BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DUQUESNE LIGHT COMPANY
FINAL SMART METER TECHNOLOGY
PROCUREMENT AND INSTALLATION PLAN

Docket Nos. P-2012-_____
M-2009-2123948

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I. EXECUTIVE SUMMARY

Duquesne Light Company ("Duquesne Light" or the "Company") filed its Initial Smart Meter Procurement and Installation Plan ("Initial Smart Meter Plan") with the Pennsylvania Public Utility Commission ("Commission") on August 14, 2009. As part of the Initial filing, Duquesne Light received Commission approval to upgrade its customer information system and install a meter data management system. This project is known as the FOCUS Project. The new and replacement systems under the FOCUS Project are necessary in order for Duquesne Light to provide smart meter technology to customers. In addition, Duquesne Light received Commission approval to further develop a Final Smart Meter Procurement and Installation Plan to be filed with the Commission by December 31, 2011 ("Final Smart Meter Plan" or "Plan"). This date was subsequently extended to June 30, 2012 upon the request of the Company.

This filing constitutes Duquesne Light's Final Smart Meter Plan. Below, Duquesne Light has:

(1) Explained the steps that it has taken to develop this Plan during the Grace Period;

(2) Provided an overview of the FOCUS Project;

(3) Explained the Company's Advanced Metering Infrastructure ("AMI") Project which includes smart meters, the Local Area Network ("LAN"), the Wide Area Network ("WAN") and the Head End Collection Engine;

(4) Explained its plans for IT systems;

(5) Described the AMI system capabilities;

(6) Explained its proposed deployment schedule;

(7) Summarized the Smart Meter Program costs and cost recovery mechanism;

(8) Explained the Company's Customer Education and Acceptance Strategy; and

(9) Explained the Company's Risk Mitigation Strategies.

As explained herein, Duquesne Light's Final Smart Meter Plan will meet all of the requirements of Act 129, the additional requirements set forth in the *Implementation Order* and provides smart meter technology to customers in a cost-effective manner. *Smart Meter Procurement and Installation*, Docket No. M-2009-2092655, *Implementation Order* entered June 24, 2009 ("*Implementation Order*").

Under Duquesne Light's Final Smart Meter Plan, Duquesne Light proposes to install Itron Smart Meters for all customers. The Itron Smart Meters will be connected by a Local Area Network ("LAN") that collects data from the meters and transmits it through a Wide Area Network ("WAN") to a Head End Data Collection Engine. These four components will constitute Duquesne Light's Advanced Metering Infrastructure ("AMI") system. As explained herein, Duquesne Light's AMI system will provide a technology architecture that enables the six minimum capabilities of Act 129 and the nine additional capabilities identified by the Commission in its Smart Meter Implementation Order.

Duquesne Light proposes to deploy Smart Meters to customers over a seven-year period. This includes a two-year ramp up period to allow time for the Company to test its AMI system, followed by a deployment schedule of 9,000 meters per month, with full deployment of smart meters across the Company's service territory by 2020, three years ahead of the statutory time period under Act 129. In addition, Duquesne Light proposes to phase-in meter functionalities from 2013-2017. The phase-in approach will allow the market for many of the advanced smart meter capabilities to become more mature over time.

Duquesne Light estimates that the total cost of its Smart Meter Program will be approximately $238 million. This includes costs for both the FOCUS and AMI projects within the Smart Meter Program. In its Initial Smart Meter Filing, Duquesne Light estimated that its Smart Meter Program could cost between $152 million and $262 million to implement. Duquesne Light's current estimate of its Smart Meter Program cost is within the range originally identified by the Company and is $24 million lower than the high end of its original estimate.

In the Company's Initial Smart Meter filing, the Commission approved, with certain modifications, Duquesne Light's request to recover its smart meter costs through a fully

recoverable Smart Meter Charge ("SMC"). In this proceeding, Duquesne Light is proposing to continue to recover its smart meter costs through its Commission-approved SMC.

In addition, Duquesne Light is proposing a detailed, comprehensive Customer Education and Acceptance ("CEA") strategy to educate customers, stakeholder groups and employees about the Company's Smart Meter Program and its benefits. Duquesne Light is basing its CEA strategy on successful programs used by other utilities across the country. Duquesne Light believes that its CEA strategy is a vital component of its Final Smart Meter Plan.

As with all large, multi-year, multi-million dollar technology projects, the Company recognizes the multitude of risks inherent in a Smart Meter Program of this magnitude. Therefore, Duquesne Light has developed a broad set of risk mitigation strategies to minimize any potential negative impact of these risks on the program.

II. BACKGROUND

Duquesne Light is a public utility as that term is defined under Section 102 of the Public Utility Code, 66 Pa. C.S. § 102, certificated by the Commission to provide electric service in the City of Pittsburgh and in Allegheny and Beaver Counties in Pennsylvania.

On October 15, 2008, Governor Rendell signed into law Act 129 of 2008, which took effect on November 14, 2008 and, *inter alia*, mandated a smart meter procurement and installation program. *See* 66 Pa. C.S. § 2807(f), et seq. ("Act 129"). Act 129 provides, among other things, that each Pennsylvania EDC with at least 100,000 customers is required to provide smart meter technology to customers in accordance with a schedule not to exceed 15 years. Act 129 defines smart meter technology as follows:

> (g) Definition. – As used in this section, the term "smart meter technology" means technology, including metering technology and network communications 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. The technology shall provide customers with direct access to and use of price and consumption information. The technology shall also:
>
> (1) Directly provide customers with information on their hourly consumption.
>
> (2) Enable time-of-use rates and real-time price programs.
>
> (3) Effectively support the automatic control of the customer's electricity consumption by one or more of the following as selected by the customer:
>
> (i) the customer;
>
> (ii) the customer's utility; or
>
> (iii) a third party engaged by the customer or the customer's utility.

66 Pa. C.S. § 2807(g).

The Commission adopted its *Smart Meter Implementation Order* on June 18, 2009, outlining its guidance for an EDC's Smart Meter Procurement and Installation program pursuant to Act 129. The *Implementation Order* established the standards that each plan must meet and provided guidance on the procedures to be followed for submittal, review and approval of all aspects of each smart meter plan. Additionally, upon the recognition that it will take time to fully develop and install the entire smart meter network, the Commission granted a grace period of 30 months following plan approval ("Grace Period") for EDCs to assess needs, select technology, secure vendors, train personnel, install and test support equipment and establish a detailed meter deployment schedule.

In the *Implementation Order*, the Commission identified six minimum functionalities that EDC smart meter systems must provide under Act 129. These six minimum functionalities are:

1. Bidirectional data communications.
2. Reading usage data on at least an hourly basis once per day.
3. Providing customers with direct access to and use of price and consumption information.
4. Providing customers with information on their hourly consumption.
5. Enabling time-of-use ("TOU") rates and real-time price options.
6. Supporting the automatic control of the customers' electric consumption.

Implementation Order, pp. 29-30.

In addition, the Commission stated that each Plan filing should include an analysis of the individual incremental costs for deploying and operating the following nine additional smart meter technology capabilities:

1. Ability to remotely disconnect and reconnect.
2. 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.
3. On-board meter storage of meter data that complies with nationally recognized non-proprietary standards such as ANSI C12.19 and C12.22 tables.

4. Open standards and protocols that comply with nationally recognized non-proprietary standards, such as IEEE 802.15.4.

5. Ability to upgrade these minimum capabilities as technology advances and becomes economically feasible.

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

7. Ability to remotely reprogram the meter.

8. Ability to communicate outages and restorations.

9. Ability to support net metering of customer-generators.

Implementation Order, p. 30.

In the *Implementation Order*, the Commission further noted that it may waive the additional requirements for an EDC if the requirements are not cost-effective.

On August 14, 2009, Duquesne Light filed its Initial Smart Meter Plan with the Commission. In its Initial Smart Meter Plan, the Company, among other things: (1) provided a description of its current metering system, (2) explained how it would address customer requests for smart meters and installation of smart meters in new construction during the grace period, (3) explained its approach for developing a Final Smart Meter Plan within the 30 month grade period, (4) proposed a milestone and status reporting schedule during the grace period, (5) provided an estimated budget for grace period budget, and (6) proposed a cost recovery mechanism for recovering smart meter costs.

On May 11, 2010, the Commission approved Duquesne Light's Initial Smart Meter Plan, with certain modifications. *Petition of Duquesne Light Company for Approval of Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2009-2123948. In summary, the Commission approved Duquesne Light's proposal to recover its smart meter costs through a reconcilable cost recovery mechanism, and set forth the details of how this mechanism would work. In addition, the Commission approved the Company's proposed smart meter implementation schedule, which the Company explained was subject to change. The

Commission also approved the Company's proposed milestone filing dates, and the Company's proposal to file a Final Smart Meter Plan by December 31, 2011.

On July 1, 2010, the Company filed a Cost Benefit Analysis for the additional smart meter capabilities identified in the *Implementation Order*. Therein, the Company provided a detailed evaluation of the costs to implement each of the nine additional smart meter capabilities identified in the *Implementation Order*, the potential benefits of implementing these additional capabilities and the Company's recommendations regarding whether it should be required to implement these additional capabilities. In the July 1, 2010 filing, Duquesne Light explained that its cost-benefit analysis was a preliminary analysis based upon information that was available at the time. Duquesne Light requested that the Commission defer ruling on whether Duquesne Light should implement the additional smart meter capabilities at that time. Duquesne Light further explained that it would have a better estimate of its smart meter costs at a later time and that the Company would provide a refined project budget and cost estimates in its Final Smart Meter Plan filing.

On December 29, 2010, Duquesne Light filed its Application for Approval of Assessment of Needs, Technology Solutions and Vendor Selection ("Assessment Application"). In summary, in the Assessment Application, Duquesne Light proposed to replace its existing Automated Meter Reading ("AMR") system with a new AMI system that would provide two-way communication between the meter and the Company and would comply with all requirements of Act 129 and the Commission's *Implementation Order*. In the Assessment Application, the Company requested that the Commission issue an order approving: (1) the procedure used to evaluate and select a primary AMI vendor, (2) the Company's Assessment of Needs, (3) the Technology Section of RF mesh and associated findings, (4) the selection of the Company's Primary AMI vendor, (5) updated cost projections for the entire Smart Meter Project and Deployment, and (6) any other approvals that the Commission deemed to be necessary.

On January 31, 2011, the Company filed a Supplement to its Assessment Application. In the Supplement, Duquesne Light identified Itron, Inc. ("Itron") as its recommended primary contractor to design, construct, implement and oversee the Company's Smart Meter program.

The Company explained that it had issued bids for smart meter contractors and received four bids. Itron scored the highest on a technical evaluation of the bids and provided the lowest cost solution of the four bidders. In the Supplement, Duquesne Light requested Commission approval of the initial Assessment Application and Supplement. No party objected to the Company's Assessment Application or its Supplement. The Commission did not issue an Order with respect to the Assessment Application or the Supplement thereto.

On March 31, 2011, the Company filed its Establishment of Network Design for the Duquesne Light Smart Meter Program ("Network Design") with the Commission. Therein, the Company explained that it had conducted a study to review the Company's existing communication infrastructure, review network and communication infrastructure necessary for the AMI and also review available private and public written communications solutions. Specifically, the Company evaluated:

- Operating Frequencies Available in its Service Territory;
- Radio Technologies/Vendors;
- Solution Cost (up front and ongoing)
- Expected capacity, bandwidth, latency and reliability of each option;
- Security provisions (public versus private writers communications); and
- Advantages and disadvantages of available solutions.

The initial Network Design conclusions supported the use of private wireless options as the primary communication methodologies, with public wireless as a backup communication. The Company also noted that further analysis was necessary to finalize the Network Design Study conclusions and that the proposed design was subject to change based on further findings or in the event that other viable technologies would become available.

On June 30, 2011, the Company made an additional milestone filing related to the design, testing and certification of Electronic Data Interchange ("EDI") transactions. Therein, Duquesne Light explained that it would be able to provide customers with direct access to non-validated real time data directly from the smart meter through a residential customer's Home Area Network (HAN).

Validated hourly interval data would be provided through a secure web portal within 24 hours from the completion of the data upload for the entire population of Duquesne Light's smart meters to the MDM systems. Additionally, non-validated, real time data would be provided to third parties through a secure, authenticated connection at the expense of the third party. Validated hourly interval data would be provided to third parties through a standard interface consistent with the North American Energy Standards Board within 24 hours of the completion of the data upload for the entire population of Duquesne Light's smart meters to the MDM systems. Finally, the Company would provide EDI access to smart meter data to authorized commercial operators, such as conservation service providers and electric generation suppliers ("EGS") using the 867 historical interval usage transaction.

On October 6, 2011, the Company filed an Installation, Testing and Rollout of Support Equipment and Software Update filing. The purpose of the October 6 update filing was to outline the equipment testing that the Company planned to conduct prior to deploying AMI meters across its service territory.

On November 2, 2011, the Company filed a status update related to its Establishment of Plans for Installation of Meters and Outside Communications and Training. Therein, the Company provided an overview of its smart meter deployment plan, a high level Smart Meter Program Schedule and Milestones, and an overview of its Staff Training Plan.

On November 18, 2011, the Company filed a status update with respect to its Smart Meter Plan and further requested a six month extension, from December 31, 2011 to June 30, 2012, to file the Company's Final Smart Meter Plan. With respect to the status update, the Company provided a summary of the work that it had done in the previous 18 months. In addition, the Company noted that there were several smart meter issues that it was still reviewing.

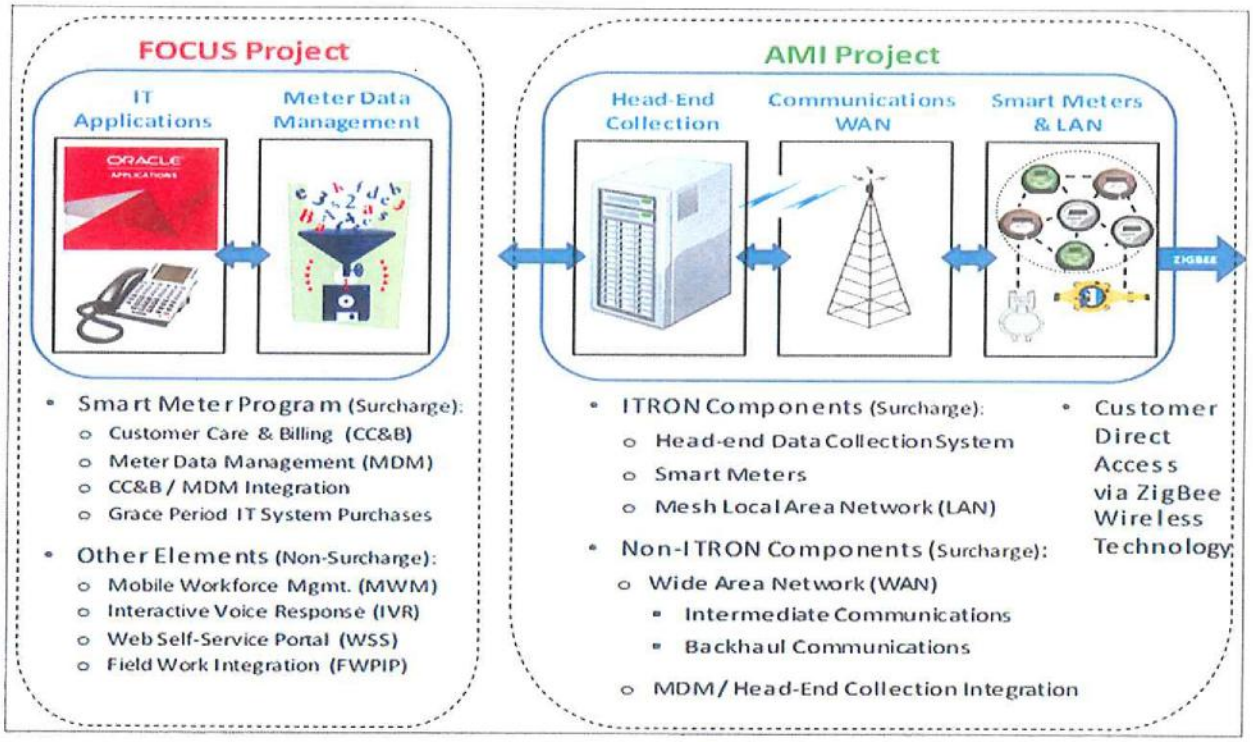
On December 13, 2011, the Commission issued a Secretarial Letter granting the Company's request for an extension, until June 30, 2012, to file its Final Smart Meter Plan. Pursuant to the Commission's December 13, 2011 Secretarial Letter, Duquesne Light hereby files its Final Smart Meter Plan.

III. FINAL SMART METER PLAN

A. INTRODUCTION

Duquesne Light's Smart Meter Program consists of two major projects, FOCUS and AMI. Diagram #1 provides a high-level overview of the scope of Duquesne's Smart Meter Program.

Diagram # 1: Duquesne Smart Meter Program – Two Major Projects



Under the FOCUS project, Duquesne Light is replacing its customer information system with a Customer Care and Billing ("CC&B") system and is implementing a new Meter Data Management ("MDM") system. The Commission approved the upgrade of these Information Technology ("IT") systems in the Company's Initial Smart Meter Plan. The upgrade of these IT systems is necessary in order for Duquesne Light to provide smart meter technology to customers.

Under the AMI project, Duquesne Light will install Itron smart meters, develop necessary communication networks and install a head-end data collection engine for smart meter data. In addition, Duquesne Light will hire a systems integrator to integrate all of the separate

components of the Company's Smart Meter Program. This is a critical function in order to ensure seamless operation of the AMI system.

As explained below, Duquesne Light proposes to deploy its AMI System over a seven-year period. The seven-year period includes a two-year ramp up period to allow systems testing before they are implemented on a broader scale. At the end of the two-year ramp up period, the Company proposes a deployment schedule of 9,000 meters per month with full deployment by the end of 2020. In addition, the Company proposes to phase-in AMI functionalities over time to allow the markets for these functionalities to become more mature. The Company's AMI System will meet all of the requirements of Act 129 and provide all of the additional capabilities set forth in the Commission's *Implementation Order*, after all functionalities are phased-in.

The total Smart Meter Program will cost approximately $238 million. The Company has provided additional details regarding these costs herein. In addition, the Company proposes to continue to recover its smart meter costs through its SMC.

These topics are discussed in more detail below.

B. FOCUS PROJECT

In its *Implementation Order*, the Commission recognized that a fully functional smart meter involved more than just the meter hardware attached to the customer's premises. *Implementation Order*, p. 6. Therein, the Commission stated as follows:

> A fully functional smart meter that supports the capabilities required by Act 129 and as outlined below, involves an entire network, to include the meter, two-way communication, computer hardware and software, and trained support personnel.

Consistent with this direction from the Commission, Duquesne Light explained in its Initial Smart Meter filing that it was required to replace its billing, data collection and back-office systems in order to provide smart meter technology to customers. This project is called the FOCUS Project.

The FOCUS project encompasses significant upgrades to the Company's existing IT system architecture in order to provide the back-office foundation necessary to successfully deploy smart meters. Duquesne Light's current customer information system ("CIS") is adequate for sustaining existing business requirements, but is insufficient for meeting Act 129 and the Commission's *Implementation Order* Smart Meter requirements. Functionality enhancements such as TOU rates, real-time price programs, remote disconnect and reconnect, direct access to price and consumption information, and the automatic control of customer's electric consumption cannot be supported without replacing Duquesne Light's existing CIS. Furthermore, Duquesne Light's existing back-office IT architecture is not designed for the proliferation of data inherent in providing hourly or even more granular interval usage information to all of our customers on a daily basis. Therefore, in conjunction with replacing our CIS, Duquesne Light must implement an MDM system as well as integrate this new system with the replacement CIS.

As part of FOCUS project scope within Duquesne Light's Smart Meter Program, the Company is now implementing the Oracle Customer Care and Billing ("CC&B") module within the Utility Application Suite to replace our existing CIS. In addition, Duquesne Light has purchased the Oracle MDM module and is currently implementing this component of the Utility Application Suite as well as integrating it with CC&B as a part of the FOCUS project. The implementation and integration of these two modules provides the necessary IT system foundation components to support the subsequent extension of this architecture for AMI system capabilities. The FOCUS project is an integral part of Duquesne Light's Plan for meeting Act 129 and the Commission's *Implementation Order* requirements.[1]

The FOCUS project started in July 2010 after Commission approval of the Company's Initial Smart Meter Plan and is projected to be completed by the end of the second quarter of 2013. There are five general phases during the FOCUS project lifecycle and timeline is as follows:

[1] The FOCUS project also includes several supporting scope components that are not part of Duquesne Light's Smart Meter Program. Some of these more significant components include the implementation of the Oracle Mobile Workforce Management ("MWM") module as well as its integration with CC&B, the replacement of our existing Interactive Voice Response ("IVR") system, and the redesign of our Outage Analysis System ("OAS") and Web Portal ("WSS") to work with CC&B.

- Discovery (Define Scope): July 2010 to November 2010
- Analysis (Gather Requirements): December 2010 to August 2011
- Assembly (Design & Build): August 2011 to May 2012
- Acceptance (Test & Train): June 2012 to March 2013
- Deployment (Go-Live & Support): April 2013 to June 2013

C. AMI PROJECT

1. Introduction

There is a growing demand for sophisticated metering (e.g., net metering), meter data management and price responsive rates as customers have a greater interest in reducing their electric bill. These new demands and requirements cannot be met with Duquesne Light's current meter and system infrastructure.

Pursuant to the milestones detailed in the Company's Initial Smart Meter Plan, Duquesne Light filed an assessment of its AMI technology requirements and potential solutions on December 29, 2010. In this filing, Duquesne Light describes the comprehensive process it undertook with its AMI advisor, SAIC, Inc. ("SAIC") (formerly R. W. Beck), to assess its current AMR technology environment as well as explicitly document the Company's requirements for a future AMI technology environment in the form of a formal Request for Proposal (RFP). The December 2010 filing also described the rigorous RFP process that the Company followed with its AMI advisor to create a short-list of two AMI vendors with similar solutions that best addressed Duquesne Light's needs ranked exclusively on technical merit. In a supplemental filing submitted on January 31, 2011, Duquesne Light advised the Commission concerning the selection of ITRON's OpenWay solution as the most cost effective AMI system for addressing its needs.

In the first step of defining the AMI project scope, a technology needs assessment was performed to identify the necessary AMI requirements to minimally meet ACT 129 smart meter requirements, as well as the additional requirements outlined in the Commission's *Implementation Order*. The requirements assessment was performed by outlining the current

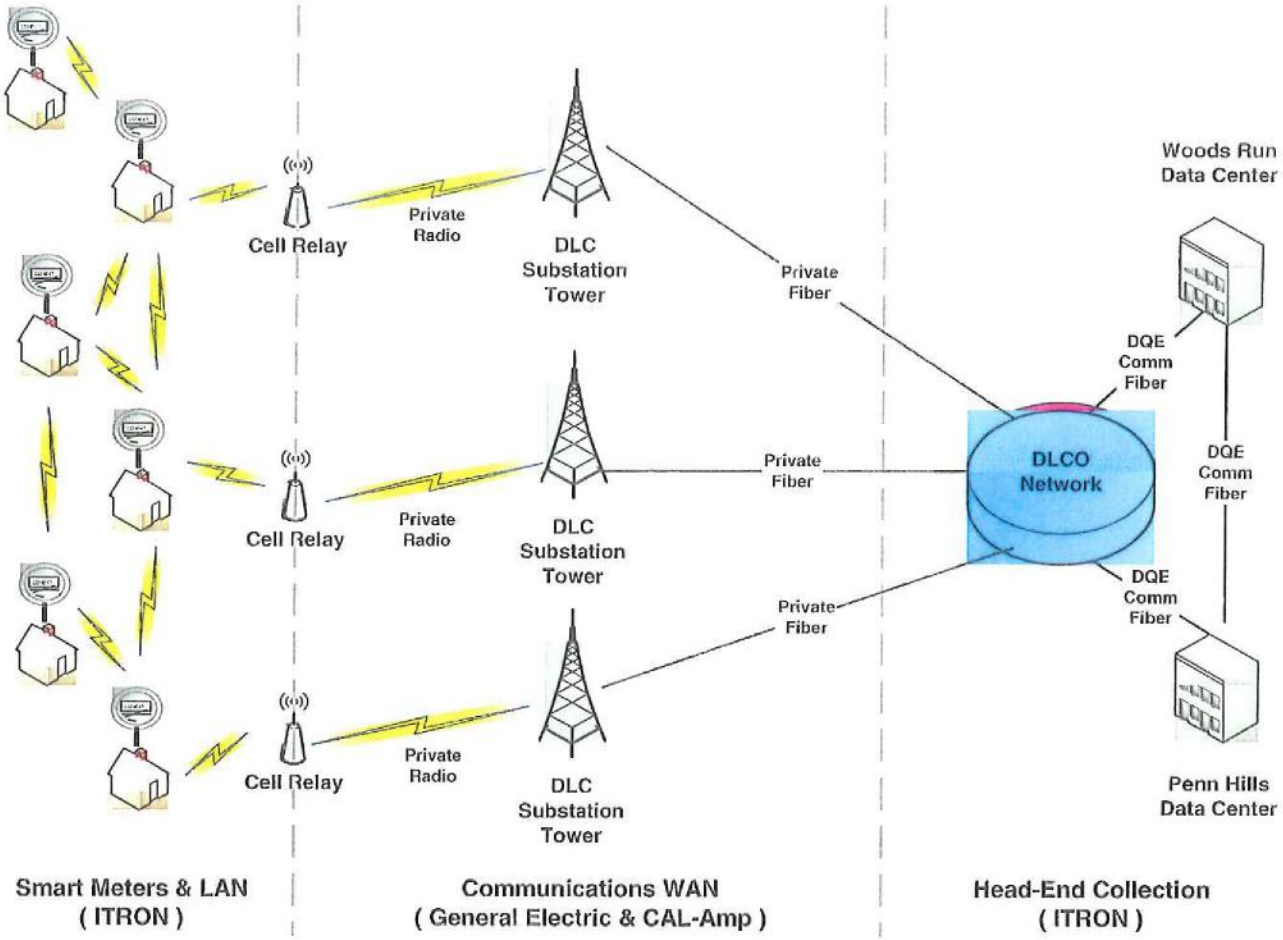
state of Duquesne Light's technology, including AMR and back-office supporting systems, either currently installed, or planned for installation, that would either directly or indirectly integrate with AMI during the Smart Meter deployment phase. By understanding the current environment, AMI requirements could be defined and outlined in a detailed RFP which would ensure that the solutions AMI vendors proposed succinctly addressed Duquesne Light's needs.

Duquesne Light's proposed AMI solution includes four components. These four components are:

- Smart Meters
- Local Area Network
- Wide Area Network
- Head End Data Collection Engine

Diagram 2 below provides an overview of the AMI System Components.

Diagram # 2: Duquesne AMI System Architecture



Duquesne Light plans to replace all existing AMR meters with new smart meters that will provide two-way communication between each customer premise and the utility. All single phase meters will be equipped with ZigBee[2] data channels to enable customers direct access to interval usage data, and provide a platform for future HAN applications. The selected AMI solution is capable of providing interval data for all meters, and single phase meters will be equipped with an internal switch for remote connections and disconnections.

[2] ZigBee is a commonly used communication specification for advanced metering systems. ZigBee has the ability to link smart meters with devices such as thermostats, household appliances, HVAC and other equipment that uses electricity.

2. Smart Meters

Duquesne Light proposes to install ITRON smart meters for all customers. The ITRON Smart Meters include the latest advanced metering technology, including bidirectional data communications, ZigBee direct access capabilities and a remote connect/disconnect switch. The ITRON smart meters and related advanced metering infrastructure discussed below will meet all of the six minimum smart meter requirements set forth under Act 129, including:

1. Bidirectional data communications.
2. Reading usage data on at least an hourly basis once per day.
3. Providing customers with direct access to and use of price and consumption information.
4. Providing customers with information on their hourly consumption.
5. Enabling TOU rates and RTP options.
6. Supporting the automatic control of the customers' electric consumption.

In addition, the ITRON Smart Meters and related advanced metering infrastructure will meet all of the nine additional smart meter requirements set forth in the *Implementation Order*, including:

1. Ability to remotely disconnect and reconnect.
2. 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.
3. On-board meter storage of meter data that complies with nationally recognized non-proprietary standards such as ANSI C12.19 and C12.22 tables.
4. Open standards and protocols that comply with nationally recognized non-proprietary standards, such as IEEE 802.15.4.
5. Ability to upgrade these minimum capabilities as technology advances and becomes economically feasible.
6. Ability to monitor voltage at each meter and report data in a manner that allows an EDC to react to the information.
7. Ability to remotely reprogram the meter.

8. Ability to communicate outages and restorations.

9. Ability to support net metering of customer-generators.

Further explanation regarding how Duquesne Light's AMI system will meet all of the six minimum smart meter requirements set forth under Act 129 and will meet all of the nine additional smart meter requirements set forth in the *Implementation Order* is provided in Section E below. In addition, the specific technical capabilities of the ITRON smart meters, including the AMI standards supported by the ITRON smart meters are set forth in Appendix A.

3. Mesh or Local Area Network ("LAN")

The LAN consists of the transmission of data between ITRON smart meters and ITRON cell relays. The LAN has the following features:

- An RF mesh based solution that is capable to being Upgraded to an IPv6 based mesh solution
- Bi-directional communication
- Operates in the unlicensed 900 MHz band
- 902-928 MHz Bandwidth (with frequency hopping signaling)
- Supports 142-153 kilobits per second ("kbps") throughput
- Each cell relay supports up to approximately 2,000 meters
- Support of IP and native DNP protocols when running the full IPv6 solution

4. Wide Area Network ("WAN")

The WAN provides data communications between the LAN and the Head-End data collection system. A diagram of the AMI system architecture, including the WAN, is shown on Diagram 2 above.

The solution for the WAN component of the AMI system was determined with the assistance of SAIC. Pursuant to the milestones detailed in the Company's Initial Smart Meter Plan, Duquesne Light filed a preliminary design for the AMI communication network on March 31, 2011. In this preliminary design of the WAN component of the AMI system, Duquesne Light proposed a private radio solution as opposed to a public wireless solution for the intermediate portion of the WAN, which connects the cell relays that are part of ITRON's LAN to existing Duquesne Light owned communication towers. See Diagram # 2. The preliminary design also

proposed leveraging the private fiber currently leased by Duquesne Light from DQE Communications that already exists between Duquesne Light's communication towers and data center for the back-haul portion of the WAN. At the time of the March 31, 2011 filing, this preliminary design was determined to be the most cost-effective solution for the WAN component of Duquesne Light's AMI system. The following is a bulleted summary of the Company's preliminary due diligence efforts.

- Engaged SAIC in November 2010 to assist with the AMI Communication Network technology and cost assessment
- Analyzed multiple Private Licensed Wireless (Radio), Private Unlicensed Wireless (Radio) and Public Wireless alternatives for the LAN Cell Relay to Tower communication network
- SAIC recommended a combination of two Private Licensed Wireless solutions (3.65 GHz & 220 MHz) as cost effective alternatives that best met Duquesne Light's technological requirements
- Recognizing the potential unavailability of 220 MHz spectrum in DLC territory, the recommendation also included 900 MHz as a replacement
- It was noted that public wireless could be used as a back-up to the private wireless solution
- Filed preliminary communications network design with PA PUC in March 2011 based on SAIC's recommendation

In requesting and subsequently receiving a six month extension for filing our Final Smart Meter Plan, Duquesne Light committed to performing additional due diligence related to private versus public WAN solutions in light of new information that public carrier price offerings were becoming more cost competitive. After several more months of analysis, Duquesne Light confirmed that a private wireless solution as originally proposed is the best solution because it provides Duquesne Light with more control over the security and reliability of the system as well as strategic opportunities to utilize available bandwidth for other data communication applications including mobile workforce, SCADA, and corporate security. The private wireless solution has more initial costs than a public wireless solution. However, the private wireless solution has considerable annual O&M savings which offset the initial upfront costs over the life

of the system. A financial analysis between private versus public networks was too close to conclusively drive the decision of one type over the other.

The following is a bulleted summary of our additional due diligence efforts.

- Met with WAN vendors to determine availability of licensed spectrum in Duquesne territory
- Determined that 220 MHz was not an available spectrum
- Reserved 900 MHz spectrum from Space Data through a 15 month lease with an option to buy upon termination
- Worked with SAIC and ITRON to develop a Propagation study to evaluate coverage capabilities of the 3.65 GHz and 900 MHz Private Licensed Wireless solution
- Finalized capital and on-going O&M cost estimates of private and public solutions based on the propagation study
- Developed a detailed cost comparison between the Private Licensed Wireless solution and the Public Wireless solution
- Determined that the private wireless solution was still the best value for Duquesne Light
- Filed a private wireless solution for the WAN component of our AMI system as part of this Plan

5. Technical Advantages of the New AMI System

There are several distinct technical advantages associated with the proposed AMI system architecture network over the existing AMR system. First and foremost, the existing AMR system architecture only supports a single directional data flow (from meter to head-end data collection engine), whereas the proposed AMI System architecture supports a bi-directional data flow.

Secondly, the existing AMR system LAN solution requires each meter to be in the line of sight of a Cell Control Unit ("CCU") in order to communicate. The new AMI system LAN solution uses mesh network technology which enables meters to communicate to each other. A meter that is not in line of sight of a cell relay communicates its data to a neighboring meter that in turn communicates its data to a neighboring meter and this process continues until the data is

consolidated at a meter that does have line of sight to a cell relay. This mesh network technology only requires a portion of the meters to be in the line of sight of a cell relay in order for all meters to be read. Since most meters have several neighboring meters, the mesh network technology also provides redundant paths for communicating data to a cell relay. Therefore, the AMI system solution greatly reduces the amount of LAN components that need to be installed in order to cover all of Duquesne Light's service territory. This will make it more cost effective to read 100% of Duquesne Light's meters at least once daily rather than the 80 to 90% that are being read daily with the AMR system.

Finally, the existing AMR system architecture requires multiple, disparate solutions to communicate with all of Duquesne Light's meters. These solutions differ for all three system components including the type of meter data communications; the WAN communication protocols; and the head-end collection engine applications. The AMI system architecture uses a single type of meter data communications; a common WAN communication protocol and the same head-end data collection engine application to communicate with all of Duquesne Light's meters.

6. Head-End Data Collection Engine

As part of its AMI Project, Duquesne Light must install a Head-End Data Collection Engine. The Head-End Data Collection Engine performs network management and coordinates data collection and operations. The Head-End Data Collection Engine has the following characteristics:

- Collects interval meter usage data for all single phase and three phase meters.
- Support scheduled (automatic) and unscheduled (operator-initiated) meter reads.
- Remotely downloads updates to meter settings, configuration, security settings, and firmware for all AMI devices.
- Obtains meter data, such as register and power status, on demand.
- Communicates with groups of AMI meters and consumer owned control devices to enable load management.

- Collects and reports measurement data, control events, self-test data and alerts, service continuity data and alerts, power quality data and alerts (including tamper), programming events, configuration settings, etc.
- Monitors, analyzes, and manages service continuity.
- Supports and reports service continuity and voltage interruptions.
- Supports monitoring, analyses, and management of customers' power quality.
- Supports customer (scheduled and unscheduled) load control functions.
- Provides automatic self-registration of AMI endpoints/meters.
- Supports meter self testing, system performance monitoring and reporting.
- Effectively employs Service Oriented Architecture ("SOA") and/or Enterprise Service Bus ("ESB") technologies for communication among its application modules and for interoperation of its system components with Duquesne's other information systems.

D. IT SYSTEMS

1. Introduction

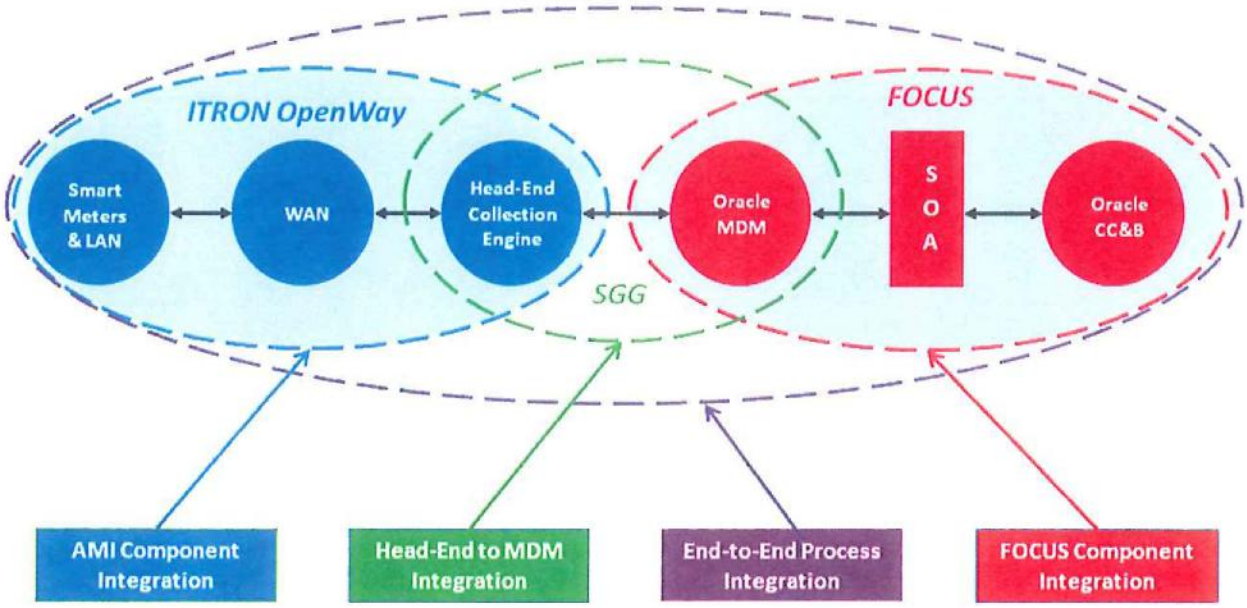
In addition to the AMI Project scope described in the section above, Duquesne Light's Final Smart Meter Plan includes the implementation, ongoing support and multifaceted integration of several IT systems. Some of the more significant of these IT systems such as Oracle's CC&B and MDM will be implemented and integrated as part of the Focus Project but will also require further systems integration and functional enhancements as part of the AMI project.

Much of the systems integration and ongoing support work requires specific expertise and technology skills that are not available within Duquesne Light's existing internal IT staff. Therefore, the Plan supplements Duquesne Light's resources with third party IT vendor delivery and support resources as well as third party Systems Integrator ("SI") resources. Duquesne Light will embark on a formal RFP process to select a qualified SI in the latter half of 2012. Duquesne Light also plans to negotiate a contract with the selected SI that will be executed upon approval of our final Smart Meter Plan.

2. Systems Integration

As shown on Diagram #3 below, Duquesne Light's Smart Meter Program has four levels of complex systems integration that must work both independently as well as in conjunction with each other in order for the entire solution to function properly.

Diagram #3: Duquesne Light Systems Integration



The first level of systems integration is to establish a bidirectional interface between the CC&B and MDM components of the FOCUS project. The integration of these two components is facilitated through Oracle's Services Oriented Architecture ("SOA"). All meter usage data is validated, edited and estimated ("VEE") by the MDM module before it is passed to CC&B on a request basis for billing purposes. This cleansed usage data along with meter events such as tamper notifications is also utilized to support other customer oriented transactions such as high bill complaints, meter inspections and the automated completion of service orders that require a meter read.

The second level of systems integration is to establish a bidirectional interface between the Smart Meters deployed at customer premises and the Head-End Collection Engine installed at Duquesne Light's data center. The integration of these two components is facilitated through the AMI system communication network, which includes the LAN and the WAN. The Smart Meter

records interval data on at least an hourly basis which then must be collected from the field at least once daily by the Head-End Collection Engine. The LAN and WAN provide the connectivity necessary to accomplish this automated data collection. This bidirectional interface is also used for collection of meter events and alerts as well as to perform firmware upgrades within the meter.

The third level of systems integration is to establish a bidirectional interface between the Head-End Collection Engine and the MDM module. The integration of these two components is facilitated through Oracle's Smart Grid Gateway ("SGG"). SGG provides standard adapters for data exchange between Head-End Collection Engines from leading AMI vendors and Oracle's MDM module. All requests for meter usage data, events and alerts from Smart Meters are initiated from the MDM module. Therefore, the Head-End Collection Engines receives all of its instructions on what data to collect from the field as well as when to collect this data through the SGG.

The fourth level of systems integration is to establish end-to-end business processes that leverage the bidirectional interfaces between all of the components that were implemented and interfaced in the previous three levels. These end-to-end business processes include base metering functions such as monthly billing; daily displays of usage data on a customer web portal; commissioning and decommissioning of meters; and on-demand meter reads as well as advanced metering functions such as remote connects and disconnects; automated control of electric consumption; and provisioning of HAN devices.

3. Functional Enhancements

There are many functional enhancements to IT systems required to meet the smart meter requirements of ACT 129 and the Implementation Order, which are described in more detail in the AMI System Capabilities section of this plan. In addition, there are other functional enhancements to IT systems that leverage these AMI system capabilities to provide expanded self-service offerings to our customers as well as better information for our customer service representatives. These functional enhancements are described in more detail in the following appendices to this Plan:

- Bill-to-Date & Projected Bill – Appendix B
- Bill Alerts – Appendix C
- Smart Meter Usage Display – Appendix D
- Web Dashboard – Appendix E

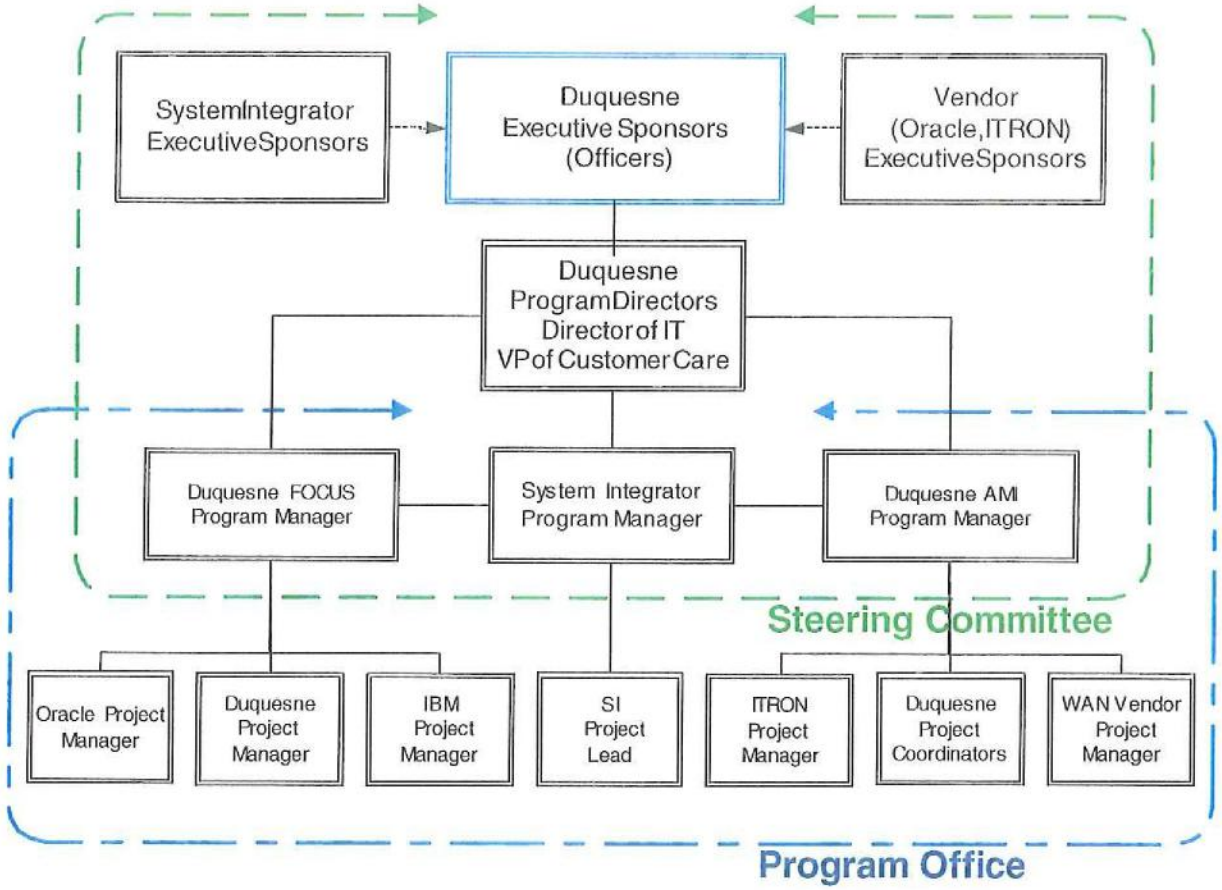
4. Systems Integrator

The complexity of integrating multiple IT systems from multiple vendors across several lines of business such as customer care and metering operations along with deploying all new advanced meters and communication networks requires specific expertise across several technology disciplines that does not exist internally within Duquesne Light. Therefore, Duquesne Light plans to engage a Systems Integrator (SI) to manage the IT systems work effort within the AMI project. The success of the AMI project is highly dependent on engaging an SI that has utility industry experience with both AMI technology projects as well as with Oracle Utility Application Suite implementations. The SI will have ultimate responsibility for the implementation of the remaining three levels of integration (the first level will be complete upon implementation of the FOCUS project) of Duquesne Light's Smart Meter Program. This responsibility includes oversight of the IT system integration and functional enhancement work being performed by other vendors including Oracle and ITRON.

Working with Duquesne Light, one of the initial tasks for the SI will be to finalize the phased implementation approach for the AMI Project. Phased scope definition is established by considering a variety of factors including business criticality and benefit, regulatory mandates, customer needs, overall program risk mitigation, technology availability and delivery, incremental change that users can adapt to and embrace, and other key considerations.

Once the implementation approach and individual phase scopes are confirmed, a detailed project plan will be developed including main tasks, deliverables, milestones and schedule. A Program Management Office (PMO), consisting of Duquesne Light, SI, Oracle, ITRON and other vendor resources will be established to manage and monitor the execution of this plan.

Diagram #4: Duquesne Light Smart Meter Program Management Office



Simply defined, System Integration looks beyond a single, independent system or solution delivery with the knowledge, responsibility, and accountability to validate the enterprise solution delivers as planned and is maintainable and supportable over the useful life of the system. System integration encompasses both business and technical integration of applicable processes. Duquesne Light's Final Smart Meter Plan proposes that the SI will act as an implementation advisor driving day-to-day results by validating constant and consistent alignment of the business vision to the technical solution; managing to an integrated program view vs. individual project views; managing overall program dependencies and interactions between related projects and initiatives; balancing competing interests to provide solutions delivering optimal enterprise results; seeking to eliminate overlap, duplication, and redundancy in program activities; and ensuring individual component applications (new, existing, third party) can support end-to-end

business processes. The specific services provided by the SI are detailed in Appendix F to this plan.

5. On-going Support

The IT systems being implemented as part of both the FOCUS project and AMI project require significant ongoing support. Duquesne Light's Final Smart Meter Plan provides for this support through the end of the deployment period in the form of annual maintenance agreements with Oracle and ITRON as well as managed service agreements with a third party IT support vendors.

E. AMI SYSTEM CAPABILITIES

In the Commission's *Implementation Order*, the Commission identified six minimum smart meter capabilities that are required by Act 129. *Implementation Order*, pp. 29-30. The commission directed EDCs to quantify the costs to deploy and operate these six minimum capabilities in EDCs' Smart Meter Plans.

In addition, the Commission listed nine additional capabilities that EDCs were to evaluate. The Commission also directed EDCs to quantify the individual incremental costs for deploying these additional capabilities. The Commission further noted that it may waive these additional capabilities to the extent that an EDC or another party demonstrated that the additional capabilities were not cost-effective.

Duquesne Light addresses each of the minimum and additional capabilities set forth in the *Implementation Order* below.

1. Minimum Capabilities Under Act 129

a. Bidirectional data communications

The Company's existing AMR system provides one-way communication from the meter to the head-end data collection engine hosted at Duquesne Light's data center. The new AMI system will provide two-way communication between the meter and the head-end data collection engine hosted at Duquesne Light's data center.

b. Recording usage data on at least an hourly basis once per day

The Company's existing AMR system records usage data on a daily basis for most of our single-phase meters and on at least an hourly basis for all of our three-phase meters. The new AMI system will have the capability of recording usage data at 5, 10, 15, 30 or 60 minute intervals. The Company's AMI communication network will provide the capability to retrieve this data at least once per day for all meters.

c. Providing customers with direct access to and use of price and consumption information

The Company's existing AMR system does not have any direct access capabilities. The new AMI system will include ZigBee enabled smart meters that under current data communication standards can facilitate direct access from the meter to a customer's HAN device for price and consumption information. Duquesne Light will remotely provision and enable the direct access interface once the customer request for direct access has been authenticated. The customer will be responsible for purchasing and installing their own HAN devices as well as establishing the network connection with the ZigBee interface.

d. Providing customers with information on their hourly consumption

The Company's existing AMR system provides most customers with validated daily consumption information through Duquesne Light's secure customer web portal. The new AMI system will provide all customers with validated hourly consumption information within approximately 24 hours after the data has been collected from all meters through Duquesne Light's secure customer web portal.

e. Enabling time-of-use (TOU) rates and real-time price (RTP) programs

The Company's existing AMR system only supports TOU or hourly rates for customers with three-phase meters. The new AMI system will support TOU rates and RTP programs for all customers. As part of the company's Act 129 Smart Sense pilot, Duquesne Light will develop TOU and/or RTP tariffs for our default service customers with smart meters. Duquesne Light

will also be able to support TOU rates and/or RTP programs offered by EGS's for our customers with smart meters that switch to an alternate supplier.

f. Supporting the automatic control of the customer's electric consumption

The Company's existing AMR system cannot support the automatic control of the customer's electric consumption. The new AMI system, with its bidirectional data communication and ZigBee enabled smart meters, can be utilized to support demand response or load limiting programs. Duquesne Light plans to enable third party access to our AMI system for these types of programs through a secure web portal. However, Duquesne Light does not plan to commit to any service level agreements with third parties using our AMI system to facilitate these types of programs.

2. Additional Capabilities under Implementation Order

a. Ability To Remotely Disconnect And Reconnect

Remote disconnect and reconnect functionality allows utilities to turn off or turn on a customer's service at the meter without a physical visit to the premise. This capability is accomplished through additional hardware (a switch) integrated into the meter. This capability is only available for single-phase meters having a 240 volt service with a rating of 200 amps or less.

There are many benefits to implementing the remote disconnect and reconnect functionality. These benefits include improved safety, operational efficiency, revenue collection, employee efficiencies and improved customer experience.

There is an additional cost of approximately $30 per single phase meter to install the switch to enable the remote disconnect/reconnect functionality. In addition, the Company's FOCUS system would require upgrades costing approximately $500,000 to provide this functionality. The expected cost to install this functionality on a system wide basis is approximately $17.5 million.

Duquesne Light believes that the benefits of this functionality support implementation. For these reasons, Duquesne Light proposes to implement the remote connect/disconnect functionality for all single-phase meters.

b. Ability To Provide 15-Minute Or Shorter Interval Data

As previously stated, the Company's Smart Meters will be capable of recording data in 15 minute intervals at no incremental cost as compared to recording usage at hourly intervals. However, the bandwidth of the AMI communication network as well as the storage capacity of the Head End Data Collection Engine and Oracle MDM system would have to be expanded at an incremental cost to accommodate intervals more granular than hourly.

Duquesne Light does not believe these incremental costs are justified at this time since there are no existing requirements for interval data more granular than hourly. However, since expansion of network bandwidth and storage capacity is scalable, the Company proposes implementing an AMI system based on hourly interval data and then expanding it later if future applications require more granular intervals.

c. On-Board Storage Of Meter Data That Complies With Nationally Recognized Non-Proprietary Standards Such As ANSI C12.19 and C12.22 Tables

The ANSI C12.19 standard provides a common data structure for use in transferring data to and from meters. The ANSI C12.22 standard defines how to transmit standardized tables of meter data across wired or wireless networks. This standard uses encryption to enable secure communications, protecting confidentiality and data integrity.

The Company's AMI System will comply with these standards without any additional implementation costs.

d. Open Standards And Protocols That Comply With Nationally Recognized Non-Proprietary Standards, Such As IEEE 802.15.4

IEEE 802.15.4 is a communication standard for low rate wireless personal networks such as ZigBee. ZigBee has the ability to link smart meters with devices such as thermostats, household appliances, HVAC, lighting systems and other household appliances or systems.

The Company's AMI system will comply with the IEEE 802.15.4 standard without any additional implementation costs.

e. Ability To Upgrade Minimum Capabilities As Technology Advances And Becomes Economically Feasible

The capability is whether existing equipment can adopt or be modified to incorporate new capabilities as technology advances. Duquesne Light cannot predict all future needs or technologies. However, the Company is implementing an AMI system that is flexible and expandable. Moreover, Duquesne Light will be able to upgrade the software for its AMI system, including meter firmware and configuration.

f. Ability To Monitor Voltage At Each Meter And Report Data In A Manner That Allows An EDC To React To The Information

The AMI system that Duquesne Light is implementing will provide the capability to monitor voltage at each meter. This monitoring can be accomplished by establishing a register within the Smart Meter for voltage related interval data or by programming the Smart Meter to send an alert if the voltage measurements are outside a normal range.

In order to report voltage data in a manner that allows an EDC to react to the information, an interface needs to be developed between the AMI Head-End Collection Engine and the FOCUS project MDM system. Duquesne Light's approach to developing these type of interfaces is to participate in Oracle's Smart Grid Gateway ("SGG") Customer Validation Program. This program enables Duquesne Light to influence the development of productized integration between ITRON and Oracle applications. At this point in the development cycle, Oracle has not

committed to a date for implementing the voltage monitoring interface requirements as part of their SGG roadmap so incremental cost information is unavailable.

In addition to developing the integration between AMI and FOCUS systems, new reporting functionality will need to be developed within the MDM application in order for Duquesne Light to react to the voltage monitoring. At this point in the MDM development roadmap, Oracle has not committed to a date for adding enhanced reporting functionality for voltage monitoring.

Since Oracle has not committed to dates for voltage monitoring capabilities, the incremental cost for developing the required productized integration and reporting functionality is unknown. However, Duquesne Light anticipates that it will implement the voltage monitoring capability, as a supplement to existing power quality systems, once the necessary software becomes available.

g. Ability To Remotely Reprogram The Meter

Firmware within the meter controls all of the functions and capabilities of the meter. Firmware is the software that interfaces the meter's hardware and the network application, enabling the meter to perform its functions. The firmware in the Company's Smart Meters can be reprogrammed remotely through the communications network or at the meter.

There are no additional meter or network costs to be able to remotely program the Smart Meter's firmware.

h. Ability To Communicate Outages And Restorations

The AMI architecture provides the capability to communicate outages and restorations from the Smart Meter to the Head-End Collection system. This communication is based on a "last gasp" alert that the meter sends when it loses power along with a subsequent "first gasp" alert when power is restored. This functionality does not exist in Duquesne Light's existing AMR system.

In order to incorporate AMI outage and restoration alerts into the Company's real-time reliability and customer notification processes, Duquesne Light would need to replace its current Outage Management System ("OMS") as well as develop and maintain a distribution system "Electrical Model". This replacement initiative is not included in the scope of the FOCUS project.

Duquesne Light estimates that the incremental cost to create an Electrical Model are not justified as part of the Company's Final Smart Meter Plan, but will be further evaluated as the AMI system is deployed.

Duquesne Light does plan to implement the capability to communicate outages and restorations from the Smart Meters to the Head-End Collection Engine as part of the AMI project. In addition, Duquesne Light plans to extract the data from the Head-End Collection Engine into an AMI data warehouse on a near real-time basis. The data warehouse will include reporting functionality that provides the Company's Operations Center with the following data:

- Number of customers that are out of power at any given time during an outage event.
- A list of customers that have been restored at any given time during an outage event.
- The length of time between when a customer lost power and when that customer's power was restored.

This reporting functionality in the AMI data warehouse will replace and improve the accuracy of all of the information that the Company's Operations Center currently receives from its existing AMR system. This initiative is estimated to cost approximately $250,000.

i. Ability To Support Net Metering Of Customer Generators

Duquesne Light's Smart Meters will support net metering of customer generators. The ITRON Smart Meters will have multiple channels and bi-directional capability that will allow the Company to measure both the excess energy that is being generated by the customer and also measure energy that is delivered by the Company to the customer. The ITRON Smart Meters come equipped with this capability, and therefore, there are no additional costs to implement this capability.

F. AMI IMPLEMENTATION TIMELINE

1. System Wide Roll-Out

A chart showing the Company's proposed AMI implementation timeline is provided as Appendix G. The timeline includes a smart meter deployment schedule that begins with a 5,000 smart meter acceptance roll out in 2014 followed by ramp up to 90,000 meters by year end 2015.

A full scale deployment of 9,000 meters per month will begin in the first quarter of 2016. The Company anticipates that it will complete full deployment of its smart meters by the end of 2020. In its Initial Smart Meter Filing, Duquesne Light noted that it was premature to develop a final system-wide deployment schedule given the substantial tasks that the Company was undertaking to: (1) assess needs, and (2) select technology, a vendor, software, hardware and other smart meter components. Therefore, the Company noted its intent to meet the 15 year deployment schedule set forth in the Commission's *Implementation Order*. See Duquesne Light Initial Smart Meter Plan, pp. 36-37. The Company did provide an initial estimated date of December 31, 2018 for full system roll out of smart meters. However, the Company explained that this date was not final and that the Company would provide a detailed description of its plans for full system-wide roll out of smart meter technology as part of its Final Smart Meter Plan. See Duquesne Light Initial Smart Meter Plan, p. 37.

In the Commission's Order approving the Company's Smart Meter Plan, the Commission noted that Duquesne Light had provided an approximate date of December 31, 2018 to complete system-wide deployment of smart meters. The Commission further noted that Duquesne Light had explained that the dates were approximate and that it was the Company's intent to meet the 15 year deployment schedule provided by Act 129. *Petition of Duquesne Light Company for Approval of Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2009-2123948, Order entered May 11, 2010, p. 27.

The Company is extending full deployment of smart meters to allow for the two-year ramp-up period described above. This ramp-up period will give the Company time to test systems and functions before implementing technology on a system-wide basis. The Company believes that this is a prudent and reasonable approach and that it will mitigate the risk of technology glitches that could create a negative experience for customers.

In addition to the ramp-up period, Duquesne Light is proposing a phased functional implementation of Smart Meter features starting with the most basic capabilities such as monthly billing from smart meter usage data and ending with the most advanced capabilities such as automatic control of electric consumption. This phased functional implementation is designed to

allow the market for many of the advanced smart meter capabilities to become more mature, which will then provide a better definition of the requirements. Requirements that are not fully defined result in rework, which ultimately results in additional costs for customers. Duquesne Light believes that this potential rework and associated costs can be avoided by our proposed phased functional implementation approach.

At the same time, however, the Company anticipates that much of the functionality throughout deployment will be valuable. The Company will integrate available functionality, to the extent it has been fully tested and accepted throughout the process, into business practices where possible. This will allow the Company to take advantage of the benefits early in the process. For example, the Company plans to integrate hourly data into its processes used for daily reconciliation and PJM settlements. Similarly, the Company plans to implement the remote connect / disconnect functionality in select areas as it become available. This extension of the phased-in approach of smart meter functionality throughout the deployment will ensure implementation obstacles are removed throughout the entire process rather than defer until the last stage of deployment. The Company and customers will be able to take advantage of the benefits of AMI as deployed throughout the service area.

The following table provides a high-level overview of Duquesne Light's proposed phased functional implementation approach by requirement.

Duquesne Final SMIP Plan

Type	Requirement	2014	2015	2016	2017
Basic	Commissioning and decommissioning of smart meters in the field	x			
Basic	Collection of usage data for billing and events such as tamper alarms	x			
Basic	Monthly billing from smart meter usage data	x			
Basic	Manual disconnects and reconnects	x			
ACT 129	Bi-directional data communications	x			
ACT 129	Record usage data on at least an hourly basis once per day	x			
ACT 129	Provide direct access to and use of price and consumption information				x
ACT 129	Provide customers with information on their hourly consumption		x		
ACT 129	Enable time-of-use (TOU) rates and real-time price (RTP) programs		x		
ACT 129	Automatic control of the customer's electric consumption				x
PA PUC	Remote disconnects and reconnects			x	
PA PUC	Provide 15-minute or shorter interval data			x	
PA PUC	On-board meter storage that comply with national standards	x			
PA PUC	Open standards and protocols	x			
PA PUC	Upgradable capabilities	x			
PA PUC	Voltage monitoring				x
PA PUC	Remote reprogramming of the meter	x			
PA PUC	Outages and restorations				x
PA PUC	Net metering of customer generators		x		

2. New Construction And Customer Requests

Pursuant to Act 129 and the Commission's *Implementation Order*, EDCs are required to deploy smart meter technology at the end of the 30-month grace period in new construction and upon customer request. As part of Duquesne Light's grace period planning efforts, the Company has designed interim solutions to comply with these deployments outside of the Company's planned smart meter deployment schedule since the AMI project will not start until the Final Smart Meter Plan is approved.

a. New Construction

Duquesne Light installs approximately 2,000 meters annually in new construction sites throughout its service territory. At the end of the grace period, Duquesne Light plans to install ITRON smart meters at all new residential construction sites and communicate with these meters through its existing AMR ITRON Fixed Network system. These meters will be transitioned to the new AMI system at the time that the new communication network is extended to these locations as part of the full deployment schedule. Smart meters that communicate through the AMR system will provide daily reads until they are transitioned to the AMI system at which time they will provide hourly reads and AMI functionality that is available at that time. The transition from the AMR system to the AMI system will be determined by the Duquesne Smart Meter Program full deployment schedule. Duquesne Light will continue to deploy Alpha meters that communicate through its existing AMR ITRON MV-90 system for all new commercial and industrial ("C&I") construction sites until the new communication network is extended to these locations as part of the full deployment schedule.

b. Customer Requests

Since the enactment of Act 129 smart meter legislation in 2008, Duquesne Light has only received a few customer requests for a smart meter. To honor customer requests for direct access to un-validated usage data after the grace period, Duquesne Light plans to install ITRON smart meters that communicate with its existing AMR ITRON Fixed Network system for billing purposes but enable HAN connectivity through ZigBee for direct access purposes. To honor customer requests for next day access to validated hourly usage data through a web portal, Duquesne Light plans to install Alpha meters (currently used on C&I accounts) and communicate with them through its existing AMR ITRON MV-90 system for both billing and next day usage data access purposes. After the Smart Meter Program Final Smart Meter Plan is approved by the Commission, Duquesne Light will purchase, implement and integrate the ITRON Head-End Data Collection Engine with the MDM. Once this work is complete, Duquesne Light will install ITRON smart meters for all customer requests and communicate with them directly via a public cellular network. This solution is projected to be available during the smart meter deployment ramp-up period and will be utilized until the new communication

network is extended to these locations as part of the full deployment schedule. Customers that request a smart meter outside of the Company's full deployment schedule will be charged the incremental communication and deployment costs but not the cost for the meter. The Company will develop a fee for this scope and update Rule 14.2 of its tariff.

G. SMART METER PROGRAM COSTS

The total cost of Duquesne's Smart Meter Program is estimated at $238 million spent over an 11 year period beginning in 2010 and ending in 2020. The following table provides a breakdown of the total Smart Meter Program estimated costs by scope component and operating versus capital expenditures.

Cost Estimates ($ millions)	Total
Smart Meter Program Planning	3.0
FOCUS Project	35.0
AMI Project Vendor Components (ITRON)	97.5
AMI Project Communication Network (WAN)	8.0
AMI Project IT Systems including PMO	63.4
AMI Project Customer Acceptance	3.1
AMI Project Contingency	28.0
Total	$238.0

The Smart Meter Program planning costs encompass all of the grace period expenditures necessary to develop the Final Smart Meter Plan. A significant portion of these planning costs are the engagement of third party subject matter expertise such as SAIC, IBM and other

consulting resources. These planning costs also include the technology proof of concept with ITRON to prove the viability of the proposed AMI system solution.

The FOCUS Project costs encompass all of the IT system costs necessary to replace Duquesne Light's CIS and implement a new MDM. These IT system costs include software and hardware purchases and maintenance during the grace period; outside services involved in the implementation and integration of CC&B and MDM; and an allocation of other ancillary project expenditures such as facilities, training, organizational change management and installation of supporting IT products.

The AMI Project Vendor Component costs encompass all of the equipment and services being provided by ITRON as described in Section C of this Plan. These cost estimates are based on the contract negotiations that have been conducted to date between Duquesne Light and ITRON. These negotiations are expected to conclude in the third quarter of 2012 with a completed contract that can be executed upon Commission approval of the Company's Final Smart Meter Plan.

The AMI Project WAN costs encompass all of the equipment and services described in Section C.4 of this Plan. These cost estimates are based on analysis, including preliminary propagation studies, conducted by Duquesne Light and ITRON with the assistance of SAIC.

The AMI Project IT Systems costs encompass all of the implementation and integration services described in Section D of this Plan. In some instances where it is cost justified, the third party delivery services may be replaced with the purchase of additional software and hardware products. These cost estimates are based on analysis conducted by Duquesne Light with the assistance of IBM.

The IT Systems costs also encompass the responsibilities of the PMO which includes third party SI resources as well as the following seven Duquesne Light internal resources which are all incremental to the Company's current staffing levels:

- AMI Program Manager (1)

- AMI IT Systems Coordinator and IT Systems Analyst (2)
- AMI Metering Coordinator and Metering Engineer (2)
- AMI Communication Network Coordinator and Telecom Engineer (2)

The AMI Project Customer Acceptance costs encompass all of the work efforts described in Section I of this Plan. These cost estimates are based on analysis conducted by Duquesne Light with the assistance of Customer Performance Group ("CPG").

The AMI Project contingency costs encompass industry standard funding reserves for third party services as well as specific funding reserves for areas of the program where meter deployment, communication protocol, and security appliance decisions still need to be finalized based on emerging or evolving additional information.

A further breakdown of the estimated costs for the FOCUS and AMI projects by year is provided in Appendix H.

H. SMART METER COST RECOVERY

In its Initial Smart Meter Plan the Company proposed to recover its costs to implement smart meter technology via a Section 1307 Smart Meter Charge. By order dated May 11, 2010, the Commission approved Duquesne Light's Initial Plan with certain modifications. In addition, the Commission approved the Company's SMC, with certain modifications, which provides for full and current cost recovery of smart meter costs. The first SMC was implemented effective August 1, 2010.

The SMC uses a formula to calculate the revenue requirement for the quarter for each component. The SMC is updated quarterly, effective January 1, April 1, July 1 and October 1 each year. Common costs are then allocated to the revenue requirement for each meter type based on the number of each type of meter. A description of the SMC is provided in Rider No. 20, Smart Meter Charge, of the Company's retail tariff.

The formula to compute the revenue requirement for single phase, three-phase and common plant each includes four primary components. The first component is the pre-tax return on average projected net plant in-service ("PIS") for the upcoming quarter. Net PIS includes eligible smart meter plant and supporting systems adjusted for accumulated depreciation and accumulated deferred income taxes associated with that plant. The second component of the revenue requirement includes the projected expenses for depreciation, operation and maintenance for the upcoming quarter. The third component is an adjustment to the revenue requirement made for expected operating cost savings, if any, realized by the Company by implementing smart meter technology. The fourth component is a reconciliation adjustment, developed through an annual filing, to reconcile for the actual revenue requirement for the previous reconciliation year versus the billed revenue for the same period.

The revenue billed under the SMC for each quarter of the reconciliation period is compared to the actual revenue requirement calculated for each quarter using actual data for each of the four components of the formula. The over or under collection of revenue is recouped or refunded as appropriate with interest over a one year period beginning on January 1 of the following year. All over and under recovery calculations include interest at the legal rate of 6%.

The Company is proposing to recover the costs for implementing its Final Smart Meter Plan through its existing SMC without modification.

I. CUSTOMER EDUCATION AND ACCEPTANCE STRATEGY

1. Introduction

In early 2011, Duquesne Light engaged Customer Performance Group (CPG) to assist the company with development of a strategy that minimizes the risk of customer resistence to smart meter technology that many utilities throughout the country have previously experienced. CPG has worked with several utilities in California, Nevada and Illinois to successfully deploy smart meters in a manner that increases customer awareness, understanding and confidence with the new AMI technologies. A primary component of the customer confidence model is the communication of AMI technology benefits to customers soon after they receive their new smart meter.

As part of our planning efforts with CPG, we identified several new enhanced products and services such as Bill-to-Date reporting, Usage threshold alerts, Usage graphs, TOU rates, RTP programs and HAN offerings that are all facilitated by leveraging the investment in AMI technologies. Duquesne Light will offer select, cost-effective enhanced products and services for our customers that also provide transactional benefits to the company. These services are signed to increase customer participation and acceptance of smart meter technology. Additionally, The CPG deployment approach also strives to minimize customer inconvenience and provide a neutral, if not positive overall customer experience related to smart meters.

2. Target Audiences

Duquesne Light's three primary target audiences are employees, stakeholders and customers. A description of these three audiences and their relationships to smart meter technology is below:

Audience	Role
Employees	
• Installers	Installers install the smart meters. They have customer contact prior to installation and when the work is completed.
• Field Liaison	The field liaison is a person skilled in energy audits who accompanies the installers to provide door-to-door outreach to customers and troubleshoot customer complaints.
• Call Center	The call center provides customers information and education regarding smart meters and processes customer complaints and claims.
• Other	All other employees serve as ambassadors who can explain the smart meter system to family, friends, and neighbors.
Stakeholders	
• Elected Officials and Staff	Elected officials and their staffs are a source of information about the smart metering system for constituents and a channel for receiving customer complaints.
• Community Leaders	Community leaders include political organizations, special-interest organizations, business organizations, service organizations, faith-based organizations, and schools. They act as third-party communicators to customers.
• Media	Media includes representatives of newspapers, television, and radio who communicate with customers.
• Electric Generation Suppliers (EGS)	EGS's are the retailers who sell the electric commodity to customers and may develop new products and services based upon the smart metering system.
• Curtailment	CSPs provide energy and demand response products to

Service Providers (CSPs)	encourage customers to curtail usage at times of peak load.
• Service Providers	Service providers include contractors, electricians, aggregators, and others who act on behalf of customers and provide information to customers about electric appliances and services.
• Union Leaders	Union leaders are the representatives of DLC employees who are represented under collective bargaining agreements. They act as third-party communicators to employees.
Customers	
• Residential	Residential customers include customers who live in single-family and multi-family premises who take service on rates RS, RH, and RA.
• Commercial and Industrial (C&I)	C&I customers include those who take service on rates GS/GM and GMH.

3. 90-60-30 Day Communication Strategy

Duquesne Light's CEA plan focuses on the creation of a neutral-to-positive customer experience. The foundation of this customer experience is the 90-60-30 day strategy. 90-60-30 refers to the number of days prior to installing a smart meter during which specific information, education, and customer experience tactics are implemented.

90 Days. At least 90 days before installing smart meters in a specific community or geography, Duquesne Light will:

1. Establish a website that contains information about the smart meter system.
2. Continue to educate employees about the smart meter system and its deployment.
3. Continue to educate stakeholders about the smart meter system and deployment.

Duquesne Light's approach for employees will be to provide information and education so that all employees can act as advocates for the smart meter system. To achieve this objective, Duquesne Light will use a variety of methods to build employee awareness and understanding. These methods include:

- Town hall meetings
- Training classes
- Internal newsletters
- Office signage
- Employee intranet
- Involving employees in testing smart meter products and services

For front-line employees, Duquesne Light will employ additional educational methods that teach specific skills associated with the employee's job role. This may include advanced training classes for call center representatives, field liaisons, and installers, and daily briefings for field liaisons and installers.

Duquesne Light's approach for stakeholder education will be one of personalized meetings, group presentations, and events (such as stakeholder collaboratives). Duquesne Light will support these activities with collateral materials, props, videos, and demonstrations of smart meter services.

60 Days. Approximately 60 days before deploying smart meters in a specific region, Duquesne Light will conduct outreach events and presentations for both residential and business community members. The media Duquesne Light plans to use for community outreach includes PowerPoint presentations, trade show-style booths, and a mobile display (similar to other mobile smart meter/grid displays used by utilities, such as Oncor's Mobile Experience Center and Reliant Energy's Smart Home Solutions recreational vehicle). The likely venues for these outreach presentations include community groups (Chambers of Commerce, Rotary, citizens' councils, political groups), homeowners' associations, and community events (street fairs, farmers' markets, and athletic events). Content presented during these events will focus on features and benefits, function (how the system works), and confidence (accuracy, security, privacy, health, and value). To increase participation in these community presentations, Duquesne Light may use paid and non-paid media to generate interest and awareness.

30 Days. Thirty days before installing a smart meter at a customer's premises, Duquesne Light will implement a targeted direct media campaign. The first element is a direct mail letter which informs customers of the forthcoming smart meter installation. It also provides the customer information about the function, benefits, and confidence associated with the smart metering system. All communication materials will include Duquesne Light's call center website address and phone number for additional information

Three days before deploying meters at a customer's premises, customers will receive an automated phone call and/or email reminding them of the smart meter installation. This communication will provide customers as precise a time as possible for when the meter will be installed.

At the time of installation, installers will perform the installation according to a customer experience script (knock, explain, install, and leave record of work). A Duquesne Light field liaison will be available to provide immediate, on-call support to customers or, when not otherwise engaged, door-to-door outreach.

Five days after installation Duquesne Light will survey a sample of customers regarding installation satisfaction and their attitudes toward the smart metering system (as compared to the baseline survey).

Thirty five days after installation, customers who have signed up for Duquesne Light's My Account service or otherwise provided Duquesne Light an email address will receive a notification that their smart meter services (bill-to-date, bill alerts, projected bill, and hourly usage data) are now available to them online.

4. Measuring Success

The measure of success for a smart meter deployment project is a neutral-to-positive customer experience. Duquesne Light will measure the success of its customer experience and education efforts through three specific methods.

First, prior to launching the CEA plan, Duquesne Light will conduct focus group tests to ensure that the approach, themes, messages, media, and methods meet customer requirements. Additionally, Duquesne Light will administer a baseline survey that gathers customer attitudes toward the smart meter system prior to implementation. This baseline survey will enable Duquesne Light to then determine the impact of the CEA plan on consumer attitudes.

Second, after implementing the 90-60-30 strategy, Duquesne Light will track the:

- Number of website visits it receives
- Number of calls it receives from customers
- Classification of those calls in appropriate categories such as complaints, claims, high bill, and opt out.

Subsequent analysis of the volume and type of these calls will enable the Duquesne Light to maintain or adjust its customer experience, customer education, and customer support efforts. Additionally, Duquesne Light will collect customer feedback during outreach presentations regarding customer attitudes toward the smart meter system.

Third, five days after the installation of smart meters, Duquesne Light will survey a sample of customers regarding their satisfaction with the installation experience. Analysts will integrate the survey results into a weekly dashboard report for Duquesne Light. This report will guide Duquesne Light in taking appropriate action to correct deficiencies in the customer experience.

J. RISK MITIGATION STRATEGIES

Duquesne's Smart Meter Program is a multi-year, multi-million dollar endeavor that will greatly impact several key stakeholders including our customers and employees. Therefore, a large part of the grace period planning effort has been spent identifying program risks as well as developing strategies for mitigating the impact of these risks. Duquesne's risk mitigation strategies include:

- Engaging Industry Subject Matter Expertise throughout the planning effort
- Commissioning an AMI Technology Proof of Concept (POC)

- Instituting a ramp-up period along with a phased functional implementation within the Smart Meter Program deployment schedule
- Development of a Customer Acceptance Strategy aligned with the PA PUC Retail Market Investigation (RMI) Directives
- Engagement of an experienced Systems Integrator to own the end-to-end integration between the FOCUS and AMI projects

Industry Subject Matter Expertise

As a first step in our Smart Meter Program planning effort, Duquesne issued a Request for Proposal (RFP) in order to obtain the services of a utility industry advisor with extensive planning experience for AMI technology projects. R.W. Beck, Inc. (now SAIC) was selected for this advisory role and assisted Duquesne with our milestone flings as well as with our AMI vendor RFP process and AMI communication network extended analysis. Duquesne has also engaged industry subject matter expertise during our contract negotiations with ITRON. Eckert Seamans is providing external legal counsel while IBM is providing contract assistance from a business risk assessment perspective. IBM was also engaged to provide Duquesne with "lessons learned" from other Smart Meter Programs where they have served as the Systems Integrator as well as to assist Duquesne with developing our systems integration cost estimates for the AMI project. Finally, Customer Performance Group (CPG) is assisting Duquesne with development of a customer acceptance strategy designed to minimize the risk of customer backlash against smart meters that other utilities throughout the country have previously experienced.

AMI Technology Proof of Concept

In the latter half of 2011, Duquesne entered into a one year contract with ITRON to conduct an AMI Technology Proof of Concept (POC). This POC enables Duquesne to test the various components of the AMI System outlined in section IV of this plan. The POC is designed to validate the following data.

- Meter configurations/settings
- Captured interval data using ITRON AMI Service Test

- Captured event messages/alerts/alarms in the ITRON OpenWay Collection Engine
- Firmware download using the ITRON OpenWay Collection Engine
- On demand reads; remote disconnects and reconnects using ITRON AMI Service Test

In addition to testing the ITRON OpenWay components of Duquesne's proposed AMI System, this POC will also test various AMI communication network solutions. The scope of the POC is 36 residential meters and 16 commercial meters. These meters are installed in a dual-socket environment so that the customer's existing meter is still used for production billing purposes. The POC local area network (LAN) consists of four cell collectors and two range extenders. The POC wide area network (WAN) utilizes various private wireless solutions for intermediate transmittal to Duquesne owned communication towers as well as public wireless solutions for direct connect functionality. As part of the POC, Duquesne is also performing laboratory tests on several Home Area Network (HAN) devices. These devices include:

- Two Smart Thermostats
- Two In-Home Displays (IHDs)
- Two Load Control Devices

Ramp-up Period and Phased Functional Implementation

In order to minimize the risk of any potential unforeseen technology glitches having a mass negative impact on our customers, Duquesne is proposing a ramp-up period for Smart Meter deployments. This period will begin with a 5,000 smart meter acceptance roll-out in the latter half of 2014 followed by a gradual build-up to a full deployment of 9,000 meters per month by the end of 2015. In addition to the ramp-up period, Duquesne is proposing a phased functional implementation of Smart Meter features starting with the most basic capabilities such as monthly billing from smart meter usage data and ending with the most advanced capabilities such as support for Home Area Networks. This phased functional implementation is designed to allow the market for many of the advanced smart meter capabilities to become more mature, which will then provide a better definition of the requirements.

Customer Acceptance Strategy

In early 2011, Duquesne engaged Customer Performance Group (CPG) to assist the company with development of a strategy that minimizes the risk of customer backlash against smart meters that many utilities throughout the country have previously experienced. CPG has worked with several utilities in California, Nevada and Illinois to successfully deploy smart meters in a manner that increases customer awareness, understanding and confidence with the new AMI technologies. Duquesne Light's Customer Acceptance Strategy is explained in more detail in Section I above.

System Integrator

As explained in Section D above, Duquesne's Smart Meter Program has four levels of complex systems integration that must work both independently as well as in conjunction with each other in order for the entire solution to function properly. The Company believes that the success of our AMI project is highly dependent on engaging an SI that has utility industry experience with both AMI technology projects as well as with Oracle Utility Application Suite implementations.

IV. CONCLUSION

As explained herein, during the Grace Period, Duquesne Light has been implementing billing system and information technology changes that are necessary to provide customers with Smart Meter Technology. In addition, Duquesne Light has been carefully and thoroughly investigating ways to meet the Act 129 Smart Meter Technology requirements. Duquesne Light's Final Smart Meter Plan will provide all of the smart meter capabilities required under Act 129 and the Commission's *Implementation Order* to customers in a cost-effective manner.