Energy Saving Obligations Across Three Continents

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Energy Savings Obligations

- Mandatory energy savings obligations placed on energy companies (generation or distribution)
- 16 EU member states (MS) have or plan
- 3 Australian states + ACT have
- 27 US states have
Global snapshot of ESOs: 48 operational and 6 planned

Source: RAP analysis for IEA
ESO’s in Three Regions

EU:
• Incremental annual savings ~0.5% of covered energy;
• 0.5-1 Euro cent/kWh

Australia:
• Incremental annual savings 0.2-0.3%/year
• 2.7-3.6 US cents/kWh

US:
• Incremental annual savings >1%/year for electricity, 0.5%/year for natural gas for covered states;
• Average ~3 US cents/kWh
Business Opportunities with ESOs

• Accelerates adoption of energy-saving technologies and practices, increasing sales for companies working in these areas

• Utilities and other obligated entities often contract with energy efficiency service providers to deliver savings

• In Australia and some European countries, energy efficiency service providers procure efficiency savings and sell them in markets or via bilateral contracts
ESOs in Europe – from 5 MS to 16

- **16 countries**

- **58%** of the EU final energy consumption (2012 data)

![Map of Europe showing ESOs](image-url)
## EU Experience with ESOs
(Up to 2011 – before the EE Directive – note variety in coverage)

<table>
<thead>
<tr>
<th>Country</th>
<th>Obligated Company</th>
<th>Eligible Customers</th>
<th>Administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium - Flanders</td>
<td>Electricity distributors</td>
<td>Residential and non energy intensive industry and service</td>
<td>Flemish Government</td>
</tr>
<tr>
<td>France</td>
<td>Retailers of non-transport energy + importers of road transport fuel</td>
<td>All (including transport) except EU ETS</td>
<td>Government</td>
</tr>
<tr>
<td>Italy</td>
<td>Electricity &amp; gas distributors</td>
<td>All including transport</td>
<td>Regulator (AEEG)</td>
</tr>
<tr>
<td>GB</td>
<td>Electricity &amp; gas retailers</td>
<td>Residential only</td>
<td>Regulator (Ofgem)</td>
</tr>
<tr>
<td>Denmark</td>
<td>Electricity, gas, fuel oil &amp; heat distributors</td>
<td>All except transport</td>
<td>Danish Energy Authority</td>
</tr>
</tbody>
</table>
Selected Energy Savings Rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Time period</th>
<th>Energy Savings per Year (ktoe)</th>
<th>Incremental Annual Svgs as % of Total Consumption</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>2008-2012</td>
<td>237</td>
<td>0.5%</td>
<td>Household sector</td>
</tr>
<tr>
<td>Denmark</td>
<td>2015</td>
<td>291</td>
<td>3.0%</td>
<td>All sectors excluding transport</td>
</tr>
<tr>
<td>France</td>
<td>2011-2013</td>
<td>377</td>
<td>0.4%</td>
<td>All sectors</td>
</tr>
<tr>
<td>Italy</td>
<td>2015</td>
<td>500</td>
<td>0.4%</td>
<td>All sectors</td>
</tr>
</tbody>
</table>

Source: Rosenow and Bayer (2016); modified incremental annual savings in percent for Denmark based on Bach (2017)
EESs under Europe’s EE Directive

EEOs deliver 1/3 of savings from all measures under Article 7 of the EU Energy Efficiency Directive
EEO savings cost 4-5 times less than energy supply

Source: based on Rosenow and Bayer (2016)
High effectiveness: UK example shows 23% reduction in domestic gas consumption

![Graph showing reduction targets of Energy Efficiency Obligations](image)

Source: based on Rosenow and Bayer (2016)
Leverage ratios: Private investment ~0.4-2 times public investment

<table>
<thead>
<tr>
<th>Country</th>
<th>Private investment compared to public costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>141% of programme costs</td>
</tr>
<tr>
<td>UK</td>
<td>87% of programme costs in 2002 to 2005 and 44% in 2005 to 2008 (residential sector only, ~50% low-income households)</td>
</tr>
<tr>
<td>France</td>
<td>37% of programme costs (EEOs operate together with tax rebates)</td>
</tr>
<tr>
<td>Denmark</td>
<td>200% of programme costs (industry sector only)</td>
</tr>
</tbody>
</table>

Source: RAP
Costs of EEOs are small to customers

Example: Italy

Source: based on http://www.autorita.energia.it
EU Lessons Learned

- ESOs are a valuable option even in reformed energy markets such as the UK
- Greater ambition is feasible, cost-effective
- MS have a wide range of choices on obliged entities, fuel coverage, delivery techniques
- Trading, “white certificate” schemes don’t add a lot to effectiveness
- “Continuous learning” and EM&V needed - transparent, open review process
EEOs in Australia

- 4 EEO schemes today
- New South Wales, Victoria, South Australia & AUS Capital Territory
- 66% of AUS population
- Began 2009 & 2013 (NSW had an early version 2003)
- Main goal: reduce GHG emissions
- Savings goals are in emissions avoided
Special aspects of the AUS schemes

- Savings obligations in terms of lifetime CO2-equivalents (tCO2-e)
- CO2-e credits vary: gas vs. power; power mixes are different; change over time
- NSW is power only; others include gas
- Most savings are done by Accredited third parties who earn white certificates and sell them to obliged parties
Lessons from Australia

• **Certified delivery agents** – can build a competitive EE delivery industry

• **Private OTC trading** – no need for an official “white certificates market”

• **Deemed savings** – an efficient way to count savings where technology and savings are known

• **Cream skimming** – can be a big problem with competitive delivery, unless bonuses are given for deeper retrofits and longer-lived measures.
Utility Savings Targets (electric) (27 states)

As of May 2018
States with Natural Gas Savings Targets

Source: ACEEE, Berg et al. 2017 plus revisions

18 states
State Targets by Year of Enactment

The bar chart shows the number of states with EERS policies by year of enactment. The states are categorized by the year they enacted their EERS policies, with blue bars representing existing EERS policies and red bars indicating new EERS policies. States such as Arizona (AZ), Iowa (IA), and Indiana (IN) are shown with both existing and new policies, while states like Texas (TX) and Vermont (VT) have only existing policies. The chart also notes that some EERS policies have been rolled back.
Utility Spending on Energy Efficiency

Program spending (billion $)

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity programs</th>
<th>Natural gas programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>$1.8</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>$1.2</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>$1.0</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>$0.9</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>$1.0</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>$1.1</td>
<td></td>
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<tr>
<td>2001</td>
<td>$1.1</td>
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</tr>
<tr>
<td>2002</td>
<td>$1.1</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>$1.4</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>$1.4</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>$1.6</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>$0.3</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>$0.3</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>$0.6</td>
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<td>2011</td>
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<tr>
<td>2013</td>
<td>$1.1</td>
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<tr>
<td>2014</td>
<td>$5.9</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>$6.3</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>$6.3</td>
<td></td>
</tr>
</tbody>
</table>

Electricity programs: $1.8, $1.2, $1.0, $1.1, $1.4, $1.4, $1.6, $0.3, $0.3, $0.6, $0.8, $0.9, $1.0, $1.1, $1.1, $5.9, $6.3, $6.3
Natural gas programs: $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0, $0.0

Source: ACEEE
Savings from Utility-Sector Energy Efficiency Programs

6.0% of sales in 2016

0.7% in 2016
Levelized Electricity Resource Costs

*Notes: Energy efficiency program portfolio data from Molina 2014; All other data from Lazard 2017.
High-end range of coal includes 90% carbon capture and compression.
Other Motivations in US

• Regulators often encourage EE to benefit consumers
• Greenhouse gas reductions and other emissions reductions (important in some states, not others)
• Less exposure/risk
Business Model for Electric Utilities

Source: ACEEE

Total of 32 states

- States with electric decoupling (not including LRAM)
- States with performance incentives for electric utilities

2017
# Impact of Electric EERS

(2016 data)

<table>
<thead>
<tr>
<th>Policy</th>
<th>No. of states</th>
<th>Average EE investments as % of revenues*</th>
<th>Average EE savings as % of sales*</th>
</tr>
</thead>
<tbody>
<tr>
<td>No EERS</td>
<td>24</td>
<td>0.75</td>
<td>0.30</td>
</tr>
<tr>
<td>Yes EERS</td>
<td>26</td>
<td>2.59</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Source: ACEEE.
Average Cost of Saved Energy and Energy Savings as a % of Retail Sales for Major Utility Programs

http://aceee.org/research-report/u1601
US Lessons Learned

- Plan for ramp-up periods
- Complement targets with other policies: “decoupling” & performance incentives
- Set challenging targets and allow a range of eligible efficiency measures; serve all customer classes
- Involve stakeholders in efficiency planning; use clear, transparent and consistent tests for planning resource portfolios
Conclusions

1. EEOs generally been successful in all three regions – save a substantial amount of energy (more than 20% in a few cases)

2. Savings generally cost-effective – costs generally less than half those of supply-side resources

3. Provide opportunities for EE businesses

4. Steady political support, stable funding, outreach on benefits and high-quality EM&V are important
Contact Information

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