

Integrating Demand Response and Energy Efficiency: Options and Issues

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FERC View of Market Intervention

- Wholesale electricity markets do not automatically structure themselves with fair behavioral rules, provide a level playing field for market participants, effectively monitor themselves, check the influence of market power, mitigate prices that are unlawful, or fix themselves when broken.

FERC White Paper: Wholesale Power Market Platform; April 28, 2003

EE Advocate Views: Market Design

- *System* planning, not just *transmission* planning
- Effective regional planning and coordination
- EE included as a demand response resource
- Comparable, meaningful opportunities for EE in:
 - Regional system expansion planning and investment
 - Relief of persistent congestion
 - Resource adequacy
 - Distribution system expansion
- Regional funding for demand resources
- *All of these have not been realized*

3

Demand Response Resources

A broad definition of demand response:

- Shorter-term demand response (load management and curtailment) including economic and price responsive load programs (e.g., ISO load response)
- Pricing and metering
- Energy efficiency load reductions as longer-term demand response
- All aspects of markets (energy, capacity, ancillary services, contingency, etc.)

4

Evolving Concepts of Demand Response

- Shorter-term (LM) and longer-term (EE)
- Event driven vs. investment driven
- Response to call/emergency or response to price
- Geographically targeted vs broadcast
- Demand only vs. on-site generation

- Deployable: energy efficiency, building codes and equipment standards
- Dispatchable: in response to an ISO call (emergency or reliability programs)
- Scheduled: load bidding into day-ahead markets

5

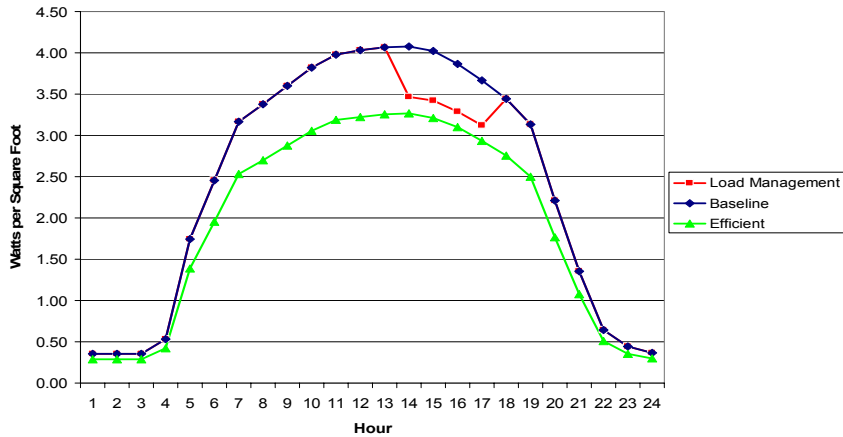
Example: Two Scenarios

- Illustrative only – other scenarios possible
- Existing large commercial office building
- Albany, NY (8760 hr load shape data)
- Peak load and load shape on summer day
 1. Energy efficiency measures for lighting and cooling that reduced load by 20%
 2. Load management (STDR) as 4 hour curtailment load reduction of 15% by reducing lighting and HVAC load (no BUG)

6

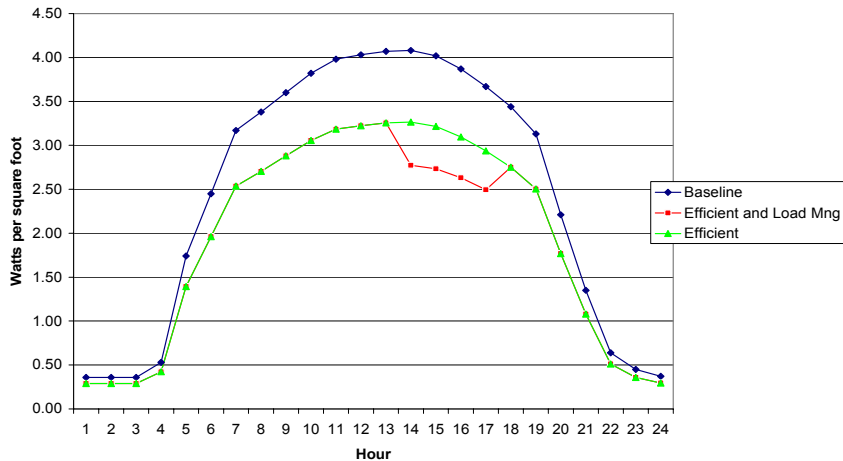
Energy Efficiency Compared to Load Management (4 hr curtailment)

Combined Commercial Cooling and Lighting Loadshape
Baseline, Load Management (STDR), and Energy Efficiency



Opportunity: Integrating Energy Efficiency & STDR/Load Response

Combined Commercial Cooling and Lighting Loadshape with
Efficiency and Load Management (Four-Hour Curtailment by 15%)



New England Demand Response Initiative (NEDRI)

- Goal: Increase demand response to balance markets
- Objective: Devise an effective long term strategy for demand responsiveness, including shorter term load response and longer term energy efficiency investments
- Depth: Propose coordinated policies and programs for wholesale, wires, and retail
- Facilitated stakeholder process:
 - About 40 participants: ISO NE, 6 state PUCs, state air regulators, DOE, EPA, market participants, and advocates
- Sponsors: ISO NE, DOE, EPA, FERC, and NECPUC

9

NEDRI EE Recommendations

- System Benefit Charge (SBC) Funds and Ratepayer Support for Energy Efficiency
- Principles for Effective Energy Efficiency Programs and Portfolios
- Minimum Energy Efficiency Standards for Appliances and Equipment
- Building Energy Codes
- Enhanced Regional Coordination for Demand Side Resources
- Complementary and Integrated Options for Energy Efficiency and Shorter Term Demand Response
- Comparable or Equal Treatment for Energy Efficiency in Power Delivery Systems (as one of several demand response resources)

10

Complementary and Integrated Approaches: EE and STDR

- Integrate shorter-term DR and EE programs into complementary offerings
 - Fully utilize DR enabling technologies for both EE and shorter-term DR
 - Promote effective facility O&M
 - Comprehensive and coordinated marketing programs and information
 - Coordinated program management and delivery

11

Fully Utilize Technologies and O&M

- STDR technologies that assist in energy efficiency (metering, analysis, control, communication, education)
- EE technologies that enable or assist in STDR, for example:
 - EMS and controls
 - Dimmable lighting systems
 - Smart chips in efficient appliances/equipment
- Efficient and effective O&M

12

Comprehensive, Coherent Marketing, and Integrated Delivery

- Comprehensive, coherent messages
- Coordinated marketing of EE & STDR
 - Account managers
 - Integrated assessment and analysis
 - STDR from customer viewpoint
 - Value for customer and for system
- Integrated programs and delivery
 - Coordinated or integrated programs

13

Implications and Observations

- Some tensions or conflicts between resources
- Technology installed for shorter term DR may be used for energy efficiency, which is good...
- ...but doing so impacts the customer baseline, and the ability to curtail load further, therefore reducing the level of shorter term demand response in the future (and customer payments)
- And vice versa: doing STDR may reduce value of EE
- Focus on peak reductions vs. energy reductions
- Some pricing approaches reduce EE value off peak
- Mismatch between system value, customer value, and the integrated value of energy efficiency

14

Challenges and Next Steps

- Customer world vs system operator world
- Reduce market barriers and risks to increase customer participation in many forms of DR, or have a fairly small demand response (and much larger market power for suppliers)
- EE as longer-term demand response, or at least as parallel valuable resource
- Market rules that value all load reductions in some comparable manner (resource parity)
- Capacity credits in addition to energy market

15

Will Regional Markets “Work” for Energy Efficiency Resources?

- Doubtful, at least in near term
- Regional markets are de-integrated (compared to integrated value of EE), and focused on shorter-term or dispatchable resources
- Significant institutional barriers
- At a minimum, a long transition
- Therefore, it is essential to continue to intervene to achieve cost-effective EE
- Public policies and EE programs are a must
- EE/DR integration possible and can be valuable, but some tensions and issues to address

16