

# **COLORADO'S CLEAN ENERGY FUTURE**

**Recommendations for a Sustainable Energy Policy**

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# Executive Summary

We in Colorado seem to have it all; awe inspiring natural beauty, a diverse and educated population, boundless recreational possibilities and a quality of life that rivals anywhere on earth. The state's economy is booming as we diversify our economic base and as people from around the country flock to Colorado. With that expanding economy, however, comes an increased need for the very things we rely on to support our society, things like clean air and sufficient energy. Between 1988 and 2000 our energy consumption grew by 3% a year and is projected to grow even more in the next ten years.

At the dawn of the 21<sup>st</sup> century, Colorado and the rest of the country are at an energy crossroads. There are two clear paths the state's leadership can follow as we seek to sustain our economic momentum and to preserve the quality of life that makes Colorado such a special place.

One pathway leads us back into the past, to the technology of the 19<sup>th</sup> century. Down that path lies dirty power, based on limited reserves of fossil fuels like coal and gas. This is the path promoted by the coal companies and Colorado's utilities. This path ignores the health risks, threats to the environment and costs to consumers.

CoPIRG's plan for a Clean Energy Future proposes maximizing largely untapped renewable resources in Colorado and taking advantage of low-cost, high-yield energy efficiency measures to create a cleaner, healthier, more stable, cost effective power system for Colorado.

CoPIRG's plan will:

- Eliminate the need to build dirty and expensive new coal burning plants because our future energy needs will be met by a combination of clean, renewable energy sources and reasonable increases in energy efficiency utilizing readily available technology.
- Increase generating capacity from clean renewable energy technologies, including wind power, solar energy, biomass and geothermal.
- Aggressively implement modern cost-effective energy efficiency technologies that can rapidly reduce our need for energy and bring overall power costs down.
- Give Colorado energy consumers a voice in how our future power needs are met.

This report outlines the public policies that will result in the fulfillment of CoPIRG's Clean Energy Future plan. It is time to provide Coloradans with a clean, reliable and cost-effective power supply and move beyond dirty fossil fuels.

## **CoPIRG's Clean Energy Future Plan Policy Recommendations:**

- Adopt the International Energy Efficiency Code
- Increase state government investment in energy efficiency
- Provide tax credits to individuals and businesses that purchase and install qualifying efficiency measures.

- Adopt a Renewables Portfolio Standard of 10 percent by 2010 and 20 percent by 2020, that is made up entirely of new renewable facilities
- Implement an Energy Security Fund that would be used to invest in solar power, biomass energy and wind power research and installation throughout Colorado and to increase energy efficiency.
- Make provisions for net metering to allow for clean distributed generation technologies.
- We urge the Governor to issue an executive order directing state agencies to purchase 10 percent of their power from non-hydro renewable sources by 2010 and 20 percent by 2020.
- The Colorado State Land Board should develop policies for leasing of state land for the purpose of building and operating renewable energy facilities.
- Initiate Deliberative Polling practices to give Colorado ratepayers a voice in determining future power generation sources.
- Promote the use of clean fuels and zero and low emissions vehicles.

Colorado residents are blessed with a wonderful quality of life. We have beautiful scenery, a healthy and educated population, and a strong economy: all of which are threatened by interests that would shackle us to dirty and unsustainable power sources for the next half century. The time has come for us to make a real commitment to responsibly reducing energy usage and to developing our state's huge renewable resource potential.

There really is no reason to continue down the dirty energy path of the last century; with its billion dollar coal plants that belch tons of toxic compounds into the air we all breathe, scarred landscapes, stripped bare by mining and a continued reliance on foreign oil. Especially when energy efficiency measures can be implemented in the immediate future that will obviate much of the need for new power plants, and our wind, solar, geothermal and biomass resources can be developed to meet new need in just a few years.

With available technology and cost-effective measures we can meet our state's future energy needs through a combination of energy efficiency and renewable energy sources. In the process Colorado has the opportunity to become the Silicon Valley of renewable energy, with high-tech jobs, innovative new businesses and a diverse portfolio of energy options from which to choose.

# Introduction

Although Colorado currently has enough power generation capability to meet our energy needs, continued population growth and an expanding economy will increase demand over the next 20 years. According to Xcel Energy, which accounts for three quarters of the Colorado retail electric market, the average power consumption in our state has risen 1.2% annually over the past 13 years. The most recent Integrated Resource Plan approved the construction of nine new natural gas plants slated for construction by 2003. These plants will provide an additional 1500 MW to meet peak energy demand in the Xcel service area alone. Xcel estimates the need for an additional 250MW of generating capacity each year after that to meet their portion of Colorado's total energy needs.

The current energy picture in Colorado looks like a snapshot from the past. The vast majority, over 96%, of our electricity is generated from the burning of dirty fossil fuels like coal and natural gas. These resources were a logical choice when no other technologies were available, but are no longer the solution.

## Colorado Utility Generation by Primary Energy Source, 1998<sup>1</sup>



## The Case for Diversifying Colorado's Energy Supply

All fossil fuels, and natural gas in particular, are finite resources. Once we drill and pump out remaining reserves, they will be gone forever. According to a report by the Community Office for Resource Efficiency, natural gas production in the United States has already reached its peak, and is now on an irreversible course down to zero. In Texas, which supplies one-third of the nation's gas, a typical new well has an astounding first year decline of 56%. By year four, 75% of the gas is gone.<sup>2</sup> The gas left in the ground is now harder to locate, more expensive to tap and more rapidly depleted than it was just five years ago and a number of forecasters are predicting a dire future.

Coal is more plentiful, but comes at a cost that makes it another poor choice for meeting our energy needs. In order to mine coal in Colorado, it must be extracted from the ground in one of several ways. The first option is to dig underground tunnels and to move the coal to the surface for transport to the power plant. When a mine has outlived its usefulness, the giant holes in the ground remain behind and can wreak environmental havoc. Rainfall percolates through the tunnels and reacts with the recently exposed rock, creating a toxic mix of acid and heavy metals. This mix eventually finds its way out of the mine and into our groundwater and streams where it makes drinking water unsafe and kills a wide range of aquatic life from tiny insects on up to trophy trout.

In a second method of coal mining, strip mining actually removes entire mountains and carts them away to be burned. In the wake of this practice we find dramatically altered landscapes, with little of the biodiversity that once thrived there. Stately, mature forests that once provided refuge for birds, salamanders and lynx, are reduced to little more than piles of rubble, or in the best cases, a monoculture of tree species planted in an effort by the industry to "reclaim" the site.

## **Environmental and Health Costs**

The process of burning coal for energy is also saddled with environmental and health costs that we all pay. Coal burning power plants are the state's largest source of both particulate pollution, and mercury emissions. In addition, according to the US EPA, coal power plants are responsible for two-thirds of the sulfate particles that are the chief cause of smog, and are the second largest source of water pollution. Partially as the result of coal burning power plants, much of the Denver metro area suffers from poor air quality. According to the American Lung Association, national asthma rates have skyrocketed 75% in the past ten years and 67,000 Colorado children currently suffer from the effects of this debilitating disease. The dirty energy path also leads us to other health risks like increased heart and lung disease, lost work time, increased health insurance premiums and even premature death.

In addition to threatening our health, dirty power threatens our environment. Global climate change could have an enormous negative impact on Colorado. Global warming could impact everything from already tight water supplies to the length of the growing season, in addition to any storm related damage due to changing weather patterns. According to the Department of Energy documents, over 50% of all global warming gases emitted in Colorado come from power plants.

Dirty energy also threatens some of the most treasured and pristine places in Colorado, like Rocky Mountain National Park. According to the National Park Service, over half of the total sulfur dioxide (SO<sub>2</sub>) emissions in Colorado are generated within 90 miles of the park. Air pollutants can reduce visibility, injure plants, and lead to concentrations of poisons in the food chain.

# A Clean Energy Future

Dirty energy is not the only option available as we work to meet our future energy needs. In fact Colorado is blessed with a combination of factors that make us one of the best places in the country to pursue energy efficiency measures and renewable energy sources. We are distinctly positioned for the new energy century and should not let this opportunity pass us by.

Energy experts across the state agree. The Land and Water Fund of the Rockies released a report entitled "How The West Can Win, A Blueprint for a Clean & Affordable Energy Future." It covers the five-state region of Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. Key findings include:

- Utility resource plans show a continued reliance on fossil fuel to meet close to 90 percent of the new electricity need.
- A strategy relying more heavily on energy efficiency, renewable resources, natural gas and clean coal would lower utility costs by \$2.2 billion, reduce key pollutant emissions 20 to 40 percent and diversify the region's energy mix, leading to greater energy security.
- This alternative strategy would lead to a net gain of over 12,000 jobs and add \$180 million annually to the region's wage base, with no reductions in coal jobs through 2010.

In a report by Skip Laitner and Marshall Goldberg of Economic Research Associates entitled "Colorado's Energy Future: Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy." The report compares a business-as-usual strategy and an alternative strategy with accelerated investments in energy efficiency and renewable energy sources.

- In the year 2010, according to the report, using the alternative strategy would save Colorado \$1.2 billion in energy bills, and provide a cleaner environment with 133,000 tons of energy-related pollutants kept from the air.
- The alternative strategy would also support a net increase of 8,400 jobs adding \$171 million in new wage and salary income (in 1996 dollars). Those jobs are equivalent to the employment supported directly and indirectly by about 67 small manufacturing plants. These benefits would be achieved by redirecting less than 0.2 percent of the state's cumulative GSP toward more productive energy investments.

## Efficiency

In "Opportunity Lost", a recent report by the Alliance to Save Energy, Colorado was ranked as one of the top three states in total energy savings potential. The report found that Colorado could potentially save 534 million cubic feet of natural gas, 23 million kilowatt hours and 52,000 gallons of oil by implementing more modern building efficiency codes. Colorado homeowners would realize \$145 in energy savings the first year and reduce toxic air pollution by between 23,000 and 34,000 tons annually.

By adopting the International Energy Efficiency Code, Colorado could reduce power usage by as much as 40% in residential buildings and even more in commercial and industrial applications. Many states now have energy codes based on the IECC, and are realizing substantial savings that far exceed the initial implementation costs and pay dividends forever.

The American Council for an Energy Efficient Economy estimates that adopting a comprehensive set of policies for advancing energy efficiency could lower national energy use by as much as 18 percent in 2010 and 33 percent in 2020, and do so cost-effectively.<sup>3</sup>

Increasing energy efficiency will:

- Reduce energy waste and increase productivity, without forcing consumers or businesses to cut back on energy services or amenities;
- Save consumers and businesses money since the energy savings more than pay for any increase in first cost and reduce competition for increasingly scarce fossil resources, thereby keeping costs lower;
- Reduce the risk of energy shortages and improve the reliability of overtaxed electric systems;
- Reduce energy imports;
- Reduce air pollution of all types since burning fossil fuels is the main source of most types of air pollution; and
- Lower U.S. greenhouse gas emissions and thereby help to slow the rate of global warming.

## **Residential Efficiency Opportunity**

America's historic abundance of cheap, plentiful power has undoubtedly helped the nation to become the most prosperous in history. An unintended consequence of that abundance however, is America's relative inefficiency at home. The Rocky Mountain Institute, a recognized leader in the area of energy efficiency, estimates that our homes could easily be 50-90 percent more efficient than they are today with modest initial investment, and lifelong returns on that investment. Home energy efficiency can be as simple as changing a light bulb- literally. Compact fluorescent bulbs save an average of 75 percent of the electricity conventional bulbs use and have the added benefit of lasting as long as 13 conventional bulbs. Light bulbs are only the tip of the iceberg when it comes to home energy efficiency. New technologies in window design and materials, home appliances and building design can deliver huge increases in efficiency today and reduce the need for new power plants in the future.

## **Industrial Efficiency Opportunity**

The industrial sector accounts for about 39 percent of total U.S. energy consumption. Manufacturing represents about two-thirds of industrial energy use, with six energy-intensive sectors dominating (petroleum refining, chemicals, primary metals, paper and pulp, food and kindred products, and stone, clay, and glass products). There is substantial potential for cost-effective efficiency improvement in both energy-intensive and non-energy-intensive industries. For example, an in-depth analysis of 49 specific energy efficiency technologies for the iron and steel industry found a total cost-effective energy savings potential of 18 percent.<sup>4</sup>

## **Efficiency Policy Recommendations**

In order to increase energy efficiency on a national scale, we must act boldly to implement a variety of public policies that encourage homeowners and businesses to invest in efficient technologies and adopt efficient practices. If America commits to reducing the demand side of the energy equation, we can avoid the need for building many of the two power plants a week for 20 years that Vice President Cheney suggested recently.

There is a very real difference between the concepts of conservation and energy efficiency. When President Carter sat in the Oval Office in his cardigan and asked America to turn down the thermostat, he was talking about conservation. Critics say that energy efficiency is essentially making do with less; in reality energy efficiency is all about doing more with less. Using readily available technology to instantly get more use per kilowatt is the essence of energy efficiency.

### **1. Develop a statewide Energy Security Fund**

This charge would appear on the electricity bills of all Colorado customers to provide a dedicated source of funding for energy efficiency measures. The ultimate result will be lower electricity bills and a reduced need for new power plants in Colorado. All revenues would go into a fund to support energy efficiency initiatives such as:

- Financial support for installation of energy efficiency measures in homes, businesses and public buildings
- Research into energy efficiency technologies and marketing strategies
- Provide assistance to low income electricity customers to support energy efficiency improvements in their residences
- Develop and distribute educational materials and programs that provide information on the benefits of energy efficiency and the available sources of funding assistance

The charge would apply to all electricity customers, who would benefit from the charge through cleaner air and health benefits that will follow energy efficiency improvements, as well as stable energy prices.

### **2. Adopt the International Energy Efficiency Code**

Energy codes are beneficial beyond lowering energy use in residential and commercial buildings, and thereby utility bills, because energy use also impacts our economy and the environment. Energy Codes provide builders with minimum building standards helping assure new home and business owners that their investment will meet these standards. Unfortunately, Colorado does not have a meaningful statewide efficiency building code. Currently, municipalities determine whether to adopt efficiency codes, and how stringent they are if adopted. Many cities use the hopelessly outdated Colorado State Code, which was created in 1977, well before today's levels of efficiency technology. Other municipalities, like Fort Collins, have realized significant (a 16 percent reduction) energy savings by adopting more aggressive codes like the International Energy Efficiency Code. A statewide energy savings of 16 percent would equal around 740MW of newfound energy capacity by 2010. That is the equivalent of saving the need for a large coal fired power plant, and millions of tons of pollution annually.

The IEEC was originally developed jointly under the auspices of the Council of American Building Officials (CABO), Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO), National Conference of States on Building Codes and

Standards (NCSBCS), and Southern Building Code Congress International (SBCCI) under a contract funded by the U.S. Department of Energy.

### **3. Increase state government investment in energy efficiency**

CoPIRG recommends that the state reduce energy consumption by 15 percent by 2010. State owned buildings should be constructed or retrofitted with high efficiency lighting, heating, venting and air conditioning (HVAC) and appliances in order to reduce energy consumption and to support efficiency technologies and businesses in Colorado.

### **4. Provide tax credits to individuals and businesses that purchase and install qualifying efficiency measures**

Colorado should offer a wide array of state income tax credits to promote energy efficiency improvements and technologies. Tax breaks will spur consumers and businesses to reduce power consumption, thereby reducing the need to build new power plants and saving billions of dollars in the process. We recommend tax breaks for the following:

- **Lighting.** A tax credit for purchases of high efficiency compact fluorescent light bulbs.
- **Energy Audits.** A tax credit for individuals and businesses that use the results of energy audits to improve efficiency by 25% or more.
- **Appliances.** A tax credit for manufacturers of highly efficient clothes washers and refrigerators will help save energy and water (with a cap on the total credit per manufacturer). This proposal has been introduced by Senator Allard in the US Congress.
- **New Homes.** A tax credit for highly efficient new homes will stimulate efficiency and help lower housing costs for American families.
- **Other Building Equipment.** We support a 20 percent investment tax credit (with caps) for innovative building technologies including very efficient furnaces, stationary fuel cell power systems, gas-fired heat pumps, and electric heat pump water heaters.
- **Commercial Buildings.** We support a tax deduction of \$2.25 per square foot for investments in commercial buildings and multifamily residences that achieve a 50 percent or greater reduction in heating and cooling costs compared to buildings meeting current model energy codes.
- **Combined Heat and Power (CHP).** We support either an investment tax credit or shortened depreciation period for combined heat and power systems with an overall efficiency of at least 60-70 percent depending on system size.
- **New Construction.** Tax credits to builders and developers who include energy efficient technologies in new construction.

# Renewable Energy Potential

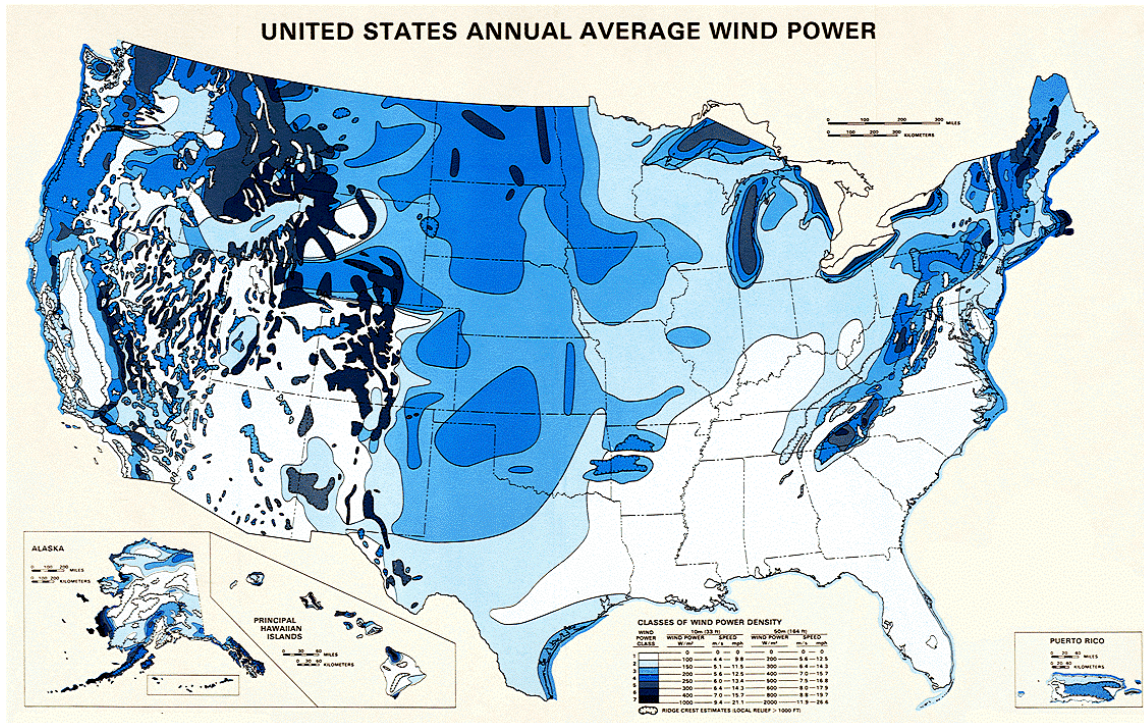
Traditional thinking about Colorado's natural resources has centered on the state's forests, rivers, mineral deposits and fossil fuels like coal, oil and natural gas. As those resources are depleted, as our lands are despoiled.

## Wind

The National Renewable Energy Laboratory (NREL) estimates that there are at least 26,000 mega watts of potential wind powered electricity available in Colorado. That potential is more than five times our current total electricity usage, simply through utilizing existing technology to harness wind power in our state. Within a year, 30-40 percent of the projected new electricity demand in our state could be met with wind power.

The Colorado Public Utilities Commission recently ruled that wind power is cost-competitive with natural gas and ordered Xcel Energy to begin negotiations to build new wind power capacity. A 168 MW wind farm near Lamar will soon be operating at less cost than a traditional fossil fuel plant and with virtually no pollution.

Another benefit of wind power is the potential income it represents to the ranchers and farmers of Colorado. In many places where wind power is more fully developed, farmers and ranchers are paid two thousand dollars annually to have wind turbines located on their property. The stable income provided by the wind farms helps agricultural landowners make it through lean years and provides needed capital for improvements to land and equipment.



Source: National Renewable Energy Lab<sup>5</sup>

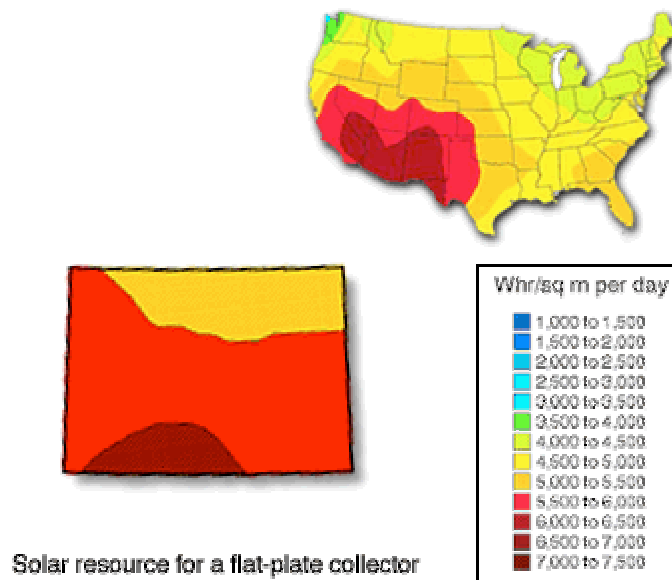
## Solar

Most of the Front Range enjoys over 300 sun days a year, providing an excellent source of energy. While solar power is still generally more expensive than natural gas, it can be used today to provide power to

communities and residences that are located off the current energy grid. Other applications for solar power include agricultural uses such as irrigation pumps and municipal use in lighting and traffic devices. According to the National Renewable Energy Laboratory (NREL), photovoltaic energy production has risen by over 75 percent in the past 7 years, thanks largely to falling production costs.

Passive solar energy, which includes smart building design that uses solar radiation to heat and light buildings, is an inexpensive and effective way to reduce energy usage. Passive solar power could reduce the need for heating and hot water by as much as 30 percent at very low cost to consumers.

## U.S. Solar Resource Map<sup>6</sup>



Source: National Renewable Energy Lab

### Biomass

Everything from farm by products to human and animal waste could be used to generate electricity with no net increase the amount of green house gases that are emitted into the atmosphere. Agricultural and forestry wastes already generate over 2 percent of U.S. electric power. Potential biomass resources in Colorado include an annual 2.2 million tons of agricultural residue, 7 million tons of municipal solid waste and 474,000 tons of animal manure.<sup>7</sup>

### Geothermal

Much of Colorado has strong potential to utilize heat within the earth's crust to generate electricity and to heat water. Geothermally derived heat can be pumped to the surface and used to drive steam turbines that create electricity, to power heat pumps in residential applications or to heat swimming pools. The Colorado Geological Survey has identified 56 systems of geothermal energy which could provide hot water and heat for 100,000 homes.

# **Renewable Energy Policy Recommendations**

For generations, our government has propped up dirty fossil fuel and nuclear energy production. American taxpayers have unwittingly subsidized the development of unsustainable, dirty and unhealthy power industries at the expense of clean, renewable energy sources. Wind and solar energy technologies, for example, have received about 3 percent of the amount of federal research dollars received by the nuclear industry over the past fifty years.

CoPIRG recommends that Colorado level the playing field for wind, solar, geothermal and biomass energy production by adopting the following policies:

## **1. Adopt a Renewables Portfolio Standard of 10% by 2010 and 20% by 2020**

A RPS requires all retail electricity suppliers to include a specific percentage of renewable resources in their generation mix. According to a recent clean energy development plan entitled "Repowering the Midwest" the Environmental Law & Policy Center described Renewable Portfolio Standards as one of the most important public policies for promoting renewable resources. "It is market based, and relies upon competing generating companies to develop the technologies necessary to achieve the targeted level of renewable resources. As of August 2000, minimum renewable energy requirements have been adopted in Connecticut, Iowa, Maine, Massachusetts, Minnesota, Nevada, New Jersey, Pennsylvania, Texas, Arizona, New Mexico and Wisconsin."

Xcel's projected 2010 generating capacity total of about 6.5 to 7 GW would mean 650 to 700 MW of renewable power generation by 2010. This goal could be met by simply building one moderately sized wind farm a year between 2003 and 2010.

## **2. Implement an Energy Security Fund that would be used to invest in solar power, biomass energy and wind power research and installation**

The charge would apply to all electricity customers, who would benefit from the charge through cleaner air and health benefits that will follow renewable energy development, as well as stable energy prices.

The fund should support projects that:

1. Are not currently cost competitive with grid power due to small economies of scale, new technology or other reasons. Examples include solar photovoltaics and fuel cells.
2. Encourage private participation in research, development and marketing of renewable energy technology.
3. Support efforts to familiarize the public, businesses and government agencies with renewables and the applicability of such technologies in their lives.

## **3. Implement net metering for clean distributed generation technologies**

Net metering is not available statewide in Colorado to allow customers to produce energy for their own needs and turn their electric meter backwards. Some utilities allow it, but many do not, particularly in rural areas. Net metering can help spread small, clean, customer-sited technologies like solar photovoltaics and fuel cells that help to diversify generation resources.

#### **4. Create State Tax Incentives**

A system of tax credits for those individuals and businesses that install renewable energy generating capacity will stimulate development and production of high tech industry in Colorado, reduce the need for new power plants and provide economical power supplies to those rural Coloradans who are located off-grid.

- reduce property taxes for renewable energy plants by 50 percent
- introduce a statewide renewable energy production tax credit for both supply-side power generation and customer side applications of renewables. The amount of credit should be tied to the cost difference between renewable energy sources and conventional sources (where those differences exist) so that the credit shrinks as renewables approach competitive levels.

#### **5. Require state agencies to purchase 10 percent of their power from non-hydro renewable sources by 2010 and 20 percent by 2020**

The state should lead by example by purchasing a significant portion of its power from renewable sources. Not only will the residents of our state benefit from cleaner air and stable utility prices, but local renewable energy companies will grow thanks to larger markets.

#### **6. Develop policies for leasing of state land for the purpose of building and operating renewable energy facilities**

The state of Colorado owns some 3 million acres of land, much of which is located in prime wind farm areas in the eastern plains. The land is already used for agriculture and mining purposes, and wind farms should be explored as an additional use. The construction of wind farms on state lands is especially appealing because the open space characteristics of such areas would be maintained.

## **Consumer Input Policy Recommendation**

Colorado utility customers should have a determining voice in what power sources are built in our state to serve them. After all, customers do pay the bills. Currently, electricity customers are largely missing from the decision-making processes that determine their energy future. Under Governor George W. Bush, Texas implemented deliberative polls that involved a statistically valid random sample of Texas utility customers. Deliberative polling is a process in which electricity customers are polled on a wide variety of energy issues, including their views about various forms of electricity generation, including coal, gas, wind, solar and biomass.

After a random sample telephone poll determines baseline responses, a random sample of participants are educated about the pros and cons of each power source with information presented from a variety of viewpoints. Texas customers learned more about; cost, sustainability, environmental impacts, reliability and other considerations. After in-depth discussions and deliberations, participants are asked the same questions as the baseline poll. The results changed Texas utility and state government selections of power sources, from fossil fuel and nuclear toward renewables and energy efficiency. In the Texas process, customers decided what they wanted based on informed opinions, and the state will lead the nation in wind power additions in 2001. Based on the polling results, the Texas Legislature has also adopted a Renewable Portfolio Standard.

### **1. Initiate deliberative polling practices to give Colorado power customers a voice in determining future power generation sources**

The results of deliberative polling have proven to be highly reliable. All the utilities in Texas conducted additional market research after the polling to discredit the results, but found that the public overwhelmingly supported the initial conclusions.

# Conclusion

Colorado residents are blessed with a wonderful quality of life. We have beautiful scenery, a healthy and educated population, and a strong economy: all of which are threatened by special interests that would shackle us to dirty and unsustainable power sources for the next half century. The time has come for us to make a real commitment to responsibly reducing energy usage and to developing our state's huge renewable resource potential.

There really is no reason to continue down the dirty energy path of the last century; with its billion dollar coal plants that belch tons of toxic compounds into the air we all breathe, scarred landscapes, stripped bare by mining and a continued reliance on foreign oil. Especially when energy efficiency measures can be implemented in the immediate future that will obviate much of the need for new power plants, and our wind, solar, geothermal and biomass resources can be developed to meet new need in just a few years.

## Benefits of the Clean Energy Future Program

- Greatly improved quality of Coloradans health and environment by reducing harmful emissions of sulfur dioxide, carbon dioxide and nitrogen oxides as well as mercury and other neurotoxins.
- Reduce the need for new power through efficiency improvements that reduce projected electricity use by 15 percent by 2010. This can be accomplished through an average investment of 2.3 cents per kilowatt-hour (kWh). This is much less than the cost of generating, transmitting and distributing electricity from a coal burning power plant.
- Renewable energy development will provide ten percent of Colorado's power by 2010.
- Colorado will have a more stable supply of electricity, due to a more diverse energy portfolio and less reliance on finite fossil fuels.
- Colorado's economy will grow as homegrown companies capitalize on the newly expanded market for their wind, solar and biomass technologies. Colorado's farmers and ranchers will also benefit through wind generator siting fees and the use of agricultural waste as fuel.

With available technology and cost-effective measures we can meet our state's future energy needs through a combination of energy efficiency and renewable energy sources. In the process Colorado has the opportunity to become the Silicon Valley of renewable energy, with high-tech jobs, innovative new businesses and a diverse portfolio of energy options from which to choose.

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<sup>1</sup> U.S. Energy Information Administration Website, [www.eia.doe.gov/cneaf/electricity/st\\_profiles/colorado/co.html](http://www.eia.doe.gov/cneaf/electricity/st_profiles/colorado/co.html)

<sup>2</sup> R. Udall and S. Andrews, Methane Madness: A Natural Gas Primer (Aspen: Community Office for Resource Efficiency).

<sup>3</sup> H. Geller, S. Bernow, and W. Dougherty, Meeting America's Kyoto Protocol Target: Policies and Impacts (Washington, D.C.: American Council for an Energy-Efficient Economy, 1999).

<sup>4</sup> OIT, 2001, Office of Industrial Technologies: Summary of Program Results, Washington, D.C.: U.S. Department of Energy, Office of Industrial Technologies.

<sup>5</sup> Pacific Northwest National Laboratory, <http://tredc.nrel.gov/wind/pubs/atlas/>

<sup>6</sup> National Renewable Energy Laboratory, <http://www.maps.nrel.gov>

<sup>7</sup> Renewable Energy in Colorado's Future: Recommendations of the Governor's Renewable Energy Task Force, November 1997.