

Demand Side Reduction for Pennsylvania

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Discussion Items



- **Who's Elster**
- **Cost mitigation from DSR**
- **Benefits assessment**
- **Rules for AMI**
- **AMI as a bridge to the future**

Who's Elster?



- **Offers AMI systems for electricity, gas, and water that operate with numerous other vendors' communications and data management systems. Products satisfy Act 129**
- **900,000 AMI meters in Ontario, Canada (600,000 more ordered), 725,000 in the USA (900,000 more ordered), 65,000 in Latin America and Caribbean, (300,000 ordered for New Zealand). With partners offering compatible:**
 - **In home displays**
 - **'Programmable Communicating Thermostats'**
 - **Load control switches**
- **Elster has established the Advanced Grid Infrastructure initiative to foster collaboration on additional applications**
 - **Switchgear with metering**
 - **Transformer monitoring**
 - **Voltage and current sensing and control**

Benefits of DSR



Costs of all 'inputs' to utilities are going up



- **Fuel—oil, natural gas, coal, uranium—impacts current generation**
- **Plant construction—impacts cost of new plants**
- **Basic materials—electrical steels, copper, aluminum, concrete—impacts new plants and upgrades (like efficient transformers)**
- **RPS—typically requires large transmission investment and needs smart grid interoperability**
- **Carbon reduction**

Impacts of Rates and Load Control

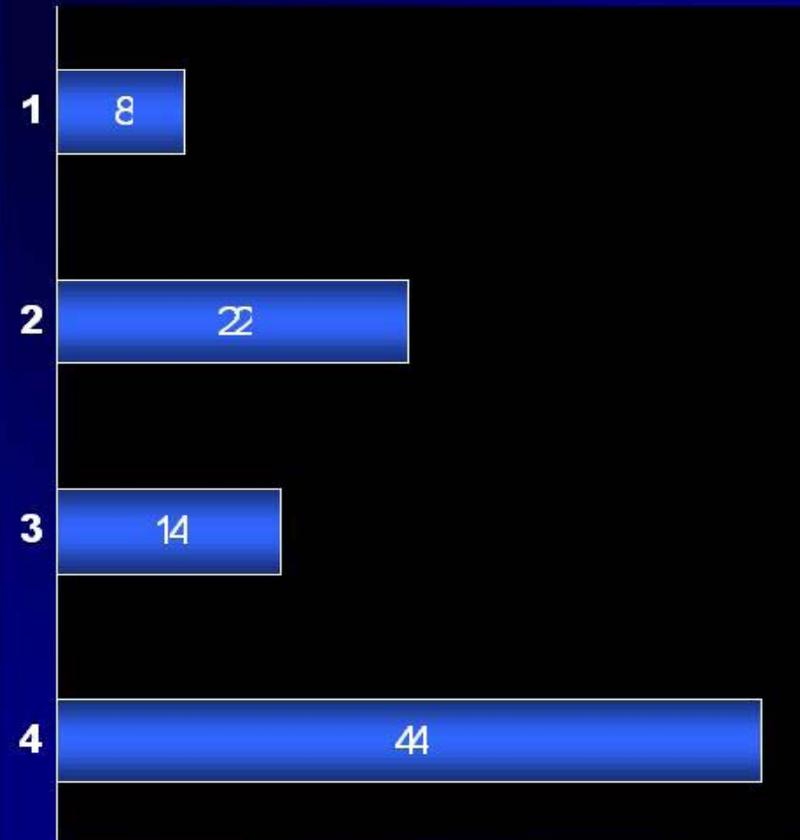


- **Time of Use rates alone = 5% peak reduction***
- **Critical Peak Pricing alone = 10-15% peak reduction***
- **TOU + enabling technology = 10% peak reduction***
- **CPP with enabling technology = 20-30% peak reduction***
- **AMI driven automated demand response rated best alternative by PJM Interconnection DR II symposium participants (May 2008—see next slide)**

***Source Ahmad Faruqui, Brattle Group**

The most effective means for administering demand response programs in the PJM region is:

- 1) More residential direct load control
- 2) More participation by commercial and industrial customers through Curtailment Service Providers (CSPs) in the PJM wholesale market
- 3) Smart meters/market based (smart) prices for all end-use customers
- 4) Advanced metering infrastructure plus technology that automates demand response



Benefits of Peak Load Reduction



- **Benefit of 5% ranges from \$35B to \$332 Billion/year for US; the high end is more representative of today's conditions***
- **Benefit of 3% peak reduction in the BGE, Delmarva, PECO, PEPCO, and PSEG zones for the PJM Interconnection is \$65M to \$203 Million/year; for the MADRI states \$57M to \$182 Million/year****
- **Folks are working to quantify the benefits of peak load reduction in carbon reduction terms, which varies regionally**

***Source Ahmad Faruqui, Brattle Group**

**** *Quantifying Demand Response Benefits in PJM*, Brattle Group, January 29, 2007, funded by PJM Interconnection and MADRI. Based on 2005 prices**

Benefits Assessment



Program Benefit/Cost Analysis



- **Industry standards for conducting DSM program benefit/cost analysis first established in 1983.**
- **The California Standard Practice Manual defines the methodology for conducting program benefit/cost tests.**
- **First published in 1983, revised in 1988 and 2001.**

Stakeholder Tests Typically Used



- **Participant Test - Evaluates whether a program/measure is cost effective to program participants.**
- **Total Resource Cost (TRC) Test - Evaluates whether a measure/program is cost effective as a resource option from the perspective of the utility's ratepayers as a whole.**
- **Societal Cost (SC) Test - Similar to TRC test but includes the value of other societal benefits such as environmental externalities**

Total Resource Cost (TRC) Test



- **Evaluates whether a measure/program is cost effective as a resource option from the perspective of the utility's ratepayers as a whole.**
- **Compares the present value of the avoided cost benefits over the measure's lifetime to the total cost of the program including both utility and participant costs**
- **The test typically relied on for decision making**

Maryland Metering Order 9/28/07



- **A minimum of hourly meter reads delivered one time per day.**
- **Non-discriminatory access for retail electric suppliers and curtailment service providers to meter data and demand response control functions**
- **AMI shall be implemented for all customers of the electric company.**
- **Metering and meter data management should generally continue to be an electric company function including the implementation of AMI/MDM.**
- **All AMI meters shall have the ability to monitor voltage at each meter and allow the utility to react to the information.**

Maryland Order Continued



- **All meters shall have remote programming capability.**
- **All meters shall be capable of two-way communications.**
- **Remote disconnect / reconnect for all meters rated at or below 200 amps.**
- **Time-stamp capability for all AMI meters.**
- **All meters shall have a minimum of 14 days of data storage capability on the meter.**
- **All meters shall communicate outages and restorations.**
- **All meters shall be net metering and bi-directional metering capable.**

AMI is the Smart Grid System that Works Now



- Technology and associated standards
 - American National Standards Institute electricity metering standard C12.22--Protocol Specification for Interfacing to Data Communication Networks
 - Utility Communication Architecture, Open HAN, Utility AMI, ZigBee, ...
- Interoperable with Home Area Network for improved energy efficiency and demand response
- Backwards compatible (current Elster version 6 automation software compatible with 2003 smart meters)
- Future proof via over the air firmware upgrades
- AMI recognized in the Energy Independence and Security Act of 2007 as a smart grid system
- Emergency Economic Stabilization Act of 2008 reduces tax life of AMI and distribution automation to 10 years
- Economic Stimulus Act of 2008 adds a temporary 50% first year bonus depreciation benefit on top of EESA

Conclusions



- **Costs are going up and doing nothing is not an option (a stitch in time saves 9)**
- **Two-way AMI enabled demand response provides more customer choice and demand reduction; and verifies the results**
- **Potential cost savings are large**
- **The TRC test is an appropriate test of benefits versus costs**
- **AMI is the bridge to the smart grid future**

Thank you

