ESI: DSM Challenges – Situation Analysis

- Fork in the road: direct versus indirect (market vs. utility control)
  - "Google" vs. utility, centralized vs. de-centralized
  - How indirect option works not fully understood
  - Favor indirect/market approach – "markets not management"
  - Hybrid mix of both?
- Changing utility value streams
  - Stagnant load growth seen by utility, overall pie growing
    - Need for non-traditional business models for DSM in absence of growth
  - Low market prices inhibit incentives for both generation & DSM
    - Subsidized renewables (wind) lowering LMPs
    - Pricing carbon not possible in US political environment
  - Dynamic rates that value resource needed but difficult
  - Need to understand full DSM potential & multiple value streams
  - Value of flexibility acknowledged but not quantified
  - Capitalization of energy efficiency remains a problem

ESI: DSM Challenges – Markets, Policy & Regulation

- Markets
  - Reflect long-term costs at planning and operational time scales
  - How do we design capacity markets to properly reflect what DSM actually offers to grid
  - How to value DSM in markets
    - As generator equivalent? (awkward)
    - If not as generator, how? Value in lower grid costs?
    - Flexibility market product is needed
  - Modeling needed to design markets & analyze policy
- Policy & Regulation
  - Resolve net metering subsidies for PV (re. NJ, CA, AZ, HI)
  - PV & EV penetration strongly driven by market policies & rates
  - Aggregator business model may evolve; sustainable model needed
  - $8 billion US system benefit charges – how to optimize their use to drive business innovation (especially EE)

ESI: DSM Challenges – Technical

- Modeling framework
  - Approaches that bridge physical and statistical
  - Market models to inform regulatory policy options
  - Characterizing customer response (new time scales re high RE pen.)
  - Must bridge ESI scope – gas, electricity, thermal
- Controls/optimization for indirect approaches
  - Combine w/ direct approaches for certain services/timescales
- Methods to establish baseline consumption for market approach
  - Accurate, prevent gaming
  - Enable dynamic incentives in lieu of dynamic rates
- Real time predictive control for operations
  - Structures that unify DSM & DERs desirable where logical, e.g. DR as battery may make more sense
  - DSM control strategies for industrial loads

ESI: DSM Challenges Technical (cont)

- Cybersecurity & Privacy
  - Are utility networks any more secure than internet?
  - Need for cloud computing
  - Indirect approaches (markets/incentives) less dangerous, easier to monitor?
  - Privacy must be respected (ownership of data)
- Big data
  - Lack of data transparency, breakdown silos, proprietary data
  - Data mining & applications
    - Diagnostics
    - Behavior
    - Forecasting
    - Predictive control
    - EE opportunities
    - Don’t duplicate vendor solutions!

ESI: DSM Proposed Action items

- Define goal for DSM (DR + EE):
  - EE + RE + clean energy needed to achieve US Pres. goals: 80% clean energy by 2030; reduce bldg. energy waste by 50% by 2050
  - This group would help define the DR capability needed to manage and balance this system? (given RE + CE + EE contributions)
- Model future scenarios to define DR contribution to achieving goal
  - Regional modeling approaches focusing on power grid (different scales)
  - Model different market products and answer questions raised previously
    - Respond to wholesale prices/production costs
    - Understand full DM potential and value stream, and multiple revenue streams (co-optimization);
    - Flexibility market product
    - Ability to provide spinning reserve, regulation, ramping to the system level
  - Exchange scenarios, modeling techniques, etc. with European colleagues

ESI: DSM Proposed Action items

- Develop ESI regional modeling capability in parallel
  - Design series of projects (US + EU):
    - Smaller scale ESI focus (e.g., clean cities)
    - Cooperation on modeling & simulation
    - Conduct demonstrations of regulatory approaches in regulatory test cases
    - Demo new markets + new operations + technologies to meet goal
  - Evaluate lessons learned, exchange best practices from existing projects
- Stakeholders: city/regional govt., utilities, BAs, consumers, regulators, R&D orgs, vendors, stds. orgs., advocates (CEE, ACEEE, etc.)