Energy Savings Obligations

Global Experience, Lessons Learned

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Regulatory Assistance Project (RAP)

**RAP** is a global, non-profit team of experts providing technical and policy assistance to government officials on energy and environmental issues. RAP has advised governments in more than 30 nations and 55 states and provinces.

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Major Points Today

1. “Energy Efficiency First” EE is Europe’s most overlooked energy resource. Now, challenge to deliver on the EED.

2. Energy efficiency obligations/white certificates (EEOs) are powerful tools to deliver efficiency benefits

3. A variety of EEO structures and approaches are working well in the US, EU, AUS, China, Canada, elsewhere –

4. Lessons learned/ Key features of successful EEOs: Clear obligation; growing ambition; stable source of revenue; consumer focus; and good M&V and regulatory oversight.
EEOs & White Certificates (WCs)

- Whether called EEOs, WCs, EE Resource Standards, key elements are:
  
  A public mandate requires an energy provider to prove their activities have resulted in energy efficiency improvements by eligible end use customers

- In some systems installers can earn a White Certificate for the energy savings achieved – not necessarily tradable

Why obligate energy companies?

- Integrated system management -- “Load” is really part of power systems
- Customer relationships
- Non-government funding
Global Experience with EEOs

- Europe: Several Member States or Regions
  - UK, France, Italy, Denmark, Flanders (changing), Ireland & Poland (new)
- 24 US States (“EE Resource Standards”)
- Australia: 3 largest States -- New South Wales, Victoria, South Australia
- China: “Efficiency Power Plants”
- Brazil: 1% for public purposes, ½% for EE
- Korea: over 3% of power revenues support required EE and DSM programs
- Canada: Ontario: 5% reduction 2011-2014
US - 24 US States with EEOs

State Energy Efficiency Resource Standard (EERS) Activity

October 2011

Source: American Council for an Energy-Efficient Economy
U.S. Utility EE Program Spending Now Over $7 Billion/Year and Still Growing

China’s 12th Five Year Plan (2011 – 2015) requires:
- 16% reduction in energy intensity over five years
- 17% reduction in carbon intensity
- Major pollutants emission reduction of 8-10%

These are *mandatory*

New DSM Rule (2011) requires distribution companies to deliver incremental 0.3% efficiency savings annually

China spending on EE: between 3% and 4% of total system revenues (about 1.2% is through utilities, rest is direct government spending)
Lessons From Global Experience

State Energy Efficiency Resource Standard (EERS) Activity

Twenty-four states have enacted energy savings goals, or Energy Efficiency Resource Standards (EERS), through legislation and several states have a pending EERS.
1. Design for the Many Benefits of Energy Efficiency

- Production Energy
- Production Capacity
- Avoided Emissions
- Transmission Capacity
- Distribution Capacity
- Line Loss Reduction
- Avoided Reserves

Plus “Non-Energy” Benefits including:
- Add’l resource benefits (water), building durability, health & safety

* Note: numbers presented in graph are Illustrative
Globally, EEOs Are Highly Cost Effective

- **US state EEOs** save electricity for 3-4 US cents/kWh compared to 6-9 cents per kWh for generation cost alone.

- **EU experience**: saving residential electricity or gas costs less than 25% of the cost of that fuel to the consumer.

- **PLUS**: EE also saves on transmission and distribution upgrades, lowers reserve margins and line losses, has no emissions, improves reliability, lowers peak loads.

- “**Merit Order Effect**”: In competitive power markets, lower demand also lowers clearing prices for all consumers – not just consumers who save energy.
  - In some cases, this effect alone can justify the entire cost of the program
EE savings grow over time; utility programs are *in addition to* other public policies (California example)

California efficiency investments lowered demand by 25% over 25 years* and then were expanded.
Competitive example: EE & DR Bidding in Regional Capacity Markets

- **Issue**: Power system needs reliable capacity on a forwards basis (to avoid future capacity crisis)
- **Generator proposal**: Pay for Generator capacity in advance, for 10-year forward period
- **Better solution**: Let supply and demand-reduction also bid to meet growth needs
- First auction (New England ISO) 2007: demand resources including EE won 2/3rds of the bids for new capacity & lowered the clearing price
- PJM auction (for 2012/2013) DSM bids lowered the clearing price by 90% (from ~$179MW/day to $16.46 per MW/day)
- Demand-side winners include utilities, ESCOs and state programs
2. Design the Program to Work for Customers: EEOs Must Overcome Stubborn Market Barriers

<table>
<thead>
<tr>
<th>Market barriers</th>
<th>Key Lessons, 20+ years Experience:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of information</td>
<td><strong>Barriers are same</strong> in both traditional utility systems and liberalised markets (EU &amp; US have both)</td>
</tr>
<tr>
<td>Upfront costs</td>
<td><strong>Single-barrier attempts don’t work</strong> (pricing alone, financing alone, etc.)</td>
</tr>
<tr>
<td>Payback periods - high implicit</td>
<td><strong>Consumers need trusted information, quality assurance, and financial help</strong></td>
</tr>
<tr>
<td>discount rate</td>
<td><strong>Public investment (from gov’t or all consumers) is needed to remove barriers &amp; leverage</strong></td>
</tr>
<tr>
<td>Consumer inertia: Hassle factor,</td>
<td>sufficient private investment in EE</td>
</tr>
<tr>
<td>timing mismatches</td>
<td></td>
</tr>
<tr>
<td>Split incentives – eg, Builder/buyer</td>
<td></td>
</tr>
<tr>
<td>Tenant/landlord</td>
<td></td>
</tr>
<tr>
<td>Unpriced external costs</td>
<td></td>
</tr>
<tr>
<td>Uncompensated benefits –eg, system</td>
<td></td>
</tr>
<tr>
<td>reliability</td>
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1. Obligation on regulated distribution utility
   *Italy; Denmark; most US states, including California; Ontario*

2. Obligation on competitive retail suppliers
   *Great Britain, France, Ireland; 3 Australian states*

3. Obligation funded by levy on distribution companies but borne by a state agency
   *Oregon, & New York (partially)*

4. Obligation funded by levy on distribution companies but borne by an independent “Energy Efficiency Utility”
   *Efficiency Vermont; Efficiency Maine*

5. **Performance Contracting** with 3rd parties (other than the obligated entities)
   *Texas, New Jersey*
4. Strong Programs Add 2% Incremental Savings Per Year

- **Public mandates: Clear, growing, long-term**
- **Energy savings add up, can become one of the largest energy resources in the economy.**
- **Some obligations now in place:**
  - New South Wales: growing to save 34% in 11 years
  - New York save 2% per year by 2015
  - Arizona: save 2% annually, over 20% in 10 years
  - Illinois: save 2% annually, 2015-2022
  - Massachusetts: save 2.3% per year through 2020
- **Leading programs spend 3% to 5% of system revenues on energy savings (and save more)**
Experience Drives Growth in Ambition
(Leading US States are Increasing Savings Targets)

<table>
<thead>
<tr>
<th>State</th>
<th>2006</th>
<th>2009</th>
<th>Current Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>0.8%</td>
<td>0.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Vermont</td>
<td>1.1%</td>
<td>1.6%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Arizona</td>
<td>n.a.</td>
<td>0.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>1.2%</td>
<td>0.8%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>1.2%</td>
<td>1.1%</td>
<td>1.9%</td>
</tr>
<tr>
<td>New York</td>
<td>0.6%</td>
<td>0.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Maryland</td>
<td>n.a.</td>
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<td>1.5%</td>
</tr>
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<td>Minnesota</td>
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</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.8%</strong></td>
<td><strong>0.9%</strong></td>
<td><strong>1.8%</strong></td>
</tr>
</tbody>
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Sources: ACEEE 2008 State Scorecard (for 2006 savings) and 2011 State Scorecard (for 2009 savings and for current plans other than for CT). CT “current plan” data are for plan filed by utilities and supported by draft order.
5. Quality Control, M&V, and Continuous Improvement are Needed

- Strong, **independent oversight** is needed – usually via independent regulators and transparent reviews
- Down side: Without oversight, programs see cream-skimming, poor quality control, slow learning curves
- Plus side: Ambitious programs benefit from economies of scale, market transformation, and good quality oversight
6. Stable & Adequate Funding is Essential

Challenge: how to finance EE programs that must be much larger and cross fuel types?

Public FUNDING = 25-30%; Private FINANCE = 70-75%

Adequate and stable – not annual appropriations

Utility sector funds are not Treasury receipts!

FUNDING side: **Benchmark level** -- at least 3% to 5% of annual system revenues

*Revenue collection and program administration* can be different.

Numerous Funding Options are available

Many options are *competitively-neutral*, do not interfere with competition
Why Long-term Goals And Steady Funding Are Crucial -- History Of Savings In CA

Figure 1: Annual Electricity Savings From California Utility Efficiency Programs

- Deregulation law enacted
- Utilities’ resume portfolio management
- IOU decoupling restored; CPUC sets aggressive 10-year targets
- Energy Action Plan makes EE top priority
- Electricity crisis
- IOU administration restored; new incentive mechanism begins; AB 2021 requires POUs to set targets
- SB 1037 makes EE top priority and requires POU reporting
7. Paying for Energy Efficiency – several options for the “public” portion

- **Supplier Obligation** – Rolled into energy costs (UK, France, Texas)
- **Supplier Obligation** – Paid for via a Distribution-based tariff (Italy, Denmark, Vermont, California)
- **Funding in rates or through wires/pipes charges** in North America is considered part of providing safe and reliable energy services—Regulator authorizes collections for service, as for transmission, meters, reserve costs, etc. – these are NOT public Treasury receipts.
- **Carbon auction revenue** – a huge new opportunity (RGGI – 10 states; German carbon fund, AAU sales in Europe)
- **Other ideas:** Capacity markets, Tax revenues
Efficiency Programmes Save 9x More Carbon Per Consumer GBP Than Carbon Taxes Or Prices

Cumulative CO₂ Emissions Saved by: Increasing Rates 3%; and Increasing Rates 3% to Fund Energy Efficiency (UK Example)

- Cumulative carbon dioxide emissions saved with 3% rise in rates to fund energy efficiency (Mtons)
- Cumulative carbon dioxide emissions saved with 3% rise in rates only (Mtons)

Cumulative CO₂ emissions avoided from raising rates 3% and funding EE, 2006-2020: **59.8 million tons**

Cumulative CO₂ emissions avoided from raising rates 3%, 2006-2020: **6.8 million tons**

- Key idea: Sell allowances, invest carbon revenue in low-cost carbon reduction -- especially EE
- **Northeast US**: 10 RGGI states now dedicate >80% of allowance value to clean energy (~55% to EE)

- Even with low (~$3/ton) CO2 prices, RGGI has raised over $500 Million for EE programs – avoiding CO2 at a cost of (minus) $-73 per ton!
- **So far**: Adding $1.6 Billion to the regional economy, and supporting 16,000 new jobs

- Germany, France, Czech Republic – have programs and/or plans to invest substantial carbon revenues in EE
Questions?


Many other reports on EEOs on the RAP website

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Posted at www.raponline.org
Email questions to rcowart@raponline.com