Act 129 and the Aclara Portfolio

July 16, 2009

ACLARA™
Aclara Technologies of ESCO

© 2008 Aclara

Aclara Technology – Current Functionality

- **Bi-Directional Data Communications**
  - Each system in the Aclara portfolio provides two way communications from the head end to the endpoint devices.
- **Interval Data**
  - Each Aclara module integrated into an electric meter collects data with interval increments of at least one hour.
  - All Aclara modules have on-board memory to store historical interval data for at least seven days.
    - Modules are available that have memory to store data for longer periods
  - Aclara provides modules that can collect interval data of 15 minutes
    - Every system in the Aclara portfolio can implement 15 minute data for every metering point on the Utility's service territory with these modules.

© 2008 Aclara

Aclara Technology – Current Functionality

- **Customer Data Presentment Software**
  - Aclara provides data presentment software, called Energy Prism, that provides customer access to data
  - Consumers can view their rate structure, energy profile (hourly usage data), and energy costs using Energy Prism
- **Flexible Pricing Structures**
  - With interval data, Aclara's system supports time-of-use and other variable rate structures
- **Demand Response to Control Customer Loads**
  - Aclara's Demand Response Unit (DRU) and Load Control Transponder (LCT) provide the ability to control customer loads
  - The DRU uses Aclara's Intelligent Comfort™Technology
  - Designed to maximize customer comfort during Demand Response Events
  - Control based on monitoring individual appliance usage profiles provides equitable distribution of load shedding across customer base

© 2008 Aclara

Aclara Technology – Current Functionality

- Reconnect/Disconnect Functionality
  - Aclara's technology portfolio supports the reconnect, customer reconnect, disconnect, and service limiting functionality implemented in electric meters of various manufacturers.
  - Meters can be purchased with a button that allows the customers to reconnect their service at the electric meter.
  - This functionality is available now by purchasing a meter equipped with reconnect/disconnect functionality and an Aclara module

© 2008 Aclara

Aclara Technology – Current Functionality

- Downloadable Firmware
  - Downloadable firmware allows modules to be upgraded with new features without the replacement of the existing asset.
  - The modules deployed will have to support this feature
    - This functionality can be added incrementally through installation of these modules; the existing systems support the feature
- Net Metering/Distributed Generation
  - All systems in the Aclara Portfolio support net metering and bi-directional metering
  - Each module reads and returns net metering data

© 2008 Aclara

This current functionality is available today in systems deployed in Pennsylvania.

PPL's Aclara Two Way Automatic Communications System (TWACS) currently provides:

- Bi-directional data communications
- Hourly interval data reads delivered across the network every four hours
- Data access for the customer using Energy Prism
  - Customers can view their hourly interval data
  - Access rate structures, energy usage, and costs
- Outage detection and restoration
- Reconnect/Disconnect
- Net Metering/Distributed Generation
- Flexible Rate structures can be supported using interval data

With an additional investment, the following features can be supported now:

- Demand Response programs can be supported with the installation of DRU's; no additional infrastructure is required.
- Downloadable Firmware can be supported through installation of Aclara modules capable of that functionality.

© 2008 Aclara

Interoperability, Standards, and Legacy Systems

- Many AMI systems are deployed in North America, providing value today and will continue to provide value and added functionality tomorrow to Utilities and their customers

- Through adoption of IP and a common information model at the proper layer of the Smart Grid, these AMI systems will continue providing services and functionality
  - Interoperability and information exchange is achieved
  - Other Smart Grid functions can be added at other layers of the system, and allow a growth and migration path while not stranding assets
  - Standards support at key layers

© 2008 Aclara

Standards

- Aclara supports the adoption of existing industry standards for use in Smart Grid
- Standards should be structured to drive innovation
  - The key is for the standards to enable:
    - interoperability and data sharing for all utility segments (Electric, Gas, and Water)
    - security
    - guidance for future applications
    - a roadmap to address the gaps of today for tomorrow's development
- New standards will need to address:
  - A variety of yet-to-be-defined hardware, data, and applications
    - I.e. Yesterdays parallel port is today's USB. Speed and size will influence another generation of development

© 2008 Aclara

Standards

- The Smart Grid will be an interconnection of systems
  - Interoperable by the use and application of IP
  - Multiple data structures and protocols will be used based on the part of the Smart Grid
    - Distribution Automation – IEC-61850, DNP3, MODBUS
    - AMI – standards such as C12.19, C12.22, and others
    - Home Area Networking – Zigbee, Homeplug, Smart Energy Profile, WiFi
- Smart Grid will develop based on common objectives, and should allow for innovation and evolution while anticipating further change

© 2008 Aclara

Future Functionality - Reconfiguration of Electric Meters

- The ability to remotely reconfigure electric meters is currently being developed for the systems in the Aclara portfolio

- These features will allow the Utility user to configure the meter:
  - To implement meter specific functionality
  - Change Rate Structures
    - TOU parameters
    - CPP and other flexible rates
  - Update calendars

- Support for this functionality is currently in development. Implementing this feature requires an ANSI C12.19 capable meter and a head end software application enhancement.

© 2008 Aclara

Future Functionality - Voltage

- The systems in the Aclara portfolio have the ability to retrieve voltage measurements from the electric meter.
- Readings are sent on request at this time
- Devices that monitor voltage more frequently exist are in development in all systems in the Aclara portfolio, including functionality that will indicate whether the voltage is outside a set Utility range (+ x % of rated voltage).
  - Implementing this feature will require the installation of meters and modules.

© 2008 Aclara

The Aclara portfolio is structured for flexibility.

- Systems are interoperable, allowing our solutions to grow with our customer's needs now and in the future.

- A Utility can add Aclara's:

  - Distribution Automation and Monitoring
  - Demand Response
  - Meter Data Management and Data Presentation

This interoperability allows the utility to add Smart Grid functionality to enhance functionality of systems over time

© 2008 Aclara