Panel Session #4
Smart Grid Workforce Training and Education: Identifying the Industry Perspective

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A Workshop on
Building Research Collaborations: Electricity Systems
MRGN Building Room No. 121
(Burton D. Morgan Center for Entrepreneurship Center, Discovery Park)
Purdue University, West Lafayette, IN 47907
August 28-29, 2013
Process

- Series of interviews and working sessions with electric utilities serving Indiana
  - Wave 1: Initial information gathering on status of each utility’s grid modernization efforts, plans and concerns
  - Wave 2: Discussion of common issues and concerns, and education and training challenges
  - Wave 3: Discussion of potential course content and training modules
Industry Staffing Challenges

- Evolution towards a national Smart Grid is occurring in the context of major energy sector staffing concerns which include:
  - Effects on grid reliability and capability with the loss of knowledge and expertise due to retirements (line, technical and engineering)
  - Up-skilling of the existing workforce to meet changing and increasingly technical requirements
  - Filling the career pipeline with students interested in energy careers
  - Improving employability and retention
Key Observations

- Firms approach Smart-Grid very differently
  - Term “Smart-Grid” may add more confusion than clarity
  - One interviewee noted: “if you put 100 highly qualified industry professionals in a room and asked them to define SG, you would get 50 different answers.”
- Each utility is at quite different points in internal planning for Smart-Grid, yet all are implementing core platform strategies critical to a mature Smart-Grid framework
  - Distribution & substation automation
  - Incorporation of variable and unpredictable sources of alternative and distributed supply
  - Installation of smart meters
  - Sophisticated demand management programs, etc.
Common Ed/Training Issues: I

- **Smart-Grid Overview:** Interested in providing employees with basic understanding of Smart-Grid in general and specifically what their firm is implementing.

- **Advanced Smart-Grid Concepts:** Smart-Grid implementation has highly differential impacts across firm.
  - Who needs to know what? (e.g., engineering, IT, field staff, and customer service, etc.)

- **Distribution & Substation Automation:** Firms very early in Smart-Grid planning, but all are at different points in the deployment of distribution & substation automation (DA).
  - Face an array of similar engineering and technical workforce challenges associated with planning, design, installation, operations, maintenance, troubleshooting and repair.
Common Ed/Training Issues: II

- Challenges of an **evolving hybrid system.**
  - Deployment takes time. Must design, plan, deploy and safely operate digital systems in older electro-mechanical framework
- **Security:** Rapidly evolving security threats: not just Cyber
- How to get **engineering staff up to speed on IT and security,** and **IT staff up to speed on power systems**
- Impacts on **business management**
- Emphasis on building a “**communications**” skillset
  - Strong need to add communications technology people and skills
- **Data analysis and management:**
  - Strong need for people and skills to plan for, design architecture and systems, and analyze and use effectively the massive volumes of data that will become available
Common Ed/Training Issues: III

- **Planning**: Concern about internal depth and breadth of planning knowledge, ranging from high-level system design to the most mundane changes in day-to-day operations.

- **Customer education**: Much public misunderstanding and confusion.

- Particular needs noted for **control and automation engineering**, **sub-station engineering**, and **substation operations** (what one firm called substation mechanics), cutting across requirements for planning, design, and operations.

- **Transition from vendor to internal staff**: Most firms will deploy with vendors, but over time will re-integrate some installation, O&M, and repair functions back into the firm.
Power Industry Job Outlook

- Large replacement demand
- Position redefinition: All jobs become more technical
  - For example: redeployment of meter readers to meter and instrument techs
- Large growth in requirements for communication, data, and IT skills
Incentive to Get it Right
Thank You

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Background Information
Acknowledgment

- This material is based upon work supported by the Department of Energy, Energy Delivery Technologies Division National Energy Technology Laboratory under Award Number: DE-OE0000469.

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NIST Reference Model
Smart Grid Data Explosion

- New devices in the home enabled by the smart meter
- Advanced Distribution Automation
- PCTs Come On-line
- Distribution Management Rollout
- Mobile Data Goes Live
- GIS System Deployment
- RTU Upgrade
- Substation Automation System
- OMS Upgrade
- AMI Deployment
- Workforce Management Project

Annual Rate of Data Intake

Source: EnerNex Corporation