

A Smart Grid Case Study

Leesburg's Approach to Smart Grid Deployment

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Lake County Green Symposium
July 29, 2010

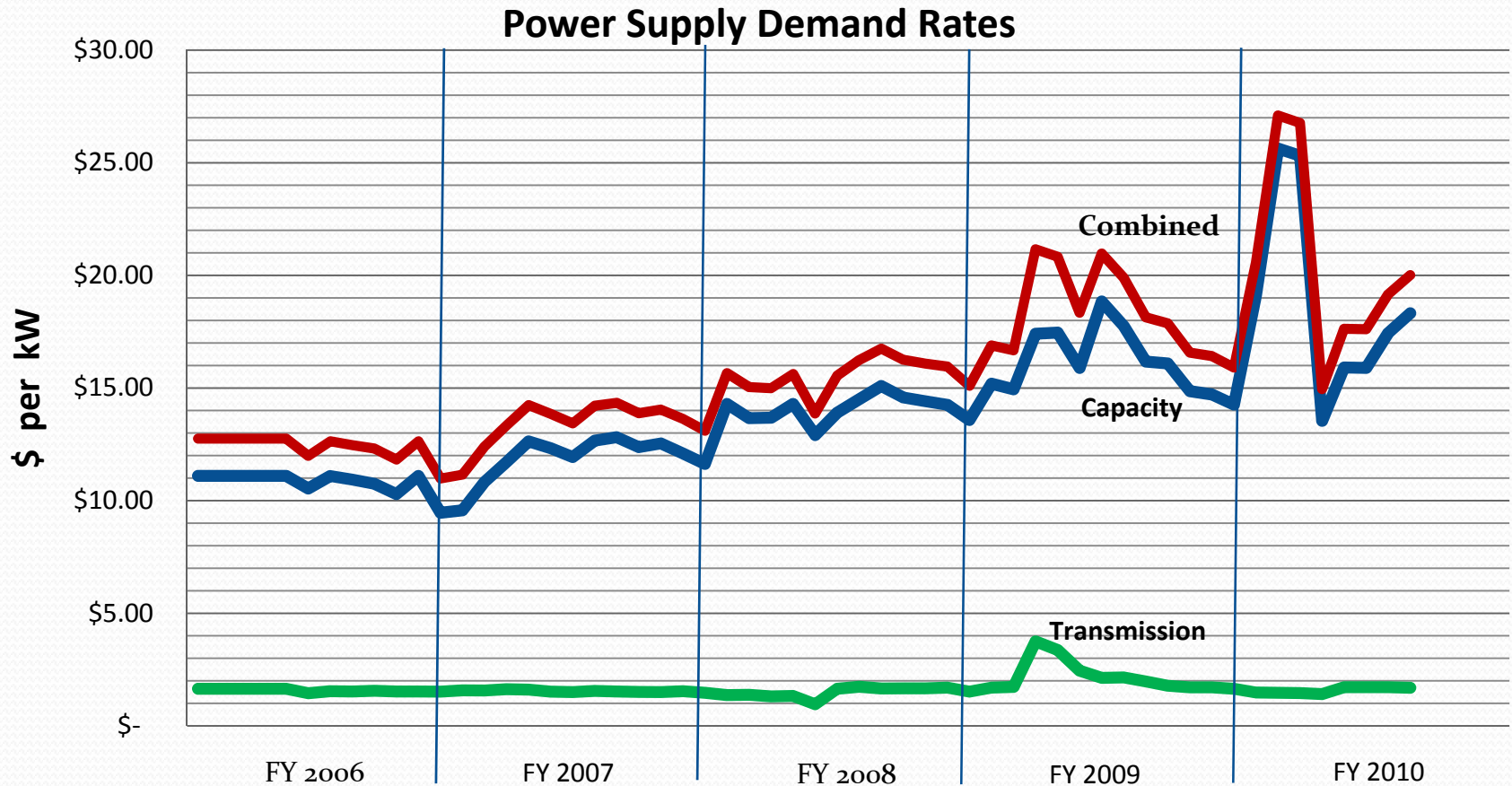
Current Grid vs. Smarter Grid... Differences

	Current Grid	Smarter Grid
Communications.....	None or One Way	Two Way, real-time
Customer Interaction..	Limited	Extensive
Metering.....	Electromechanical	Digital, real-time
Operation.....	Manual checks and maintenance	Remote monitoring, predictive, need-based
Generation.....	Centralized	Centralized & distributed
Power Flow Control....	Limited	Comprehensive, automated
Reliability.....	Prone to failures and reactive to events	Automated, pro-active protection
Restoration.....	Manual	Self-healing
System Topology.....	Radial; one-way power flow	Network; multiple power flow pathways

Leesburg Overview

- 23,000 electric customers also gas, water & internet.
- 9,700 (42%) AMR electric – 18,900 (34%) AMR total meters.
(Discontinued further AMR deployment 2007)
- 140 residential electric meter AMI pilot deployed January 2008.
- Completed AMI Business Case December 2009.
- \$19,500,000 SGIG from DOE & \$1,240,000 EECBG from State
- Finalizing Smart Grid RFP for release this week.

Top Priority... Reduce Peak Demand



Why are Costs Increasing?

- Increasing global demand for energy
 - Increasing per capita energy usage
 - Developing nations also want modern conveniences
- Increasing requirements for environmental measures
- Renewable technologies have orders of magnitude higher costs
- Newer traditional generation is always more expensive

Startling Realization

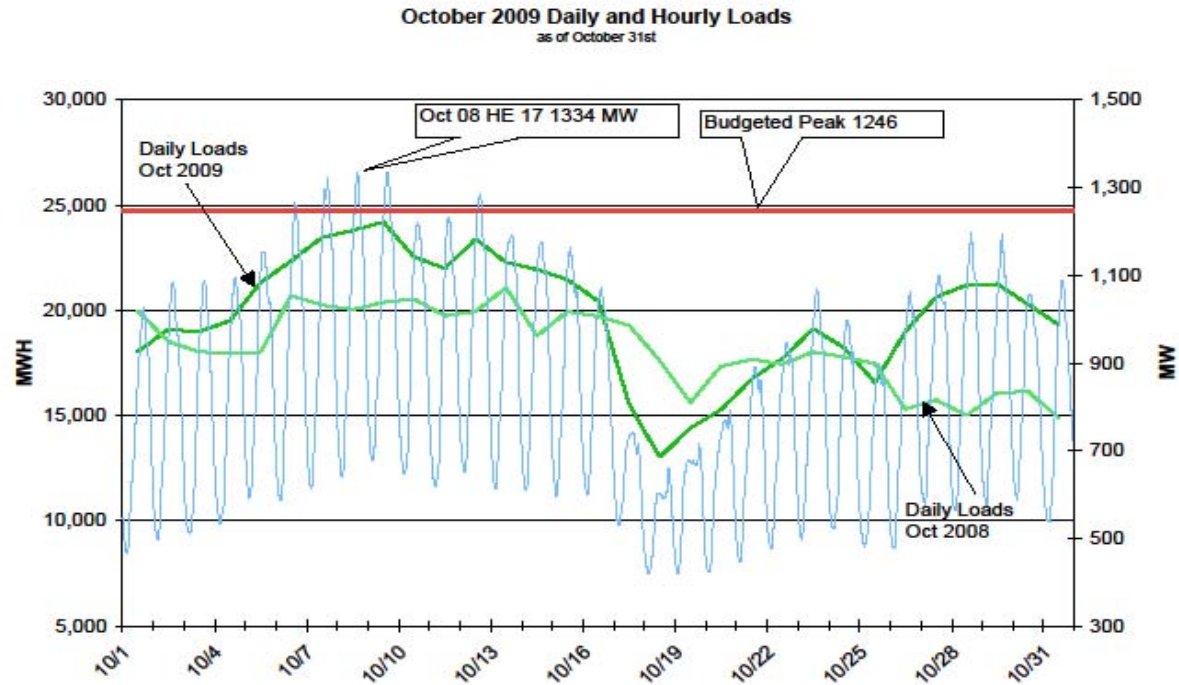
- All kilo-watt-hours are:

NOT CREATED EQUAL - Cost Differences

- The lowest cost kilo-watt-hour is:

The kilo-watt hour NOT GENERATED

Charges Based on Coincident Demand





Where Did We Start?

1. Developed a Vision
2. Identified 4 Broad Goals
3. Focused efforts on Strategies

Leesburg's 2020 Vision

Leesburg will operate the best and most secure electric grid available in the country by the year 2020 by incorporating information and control technologies that can support four goals:

- (1) empowering consumers,
- (2) rewarding conservation and energy efficiency,
- (3) improving distribution reliability and resiliency
- (4) expanding the use of renewable energy, distributed generation, and alternative technologies.

Focus - Empowering Consumers

- AMI Related Technologies
 - Advanced Metering Infrastructure (Focus: Consumer Needs not Technology)
 - Smart Meters.
 - Communications network, or 2 or 3 or 4.... or more
 - Meter Data Management System
 - Communications infrastructure and meter installation
 - Field Acceptance Testing
 - Home Area Network
 - In Home Display and web portal
 - Programmable Communicating Thermostat
 - Direct Load Control
 - Pay-as-you-go

Focus: Rewarding Efficiency & Conservation

- Energy Efficiency & Conservation Initiatives
 - Consumer Education & Information to change behavior
 - Communications Plan
 - Who to notify
 - When to notify
 - How to notify
 - Focus Groups to receive consumer input
 - Time Differentiated Rate Schedules – offer choices
 - TOU, PTR, Direct Load Control, Other
 - Utility control or Consumer control
 - Security and Personally Identifiable Information(PII)

Focus – Improving Reliability and Resiliency

- Reliability and Resiliency Initiatives (Automation)
 - Cyber Security
 - Outage reported by the Meter
 - Substation Power Transformer w/Smart Grid monitoring
 - Distribution Transformer Monitoring
 - Communicating Reclosers
 - SCADA Upgrades
 - Communicating Faulted Circuit Indicators
 - Trip Saver Cutouts (fuse saving vs. fuse blowing... how about both)
 - Integrated Distributed Generation
 - Integrated Volt/VAR Control

Focus – Expanding the use of Renewable Energy, Distributed Generation, and Alternative Technologies

- “Preparing for the Future” Initiatives - In Progress
 - Integrating customer owned Solar PV systems
 - Integrated Distributed Generation – Utility and Customer
 - “Florida Clean Energy Grant” application for a 25 kW Solar PV system, with storage and monitoring to be installed at an E-Shelter elementary school
- “Preparing for the Future” Initiatives - Future
 - Integrating PHEV Load and Storage
 - 2 MW Battery Storage at Substations
 - ???

Approach to Smart Grid Deployment

- Attack our biggest issues – our needs are different
- Focus on our Consumer - not the technology
- Create a Vision and Goals - to drive your strategies
- Prepare a Business Case – you may be surprised
- Smart Grid entry points – start with what you have
 - AMI or Distribution Automation
- Learn from others – Good, Bad, and Ugly
- Replicate only the GOOD
- Our business model will change – back office impacts

Links for Additional Information

- <http://???????> search “smart grid”
- <http://www.smartgridnews.com>
- <http://amimdm.com>
- <http://energy.gov>



Good luck, have fun and...

HANG ON TIGHT!

Thank YOU

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