Under the Bright Lights: Energy Efficiency Programs

Energy Information Administration Annual Conference

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Joe Loper
Boom Times for Energy Efficiency

- **EISA (2007)**
  - Most significant EE legislation in previous 3 decades
  - Incandescent light bulb phase out starting 2012
  - Vehicle fuel economy standards increased for first time since 1980s
  - Numerous program budget authorizations

- **Federal Stimulus Funding**

- **Ratepayer Funded Programs**
  - All states except AK and LA
  - 4 states half of total funding, 10 states 94%
US Energy Efficiency Funding 1990-2013

- Projected Stimulus
- Projected Federal Programs (2010 levels)
- Projected Federal Buildings (2010 levels)
- Projected DSM
- Historic Federal Programs
- Historic Federal Buildings
- Historic DSM

Alliance to Save Energy 2011
About this Presentation

- Are EE programs reducing energy consumption?
  - Short Answer: Yes – Programs are not increasing energy use.

- Are programs meeting expectations (goals)?
  - Short Answer: Depends on your expectations and who is measuring.

- Are EE programs cost effective?
  - Short Answer: Yes, at portfolio level, but some programs may need to be revisited and federal standards will pick a lot of the low hanging fruit.

- Outline
  > Focus on Maryland EmPOWER findings to date
  > Additional states for context
  > Then national perspective and recommendations
About EmPOWER MD

- **Goals**
  - Reduce per capita statewide electric use (from 2007)
    - kWh – 15% by end 2015, 5% by end 2011
      - Roughly 15% reduction in overall kWh sales
      - 2% annual!
      - EmPOWER utilities on hook for 10%
    - kW -- 15% by end of 2015, 5% by end 2011

- **Objectives**
  - Commission to consider cost effectiveness and impacts on rates, jobs and environment

- **Statewide Evaluation of Savings and Cost**
  - Independent evaluator to provide info symmetry
EmPOWER Maryland Findings – Yes!

- Reduced MWH by ~0.8% in 2009-10
  - Reduced peak MW by ~ 0.6%
  - Percent of 2007 sales
- Total Resource Cost B/C > 1
  - For 4 of 5 utility portfolios
  - For 14 of 26 program areas
  - Statewide B/C = 2.2
  - B/C more likely to be higher than lower
- Statewide RIM = 0.5
- Verified savings ~= evaluated savings ~= utility-reported savings
EmPOWER MD Findings – Hmmm…. 

- Meeting expectations?
  - kWh ~25% of target trajectory

- Lighting dominates portfolio savings
  - More than 80% of evaluated kWh savings
  - EISA standards will remove some of this low hanging fruit

- Low cost utility portfolio did not pass TRC B/C

- Some programs don’t make the cut and likely won’t in the future
  - E.g., Res HVAC programs
Is Maryland Typical?

> Rebuilding Program Delivery Infrastructure
  - Some utilities new to EE, some old hands
> Lighting programs dominate savings and cost effectiveness
> High and low cost utilities
  - Hard to establish “cost effective” targets for all utilities
> Aggressiveness of targets
  - Some higher (e.g., VT)
  - Some lower (e.g., OH)
  - Per capita targets!
> Taking EMV seriously
  - EMV budget ~$7m over 2 years for a $120m portfolio
  - About average for “serious” states
Assumptions Drive Benefit Cost Estimates

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Base Case (thru Sept 30, 2010) TRC B/C</th>
<th>Amortized Administrative Costs</th>
<th>4th Quarter Update of Costs and Savings</th>
<th>High-Cost Supplier Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5 Years</td>
<td>3 Years</td>
<td></td>
</tr>
<tr>
<td>Residential HVAC (5)</td>
<td>0.18 - 0.69</td>
<td>14 - 207%</td>
<td>12 - 128%</td>
<td>1 - 179%</td>
</tr>
<tr>
<td>Residential Appliances (2)</td>
<td>0.45 - 0.64</td>
<td>104 - 107%</td>
<td>75%</td>
<td>(2) - (10)%</td>
</tr>
<tr>
<td>C&amp;I Custom (2)</td>
<td>0.06 - 0.93</td>
<td>60 - 366%</td>
<td>45 - 193%</td>
<td>52 - 1952%</td>
</tr>
<tr>
<td>C&amp;I Prescriptive (2)</td>
<td>0.69 - 0.99</td>
<td>150 - 229%</td>
<td>99 - 138%</td>
<td>49 - 95%</td>
</tr>
</tbody>
</table>

Adapted from Itron, *Cost Effectiveness Estimates for 2009-10 EmPOWER Maryland Energy Efficiency Programs*, April 2011
Policies Too

- $100 CO2 tax ($27/ton Carbon)
  - Low cost utility portfolio becomes cost effective
  - Even Res HVAC programs start looking good

- Standards reduce PROGRAM cost effectiveness
  - CFLs >> Remaining Useful Life of 5.7 years increasingly questionable
  - SEER 13 CAC >> Much higher incremental costs and lower savings
  - This is NOT an argument AGAINST standards
Raising the Bar on EE Program Evaluation

- More money = more visibility
  - Stimulus, Ratepayers, Carbon Cap & Trade
- Performance-based compensation
  - CA Incentive Mechanism, Save-a-Watt
- Performance-based funding
  - Carbon Offsets, Cap & Trade allowance distribution
- Performance-based DSM Standards
  - Energy Efficiency Resource Standards
- System Planning
- Making Programs Work Better!
Program Evaluation Challenge in a Nutshell

- Objectives
  - Comparability
  - Reliability
  - Credibility

- Means
  - Consistency
  - Transparency
  - Knowledge & Expertise
  - Independent Verification/Oversight
National “Framework” for Evaluation

- No easy path
  > Decide assumptions/methods, if you can
  > Create credible decision frameworks
    • CA, MD, OH, MA

- Several initiatives underway
  > NEEP EMV Forum (regional)
  > NAPEE
  > NAESB
  > California (and other states)

- Macro-Consumption (Top-Down) Models
  • CPUC pilot projects to develop metric(s) to be used in 2013-15 Program Evaluation Plans
How to Attribute Savings?

Figure 13. U.S. energy-related carbon dioxide emissions, 1990-2035
Billion metric tons carbon dioxide equivalent

Source: EIA, Annual Energy Outlook 2011, Early Release
EIA….Help!

- **Surveys**
  - Some individual state surveys, but no coordination
  - Continue and increase funding for RECS, CBECS, MECS (and Transportation too)
  - Refine/focus DSM data (Form 861)

- **Annual Energy Outlook (AEO) and Service Reports**
  - Refine and build demand modules
  - Maintain independence
EIA….Help! (cont’d)

- **AEO tells us where we’re going**
  - EE will reduce consumption 13% from baseline
  - Structural change will reduce by 33%

- **But where have we been?**
  - Have we moved the needle?
    - Programs, standards, supply
    - Energy subsidies, mortgage interest deduction
Recap

- EE Programs ARE saving energy
  - BUT “The fruit always grows back” thesis will be tested over next few years

- Utility program portfolios ARE generally cost effective
  - BUT low-cost utilities may not be “cost effective” w/o CO2 price
  - Some programs may need to be “revisited”

- Assumptions and policies can drive cost effectiveness
  - Evaluation challenges remain
Thanks!

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