



Colorado Springs Utilities
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Colorado Springs Utilities' Evaluation of Potential Options to Meet the CO₂ Reduction Goals of the Colorado Climate Action Plan June 1, 2009

Executive Summary

Colorado Springs citizens have high expectations for their local utility. In addition to safe, reliable, low-cost service, they want to know that the beauty of the Pikes Peak region is being preserved for their children and grandchildren.

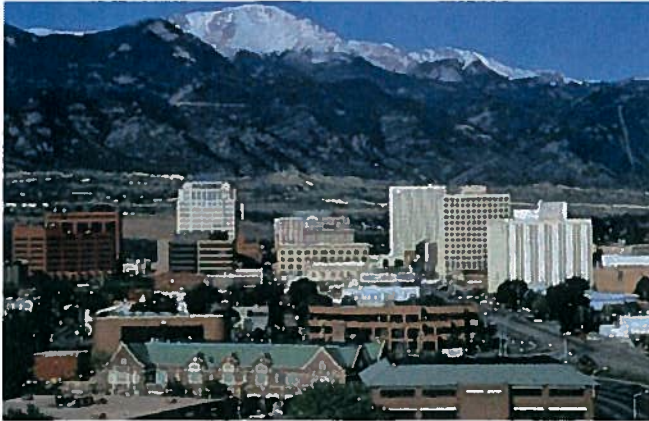
That's why environmental stewardship has been an integral part of our business for decades. We believe that being environmentally focused goes beyond complying with regulations. It means managing our operations in a way that helps protect our air, water, land and natural resources now and for future generations. It also means partnering with other organizations and agencies to find solutions to environmental issues in our community.

Over the past several years, Colorado Springs Utilities has been engaged in such a partnership with the Colorado Governor's Energy Office (GEO). In 2007 the GEO engaged Colorado's municipal utilities for the purpose evaluating various supply-side and demand-side options which may allow utilities to achieve a 20% reduction of CO₂ emissions from 2005 levels by the year 2020, as called for in Governor Ritter's Colorado Climate Action Plan.

This report represents an analysis of the potential CO₂ reduction options available to Colorado Springs Utilities. Our analysis found that a 20% reduction in CO₂ below 2005 levels by 2020 could be achieved by employing such options as additional investment in Demand-Side Management resources (DSM), increased use of renewable energy, and by fuel switching from coal to natural gas. The precise mix of options ultimately employed would depend greatly on factors including growth in system load, changes in commodity prices and new legislation or mandates.

For the purposes of this analysis we did not look at financial impacts on our customers as a limiting factor as to whether or not a 20% CO₂ reduction goal by 2020 is ultimately a good policy. However, it should be noted that our analysis does show that achieving such a goal could result in an increase of 15% to 27% to the average residential monthly electric bill through 2020 when compared with options which do not require reductions in CO₂ emissions.

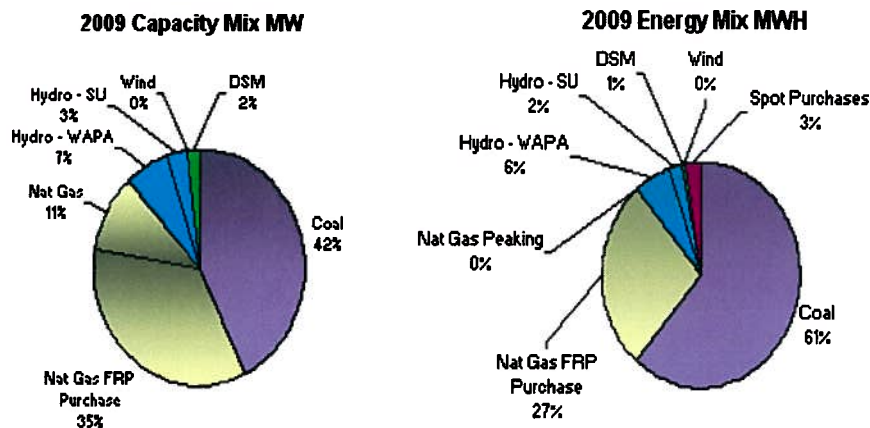
About Colorado Springs Utilities' Electric Service



The City of Colorado Springs, Colorado is a home rule municipal corporation, and has established Colorado Springs Utilities as an enterprise of the City with a mission to provide safe, reliable and competitively priced electricity, natural gas, water, and wastewater services to the Pikes Peak Region. Colorado Springs Utilities' electric system provides retail service to approximately 220,000 customers

over 500 square miles in Colorado Springs, Manitou Springs, Chipita Park, Green Mountain Falls, parts of Security, and some other unincorporated areas of El Paso and Teller Counties. This service includes special contract power to Fort Carson, Peterson Air Force Base, Cheyenne Mountain Air Station, and the United States Air Force Academy.

As noted in the 2007 Operating Statement, Colorado Springs electric system peak of 863 megawatts (MW) was established in August 2007, with a load factor of 63.1%. Colorado Springs Utilities meets its capacity and energy requirements through self-generation and long-term purchase power agreements. The Utility owns and operates 462 MW of coal, 34 MW of hydro and 115 MW of natural gas and oil-fueled generation systems. Long-term, firm contracts include Western Area Power Administration (WAPA) hydro contracts of 118 MW (winter) and 75 MW (summer), a wind contract (1 MW) and a long-term power purchase contract from a 480 MW natural gas-fired combined-cycle facility owned by Front Range Power (increasing each year to nearly all of the capacity by 2013).



2005 Baseline Emissions

For the Colorado Climate Action Plan, Colorado Springs Utilities established its baseline on all emissions which can be influenced by Colorado Springs Utilities. The baseline included emissions from all utility owned generation assets (including generation for off-system sales) and emissions estimates for purchased power. This method may lead to some “double-counting” of emissions state-wide, as other utilities may choose to count emissions from power sold to or purchased from Colorado Springs. The selected baseline was 4.75 million tons CO₂ and the 2020 goal is 3.8 million tons of CO₂.

Colorado Springs Utilities’ Current Emission Reduction Efforts

Prior to the announcement of the Colorado Climate Action Plan, Colorado Springs Utilities had been engaged in a number of efforts to reduce CO₂ emissions from its electric generation portfolio. These efforts include the utilization of clean, non-emitting hydroelectric power from both our own hydroelectric system and a continued partnership with WAPA for large hydroelectric power purchases, expanding our participation in renewable energy projects, along with a robust commercial and residential DSM program.

Since 1905, Colorado Springs Utilities has utilized clean, non-emitting hydroelectric power and today approximately 10% of our electric capacity comes from hydroelectric sources. Currently, Colorado Springs Utilities can produce about 3% of its energy from its own hydroelectric resources which include: Tesla Plant (28 MW) and Manitou and Ruxton units (5.46 MW). We also purchase federal hydroelectric power from WAPA (98 MW winter and 75 MW summer) equal to approximately 7% of our resource portfolio mix. As a result, Colorado Springs Utilities enjoys a smaller carbon footprint than utilities without access to similar hydroelectric resources.



In addition to our non-emitting hydroelectric resources, Colorado Springs Utilities has long invested in other forms renewable energy. In 1998, Colorado Springs created a Green Power Program whereby we purchase 1 MW of wind power from Xcel Energy. In 2006, in response to the direction from our board and growing customer demand for energy from renewable sources, Colorado Springs Utilities entered into a contract for a large scale purchase of Renewable Energy Credits from WAPA; RECs are the property rights to the environmental benefits from generating electricity from renewable energy sources, such as solar, wind, geothermal, biomass or hydroelectricity. For \$0.34 per REC (100 kilowatt hour), customers can help offset their electric usage and lower their carbon footprint.

Further building on the positive customer demand for renewable energy projects, Colorado Springs Utilities established one of Colorado's first incentive programs for distributed solar generation projects offering \$3.75 per kilowatt (kW) for residential and commercial installations of solar generation up to 10 kW and 25 kW, respectively. We are proud to say that since 2006 nearly 189 kW of solar energy has been installed by our customers resulting in 300 MWh of clean energy.



Along with our expanded efforts in renewable energy, Colorado Springs Utilities has long standing DSM programs available to our customers. We are continuing to expand our residential rebate programs for the installation of such items as insulation, air sealing and residential solar hot water. In addition, we offer major energy efficiency programs including a Business Lighting Rebate Program; a Retail CFL Program with discounts for the purchase of CFLs in large retail outlets; and we have installed and are continuing to install LED traffic signals throughout the City.

We have successfully combined these efficiency measures with our robust Demand Response programs for peak demand reduction including our Peak Demand Rebate Program for medium and large commercial customers; our Air Conditioning Load Cycling Program for residential customers; our Kilowatcher Program; and our peak Curtailment Rate for customers with on-site generation.

Taken together, our efficiency and demand response programs resulted in overall energy savings in Colorado Springs of 6.66 MW and 14,543 MWh in 2008. We credit the success of such programs with assisting the delay of our need to build new generation assets and thus avoiding any emissions we would have otherwise incurred.

Potential Future Emissions Reduction Projects

In spite of the success enjoyed by Colorado Springs Utilities in managing its CO₂ emissions, the fact of the matter remains that additional programs and projects will be needed if we are to achieve a 20% CO₂ reduction goal by 2020 as called for in the Colorado Climate Action Plan. While numerous options exist that would allow Colorado Springs Utilities to achieve these reductions, our analysis finds that we would need to continue to reduce our community's electric consumption through expanded DSM programs; and we would need to continue adding more renewable energy assets to our portfolio. Other necessary options include: utilizing biomass as a net carbon reducing fuel source, taking advantage of smart grid technologies as they develop, utilizing future CO₂ capture technologies, and leveraging our natural gas fired generation assets.

Among the simplest options to reduce Colorado Springs' CO₂ profile is to continue reducing the amount of energy our community needs. In response, we will be looking to expand upon our successful DSM programs. Presently, Colorado Springs Utilities is completing a DSM Potential Study, and, when complete, Colorado Springs will have a good picture of what additional DSM projects will result in the most energy savings for the least cost to our ratepayers.

Another simple and available option to achieve CO₂ emissions reductions is to add more renewable energy to our portfolio. Presently, Colorado Springs Utilities is undertaking several projects to achieve this goal including finalizing the installation of our Cascade hydro plant, which when finished, will deliver an additional 850 kW of clean, non-emitting hydroelectric energy to our service territory by the end of 2009. As we continue to expand our water delivery infrastructure we will look for ways to add additional hydroelectric assets where feasible.

However, expanded DSM projects and additional hydropower assets will only play a small role in helping us potentially make a 20% CO₂ reduction and our analysis indicates significant amounts of additional renewable energy will be needed to achieve the goal. In response to this demand, and to achieve our RPS requirements, Colorado Springs Utilities is currently negotiating a Purchase Power Agreement whereby we may take delivery of up to 50 MW of wind power in early 2011.



Further, we are working with the Air Force Academy to install 1-3 MW of solar power from a project funded by the American Recovery and Reinvestment Act. We are actively working with the military on new partnerships around renewable energy, with a goal of helping local military installations achieve their goal of net zero greenhouse gas emission before 2020.

Beyond traditional DSM programs and conventional renewable energy project, Colorado Springs Utilities is also looking to achieve significant CO₂ reductions by utilizing new fuels and technologies at its existing coal-fired generators and taking advantage of the development of smart grid technologies.

Among the key CO₂ reduction programs we are examining are the co-firing of woody biomass Martin Drake Power Plant. We are currently pursuing biomass funding grants, fuel supply contracts, and permits from the State of Colorado to burn up to 15% biomass in existing coal units. Using biomass is a good CO₂ reduction tool because coal is offset with wood fuel. Replacing dead timber with new trees results in a carbon neutral process.



Also, Colorado Springs Utilities is poised to take advantage of smart grid technologies. Since 2005, we have replaced more than 80% of the utility meters in Colorado Springs with new, automated meters and network communication system (AMI). The AMI installation has laid the foundation for future two-way communication with customers for the potential of load control, near real-time customer energy/capacity usage and time of use rates. The remaining AMI installations are expected to be completed by mid-2010.

While it is difficult to accurately predict the CO₂ emissions reduction attributable to such technologies, we view such advances as key ties that will bind more distributed renewable generation with an efficient distribution grid, developments that, in the long run, will further diminish our need to build new generation sources.

Additionally, Colorado Springs Utilities is positioning itself to take advantage of carbon capture and sequestration (CCS) technologies once they fully develop. In our view, CCS technologies could enable the most significant and most affordable reductions in power plant CO₂ emissions in future years. Currently, CCS work is being initiated by EPRI and others across the United States. Colorado Springs Utilities is presently working with Colorado Springs-based Neumann Systems Group on advanced SO_x scrubbing technology that may be used to capture and process CO₂ in the future. As this technology matures and as carbon costs increase, economics will influence the future use of these devices in coal and natural gas power plants.



Ultimately, while none of aforementioned options by themselves will allow Colorado Springs Utilities to potentially reach the CO₂ reduction goals called for in the Colorado Climate Action Plan, one option does stand out as the most likely option to be utilized by Colorado Springs in the short term – fuel switching from coal to natural gas. Colorado Springs Utilities operates both coal-fired and gas-fired electrical generating assets. The

easiest method for our electric utility to reduce its greenhouse gas emissions is to increase the use of natural gas and decrease the use of coal in the energy supply.

While this option is available and must be part of an overall portfolio to meet the Climate Action Plan goal, we note that fuel-switching is not a sustainable option. In addition to the higher and more volatile cost of natural gas compared to coal, natural gas resource supplies are generally thought to be far more limited than coal supplies. Diverting natural gas resources from efficient uses, such as heating, to electric generation could further increase cost and decrease supplies. Colorado Springs Utilities will work to assure a diverse and sustainable portfolio of electric resources.

Potential Constraints to Implementation

While we acknowledge the potential exists for Colorado Springs Utilities to meet the Colorado Climate Action Plan goals, we also acknowledge several potential barriers stand in the way. Among these barriers are the challenges of large scale integration of intermittent renewable resources, saturation points of DSM programs, and limited or delayed technology advances.

First, the challenges surrounding renewable energy cannot be overlooked. Wind integration challenges limit the amount of wind that can be reliably and cost-effectively interconnected with the electric system, and solar costs need to be more competitive to be seriously considered in a CO₂ reduction option analysis. The lack of affordable energy storage options for renewable power is a barrier for both wind and solar technologies. Concerning DSM programs, while they offer tremendous promise, utilities have no control over whether or not customers will accept the programs offered by utilities.

Further, as consumer behaviors and markets evolve, the cost and penetration of DSM energy efficiency programs will vary with time. The vagaries of consumer behavior are among the many factors in making it difficult to determine the sustainability of certain DSM projects.

Colorado Springs Utilities is placing a great deal of emphasis on the development of new technology, especially clean coal technology, since technical advances for baseload generation after the year 2020, such as for nuclear power, solar, carbon capture and sequestration may reduce some of the greatest barriers to achieving significant CO₂ reductions. However, according to conservative estimates, the deployment of the most promising carbon capture and sequestration projects cannot be expected to come online for at least another decade.

Estimated Costs of Implementation

The estimated increase in costs for residential customers in Colorado Springs associated with meeting the goals outlined in the Colorado Climate Action Plan is significant. To achieve the 20% reduction in CO₂ emissions from 2005 levels by the year 2020, residential bills are estimated to increase by 15% to 27% over portfolios which do not currently required CO₂ reductions. Further, we are concerned that our business customers will bear an even greater share of these cost increases. At a time when Colorado Springs is loosing many energy intensive customers, we worry about the economic impact such policies will have on our community. Finally, though we did not factor in financial impacts to the customer as a constraining factor as to whether or not achieving a 20% by 2020 reduction goal was technically possible, the fact of the matter is that cost will ultimately determine if, how and when any large-scale reduction in CO₂ will actually be made.



Conclusions

While a 20% reduction of greenhouse gas emissions is technically attainable, achieving such a goal by 2020 would come at a significant cost to the consumer. However, overall costs are highly dependant on future environmental legislation, load forecast assumptions, commodity prices, technology improvements and customers' willingness to embrace DSM programs.

Ultimately, potential emission reductions will demand the utilization of a flexible range of options. As a result, we will continue to innovate our way forward and strive to exceed our customers' expectations as we carefully steward every electron in the delivery of our electric utility services.