Ohio's Energy Future and The Smart Grid

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The views expressed herein are my own and should not be regarded as an opinion regarding the merits of any pending case.

Smart Grid

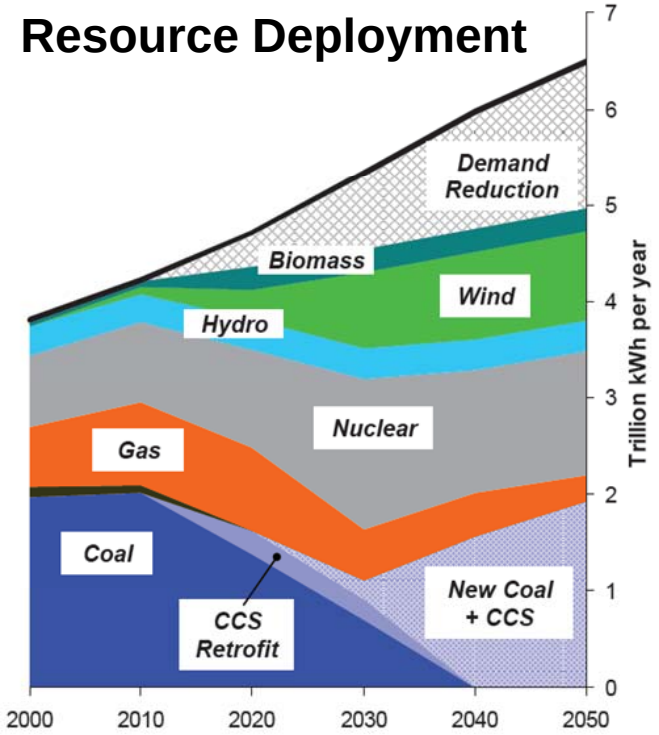
- A smart grid is the integration of the power system with an open architecture, advanced communications infrastructure
  - A smart grid is the information and communications architecture that supports new applications and enables them to interact with one another and with established power system functions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

PUCO: Implementing Ohio's Electricity Law

- Ohio's New Electricity Law (S.B. 221) Effective July 31, 2008
  - Moderated Rate Increases & Aligned Policies to Meet New Challenges
- Alternative Energy Standard: 25% of Energy From Renewable & Advanced Energy Resources by 2025
- Energy Efficiency Standard: 22%+ Reduction by 2025
  - Could Reduce Annual Electric Use to 13.8 million MWh below 2007
- Peak Demand Reduction Standard: 7.75% Reduction by 2018
  - State Policy to Encourage Time-Differentiated Retail Prices
- Grid Modernization
  - Single Issue & Incentive Ratemaking for Grid Modernization
  - State Policy to Encourage Advanced Metering Infrastructure
  - State Policy to develop Distribution Quality of Service Standards
- PUCO Approved Smart Grid Deployments
  - Duke Energy: 50,000 Advanced Meters in 2009, Complete Rollout over 5 years
  - AEP: 110,000 Advanced Meters in Phase 1, Complete Rollout over 7 years

Key Challenge: In a Global Economy, How can Ohio Affordably Meet Growing Demand for Energy Services & Sharply Reduce Carbon Emissions?

Electric Power Research Institute: Carbon Constrained U.S. Resource Deployment



Source: EPRI, *MERGE Analysis of Full Resource Portfolio* (2009)

80% Projected Price Increase
(Constant 2007 $)

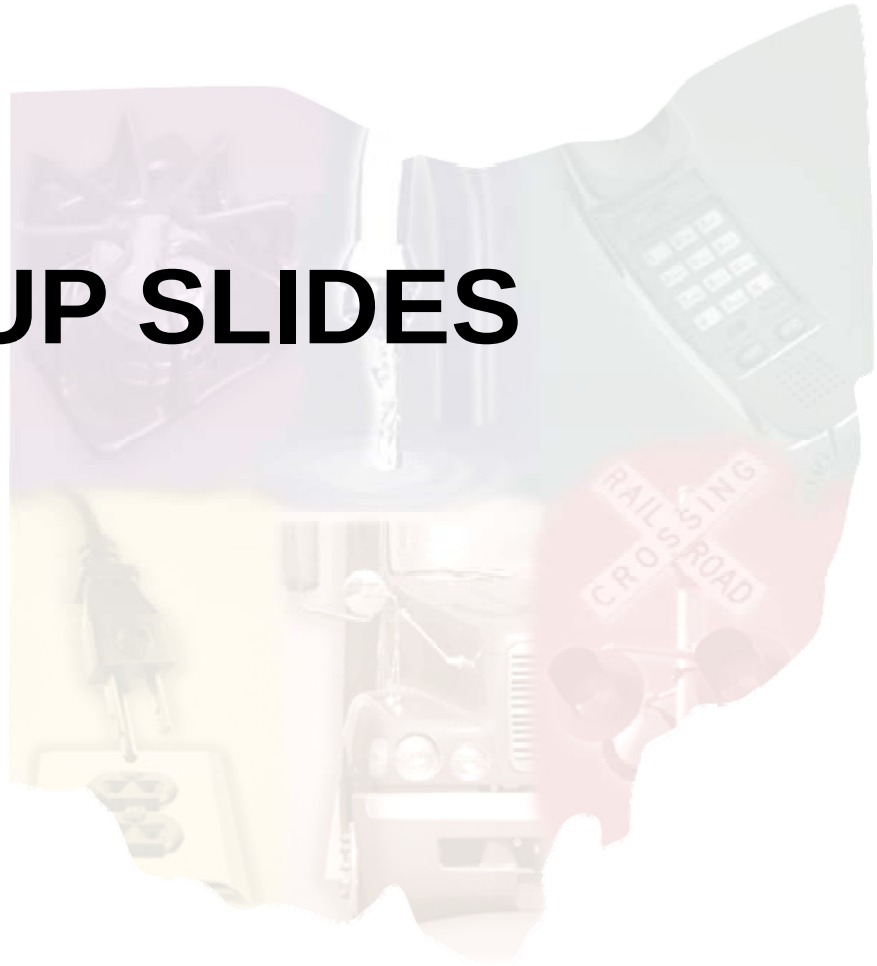
Enable Consumers & Businesses To Reduce their Energy Bills

- Energy Efficiency
- Demand Response
- Smart Grid

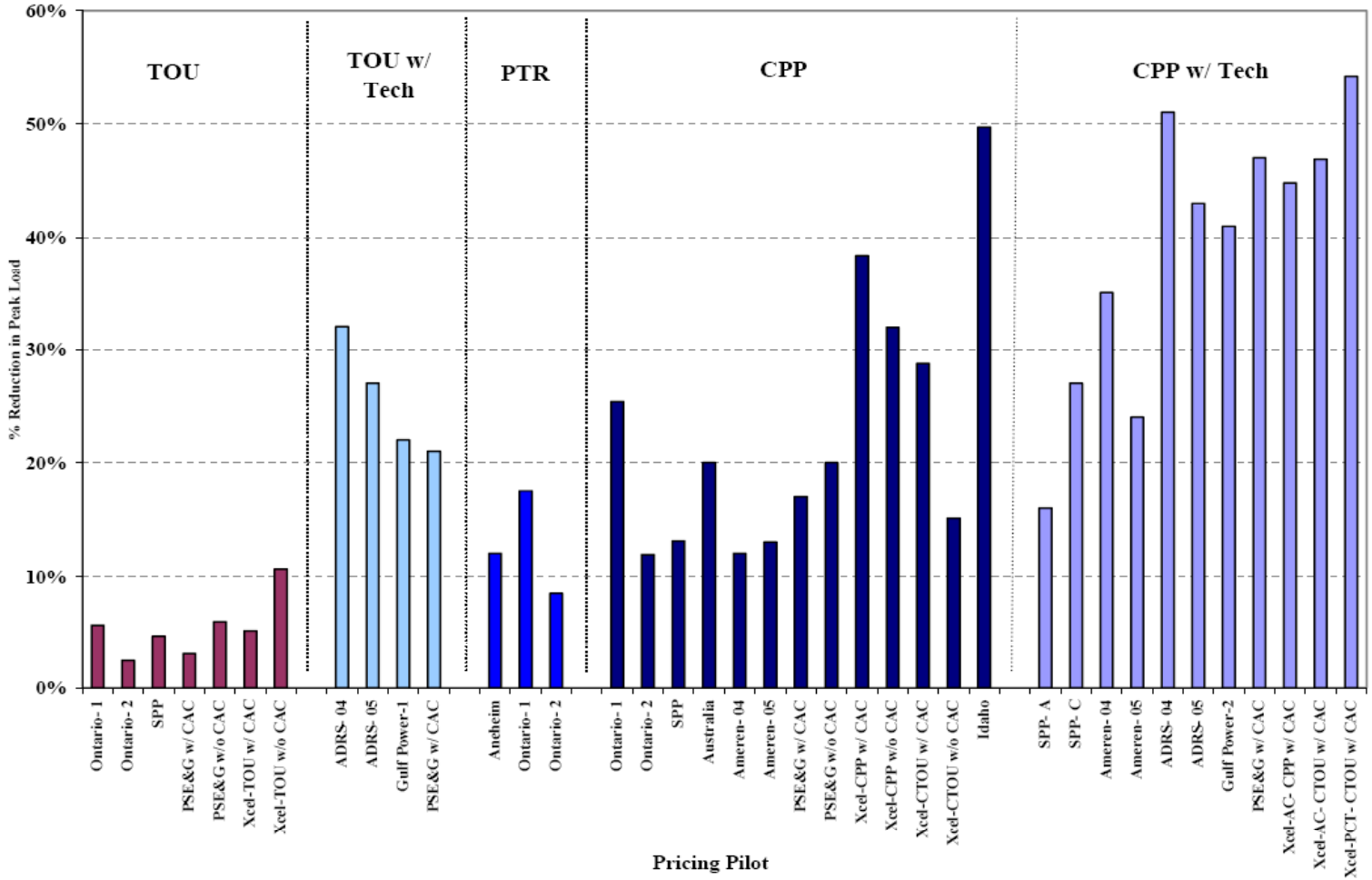
Potential Benefits:

- Provide Consumers Feedback & Controls
- Improve the Efficiency of Electricity Generation, Distribution & Use
- Defer Generation Investment Decisions
- Mitigate Price Impacts
- Reduce Often Regressive Cross-Subsidies in Flat Rates
- Enhance System Reliability & Reduce Outages
- Facilitate Integration of Renewable Resources
- Optimize Charging of Electric Vehicles
- Create a Platform for Innovation

BACKUP SLIDES

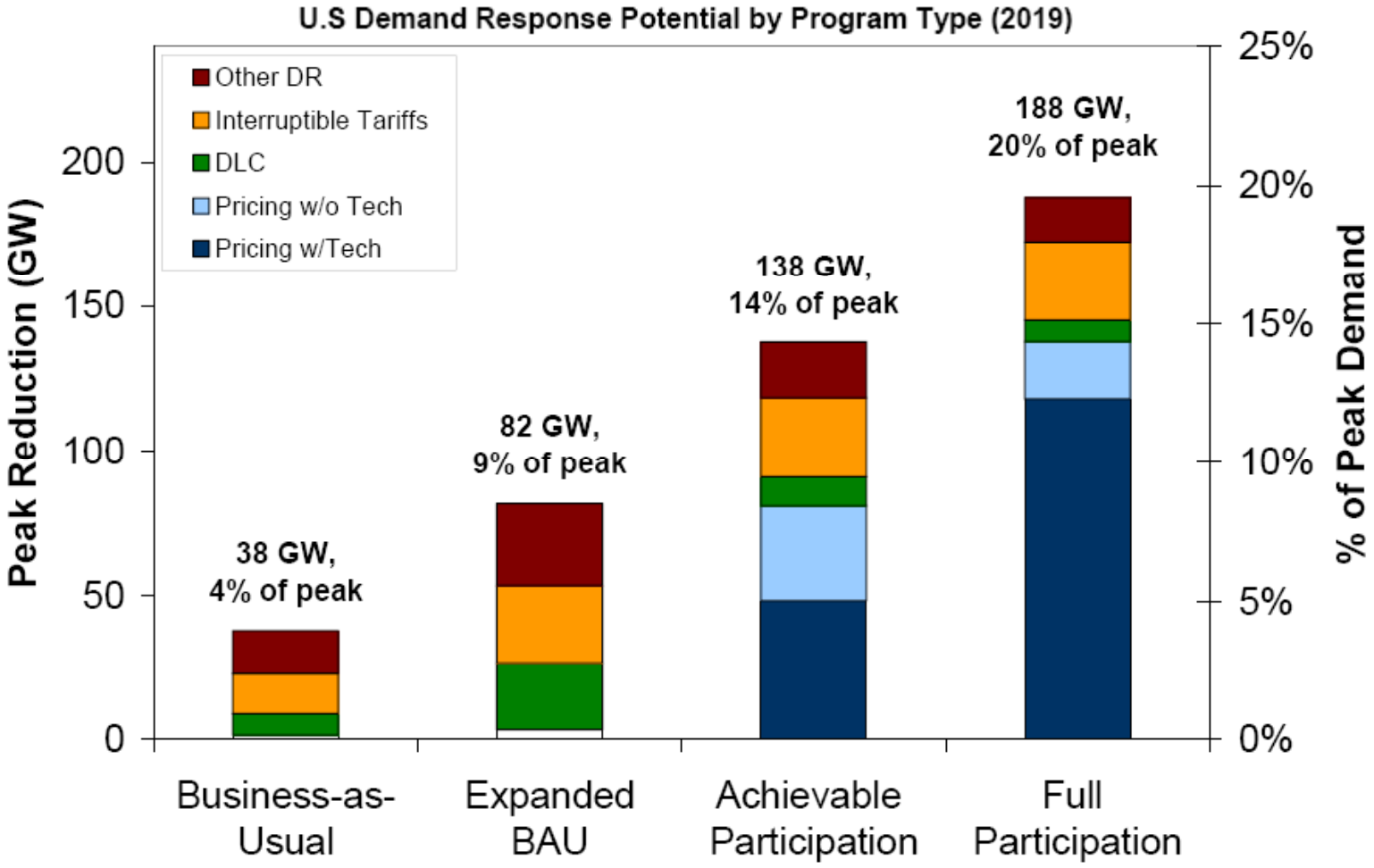


Estimated Household Demand Response



Source: A. Faruqui & S. Sergici, *Household Response to Dynamic Pricing of Electricity A Survey of Seventeen Pricing Experiments* (2008)

FERC: National Assessment of DR Potential



Source: The Brattle Group, et al., *FERC Staff Report: A National Assessment of U.S. Demand Response Potential* (June 2009).