

Utilities as Networks Part I:

How the Smart Grid Changes the Utility Paradigm

Hon. Paul A. Centolella, Commissioner
Public Utilities Commission of Ohio

NARUC Summer Meetings
Portland, OR.
July 21, 2008

What is a Smart Grid?

- Characteristics: Stakeholder Consensus from DOE Smart Grid Regional & National Conferences

Characteristic	Today	Tomorrow
Motivates/Includes Consumer	Little price visibility, dynamic pricing rare, few choices	Prices that vary with cost are available to end use devices. Consumers can program in preferences & choose plans. New services are available.
Accommodates Generation/Storage	Dominated by central generation. Limited DG, DR, storage, & renewables.	Distributed generation, storage, & demand response refine central station power to meet local needs and accommodates renewables.
Enables Markets	Limited, one-sided wholesale markets, not fully integrated	Integrated , two-sided demand & supply markets
Meets Power Quality Needs	Focus on longer outages not momentary outages or power quality	Power Quality a priority with quality options to meet digital economy requirements

What is a Smart Grid?

- Characteristics continued ...

Characteristic	Today	Tomorrow
Optimizes	Safe operations require significant capacity margins.	Improved utilization of existing assets. Integration of grid intelligence with asset management.
Self Heals	Protects assets and responds following a disruption	Automatically detects and responds to problems, preventing disruptions and minimizing their impact
Resists Attack	Vulnerable to terrorists and natural disasters	Resilient with rapid restoration. Cyber-security built in.

Source: Adapted from NETL Modern Grid Initiative

What is a Smart Grid?

- **Functionality:**

- Smart Grid = An electrical grid that has been enhanced through the use of digital technologies and that informs customers, utilities and society in making wise choices in how energy is produced, delivered and consumed.

- In practical terms, the smart grid (SG) can be represented by the following equation:

SG = Necessary foundational applications [Advanced Metering/Dynamic Pricing and Distribution Automation] + Exciting prospective functions [Home Automation + DG + PHEVs + Storage + much, much more to come]

- *Proposed by: Ahmad Faruqui as Modified by Michael Jung (EEI AMI List Serve)*

What is a Smart Grid?

- Network Architecture:
 - A smart grid is the integration of the power system with an open architecture, advanced communications infrastructure.
 - The network provides the platform for a potentially broad range of sensing, measurement, transactional, control, and other applications that may include AMI, dynamic pricing, advanced distribution automation, distributed resource management, electric vehicle integration, etc.
 - A smart grid is the information and communications architecture that supports new applications and permits them to interact with one another and with established power system functions.

Panel Members

- Dan Delurey, Executive Director of the Demand Response and Advanced Metering Coalition
- Eric Dresselhuys, Vice President for Markets, Silver Spring Networks
- Jana Corey, Director, Energy Information Network, PG&E