

Efficiency Obligations and EE Resource Standards

Experience in the United States

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24 States with (some sort of) EE Resource Standards

State Energy Efficiency Resource Standard (EERS) Activity

November 2010



Twenty-four states have enacted energy savings goals, or Energy Efficiency Resource Standards (EERS), through legislation and several states have a pending EERS

States with EERS and pending standards account for 2/3 of all electricity sales in the US.

Evolution from "Utility DSM" to Whole Buildings/All Fuels/Carbon Reduction

- >Under IRP EE is a power system or gas system resource (valued only in those terms). Broader view today:
 - Buildings are the infrastructure of the nation
 - Building and industrial efficiency essential to meet carbon goals
 - Energy security, economy, jobs, health benefits
 - "Whole Buildings" approach essential -- Buildings systems are interrelated

>2050 view – we need deep savings, a thin job now may leave stranded opportunities later

ENERGY EFFICIENCY ON A "POWER PLANT" SCALE

- Leading state examples
 - Minnesota has saved over 2,300 MW since 1990
 - The Pacific Northwest has saved over 1,600 MW over a similar timeframe
 - California has saved over 1,500 MW in the last 5 years
- Ten states have EE programs on a scale large enough to displace power plants (i.e., save an additional 0.4% to 1.0% or more of load each year)
 - CA, CT, IA, MA, MN, NY, OR, RI, VT, WI

EE program spending in the US has increased significantly over the past decade





*All values actual program spending except for 2009, which are budgets. Notes: Includes ratepayer-funded programs. Natural gas efficiency program spending is not available for 1993–2004. Sources: Nadel et al. (2000); York and Kushler (2002), (2005); Eldridge et al. (2008), (2009)

Source: ACEEE 2010 State EEE Scorecard and Key Findings from ACEEE's 2010 State EE Scorecard

Delivery Mechanisms Vary –

at least 5 options now used in US

- 1. Obligation on distribution utility
 - Most states, including CA
- 2. Obligation borne by a state agency
 - E.g., New York, Oregon
- 3. Energy Efficiency Utility
 - *Efficiency Vermont* is the leading case; *Efficiency Maine*
- 4. Performance contracts with 3rd parties
 - Texas
- 5. Bidding into regional capacity market
 - New England ISO and PJM Forward Capacity Markets

(Model 1) Savings Obligation on Distribution Utilities

- This is the dominant US model -- major utilities must develop EE plans with targets, subject to regulatory review
- California policy driven by the "loading order"
 - In all utility policy choices, EE comes first, then renewables, then fossil
- Regulators also adopted "decoupling" and performance incentives for EE success
- In California, cumulative savings quite large
- Wide range of programs in dozens of other states

PER CAPITA ELECTRICITY CONSUMPTION VS. PER CAPITA GROSS DOMESTIC PRODUCT PER CAPITA PER CAPITA GDP ELECTRICITY (chained to constant CONSUMPTION 2000 U.S. dollars) CALIFORNIA PER CAPITA GDP 40,000 12,500 kWh per year U.S. PER CAPITA PER CAPITA ELECTRICITY 10,000 -GDP CONSUMPTION 30,000 7,500 -**CALIFORNIA PER CAPITA** 20,000 ELECTRICITY CONSUMPTION 5,000 -10,000 2,500 -0 1980 1960 1970 1990 2000 2010 Source: Environmental Defense Fund

(Model 3) The Efficiency Utility – "Efficiency Vermont"

- A unique franchise comprehensive EE services only -awarded through a public tender and competitive bidding
- Funded by a uniform "wires charge" on electricity sales
- Supervised by the energy regulator
- Based on a performance contract
- Single brand builds awareness & trust
- Efficiency Vermont now meeting 9% of Vermont's electric energy requirements and is on path to meet over 12% by 2012

-- in addition to effects of codes, standards, & other programs.

* "Low-hanging fruit" is reappearing – costs per MWH actually declining & recently meeting >100% of load growth

(Model 4) "Standard Performance Contracting" for EE (Texas)

- Legislature and Regulator set goal (X% of load growth)
- Regulator sets the level of incentive payments to "project sponsors" for installing eligible energy efficiency measures in residences, businesses or industrial facilities
- Project sponsors arrange to sell EE to utilities
- Incentives based on engineering estimates of the savings for many measures ("deemed savings").
- Utility has no role in delivery simply pays for the resource delivered akin to a feed-in tariff for EE

Texas Experience

- Modest beginnings– Initially 10% of load growth, then 20% of load growth by 2009
- In 2010 the Regulator increased the goals to 25% of load growth for 2012 and 30% for 2013 and thereafter
- Utilities have easily met or exceeded targets
- Between 1999 and 2009, the utilities' programs have produced 1,365 MW of peak demand reduction and 3,574 GWh of electricity savings.
- In 2009, \$106 million was spent on EE through standard performance contracting

(Model 5) Forward Capacity Markets in the US

Figure 1. ISO New England and PJM Territories



EE & DR credits in Regional Forward 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 both 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

LESSONS FROM US STATES' EXPERIENCE

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1. Design Programs to Overcome Customer Barriers to EE

Market barriers

Lack of information

Upfront costs

Payback periods - high implicit discount rate

Consumer inertia: Hassle factor, timing mismatches

Split incentives – eg, Builder/buyer Tenant/landlord

Unpriced external costs

Uncompensated benefits –eg, system reliability

Lessons:

- The barriers are the same in both traditional utility systems and in restructured, liberalized markets (EU &US have both)
- Single-barrier attempts don't work (audits alone, financing alone, etc.).
- Cheap measures now, more later creates lost opportunities
- Utility-system charges, not taxes to leverage private capital

2. Who Should be the Portfolio Manager(s)? US Experience Shows a Range of Successful Choices

State	Efficiency Portfolio Manager
	Structure of Top 10 (ACEEE)
California	Regulated Utility (e.g., DNO)
Massachusetts	Regulated Utility (e.g., DNO)
Connecticut	Regulated Utility (e.g., DNO)
Vermont	Contracted Private Entity
Wisconsin	Contracted Private Entity
New York	Unit of Government
Oregon	Sole-Purpose Public Corporation
Minnesota	Regulated Utility (e.g., DNO)
New Jersey	Contracted Private Entity
Washington	Regulated Utility (e.g., DNO)

3. Cost and Savings Performance – Ambitious programs can cost less per MWH saved



BACKGROUND CHART COURTESY SYNAPSE ENERGY ECONOMICS

Efficiency resources are cost effective across many states: 1.6 – 3.3 cents/kWh

Figure 2. Average State Values for Utility Cost of Saved Energy — Electricity Programs



Source: ACEEE, Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs

4. Lack of national mandate yields slow progress and underperformance in many states

Figure 7 U.S. Electric Program Budgets per Capita by State, 2009, Energy Efficiency Only (Excludes Load Management)



 Information from at least one known electric program administrator is missing from this state.
** Includes aggregated data from Idaho, Montana, Oregon, Washington, the Northwest Energy Efficiency Alliance and the Bonneville Power Administration.

[†] A portion of this state's budget is incorporated into Tennessee Valley Authority's regional budget.

5. 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





6. Carbon Markets Can Finance Energy Efficiency

- "Cap and Invest" now the leading allocation idea for the US power and gas sectors
- Key idea: Sell allowances, invest carbon revenue in low-cost carbon reduction (esp EE)
- 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 \$400 Million/pa for EE programs – avoiding CO2 at a cost of (minus) \$-73 per ton !
- In the EU: MS could award allowances to an Efficiency Trust or regulated DNO for auction & support for EE

Efficiency programs can save 7x more carbon per consumer EUR than carbon taxes or prices



Assumptions: Electricity use increases by 1.7% per year; Retail electric sales increase by 3%; Price elasticity is -0.25 (-0.75 for a 3% increase), distributed over 5 years; Carbon dioxide emissions are 0.915 tons per MWh in Ohio; Cost of EE is 3 cents per kWh; Average EE measure life is 12 years

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, Structural/Cohesion funds, and other options now possible

The 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 25 nations and 45 states and provinces, and in Europe works closely with the European Climate Foundation.

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