Electricity Energy Efficiency: Leadership at the State Level

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Abstract

This paper summarizes the recent experience of states that have enacted or are developing bold new energy efficiency policies that have major impacts on the electric power sector. It focuses in on 15 states; the primary policy focus is generically on energy efficiency resource standards (EERS), but also addresses related policy and program issues. These leading states have defined a major shift in state electricity policy, in which energy efficiency is called on as a leading resource to moderate demand growth, control energy bills, forestall capacity shortages, and control carbon dioxide emissions. Collectively, these 15 states' efficiency targets could significantly alter the national electricity demand growth curve. If their targets are met, they would save 0.8% of total U.S. electricity sales. Since the current federal Annual Energy Outlook forecast estimates that U.S. electricity demand growth will average 1.5% annually, this would cut the AEO forecast in half. While full attainment of these goals is uncertain, they nonetheless represent a major effort to drive electricity demand growth substantially lower.

Introduction

States have greatly accelerated their energy efficiency policies in the electricity sector in recent years. Driven by a combination of concerns about rising electricity prices, growing capacity shortages, and global warming, these states have made energy efficiency the "first fuel" in their commitment to a clean energy future. While future power generation sources are an equally important concern, most policy analysts have concluded that energy efficiency needs to be the first priority in redirecting the electricity sector toward a low-carbon future.

This paper provides capsule summaries of 15 states that have recently defined new policies that included significant and long-term energy savings targets in the electric utility sector. Most of these policies set Energy Efficiency Resource Standards (EERS) for electric utilities, in which utilities must achieve end-use electricity savings in specific amounts, on a timetable that typically stretches from seven to 15 years.

State Updates

The following summaries provide an update of the initiatives in 15 leading states that are designed to drive major new resource impacts from electric energy efficiency.

California: Following California's 2001 electricity crisis, the main state resource agencies worked together along with the state's utilities and other key stakeholders and developed the *California Integrated Energy Policy* Report that includes energy savings goals for the state's investor-owned utilities. These goals call for electricity use reductions in 2013 of 30,000 million kWh and peak demand reductions of 7,760 MW from programs operated over the 2004-2013 period. These targets represent 10% of projected 2013 electricity use and 12% of 2013 peak demand. The California Public Utilities Commission, the utilities and other interested parties

then worked together to develop program plans, goals, and budgets for 2006-2008 that will put California on the path for meeting its 10-year goals. From 2004 to mid-2007, California's investor-owned utilities (IOUs) saved 7,820 million kWh and 1,477 MW.[1] The kWh savings represent about 34% of the IOUs ten-year goals (municipal utilities also contribute toward the 10-year goals). Savings are up significantly in 2007 relative to 2006, with IOU savings of about 0.7% of sales in just the first 6-months of 2007.

Colorado: Colorado is working on two types of savings targets. First, targets are in place for Colorado's largest utility, Xcel Colorado. As part of a settlement of a Least Cost Planning case, Xcel agreed to "use its best efforts to acquire, on average, 40 MW of demand reduction and 100 GWh of energy savings per year from cost-effective Demand-Side Management ("DSM") programs over the period beginning Jan. 1, 2006 and ending Dec. 31, 2013, so that by Jan. 1, 2014 the Company will have achieved a cumulative level of 320 MW of total demand reduction and 800 GWh of annual savings." The company agreed to expend up to $196 million (2005 dollars) to meet these commitments. The agreement calls for recovering program costs through rates. Based on PSC's 2004 sales, the annual savings goals amount to about 0.38% of sales. Second, in April, 2007, the Colorado legislature adopted a bill that calls on the Colorado Public Utilities Commission (CPUC) to establish energy savings goals for electric and gas utilities as well as provide utilities with financial incentives for implementing cost-effective energy-saving programs. The bill sets a minimum energy efficiency spending target of 0.5% of revenues from full-service customers and directs that savings targets be set that are "commensurate with program expenditures". The CPUC will open separate electric and gas dockets to establish targets and incentive mechanisms.

Connecticut: Connecticut established a renewable portfolio standard (RPS) several years ago and in 2005 expanded it. Specifically, in June 2005 the Connecticut legislature adopted legislation that, among other provisions, complements the existing RPS by adding new "Class III" requirements covering energy efficiency, combined heat and power plants (CHP) and energy savings from waste heat recovery (this last item was added under 2007 legislation). Under the new class III requirements, electricity suppliers must purchase 1% of supply from efficiency and CHP by 2007, and 4% by 2010 (e.g. the targets increase by 1%/year). Distribution utilities and other power distributors are responsible for meeting the goals. Existing energy efficiency programs can be used to help meet the goals, starting with savings achieved in 2006. Third party providers can also earn savings certificates and sell these to power providers that have Class III obligations. Under the legislation, certificate values can range between $0.01-0.031 per kWh of savings. Meeting the 2007 target should not be difficult, as savings from both 2006 and 2007 can be applied. For 2008, some increased efficiency efforts will be needed to meet the targets.

Hawaii: Hawaii established a binding renewable portfolio standard via statute in 2004 (Act 95). The law sets a renewable resource requirement of 8% of kWh sales in 2005, rising to 20% in 2020. Efficiency qualifies as a resource under these requirements with no cap or set-aside. In 2005, according to a report filed by Hawaii's dominant utility, renewable energy and energy

[1] Messenger, Michael. "DSMiou" spreadsheet. Sacramento, CA: California Energy Commission. California Public Utility Commission, Energy Efficiency Groupware Application, http://eega2006.cpuc.ca.gov/Default.aspx . Visited Aug. 2007.

efficiency resources accounted for about 11.7% of electricity sales, with renewables 65% of these resources and efficiency 35%.[2]

Illinois: In July, 2007; the Illinois legislature passed legislation that includes requirements for energy efficiency and demand response programs. Under the new law, utilities, with help from the Illinois Department of Commerce and Economic Opportunity (IDCEO), are directed to implement cost-effective energy efficiency programs and measures sufficient to achieve the annual energy savings: 0.2% of energy delivered in 2008, 0.4% in 2009, and so on, rising to 2.0% annually for 2015 and subsequent years. Utility programs will be responsible for 75% of these targets, IDCEO for 25% of these targets. Utilities and IDCEO are instructed to first develop energy efficiency plans. In addition, utilities must implement demand response programs and measures to reduce peak load demand by 0.1% each year between 2008 and 2018 (i.e., 1.1% savings in 2018). For all of these programs, there is a rate impact cap of 0.5% of overall rates in any one year, and 2.0% of overall rates in total (e.g. relative to base rates, rates could increase 0.5% in the first year, 1.0% in the second year, etc. up to a maximum of 2.0%). If the rate impact cap is reached, the energy savings goals will be relaxed to the maximum savings that can be achieved within the rate impact cap. This cap, unless changed, will likely limit the savings to significantly less than the out-year goals.

Minnesota: In May 2007, the Minnesota legislature passed the New Generation Energy Act of 2007. Among its provisions, the Act sets energy-saving goals for utilities in the state of 1.5% of retail sales each year. Included under this goal are savings from energy conservation programs, rate design, energy codes, appliance standards, market transformation programs, programs to change human behavior, improvements to utility infrastructure (e.g., T&D improvements) and waste heat recovery. The law allows a utility to request a lower target (based on historical experience, an energy conservation potential study and other factors), but in no case lower than 1% per year. Lower savings can also be justified if the Commissioner of Commerce determines that additional savings are not cost-effective to ratepayers, the utility, participants and society. Implementation of this new law has not yet begun, but for the most part, the 1.5% per year savings goal represents a significant increase relative to current Minnesota utility programs.

Nevada: In 2001, the Nevada legislature enacted renewable portfolio standard legislation. In 2005 this law was amended to increase the portfolio requirement, but also to allow the utilities to use energy efficiency programs to help meet the requirements. Under the new law, renewable energy and energy efficiency must meet 20% of the state's electricity needs by 2015, of which up to 25% can be met with energy efficiency. There are also gradually rising targets for earlier years. These amendments were agreed to after the utilities had difficulty meeting the renewables-only requirements during the first two years of implementation. In 2006, the utilities were able to meet the revised overall renewable requirements, assuming a sale of credits from one utility to another is approved by the Public Utilities Commission. Nevada's standard also has a solar target, which the utilities did not meet. In 2006 the total requirement was 6% of retail sales from eligible resources. Actual eligible resources were 6.4% of sales. Of the eligible resources, 12% were from efficiency and the other 88% renewable energy. In their filing on 2006 accomplishments, the utilities reported they have increased energy efficiency budgets

[2] Hawaiian Electric Co., 2006, "Renewable Portfolio Standard Status Report." http://www.hawaii.gov/budget/puc/dockets/energy.htm .

substantially and are on track to achieve the maximum 25% of the portfolio from efficiency programs by the end of 2008 for Nevada Power and the end of 2010 for Sierra Pacific.[3]

New Jersey: New Jersey is working on two sets of energy-saving goals, one similar to the Vermont system (described below) and a second more formal set of EERS requirements for each electrical energy supplier. New Jersey passed electric industry restructuring legislation in 1999, which included a public benefit fund to pay for energy efficiency and renewable energy programs. In 2003, the Board of Public Utilities (BPU) decided to transfer program administration of the public benefit programs from the utilities to the Board directly and to manage the program through independent contractors and not the utilities. A RFP for contractors to run the program was issued and a contractor selected. As part of the contracting process, specific performance goals were set and call for savings from 2007 programs of 257 million kWh and 452 billion Btu's of natural gas. These are about 0.33% and 0.09% respectively of 2004 sales. Incentives are provided for meeting these goals, with greater incentives for achieving 120% and 140% of the goals. In addition, the BPU is pursuing development of a more formal EERS that would require each electricity supplier/provider that sells electricity to retail customers in the state to meet energy efficiency goals. Legislation passed in June 2007 authorizes (but does not require) the BPU to adopt an electric and a gas energy efficiency portfolio standard, with goals as high as 20% savings by 2020 relative to predicted consumption in 2020. Workshops and hearings to develop the details are expected to start in fall 2007.

New York: In April 2007, Governor Spitzer set a new policy goal to reduce electricity use in 2015 by 15% ("15 by 15"), relative to projected use in 2015. Shortly thereafter, the New York Public Service Commission established an Energy Portfolio Standard Proceeding to determine the best approach for meeting this target. The Proceeding includes natural gas programs, including setting an appropriate 2015 savings target for these programs. In August 2007, Commission staff released a report suggesting the targets be met through a combination of expanding existing system benefit charge programs run by the New York State Energy Research and Development Authority, programs and assistance offered by the state's utilities (including both investor-owned utilities as well as the New York and Long Island Power Authorities), expanding the low income weatherization program, and adopting new and strengthened energy codes and standards. The proposal includes a variety of "fast-track" programs to be started in 2008, as well as a planning process beginning in 2008 to develop programs that would start in 2009 and thereafter. There will be a round of comments and collaborative meetings before the Commission issues a final order.

North Carolina: In August, 2007 the North Carolina legislature enacted a new law establishing a renewable energy and energy efficiency portfolio standard. The law requires public electric utilities in the state to obtain renewable energy power and energy efficiency savings of 3% of prior-year electricity sales in 2012, 6% in 2015, 10% in 2018, and 12.5% in 2021 and thereafter. Energy efficiency is capped at 25% of the 2012-2018 targets, and at 40% of the 2021 target. There are also slightly different requirements for municipal utilities and electric coops, with the requirement peaking at 10% of prior-year sales in 2018, and containing no restriction on how much efficiency can be included as part of this 10%.

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[3] Nevada Power Company and Sierra Pacific Power Company, 2007, "Portfolio Standard Annual Report, Compliance Year 2006." http://pucweb1.state.nv.us/PUCN/DktInfo.aspx?Util=Renewable , Docket 07-04005.

Pennsylvania: The legislature adopted the Alternative Energy Portfolio Standards (AEPS) Act in late 2004. Under the law, renewable energy must account for 8% of the power sold in the state after 15 years of implementation. In addition, "tier 2" "advanced energy resources" must account for an *additional* 10% of power sold in 15 years. "Tier 2" resources include energy efficiency, hydropower, and waste coal and municipal solid waste generation. The legislation also establishes interim requirements. The Pennsylvania Public Utility Commission developed implementing regulations but little in the way of efficiency savings is expected for many years since enough eligible hydroelectric, waste coal and municipal solid waste generation is already in place to meet the Tier 2 targets through to 2016.[4]

Texas: Texas' electricity restructuring law (SB-7-1999, signed into law by then-Governor Bush) established a requirement for electric utilities to offset 10% of their demand growth through end-use energy efficiency programs. Utilities are generally exceeding this goal. For example, in 2006, utility energy efficiency programs reduced demand by 164 MW, exceeding the 129 MW goal by 27%. This was the fourth year in a row the goal was exceeded. The 2006 programs also reduced electricity use by 366 million kWh. Since 1999, the program has reduced peak demand by 756 MW and provided 2,005 million kWh of annual kWh savings.[5] In 2007 the law was changed to double the savings requirement to 20% of demand growth, direct that incentives be provided to utilities for exceeding the minimum savings goals, and require a study to see whether the target can be increased to 30% of load growth in 2010 and 50% of load growth in 2015.

Vermont: Vermont has had extensive energy efficiency programs since 1990, as part of regulated utility's least-cost planning obligations, under the jurisdiction of the Vermont Public Service Board (PSB). Originally, programs were run by the state's utilities, but in 1999 the PSB transferred operations to a single, statewide "energy efficiency utility" operating under the name Efficiency Vermont. Efficiency Vermont in turn is run by a competitively selected contractor, currently the nonprofit Vermont Energy Investment Corporation, under a performance-based contract with PSB. The contract with the PSB includes specific energy (kWh) and peak demand (kW) savings targets. There is a significant holdback in the compensation received by the contractor, pending confirmation that contractual goals for savings and other performance indicators have been achieved. Efficiency Vermont began operations in 2000 and in 2006 achieved 321 million kWh of annual savings and 33 MW of summer peak demand reduction (these figures include savings in 2006 from measures installed in earlier years). Savings started modestly at first, but cumulatively met over 5% of Vermont's electricity requirements by the end of 2005. In 2006, efficiency savings were about 1% of 2006 sales. In late 2006, an expansion of programs began, targeting four areas of the state with significant transmission and distribution constraints. With these expanded programs, Efficiency Vermont is planning to achieve an

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[4] Nadel, Steven, 2006, *Energy Efficiency Resource Standards: Experience and Recommendations.* Washington, DC: American Council for an Energy-Efficient Economy. http://www.aceee.org/store/proddetail.cfm?CFID=1462769&CFTOKEN=87534384&ItemID=409&CategoryID=7 .

[5] Frontier Associates. 2007. *Energy Efficiency Accomplishments of Texas Investor Owned Utilities, Calendar Year 2006.* http://www.texasefficiency.com/news.shtml .

additional 214 million kWh of savings and 30 MW of summer peak demand reduction in 2007-2008. These projected kWh amount to 3.5% of 2006 sales.[6]

Virginia: In March, 2007 the Virginia legislature passed a bill amending Virginia's earlier electric industry restructuring law. The Governor conditionally approved the bill, with one of the conditions being the addition of a section on conservation of energy, including setting a goal of 10% electricity savings by 2022 (with the 10% calculated relative to 2006 sales). The legislature then accepted this condition in the final bill. Under this provision, the State Corporation Commission (the utility commission in Virginia) is directed to conduct a proceeding to consider whether the 10% goal can be met cost-effectively, determine the mix of programs that should be implemented and their cost, and develop a plan for development and implementation of these programs, including who should deploy and administer these programs. The Commission has completed this proceeding with a variety of working groups providing input through a working group process that involved some 160 people. Findings were submitted by the Commission to the Governor and legislature Dec. 15, 2007. Further regulatory or legislative action is pending.

Washington: Washington votes approved an initiative in November, 2006 that set new requirements for electricity resources, including use of renewable energy and energy conservation. The energy conservation section requires each qualifying utility (those with more than 25,000 customers in Washington) to "pursue all available conservation that is cost-effective, reliable and feasible." "High efficiency cogeneration" is included as part of conservation and the term is defined in the law. By January 1, 2010, utilities are directed to determine their achievable cost-effective conservation potential through 2019, and a set of biennial acquisition targets for acquiring these resources. The law specifies that utilities must use methodologies consistent with those of regional power developed by the Northwest Power and Conservation Counsel (NWPCC). The most recent NWPPC plan identifies 2700 average MW of conservation savings as being cost-effective and achievable by 2025, amounting to 10.6% of projected needs in that year if additional conservation is not pursued. Available cogeneration resources are not quantified.

Discussion

These 15 states present an interesting new picture of the emerging policy trend in state energy efficiency policy. Following the "great wave" of demand-side management programs in the late 1980s and early 1990s, in which state-driven spending on energy efficiency rose to $1.6 billion, total spending fell to about $800 million by the late 1990s as electricity restructuring swept the industry. Most of this residual spending was in the form of "public benefits" funding, in which the funds were collected outside of utility budgets.

In this ten-year period since restructuring began in earnest, the public-benefits model of utility-sector program funding dominated the field, though a few states, like Iowa and Minnesota, kept up their regulated, utility-run DSM programs much as before. In the public-benefits program model, the focus was on long-term market transformation, and less on delivering specific energy and capacity results in specific years. These programs were also funding-driven, in that the

[6] Vermont Energy Efficiency Investment Corp. 2007. *2006 Preliminary Results and Savings Estimate Report*. Also, *Efficiency VermontAnnual Plan 2007-2008*. Burlington, VT. http://www.efficiencyvermont.org/pages/Common/AboutUs/AnnualReport/ .

public benefit charge, be it 1, 2, or 3 mills per kWh or some other number, defined maximum program dimensions.

In the last few years, as states have re-evaluated their restructuring experience, as energy prices have risen, and capacity shortages have appeared on the horizon, and as the imperative to address climate change has grown more urgent, a shift has emerged in the policy framework for utility-sector efficiency programs. Governors, legislatures, and utility commissions are focusing on results more than spending, and at the same time have extended their planning horizon. The EERS goals set in the states described in this paper reflect this new resource-target approach as well as a longer-term focus. Some of the early public benefits funds were authorized for 2, 3, or 5 years; the EERS targets emerging today are typically in the 8-15 year range.

This trend toward setting long-term efficiency targets represents a striking departure from the policy thinking that drove electricity restructuring. At that time, it was believed that market forces would lead to an optimal pattern of investment in demand and supply resources. Experience with restructuring has convinced many state leaders that while markets can work and should be the focus for clean energy solutions, a strong policy framework is needed to encourage a balance of demand and supply resource investment.

These EERS-type resource targets also represent a significant shift in U.S. electricity demand growth. The long-term trend in the U.S. economy has been one of declining load growth. In the post-WWII period, demand grew at 10-15% annually. By the 1970s, demand growth was in the 3-4% range. In the 2006 Annual Energy Outlook reference forecast, electricity demand was projected to grow at 1.7% annually on average over the following two decades. The next year, the 2007 AEO reduced the average growth forecast to 1.5%/year—a 12% reduction from one year to the next.

The electricity savings goals set by the 15 states profiled in this paper would collectively reduce the AEO forecast still further. In 2019, these state targets would collectively save 0.8% of total U.S. electricity usage in the AEO forecast. That represents more than 50% of the load growth in the current AEO forecast. It is not certain that all of these state goals will be fully met in 2019, but these goals nonetheless represent a serious policy commitment to further reduce electricity demand growth.

These new and aggressive energy savings targets also represent a major new set of opportunities and challenges for the energy services industry. New business opportunities will be created, but conventional methods of program design and delivery will be challenged to meet such ambitious targets. New delivery channels, financing mechanisms, and other innovations will be needed. This trend will also accelerate the demand for people qualified, motivated, and equipped to work in this area, suggesting that new educational and professional development systems will be needed.