Questions and Answers from EA Live Webcast

The Smart Grid Now Delivered - 2PM EDT, Tuesday, June 30, 2009

Q. What support does EnergyAxis provide for IHD interoperability?

A. EnergyAxis supports multiple methods of enabling communications to in-premise devices. Today Elster offers solutions that include use of ZigBee Smart Energy Profile and we also support communications using EnergyAxis 900MHz technology. Multiple ZigBee and 900MHz displays options are available from Elster partners. Please contact your Elster representative for a comprehensive list of IHD partners.

Q. Much of our service area is in rural areas. What solutions are available, or in planning, to extend coverage into remote/rural areas?

A. There are multiple options to address coverage in rural areas, with the best solution depending on an analysis of the specific area(s) in question. EnergyAxis is currently being used in rural areas today and in many cases the EnergyAxis LAN will provide sufficient coverage. A rural "pocket" of devices is frequently accessed by establishing connectivity to Gatekeepers in the area using one of a variety of WAN options (for example, cellular, satellite, private radio or others). Further, optional external antennas are available on all gatekeepers and also on all metering points. Though we typically find that these antennae are not necessary, they can be used to enhance coverage of the EnergyAxis LAN when and where needed. This year we are introducing EnergyAxis repeaters, and as noted in our webcast we are also extending the LAN's mesh depth from 8 to 16 hops. Both of these solutions will extend the reach of the EnergyAxis LAN and further improve performance in rural areas. For very isolated single-point solutions, we typically recommend a direct WAN connection to the endpoint; however this usually represents an extremely small portion of the overall system.

Q. Please describe the process where software on installed equipment is updated remotely and what steps you are taking to keep installed equipment from going obsolete.

A. Firmware updates to field devices are initiated with the EnergyAxis Management System (EA_MS). The EA_MS securely distributes an encrypted image of the new firmware image to the Gatekeepers along with a list of the specific end devices which should receive that image. The Gatekeepers then independently manage the distribution of the image to the specified devices in their subnet using a broadcast mechanism. This is a great example of the distributed intelligence of the EnergyAxis system and assures that all desired upgrades are reliably accomplished with a minimum amount of WAN and LAN communications. EA_MS contacts the Gatekeeper periodically to check status and controls the eventual message to "activate" the new firmware once receipt of the new image has been verified by all of the end devices. For a more in-depth discussion on this process, please contact your local Elster representative.

Q. You do need an integrated model of the power system, main generation, renewables, storage and distributed controllable resources to evaluate the best way to run to reduce/remove fossil fuel burn. My specialized subject over many years!

A. We agree. EnergyAxis smart grid solutions allow for bi-directional metering and multiple channels of interval metering at the revenue meter. Elster also offers measurement devices that can be placed at co-generation sites so the exact status of the co-generation can be known and understood across the grid and made available to any applications attempting to minimize the use of fossil fuels.

Q. How many smart grids can a single management system control?

A. The EnergyAxis Management System (EA_MS) is designed to support millions of connected network elements. There is no defined limit though the hardware and the IT environment must be sized to accommodate the desired performance characteristics such as the speed of data retrieval. These network elements can be within a single utility or can be spread across multiple utility environments in cases where EA_MS is used by a centralized service provider. We have active deployments under each of these scenarios.

Q. How will your product support micro generation?

A. All of the measurement devices used within EnergyAxis today support bi-directional energy measurement, allowing time-based differentiation of when energy is received from the grid or delivered to the grid. We also have commercially available EnergyAxis measurement devices in different form factors than the traditional socket based meter. These devices can be easily deployed on specific loads that might exist "behind" the billing meter such as a solar panel or wind turbine, providing direct measurement of the energy delivered by these distributed energy resources. This measurement is time-synchronous with the entire smart grid network.

Q. Does Elster meet all the "Buy America" provisions of the Smart Grid FOA?

A. Elster Electricity is an American company based in Raleigh, North Carolina with approximately 450 American employees and has been in business for seven years. The metering business which traces itself back to Westinghouse is over 120 years old and was located by Westinghouse in Raleigh in 1954. Elster Electricity meters satisfy the "Buy American" provisions of the Act.

Q. Are the ARRA funds earmarked for S/G and/or Energy R&D available to anyone (i.e., both users and suppliers), or only to utilities?

A. The funds in ARRA are available to suppliers as well as utilities. The Energy Independence and Security Act of 2007 (except for appliance controls and electric motor manufacturers) had generally limited funding to utilities. However, the ARRA changed this to make funding available to smart grid products and systems manufacturers, in addition to utilities.

Q. You mentioned ubiquitous two-way communication for AMI. What are the most needed communication technologies right now (zigBee, WiFi, Bluetooth, proprietary, mesh, etc)? What communication technologies do you see will be needed next?

A. The answer to this question depends on the application. Some communications technologies are intended for HAN applications where there is a need for low power short range solutions. Other technologies are designed for the LAN where there is a need for reliable, yet cost effective communications for large numbers of devices throughout the utility distribution system. Yet other technologies provide WAN solutions where there is a need for higher bandwidth and throughput.

There are many communications technologies in each category (HAN, LAN, WAN), each with their own benefits targeted for the specific application. For example, ZigBee technology is primarily focused on low-power short-range communications in support of applications like in-premise communications, while WiFi and cellular data services provide broadband speeds for WAN connectivity, and mesh LAN technologies provide an optimum balance of cost/performance to economically reach grid sensing and control devices such as meters. We look at this issue as not so much being a question of what technologies are 'needed,' but rather what combination of communications technologies create the best overall solution for a given smart grid deployment.

A great example of this can be seen with WAN communications. EnergyAxis supports virtually any WAN technology. A utility with an existing deployed private WAN solution will certainly want to leverage that for their smart grid applications. Other utilities may desire to leverage existing WAN relationships they may have with public wireless carriers or intermediate M2M communications providers. The beauty of EnergyAxis is that we can work with multiple communications technologies at all levels of the system to provide the best overall solution to each customer. Further, new technologies can be applied as they become available. For example a utility might initially deploy a system using cellular based WAN communications but later switch to another WAN technology (e.g. WiMax, private fiber, etc.) when those technologies become available in their service territory.

Q. What challenges have you identified to secure reliable supply chain management in order to make sure utility orders are fulfilled on time? What questions should utilities ask potential suppliers regarding reliable manufacturing and delivery of smart grid products?

A. Most supply chain lead-times extend well beyond the desired smart grid component lead-times. This means that the components used in a smart-grid device must be ordered well ahead of the actual customer order. The main concern is having a good forecast of what is needed and sufficient supply capacity in place to meet that forecast. This requires that the product be mature enough that the components are not changing. It also requires that the product have as few variants as possible, or at least that the variants are understood and covered by the forecast. Unfortunately, it is difficult in this industry to forecast a stable product. New products in new markets are much more difficult to forecast. Design or component quality problems can have a devastating effect on supply. These can be somewhat mitigated by designing for few variants, having robust quality procedures in place, having proven or multiple sources, having close suppliers, etc. Questions a utility should ask:

- What is the product verification / qualification process?
- What is the supply/manufacturing quality process?
- How many units of this design have been produced and how long have they been in the field?
- How many units of this design are you currently building each month, what is your current capacity, what percentage of your capacity would my business be, do you have others vying for that capacity, what are your capacity plans?
- Where are your suppliers located? Can I visit your suppliers?
- What major components/assemblies are single sourced?

Q. What is Elster doing to response to cyber security concerns?

A. EnergyAxis provides stringent security measures throughout the network with AES-128 encryption with security keys for each device at all levels. Security features are built into the end devices, the radio communications networks, the gatekeepers and the network management system. Data is protected while residing in the end devices and gatekeepers as well as during LAN and WAN transmission. Passwords are required for access to any field devices. We also support HAN level security through the ZigBee Smart Energy Profile or AES encryption for EnergyAxis LAN enabled in-home devices. Additional information and system security is provided at the EnergyAxis Management System (EA_MS) level. User activity is also monitored and recorded for auditing and Sarbanes Oxley compliance.

Q. What is Elster's involvement in the NIST standards activities?

A. Elster is committed to open (including IP) standards based solutions and serves on numerous US and international standards committees. Elster is directly and deeply involved in the National Institute of Standards and Technology interoperability standards framework development process established by the Energy Independence and Security Act of 2007. Recent participation included a meeting with George Arnold, Deputy Director of NIST and National Coordinator for Smart Grid Interoperability, on June 23, 2009; and participation at the May 19 and 20, 2009 National Harbor standards meeting, where Elster had 15 representatives, more than any other company. Elster continues to maximize present and future smart grid capabilities including interoperability and cyber security.

Q. What plans does Elster have for Hybrid Electric vehicles and EnergyAxis?

A. The Energy Information Administration estimates that baseline electricity demand will increase 25 percent by 2030 with an additional 8 percent increase projected to meet the need of Plug-in Hybrid Electric Vehicles (PHEVs) in this same timeframe. We facilitate the interconnection of emerging and future renewable energy sources like solar and wind. EnergyAxis is poised to adapt to unfolding grid requirements including the use of hybrid electric vehicles. One example of how EnergyAxis offers improved energy efficiency and environmental sustainability is through the use of PHEVs as distributed storage devices. Because EnergyAxis is able to support bi-directional metering (enabling it to track availability of power from renewable resources), a consumer could establish charging preferences that favor green sources of supply. Similarly, based on consumer priorities, charging and load dispatch within the home or premise could respond to both real time pricing and availability of renewable sources.

Q. Is Elster proving assistance with ARRA applications?

A. Elster is well qualified to help utilities apply for Department of Energy smart grid cost sharing grants. Elster is helping a number of utilities prepare each application as part of the utility's project team. Elster's Vice President of Regulatory Affairs was directly involved in the drafting of the Energy Independence and Security Act (EISA) of 2007 (PL 110-140), which is the federal law that is the basis for the smart grids grants program. Elster has prepared applications sections for its scope of smart grid systems and components supply, including technical descriptions as well as discussions on cyber security and interoperability responsive to the Department of Energy Final Funding Opportunity Announcement requirements of June 25, 2009.

Q. Are the technology enhancements you talked about applicable to EnergyAxis meters already in the field or do you have to replace the older hardware?

A. The new enhancements to our LAN technology can be deployed on devices that are in the field today. Any device that has a second-generation EnergyAxis LAN radio is capable of receiving these enhancements and Elster is able to deliver these enhancements to those devices through over-the-air flash firmware upgrades. Initial installations of second-generation EnergyAxis radios began more than one year ago with the REX2 introduction. Second-generation devices specifically include the EA_NIC in all REX2 meters, EA_NIC cards v3.5 or higher in A3 ALPHA meters, and v5.0 or higher EA_Gatekeeper modules. While we are able support this upgrade to second-generation hardware, we are also pleased to communicate that we are not obsolescing any existing first-generation hardware that these customers night have in their installations.