

Clean and Diversified Energy Initiative



WESTERN GOVERNORS' ASSOCIATION



Energy Efficiency Task Force Report

Executive Summary
January 2006

Western Governors' Association Clean and Diversified Energy Initiative

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Executive Summary

The Western Governors' Association's Clean and Diversified Energy Advisory Committee (CDEAC) commissioned this task force report in February 2005. Members of the Task Force are listed below. This is one of several task force reports presented to the CDEAC on December 8, 2005 and accepted for further consideration as the CDEAC develops recommendations for the Governors. While this task force report represents the consensus views of the members, it does not represent the adopted policy of WGA or the CDEAC. At their Annual Meeting in June, 2006, Western Governors will consider and adopt a broad range of recommendations for increasing the development of clean and diverse energy, improving the efficient use of energy and ensuring adequate transmission. The CDEAC commends the Task Force for its thorough analysis and thoughtful recommendations.

Members of the Energy Efficiency Task Force

Howard Geller (Chair)	Southwest Energy Efficiency Project
Michele Barlow	Wyoming Outdoor Council
Jeff Burks	Public Service Co. of NM Resources
Joshua Bushinsky	Pew Center on Global Climate Chang
Sheryl Carter	Natural Resources Defense Council
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Quantitative Working Group

The quantitative working group was created by the CDEAC to compare the analysis of data among task forces in order to ensure consistency in assumptions across the reports.

The following members contributed to this report:

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Quantitative Working Group

The Western United States contains the fastest growing states in the country in terms of population and energy consumption. For the region as a whole, electricity sales increased 1.7% per year on average during 1990-2003.¹ But electricity use in Nevada climbed nearly 5% per year, and electricity use in Arizona, Colorado, North Dakota, and Utah increased more than 3% per year during this period. Rapid growth in electricity demand presents a number of challenges for the region including high investment requirements in new generation, transmission and distribution facilities; increasing risk of power shortages; increasing water consumption; and more harmful emissions by power plants.

Increasing the efficiency of energy use in Western states will provide a broad range of benefits, including:

- Saving consumers and businesses money on their energy bills;
- Reducing dependence on imported fuel sources;
- Reducing vulnerability to energy price spikes;
- Reducing peak demand and improving the utilization of the electricity system;
- Reducing the risk of power shortages;
- Supporting local businesses and stimulating economic development;
- Enabling avoidance of the most controversial energy supply projects;
- Reducing water consumption by power plants; and
- Reducing pollutant emissions by power plants and improving public health.

In short, increasing energy efficiency is our cleanest, cheapest, least risky, and least controversial energy resource. And increasing energy efficiency is a “win-win strategy” for consumers, businesses, utilities, and the environment in western states.

Some Western states have taken significant steps to increase the efficiency of energy use in recent years. This report reviews these “best practice” energy efficiency efforts.² It also reviews studies on energy efficiency potential that have been completed in recent years in member states of the Western Governors’ Association (WGA) as well as barriers to greater energy efficiency. We then analyzed the impacts of current energy efficiency policies and programs, as well as the potential benefits of widespread adoption of “best practice” policies and programs. **We find that it is feasible to reduce electricity use 20% from projected levels in 2020, and do so cost effectively, through full deployment of best practice policies and programs.** This is the energy efficiency goal enunciated in the 2004 WGA clean and diversified energy resolution. The final chapter of the report provides our energy efficiency policy recommendations.

Efficiency Potential Studies

¹ The 18 Western states that belong to the WGA and are included in this report are Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

² Our report focuses primarily on electricity efficiency efforts but also addresses natural gas efficiency to a limited degree. We have not attempted to address more efficient use of transportation fuels.

We reviewed seven major efficiency potential studies that have been completed in the WGA region in the past five years. The studies vary in terms of their timeframe for projecting electricity savings potential, their geographical coverage, and their approach. Some examine technical and economic savings potential only; others consider achievable savings potential from specific policies and programs. Nonetheless, the studies as a whole show there is considerable cost-effective and achievable electricity savings potential in the Western states.

In general, the efficiency potential studies show it is possible to reduce electricity demand growth by 0.5-2% per year through more concerted energy efficiency efforts. By comparison, the energy efficiency goal in the WGA clean and diversified energy resolution is equivalent to about a 1.4% annual reduction in electricity demand growth. Studies that consider a wider set of efficiency measures and more aggressive implementation strategies tend to project savings at the higher end of this range, while those with more limited measures and/or more conservative assumptions about measure adoption are at the lower end. The studies that examined potential net economic benefits all found that more aggressive, multi-year energy efficiency efforts could save consumers and businesses billions of dollars over the lifetime of the measures, with very favorable benefit-cost ratios.

Barriers to Greater Energy Efficiency

Despite the many benefits, there are a wide range of market failures or barriers that inhibit greater investment in energy efficiency measures by households and businesses, including:

- limited supply and availability of some energy efficiency measures such as newer measures manufactured on a limited scale or not yet widely marketed;
- consumers lacking or having incomplete information about energy efficiency options;
- consumers lacking the capital to invest in energy efficiency measures;
- fiscal or regulatory policies that discourage energy efficiency investments;
- decision-making that does not consider or value energy efficiency;
- perceived risk associated with the performance of relatively new energy efficiency measures;
- split incentives whereby the party designing, constructing, or purchasing a building or piece of equipment does not pay the operating costs; and
- energy prices that do not reflect the full costs imposed on society by energy production and consumption (so-called externalities).

Taken as a whole, these barriers lead to relatively limited adoption of cost-effective energy efficiency measures in the marketplace. In order to realize the broad benefits offered by greater energy efficiency, there is justification for adopting policies and programs to remove or overcome these barriers.

Best Practice Policies and Programs

The Task Force reviewed a wide range of energy efficiency policies and programs being implemented across the WGA region. We identified numerous efforts that we consider exemplary. These “best practice” policies and programs are briefly summarized below.

Electricity Energy Efficiency Programs

Leading utilities such as California’s investor-owned utilities, Austin Energy, Puget Sound Energy, and Seattle City Light are spending at least 2% of their revenues on energy efficiency and load management programs. These programs are cutting electricity use by 0.8-1.0% per year, from efficiency measures installed each year (i.e., the programs would reduce electricity use by 8-10% from cumulative efforts over 10 years). California and Texas have set energy savings targets for their electric utilities. In addition, utilities in Hawaii and Nevada may use energy savings from efficiency measures to meet at least a portion of their clean energy requirements.

Funding for these programs is typically provided through utility rates and/or tariff riders. Some states, including California, Montana, and Oregon, have created a funding mechanism via a separate surcharge known as a public benefits fund. Most of the programs are saving electricity at a total cost of 2-3 cents per kWh saved.

Building Codes and “Beyond Code” Programs

Leading states have adopted a recent version of the International Energy Conservation Code (IECC), or a customized energy code that is at least as stringent as this model code; e.g., California’s Title 24 building efficiency standards. Also, leading states update their energy codes at least once every three years, and leading states train architects, builders and local code officials in how to comply with new codes.

A number of Western states and utilities implement programs to encourage construction of new homes and commercial buildings that exceed minimum energy code requirements. These programs typically provide training and technical assistance to architects, builders, and contractors as well as promotion and consumer education. In some cases, financial incentives are offered to builders or homeowners who construct/buy buildings that exceed the minimum code requirements. In the residential sector, many of these programs promote construction of ENERGY STAR[®] new homes.

Appliance Standards

California is leading the nation in developing and enacting minimum efficiency standards on appliances that are not regulated by the federal government. Other Western states including, Arizona, Oregon and Washington, have adopted appliance efficiency standards on some of the same products regulated by California. These standards are very cost-effective with energy bill savings paying back any additional first cost in two years or less, in most cases.

Research and Development (R&D) and Technology Transfer

A few Western states support R&D on innovative energy-efficient technologies and/or support technology transfer. California's Public Interest Energy Research (PIER) program invests in R&D to increase the energy efficiency of electric and natural gas technologies and services in California. The Washington State University Energy Program trains industrial energy and facility managers in best practice energy management, provides technical assistance to individual companies, conducts field research and testing on issues such as indoor air quality and moisture problems in buildings and supports implementation of the state's building energy code.

Public Sector Initiatives

Many Western states have acted to cut energy waste in public buildings. Leading initiatives include:

- Legislation in Arizona that directs state agencies and universities to achieve a 10% reduction in energy use per unit of floor area by 2008 and a 15% reduction by 2011.
- In California, Governor Schwarzenegger issued an executive order requiring all new and renovated state buildings achieve a LEED™ silver level certification or higher, and setting a goal for all state buildings to be 20% more efficient by 2015.
- Colorado has made considerable progress in using energy service companies (ESCOs) and performance contracting to carry out energy efficiency projects in state and local government buildings as well as in public schools.
- The Kansas Facility Conservation Improvement Program retrofitted about 50% of all state facilities over five years using a streamlined performance contracting model.
- The Texas LoanSTAR program provides low-interest loans for energy-conserving retrofits made in state, county, and local government buildings and independent school districts. The original fund has "revolved" 2.3 times and funded 182 loans for \$227 million since 1989.

Tax Credits and Other Financial Incentives

There are relatively few examples of tax credits or other financial incentives for energy efficiency measures and projects in Western states, apart from utility and other ratepayer-funded programs. Oregon is the exception, offering both households and businesses tax credits for investments in a wide range of energy efficiency measures.

Pricing and Regulatory Policies

At least four Western states (CA, OR, UT, and WA) have adopted inverted block electricity rates (also known as tiered rates) for residential customers. This means the cost per kWh increases as electricity consumption increases, thereby encouraging energy efficiency and conservation. California and Oregon have taken regulatory action to

ensure that investor-owned utilities are not penalized financially for implementing effective energy efficiency programs. Both states have adopted mechanisms to decouple utility sales and revenues. Also, California and Pacific Northwest states fully integrate energy efficiency options into utility resource planning.

Regional Cooperation and Market Transformation

The Northwest Energy Efficiency Alliance (NEEA) is increasing the supply of and demand for energy efficiency measures in Idaho, Montana, Oregon and Washington. Projects target all sectors, striving to remove barriers to energy efficiency adoption in the marketplace. NEEA estimates its activities in 2004 reduced electricity use in the region by 420 GWh/yr, equivalent to about 0.25% of annual electricity use in the four-state region. NEEA achieves electricity savings at an average cost of about 1.0 cent per kWh (program costs only).

Energy Efficiency as an Air Pollution Control Strategy

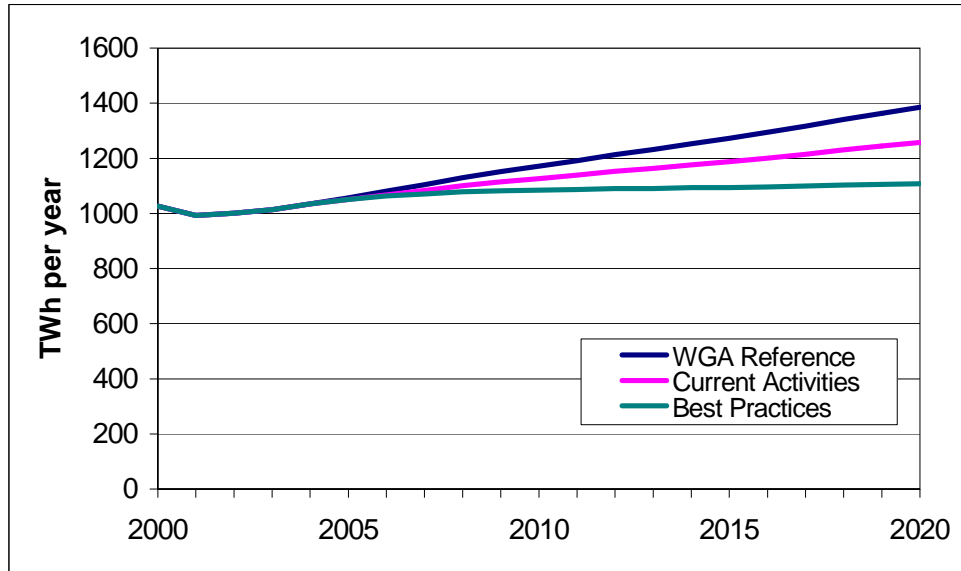
Texas is providing leadership in analyzing air emissions reductions from energy efficiency programs and incorporating energy efficiency initiatives into clean air compliance plans. Also, the Western Regional Air Partnership (WRAP) is encouraging states to include energy efficiency programs in their pollution control strategies.

Analysis of Energy Efficiency Potential

In order to assess potential electricity savings and the impacts of more aggressive energy efficiency efforts in Western states, the Task Force conducted an independent energy savings analysis. With the help of a consultant, we developed and analyzed the following three scenarios for electricity demand in the 18-state region through 2020:

- **Reference scenario:** a slightly modified version of the most recent Reference Case forecast prepared by the Energy Information Administration, applied to WGA states.
- **Current Activities scenario:** adjusting the Reference scenario to account for the estimated impacts of ongoing and recently enacted policies and programs at the state, regional or utility levels.
- **Best Practices scenario:** assuming adoption of “best practice” policies and programs, as identified in Chapter IV, in all 18 states.

Figure 1. Electricity Consumption in WGA states by Scenario



As shown in Figure ES-1, load growth during 2003-2020 averages 1.9% per year in the Reference scenario, 1.3% per year in the Current Activities scenario, and 0.5% per year in the Best Practices scenario. As noted above, electricity consumption increased 1.7% per year on average during 1990-2003 in the 18 WGA states. **We conclude that widespread adoption of best practice policies and programs would not eliminate all load growth over the next 15 years, but it would reduce it by about three-quarters.**

The Best Practices scenario reduces electricity consumption in 2020 by 20% relative to that in the Reference scenario, or the equivalent of electricity supplied by 100 baseload power plants. Thus we conclude it is possible to achieve the energy efficiency goal enunciated in the WGA Clean and Diversified Energy Resolution, namely realizing 20% electricity savings by 2020. Moreover, even greater electricity savings may be possible through adoption of other strategies not included in our Best Practices scenario, such as R&D, technology transfer or pricing initiatives.

Benefits of the Best Practices Scenario

- **20% electricity savings by 2020, relative to the Reference Scenario**
- **48,000 MW of avoided power plant construction during 2005-2020**
- **Small reduction in electricity prices in the latter part of study period**
- **\$53 billion in net economic benefits for consumers and businesses**
- **Substantial reduction in power plant CO₂ emissions**
- **Moderate reduction in power plant NO_x emissions**
- **Approximately 1.8 trillion gallons of water savings during 2005-2020**

Implementing the Best Practice energy efficiency policies and programs would provide substantial economic benefits for households and businesses in Western states. By 2020, these efforts could lower electricity bills in aggregate by \$21 billion per year. The Best Practices scenario would yield \$53 billion in net economic benefits during 2005-2020 on

a net present value basis, with an overall benefit-cost ratio of 2.5. The benefits result mainly from avoided fuel purchases by utilities, and avoided investment in generation, transmission and distribution infrastructure. Furthermore, the benefits could be even greater since relatively low natural gas prices (below \$5 per thousand cubic feet) were assumed in the analysis.

Implementing the Best Practice energy efficiency policies and programs would also provide air pollutant emissions reductions. Carbon dioxide (CO₂) emissions would decline the most (17% by 2020). In addition, NO_x emissions by power plants would decline a moderate amount (7% by 2020) in the Best Practices scenario, relative to the Reference Scenario.

Energy efficiency best practices would result in water savings from both increased use of energy and water saving devices in homes and businesses, and less operation of steam-based power plants. We estimate that the Best Practices scenario would save 260 billion gallons of water per year by 2020 relative to the Reference scenario, equivalent to the annual water use of about 1.4 million households. Total water savings during 2005-2020 in this scenario would be approximately 1.8 trillion gallons.

Policy Recommendations

Drawing heavily from our review of best practice policies and programs, the Energy Efficiency Task Force developed numerous policy recommendations for Western states. All of these recommendations would lead to greater deployment of cost-effective energy efficiency measures, thereby helping states achieve the substantial benefits described above for the Best Practices Scenario.

Electric Utility Demand-Side Management (DSM) Programs

- Encourage or require that utilities integrate energy efficiency options into resource planning and procurement decisions and pursue energy efficiency whenever it is the least cost resource option. At a minimum, electricity distribution companies in Western states should dedicate at least 2% of revenues for ratepayer-funded energy efficiency programs, as long as doing so is cost effective.
- Establish minimum energy savings requirements or targets. In particular, we recommend setting a goal of saving 3-5% of projected electricity sales in 2010 through DSM programs. By 2020, we recommend setting a goal of 10-15% savings from DSM programs, as long as doing so is cost effective.
- Decouple electricity sales and revenues so that reduced electricity sales do not adversely affect utility revenues, in combination with the creation of performance incentives that reward utilities for implementing effective DSM programs.

Gas Utility Demand-Side Management (DSM) Programs

- Encourage or require gas utilities to integrate energy efficiency resources into their resource planning and procurement decisions and pursue energy efficiency whenever it is the lowest cost option.
- Establish ratepayer-funded natural gas energy efficiency programs.
- Invest at least 1.5-2% of gas utility revenues in energy efficiency programs and strive to save the equivalent of 0.5-1.0% of gas consumption per year, as long as doing so is cost effective.
- Decouple gas utility sales and revenues and create performance incentives that reward utilities for implementing effective DSM programs.

Building Energy Codes

- For states with outdated (pre-2003) energy codes, adopt the 2004 International Energy Conservation Code. Also, consider adopting innovative features of California's latest Title 24 building energy codes, such as lighting efficiency requirements in new homes.
- Update building energy codes regularly. A three-year cycle could be timed to coincide with release of the national model codes.
- In home rule states, either establish a statewide mandatory code or strongly encourage local jurisdictions to adopt and maintain state-of-the-art codes.
- Implement training and technical assistance for builders, designers, and code officials.

Appliance Efficiency Standards

- California should continue to adopt minimum efficiency standards on products not covered by the federal standards.
- Other western states should replicate efficiency standards first adopted by California, where cost effective.

Public Sector Initiatives

- Establish substantial energy savings goals or requirements for state and municipal agencies, and track progress towards meeting them. We suggest at least a 2% annual reduction in energy use per square foot of floor area.
- Provide financial and technical assistance for implementation of energy savings projects in existing buildings and facilities.
- Use energy service companies (ESCOs) and performance contracting to implement efficiency projects without public sector capital investment.
- Construct new buildings that are exemplary and surpass minimum energy code requirements by a wide margin.
- Purchase only ENERGY STAR-labeled equipment in categories where such products are designated.

Financial Incentives

- Consider providing income or property tax incentives to help stimulate greater adoption of energy efficiency measures, and consider coordinating qualification levels with the newly adopted federal energy efficiency tax credits.
- For states with growing severance tax revenues on fossil fuels production, consider using a portion of these revenues to offset the revenue loss from tax incentives on energy efficiency measures.

Pricing Policies

- Adopt inverted block rates (also known as tiered rates) for electricity consumed by residential customers.
- Consider adopting inverted block rates for natural gas.

Education and Training

- Partner with the U.S. EPA and DOE in promoting ENERGY STAR products, homes, commercial buildings and industries.
- Implement programs to train builders and contractors on proper heating and air conditioning sizing and installation.
- Train commercial building energy managers, for example by making use of the building operator training and certification program developed in the Pacific Northwest.
- Train industrial energy and facility managers in techniques for improving the efficiency of their steam, process heat, pumping, compressed air, motors and other systems, partnering with the U.S. DOE in doing so.
- Educate consumers about innovative energy efficiency measures such as modern evaporative cooling systems, reflective roofing materials, sealing thermal distribution systems and use of day lighting.
- Undertake K-12 school- and college-based energy education programs.

Technology R&D and Transfer

- Support energy efficiency R&D and technology transfer efforts through either intrastate programs or working collaboratively among states.
- Initiate, continue and, where appropriate, expand programs promoting best practices in industrial energy management.
- Encourage companies to set goals for energy efficiency improvement and energy savings, and track their progress towards the goals.

Regional-Level Initiatives

- Create additional regional market transformation organizations modeled on the successful Northwest Energy Efficiency Alliance.
- Form a regional building energy code collaborative to support code development, adoption and implementation.

- Advocate, as a region, for stronger federal appliance efficiency standards where this is technically feasible and economically justified.
- Create or utilize a regional working group to quantify the air emissions benefits of energy efficiency programs and foster inclusion of energy efficiency initiatives in state and regional air quality improvement plans.
- Ensure that the potential for and effects of energy efficiency efforts are incorporated in regional transmission planning.
- Encourage Native American tribes to work together in hiring and training energy managers and contractors.
- Reduce barriers to performance contracting and implement other strategies for increasing energy efficiency in commercial buildings.

Conclusion

Increasing energy efficiency should be a major component of energy strategies developed and implemented by Western Governors. Some Western states have already undertaken important initiatives including adopting comprehensive and well-funded utility energy efficiency programs, up-to-date building energy codes and/or appliance efficiency standards, initiatives to improve energy efficiency in the public sector, tax credits and R&D and technology transfer efforts. In addition, the Pacific Northwest states have formed a model organization aimed at transforming energy efficiency markets at the regional level. But much more can and should be done.

Adopting “best practice” energy efficiency policies and programs in all Western states could eliminate most of projected load growth during 2005-2020, reduce overall electricity consumption in 2020 by 20% relative to a scenario without energy efficiency initiatives, and yield tremendous economic and environmental benefits.

In order to realize these broad benefits, we recommend that Western Governors work with their legislatures, state regulatory commissions and the private sector to enact new policies aimed at increasing the efficiency of both electricity and natural gas use. There is no “silver bullet” for overcoming the barriers that are inhibiting widespread energy efficiency improvements. But there are a variety of proven policies and programs that are available for states to take advantage of. With energy costs high and rising, the time to act is now.