Senate Select Committee on Renewable Energy

Report to the Colorado Senate

June 2007

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Senate Select Committee on Renewable Energy

Members of the Committee

Senator Chris Romer, Chairman
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Executive Summary

Committee Charge

The Senate Select Committee on Renewable Energy was convened pursuant to Senate Rule 22C which allows the Senate President to create a committee to review a single specified subject matter area or issue during a regular legislative session. Pursuant to the Senate rule, the President appointed five members to the committee. Senate select committees may sponsor legislation recommended for introduction during the regular session. Committee members may seek authorization from the Senate Committee on Delayed Bills for such legislation.

Committee Activities

The committee met eight times during the 2007 legislative session taking testimony from utility regulators, energy researchers, energy producers, renewable energy advocates, equipment manufacturers, and local government officials. The committee received briefings on the following renewable energy issues:

- activities of the 2006 House Select Committee on Strategic Renewable Energy;
- state and federal renewable energy and energy conservation legislation;
- wind energy transmission and production;
- rural economic benefits from renewable energy projects and clean energy jobs;
- public and private funding for renewable energy projects;
- biofuels research and production;
- photovoltaic and concentrated solar power;
- energy conservation;
- renewable energy research and technology transfers; and
- implementation of House Bill 07-1281 concerning the renewable energy requirement by the Public Utilities Commission.

Committee Recommendations

The committee did not issue recommendations. However, 22 bills concerning renewable energy and energy conservation were introduced in 2007 which address many of the policy problems considered by the Select Committee on Renewable Energy. The following section on committee activities highlights 2007 legislation that address policy problems discussed by the committee.

Committee Activities

The committee met eight times during the 2007 legislative session. At these hearings, the committee received briefings on a broad range of renewable energy policy issues from government officials, private energy providers, and other interested persons. Briefing topics included implementation of Colorado's renewable energy requirement, wind energy issues, energy transmission constraints, bio-fuels, solar energy, energy conservation, technology, funding for energy projects, and federal energy legislation. The committee did not issue specific recommendations; however, 22 bills concerning renewable energy and energy conservation were introduced in 2007 which address most of the policy problems considered by the Select Committee on Renewable Energy. Eighteen of these bills were signed by the Governor. The following section highlights *enacted* 2007 legislation that addressed policy problems discussed by the committee. Additional information about renewable energy and energy conservation legislation is provided in the appendix of this report.

Colorado's Renewable Energy Requirement

In 2004, Colorado voters approved Amendment 37 which established a renewable portfolio standard (RPS) for investor-owned utilities. House Bill 07-1281 increases the RPS for these utilities and creates an RPS for electric cooperatives and larger municipal utilities.

Requirements for investor-owned utilities. House Bill 07-1281 raises the standard for electricity generation from eligible energy sources for investor-owned utilities from:

- 3 to 5 percent for 2008 through 2010;
- 6 to 10 percent for 2011 through 2014;
- 10 to 15 percent for 2015 though 2019; and
- 10 to 20 percent for 2020 and after.

At least 4 percent of the standard for investor-owned utilities must be generated by solar electric technologies. At least one-half of this solar standard must be generated by solar-electric systems located at customers' facilities. Each kilowatt-hour of eligible electricity generated in-state receives 125 percent credit for RPS-compliance purposes. Under the law, eligible renewable energy resources include solar-electric, wind, geothermal, biomass, hydro-power, fuel cells using hydrogen, and recycled energy. Recycled energy converts the heat from exhaust stacks and pipes into electricity that would otherwise be lost energy. Only recycled energy from generation units of 15 megawatts or less may satisfy the RPS. A megawatt is a million watts or approximately the amount of energy consumed by 500 to 1,000 homes depending upon the time of day. The law also creates a system of tradeable renewable energy credits that may be purchased by utilities that do not generate the required amount of renewable energy from utilities that exceed the requirement.

Requirements for electric cooperatives and municipal utilities. House Bill 07-1281 also establishes an RPS for electricity generation for electric cooperatives and municipally-owned utilities serving over 40,000 customers:

- 1 percent for 2008 through 2010;
- 3 percent for 2011 through 2014;
- 6 percent for 2015 through 2019; and
- 10 percent for 2020 and after.

Credits for community-based projects and solar. Under the law, electricity generated by community-based projects receives a 150 percent credit for RPS-compliance purposes. Such projects are limited to 30 megawatts in capacity. They must also be located in Colorado and owned by individual residents or by non-profits, cooperatives, local governments, or tribal councils. There is no solar requirement for electric cooperatives and municipal utilities. However, solar electricity generated by a facility that begins operation before July 1, 2015, receives 300 percent credit for RPS-compliance purposes. Solar electricity generated by a facility that begins operation on or after July 1, 2015, receives 100 percent credit.

Implementation of House Bill 07-1281. House Bill 07-1281 requires the Public Utilities Commission to revise or clarify the renewable energy regulations for electric utilities to implement the new law (4 CCR 723-3). The committee met with the commission to discuss the rule-making process that must be completed by October 1, 2007. The commission described the requirements for amending its rules including providing notice of the proposed rule, receiving public comments, and holding hearings.

Briefings on Renewable Energy Issues

Wind Energy

According to the U.S. Department of Energy's National Renewable Energy Laboratory, wind energy is one of the fastest-growing forms of electricity generation in the world. The United States can currently generate over 10,000 megawatts (MW) of electricity from the wind. This is approximately the amount of energy consumed by 5 million homes. A committee meeting was devoted to learning about wind energy issues in Colorado, including economic benefits from wind energy projects and energy transmission constraints affecting Colorado's wind energy production capacity.

Local benefits of wind energy. Staff from the National Renewable Energy Laboratory (NREL) identified the local economic benefits from wind generation facilities. For example, land owners receive lease payments of approximately $3,000 per year for generation facilities located on their land. For each 100 megawatts of power production capacity, NREL explained that local governments receive up to $1 million in property tax revenue and as many as 10 permanent operations and maintenance jobs are created. An official with the investor-owned Prairie Wind Energy described the economic benefits of its 69 megawatt wind energy project in Prowers County. This project sells its electricity to Xcel Energy.

Wind turbine manufacturing. The committee met with manufacturers of wind turbines to discuss how to attract renewable energy jobs to Colorado. An official with Clipper Wind, Inc., explained that his company built its wind turbine manufacturing facility in Iowa because of its proximity to the market for wind turbines and the support from Iowa's electric utilities for voluntarily expanding wind energy production. The Clipper Wind Power, Inc., turbine was developed in partnership with the National Renewable Energy Laboratory. Staff from Southwest Wind Power described the small wind turbines that it builds for homes, ranches, and small businesses. For example, its 1.8 kilowatt turbine is capable of generating between 40 and 100 percent of a customer's energy needs. The technology used by these turbines was developed in partnership with the National Renewable Energy Laboratory.

Energy Transmission Constraints

Energy transmission constraints in Colorado. The committee received a briefing on constraints in the energy transmission system that limits Colorado's ability to fully develop its wind energy resources. The chairman of the Public Utilities Commission described the commission's efforts to coordinate transmission facility development to maximize the benefits to Colorado's energy consumers and producers. He explained that the commission is overseeing construction of the Eastern Plains Transmission Project. This project — sponsored by Tri-State Generation and Transmission Association, Inc., and the Western Area Power Administration — will include 1,000 miles of new high-voltage transmission lines and related facilities in eastern Colorado and western Kansas. It is expected to enhance power delivery system reliability in the region and expand interconnections for renewable energy projects. Construction of the transmission project is scheduled to begin in 2008 and to be completed in 2011.

Texas renewable energy policies. The committee received a briefing on the renewable energy requirements in Texas and its state policy to address transmission congestion problems. A representative of AES Corporation explained that Texas enacted a law in 1999 that required 2,000 megawatts (MW) of new renewable energy to be installed by 2009, in addition to the 880 MW of existing renewable energy generation at the time. In 2005, Texas increased the renewable-energy mandate to 5,880 MW by 2015 — or approximately 5 percent of the state's electricity demand — including a target of 500 MW of renewable-energy capacity from resources other than wind. To address congestion problems with the state's transmission systems, the new law instructs the Public Utilities Commission of Texas to require utilities to expand their transmission systems as necessary to meet the renewable energy goal. It also allows utilities to recover the cost of such projects through electric rate increases.

Colorado's 2007 energy transmission legislation. Senate Bill 07-100, signed by the Governor, requires regulated electric utilities to biennially review designated energy resource zones where transmission constraints hinder the delivery of electricity. The law requires utilities to submit plans for the construction of additional transmission capacity in these zones to the Public Utilities Commission. The law allows utilities to recover costs during construction through a rate adjustment. Senate Bill 07-91, also signed into law, creates a 16-member Renewable Resource Generation Development Area Task Force to identify areas in Colorado that have the potential to support competition among developers for renewable energy projects. Members of the board include energy providers, renewable energy producers, agricultural interests, and government officials.

Alternative Fuels

Ethanol. Ethanol is an alcohol-based alternative fuel produced by fermenting and distilling corn, barley, wheat and other starch crops. As of March 2007, the U.S. Department of Energy reported that the national average price for a gallon of ethanol was $2.10 compared with $2.30 for gasoline. The national average price per million BTU (British thermal unit) from ethanol — which has a lower energy content than gasoline — was $25.68 compared with $19.96 for gasoline. Staff with the National Renewable Energy Laboratory explained that there are 110 facilities that can annually produce 5.6 billion gallons of ethanol from corn in the United States, including three in Colorado. Another 3 billion gallons of corn ethanol will be produced by facilities that are currently under construction. He also described research programs to produce cellulosic ethanol made from switch grass and other plants. The United States has the potential to harvest as much as 1 billion tons of biomass to produce cellulosic ethanol without affecting food and fiber production.

A representative of Sterling-Yuma Ethanol, LLC described ethanol production by his company in northeastern Colorado. Ethanol from this plant is primarily sold to users in Colorado. He explained that 85 percent of his company's start-up capital was raised from local farmers and livestock producers who benefit from the facility. For example, corn producers are able to sell their product to the ethanol facility and ranchers feed the corn to their livestock after it has been used to produce ethanol. He described competition from ethanol producers in states such as Iowa, Indiana, and Illinois that provide public incentives to their ethanol producers. For example, Illinois provides a rebate for 80 percent of the incremental cost of purchasing an alternative fuel vehicle up to $4,000. Iowa provides a tax credit of $0.025 for each additional gallon of gasoline blended with ethanol sold by certain retail service stations. A representative of Ethanol Resource Assessment and Solution Inc., identified policies to encourage renewable energy production and consumption including providing market incentives, increasing the retail availability of ethanol, and increasing the number of state vehicles that use biofuels.

Ethanol transport challenges. Ethanol is primarily transported by trains and tanker trucks. The committee heard testimony from a representative with Magellan Midstream Partners which operates pipelines that transport refined petroleum products. He explained that his company's research indicates that ethanol may cause stress corrosion in pipelines that transport refined petroleum products. He suggested that additional research is needed to develop pipelines capable of transporting ethanol. Using pipelines to transport ethanol may help reduce the cost of ethanol and make it more cost competitive with gasoline.

Biodiesel. Biodiesel is produced from vegetable oils, animal fats, and recycled restaurant greases. Blends of 20 percent biodiesel and 80 percent petroleum diesel, called B20, can be used in unmodified diesel engines. Soybean oil is the primary source of vegetable oil used for the production of biodiesel in the United States. As of March 2007, the U.S. Department of Energy reported that the national average price for a gallon of B20 biodiesel was $2.53 compared with $2.30 for gasoline. B20 has a similar energy content to that of gasoline. The national average price per million BTU from biodiesel was $20.05 compared with $19.96 for gasoline. A representative of Blue Sun Biodiesel described the production and marketing of biodiesel by his company which is the leading supplier of biodiesel in Colorado, New Mexico, and Idaho. Its largest customer is the City and County of Denver which operates part of its vehicle fleet on biodiesel. He explained that

biodiesel production may be increased in Colorado by providing incentives to encourage Colorado farmers to grow oil seed crops. He also identified incentives offered by other states to locate biodiesel processing facilities within their borders. For example, Wyoming offered $2 million dollars to locate a biodiesel processing facility in that state, and Kansas offers a subsidy for each gallon of biodiesel that is produced in the state.

Straight vegetable oil. Straight vegetable oil (SVO) is virgin vegetable oil crushed from oil seeds that can be substituted for diesel and biodiesel. Staff from the International Center for Appropriate and Sustainable Technology testified about the advantages of SVO over biodiesel and petroleum diesel. For example, SVO has an energy balance of 6:1 because it may be produced and used on the same farm. This means that SVO provides six units of energy for each unit of energy that it requires to produce it. In contrast, biodiesel's energy balance ratio is 3:1 and petroleum diesel's energy balance is 0.83:1. The official urged Colorado to develop a state standard for straight vegetable oil and fund a pilot project to demonstrate the benefits of SVO.

Biofuels research. The committee heard testimony about research being conducted by the Colorado Center for Biorefining and Biofuels, also called "C2B2." For example, the center is conducting research on the production of biofuels from low-water consuming plants. The center is a project of the Colorado Renewable Energy Collaboratory that is comprised of the National Renewable Energy Laboratory, the University of Colorado, Colorado State University, and the Colorado School of Mines. These entities collaborate on research and educational programs for the advancement of renewable energy technologies and their introduction into the marketplace.

Colorado's 2007 alternative fuels legislation. House Bill 07-1228, signed by the Governor, requires the state of Colorado to purchase flexible fuel vehicles by 2008 unless they cost substantially more than comparable non-flexible fueled vehicles. The act requires the Division of Oil and Public Safety in the Department of Labor and Employment to establish uniform regulations for above-ground storage tanks that hold renewable fuels.

Solar Power

Colorado's solar energy requirement. At least 4 percent of the renewable portfolio standard (RPS) for investor-owned utilities must be generated by solar-electric technologies. At least one-half of the solar requirement must be generated by solar-electric systems located on-site at customers' facilities. Each kilowatt-hour of eligible electricity generated in-state receives 125 percent credit for RPS-compliance purposes. There is no solar requirement for electric cooperatives and municipal utilities. However, solar electricity generated by a facility that begins operation before July 1, 2015, receives 300 percent credit for RPS-compliance purposes. Solar electricity generated by a facility that begins operation on or after July 1, 2015, receives 100 percent credit.

Photovoltaic power. Photovoltaic power systems convert sunlight directly into electricity. A representative of Sun Edison Company described the Alamosa Photovoltaic Solar Plant that is under construction in the San Luis Valley in south central Colorado. The 8.22-megawatt facility is being built and maintained by Sun Edison. Xcel Energy will purchase the plant's electricity to help it comply with the renewable energy requirement. When completed in early 2008, the facility will

generate 17,000 megawatt hours annually at a cost of approximately 22 cents per kilowatt hour. The official also described the photovoltaic system that supplies power for his home. He estimated that the system will pay for itself in approximately 10 years based on the cost of conventional power sources. The cost of installing residential photovoltaic is expected to decline as new manufacturing facilities are built and investments in solar energy technology increases.

Concentrated solar power. Concentrated solar power systems use reflective materials that concentrate the sun's heat energy to drive a generator that produces electricity. An official with Ausra, Inc. — a developer of large scale solar electric power parks — explained that solar concentration power facilities use a heat storage system that is constructed from concrete steel and glass which is cheaper to build than photovoltaic facilities. He estimated that large concentrated solar power facilities can generate electricity at a cost of 10 cents per kilowatt hour. Wind and solar generation facilities can be used in combination to increase the overall efficiency of the two systems. An official with Colorado Solar Energy Industries Association described the economic advantages of large concentrated solar facilities and provided recommendations to increase solar energy production in Colorado. For example, he recommended that Colorado's renewable energy requirement be amended to allow larger solar power facilities to qualify for the solar equipment rebate. Currently, retail utilities must provide their retail electricity customers a rebate of at least $2.00 per watt for the installation of solar electric generation on the customers' property up to 100 kilowatts per installation.

Solar heating. A representative of the Colorado Solar Energy Industries Association described the economic advantages of solar thermal systems which use solar energy to heat water for in-house use, living spaces, hot tubs, and swimming pools. Because they are cheaper than photovoltaic systems, solar heating systems are more appealing to lower income households. He urged the committee to recommend a bill that would collect a tax on the energy consumed by customers of investor owned utilities. Revenue collected from this tax would be used to pay for a rebate for customers who purchase a solar heating system.

Energy Conservation

According to the Western Governor's Association Report of the Clean and Diversified Energy Advisory Committee, a 20 percent improvement in efficiency of electricity use would provide $50 billion in economic benefits and prevent the need to build nearly 100 large conventional power plants. Staff with Financial Energy Management described the investment opportunities for energy efficiency projects and proposed legislation to require utilities to adopt demand-response programs and time-of-use pricing structures. Demand response occurs when customers change their consumption of electricity in response to the change in price of electricity or in response to incentive payments from the utility. With time-of-use pricing, electric rates are higher when electric demand is greatest and lower during times of lower use. This price change encourages customers to reduce their energy consumption when prices are highest and defer their power use to off-peak times.

Home energy efficiency retrofits for low income households. According to the Rocky Mountain Institute, a nonprofit research organization, the average American family spends nearly $1,500 per year on utility bills. It estimates that energy efficiency improvements may reduce utility

costs by 10 percent to 90 percent depending on how inefficient a household is and how much the homeowner invests in energy efficient improvements. The committee discussed the need for a low-cost loan program to help low-income households pay for home energy improvements. It also discussed requesting a bill to authorize the Colorado Housing and Finance Authority (CHFA) to issue loans to low-income households for such home energy improvements. CHFA is an independent public entity that provides single family mortgages to qualifying home buyers and facilitates the development of multifamily apartment units for low and moderate income residents. Some committee members indicated a desire to meet with CHFA during the interim to discuss the need for such a program and whether legislation would be necessary.

Colorado's 2007 energy conservation legislation. House Bill 07-1037, signed by the Governor, requires investor-owned natural gas distributors and electric utilities to adopt demand-side management plans which include energy efficiency, conservation, load management, and demand response programs. House Bill 07-1146, signed by the Governor, requires boards of county commissioners and municipal governing boards that have a building code in place to adopt and enforce a building energy code that meets or exceeds the 2003 International Energy Conservation Code standard. Senate Bill 07-51, signed by the Governor, requires the Department of Personnel and Administration to consult with the Colorado Commission on Higher Education to adopt a "high performance standard certification program" for state building projects.

Clean Coal Technology

According to the Colorado Mining Association, coal-fired power plants produce approximately 80 percent of the electricity used in Colorado. There are 13 coal-fired power plants in Colorado that burned 19 million tons of coal in 2006 and generated 37.5 million megawatt-hours of electricity. Most of the coal burned in these plants was mined in Colorado. An official with the Colorado Mining Association described new technologies that may reduce emissions from the combustion of coal such as coal gasification that converts coal into gaseous components by applying heat under pressure in the presence of steam. A representative of Evergreen Energy described his company's coal refining process, called K-Fuel, that uses heat and pressure to transform high moisture, low heat producing coals into a more energy efficient, lower emission fuel. This process also reduces the emission of carbon dioxide, sulfur dioxide, and nitrogen oxides.

Public Financing for Renewable Energy and Infrastructure

Sales tax exemption for renewable energy equipment. Colorado law provides a sales and use tax exemption for machinery costing over $500 that is used in Colorado in manufacturing tangible personal property for sale or profit (Section 39-26-709, C.R.S.). A representative of the American Wind Energy Association testified about a ruling from the Colorado Department of Revenue concerning the sales and use tax exemption for wind generation machinery. In February 2001, the Department of Revenue issued a determination that the sales tax exemption applied to machinery used in the production of electricity. However, in November 2006, the department issued another determination that the exemption did not apply to machinery used in the production of electricity. The committee heard testimony about the effect of the ruling and the need to exempt renewable energy production machinery from the sales and use tax.

Public renewable energy funding in other states. The committee received a briefing on the Wyoming Infrastructure Authority which was created in 2004 to pay for the expansion of Wyoming's electrical transmission system. The authority is responsible for planning, financing, building, and operating interstate electric transmission and related facilities. It is authorized to issue revenue bonds to finance new transmission lines and advanced coal plants and extend up to $1 billion in bond financing for projects owned by private parties. It may form partnerships with public or private entities to build and upgrade transmission lines and to develop advanced coal plants.

The Renewable Energy Finance Advisor for the Governor of New Mexico described financial incentives provided by New Mexico to encourage renewable energy production. For example, New Mexico provides a tax credit against the corporate income tax of one cent per kilowatt-hour for companies that generate electricity from wind, solar, or biomass. He also identified obstacles to obtaining financing for renewable energy projects including the price of competing energy resources and the cost of transporting renewable energy to distant markets.

Opportunities for interstate cooperation on renewable energy projects. The committee heard testimony about transmission and other energy infrastructure needs affecting Colorado and the surrounding states. For example, eastern Colorado, New Mexico, and Wyoming share a wind resource zone that lacks an adequate energy transmission system. The committee discussed opportunities to share the cost of building transmission lines with other states to help wind energy producers sell their power to distant markets. Committee members expressed an interest in meeting with officials from surrounding states during the legislative interim to discuss opportunities to cooperate on mutually beneficial renewable energy infrastructure projects.

Colorado's 2007 legislation for renewable energy and infrastructure development. House Bill 07-1279, signed by the Governor, specifies that machinery used to produce electricity from renewable resources, including wind energy, is exempt from the Colorado sales and use tax. It also exempts machinery that is used in a facility that obtained a power purchase agreement with an energy provider between February 5, 2001, and November 7, 2006. House Bill 07-1150, signed by the Governor, creates the Colorado Clean Energy Development Authority which will issue loans and grants to increase the production and consumption of clean energy resources including biodiesel, biomass, ethanol, zero emission generation technology, renewable resources, and integrated gasification combined cycle generation (IGCC) facilities. The law allows the General Assembly to appropriate up to $8 million annually to service the debt for bonds issued by the authority. Senate Bill 07-246, signed by the Governor, creates the Clean Energy Fund to advance energy efficiency and renewable energy throughout Colorado including assisting transfers of technology into the marketplace; providing incentives to purchase and distribute energy efficient and renewable energy products; and implementing energy efficiency projects. This law transfers $9.5 million to the Clean Energy Fund at the end of FY 2007-08 that would otherwise be transferred to the General Fund.

Private Financing for Renewable Energy

According Venture One, a unit of Dow Jones Newswires, over $1 billion was invested in alternative energy-related technologies in 2006. Staff with the National Renewable Energy Laboratory explained that biofuels are attracting a large portion of this venture capital. For example,

BP, formerly called British Petroleum, is investing $500 million over ten years in research into cellulosic ethanol and other biofuels. The Altira Group invests in companies that develop and commercialize energy technologies in the areas of natural resources, clean energy, and electric power. An official with this company described the challenge of obtaining money for renewable energy technology demonstration projects. He also described the importance of long-term government incentives and consistent regulations to encourage private investment in developing technologies. An official with the National Renewable Energy Laboratory described the funding gaps that limits private sector investment in clean energy technology. He explained that an equity funding gap occurs where the new technology has been developed but is not part of a market driven business. Another funding gap occurs after the technology is part of a business but is unable to expand due to financing limits.

Power purchase agreements and renewable energy credits. A representative of Xcel Energy explained how the utility uses power purchase agreements to obtain renewable energy from independently owned power generators. This power helps the utility comply with the renewable energy requirements under Amendment 37. Renewable Choice Energy sells wind energy credits to organizations and individuals around the country. An official with this company described the market for renewable energy credits purchased by power users wanting to use energy from wind and other renewable resources.

Federal Renewable Energy Legislation

The committee met with Representative Diana DeGette, Vice-Chair of the U.S. House Energy and Commerce Committee, to learn about the committee's jurisdiction over renewable energy, global warming, and other energy issues. She described the provisions of the Clean Energy Act (H.R. 6) that she is sponsoring in the current 110th Congress. This bill repeals the tax credits for oil and gas production and provides a similar tax credit for renewable energy production. The committee also received a briefing on S. 672 that U.S. Senator Ken Salazar is sponsoring in the 110th Congress. This bill authorizes tax exempt financing for smaller renewable energy facilities.

APPENDIX

Summary of 2007 Renewable Energy and Energy Conservation Legislation

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor			
HB 07-1037 Natural Gas Distributors and Electric Utility Energy Efficiency *Rep. Levy* *Sen. Fitz-Gerald* Signed by the Governor	House Bill 07-1037 requires investor-owned natural gas distributors and electric utilities to adopt *demand-side management* (DSM) plans which include energy efficiency, conservation, load management, and demand response programs. Demand response programs encourage customers to change their energy consumption based on the price of energy or incentive payments from an energy provider. By September 30, 2007, the Public Utilities Commission (PUC) is required to start a rule-making process for natural gas distributors establishing: • an expenditure target of at least 0.5% of revenues being spent on DSM programs; • a savings target that is expressed in the amount of gas saved per expenditure; • procedures to recover DSM program costs without having to file a rate case; • a method of tying cost-recovery to the group (residential or non-residential) that is receiving the benefit of the DSM program; and • a bonus structure for utilities that achieve the commission's targets. For investor-owned electric utilities, the PUC is required to: • establish energy savings and peak demand reduction goals using specific guidelines and other factors identified by the PUC; • ensure that electric DSM programs are developed to give all classes of customers an opportunity to participate; and • ensure that DSM investments by utility providers are profitable by either implementing incentive mechanisms specified by the bill or by developing other incentive mechanisms. Within 12 months of rule promulgation, investor-owned gas distribution providers are required to begin implementing their DSM programs. These programs may target low-income households. Electric utilities must satisfy their energy savings and peak demand reduction goals by 2018. The utilities must submit an annual report to the PUC that documents expenditures and savings impacts. The PUC must submit an annual report to the General Assembly describing the effect of energy efficiency legislation and any recommendations to implement the DSM programs.	Public Utilities Commission in the Department of Regulatory Agencies Department of Law	The act appropriates $191,776 to the PUC from the PUC Fixed Utility Fund. It also appropriates $13,554 from this fund to the Department of Law.

Summary of 2007 Renewable Energy and Energy Conservation Legislation (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
HB 07-1060 Bioscience Research Grants *Rep. Riesberg* *Sen. Shaffer* Signed by the Governor	House Bill 07-1060 establishes, within the existing Bioscience Discovery Evaluation Grant Program, separate maximum grant amounts for research projects based on whether the project is funded by grants from the federal Small Business Innovation Research program (SBIR) or a federal Small Business Technology Transfer program (STTR). The grants are limited to: - $150,000 for each project that *is not* a SBIR or STTR project; and - $100,000 for each project that *is* a SBIR or STTR project. The bill allocates grant money appropriated from the Bioscience Discovery Evaluation Cash Fund as follows: • 20 percent to biofuel research projects that are not SBIR projects or STTR projects, and • 80 percent to SBIR or STTR projects. Seventy-five percent of this allocation must be used for life sciences research projects, and 25 percent for biofuel research projects.	Governor's Office of Economic Development	The act requires a transfer of $2.5 million from the General Fund to the Bioscience Discovery Evaluation Cash Fund. These moneys are then to be appropriated to the Governor's Office of Economic Development.
HB 07-1087 Wind for Schools Grant Program *Rep. Kerr* *Sen. Romer* Signed by the Governor	House Bill 07-1087 establishes the Wind for Schools Grant Program to fund wind energy projects at qualified public schools and community colleges. Grants are limited to $5,000 per school. The program will be administered by the Office of Energy Management and Conservation.	Governor's Office of Energy Management and Conservation	The law requires the Office of Energy Management to spend $50,000 of federal funds for the program within its existing budget.
HB 07-1145 Renewable Energy Development on State Lands *Rep. Merrifield* *Sen. Gordon* Signed by the Governor	House Bill 07-1145 requires the State Board of Land Commissioners to examine land under its control and to identify land suitable for developing qualified renewable energy resources. In conducting this examination, the board is required to collaborate with the National Renewable Energy Laboratory, the University of Colorado, Colorado State University, and the Colorado School of Mines. The board must also collaborate with the Office of Energy Management and Conservation to ensure that potential renewable energy resource developers are aware of any lands suitable for renewable energy resource development. The board is also authorizes the board to lease renewable energy resources.	State Board of Land Commissioners Governor's Office of Energy Management and Conservation	This law may increase state revenue from new leases if the study identifies additional lands that are suitable for resource development.

Summary of 2007 Renewable Energy and Energy Conservation Legislation (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
HB 07-1146 Energy Conservation Building Codes *Rep. Levy* *Sen. Gordon* Signed by the Governor	House Bill 07-1146 requires boards of county commissioners and municipal governing boards that have a building code in place to adopt and enforce a building energy code that meets or exceeds the 2003 International Energy Conservation Code standard, or any successor edition, by July 1, 2008. The energy code applies to the construction of, and the renovation and additions to, all commercial and residential buildings. The act exempts certain buildings from the energy code. The Governor's Office of Energy Management and Conservation is required to provide information that explains the requirements and compliance methods of the energy code to builders, designers, engineers, and architects. It must also provide technical assistance to local governments regarding the function and enforcement of the code.	Governor's Office of Energy Management and Conservation	No appropriation is required.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
HB 07-1150 Creation of the Colorado Clean Energy Development Authority *Rep. Cory Gardner* *Sen. Kester* Signed by the Governor	House Bill 07-1150 creates the Colorado Clean Energy Development Authority which will issue loans and grants to increase the production and consumption of clean energy resources including biodiesel, biomass, ethanol, zero emission generation technology, renewable resources, and integrated gasification combined cycle generation (IGCC) facilities. The nine-member authority board is comprised of the State Treasurer, the Director of the Colorado Office of Economic Development; the Commissioner of Agriculture; the Director of the Governor's Office of Energy Management; an appointee of the Governor; and four appointees of the House and Senate leadership who have expertise in the public utility industry, clean energy development, and major project financing. The authority's powers include: • financing projects; • issuing and refunding bonds; • entering into contracts and financing agreements; • issuing loans and other financing agreements; • receiving gifts, grants and donations; • enter into contracts or agreements as necessary; and • selling notes, bonds, loans or any other secured or unsecured obligations. The act prohibits bonds or other obligations that are to be paid from or secured by tax revenue. Unless voters of the state have approved bonds or other obligations, no moneys in the fund other than those specifically earmarked for that purpose may be used to pay or secure bonds or other obligations. Voter approval is also required for the authority to incur a multi-year obligation. The act allows the General Assembly to appropriate up to $8 million annually to service the debt for bonds issued by the authority. The authority is required to report annually to the General Assembly concerning bond that its seeks to issue with a state obligation to repay the debt.	None. The Colorado Renewable Energy and Infrastructure Authority is independent of any state agency.	The act creates the Colorado Renewable Energy and Infrastructure Development Authority Operational Fund. However, the act is silent on the amount of money to be appropriated to the fund or its source.
HB 07-1169 Net Metering for Cooperative Electric Associations *Rep. Solano* *Sen. Shaffer* Signed by the Governor	House Bill 07-1169 requires cooperative electric utilities and customer-generators to comply with the Public Utilities Commission's interconnection standards for net metering systems. These systems enable a customers' electricity consumption to be offset by electricity that they generate from renewable energy resources including solar, wind, biomass, or hydro-power resources.	Public Utilities Commission in the Department of Regulatory Agencies	No state fiscal impact.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
HB 07-1203 Energy Management and Conservation Studies *Rep. Fischer* *Sen. Romer* Signed by the Governor	House Bill 07-1203 finds that Colorado can realize substantial economic benefits by helping to satisfy the nation's need for alternative energy sources and for the mitigation of greenhouse gas emissions. The act declares that the Governor's Office of Energy Management and Conservation is best able to help Colorado meet these needs and it encourages the Governor's Office to set a high priority on funding for: • a county-level appraisal of greenhouse gas mitigation and potential for carbon sequestration which removes carbon dioxide from the atmosphere and places it in long-term storage; and • creation of a Colorado energy profile that analyzes Colorado's current and projected future energy resources.	Governor's Office of Energy Management and Conservation	No state fiscal impact.
HB 07-1228 Renewable Energy Fuels and Production *Rep. Cory Gardner* *Sen. Shaffer* Signed by the Governor	House Bill 07-1228 requires the Department of Personnel and Administration to purchase flexible fuel vehicles by 2008 unless they cost more than 10 percent over the cost of comparable non-flexible fueled vehicles. Flexible fuel vehicles can run on either petroleum gasoline or on an E85 ethanol blend. An E85 ethanol blend is made up of 85 percent ethanol and 15 percent petroleum gasoline. The act requires the Division of Oil and Public Safety in the Department of Labor and Employment to establish uniform regulations for above-ground storage tanks that hold renewable fuels. It also requires the Public Utilities Commission to establish incentives for consumers who produce distributed generation, including small wind turbines, thermal biomass, electric biomass, and solar thermal energy.	Department of Regulatory Agencies Division of Oil and Public Safety in the Department of Labor and Employment	The act requires appropriations from the General Fund of $8,400 to the Department of Regulatory Agencies and an appropriation of $35,653 from the Petroleum Storage Tank Fund to the Department of Labor and Employment.
HB 07-1279 Machinery Exempt from Sales and Use Tax *Rep. McKinley* *Sen. Romer* Signed by the Governor	House Bill 07-1279 specifies that machinery used to produce electricity from renewable resources, including wind energy, is exempt from the Colorado sales and use tax. It also exempts machinery that is used in a facility that obtained a power purchase agreement with an energy provider between February 5, 2001 and November 7, 2006. The bill applies to all audits, assessments, appeals, refund claims and transactions pending on or after the bill's effective date. This bill addresses a ruling from the Colorado Department of Revenue concerning the sales and use tax exemption for machinery. Prior to November 6, 2007, Colorado machinery manufacturers entered into contracts with the expectation, based upon regulatory direction from the department, that machinery used to produce electricity was tax-exempt. After these contracts had been executed, a subsequent regulatory reversal of this decision was made by the department and has resulted in the assessment of back taxes to these companies.	Projects that receive Highway Users Tax Fund moneys Capital construction projects	This act reduces General Fund revenue by $18 million from FY 2006-07 through FY 2008-09.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
HB 07-1281 Increase Renewable Energy Standard *Reps. Pommer and Witwer* *Sen. Schwartz* Signed by the Governor	House Bill 07-1281 increases the renewable energy requirements approved by Colorado voters in 2004 (Amendment 37) to include all utilities, except municipally-owned utilities serving fewer than 40,000 customers, and defines "eligible energy sources" to include recycled energy. The law raises the standard for electricity generation from eligible energy sources for investor-owned utilities from: • 3 to 5 percent for 2008 through 2010; • 6 to 10 percent for 2011 through 2014; • 10 to 15 percent for 2015 though 2019; and • 10 to 20 percent for 2020 and after. The law also establishes a new standard for electricity generation from eligible energy sources for rural electric cooperatives and municipally-owned utilities serving over 40,000 customers: • 1 percent for 2008 through 2010; • 3 percent for 2011 through 2014; • 6 percent for 2015 through 2019; and • 10 percent for 2020 and after.	Public Utilities Commission in the Department of Regulatory Agencies	No state fiscal impact.
HB 07-1309 Use Interest on Severance Tax to Increase Energy Efficiency in Public Schools *Rep. Weissmann* *Sen.* Tupa Signed by the Governor	House Bill 07-1309 requires estimated tax payments and withholding for oil and gas severance taxes to be made on a monthly basis, rather than quarterly. The bill also specifies that payments are to be made electronically. The additional interest earned from making monthly payments will be deposited into the Public School Energy Efficiency Fund, up to a maximum of $1.5 million annually. Money in the fund is continuously appropriated to the Governor's Office of Energy Management and Conservation for energy efficiency projects and programs in public schools. In administering the program, the office is required to consider whether schools are located in areas affected mineral development. The 2007 Interim Committee to Study the Allocation of Severance Tax and Federal Mineral Lease Revenue (created in Senate Joint Resolution 07-42) is required to study the allocation of the revenue generated from the monthly payments. Legislative Council Staff is required to determine the additional interest earnings generated by the bill and to notify the State Treasurer of the amount on a quarterly basis, which will be deposited into the Public School Energy Efficiency Fund. The calculation and distribution of additional interest will begin on December 1, 2007, and continue every three months thereafter until September 1, 2012.	Governor's Office of Energy Management and Conservation Department of Revenue	Department of Revenue will require a $2,722 General Fund appropriation. The act appropriates $489,000 from the Public School Energy Efficiency Fund to the Governor's Office of Energy Management and Conservation in FY 2007-08.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
SB 07-051 High Performance State Buildings *Sen. Gordon* *Reps. Witwer and Levy* Signed by the Governor	Senate Bill 07-51 requires the Department of Personnel and Administration to consult with the Colorado Commission on Higher Education to adopt a "high performance standard certification program" for state building projects. The program must: • include quantifiable and verifiable standards; • reduce long-term operating costs (e.g., energy, water consumption); • recoup increased initial costs within 15 years through lower operating costs; • improve indoor environmental quality; • encourage the use of local building products and materials; and • comply with the federal standards for historic properties. This act applies to facilities that: (1) are substantially renovated, designed, or constructed with state moneys; (2) are at least 5,000 gross square feet; (3) include heating, ventilation, or air conditioning systems; and (4) have not entered a design phase prior to January 1, 2008. The act affects any renovation that exceeds 25 percent of the property's value. It exempts certain projects including historic buildings, projects that cannot reduce operating cost enough to recoup the initial costs within 15 years; and those that substantially increase the cost of the building or other extenuating circumstances. The department is required to report annually to the Capital Development Committee regarding the high performance standard certification program.	Department of Personnel and Administration Colorado Commission on Higher Education	The law will likely affect state expenditures, but its impact cannot yet be quantified.
SB 07-091 Renewable Resource Generation Development Areas *Sen. Schwartz* *Rep. Massey* Signed by the Governor	Senate Bill 07-91 creates a 16-member Task Force on Renewable Resource Generation Development Areas to identify areas in Colorado with potential to support competition among developers for renewable energy projects. The task force must consider: • the use of enterprise zones in the development of these areas; • the transmission needs of these areas to locations where customers can use the renewable resources; and • the potential development of various renewable resources.	Governor's Office of Energy Management and Conservation	Task force funding is expected to come from gifts, grants, and donations. No appropriation is needed but expenditures are estimated to be $45,411.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
SB 07-100 Transmission Facility Development in Energy Resource Zones *Sen. Fitz-Gerald* *Rep. McFadyen* Signed by the Governor	Senate Bill 07-100 requires regulated electric utilities to biennially review designated *Energy Resource Zones* where transmission constraints hinder the delivery of electricity. The law requires utilities to submit plans for the construction of additional transmission capacity in these zones to the Public Utilities Commission (PUC). The PUC is then required to grant or deny certificates of public necessity and convenience within 180 days if: • the construction or expansion is required to ensure reliable delivery of electricity or to enable the utility to meet the state's renewable energy standards; and • public convenience and necessity require such construction or expansion. The law allows utilities to recover costs during construction through a rate adjustment clause.	Public Utilities Commission in the Department of Regulatory Agencies	No state fiscal impact.
SB 07-126 Renewable Energy Authority within the Governor's Office *Sen. Keller* *Rep. Pommer* Signed by the Governor	Senate Bill 07-126 appropriates revenues that would otherwise be appropriated directly to the Colorado Renewable Energy Authority to the Governor's Office of Energy Management and Conservation. The office is then required to distribute the funds to the authority. HB 06-1322 appropriated $2.0 million annually to the Colorado Renewable Energy Authority. However, appropriations may not be made directly to entities that are not state agencies. This act clarifies the moneys go to the Governor's Office of Energy Management and Conservation and is then distributed to the authority.	Governor's Office of Energy Management and Conservation	No appropriation is required.
SB 07-145 Renewable Energy Fixtures Incentives *Sen. Tupa* *Rep. Gibbs* Signed by the Governor	Senate Bill 07-145 allows a county, city and county, or municipality to offer either a property tax or sales tax credit or rebate to residential or commercial property owners who install a fixture on their property that produces electricity from renewable resources, including photovoltaic, solar thermal, small wind, biomass, or geothermal systems.	None	No state fiscal impact.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Signed by the Governor (Cont.)			
SB 07-246 Clean Energy Fund *Sen. Fitz-Gerald* *Rep. Buescher* Signed by the Governor	Senate Bill 07-246 creates the Clean Energy Fund and capitalizes it with money from the Limited Gaming Fund that would otherwise be transferred to the General Fund at the end of the fiscal year under current law. This act transfers $9.5 million to the Clean Energy Fund at the end of FY 2007-08 that would otherwise be transferred to the General Fund. The bill also transfers to the Clean Energy Fund unexpended moneys at the end of the fiscal year received by the Governor's Office of Energy Management and Conservation to fund home energy efficiency improvements for low-income households. The act authorizes the Governor's Office of Energy Management and Conservation to use moneys in the Clean Energy Fund to advance energy efficiency and renewable energy throughout Colorado including: • attracting investment from the renewable energy industry; • assisting transfers of technology into the marketplace ; • providing incentives to purchase and distribute energy efficient and renewable energy products; • implementing energy efficiency projects; • aiding governmental agencies in greening government initiatives; • removing regulatory barriers to implement renewable energy technology; and • serving any other manner that advances energy efficiency and renewable energy. The act requires all income and interest earned on moneys in the Clean Energy Fund to be credited to the fund and that all moneys remaining in the fund at the end of the fiscal year remain in the fund. It also requires the General Assembly to conduct a post-enactment review of the act to determine whether it advances energy efficiency and renewable energy.	Governor's Office of Energy Management and Conservation	The act requires a transfer of $9.5 million from the Limited Gaming Fund to the Clean Energy Fund. These moneys are then to be continuously appropriated to the Governor's Office of Economic Development.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Postponed Indefinitely			
HB 07-1191 Property Tax Exemption for Alternative Energy Generating Facilities *Rep. May* *Sen. Harvey* Postponed indefinitely in House Finance	Starting in 2008, House Bill 07-1191 would have exempted alternative energy generating facilities from the business personal property tax. The amount of the tax exemption would have been 25 percent in 2008, 50 percent in 2009, and 100 percent in 2010 and each year thereafter.	Division of Property Taxation in the Department of Local Affairs.	No appropriation was required to implement the bill in FY 2007-08.
HB 07-1268 Use Interest on Severance Tax to Increase Energy Efficiency in Public Schools *Rep. Weissmann* *Sen. (none)* Postponed indefinitely in House Finance	House Bill 07-1268 would have required oil and gas producers to pay the severance tax monthly. Under current law, severance tax withholding by oil and gas producers is paid quarterly. The additional interest earned from monthly withholding would have been deposited into the Public School Energy Efficiency Fund to pay for public school energy efficiency programs and projects. The amount deposited would have been limited to $1.5 million annually. Any interest earnings above this amount would have been divided equally between the Severance Tax Trust Fund and the Local Government Severance Tax Fund, as specified under current law. Legislative Council Staff would have been required to estimate the additional interest earnings and notify the State Treasurer of the amount to be transferred to the Public School Energy Efficiency Fund. House Bill 07-1309, also sponsored by Representative Weissmann, includes provisions similar to HB 07-1268.	Governor's Office of Energy Management and Conservation Department of Revenue Legislative Council Staff	No appropriation was required to implement the bill in FY 2007-08. The Governor's Office of Energy Management and Conservation would have had continuous spending authority to use any interest earnings received.
SB 07-147 Requirement for Alternative Fuels in Gasoline *Sen. Shaffer* *Rep. (none)* Postponed indefinitely in Senate State, Veterans & Military Affairs	Starting in 2008, Senate Bill 07-147 would have required that at least 75 percent of gasoline sold in Colorado from November through April contain at least 10 percent alternative fuel that is made from non-petroleum products. Gasoline dealers would have had to state monthly the total volume of gasoline and alternative fuel sold, and the Department of Labor and Employment would have been required to verify that the gasoline sold in Colorado complied with the requirement. The department was allowed to assess up to $500 per month in fines against dealers who did not comply with the alternative fuel requirement.	Department of Labor and Employment Department of Law	The bill required a $208,122 General Fund appropriation to the Department of Labor and Employment. It also required a $9,759 cash funds exempt appropriation to the Department of Law.

Summary of Renewable Energy and Energy Conservation Legislation in 2007 (Cont.)

Bill No. / Short Title/ Sponsor (s) / Status	Bill Summary	Department(s) with Expenditure Impact	Total FY 2007-08 Expenditure Impact
Postponed Indefinitely (Cont.)			
SB 07-238 Ethanol Biodiesel Fuel Clean Energy *Sen. Shaffer* *Rep. Fischer* Postponed indefinitely in Senate Appropriations	Senate Bill 07-238, as introduced, would have established renewable fuel standards for diesel and gasoline based on Colorado production levels of biodiesel and ethanol respectively. It required the Department of Labor and Employment to notify dealers when production of these fuels reaches the required levels. For ethanol, production must be at least 115 million gallons. Ninety days after this threshold was reached, gasoline would have had to contain at least 10 percent ethanol by volume. For biodiesel, annualized production would have been required to reach: • 5 million gallons for a 3 month period. Ninety days after that threshold was reached, diesel fuel must contain at least 2 percent renewable diesel fuel by volume; and • 15 million gallons for a 3 month period. Ninety days after that threshold was reached, diesel fuel must contain at least 5 percent renewable diesel fuel by volume. The bill required the Executive Director of the Department of Labor and Employment to adopt rules for the composition of renewable diesel fuel sold in Colorado. The department would have been authorized to test any renewable diesel for compliance with these standards. If the bill had passed, the Venture Capital Authority would have been required to use its moneys for clean energy development in Colorado. Clean energy includes energy produced from biodiesel, biomass, clean coal, ethanol, solar, wind, hydropower, and geothermal. The Venture Capital Authority was created in 2004 and is funded by an allocation of $50 million in tax credits which were sold to insurance companies. The bill required a post-enactment review of the renewable fuel requirement in 5 years by the legislative service agencies.	Division of Oil and Public Safety in the Department of Labor and Employment Air Quality Control Commission in the Department of Public Health and Environment Legislative Service Agencies of the Colorado General Assembly	The bill requires a General Fund appropriation of $125,075 and 1.5 FTE to the Division of Oil and Public Safety and $12,465 and 0.2 FTE to the Air Quality Control Commission.