IEA DSM Task XXII
Energy Efficiency Portfolio Standards: Initial Research Findings

Paris

6 Avril 2010

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The Regulatory Assistance Project

China ♦ India ♦ European Union ♦ Latin America ♦ United States

About the Regulatory Assistance Project

- RAP is a non-profit organization providing technical and educational assistance to government officials on energy and environmental issues. Senior RAP staff all have extensive utility regulatory experience.
  - From 1989 to 2000, Rick Weston was an economist and administrative law judge with the Vermont Public Service Board
- Funded by charitable foundations (including the European Climate Foundation), US DOE, and US EPA. We have worked in nearly every state and 17 nations.
- RAP also provides educational assistance to stakeholders, utilities, and other interested parties.
- RAP is participating in Task XXII by providing in-kind policy research and analysis

Energy Efficiency Portfolio Standards

- An energy efficiency portfolio (or resource) standard is analogous to a renewable portfolio standard
- Electric and/or gas savings targets for utilities
  - Includes end-use efficiency and sometimes combined heat & power (CHP) and codes/standards
  - Targets generally start low and increase over time
- Savings must be documented in accordance with evaluation rules established by regulators
- Can authorize bilateral contracts to exchange savings credits and provide a role for 3rd parties

Countries and States We're Researching

Countries

- **Australia**
- **Belgium** (Flanders)
- **China**
- Denmark
- **France**
- India
- Italy
- South Africa
- United Kingdom

States

- **California**
- **Connecticut**
- New Jersey
- New York
- Massachusetts
- Minnesota
- Texas
- **Vermont**

Boldface denotes places whose programs are described herein

New South Wales Australia

- Commenced 1 July 2009; will end in 2020
- Goals:
  - Create financial incentives to reduce consumption
  - Help households and businesses reduce electricity consumption and costs
  - Complement the national carbon pollution scheme by providing lower cost of GHG emissions reductions
  - Reduce the cost of – and need for – additional energy generation, transmission and distribution infrastructure
- Targets:
  - 0.4% of total electricity sales (MWh) in first year
  - Increases gradually over time, reaching 4.0% of total electricity in 2014, and continuing at that level through 2020

NSW, Australia

- Compliance:
  - Tradable certificates or "white tags"
    - One energy savings certificate = 1 ton of CO_2e
      - Energy savings are calculated using a conversion factor to translate tons of CO_2e to MWh as set forth in law
- Regulator
  - The Independent Pricing and Regulatory Tribunal ("IPART") oversees the ESS, according to rules developed by the Department of Environment, Climate Change and Water, and the Department of Industry & Investment

NSW, Australia

- Who is regulated? "Scheme Participants"
  - All holders of NSW electricity retail licenses
  - Generators that supply directly to retail customers in NSW
  - Customers who purchase their electricity directly from the National Electricity Market
- EM&V – three methods:
  - Project Impact Assessment Method – case by case
  - Metered Baseline Method – Savings determined by reference to a site baseline
  - Deemed Energy Savings Method – where energy-saving activities involve installing or replacing a range of common end uses
- Carry-Overs and Penalties
  - Maximum allowable carry-over is 20% (except for 2009, when participants may carry forward up to a 50% shortfall into 2010)
  - Penalty is the product of the amount of the shortfall (in excess of carry-over) and annual penalty rate (set in law)

Flanders, Belgium

- Flemish regional government enacted the "rational use of energy" law (RUE) on 29 March 2002. The RUE established energy savings obligations for the twelve electricity distribution network managers in Flanders. Several amendments since.
- Goal:
  - "To encourage the efficient use of energy in a liberalized market"
  - Overall Flemish goal: consumption in 2010 to be 7.5% below 1999 levels
- Targets: Differentiated by customer class
  - From 2003 to 2007, different targets were set for low-voltage users and high-voltage users
    - High-voltage users: 1.0 percent of the average energy consumption of two years previously
    - Low-voltage users: Began at 1.0 percent also, but target grew to 2.0-2.2 percent between 2004 and 2007, because of significant potential in residential lighting (CFLs).
      - Distributors for whom low-voltage end users compromise less than 10% of total electricity are exempted from these higher targets.
  - In 2008, the approach was changed: different targets were set for residential and non-residential users
    - Beginning in 2008, savings targets rose to 2% of average consumption over the two previous years for residential users, and 1.5% for non-residential users

Flanders, Belgium

- Eligible measures:
  - RUE imposes a twofold obligation on electricity distributors:
    - "Action obligations:" specified actions, set by the Energy Agency, that distributors must undertake to meet their targets
      - E.g., rebates, coupons, home audits – for CFLs, pipe insulation, low-flow showerheads, etc
    - "Result obligations:" energy efficiency measures that contribute to the RUE target
      - Before the 2007 changes, most any energy saving measure was eligible. Since 2007, most energy audits no longer count as result obligations, and distributors must submit their proposed measures for approval by the Energy Agency.
- Program Administrator:
  - The Flemish Energy Agency approves programs and calculation methods for energy savings. The Flemish Regulation Entity for the Electricity and Gas market ensures compliance with the RUE obligations and imposes fines on non-compliant parties
- Funding: By electric distribution companies

Flanders, Belgium

- EM&V
  - Methods set by the Flemish Department of Natural Resources and Energy
  - First-year savings (as opposed to lifetime)
- Penalties
  - Distribution companies pay €10/MWh short of target.
  - Fines cannot be recovered through rates
- Alternative methods of compliance
  - Distribution companies may carry over surplus from a given year to aid in compliance for the same user category in the following year
  - Grid operators may apply for a change in the baseline for a given year if the total energy supplied to non-domestic end users decreased by more than 5% due to disconnections by non-domestic users
  - Minister of Energy can loosen the RUE target for any distribution company with fewer than 2500 end users of either category, provided that the company propose actions or a financing commitment that compensates for the more relaxed target

Flanders, Belgium

- Achievements
  - Targets have been exceeded

Table 1.1: Results of Flemish Energy Efficiency Obligations; units are in GWh primary energy savings (Source VEA).

Year	LV target	LV target achieved	HV target	HV target achieved
2003	154	337	228	426
2004	316	473	235	316
2005	357	489	227	494

  - Average cost per kWh-saved has been less than a third of the average retail price

China

- No EEPS, but—
  - China's "Top-1000 Energy-Consuming Enterprises Programme"
    - To decrease the energy consumption of the top 1000 energy users by 100 Mtce between 2006 and 2010
    - Component of China's 11th Five-Year Plan (2005), which calls for a reduction in nationwide energy consumption per unit of GDP of 20% by2010
- Regulator
  - National Development and Reform Commission
    - In July 2006, NDRC set goals for each participating enterprise, and calculated aggregate targets for each province
    - Provincial governments responsible for assuring that targeted enterprises in their regions comply
- Regulated:
  - Top energy consumers in nine energy-intensive industries that consumed a minimum of 180,000 tce/year

China

- Funding
  - National and provincial government sources: e.g., bonds
- Incentives and Penalties
  - Incentives
    - RMB 200 for every tce saved per year for enterprises in mid- or western- China, provided the enterprises have measured and documented at least 10,000 tce from "energy-saving technical transformation projects"
  - Penalties
    - Differential pricing: Government-set output-based efficiency standards (e.g., MWh used/ton of cement produced) must be met; if not, the price/MWh is increased
      - Has effect of forcing inefficient producers to replace their facilities or shut down
- Achievements
  - NRDC evaluation in 2009 found that, collectively, Top-1000 enterprises had invested 90 billion RMB ($13.2 billion) in improving their efficiency and had already met the overall target

France

- Law passed in 2005: National Energy Efficiency Action Plan calls for reduction in energy intensity by 2% per year until 2015 and then by 2.5% until 2030
- Objective
  - to "encourage the efficient use of energy in a liberalized market. Additionally...to encourage the development of the energy service approach."
  - Obligation on about 2,500 suppliers of electricity, gas, and other domestic (mainly heating) fuels
  - More than 80% of the obligation falls on EDF and GDF
- Targets:
  - Set and administered by French Government. Allocated among energy suppliers based on their market shares by energy volume in the residential and tertiary markets and the prices of the energies. Targets do not prescribe how energy suppliers EE savings are to be achieved

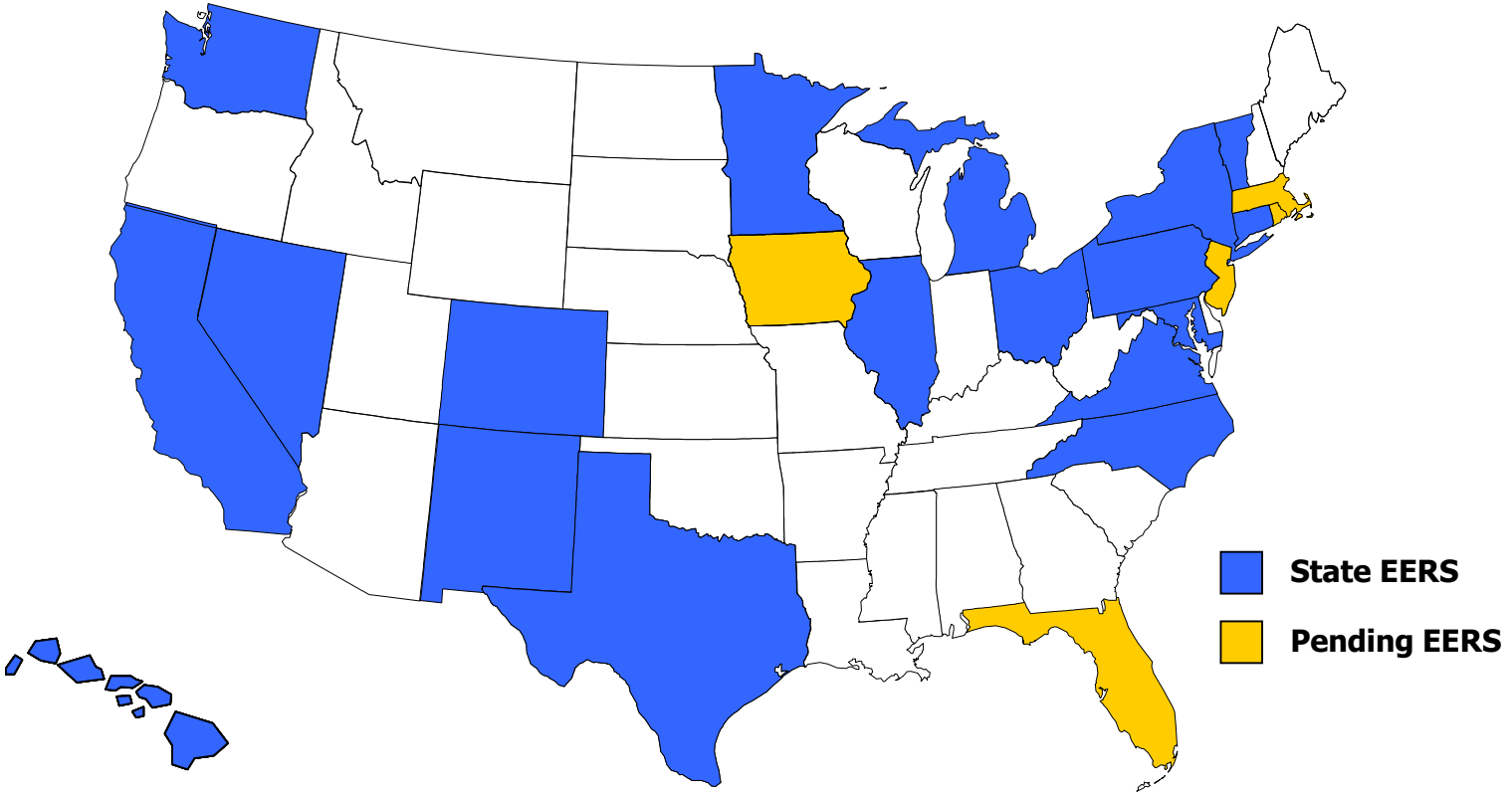
France

- Measures employed include CFLs, condensing boilers, glazing, heating controls, heat pumps, attic insulation, walls, and solar water heating
- Compliance:
  - Targets reached either by implementing end-use energy savings or by buying energy saving certificates ("white certificates")
- Funding:
  - Regulated electricity and gas (EDF and GDF): In principle, costs borne by energy suppliers in attaining white certificates passed on in increased end-user prices.
    - However, in first phase of program, costs (of at least €60 million) were not passed through
    - An additional wires charge for gas
  - Unregulated fuels: no explicit levy, suppliers cover costs, adjust prices if necessary

France

- Incentives:
  - Tax credits up to 50% of the capital costs for householder who has certain energy saving measures installed professionally (e.g., insulation, efficient heating). These are allowed to be claimed in conjunction with White Certificates by an obligated energy supplier.
- EM&V
  - Mostly *ex ante*, i.e., deemed energy savings
  - *Ex post* when necessary
- White certificates trading at prices less than expected
  - EDF and GDF are not purchasing certificates from the market

EERSs in19 States



Expected to save ~6% of US demand for electric energy in 2020

In US, Obligations Vary

- Obligation on distribution utility
  - Most states, including California
- Obligation borne by a state agency
  - New York, Oregon
- Energy Efficiency Utility
  - *Efficiency Vermont* is the leading case
- Performance contracts with 3rd parties
  - Texas
- Bidding into regional capacity market
  - New England ISO Forward Capacity Market

California

- CA's 2010-2012 EE Plan sets targets for its 4 major electric and gas utilities
  - Goal: 7,000 GWh saved over three-year period, or 0.9% of CA's 2007 sales annually
- Regulator: California Public Utilities Commission
- Program Administration
  - Distribution companies fund and administer programmes.
- Funding:
  - Through a charge on end-users' bills: a "public goods charge"
  - In 2007, electric utilities spent $755 million, or about 2.2% of utility revenues
  - In September 2009, the CPUC approved a $3.1 billion budget for the electric utilities for the years 2010-2012
    - 42% increase over the previous three-year programme cycle

California

- Incentives and Penalties
  - Revenue-cap ratemaking ("decoupling")
  - Risk/Reward Incentive Mechanism (RRIM)
    - Calculated for each utility based on two aspects of its performance: how well it meets the energy savings targets established by the CPUC, and the economic benefits generated from its energy efficiency portfolio
    - If energy savings thresholds are exceeded, then the companies can share a small portion of the net benefits the programmes provide customers. In aggregate, the utilities can earn rewards of up to $150 million before taxes each year; this is less than 1 percent of consumers' total annual cost for electricity and natural gas.
    - If the companies fail to meet targets and save customers money, they face symmetrical penalties of up to $150 million statewide each year.

Connecticut

- In June 2005, the CT legislature modified its RPS to include EE:
  - Starting in 2007, the state's electric utilities must procure a minimum 1% of electricity sales from "Class III" resources, rising to 4% in 2010
    - Class III resources include energy efficiency and combined heat and power (CHP)
    - Class I and II resources are different types of RE
  - In 2007, legislature required that companies acquire "all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible."
  - In 2008, the DPUC ordered utilities to establish savings goals
    - Utilities are planning annual savings goals averaging about 1.5%
- Funding
  - Per kWh charge on end-user bills for the Connecticut Energy Efficiency Fund on end-user bills

Connecticut

- Incentives and Penalties
  - Revenue-cap ratemaking (decoupling) is allowed, but not yet in force
  - Rewards:
    - Electric and gas utilities are allowed to earn up to 5% bonus rate of return on conservation investments, or up to 5% of qualified expenditures
      - Incentive levels vary as achievements range from 70% to 130% of goals
    - CPUC is considering possible changes to incentive levels

Vermont

- Energy efficiency investments delivered to end users by third-party administrator, under contract with the state (chosen through competitive bidding)
- Objective: to acquire all cost-effective energy efficiency savings
- Regulator:
  - Vermont Public Service Board
- Regulated:
  - Distribution utilities under legal requirement to meet current and future demand for service at the lowest total cost (including environmental damage costs)
  - An "energy efficiency utility" (EEU), under contract with the state and operating under the state's trademark, *Efficiency Vermont*, delivers most efficiency programmes
    - Utilities may contract with the EEU for additional EE services to fulfill their obligation to procure cost-effective EE
    - One municipal utility, Burlington Electric Department, has chosen to implement its own EE (pursuant to the legal requirements of the government bonds issued by Burlington, which fund EE investments in the city)

Vermont

- Funding
  - "Energy efficiency fee" paid by end users, in $/kWh
  - Roughly 5% of revenues
  - EEU budgets in 2009, 2010 and 2011 are US $26.5 mn, $30.8 mn, and $34.7 mn, respectively
- Administration:
  - Three-year cumulative savings goals are established in the Board's contract with the private corporation that serves as the EEU
  - Contract includes performance targets and budget
- Targets (Vermont's annual peak demand is 1080 MW)
  - 2009-2011 targets:
    - 360,000 total annual MWh
    - The summer and winter peak capacity of 51.2 MW and 54.0 MW, respectively

Vermont

- EM&V:
  - Statutory requirement for independent, third-party evaluation of programmes and verification of savings (both deemed and actual)
  - Must also conform to EM&V requirements of New England's Forward Capacity Market
- Incentives and Penalties
  - Distribution utilities are decoupled, thus no adverse financial impact associated with changes in sales
  - EEU contract specifies performance rewards if targets are met
    - Performance indicators include energy and capacity savings, as well as factors such as geographic equity and adequate R&D. By meeting these goals the EEU can earn up to 3.5% of its total three-year budget