# Chapter 4 Moving the Interior West toward a More Balanced Energy Future

## Introduction

The Balanced Energy Plan presented in this report is less costly than Business as Usual, helps manage fuel-price, environmental and drought risks, is just as reliable and is much better for public health and the environment. Westerners have an enormous stake in its implementation.

Under the Balanced Energy Plan, businesses will find their energy costs decreasing over time, making them more competitive. Other utility customers will find that they are spending a lower percentage of their income on utility bills. Utilities and businesses will reduce their exposure to risks and future costs. The Balanced Energy Plan is easier on the land than Business as Usual, protecting the interests of ranchers, the recreation industry and rural local governments. Cities will be better able to improve their air quality. The region will also help reduce the risks, costs and eventual liabilities of the largest environmental challenge facing the planet – global climate change. Under the BEP, the entire region will save billions of dollars to invest in other economic activities. Most importantly, through our actions in implementing the plan, we will be safeguarding the region's economy and natural environment for future generations.

These benefits, however, will not be realized on their own. There are barriers that limit investments in the energy resources that are key elements of the Balanced Energy Plan.

Fortunately, there is growing evidence from both the private and public sectors that shows that these barriers can be overcome and the many benefits of the BEP realized.

This chapter begins with a brief description of barriers facing the BEP. It then presents a series of examples that show how businesses and public policy makers are breaking down these barriers. Drawing from these examples, the chapter concludes with a set of guidelines the region can follow to encourage movement toward a more balanced energy future.

## Barriers to the Balanced Energy Plan

The barriers to investments in energy efficiency, renewable energy and combined heat and power resources (hereafter referred to as BEP resources) have been described in detail in many reports.[1] We do not repeat these details here. Instead, we describe the major categories of barriers as a context for the remainder of the chapter.

### Focus on the short run

The typical cost profile of the BEP resources is higher front-end capital investment, low life-cycle costs and low long-run risks. A problem for technologies with this profile is that energy consumers, investors and regulators often focus on minimizing short-run outlays. Faced with competition, political pressure or lack

of access to financial resources, we make decisions that sharply discount the future. Our decisions do not fully take into account future risks and costs, and we ignore the fact that our energy decisions will affect our own finances and reverberate through the economy and environment for decades to come. Remedies include technological innovations that can lower front-end costs, entrepreneurial willingness to tap into and develop markets for these resources despite their higher short-term costs, and public policies to steer additional financial investment toward BEP resources.

## Focus on the familiar

In addition to the short-run focus is the tendency to go with what we know. On the electricity supply side, that usually means deploying technologies that use fossil fuels. On the demand side, it means that buildings and lighting and other equipment are typically less energy efficient than they could be. There are transaction costs – in money, time and effort – in learning about new technologies, and there are doubts about the performance of new technologies or their role in meeting demand, often based mainly on the lack of experience with them. The focus on the familiar may cause utilities and others to forego investments in non-traditional technologies even when they are less expensive than the alternatives. Remedies include training and education about new technologies and gaining hands-on experience through initial projects.

## Regulatory barriers

Utility and other regulatory barriers curtail cost-effective investment in BEP technologies. These barriers include:

- Retail electric rates that do not clearly communicate costs that are avoided when customers reduce consumption
- Failure to seriously consider a full range of alternatives when planning for resources to meet growing demand
- Regulation that allows utilities to pass on to customers future risks and costs of utility resource decisions over which customers have no control
- Failure to fully recognize the environmental costs of electricity production
- Regulation that allows obstacles to non-utility-owned combined heat and power and distributed renewable resources
- Transmission planning, access and pricing policies that discourage intermittent renewable resources and fail to recognize the benefits of energy efficiency and distributed resources in relieving transmission congestion

Remedies include integrated resource planning, electric rate design reform, equal treatment of non-utility generation, and transmission planning reform.

We believe these barriers need not block implementation of the BEP. Examples from both the private and public policy sectors support our optimism.

# Toward a Balanced Energy Future: Examples from the Private Sector

Businesses and other private sector decision makers can play an important role in moving the Interior West toward a balanced energy future. Below we describe several success stories where companies have taken innovative steps to reduce barriers and increase the use of efficiency, renewables, and combined heat and power resources.

## PacifiCorp: Resource planning that recognizes future climate change regulatory risk[2]

PacifiCorp is a major western utility serving approximately 1.5 million customers in California, Idaho, Oregon, Utah, Washington, and Wyoming. Following the California electricity crisis of 2000 and 2001, the company revamped its resource planning process to more thoroughly address growing risks and long-term costs faced by its customers and shareholders.

In 2003 PacifiCorp presented a comprehensive resource plan for meeting the growing electric service requirements of its customers through 2012. In addition to carefully analyzing natural gas price risk, the company incorporated risks and costs of future climate change and other environmental regulations into its decision-making process. With respect to climate change risk, PacifiCorp evaluated various resource portfolios assuming an $8 cost adder for each ton of carbon dioxide produced.

Recognition and evaluation of climate change regulatory risks by a major electric utility in the West is an important step along the road to a more balanced energy future for the region.

## IBM: Stabilizing electricity costs by purchasing renewable energy[3]

IBM has a history of energy management dating back to the 1970s. The company currently has a corporate goal to achieve an annual 4 percent savings in electricity and fuel use. Designed to provide employees with an incentive to reduce costs, improve competitiveness and protect the environment, the corporate goal can be met through improved energy efficiency or by the increased use of renewable energy.

In response to this goal, the energy manager at IBM's facility in Austin, Texas began purchasing a renewable energy product offered by Austin Energy, the local utility. The price of renewable energy was slightly higher than conventional fossil power, but unlike the price of conventional power, which fluctuated with changes in fuel prices, renewable energy was offered at a fixed rate through 2011.

IBM initially predicted that renewable power would cost $30,000 more per year, but opted for the purchase anyway due to three factors:

- The fixed-price contract provided a hedge against possible higher electricity costs due to fuel price increases.
- The cost stability helped IBM manage its energy budget.
- The renewable energy purchases helped IBM manage greenhouse gas emissions.

Ultimately, conventional power costs increased due to higher fuel prices, leading to a $20,000 electricity bill savings for IBM in its first year in the program. IBM expects that fuel prices

will again increase conventional power costs and that corporate savings will be over $60,000 in 2004. These savings go directly to IBM's bottom-line profitability. In addition, IBM estimates that its renewable energy purchases will avoid roughly 8250 tons of carbon dioxide emissions per year.

IBM's Austin experience highlights two issues regarding increased renewable energy use. First, IBM's renewable energy purchases would not have occurred if the company had focused only on the expected higher short-term costs. A longer-term view that considered the potential for renewable energy to hedge against fuel price risk, as well as recognition of the environmental benefits, were critical factors in making the renewable energy purchases. Second, IBM's experience demonstrates how setting corporate energy management goals can lead employees to seek out and realize the cost-reduction benefits that renewables and efficiency have to offer.

## Alcoa: Identifying and capturing industrial energy savings in Utah[4]

Alcoa, the world's leading aluminum producer, owns and operates an aluminum plant in Spanish Fork, Utah. Aluminum production is an energy-intensive industry, and the plant is a large user of both electricity and natural gas. In July 2000, the Industrial Assessment Center at Colorado State University conducted an energy assessment of the plant and identified a number of measures to reduce energy consumption. Measures implemented as of September 2002 reduced electricity consumption by roughly 454,300 kWh per year and natural gas consumption by roughly 24,000 million BTUs per year. Total cost savings are estimated at $245,000 per year. With an implementation cost of approximately $105,000, the simple payback period for the efficiency measures was just over five months.

Alcoa's experience at its Spanish Fork plant illustrates that even highly cost-effective energy efficiency measures with short payback periods may be untapped, because electricity consumers are simply not aware of available efficiency measures or the amount of money and energy that would be saved if they were adopted. In many firms, especially small and medium-sized enterprises, plant engineers and managers may not understand how to optimize energy use or may simply not have the resources to identify energy savings opportunities. This example shows that a lack of information can be overcome by developing and supporting programs like Colorado State's Industrial Assessment Center that provide expertise and training to energy users in the region.

## PPM Energy: Renewable energy development as a business strategy[5]

A corporate affiliate of PacifiCorp, PPM Energy develops and markets wind energy, natural gas storage projects, and combined heat and power projects, serving wholesale electricity customers such as investor-owned utilities, municipal utilities, rural electric cooperatives and large industrial customers. PPM offers services in many aspects of wholesale power and gas markets, leveraging assets and expertise in three core business lines:

- Renewable generation and development
- Natural gas-fired thermal generation and development
- Natural gas storage

By taking advantage of synergies across these business lines, PPM is able to offer customers strong energy and risk management capabilities. With this innovative combination, PPM has taken a leading role as a developer and wholesaler of renewable energy. By the end of 2003, the company owned, or had wholesale contract rights on, 830 MW of wind power. The company's goal is to have 2000 MW of wind power under control by 2010. PPM's access to wholesale power markets allows it to combine wind-generated energy with wholesale power purchases to assure customers that their power will be delivered as needed. In essence, PPM is able to "trade around" its physical wind assets to address wind's intermittency and to provide competitive, stably priced, zero-emission wind power.

PPM is an example of how creative development of a market niche can overcome barriers to renewable energy and how renewables can be a core component of a successful business strategy. As shown in the accompanying box, PPM is not alone when it comes to recognizing market opportunities for renewable energy.

**Large Companies Engaged in Renewable Technologies**

Photovoltaics
• Sharp • BP Solar • Kyocera • Shell Solar • Sanyo

Wind Power
• GE Wind • NEG Micon/Vestas • Mitsubishi • FPL Energy • Shell Wind Power

Biomass Power
• Foster Wheeler • Caterpillar

Concentrating Solar Power
• Solargenix Energy • Gamesa • FPL Energy • Constellation

Geothermal
• Calpine • Mitsubishi • Toshiba • Fuji

## CMS Viron Energy Services: Using energy performance contracts to save Nevada taxpayers money[6]

CMS Viron Energy Services is a Kansas City–based energy services company and a pioneer in developing energy performance contracts that allow customers to finance energy efficiency investments using the dollar savings from energy efficiency projects. CMS Viron and the State of Nevada entered into an energy performance contract to reduce energy use at the State Capitol Complex. Under the contract $1.9 million in energy efficiency measures were implemented in 20 buildings. CMS Viron projects savings of more than $3 million in energy costs, $148,000 in water costs and $69,000 in operation and maintenance costs over the 12-year contract period. Thus the net savings to Nevada are expected to be in excess of $1 million.

Nevada's experience working with CMS Viron is an example of how energy service companies and energy performance contracts can help overcome a number of barriers to energy efficiency investments. First, because of their expertise in identifying and implementing efficiency measures, energy service companies help overcome information barriers. Second, performance contracts typically guarantee energy savings levels, thus alleviating concerns that customers may

have regarding the performance of efficiency measures. Finally, by allowing customers to finance efficiency measures out of energy savings, performance contracts overcome capital and financing constraints.

# Toward a Balanced Energy Future: Examples from the Public Policy Sector

While private sector leadership is essential in moving the region toward a balanced energy future, public policy also has critical role to play. Public policy shapes the context in which private sector energy decisions are made and helps ensure that private decisions take into account broader public interests such as reducing risks and long-term costs and protecting public health and the environment. This section presents examples of how policies implemented at the state and regional level are removing barriers and providing incentives for increased use of renewables, efficiency, and combined heat and power in the Interior West.

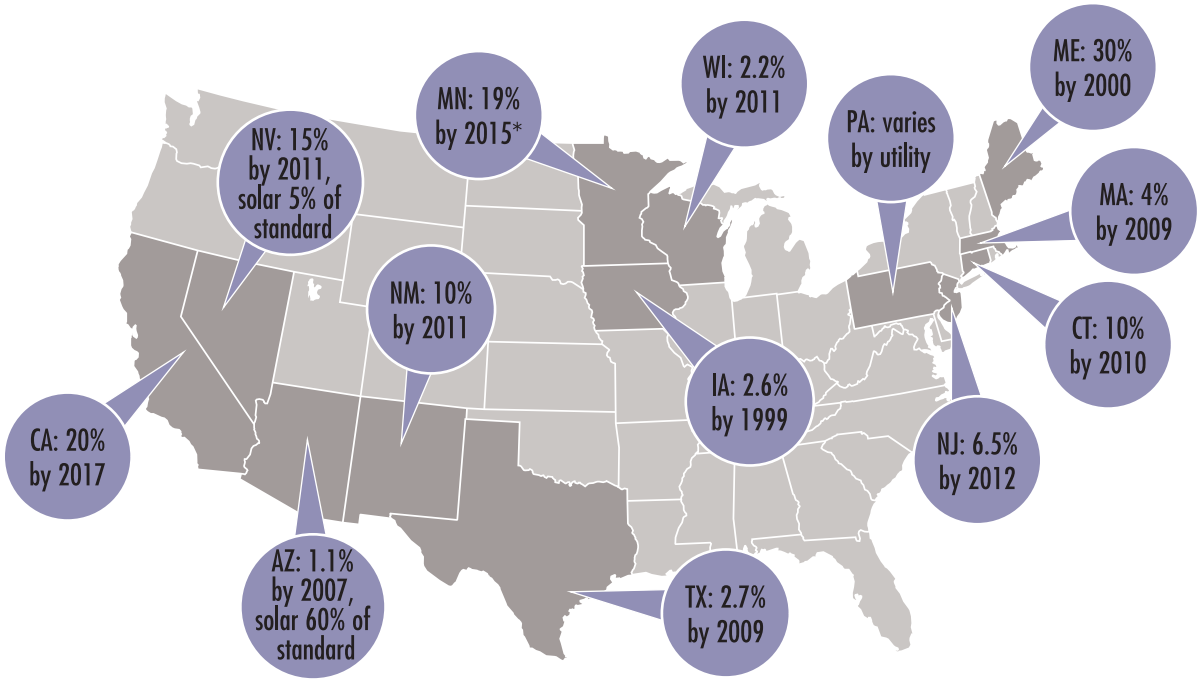
## Renewable Energy Standards: Encouraging the market to develop renewable resources[7]

A renewable energy standard is a governmental requirement that electric utilities obtain a specified amount of the electricity they sell at retail from eligible renewable resources. As indicated in Chapter 3, renewable energy standards have been adopted in Arizona, Nevada, and New Mexico, and they are used in other western states as well, notably California and Texas. Renewable standards foster development of renewable energy by overcoming barriers to acquisition of renewable energy in the following ways:

- They focus utilities on understanding how to use renewable resources in their generation and transmission systems, thereby helping to overcome unfamiliarity with renewable energy technologies. For example, utilities that buy energy from large wind projects learn how to accommodate intermittent resources.
- They provide some regulatory certainty for utilities regarding cost recovery for acquiring energy from resources that are not always cost competitive with conventional technologies.
- They create markets for renewable energy and can lead to large, multi-year orders for renewable energy generating equipment, thereby lowering manufacturing costs and creating more market certainty for vendors.
- They encourage active searches for cost-effective utility applications of renewable energy.
- They can create new revenue sources for utilities that sell tradable renewable energy credits or tradable emission reduction credits derived from renewable energy.

To add flexibility and reduce the costs of meeting the renewable energy requirement, tradable renewable energy credits are sometimes used. Credit trading allows electricity suppliers who can most cost-effectively meet the standard to generate extra renewable energy and sell credits to utilities with higher renewable generation costs. A renewable energy standard with a tradable credit system uses market mechanisms to ensure that the standard is met at least cost and with a minimum of ongoing administrative involvement by government.

**Fig. 4-1. Renewable Energy Standards**




Source: Union of Concerned Scientists. 2003.
* MN has a minimum requirement for one utility, Xcel Energy.

## Western Renewable Energy Generation Information System: Building institutions to support renewable energy development[8]

The ability to track renewable generation and verify compliance is critical to successful implementation of renewable energy standard policies. A tracking system also ensures that electricity customers who are making voluntary renewable energy purchases are getting what they pay for.

In recognition of these needs, the Western Governors' Association and the California Energy Commission are working to develop the Western Renewable Energy Generation Information System. WREGIS will serve as an independent tracking system to provide data necessary to substantiate generation from renewable resources and support verification, tracking and trading of renewable energy credits in the western United States. The system is expected to be operational by 2005.

By establishing common definitions, rules and operating guidelines for the creation and trading of renewable energy credits, WREGIS will reduce costs incurred by both government agencies and electricity suppliers in verifying compliance with renewable energy standards and other renewable energy policies. This regional tracking system will also lower transaction costs for trades of renewable energy credits. In addition, WREGIS will support the development of more robust renewable energy markets in the West, since tradable credits help overcome transmission and other issues inherent in purchases of renewable energy.

## Addressing Regional Haze in the West: Valuing the environmental benefits of renewable energy and energy efficiency[9]

By reducing power sector emissions, renewable energy and energy efficiency investments help address air quality problems in the region. Unfortunately, air quality regulatory programs typically do not recognize these benefits or reward companies that make investments in clean energy technologies.

The western component of EPA's regional haze rule is an exception. Under this rule, certain western states can meet their haze reduction requirements by opting into a western component of the rule. Those states that opt in receive credit for expanding their use of renewables and efficiency as part of a comprehensive emission reduction strategy that must also include efforts to reduce emissions from power plants, other industrial sources and automobiles.[10]

Incorporating energy efficiency and renewable energy projects into state regional haze plans was recommended to EPA by the Western Regional Air Partnership. The WRAP is an organization of western states and tribes working to address air quality problems in the region. The decisions of the WRAP are informed by a wide range of interests including industry, federal land management agencies, state and local governments, and environmental groups. Based on the WRAP's recommendations the western component of the regional haze rule calls for the expansion of energy efficiency efforts and sets a regional renewable energy goal that 20 percent of the region's electricity consumption should come from renewable resources by 2015. States opting into the western component of the rule must include in their emission reduction plans strategies and policies to increase energy efficiency and move toward the renewable energy goals.

The western component of the regional haze rule is an example of air quality regulators recognizing the environmental benefits of energy efficiency and renewable energy and pursuing new regulatory mechanisms to encourage their development. Five states – Arizona, New Mexico, Oregon, Utah and Wyoming – have opted in to the western component.

## The Rocky Mountain Area Transmission Study: Integrating wind and energy efficiency into transmission planning[11]

In September 2003, the governors of Utah and Wyoming kicked off the Rocky Mountain Area Transmission Study (RMATS), an innovative public process for the development of upgrades and additions to the transmission systems that serve Utah, Wyoming, Colorado, Idaho, and Montana. Typically, transmission planning has tended to ignore renewable resources, energy efficiency, and environmental issues. The RMATS study takes these matters seriously, adds broad public participation and review, and analyzes both new transmission lines and alternatives to new line construction.

The voluntary RMATS process is open to all interested participants. The steering committee consists mainly of state officials. All of the region's utility transmission owners participate, along with representative investor-owned utilities, generation and transmission co-ops, public power agencies, generation

developers, environmental groups, and state regulatory commissions.

A central part of the RMATS study is examining the extent to which new transmission lines are needed in order to tap into the region's wind resources. The study also examines steps that can be taken to provide wind resources better access to the existing transmission system. In addition, the study addresses how energy efficiency can relieve congestion on existing lines and reduce the need for new transmission and generation. The study will also examine a number of risk scenarios designed to test how the transmission system would perform under varying assumptions concerning natural gas prices and future carbon taxes.

The RMATS study is an example of a planning process that recognizes and evaluates the infrastructure investments that will be needed to move the region toward a more balanced energy future as well as the benefits that renewable energy and energy efficiency can provide to electricity customers across the region.

## The City of Phoenix: Providing stable funding for energy efficiency[12]

The energy management program established by the City of Phoenix in the 1970s is a model for developing stable funding sources for energy efficiency projects at the local level. In 1984, the city started the Energy Conservation Savings Reinvestment Plan with money from state oil overcharge funds. This plan provides funding for energy efficiency projects. Half the savings from these projects goes back into the reinvestment plan and half goes into the city's general fund. Between 1978 and 2000 the city estimated that it saved $42 million from energy efficiency improvements.

Phoenix also uses the fund to help pay for new energy-efficient equipment used by the city. The fund has paid for many low-tech measures like lighting, motors and chillers, and has also financed a district cooling system and a thermal storage system for the new Phoenix City Hall.

One of the keys to the program's success has been city's focus on developing in-house expertise to plan and monitor energy efficiency measures and to calculate efficiency costs and savings. The city also established an Energy Conservation Team that included representatives from all municipal departments. It brought department managers on board by promising support for their budgets through participation in the program. Another key to the success of the Phoenix model has been the recognition that roughly 8 to 15 percent of any energy efficiency project should be reserved for maintenance and training.

## Utah Public Service Commission: Using price signals to encourage energy efficiency[13]

In January 2004, the Utah Public Service Commission approved new electric rate designs aimed at providing PacifiCorp's retail customers with economic incentives to use electricity more efficiently in the summer, when power plants are running hardest and electricity is most costly to produce. For residential customers the commission adopted an "inverted block rate" structure where the price of electricity increases with use. During summer months, when electricity demand is highest, residential electricity prices will be

6.7 cents per kWh for electricity use up to 400 kWh per month, 7.6 cents per kWh for use between 400 and 1000 kWh, and 9 cents per kWh for use over 1000 kWh. Higher summer rates were also approved for commercial and industrial customers. The new rate structures send customers price signals that more accurately reflect the costs of producing electricity.

The impetus behind the new rate structures was the desire to reduce the continued pressure to build new power plants and transmission and distribution facilities to satisfy growing electric demands along Utah's Wasatch Front. Utah's inverted block rates are an example of using price signals as a policy tool to promote increased energy efficiency and conservation during times when saving energy matters most.

# The Path Forward

The foregoing examples provide evidence that we can overcome the barriers to the implementation of the Balanced Energy Plan. However, much more needs to be done if these examples are to become the norm rather than the exception.

The experience of Western Resource Advocates in promoting sustainable energy in the Interior West for over a decade, together with the examples described above, lead us to propose the following guidelines for moving the region toward a balanced energy future.

## Business needs to lead the way

Businesses in the West have found ways to become more competitive, reduce costs, and increase profits by investing in or using BEP resources. It is business – utilities, large electricity users, energy service companies, and renewable energy and combined heat and power developers – on whom we must depend primarily for the implementation of the BEP. Businesses control the flow of most of the capital that could be invested in BEP technologies. Businesses see the opportunities, risks, and benefits that these technologies can provide in their operations and markets better than anyone else. Corporate policies that recognize the value of BEP resources are critical foundations for progress toward a balanced energy future.

The examples presented above suggest several actions corporations can take to better seize these opportunities. For large industrial electricity users, setting corporate energy efficiency and renewable energy goals and standards can send clear signals about intentions and can encourage employees to seek out cost-effective opportunities to utilize BEP resources. The savings go to the corporate bottom line in the form of increased profits. Businesses can train and educate employees to recognize energy savings opportunities and they can budget for and fund clean energy investments. Finally, businesses can support public policies that encourage investments in BEP resources.

## Government needs to set policies and standards for businesses and others to meet

The context in which businesses and consumers make energy investment decisions can be shaped in part by public policies. A wide variety of policies may be used to set standards and provide economic incentives that encourage increased investments in BEP resources. Among the most important are:

- Renewable energy standards that set minimum requirements for renewable energy sales
- System benefits charges that raise funds through a small charge in customers' retail electric rates to support investment in BEP resources
- Strong building codes that encourage energy-efficient new construction coupled with education, training and building inspection to maximize energy savings
- Utility energy efficiency programs that provide incentives to regulated utilities to pursue efficiency measures whenever the life-cycle costs of efficiency investments are less than those of alternative generation resources
- Fair interconnection standards, standby rates and electricity buyback rates that reduce barriers to non-utility-owned combined heat and power and distributed renewable resources
- Environmental regulations such as emission cap-and-trade programs that provide incentives to invest in cleaner energy technologies
- Continued federal support of clean energy technologies through appropriations and tax policy to encourage technological innovation and industry development

In addition to setting policies, government agencies, as electricity consumers and operators of government facilities, can lead by example by purchasing renewable energy and by investing in energy efficiency and combined heat and power resources.

## Recognize and manage risks and costs

The analysis in Chapter 3 shows that the BEP resources will reduce the region's exposure to fuel-price, environmental and drought risks. These risks have the potential to become tomorrow's costs. Recognition and evaluation of these risks and costs, and an understanding of how BEP resources can be used to help manage them, are critical ingredients of a balanced energy future.

Utility integrated resource planning is an important tool that can be used to systematically identify and manage the full set of risks and costs associated with electricity consumption. State public utility commissions should work with utilities, businesses, consumers, environmental groups, and others to implement effective resource planning processes in their states that recognize and manage risks and costs.

## Get prices right

It is important that, as much as possible, prices for electricity track the full costs that utilities avoid when customers increase their efficiency of energy use. Doing so sends appropriate price signals that encourage customers to increase efficiency during those hours of the day or seasons of the year when electricity is more costly to produce. Unfortunately, most electric rates do not send cost-based price signals. Utilities and state public utility

commissions should explore inverted block rate designs and time-of-use pricing as ways to send appropriate price signals to customers, and they should consider all costs that are not included in today's electricity prices when making decisions about generation resources and alternatives.

## Think regionally

The West is an integrated electric region. Yet electric power production is largely regulated at local, state and federal levels. At times this can make it very challenging to encourage regional cooperation and action. In certain areas, however, regional thinking will facilitate movement toward a balanced energy future, and states should strive to develop regional approaches where they would be helpful. One example is regionwide transmission planning to help ensure that remotely located renewable resources can be delivered to population centers and that the congestion-reducing benefits of energy efficiency and combined heat and power generation are recognized.

Another area where regional thinking could be beneficial is in the design of renewable energy standards. Typically, as a means of securing construction jobs and other local economic benefits, the state standards that have been enacted in the region either require or encourage in-state resources to be used for compliance. While this may yield local economic benefits, foreclosing the use of potentially lower cost out-of-state resources can lead to higher costs of complying with the standard. A more regional approach, such as a regional energy standard, could lower costs. The WREGIS renewable energy tracking system currently under development could facilitate and support compliance with a regional renewable energy standard.

## Encourage dialogue among key players

Whether the Interior West achieves a balanced energy future depends on thousands of decisions made by utilities, independent power producers, businesses, utility customers, state regulators and many others. The likelihood that these decisions will coalesce to move us toward a balanced energy future increases if there are opportunities for regional discussions about our energy choices. There are number of important forums across the West where this dialogue is already taking place, including the Western Governors' Association, the Western Regional Air Partnership, and regional transmission planning forums such as RMATS. Western Resource Advocates strongly supports these and like-minded efforts and strives to participate constructively in them. We hope the Balanced Energy Plan will help inform the dialogue on energy choices with businesses, utilities, policy makers and others about the stakes involved in our region's energy future.

# Endnotes

1. See, for example, Geller, H. 2003. *Energy Revolution: Policies for a Sustainable Future.* Washington, DC: Island Press; Brown, M. 2001. Market Failures and Barriers as a Basis for Clean Energy Policies. *Energy Policy* 29:1197-1208; Eto, J., C. Goldman and S. Nadel. 1998. *Ratepayer-Funded Energy Efficiency Programs in a Restructured Electricity Industry: Issues and Options for Regulators and Legislators.* Washington, DC: American Council for an Energy-Efficient Economy; Jochem, E. 2000. Energy End-Use Efficiency. In *World Energy Assessment: Energy and the Challenge of Sustainability*. New York: United Nations Development Programme; Martinot, E. and O. McDoom. 2000. *Promoting Energy Efficiency and Renewable Energy: GEF Climate Change Projects and Impacts.* Washington, DC: Global Environmental Facility; Nogee, A., S. Clemmer, B. Paulos and B. Haddad. 1999. *Powerful Solutions: Seven Ways to Switch America to Renewable Electricity.* Cambridge, MA: Union of Concerned Scientists; Alderfer, B., M. Eldridge and T. Starrs. 2000. *Making Connections: Case Studies of Interconnection Barriers and Their Impact on Distributed Power Projects.* NREL/SR-710-28053. Golden, CO: National Renewable Energy Laboratory.

2. PacifiCorp. *Integrated Resource Plan 2003.* http://www.pacificorp.com/File/File25682.pdf.

3. World Resources Institute, Green Power Market Development Group. Corporate Case Studies. Stabilizing Energy Costs: How IBM's Austin Facility Hedged Fossil Fuel Prices by Purchasing Green Power. http://www.thegreenpowergroup.org/case_studies.html.

4. U.S. Department of Energy. 2001. *Best Practices Assessment Case Study: Aluminum.* IAC Energy Assessment of Spanish Fork Plant. DOE/GO-102001-1375; Case Study: Alcoa North American Extrusions Plant. http://www.swenergy.org/casestudies/utah/alcoa.htm.

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6. Case Study: Nevada State Capitol Complex. http://www.swenergy.org/casestudies/nevada/capitol.htm; Energy-Efficiency Projects Multiply in Nevada as Performance Contracting Takes Firm Root. http://www.rebuild.org/news/newsdetail.asp?NewsID=1747.

7. Williamson, R. 1998. *Portfolio Approach to Developing Renewable Resources.* Washington, DC: Renewable Energy Policy Project; Wiser, R. and O. Langniss. 2001. *The Renewables Portfolio Standard in Texas: An Early Assessment.* LBNL-49107. Berkeley, CA: Lawrence Berkeley National Laboratory; Cost Evaluation Working Group. *Costs, Benefits, and Impacts of the Arizona Environmental Portfolio Standard.* Arizona Corporation Commission, June 30, 2003; New Mexico Public Regulation Commission. Final Order Adopting 17.9.573 NMAC, Utility Case No. 3619, December 17, 2002; New Mexico Legislature 2004 – SB43: Renewable Energy Act.; Berry, D. 2002. The Market for Tradable Renewable Energy Credits. 2002. *Ecological Economics* 42(3):369-379.

8. Further information on WREGIS at http://www.westgov.org/wieb/wregis/.

9. See Environmental Protection Agency, 40 CFR Part 51 Regional Haze Regulations Final Rule. More information on the Regional Haze Rule as it applies to the West can be found at http://www.wrapair.org/.

10. The Regional Haze Rule is divided into Sections 308 and Sections 309. Section 308 applies nationally. Section 309 is an optional western component that is open to the nine states that comprise the Grand Canyon Visibility Transport Region (GCVTR) that was established as part of the 1990 Clean Air Act Amendments. These states are Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah and Wyoming. These states may either opt in to the western component of the rule or meet their regional haze obligations by complying with Section 308.

11. See Hamilton, R. et al. *Integrating Wind and Demand-Side Management into Transmission Planning: The Rocky Mountain Area Transmission Study* (forthcoming). More information on RMATS can be found at http://psc.state.wy.us/htdocs/subregional/home.htm.

12. http://www.iclei.org/cases/c011-per.htm

13. Public Service Commission of Utah Docket No. 03-2035-02, In the Matter of the Application of PacifiCorp for Approval of Its Proposed Electric Service Schedules & Electric Service Regulations. January 30, 2004 Report and Order**.**

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