Energy Efficiency: Promoting "Green" Behaviors that Count

Chris Gazze
Program Manager, Targeted DSM
Con Edison

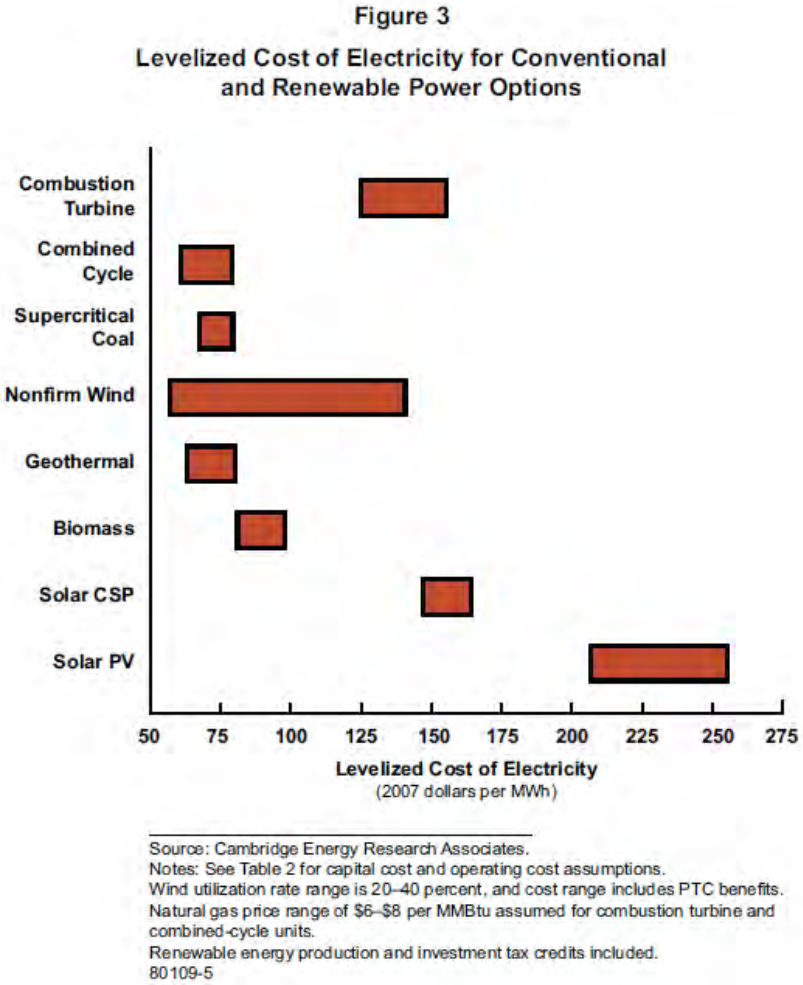
October 28, 2010

Overview

- Background: State and Utility Efficiency Efforts
- Value of Efficiency
- Efficiency Programs
- Barriers to Increased Efficiency

Background

- Many states are encouraging energy efficiency (EE) because it is a lowest cost resource with no negative environmental impacts
- By comparison, the levelized cost of EE is
  - 2 – 6 cents per kWh
  - $20 – $60 per MWh
- So it is more economic to pursue EE before new generation, particularly expensive renewables

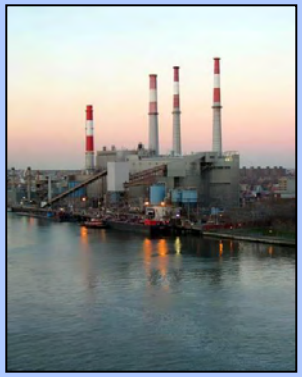


Background

- Many states have implemented Energy Efficiency Portfolio Standards or similar mandates
  - Funding comes from System Benefit Charges or other utility recovery mechanisms
  - Program delivery is via utilities, state agencies (e.g., NYSERDA), or contractors
  - Most programs are built around incentive mechanisms that encourage equipment retrofits (lighting, HVAC, motors…)
  - Improved building codes and appliance standards reach new buildings and new appliance purchases
  - “Behavioral” programs employing normative comparisons are a recent development

Valuing Efficiency




ENERGY SAVINGS:

Using less energy results in a direct cost savings to customers each month on their bill. In New York City, this savings is valued by the PSC at about $80 per MWh.

T&D SAVINGS:

If load reduction is coincident with the network peak, investments in distribution assets can often be deferred. With much underground infrastructure, this benefit is larger for Con Edison than for other utilities.

LINE LOSS SAVINGS:

Delivering less energy avoids losses in the wires. This not only increases the energy savings, but also amplifies the benefits realized earlier in the supply chain by about 7%.

CAPACITY SAVINGS:

If load reduction is coincident with the system peak, fewer new power plants may be needed to supply peak demand. In New York City, this savings is valued by the PSC at about $120 per peak kW saved.

ENVIRONMENTAL BENEFIT:

Burning less fuels reduces emissions of CO2 and other pollutants. This benefit is typically valued at $7.50 per MWh.

Demand Management Value Streams

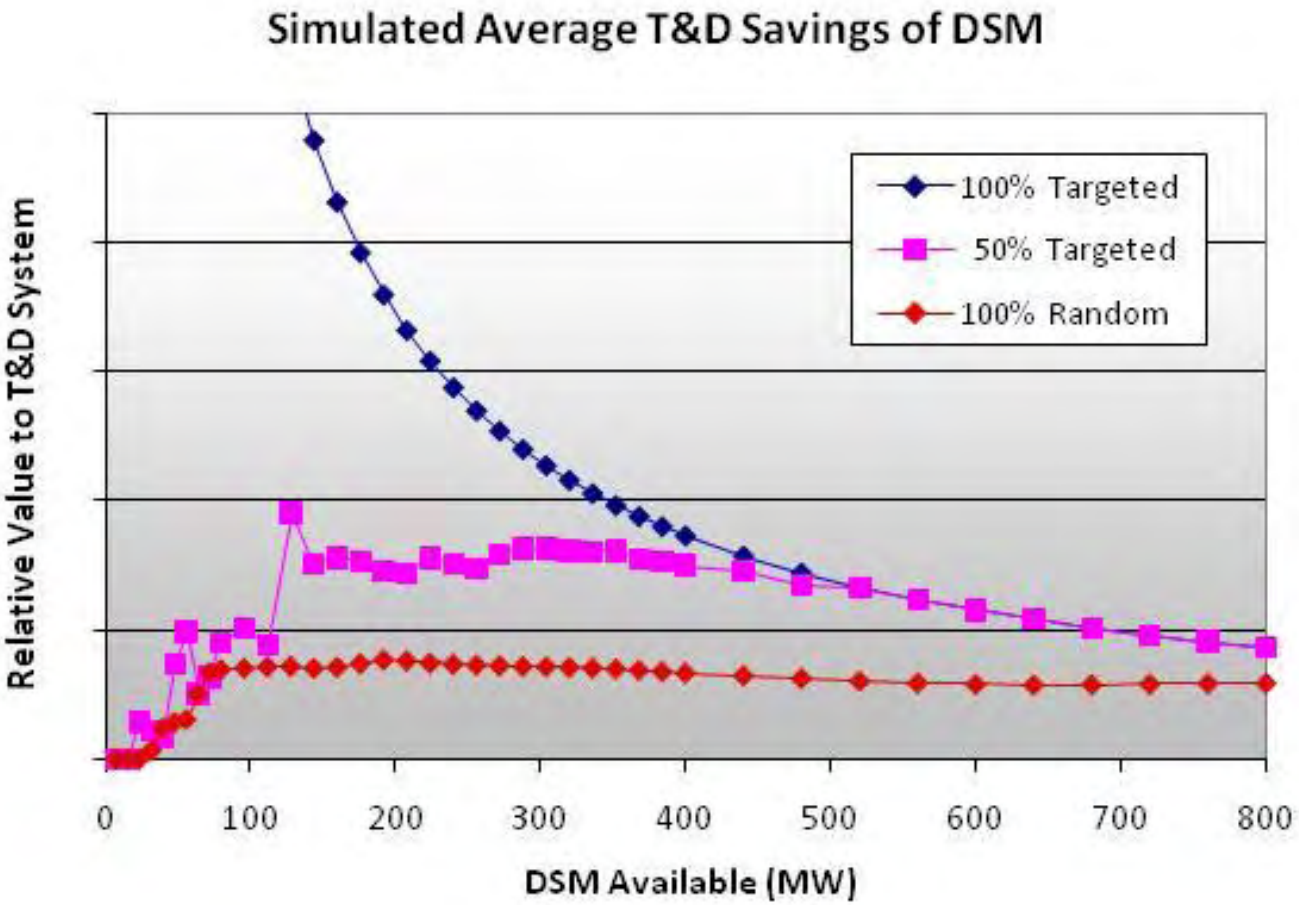
Note that these avoided costs are examples. Actual avoided costs would vary by location and application

Avoided Costs (per kW)	Commercial Lighting*	DG Solution*	DR Example*	Who Benefits?
Energy Savings	$ 1,900	$1,900	Negl.	Customer
Capacity Savings	$ 600	$ 600	$ 600	Ratepayers
Line Losses Avoided	$ 200	$ 300	Negl.	Ratepayers
T&D (example)	$ 600	$ 600	$ 600	Ratepayers
Environmental Benefit	$ 200	$ 200	Negl.	Society
Total Benefit	**$ 3,500**	**$ 3,600**	**$ 1,200**	
Sample Societal Cost	**$1300**	**$2500**	**$600**	
Benefit-to-Cost Ratio	**2.7**	**1.4**	**2.0**	

Assumptions (uses EEPS avoided costs):

- EE: 12 hour per day use
- DG: 24 hour operation and energy produced twice as efficiently as central plant and at half the cost per kWh

Targeting Increases DSM Value



Results of Monte Carlo simulation applied to current Con Edison Area Substations. Results are intuitive: if only a small amount of DSM is available, it produces more value when concentrated in an overloaded network where it can defer a load relief project, rather than spread randomly over the whole service territory.

Typical Efficiency Program Structures

- Address relevant sectors to get “breadth” of savings
  - C&I, residential, multi-family, datacenters, hospitals, etc.
  - New construction (codes), retrofit market (existing)
- Structure differing incentive levels to get “depth” of savings
  - Prescriptive and custom options
  - Incentivize more than just low hanging fruit like lighting measures
- Free or subsidized audits to identify opportunities
- Use financial incentives to
  - Buy down premium for choosing efficient technologies (e.g., A/C rebates)
  - Improve payback for retrofits (to 1 year point, if possible) to encourage early replacement (lighting), e.g., make it an operational and not a capital cost

Efficiency Program Typical Structures

- Behavioral Programs
  - Normative comparisons coupled with tailored efficiency recommendations
  - Mailings or online tools compare you to your peers
  - Issues: how are savings achieved (curtailment vs. retrofit) and how long do they persist once messaging is ended
- Smart Grid or Automated Solutions
  - Programmable thermostats
  - Smart appliances
  - Building control systems
  - Automated demand response

Barriers to EE Adoption

- Split Incentives
  - Landlord/Tenant
  - CIO/COO for Datacenters
- Economic Issues
  - Energy is typically a smaller, non-core business cost and thus gets little attention
  - Upfront capital costs are problem, especially for small businesses
  - Long payback for some measures
  - Financing
    - Mechanisms needed (PACE, equipment financing, on-bill, etc.)
    - Difficulty underwriting very small loans
    - Unwillingness to take on debt
    - Proving the bill savings will be realized

Barriers to EE Adoption (cont'd)

- Consumer Preferences
  - Light quality (CFLs)
  - Comfort factors
  - Convenience
- Education and Awareness
- Effective Measurement and Verification
- Capturing only "low hanging fruit"
- Future
  - Privacy issues?
  - Are potential smart grid savings enough to capture & hold consumer attention?