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Selected International Experience with Utility Energy Efficiency Programs

*The New Role of Electric Utilities:
Maximizing Energy Efficiency instead of Sales?*

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The Regulatory Assistance Project

Global
China
India
European Union
United States

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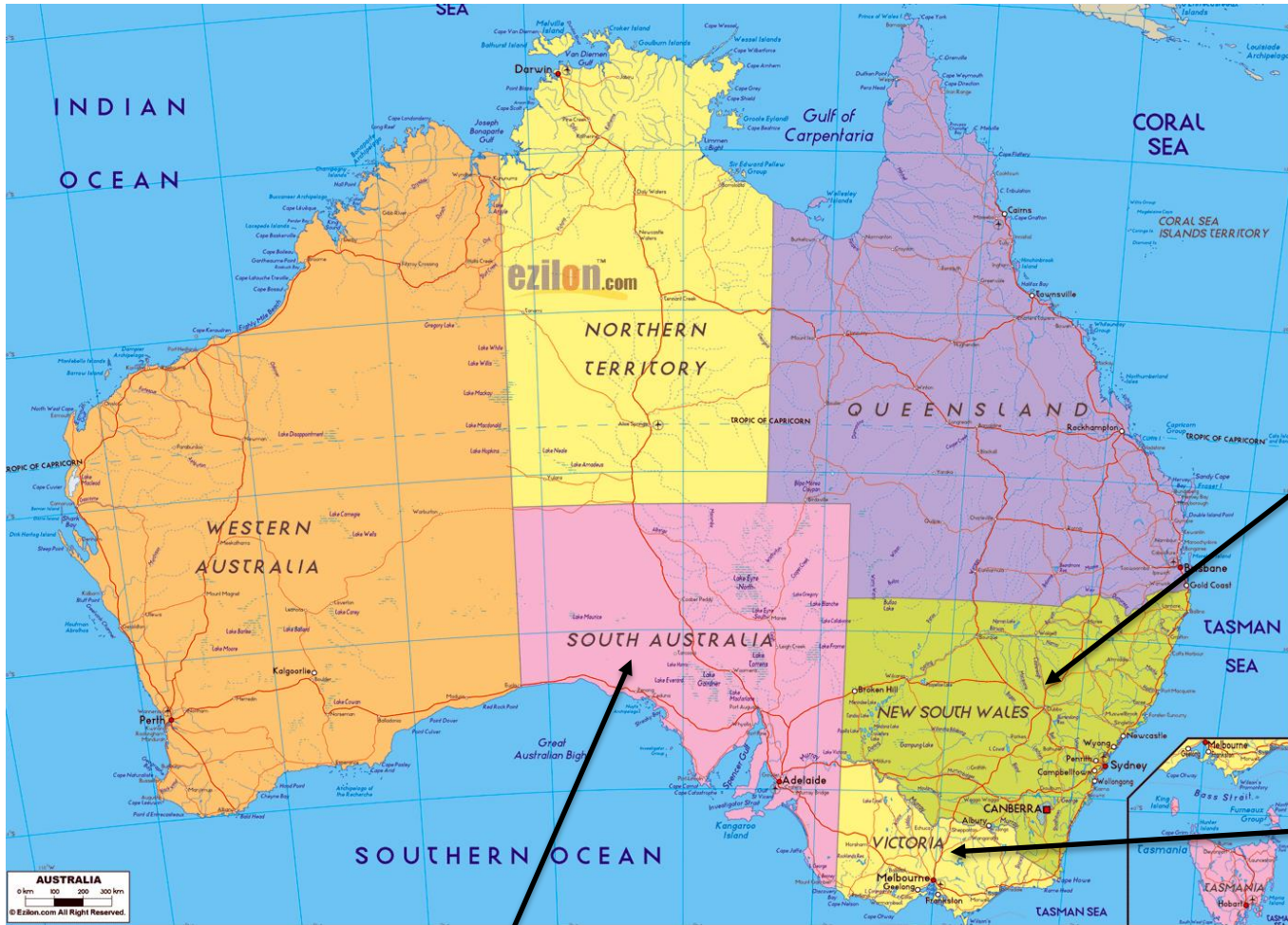
Energy Efficiency Obligations

- An energy efficiency obligation (EEO) is a *regulatory mechanism* that requires *obligated parties* to meet *quantitative energy saving targets* by delivering or procuring *eligible energy savings* produced by implementing *approved end-use energy efficiency measures*
- The requirement to meet quantitative energy saving targets distinguishes EEOs from other similar mechanisms, such as a general requirement to acquire all cost-effective energy efficiency with no target specified

Key Elements of EEO Schemes

- There are now some 50 EEO schemes in a number of jurisdictions around the world
 - The EU Energy Efficiency Directive was issued in 2012; national compliance plans are now under review
- All EEO schemes include three key elements:
 - a *quantitative target* for energy efficiency improvement;
 - *obligated parties* that must meet the target;
 - a system that: defines the *eligible energy efficiency activities* that can be implemented to meet the target; *measures, verifies and reports* the energy savings achieved through these activities; and *confirms* that the activities actually took place
- Some, but not all, EEO schemes include *trading of energy savings* (through *white certificates* or some other means)
- Some, but not all, EEO schemes require that the efficiency investments satisfy a cost-effectiveness criterion

Australian EEOs



New South Wales

Victoria

South Australia

Selected North American EEOs



Australia

	New South Wales	South Australia	Victoria
Fuel and Sectors	Electricity; residential, commercial, and industrial sectors (all facilities)	Electricity and natural gas; residential dwellings	Electricity and natural gas; residential dwellings & commercial premises
Targets	0.4% of total electricity sales in 2009, increasing to 4.0% in 2014	Set levels of annual tCO ₂ -e reductions increasing each year	2.4 MtCO ₂ -e/yr for 2009-2011; 5.4 MtCO ₂ -e/yr for 2012-2014
Obligated Parties	Electricity retailers; generators that supply customers directly; users buying directly from market	Energy retailers with 5,000 or more residential customers	Electricity and gas retailers with 5,000 or more customers in Victoria
Compliance	Surrender of energy efficiency certificates	Investments to meet emissions reduction & energy audit targets	Surrender of energy efficiency certificates
Incentives, Penalties	No performance incentives; penalties for non-compliance	No performance incentives; penalties for non-compliance	No performance incentives; penalties for non-compliance
Eligible Measures	Preapproved with deemed energy saving values; methodologies to assess specific cases	Preapproved with deemed energy saving values; new measures added occasionally	Preapproved products with deemed energy saving values; products added occasionally
Measurement & Verification	Random audits of projects	Audits of retailers' operations	Audits of product installations
Trading	Trading of EE certificates	No EE certificates, but limited transfer of credits among parties	Trading of EE certificates
Funding	A cost of doing business	Costs in regulated prices	A cost of doing business

Performance: Australia

- New South Wales
 - EEO originally a component of the Greenhouse Gas Reduction Scheme; expanded into the Energy Savings Scheme (ESS) in 2009.
 - Despite some early problems with verification, the ESS targets have been met
- South Australia and Victoria
 - EEOs are similar to that of New South Wales
 - Savings targets have been met or exceeded

Canada and China

	Ontario	China
Fuel and Sectors	Electricity; residential, commercial, industrial, institutional, and low-income customers	Electricity; all economic sectors and any facility including transmission and distribution networks
Targets	1,330-MW reduction in peak demand by 2014 and 6,000 GWh of energy savings by 2014	Savings of 0.3% of electricity sales and load reduction of 0.3% of maximum load in previous year
Obligated Parties	Electricity distributors	Government-owned grid companies
Compliance	Distributors must file for approval a strategy that describes how they intend to achieve targets	Score a minimum of 70 points in a system that uses quantitative and qualitative measures to score performance from 0 to 100 points
Incentives, Penalties	Sliding scale of performance incentives; no penalties for non-compliance	Incentives possible for score of 90 or greater, but no details specified; no penalties for non-compliance
Eligible Measures	Government-run programs or programs approved by the regulator in the distributor's service territory	Measures not specified; energy savings from other fuel types may be converted into electricity saving
Measurement & Verification	Programs evaluated by a third party; regulator publishes results annually	100% of savings can only be claimed if audited by third party or recorded by equipment
Trading	No	Obligated parties may purchase savings from customers and ESCOs under bilateral contracts
Funding	Collected from all ratepayers based on energy use or contribution to peak demand	City utility surcharge, revenue from differential electricity prices, and other funding sources

China

- National Energy and Environmental Policies
 - 16% energy intensity, 17% carbon intensity, and 4 other pollutant reduction goals in 12th FYP
 - 40-45% carbon intensity reduction and 15% non-fossil goals by 2020
 - Three regional coal consumption caps (targets set for 2017); national cap under discussion
 - AQM rule and State Council edict identify end-use energy efficiency (EE) as a means of reducing local air pollution
- Policies to Promote EE:
 - Top 10,000 Industries Program
 - Differential pricing for industries
 - Retail electricity price rises as the enterprise's manufacturing efficiency goes down
 - Energy Efficiency Power Plants (EPPs)
 - End-use energy efficiency investments aggregated to produce savings that replicate the output of a conventional power plant
 - DSM Cities Program
 - Municipal requirements for reducing electricity demand
 - Grid Company EEO

Performance: Ontario and China

- Ontario
 - Early performance was mixed. In 2012, the interim targets for energy savings were for the most part met, but peak reductions were lagging. Data for 2013 are not yet available.
 - The program is being renamed for the 2015-2020 period: the Conservation First Framework
- China
 - Performance believed to be mixed at best; no independent evaluation of achievements has been made public

United States

	California	Connecticut	Vermont
Fuel and Sectors	Fuels: electricity & natural gas Sectors: new construction; HVAC; low-income	Fuels: electricity, natural gas, propane, and heating oil Sectors: all customer classes	Fuel: electricity Sectors: residential, commercial and industrial; new construction, low-income, and farms
Targets	2010-2012: 6,965 GWh (0.9% of sales), 1537 MW, and 150 mn therms for investor-owned utilities; 700,000 MWh for public utilities	Saving targets for each obligated party specified in annual plans approved by regulator	2012-2014: reductions of 320,000 MWh and 60.8 MW at peak
Obligated Parties	Investor-owned and publicly owned electricity and natural gas utilities	Electricity distributors, municipal utilities, and natural gas utilities	Distribution utilities; obligation satisfied for most utilities by EE programs delivered by EE utility
Compliance	Utilities implement approved EE programs	Parties prepare and implement annual plans	Regulator contracts with EE utility for specified performance
Incentives, Penalties	Incentives for achieving $\geq 80\%$ of target; penalties if $< 65\%$	Incentives for achieving 70-130% of targets; no penalties for non-compliance	Bonuses for EE utility up to 2.7% of three-year budget; no penalties
Eligible Measures	Measures included in 12 statewide EE programs	Measures included in annual plans approved by regulator	EE programs approved by regulator
Measurement & Verification	Carried out by third-party contractors	Deemed energy savings and engineering calculations	Energy savings verified by third parties
Trading	No	Parties may purchase EE certificates from third parties	No
Funding	Charges included in customer bills	Charges on bills, revenues from carbon & capacity markets, & other	Charges on customer bills (~3%) and revenues from carbon market

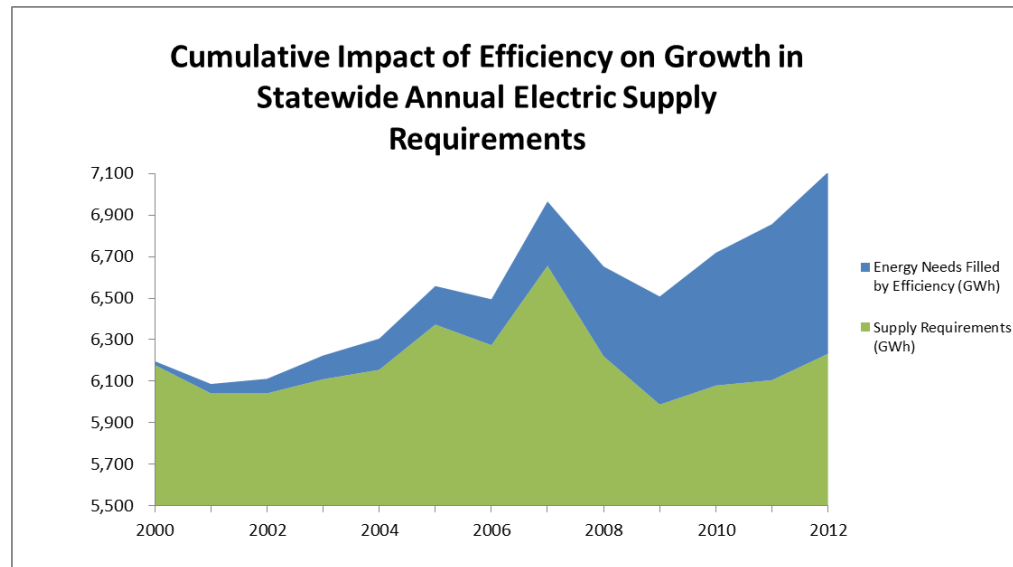
Performance: California and Connecticut

- California
 - The investor-owned utilities have, in general, met their targets, whereas the publicly-owned utilities have been less successful
- Connecticut
 - Performance has varied over the past six years, in part because the legislature diverted some of the EE funds to reduce the government's budget deficits

Performance:

Efficiency Vermont 2000- 2012

- After a decade of utilities failing to meet their obligations, Vermont created a separate entity whose sole mission is to acquire efficiency savings. *Efficiency Vermont*, the nation's first energy efficiency utility, was established in 2000.
- 42,500 homes and 1,890 businesses served
- Over \$200 million in cumulative savings, 2000-2012
- 3.4 cents/kWh for efficiency vs. 8.6 cents/kWh for supply
- EE installed since 2000 reduced supply needs by 12.3% in 2012
- Reduction of CO₂ emissions by 943,000 tons; equivalent to a year's worth of emissions from 178,000 passenger cars



Common Elements of EEOs: Lessons Learned and Best Practices

1. Policy Objectives
2. Legal Authority
3. Fuel Coverage
4. Sector and Facility Coverage
5. Energy Saving Target
6. Obligated Parties
7. Compliance Regime
8. Performance Incentives
9. Eligible Energy Savings
10. Eligible Energy Efficiency Activities
11. Measurement, Verification and Reporting
12. Trading of Energy Savings
13. Funding

Conclusions

- All EEO schemes include a small number of similar key elements, but there are significant variations in how the different schemes are designed and implemented
 - Note that only in the US is *cost-effectiveness* an EE program design criterion: EE must cost less than the supply (G, T, and D) that it avoids.
- While differences in EEO design can have important impacts on the performance of EEOs, the critical influences on results are (1) the savings targets, (2) funding levels, (3) how potential adverse impacts on regulated entities are dealt with, and (4) public, regulatory, and political commitment to efficiency.
 - Re (3): Reconsider how utilities make money. Break the link between sales and revenues (i.e., revenue-based regulation).
 - Re (4): Recognize that EE is a resource like any other. It also happens to be the least costly and least environmentally damaging resource.
- Accumulated experience in designing and implementing EEO schemes now enables the identification of several best practices
- Adopting these best practices in designing and implementing new schemes, and updating existing ones, should improve the effectiveness of the schemes in delivering cost-effective energy efficiency

Resources

- RAP website: www.raonline.org
- RAP report *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes* is available at:
www.raonline.org/document/download/id/5003
- IEA DSM Programme website: www.ieadsm.org
- DSM University website: www.dsmu.org

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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