



An Overview of Energy Efficiency

Energy efficiency means reducing the amount of energy that you need to perform a particular task. When you practice energy efficiency, you increase or maintain your level of service, but you decrease the energy used to provide that service through efficient technologies.

Examples include ENERGY STAR appliances, compact fluorescent and LED light bulbs, better insulation for buildings, more efficient windows, high efficiency air conditioning equipment, and vehicles with higher miles per gallon (mpg). Another distinct strategy is energy conservation, which means that you change your behavior or lifestyle to reduce energy use. Examples include carpooling, using mass transit, turning thermostats down in the winter and up in summer, and other behavioral changes.

Improving energy efficiency is a “win-win” strategy — it saves money for consumers and businesses, reduces the need for costly and controversial new power plants, increases the reliability of energy supply, cuts pollution and greenhouse gas emissions, and lowers energy imports. There is vast potential for improving the energy efficiency of homes, appliances, businesses, and vehicles throughout Colorado.

Quick Facts:

- ◆ Population, 2016: 5,530,105
- ◆ Population growth rate, 2008-2016: 1.55% per year
- ◆ Number of households, 2016: 2,284,863

Source: United States Census Bureau

Primary Energy Consumption (2016)

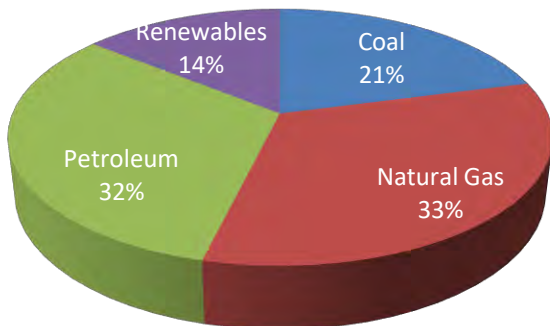
- ◆ Primary energy consumption: 1,4785 trillion Btu
- ◆ Growth rate, 2008-2014: -0.03% per year
- ◆ Primary energy consumption per capita: 268.0 million Btu
- ◆ Ranking, energy consumption per capita: 34
- ◆ Ranking, total energy consumption: 25
- ◆ Ratio of consumption to production: 0.48

Energy Expenditures (2016)

- ◆ Total energy expenditures: \$14.8 billion
- ◆ Ranking, energy expenditures: 26
- ◆ Energy expenditures per capita: \$2,681
- ◆ Ranking, energy expenditures per capita: 49

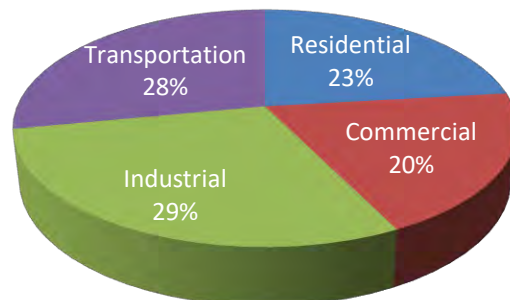
Source: U.S. Energy Information Administration, State Energy Data System, June, 2018.

2016 Primary Energy Consumption (by energy resource)



Renewables include hydropower, wood, solar, geothermal and waste materials.

2016 Primary Energy Consumption (by end use)



Primary energy use includes the losses in electricity generation and distribution. Rankings are position among US states plus DC (1 is highest, 51 is lowest).

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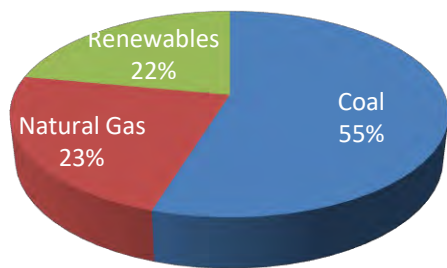
Electricity Use (2016)

- ◆ Total retail sales: 54.8 billion kWh
- ◆ Ranking, total retail sales: 26
- ◆ Consumption growth rate, 2008-2015: 0.62% per year
- ◆ Electricity use per capita: 9,910 kWh
- ◆ Residential electricity use per household: 8,243 kWh
- ◆ Average retail price, all sectors: 9.83 cents/kWh
- ◆ Ranking, average electricity price: 23

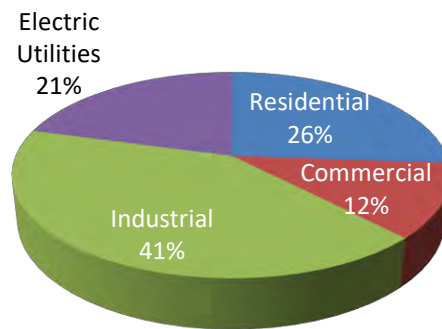
Natural Gas Use (2016)

- ◆ Natural gas consumption: 475.3 Bcf
- ◆ Ranking: 19
- ◆ Consumption growth rate, 2008-2015: -0.75% per year
- ◆ Natural gas use per capita: 84,430cf
- ◆ Residential natural gas use (per residential consumer): 70,256 cf

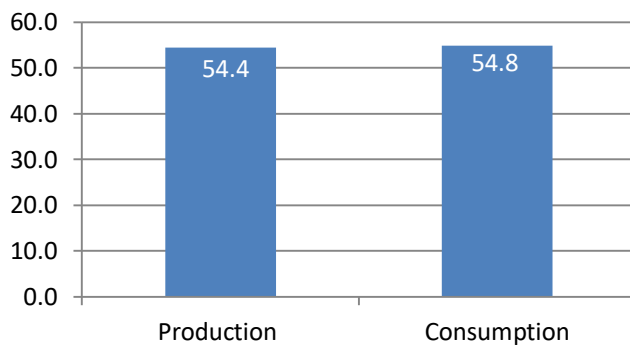
2016 Electricity Generation Breakdown



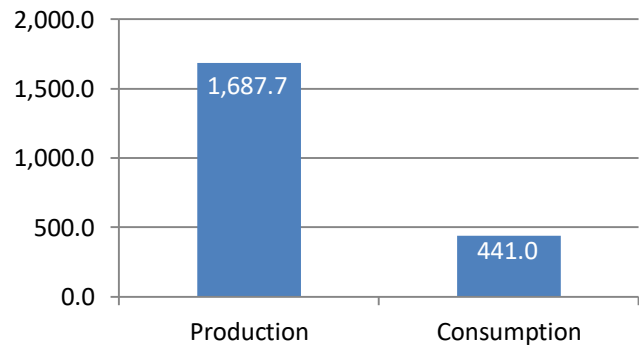
2016 Natural Gas Use by Sector



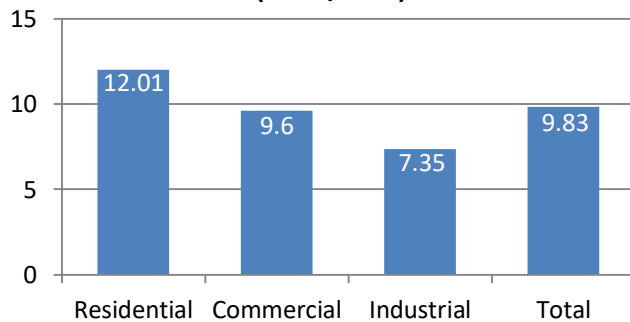
2016 Electricity Production and Consumption (Billion kWh)



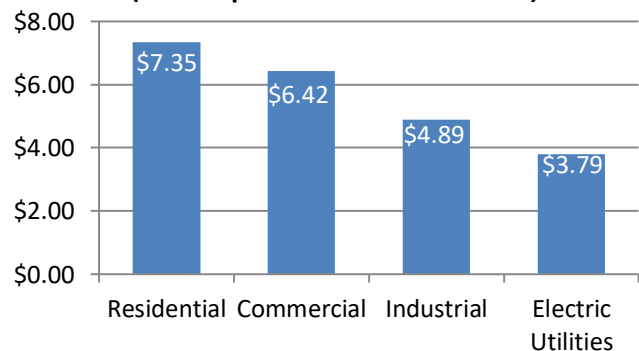
2016 Natural Gas Production and Consumption (Billion Cubic Feet)



2016 Electricity Average Retail Prices (cents/kWh)



2016 Natural Gas Average Retail Prices (Dollars per Thousand Cubic Feet)



Sources: U. S. Energy Information Administration (www.eia.doe.gov) and U. S. Census Bureau (www.census.gov)

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Energy Efficiency Policies and Programs in Colorado

Electricity Demand-Side Management

In 2018, the Colorado Public Utilities Commission (PUC) increased Xcel Energy's energy savings goals for 2019-2023 by 25% to 500 GWh per year. Xcel implements a wide range of energy efficiency and load management programs for its Colorado residential and business customers. For businesses, these programs include: 1) cash rebates for replacing or updating cooling systems, energy-efficient lighting equipment, high efficiency motor and motor speed controls, and other efficiency measures; 2) technical assistance and incentives for energy-efficient new commercial buildings; 3) discounts on energy audits and engineering studies; and 4) incentives for process efficiency improvements. For residential customers, Xcel's programs include energy audits, instant rebates on LED lamps, incentives for high efficiency air conditioning and evaporative cooling systems, incentives for highly efficient new homes, and Home Energy Reports. Also, some smaller utilities such as Black Hills Energy, Colorado Springs Utilities, Fort Collins Utilities and Holy Cross Energy implement energy efficiency programs for their customers.

Total spending on electric utility energy efficiency and load management programs in Colorado was about \$114 million in 2017. For Xcel Energy, the energy efficiency budget represents about 3.3% of revenues.

◆ For Colorado electric utility DSM program details, see: <http://swenergy.org/programs/utilities/state/colorado>

Natural Gas Demand-Side Management

Under PUC mandate, natural gas utilities in Colorado are implementing energy efficiency programs for their customers. These programs include rebates for insulation and high-efficiency furnaces, support for low-income home weatherization, and other efforts. Natural gas utilities in Colorado spent about \$17 million on energy efficiency programs in 2017.

◆ For Colorado gas utility DSM program details, see: <http://swenergy.org/programs/utilities/state/colorado>

Status of Building Energy Codes

Colorado cities and counties with building codes are required to adopt an energy code at least as stringent as the 2003 International Energy Conservation Code (IECC). Nearly 70 jurisdictions have adopted the 2015 or 2018 IECC, including the high-construction areas of Denver and most metro area cities, Fort Collins, Colorado Springs, Pueblo and Durango. The U.S. Department of Energy estimates that new homes in Colorado meeting an up-to-date energy code rather than the 2006 IECC will save \$392 per year in energy costs.

◆ For more information, see: <http://swenergy.org/buildings/energy-code/colorado>

Colorado Industrial Energy Challenge

The Colorado Industrial Energy Challenge (CIEC) program encourages Colorado's largest industrial firms to set a voluntary goal to reduce their energy intensity or energy consumption and report on their progress towards their goal. The program offers networking and training opportunities, and annual recognition of outstanding achievements by the Colorado Governor's Office. Currently the program has about 20 participants, including manufacturers, water utilities, and other industrial facilities.

◆ For more information, see: <http://swenergy.org/industrial/ciec>

State Energy Efficiency Scorecard

The American Council for an Energy-Efficient Economy (ACEEE) has ranked states based upon scores in six categories including: 1) utility and public benefits of energy efficiency programs; 2) combined heat and power (CHP); 3) building energy codes; 4) transportation policies; 5) appliance and equipment efficiency standards; and 6) state government initiatives. In the 2018 state scorecard, Colorado was ranked 14th among all states with a score of 25.5 out of a possible 50 points.

Electricity Conservation Potential and Impacts in Colorado*

Energy Savings potential:	22%
Avoided Avoided power capacity:	2,213 MW
Net dollar savings:	\$4.8 billion
Potential increase in jobs:	6,960
Potential water savings:	2.5 billion gallons per year

*Based SWEET's study *The \$20 Billion Bonanza: Best Practice Utility Energy Efficiency Programs and their Benefits for the Southwest*. This study, completed in 2012, presents the energy savings potential and impacts from a strong commitment to utility energy efficiency programs over a 10-year period.

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Residential Energy Consumption Survey (2015)

Housing Characteristics:

The Energy Information Administration (EIA) has published housing characteristics data from the 2015 Residential Energy Consumption Survey. The EIA presents regional aggregates of household characteristics in the Mountain North region, which includes Colorado, Idaho, Montana, Utah, and Wyoming.

The table below indicates the percentage of households that report having, using or practicing the following equipment and/or behaviors in their homes:

Find household too drafty at least some of the time	53%
Single Pane Windows	29%
Homes with Efficient Lighting	
At least one CFL Bulb	90%
At least one LED Bulb	40%
Two or more Refrigerators	36%
Energy Star Refrigerator	45%
Energy Star Dishwasher	30%
Energy Star Clothes Washer	50%
Three or more Televisions	40%
Electric Heat (all types)	21%
Programmable Thermostat	62%
Central Air Conditioning	57%
Use an Evaporative or Swamp Cooler	17%
Use a Ceiling Fan	71%
Electric Water Heating	29%

Source: U. S. Energy Information Administration, 2015 Residential Energy Consumption Survey: Housing Characteristics Tables.

More Information on Energy Efficiency

- ◆ American Council for an Energy-Efficient Economy (ACEEE) www.aceee.org
- ◆ Alliance to Save Energy www.ase.org
- ◆ Consortium for Energy Efficiency <https://www.cee1.org/>
- ◆ ENERGY STAR® Products www.energystar.gov
- ◆ Southwest Energy Efficiency Project www.swenergy.org
- ◆ U.S. DOE's Energy Efficiency & Renewable Energy Programs <https://energy.gov/eere/office-energy-efficiency-renewable-energy>