	\$ -	
	Jun-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	6,187.10	-	-	-	\$ -	
	Jul-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	7,463.11	-	-	-	\$ -	
	Aug-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	8,588.03	-	-	-	\$ -	
	Sep-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	9,712.96	-	-	-	\$ -	
	Oct-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	10,837.89	-	-	-	\$ -	
	Nov-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	11,962.81	-	-	-	\$ -	
	Dec-10	150,766.67	-	-	-	-	-	-	-	-	-	-	-	-	13,087.74	-	-	-	\$ -	
2011	Jan-11	379,600.00	-	-	-	-	-	-	-	-	-	-	-	-	15,526.39	-	-	-	\$ -	
	Feb-11	379,600.00	-	2,665,827.62	-	-	-	-	-	80,774.58	-	-	-	-	-	-	2,665,827.62	(33,516.20)	1,316,155.71	\$ 14,470.27
	Mar-11	379,600.00	-	3,045,427.62	-	-	-	44,430.46	-	93,426.64	-	-	-	-	-	-	3,000,997.16	(53,846.43)	2,789,731.07	\$ 75,101.73
	Apr-11	379,600.00	-	3,425,027.62	-	-	-	50,757.13	-	107,484.50	-	-	-	-	-	-	3,329,840.03	(77,384.60)	3,099,803.08	\$ 84,837.44
	May-11	379,600.00	-	3,804,627.62	-	-	-	57,083.79	-	123,299.58	-	-	-	-	-	-	3,652,356.24	(104,859.85)	3,399,975.91	\$ 94,464.31
	Jun-11	379,600.00	-	4,184,227.62	-	-	-	63,410.46	-	141,373.97	-	-	-	-	-	-	3,968,545.78	(137,209.64)	3,689,416.26	\$ 103,973.18
	Jul-11	379,600.00	-	4,563,827.62	-	-	-	69,737.13	-	162,460.75	-	-	-	-	-	-	4,278,408.65	(175,683.91)	3,967,030.44	\$ 113,352.04
	Aug-11	379,600.00	-	4,943,427.62	-	-	-	76,063.79	-	187,764.88	-	-	-	-	-	-	4,581,944.85	(222,032.60)	4,231,318.49	\$ 122,584.38
	Sep-11	379,600.00	-	5,323,027.62	-	-	-	82,390.46	-	219,395.05	-	-	-	-	-	-	4,879,154.39	(278,880.60)	4,480,093.02	\$ 131,646.16
	Oct-11	379,600.00	-	5,702,627.62	-	-	-	88,717.13	-	261,558.61	-	-	-	-	-	-	5,170,037.27	(350,602.74)	4,709,854.16	\$ 140,498.90
	Nov-11	379,600.00	-	6,082,227.62	-	-	-	95,043.79	-	324,828.95	-	-	-	-	-	-	5,454,953.47	(445,948.64)	4,914,039.68	\$ 149,070.45
	Dec-11	379,600.00	-	6,461,827.62	-	-	-	101,370.46	-	451,349.63	-	-	-	-	-	-	5,732,823.01	(591,167.25)	5,075,150.30	\$ 157,168.43
2012	Jan-12	5,300.00	-	6,461,827.62	5,300.00	-	-	107,697.13	-	239,356.86	147.21	-	-	-	-	-	5,630,425.89	(645,858.56)	5,063,111.54	\$ 163,362.73
	Feb-12	5,300.00	-	6,461,827.62	10,600.00	-	-	108,845.46	-	239,356.86	307.80	-	-	-	-	-	5,527,940.43	(700,579.86)	4,905,963.95	\$ 161,723.33
	Mar-12	5,300.00	-	6,461,827.62	15,900.00	-	-	107,873.79	-	239,356.86	484.45	-	-	-	-	-	5,425,366.63	(755,337.80)	4,748,694.70	\$ 160,082.59
	Apr-12	5,300.00	-	6,461,827.62	21,200.00	-	-	107,962.13	-	239,356.86	680.72	-	-	-	-	-	5,322,704.51	(801,140.53)	4,591,296.40	\$ 158,440.44
	May-12	5,300.00	-	6,461,827.62	26,500.00	-	-	108,050.46	-	239,356.86	901.53	-	-	-	-	-	5,219,954.05	(854,998.23)	4,433,759.89	\$ 156,796.76
	Jun-12	5,300.00	-	6,461,827.62	31,800.00	-	-	108,138.79	-	239,356.86	1,153.89	-	-	-	-	-	5,117,115.25	(919,923.99)	4,276,073.54	\$ 155,151.43
	Jul-12	5,300.00	-	6,461,827.62	37,100.00	-	-	108,227.13	-	239,356.86	1,448.31	-	-	-	-	-	5,014,188.13	(974,935.26)	4,118,222.06	\$ 153,504.29
	Aug-12	5,300.00	-	6,461,827.62	42,400.00	-	-	108,315.46	-	239,356.86	1,801.60	-	-	-	-	-	4,911,172.66	(1,030,056.48)	3,960,184.52	\$ 151,855.11
	Sep-12	5,300.00	-	6,461,827.62	47,700.00	-	-	108,403.79	-	239,356.86	2,243.23	-	-	-	-	-	4,808,068.87	(1,085,324.28)	3,801,930.39	\$ 150,203.54
	Oct-12	5,300.00	-	6,461,827.62	53,000.00	-	-	108,492.13	-	239,356.86	2,832.06	-	-	-	-	-	4,704,876.74	(1,140,799.76)	3,643,410.79	\$ 148,549.05
	Nov-12	5,300.00	-	6,461,827.62	58,300.00	-	-	108,580.46	-	239,356.86	3,715.30	-	-	-	-	-	4,601,596.28	(1,196,605.08)	3,484,534.10	\$ 146,890.64
	Dec-12	5,300.00	-	6,461,827.62	63,600.00	-	-	108,668.79	-	239,356.86	5,481.79	-	-	-	-	-	4,498,227.49	(1,253,106.72)	3,325,055.99	\$ 145,225.61
2013	Jan-13	5,300.00	-	6,461,827.62	63,600.00	5,300.00	-	108,757.13	-	79,749.72	2,355.85	147.21	-	-	-	-	4,394,770.36	(1,242,109.14)	3,198,891.00	\$ 143,926.85
	Feb-13	5,300.00	-	6,461,827.62	63,600.00	10,600.00	-	108,845.46	-	79,749.72	2,355.85	307.80	-	-	-	-	4,291,224.90	(1,231,141.54)	3,106,372.30	\$ 142,998.00
	Mar-13	5,300.00	-	6,461,827.62	63,600.00	15,900.00	-	108,933.79	-	79,749.72	2,355.85	484.45	-	-	-	-	4,187,591.11	(1,220,031.58)	3,013,731.95	\$ 142,067.81
	Apr-13	5,300.00	-	6,461,827.62	63,600.00	21,200.00	-	109,022.13	-	79,749.72	2,355.85	680.72	-	-	-	-	4,083,868.98	(1,209,324.42)	2,920,962.54	\$ 141,136.20
	May-13	5,300.00	-	6,461,827.62	63,600.00	26,500.00	-	109,110.46	-	79,749.72	2,355.85	901.53	-	-	-	-	3,980,058.52	(1,198,493.22)	2,828,054.93	\$ 140,203.08
	Jun-13	5,300.00	-	6,461,827.62	63,600.00	31,800.00	-	109,198.79	-	79,749.72	2,355.85	1,153.89	-	-	-	-	3,876,159.73	(1,187,730.09)	2,734,997.47	\$ 139,268.31
	Jul-13	5,300.00	-	6,461,827.62	63,600.00	37,100.00	-	109,287.13	-	79,749.72	2,355.85	1,448.31	-	-	-	-	3,772,172.60	(1,177,052.46)	2,641,774.89	\$ 138,331.72
	Aug-13	5,300.00	-	6,461,827.62	63,600.00	42,400.00	-	109,375.46	-	79,749.72	2,355.85	1,801.60	-	-	-	-	3,668,097.14	(1,166,484.78)	2,548,366.25	\$ 137,393.08
	Sep-13	5,300.00	-	6,461,827.62	63,600.00	47,700.00	-	109,463.79	-	79,749.72	2,355.85	2,243.23	-	-	-	-	3,563,933.35	(1,156,063.69)	2,454,741.01	\$ 136,452.07
	Oct-13	5,300.00	-	6,461,827.62	63,600.00	53,000.00	-	109,552.13	-	79,749.72	2,355.85	2,832.06	-	-	-	-	3,459,681.22	(1,145,850.27)	2,360,850.30	\$ 135,508.14
	Nov-13	5,300.00	-	6,461,827.62	63,600.00	58,300.00	-	109,640.46	-	79,749.72	2,355.85	3,715.30	-	-	-	-	3,355,340.76	(1,135,966.69)	2,266,602.51	\$ 134,560.28
	Dec-13	5,300.00	-	6,461,827.62	63,600.00	63,600.00	-	109,728.79	-	79,749.72	2,355.85	5,481.79	-	-	-	-	3,250,911.97	(1,126,779.44)	2,171,753.30	\$ 133,605.80
2014	Jan-14	5,300.00	-	6,461,827.62	63,600.00	5,300.00	5,300.00	109,817.13	-	39,901.79	784.93	2,355.85	147.21	-	-	-	3,146,394.84	(1,099,133.42)	2,085,696.98	\$ 132,748.00
	Feb-14	5,300.00	-	6,461,827.62	63,600.00	10,600.00	63,600.00	109,905.46	-	39,901.79	784.93	2,355.85	307.80	-	-	-	3,041,789.38	(1,071,517.38)	2,008,766.71	\$ 131,990.54
	Mar-14	5,300.00	-	6,461,827.62	63,600.00	15,900.00	63,600.00	109,993.79	-	39,901.79	784.93	2,355.85	484.45	-	-	-	2,937,095.59	(1,043,937.98)	1,931,714.80	\$ 131,231.74
	Apr-14	5,300.00	-	6,461,827.62	63,600.00	21,200.00	63,600.00	110,082.13	-											

WEST PENN POWER CO.
Travel Expenses
In-Service at Capital Addition

Book Life		5		Years (3, 5, 7, 10, 15 or 20) >>										10		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
Book Life Months		60												10.00%		18.00%		14.40%		11.52%		9.22%		7.37%		6.55%		6.55%		6.50%		6.55%			
Year	Date	Monthly Capital Additions \$	2010 Capital Month Ending \$	2011 Capital Month Ending \$	2012 Capital Month Ending \$	2013 Capital Month Ending \$	2014 Capital Month Ending \$	Book Depreciation \$	2010 Tax Depreciation \$	2011 Tax Depreciation \$	2012 Tax Depreciation \$	2013 Tax Depreciation \$	2014 Tax Depreciation \$	Depreciation Reserve \$	AFUDC \$	Net Plant \$	ADIT \$	Rate Base \$	Revenue Requirement \$																
2009	Jan-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																
	Feb-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Mar-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Apr-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	May-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Jun-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Jul-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Aug-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Sep-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Nov-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
	Dec-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -																
2010	Jan-10	652,488.48	652,488.48	-	-	-	-	-	5,437.40	-	-	-	-	-	-	652,488.48	(2,256.17)	325,116.16	\$ 3,574.44																
	Feb-10	652,488.48	1,304,976.96	-	-	-	-	10,874.81	11,369.12	-	-	-	-	10,874.81	-	1,294,102.15	(2,461.28)	970,936.60	\$ 21,549.62																
	Mar-10	652,488.48	1,957,465.44	-	-	-	-	21,749.62	17,894.00	-	-	-	-	32,624.42	-	1,924,841.02	(861.45)	1,607,810.23	\$ 39,426.44																
	Apr-10	652,488.48	2,609,953.92	-	-	-	-	32,624.42	25,143.87	-	-	-	-	65,248.85	-	2,544,705.08	-	2,242.50	\$ 57,201.65																
	May-10	652,488.48	3,262,442.41	-	-	-	-	43,499.23	33,299.98	-	-	-	-	98,153.694	-	3,153,694.33	-	6,474.52	\$ 74,872.24																
	Jun-10	652,488.48	3,914,930.89	-	-	-	-	54,374.04	42,621.24	-	-	-	-	163,122.12	-	3,751,808.77	-	11,351.17	\$ 92,432.78																
	Jul-10	652,488.48	4,567,419.37	-	-	-	-	65,248.85	53,496.05	-	-	-	-	228,370.97	-	4,339,048.40	-	16,227.81	\$ 109,877.30																
	Aug-10	652,488.48	5,219,907.85	-	-	-	-	76,123.66	66,545.82	-	-	-	-	304,494.62	-	4,915,413.22	-	20,201.99	\$ 146,445.72																
	Sep-10	652,488.48	5,872,396.33	-	-	-	-	86,996.46	82,858.03	-	-	-	-	580,903.24	-	5,691,484.28	-	21,920.00	\$ 144,380.37																
	Oct-10	652,488.48	6,524,884.81	-	-	-	-	97,873.27	104,507.65	-	-	-	-	649,366.36	-	6,335,518.45	-	19,125.67	\$ 161,408.68																
	Nov-10	652,488.48	7,177,373.29	-	-	-	-	108,748.08	137,232.07	-	-	-	-	759,114.44	-	7,006.67	-	6,320,604.82	\$ 178,239.01																
	Dec-10	652,488.48	7,829,861.77	-	-	-	-	119,622.89	202,480.92	-	-	-	-	717,737.33	-																				

THE POTOMAC EDISON COMPANY
CUSTOMERS
12 MONTHS ENDED 12/31/2008

[illegible]

RATE SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS
WEST VIRGINIA													
AL	49	49	49	48	49	49	49	49	49	49	49	49	587
CSH	246	246	246	244	245	245	243	242	242	242	241	241	2,923
E	3,164	3,178	3,172	3,196	3,216	3,240	3,249	3,274	3,290	3,320	3,330	3,330	38,959
EM	0	0	0	0	0	0	0	0	0	0	0	0	0
EMU	171	176	184	186	183	186	185	187	188	188	188	189	2,211
G	13,537	13,537	13,519	13,543	13,554	13,567	13,597	13,609	13,617	13,641	13,677	13,696	163,094
MSL	129	129	129	129	129	129	129	129	129	129	129	129	1,548
MU	2	2	2	2	2	2	2	2	2	2	2	4	26
OL	251	249	248	248	248	245	246	246	245	244	244	244	2,958
PH	65	65	65	65	64	65	64	64	64	64	64	63	772
PP	8	8	8	8	8	8	10	8	8	8	8	8	98
R	112,212	112,184	112,200	112,227	112,365	112,491	112,587	112,788	112,440	112,686	113,051	113,028	1,350,259
SL	18	18	18	18	18	18	18	18	18	18	18	18	216

THE MONONGAHELA POWER COMPANY
CUSTOMERS
12 MONTHS ENDED 12/31/2008

RATE SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS
WEST VIRGINIA													
A	326,953	326,962	327,084	326,730	326,544	326,671	326,623	326,957	327,265	327,309	327,858	328,332	3,925,288
AGS	2	2	4	2	2	3	2	2	2	2	2	2	27
B	45,398	45,400	45,423	45,518	45,595	45,584	45,664	45,707	45,741	45,784	45,814	45,939	547,567
C	6,359	6,384	6,414	6,455	6,491	6,530	6,550	6,596	6,622	6,647	6,701	6,682	78,431
CSH	22	22	22	22	22	22	22	22	21	21	21	21	260
D	147	148	147	144	141	144	141	141	142	142	145	143	1,725
EM	3	3	3	3	3	3	3	3	3	3	3	3	36
EMU	289	293	293	299	301	301	302	300	303	300	303	301	3,585
K	36	36	36	36	37	37	37	37	37	37	37	37	440
LIT	98	98	98	98	98	98	97	97	96	96	95	95	1,164
MU	4	4	4	4	4	4	4	4	4	4	4	4	48
MV	114	114	114	113	113	113	113	113	113	113	113	113	1,359
P	14	14	14	14	14	13	13	13	13	13	13	13	161
SL-P	1,193	1,188	1,187	1,182	1,181	1,181	1,177	1,178	1,175	1,176	1,174	1,173	14,165
SV	4	4	4	4	4	4	4	4	4	4	4	4	48

West Penn Power	8,560,814	48%
Potomac Edison-MD	2,978,231	17%
Potomac Edison-WV	1,563,651	9%
Monongahela Power	<u>4,574,304</u>	<u>26%</u>
Total	17,677,000	100%

WEST PENN POWER COMPANY

Supplement No. __ to
Electric-Pa. P. U. C. No. 39
Original Page No. __**SMART METER TECHNOLOGY ("SMT") SURCHARGE**

(C)

In addition to the charges provided in this Tariff and in accordance with 66 Pa. C.S.A. §2807, there shall be a surcharge as set forth below to recover the costs associated with a smart meter technology procurement and installation plan as approved by the Commission. This surcharge is applied to designated Rate Schedules to recover costs allocated to that Rate Schedule. This surcharge will be applied each Month until changed by the Commission. The resulting surcharge is in addition to any minimum charge set out in the Rate Schedule and is added to the Customer's bill before any tax surcharge is levied against the Customer's total bill. Amounts billed hereunder shall be subject to late payment charges.

CALCULATION OF SURCHARGE

The SMT Surcharge is a fixed charge per Month and is calculated by dividing forecasted SMT costs allocated to each Rate Schedule by the forecasted number of Customers for the same Rate Schedule. The calculation includes an Annual Reconciliation Factor adjustment, and an adjustment for gross receipts tax and the Commission assessment factor. The Annual Reconciliation Factor adjustment will be filed by January 30 to become effective the forthcoming June 1. Upon determination that the surcharge, if left unchanged, would result in a material over/under-collection, the Company may file a proposed interim revision of the surcharge for Commission approval.

Bills shall include an amount equal to the surcharge rate per Month as follows:

SMT SURCHARGE

Schedule	Rate per Month
10	\$5.86
20	\$5.94
22	\$5.94
23	\$5.94
24	\$5.94
30	\$5.94
40	\$5.94
41	\$5.94
44	\$5.94
46	\$5.94
86	\$5.94
Lighting*	\$0.27

*Schedules 51, 52, 53, 54, 55, 56, 57, 58, 59 and 71.

(C) Indicates Change

Issued

Effective

WEST PENN POWER COMPANY

Supplement No. __ to
Electric-Pa. P. U. C. No. 39
Original Page No. __

SMART METER TECHNOLOGY ("SMT") SURCHARGE (Concluded)

(C)

ELIGIBLE COSTS

SMT costs eligible for recovery through the SMT Surcharge are approved by the Commission and include:

Capital Costs – Capital Costs are estimated costs for items including, but not limited to, in home technologies, smart meters, communication network, back office systems, customer interfaces, and systems management and security.

Operating & Maintenance Costs – Operating & Maintenance Costs are estimated costs for items including, but not limited to, Company labor, software maintenance and license fees, leasing costs, depreciation of existing meters, and savings associated with deployment of the smart meter technology procurement and installation plan.

Annual Reconciliation Factor -- The Annual Reconciliation Factor corrects for over/under-collection of the SMT Surcharge and may reflect items such as an update of forecasted billing determinants and re-allocation of SMT costs to the designated Rate Schedules. The Company will submit to the Commission by January 30 of each year: (1) actual SMT Surcharge revenues billed through December of the prior year, as adjusted for removal of gross receipts tax and the Commission assessment fee; (2) actual SMT costs incurred through December of the prior year, which will include actual Operating & Maintenance Costs and a corrected capital revenue requirement to reflect actual Capital Costs, the most recently available pre-tax cost of capital from the prior year, and any changes/updates to depreciation and accumulated deferred income taxes; and (3) the difference between the two amounts to be included in the upcoming SMT Surcharge, as adjusted for gross receipts tax and the Commission assessment fee. The exception to the Annual Reconciliation Factor will occur for the filing submitted by January 30, 2011 to include 2009 costs along with 2010 costs, with Capital Cost recovery reflective of the pre-tax cost of capital of the corresponding year.

(C) Indicates Change

Issued

Effective

WEST PENN POWER COMPANY

Supplement No. ___ to
Electric-Pa. P. U. C. No. 37
Original Page No. ___

(C)

SMART METER TECHNOLOGY ("SMT") SURCHARGE

In addition to the charges provided in this Tariff and in accordance with 66 Pa. C.S.A. §2807, there shall be a surcharge as set forth below to recover the costs associated with a smart meter technology procurement and installation plan as approved by the Commission. This surcharge is applied to this Tariff to recover costs allocated to this Tariff. This surcharge will be applied each Month until changed by the Commission. The resulting surcharge is in addition to any minimum charge set out in the Tariff and is added to the Customer's bill before any tax surcharge is levied against the Customer's total bill. Amounts billed hereunder shall be subject to late payment charges.

CALCULATION OF SURCHARGE

The SMT Surcharge is a fixed charge per Month and is calculated by dividing forecasted SMT costs allocated to this Tariff by the forecasted number of Customers. The calculation includes an Annual Reconciliation Factor adjustment, and an adjustment for gross receipts tax and the Commission assessment factor. The Annual Reconciliation Factor adjustment will be filed by January 30 to become effective the forthcoming June 1. Upon determination that the surcharge, if left unchanged, would result in a material over/under-collection, the Company may file a proposed interim revision of the surcharge for Commission approval.

Bills shall include an amount equal to the surcharge rate of \$5.94 per Month.

ELIGIBLE COSTS

SMT costs eligible for recovery through the SMT Surcharge are approved by the Commission and include:

Capital Costs – Capital Costs are estimated costs for items including, but not limited to, in home technologies, smart meters, communication network, back office systems, customer interfaces, and systems management and security.

Operating & Maintenance Costs – Operating & Maintenance Costs are estimated costs for items including, but not limited to, Company labor, software maintenance and license fees, leasing costs, depreciation of existing meters, and savings associated with deployment of the smart meter technology procurement and installation plan.

Annual Reconciliation Factor -- The Annual Reconciliation Factor corrects for over/under-collection of the SMT Surcharge and may reflect items such as an update of forecasted billing determinants and re-allocation of SMT costs to this Tariff. The Company will submit to the Commission by January 30 of each year: (1) actual SMT Surcharge revenues billed through December of the prior year, as adjusted for removal of gross receipts tax and the Commission assessment fee; (2) actual SMT costs incurred through December of the prior year, which will include actual Operating & Maintenance Costs and a corrected capital revenue requirement to reflect actual Capital Costs, the most recently available pre-tax cost of capital from the prior year, and any changes/updates to depreciation and accumulated deferred income taxes; and (3) the difference between the two amounts to be included in the upcoming SMT Surcharge, as adjusted for gross receipts tax and the Commission assessment fee. The exception to the Annual Reconciliation Factor will occur for the filing submitted by January 30, 2011 to include 2009 costs along with 2010 costs, with Capital Cost recovery reflective of the pre-tax cost of capital of the corresponding year.

(C) Indicates Change

Issued

Effective