Industrial Energy Efficiency: Improving competitiveness, reducing emissions

State Policy Recommendations

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Western Governors' Association

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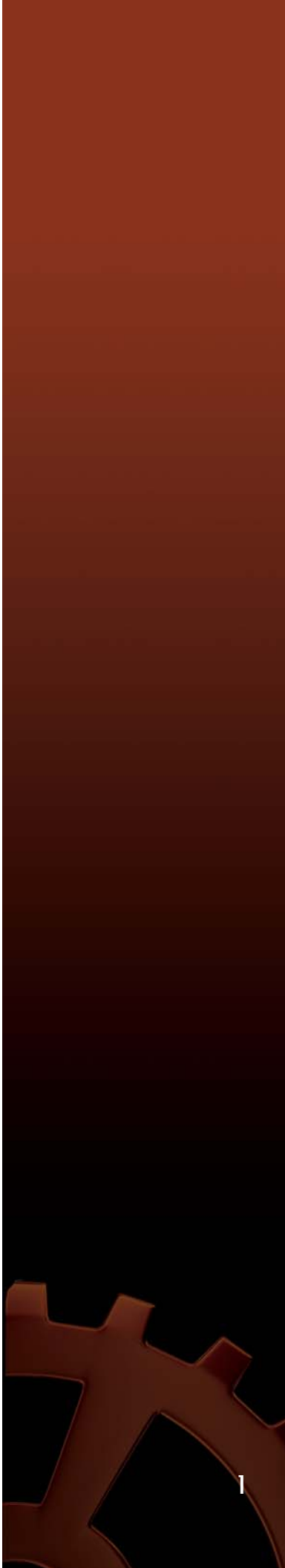


Executive Summary

A Btu is a standard unit measuring thermal energy needed to raise the temperature of one pound of water by one degree Fahrenheit. Btu is a common unit for measuring energy consumption and sources (including fuels and electricity). It is approximately the amount of heat generated by burning one blue-tip kitchen match.

Improving energy efficiency in the industrial sector offers a tremendous opportunity for states to help companies improve their economic bottom line, while offering an opportunity to reduce the need for new power generation.

In the Western States, the industrial sector accounts for 35 percent[1] of total energy consumption. Historically, rising energy costs have placed an added stress on industrial companies as they try to compete in world markets. However, this struggle with increasing energy costs can also spur companies to explore opportunities for improved energy efficiency. If companies in the WGA states reduce their industrial energy intensity by two and a half percent annually through 2016,[2] it would result in approximately 1,170 trillion Btu in annual energy savings, the amount required to heat 28 million households, or about 24 percent of all U.S. households.[3] This equates to approximately $18 *billion* in annual energy savings.

In March 2011, the Western Governors' Association hosted a diverse group of stakeholders, including representatives from Public Utility Commissions, utilities, industrial facilities, state and federal governmental agencies, and public interest groups. The purpose of the meeting was to explore what states can do to foster improved industrial energy efficiency, both within individual states and regionally. The discussions focused on a wide array of obstacles and solutions.

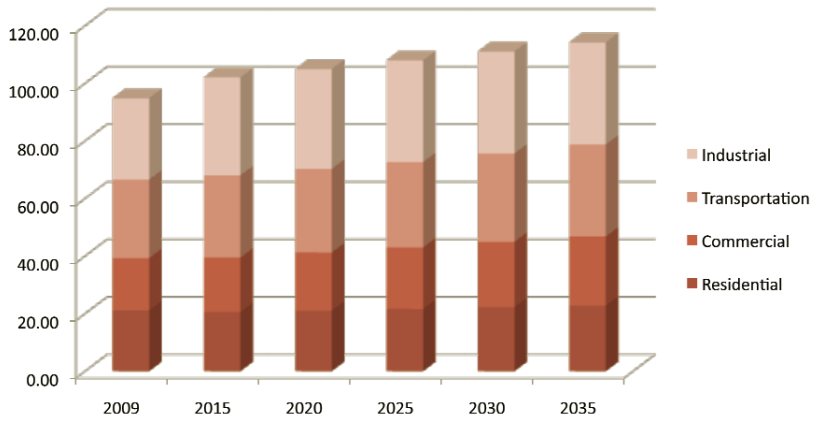
The workshop offered ideas for how Governors and states can take the lead in promoting improved industrial energy efficiency by setting energy efficiency (EE) goals and by recognizing companies for significant EE achievements. Working through Public Utilities Commissions, states can encourage utilities to expand their energy efficiency programs to industrial facilities by allowing them to provide incentives and technical support, and by helping companies overcome financial and technical barriers. PUCs can also play an integral role in removing impediments to combined heat and power projects.

Finally, state energy offices can take the lead in developing programs that complement utility programs.

Industrial Energy Use in the West – The Opportunity

The industrial sector accounts for 35 percent of energy use in the WGA states. This represents a substantial opportunity to reduce total regional energy consumption. While any reduction in energy use places less stress on the generation and transmission system, energy efficiency also helps industrial firms improve their profitability and competitiveness. A recent study by McKinsey estimates potential industrial energy savings of up to 18 percent by 2020, based on readily available, cost-effective technologies.[4] The McKinsey study shows that the potential energy savings in the industrial sector are substantial; in fact, well beyond that potentially available from any other sector.[5]

Figure 1: Primary Energy Use by End-use Sector, 2009-2035 (quadrillion Btu)



Source: EIA Annual Energy Outlook 2011, Figure 56

As expected, the states with the greatest population and industrial activity, Texas and California, account for 58 percent of the total industrial energy consumption in the West. Still, every state has opportunities to craft policies and programs to save energy in the industrial sector.

It is important for the WGA states to consider the benefits associated with adopting an industrial sector-specific energy efficiency goal. By adopting policies and programs that would reduce industrial energy intensity by 2.5 percent per year through 2016, the 19 WGA states could achieve approximately 1,170 trillion Btu per year in energy savings in 2016, with a corresponding monetary savings of $18.2 billion per year.[6]

Table 1: Energy and Cost Saving Results of an average 2.5% Annual Reduction in Energy Intensity from 2012 to 2016 in WGA States

State	Estimated Energy Saved in 2016 with 2.5% per year Reduction in Industrial Energy Intensity from 2012 (Billion Btu/yr)	Estimated Dollars Saved in 2016 2.5% per year Intensity Goal (Million)
Alaska	33,120	$908
Arizona	25,907	$421
California	229,029	$3,417
Colorado	57,511	$802
Hawaii	5,787	$312
Idaho	28,532	$313
Kansas	44,835	$714
Montana	16,968	$234
Nebraska	41,838	$577
Nevada	27,114	$524
New Mexico	28,483	$500
North Dakota	34,008	$326
Oklahoma	62,065	$890
Oregon	34,028	$399
South Dakota	17,842	$232
Texas	367,316	$6,377
Utah	25,720	$291
Washington	62,232	$692
Wyoming	24,251	$283
Regional Total	**1,166,585**	**$18,213**

Source: U.S. Energy Information Administration, State Energy Data Systems 2008; U.S. Bureau of Economic Analysis, Regional Economic Accounts, Gross Domestic Product by State[1]

Note: [1]Comparable data was not available to complete the analysis for the three U.S. territories that are included in the WGA.

EIA's Annual Energy Outlook 2011 energy projections indicate that total primary energy consumption in the U.S., including fuels used for electricity generation, will grow by 0.7 percent per year from 2009 to 2035, reaching a high of 114.2 quadrillion Btu in 2035. The largest increase is projected to come from the industrial sector, which is estimated to grow 25.5 percent over this same time period and accounting for 7.2 quadrillion Btu of the projected increase in total U.S. energy consumption over the period 2009 to 2035. Figure 1, illustrates growth in projected energy consumption, by sector, through 2035.

Overcoming Energy Management Staff Shortages at Simplot

JR Simplot's energy program was started in 2007, when it joined "ENERGY STAR for Industry." At that time, the company began to form energy teams at its major facilities with the assistance of the Northwest Energy Efficiency Alliance Industrial program. Simplot had made a commitment to energy efficiency, hired a corporate energy manager, and dedicated a certain amount of capital each year for energy projects.[7] But Simplot found that plant staff simply could not dedicate the time needed to research and implement energy projects, given their other more important product related duties. To remove this obstacle, DOE provided Simplot a grant to employ two full-time corporate energy engineers, with the goal of proving that these positions would pay for themselves through energy savings.[8] Partly due to the efforts of the energy engineers, Simplot's Food Group (8 facilities) achieved a 7.5 percent intensity improvement over two years (from 2007-2009), resulting in avoided energy costs of more than $40 million/yr.[9]

Industrial Energy Efficiency – The Obstacles

Although energy efficiency can result in substantial cost savings at industrial facilities, achieving the potential energy savings entails overcoming obstacles including:

- organizational leadership,
- capital constraints and competing priorities,
- inadequately trained staff,
- insufficient focus on industrial efficiency programs, and
- burdensome combined heat and power regulations.

Organizational Leadership

As with any program within an organization, a strong commitment from the highest levels of company management is essential for success. Companies that have strong energy efficiency programs have one thing in common — upper management is committed to IEE projects and stresses these types of projects when reviewing capital outlays. For many companies, upper management commitment is lacking, which limits the opportunities for energy efficiency achievements.

Capital Constraints and Competing Priorities

The primary goals of any industrial business are to produce and sell products to make a profit. While sophisticated companies realize the potential savings from energy efficiency programs, not all companies have a sharp view of the connection between energy costs and the bottom line. Generally, capital expenditures are based on a strategic planning process in which projects compete against each other for limited dollars and in which return on the capital investment is a major consideration. When energy efficiency projects are not considered a crucial part of the company's core mission or a key to remaining competitive, energy efficiency investments can be viewed as nonessential and discretionary. As a result, they can be given a lower priority for funding, or even ignored, unless the payback period is very rapid – often two years or less.

Inadequately Trained Staff

Generally, only the largest manufacturing or industrial firms employ a dedicated energy manager. At smaller companies energy management responsibilities are often delegated to facility managers or technical/engineering managers who typically do not have the time or training to understand the potential value of energy efficiency.

Another impediment is that there is often a lack of energy efficiency knowledge among the engineering, facilities or maintenance staff, as well as the equipment operators who can be key players in identifying more sophisticated operating practices that save energy. Without the participation of these key groups, new energy efficient technologies and equipment may never be identified.

Without proper training and tools, it is difficult to measure and assess the benefits of energy efficiency projects since measuring energy NOT consumed is not easily quantified and verified. Any lack of supporting data makes it difficult to sell the benefits of projects to senior management.

Inadequate Focus on Industrial Efficiency Programs

In the residential and commercial sectors, there are often efficiency incentives from both electric and natural gas utilities. For the industrial sector, most electric utilities offer financial incentives and, in some cases, technical assistance to help companies implement energy efficiency projects. Most medium and large-sized industrial facilities buy their natural gas through wholesale suppliers rather than directly from their local natural gas utility. Therefore, these facilities are generally not eligible to participate in utility natural gas-related efficiency programs. This can be an obstacle to implementing efficiency improvements involving steam and process heating systems.

Because of limited resources at utilities, some utility industrial efficiency programs fail to adequately serve small- and medium-size industrial firms. Overcoming the lack of focus on

smaller industries represents an opportunity to increase overall energy-saving and customer satisfaction goals, especially since industrial energy efficiency programs are generally more cost effective than residential programs.[10]

In 2008, the industrial sector made up 35 percent of all energy use in the WGA[11] states. The residential sector makes up 18 percent of all energy use in those states, though still significant. The power of working with just a handful of manufacturing companies to reduce energy consumption can have a direct impact with less investment in outreach than that required for the residential sector. Based on information from the McKinsey & Company 2010 report, *Unlocking Energy Efficiency the U.S. Economy*, on average each industrial customer has 11.1 *billion* Btu of energy efficiency potential, compared to only 24.5 *million* Btu of energy efficiency potential in the average residential home. The approximate 330,000 industrial facilities in the U.S. represent 3,650 trillion Btu of end-use energy efficiency potential in 2020, thus requiring the equivalent of reaching 149 million residential homes[1] to achieve the same amount of potential energy savings impact.[12]

An added benefit that working with the industrial sector on energy efficiency offers is greater economic competitiveness. Strong local industries keep jobs in-state, increase opportunities for employment, and boost state GDP directly in the industrial sector and indirectly in other sectors of the economy.

Finally, although there are a number of industrial energy efficiency programs available, there is often a lack of coordination between state and federal agencies, regional organizations and utilities. Designing an effective regional industrial energy program requires consultation and collaboration with federal and state agencies, as well as utilities and leadership from industrial companies.

Burdensome Combined Heat and Power Regulations

Combined heat and power (CHP) is a specific type of industrial energy efficiency opportunity that produces electricity and useful thermal energy using a single fuel input, with a much greater overall efficiency than if the two had been produced separately. In the industrial sector, CHP can be cost-effective when there is a consistent need for thermal energy, such as a year-round process heating load. CHP systems can also help improve the reliability of the facility's electrical supply. Despite these advantages, there are some obstacles to installing new CHP systems. In addition to initial investment costs, the unique obstacles to CHP include high utility standby service charges, regulatory barriers to interconnection with the grid, and conflicting environmental regulations. Facilities with CHP systems usually require standby/backup service from the utility to provide power when the system is down due to routine maintenance or unplanned outages. These barriers are addressed in more detail in the CHP policy section.

Overcoming the Obstacles – State Policy Recommendations

States can play a very important role by supporting companies with strong energy efficiency programs. Both governors and legislatures can promote energy efficiency. Programs within state energy offices can complement utility energy efficiency programs. Legislatures and public utilities commissions can establish energy efficiency targets, encourage stronger utility energy efficiency programs, and remove obstacles to combined heat and power systems.

State Leadership and Programs

A Governor's leadership within a state is key to encouraging energy efficiency. There are a number of available mechanisms that states can use to motivate companies to adopt more energy efficient practices, including recognition, partnering federal and regional resources, technical assistance and training, energy management training, and creating tax incentives and revolving loan funds. There are also possibilities for services that state programs can provide, ranging from low-cost to the more resource-intensive.

Texas Instruments (TI) built a new semiconductor facility in Richardson, Texas in 2007 with incentives from the state. TI designed the plant to be the first LEED - certified semiconductor plant in the world, and to reduce total costs per square foot by 30 percent compared to the previous TI semiconductor plant. The state incentives and commitment to cost savings helped convince TI's management to locate the plant in Texas, rather than in Asia. A typical semiconductor wafer fabrication plant can have energy costs of $20-25 million per year, and the design of this plant helped reduce energy costs by 20 percent. [13]

Recognition

Energy and plant managers at industrial facilities appreciate recognition, and it can help motivate an industrial culture in which energy efficiency is seen as important. States can complement national programs, such as the Department of Energy's *Save Energy Now Leaders* program or the U.S. Environmental Protection Agency's ENERGY STAR program, by adding their own separate recognition awards. In Colorado, the Governor participates in an annual event to recognize top achievements in industrial energy efficiency. Utah also has industrial EE recognition programs, and Oregon and Washington are working on developing similar programs.

State recognition for companies that commit to an energy efficiency goal or achieve outstanding energy savings can encourage industrial plant managers and executives to place a higher value on energy efficiency. Ideally, this type of recognition can be a catalyst for management to elevate the status of the facility/energy manager's role and to provide more resources to support their work.

Another way for states to support industrial EE is to encourage cooperation among state agencies and utilities in efforts to attract new industry to the state. For example, state energy offices can work with state economic development and utility energy efficiency programs to encourage new industrial facilities to be designed and built using state-of-the-art energy efficient equipment, systems and buildings.

Federal and Regional Resources

State programs can take advantage of federal and regional programs and resources. The U.S. Department of Energy co-sponsors workshops on optimizing industrial energy systems. DOE also provides energy assessments to companies that join its Save Energy Now (SEN) Leaders program. Over 100 companies have joined the program as of April 2011 (see http://www1.eere.energy.gov/industry/saveenergynow/leader_companies.html for list of companies). These companies have pledged to reduce their energy intensity by 25 percent or more within 10 years. State programs can leverage both of these services by working with DOE to schedule workshops and by encouraging industrial companies to join the SEN Leaders program. For example, Idaho's Office of Energy Resources has successfully recruited four of its industrial partners to become SEN Leaders.

Benchmarking Efforts

The energy intensity of individual facilities within different industrial sectors varies significantly. Benchmarking within an industrial sector can identify opportunities for improvement, best practices, and a roadmap to improved performance across the sector. EPA's ENERGY STAR for Industry program has taken the lead in developing useful benchmarking data for several key industrial sectors.[14] States can support these efforts, and where needed, can organize regional or state efforts to gather data to allow benchmarking for additional sectors.

Technical Assistance and Training

In states where utilities provide minimal technical assistance or training to industrial facilities, state programs can help fill this gap. States can also fill the gap by providing information on steam or process heating systems. For those large customers unable to take advantage of utility technical assistance programs, state programs can fill an important need. For example, Colorado's program provides free energy assessments to the industrial companies participating in the Colorado Industrial Energy Challenge (CIEC). Utah's Industrial Energy Efficiency Program focuses on providing workshops and training opportunities in key industrial energy end-uses (compressed air, steam, pumps and fan systems). Idaho's Office of Energy Resources program specializes in custom approaches specific to customer needs, intended to move energy efficiency projects toward implementation and help build industrial energy engineering expertise. Likewise, the Texas Industries of the Future Program provides energy assessments and training to industrial firms in the state.

Energy Management Training

State programs can also help educate industrial firms about what it takes to achieve on-going savings and continual improvement. Without attention to the overall energy management

program, companies tend to be inconsistent in their energy savings efforts, perhaps implementing a project or two after an initial assessment, and then limiting future energy efficiency efforts. Many companies that have on-going energy savings have formed energy teams. These teams often meet regularly to discuss possible energy saving measures, project management, and energy consumption data collected to measure progress.

The Northwest Energy Efficiency Alliance's (NEEA) Industrial Program has pioneered several efforts directed towards facilitating energy teams and helping companies to develop comprehensive, strategic energy management programs. State programs could also leverage the training and assistance in this area available through the U.S. EPA's ENERGY STAR for industry program. Colorado's program is in the early stages of developing training and assistance programs in energy management. Texas' industrial program is encouraging plants to become certified under the new ANSI standard for energy management through participation in DOE's Superior Energy Performance pilot program.

Tax Incentives and Revolving Loan Funds

Several states have developed low-interest loan funds to help industrial firms finance energy efficiency projects, however, many industrial companies are hesitant to take advantage of these programs because it would mean taking on more debt. Wisconsin has developed a potential solution to this dilemma by creating a fund similar to how an energy service company (ESCO) operates. The Wisconsin program, managed by CleanTech Partners, Inc., performs analysis to estimate the potential energy savings from projects that need financing. Then the program develops a contract to share the savings with the industrial company in a way that allows the company to receive, for example, 50 percent of the annual cost savings, while using the remainder of the cost savings to pay back the initial investment for the project. So far, the Wisconsin program has financed 10 projects using an initial investment of $2.1 million.

In Oregon, the state developed tax incentives for industrial efficiency investments. In 2010, Oregon developed the Business Energy Tax Credits (BETC). This has proven very popular with Oregon industrial companies. The program targeted companies that invest in energy conservation, recycling, renewable energy resources and less-polluting transportation fuels. While the program achieved significant energy savings, it was terminated because its popularity, along with a separate renewable tax credit program, made it unaffordable for the state. Given the current budget conditions in most Western states, opportunities for creating tax credits may be limited.

Funding for State Programs

Although state budgets are tight, there are several possibilities for funding state industrial efficiency programs, especially the technical assistance and training programs discussed above. Several states in the WGA footprint assess an additional charge on utility bills, referred to a public benefits charge. For example, the Energy Trust of Oregon funds industrial efficiency and other energy efficiency programs through a small additional charge to all ratepayers in Oregon. California also directed its three major public utilities to collect a public goods surcharge to fund renewable energy projects and energy efficiency. In June 2006, the Hawaii State Legislature enacted legislation to create a public benefits fund (PBF) for energy efficiency and demand side management. This program was implemented in July 2009 and had a net energy impact the first year of 46 million kWh.[16]

Another possible source for funding energy efficiency is the money collected through environmental fines and penalties. Several states, like Colorado, already redirect part of these funds towards projects with environmental benefits, called "supplemental environmental projects." Montana has funded the state's Alternative Energy Revolving Loan program with air quality penalties. These funds are also targeted at energy conservation projects. This program is implemented by the Department of Environmental Quality.
http://www.deq.mt.gov/energy/renewable/altenergyloan.mcpx

Assistance with Energy Management Programs

The Northwest Energy Efficiency Alliance (NEEA) Industrial program has been a leader in state or regional program efforts to promote a continual improvement approach to energy management. Since 2008, NEEA has been developing and promoting a program called "strategic energy management," which is similar to the seven elements of ENERGY STAR's energy management guidelines. For example, NEEA assisted NORPAC Foods, Inc. with the formation of energy teams at NORPAC's major facilities, and with establishing energy management plans and protocols for the on-going work of the site energy teams.[15] Partly due to NEEA's assistance and despite declines in production, NORPAC achieved an 8 percent intensity improvement over four years (2005-2009) at its four processing facilities.

Utility Industrial Energy Efficiency Programs

Electric utilities can be strong partners and often play an important role in helping companies implement more energy efficiency projects. Several types of state policies are crucial in motivating and supporting strong utility industrial energy efficiency programs. States can foster energy efficiency within the utilities by:

- setting energy efficiency standards or goals,
- creating financial incentives and implementing decoupling policies, and
- providing guidelines for utility programs through public utilities commissions.

Utility Energy Efficiency Standards or Goals

Across the U.S., states have adopted both mandatory standards and voluntary goals for energy efficiency within their electric or natural gas markets. The establishment of mandatory standards or voluntary targets for energy savings can encourage utilities to develop comprehensive programs for their industrial customers.

An Energy Efficiency Resource Standard (EERS) is a mandatory energy savings requirement set by a legislative or regulatory body. In the WGA region, five states have mandatory energy savings requirements, including Texas, Hawaii, Washington, New Mexico and Arizona.[17] Nevada has adopted clean energy standards that can be met through a combination of energy savings from demand-side management programs and renewable energy generation.

Table 2 – State Energy Efficiency Requirements

State	Description[18]
Arizona	Investor-owned electric utilities must achieve 22% energy savings by 2020, based on 2010 sales.
Hawaii	Sets an energy savings target for electric utilities (with penalties for non-compliance) of 4300 GWh by 2030 (about 40% of 2007 electric sales); the PUC must also set interim targets.
Nevada	Renewable portfolio standard requires 25% of electric sales to be from renewable sources by 2015; up to 25% of this requirement can be met through energy efficiency.
New Mexico	Requires investor-owned electric utilities to achieve savings amounting to 10% of 2005 electric sales by 2020.
Texas	Requires electric utilities to offset 25% of annual load growth through energy efficiency; increases to 30% of load growth in 2013 and beyond.
Washington	Requires investor-owned electric utilities to develop energy-saving goals for approval by the PUC.

Four WGA states, California, Oregon, Utah and Colorado have established voluntary energy efficiency goals for its utilities.[19] California and Oregon have voluntary goals for electrical and natural gas savings, for investor-owned utilities in California, and for the Oregon Energy Trust (which administers energy efficiency programs in Oregon). The Colorado PUC adopted electricity savings goals for the two investor-owned utilities in the state, Xcel Energy and Black Hills Energy. The goals in these four states are voluntary, and there is no penalty for failing to meet them.

Utah's legislature passed a resolution in 2009 asking the State PUC to set specific energy saving requirements for the State's investor-owned utilities, but the PUC has yet to act.[20]

Decoupling and Financial Incentives for Utilities

Traditionally, utilities' revenues and profits increase as total sales of electricity or natural gas increase. Under this regulatory structure, it is difficult for investor-owned utilities to vigorously encourage energy efficiency while maintaining returns for their shareholders. States can remove this disincentive to utility investment in energy efficiency by establishing ratemaking policies that decouple utility revenues from sales volume and by providing a positive financial incentive for meeting or exceeding energy savings standards or goals.

To help make energy efficiency programs economically attractive for utilities, there are three types of financial mechanisms that legislatures or state utility commissions can adopt. The first one assures recovery of the costs of implementing the energy efficiency programs themselves. This is a relatively simple policy that is already in place in most states. In many cases, utilities submit DSM program plans for PUC approval and then are allowed to recover costs for approved programs roughly at the same time as DSM expenditures occur.

The second mechanism is the recovery of lost revenue for lower sales of electricity or natural gas due to the efficiency programs. A *lost revenue adjustment* uses a rate adjustment to help a utility recover net lost revenue that results from energy efficiency program implementation, in between utility rate cases. An alternative to the lost revenue adjustment is *decoupling* mechanisms, which separate utility fixed cost recovery from the amount of electricity or gas sold to customers. Utilities are allowed to recover their authorized fixed costs, independent of energy sales, through automatic rate adjustment formulas. (Rates can be adjusted either up or down.) Both of these methods eliminate the disincentive that utilities traditionally have for implementing effective energy efficiency programs for their customers. They at least make the utilities neutral towards efficiency programs from a profitability standpoint. In Western states, lost revenue recovery or decoupling is now in place for electric and/or gas utilities in California, Hawaii, Idaho, Montana, Oregon, Utah, Washington and Wyoming.[21] Other states including Arizona and Nevada are in the process of implementing one of these policies.

The third mechanism offers utility shareholders a return on investment in energy efficiency, and rewards them for achieving or exceeding their energy saving standards or goals. These incentive mechanisms encourage utilities to achieve more energy savings, rather than merely meeting minimum requirements or goals. The incentive is often tied to the level of energy savings and/or net economic benefits achieved, increasing the reward as program performance improves. In the West, this type of policy is now in place in Arizona, California, Colorado, New Mexico, South Dakota and Washington

Using the mechanisms described above provides positive advantages for utilities and their shareholders, while benefitting industrial customers by encouraging greater energy efficiency. Periodic rate adjustments through "decoupling" and integrating performance-based incentives into the regulatory structure can be very important if not essential to incentivizing more energy efficiency actions by utilities.[22]

Public Utility Commission Oversight of Utility Programs

Some state public utilities commissions already have authority to regulate energy efficiency programs. In these states, most investor-owned utilities are required to periodically submit their energy efficiency or demand-side management (DSM) plans to the state public utilities commission for approval. By reviewing proposed expenditures on energy efficiency, states and PUC commissioners can work together to implement policies that promote the greatest energy intensity reduction per dollar spent.

Based on the industrial (or in some cases, commercial and industrial) savings goals, PUCs can encourage utilities to offer a variety of efficiency services and incentives to their industrial customers. There are five main types of utility programs for industrial customers, and the most

effective utility programs include services or incentives in all these areas:

- prescriptive incentive programs;
- custom incentive programs;
- training, education and outreach services;
- technical assistance and energy auditing services; and
- self-direction programs.

Incentive programs. *Prescriptive (targeted)* incentives are rebates for investments in specific types of energy efficiency equipment, such as premium efficiency motors, variable speed drives, efficient compressors, etc. The list of eligible measures and rebate amounts are specified, making it very easy for companies to plan qualifying efficiency projects, analyze cost effectiveness and receive utility rebates. *Custom incentive programs* provide an important complement to prescriptive incentives, covering many types of energy efficiency investments not covered by prescriptive programs, and allowing companies to take a more system-wide approach to efficiency improvements, rather than targeting specific pieces of equipment. Custom incentives can also be provided to support construction of highly efficient new industrial facilities. The most extensive utility programs offer both prescriptive and custom incentives to their industrial customers.

One of the challenges with helping to finance industrial projects is that in many cases the projects are planned and implemented over several years. For longer-term projects, utilities need the flexibility to maintain rebates and take credit for energy savings that may not occur until years into the future. This flexibility provides industrial customers the needed assurance that promised rebates will still be in place when the project is actually implemented. It also means that these programs need to be supported for a number of years.

Typically, utility industrial incentive programs are only for electricity or natural gas efficiency projects, such as improvements to compressed air, pumps, fans, boiler and motor systems. For the most part, combined heat and power (CHP) projects (generating electricity and heat from a single combustion system, such as a natural gas turbine, engine or steam turbine) have not been included in utility incentive programs. Because CHP systems offer the same types of benefits as other types of energy efficiency projects, including reduced energy costs for companies and reduced overall air emissions for the amount of electrical and thermal energy used, states should give utilities more flexibility to provide incentives to industrial customers for CHP projects.

One state that has adopted this policy is Arizona. Arizona's investor-owned electric utilities working to meet their energy savings requirements are allowed to count energy supplied from CHP systems that do not qualify as renewable energy under the state's Renewable Energy Standards. This has enabled Arizona's electric utilities to develop incentives for CHP.

Training and technical assistance programs. Utility training programs help fund courses, workshops or webinars for company employees in energy efficiency technologies, practices or behaviors, often using Energy Service Companies (ESCOs) to provide technical assistance and energy assessments. Technical assistance programs can provide companies with no- or low-cost energy assessments, which help identify cost-effective energy efficiency opportunities. These programs can help a company move through an energy efficiency upgrade process by providing direct technical assistance and helping the company select specific equipment, choose vendors, install the equipment, and learn how to operate and maintain the equipment. Technical assistance providers also offer advice on shop upgrades to improve efficiency and productivity that require little or no capital investment. The most effective utility efficiency programs provide substantial technical assistance and continued guidance throughout the energy efficiency upgrade or investment process, and they allow industrial customers to implement major energy efficiency projects over a multi-year period.

Effective utility industrial energy efficiency programs also develop different approaches for the variety of companies they serve, often reaching out to industrial sectors that may not actively seek energy efficiency guidance. In some cases, they also offer dedicated staffing and programming to meet the unique needs of each major industrial sector.

Some utility programs also help address and identify the behavioral changes that can be made to reduce energy use. The Puget Sound Energy (PSE) Resource Conservation Management Program helps to offset the cost of a salary for an individual to be an on-site Resource Conservation Manager, tasked with reducing onsite consumption and increasing general facility efficiency. Xcel Energy's "Process Efficiency" program provides a suite of incentives and technical assistance, including an assessment of the company's overall energy management program, with suggestions for improvement.

Some utility programs also help firms understand the importance and extent of non-energy benefits that can result from energy efficiency investments. These programs highlight the productivity benefits, safety and environmental improvements, and any reduced operation and maintenance costs associated with energy efficiency projects. These can be difficult to quantify, but even conservative estimates of the non-energy benefits can make a big difference in getting projects approved by company management.

Self-direction programs. Several utilities in the Western states offer large industrial customers a "self-direction option." Self-direction programs allow large customers to receive credits against their utility bill surcharge for DSM programs based on investments they make on their own (i.e., without any utility financial or technical assistance) to improve energy efficiency. In effect, this allows companies to self-direct part of their electricity charges into internal energy efficiency projects. The best utility self-direction programs review and evaluate these projects in a similar manner to projects implemented through other DSM programs.

Self-direction programs tend to be among the most cost-effective industrial programs. For example, large industrial customers in Utah implemented 176 projects under the self-direction program implemented by Rocky Mountain Power during 2004-2009.[23] In 2010, an additional 13 projects were implemented through this program, and the levelized cost of the energy savings achieved was only $.023 per kilowatt-hour.[24]

Evaluation, Measurement and Verification. PUCs oversee how utilities evaluate, measure and verify (EM&V) energy savings achieved through their energy efficiency programs. EM&V provides feedback on the cost and benefits of a project, but can be difficult to measure, since it is calculating energy NOT actually consumed. Achieving a good balance between the cost of the needed evaluations and the benefits derived from the effort is important. Programs need to be attentive to calculating savings without overspending on measurement and verification. Preserving money available for incentives and technical assistance will increase the overall savings achieved. A consistent EM&V fosters alignment between the utilities, regulators and state agencies to identify successful programs. This creates a knowledge base to establish best practices and justify increased EE investment.

Policies to Support Combined Heat and Power (CHP)

CHP projects often face a substantial number of barriers to their deployment. While some of them are entirely market-based, others can be reduced or overcome by appropriate policies promulgated at the state level. These policies include:

Utility Standby Charges

Standby charges are rates an electric utility charges for providing backup and standby power to a facility when the CHP system is down for maintenance. While standby rates are a reasonable part of utility billing, they should be set at levels that accurately reflect system down time. In some cases, it may even be appropriate to waive fees either to recognize systems that meet certain reliability and efficiency levels or simply to encourage more CHP development, as California did by exempting CHP from standby rates for several years.[25] In yet another approach, the Oregon Public Utilities Commission requires CHP systems in Portland General Electric's territory to contract for a backup of only 7 percent of the CHP's capacity (not 100%), the same reserve requirement for regular power plants.[26]

Interconnection Standards

Interconnection standards delineate clear costs, timelines and processes for connecting a CHP system to the local grid, and help prevent a utility from delaying the interconnection of a CHP system. These interconnection standards give project developers certainty about the process, the costs, and the time involved for interconnection, rather than facing a patchwork of utility-by-utility procedures. Although more than two-thirds of states have some type of interconnection standard in place, the best are those based on the Interstate Renewable Energy Council's (IREC's) Model Interconnection Procedures.[27]

CHP as a Portfolio Resource

Many states have renewable portfolio standards (RPS), and several have energy efficiency resource standards (EERS), including the six Western states listed in Table 2. Allowing credit in these standards for the use of CHP makes sense. Within the West, Nevada, Utah, Colorado, Oklahoma, North and South Dakota all include electricity generated from waste heat in an RPS, because this type of CHP has no added fuel or emissions. Nationally, several states that have a combined efficiency and renewable standard include CHP as a resource or a "tier," including Washington in the West. Lastly, CHP is counted as an efficiency resource in a growing number of states that have an EERS, most recently in Arizona.

Output-based Emission Standards

Output-based air emission standards take a CHP system's increased efficiency into consideration and provide a level playing field for CHP to compete with other types of emission reduction measures. Instead of measuring the emissions based on how much fuel is put into a system, output based standards measure the emissions according to how much electricity or total useful energy is actually produced, allowing efficiency to be considered. While no Western states have implemented output-based emission standards, they are being used in other areas of the country.[28]

Policies such as rate-base incentives could also be developed to reward utilities for developing and operating large CHP plants that serve industrial facilities. Idaho's Office of Energy Resources (OER) is exploring a partnership between the electric utility and an industrial facility with a large process heating load, the Amalgamated Sugar Company. A proposed large (100 MW) CHP plant is undergoing a detailed feasibility study, co-funded by the company, OER, and Idaho Power Company.

Education and Workforce Development

As mentioned above, many people agree that there is a shortage of technical expertise related to energy efficiency within the industrial sector. To address this issue, the U.S. Department of Energy offers a variety of workshops and certification programs.[29] State and utility industrial EE programs can encourage industrial companies to take advantage of these resources.

While there are some energy-related technical programs being offered through colleges and community colleges, state-funded schools, especially at the community college level, can still elevate their role by offering greater levels of technical training that supports energy efficiency technologies and practices.

There are many examples of good programs in this area in the Western states. In Washington state, "Centers of Excellence" have been established to cater to strategic jobs that build on economic development opportunities. Two of these centers focus on the energy efficiency industry. The Salt Lake Community College also has created a program that prepares students for energy management careers. These programs are driven by the growing demand for energy efficiency expertise. Boise State has created the Energy Efficiency Research Institute (EERI) to conduct research into energy efficient technologies and processes, as well as train technicians and engineers on advanced EE technologies. The Washington State University (WSU) Extension Energy Program is another example of a program designed to support and promote energy efficient processes throughout the Pacific Northwest.

Moving Forward

Through energy efficiency, industrial firms can reduce their operating costs, increase profits, improve their competitiveness and reduce emissions. Gubernatorial leadership and state policies play an important role in encouraging and supporting industrial companies' efforts.

At the direction of the governors, WGA will continue the dialogue on how to take advantage of industrial energy efficiency opportunities. In the next several years, WGA will continue its collaboration with U.S. DOE and the State Energy Efficiency Action Network's working group on industrial energy efficiency, as well as with utilities and other stakeholders in the Western region. WGA will work with relevant energy efficiency organizations to identify key Western industrial sectors that would benefit from in-depth energy efficiency analysis and benchmarking, and to support federal benchmarking efforts with outreach to industries and state expertise where appropriate.

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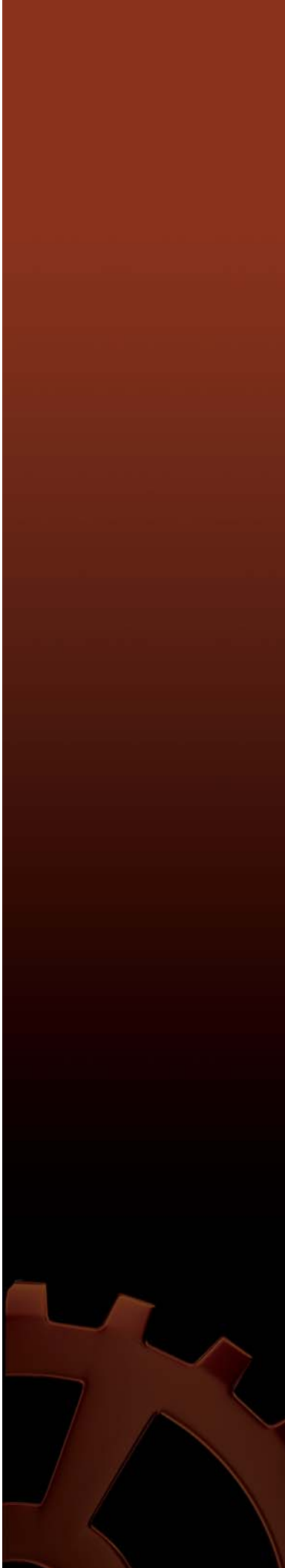

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