



gridSMARTSM
from American Electric Power

AEP's gridSMARTsm Initiative

FCC Workshop
August 25, 2009

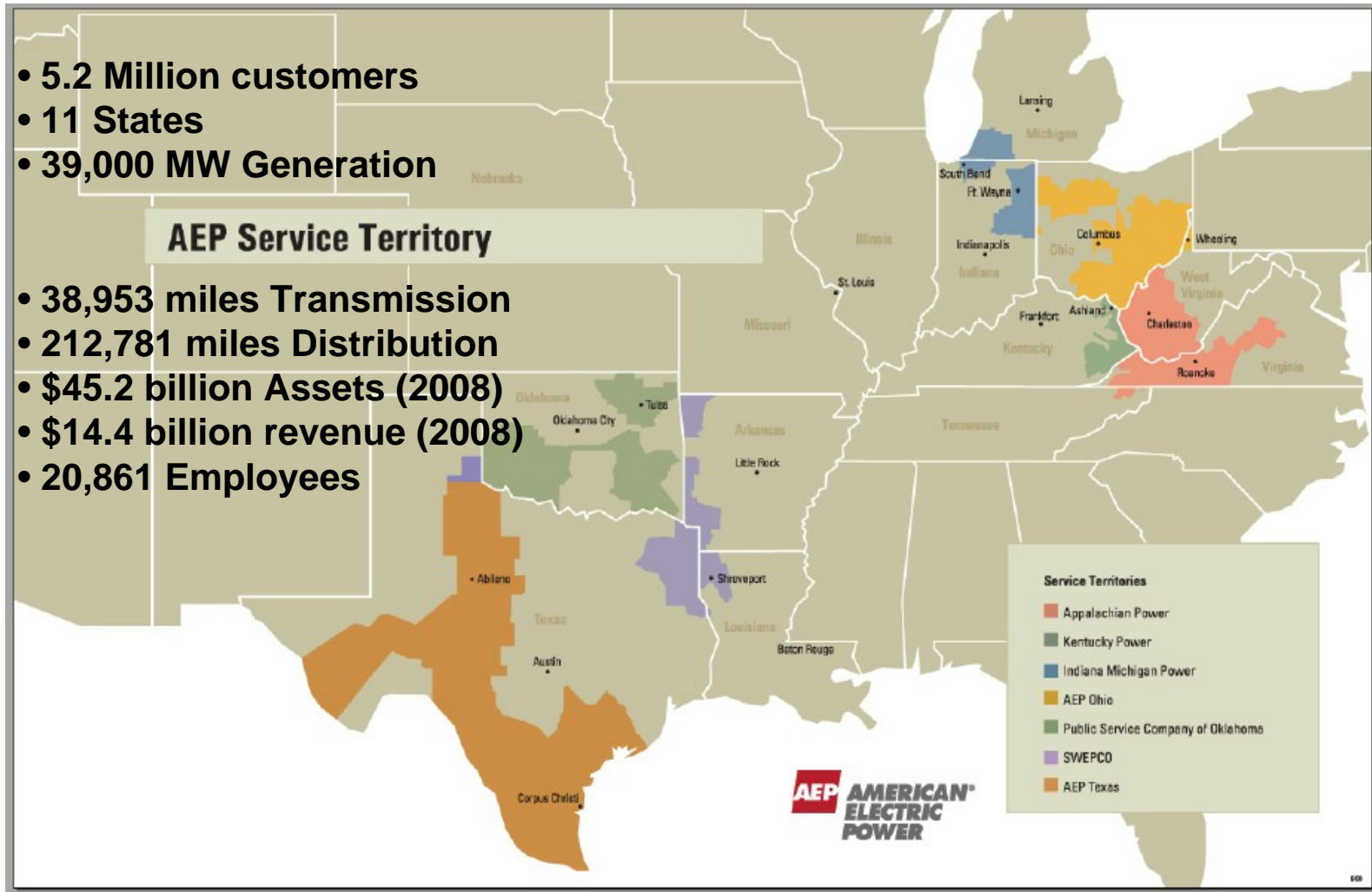
Jason D Griffith
Director – IT Telecom Engineering

AEP Overview

- 5.2 Million customers
- 11 States
- 39,000 MW Generation

AEP Service Territory

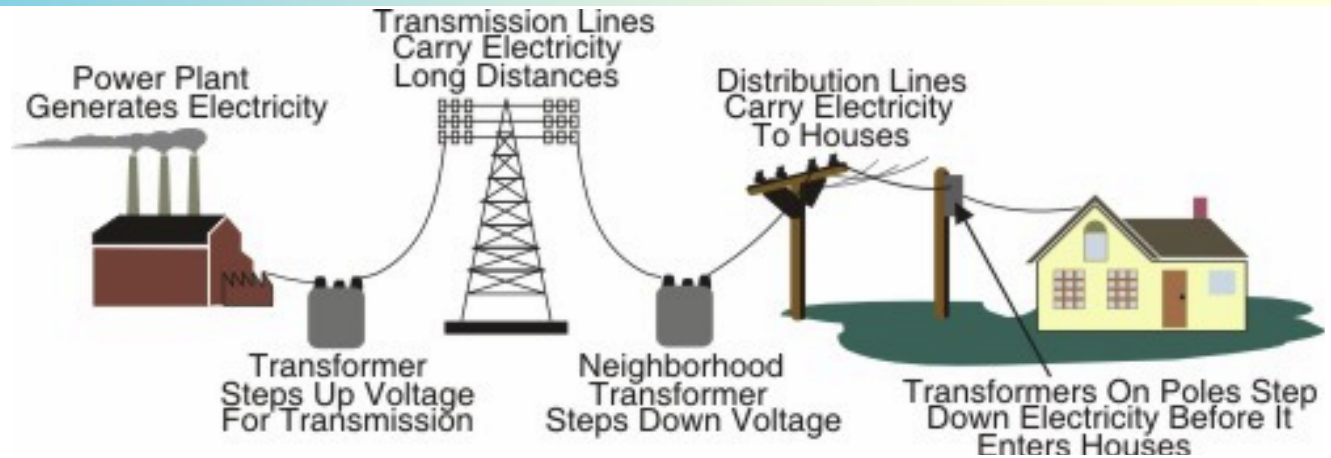
- 38,953 miles Transmission
- 212,781 miles Distribution
- \$45.2 billion Assets (2008)
- \$14.4 billion revenue (2008)
- 20,861 Employees



The Evolution of the Electric Utility System

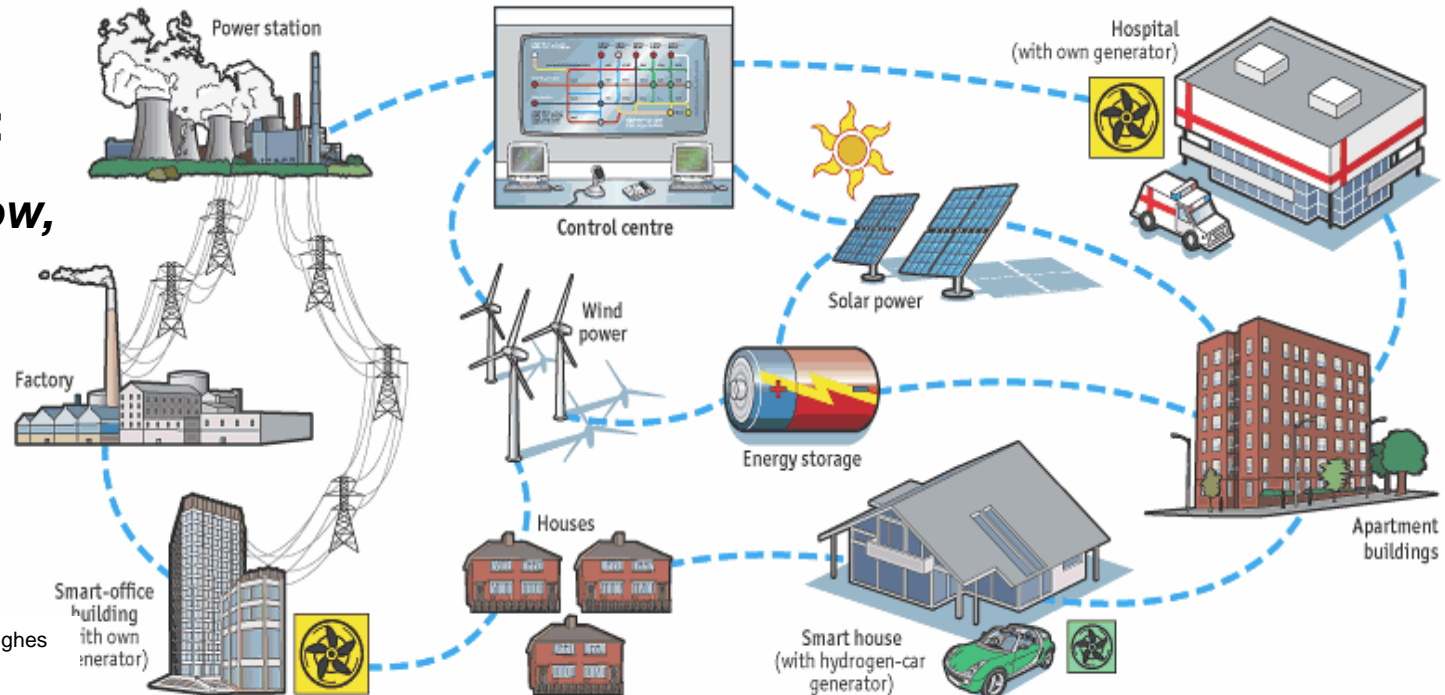
Before Smart Grid:

*One-way power flow,
simple interactions*



After Smart Grid:

*Two-way power flow,
multi-stakeholder
interactions*



Adapted from EPRI Presentation by Joe Hughes
NIST Standards Workshop
April 28, 2008

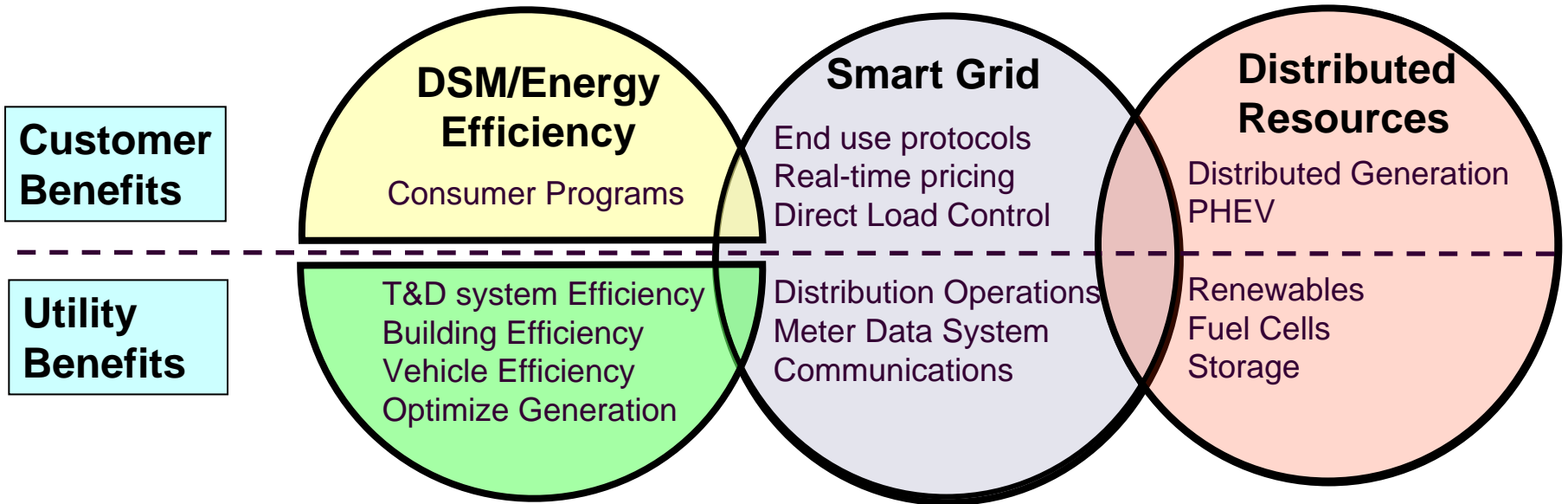
Operational Challenges to the Utility Business

To name a few....:

- Consumer demands for more control over energy consumption to control costs.
- Renewable generation, owned and operated by AEP customers, has grown by a factor of 1000 in a decade, and now doubling each year
- Customer renewable DG is variable, often not available when needed and out of the control of the utility operator
- Plug-in Electric Vehicle (PHEV) is coming
- Proper timing and maximizing the impact of invested capital

The “Smart Grid” is the key to mitigating these impacts

AEP's *gridSMART*SM Initiative



AEP's *gridSMART*sm initiative is a comprehensive approach to modernizing the electric system

Advanced Metering Infrastructure (AMI) - the Foundation for the “Smart Grid”

- AEP’s goal to install five million smart meters by 2015
- Provide customers time-based usage information
- Allow utility monitoring and control of the delivery of electricity at the meter
 - Remote Connect/Disconnect
 - Delivery Status
- Enables “Demand Response” Programs
- Provides communications foundation for distribution automation and grid management



AEP completed deploying approximately 10,000 meters in South Bend, Indiana, and is pursuing additional deployments ranging from “model city deployments” (Columbus, Ohio) to one million meters (Texas).

Telecommunication Requirements- to support AEP's "Smart Grid"

- **Coverage/Availability** – AEP's (197,500 square miles) rural/urban
- **Bandwidth** – Is it able to carry the data?
- **Latency** – Is the response time acceptable?
- **Dependable/Reliable** – Is the system or service there when you need it?
- **Affordable** – Is it cost effective?
- **Secure** – Does it provided the necessary security?
- **Not dependent on end use power source**
- **Not dependent on end use controlled subscription service**

AEP believes multiple options exist to provide smart grid telecommunication solutions. These include both licensed and unlicensed private wireless as well as commercial solutions.

AEP's Position on the Need for Dedicated Spectrum

- Dedicated licensed spectrum is sorely needed by utilities
- Needed to support the growing voice and data needs for existing SCADA, voice dispatch, AVL, and mobile data applications for the field workforce
- Needed to support the new and expanding “Smart Grid” data needs of AMI, and DA
- Dedicated spectrum is much less likely to receive interference and has a remedy procedure if interference is experienced
- Dedicated, licensed spectrum would likely allow for higher transmitter power, reducing the amount of infrastructure required to serve a given area, when compared to unlicensed solutions

AEP will need significant bandwidth in the areas that it serves and commercial broadband services will not always meet the requirements. Private broadband will be needed in some areas

AEP Supports the sharing of the 30 MHz at 1.8 GHz

- Harmonized with the Canadian grant of 30 MHz at 1.8 GHz
- Common spectrum allocation with Canada supports economies of scale for equipment and service providers lowering overall cost of ownership to utilities and ultimately lower rates to rate payers
- Quicker time to have equipment available since manufacturers will be making equipment for Canadian utilities
- The allocation of 30 MHz will support many utility critical infrastructure systems. (AMI, DA, SCADA, Voice Dispatch, Mobile Data, and AVL)

The allocation of the 30 MHz, if permitted, would be used for utility internal critical communication needs

Use of the 1.8 GHz Spectrum must be optional

- FACT: The development cycle of equipment and systems will take at least a couple of years to be realized for availability of equipment and systems.
- Existing utility communication systems must not be stranded
- The near term AMI and DA projects should not be delayed waiting on 1.8 GHz equipment development and manufacturing
- Other spectrum solutions both licensed and unlicensed will continue to be utilized by utilities depending on the requirements
- Existing spectrum that utilities hold licenses for must not be forfeited as part of 1.8 GHz spectrum
- 1.8 GHz Broadband solutions would complement the utility existing 450 MHz, 800 MHz, and 900 MHz systems

Utilities are seeking the support of the FCC for utilities to have access to the 30 MHz of 1.8 GHz spectrum to share with the existing government users.



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