

Charting a New Path for Colorado's Electricity Generation and Use



Colorado's energy future is at a crossroads

One path leads to increased dependency on fossil fuels—threatening our economy and fueling global warming. The other leads to a new, smarter energy future for Colorado. Investing in clean energy alternatives—like solar and wind power—can create and protect jobs in Colorado, save families and businesses money, and make America more energy independent. Clean energy is also the most effective solution to the threat of global warming. We can start making progress right away using proven technology, and then draw on American innovation to take us the rest of the way with new technologies.

How does Colorado generate electricity today?

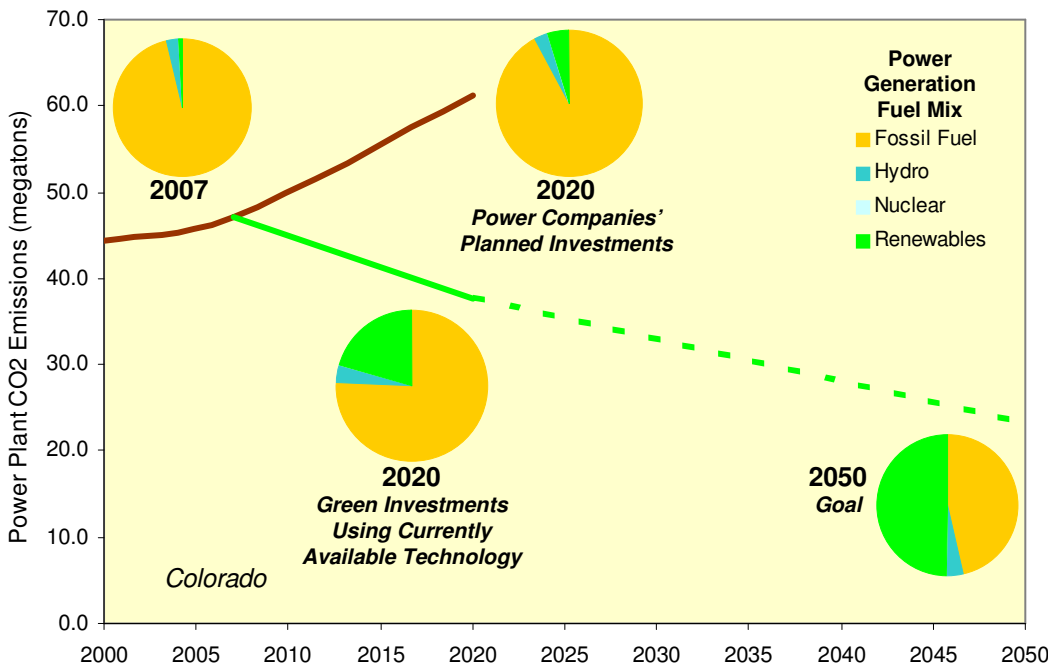
In 2007, electric power generated in Colorado primarily came from coal (72.4 percent), and gas (18.5 percent). Most utilities intend to continue relying heavily on fossil fuels in the coming decade. Colorado power companies plan to increase the energy generation from coal by 27.4 percent, gas by 12.1 percent. Only about 0.9 percent of electricity generated in Colorado is expected to come from renewable sources like wind, solar, geothermal, and biomass under current plans.

Colorado has a choice to invest in a cleaner energy future

Colorado can achieve a new energy future by making better investments as utilities replace increasingly aged infrastructure and expand capacity. An important first step is for Colorado to generate at least 20 percent of electricity from renewable sources by 2020, a goal readily achievable with today's technology. Continuing to convert 15 percent of the state's energy portfolio to renewable energy sources each decade could yield an energy profile of at least 65 percent renewables by 2050.

Colorado can also benefit from improved energy efficiency. Technologies are available that could reduce demand nationally by 20 to 30 percent over the next decade. Innovations in energy efficiency should allow us to keep demand constant after 2020, even as the population grows.

Today, Colorado is ranked 23rd in the nation for energy efficiency, largely because the state's utilities are already spending \$14 million annually to improve energy efficiency.



About the chart: 2000, 2007 and 2020 Power Companies' Planned Investments from CARMA 1.0 (www.CARMA.org). The 2020 Green Investments projection assumes that, using currently available technology, Colorado makes (1) improvements in efficiency to reduce overall demand by 25 percent and (2) shifts away from fossil fuels so that 20 percent of power generation is from renewable energy sources. The 2050 Goal assumes (1) hydro and nuclear are unchanged, (2) continued efficiency improvements keep total demand flat, and (3) renewable energy replaces at least 65 percent of power generation formerly done through fossil fuel burning. Note that the projection of future CO₂ emissions from fossil fuels assumes no investment in carbon capture and storage.

Making a Difference in Colorado

The Colorado Renewable Energy Collaboratory was formed in 2007 to help the state transition to sustainable and renewable energy sources. The National Renewable Energy Laboratory and three Colorado universities formed the Collaboratory, aiming to increase production and use of renewables, build a renewable energy economy, and educate the future renewable work force. So far, the Collaboratory has created two research centers, one for solar, and one for biofuels.

At the same time, businesses have started taking advantage of Colorado's vast wind power potential. Colorado is currently ranked 6th for total wind power production in the U.S., producing 1,066 megawatts annually. The Peetz Wind Farm in the northeastern part of the state is one of the largest wind farms in the country.



Sources:

<http://www.coloradocollaboratory.org/>

<http://www.awea.org/projects/>

http://denver.bizjournals.com/denver/stories/2007/05/14/daily29.html?from_yf=1

Making a dent in global warming pollution

Simply by shifting to renewable energy sources and improving energy efficiency over the next decade or so, Colorado can reduce its future carbon dioxide (CO₂) emissions from electricity generation by 39 percent compared to the business-as-usual path that utilities are following now.

Given that 43 percent of Colorado's CO₂ emissions come from electricity generation, diversifying and updating our power sources is critical for cutting the state's total global warming pollution.

Increasing Colorado's energy and economic security

Investing in renewable energy sources will reduce Colorado's dependence on fossil fuels and at the same time create new green collar jobs. A new energy future in Colorado could include:

Expanded solar power. Colorado has enough solar resources to produce 5,000 to 6,500 Whr per square meter using photovoltaic systems and 5,000 to 7,000 Whr per square meter using concentrating solar power systems. This means that devoting just 1 square mile in Colorado to

solar power can provide enough electricity for about 1,600 households each year.

Expanded wind power. Colorado is currently ranked 6th for wind power, with 1,067 MW of existing electricity generation capacity. The American Wind Energy Association ranks Colorado 11th in terms of its future wind potential, with 54,900 MW of potential capacity.

Biomass power. Colorado has 3.6 million dry tons of biomass available each year that could be used to generate about 700 MW of electricity.

Geothermal power. Colorado has 1 geothermal project under development, with the potential to produce as much as 10 MW of new power capacity.

New jobs. Committing to a 30 percent growth in solar energy use in the United States will bring 708 jobs and \$572 million investment to Colorado.

How does Colorado use electricity?

Colorado's energy is used to power:

- homes (34 percent),
- businesses (41 percent), and
- industry (25 percent).

Per capita residential electricity use is 3,557 kilowatt hours per year, 21 percent less than the national average.

References and Additional Reading:

American Council for an Energy-Efficiency Economy, www.aceee.org.

American Wind Energy Association, www.awea.org.

Bioenergy Feedstock Information Network, bioenergy.ornl.gov

CARMA (Carbon Monitoring for Action), www.CARMA.org.

Database of State Incentives for Renewables and Efficiency, www.dsireusa.org.

Department of Energy, Energy Efficiency and Renewable Energy, apps1.eere.energy.gov/states/alternatives/electricity.cfm.

Energy Information Administration, State Energy Data System, www.eia.doe.gov/emeu/states/_seds_updates.html.

Environmental Protection Agency, Energy CO₂ emissions by state, www.epa.gov/climatechange/emissions/state_energyco2inv.html.

Geothermal Energy Association, www.geo-energy.org.

McKinsey Global Institute, 2007: *Wasted Energy: How the U.S. Can Reach its Energy Productivity Potential*.

Political Economy Research Institute, www.peri.umass.edu.

Renewable Energy Policy Project, www.repp.org.

For more information, visit www.nwf.org/globalwarming.