



Energy Generation, Distribution, and Regulation

By Elizabeth Burger

This *issue brief* provides information on electric utilities in Colorado, and how utilities generate and distribute electricity to Colorado homes and businesses. The issue brief also describes the regulation of investor-owned electric utilities by the Public Utilities Commission (PUC)

Electric Utilities

Utilities are entities that deliver a public good, such as electricity, internet service, or transportation. Colorado residents generally purchase electricity service from one of three different types of utilities: investor-owned (IOUs), rural electric cooperatives (RECs), or municipal electric utilities. In addition, wholesale electric utilities generate electricity for sale by retail utilities in Colorado.

Investor-owned utilities. Two IOUs currently operate in Colorado: Public Service Company of Colorado (more commonly known as Xcel Energy) and Black Hills Energy. Xcel Energy serves the Denver/Boulder area, Northern Colorado, parts of the central mountains and Western Slope, as well as portions of Southern Colorado and provides electricity to approximately 1.3 million customers. Black Hills Energy serves portions of the state south of Colorado Springs, including Pueblo, and provides electricity to approximately 95,000 customers. The PUC within the Department of Regulatory Agencies regulates IOUs.

Rural electric cooperatives. RECs are member-owned, nonprofit electricity providers. There are 22 RECs throughout the state, and RECs operate in every county except Denver County. RECs are not regulated by the PUC, and are overseen by a member-elected board. The largest

REC in Colorado, the Intermountain Rural Electric Association (IREA), operates in ten counties to the west, south, and east of Denver County and serves approximately 154,000 customers.

Municipal electric utilities. Municipal electric utilities are operated by local governments. There are 29 municipal electric utilities located throughout Colorado, including in Colorado Springs, Fort Collins, Aspen, and other cities, altogether serving about 422,000 customers. Municipal electric utilities are not regulated by the PUC, but rather by local city councils or utility boards.

Wholesale utilities. Wholesale utilities generate electricity for delivery and sale to other utilities to distribute at the retail level. For example, Tri-State Generation and Transmission provides service to 18 RECs throughout the state.

A map of the service areas of Colorado's retail electric utilities can be found here: <https://bit.ly/2v6XChc>

Electricity Generation

At power plants, utilities generate energy using both fossil fuels, including coal and natural gas, and renewable energy sources, including wind and solar, among others. In Colorado, coal-fired power plants produce about 40 percent of Colorado's electricity, followed by natural gas at 32 percent, and renewable sources generate the remainder. However, the mix of sources for electricity generation in Colorado has changed over time, due, in part, to Colorado's renewable energy standard. Originally passed by voters in 1994, and

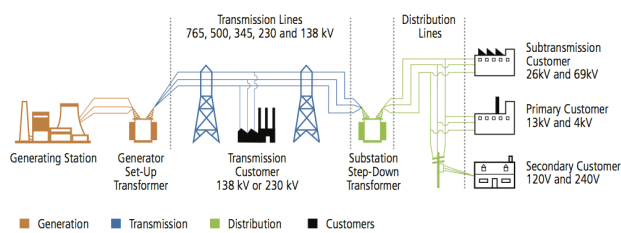
subsequently amended by the legislature, Colorado’s renewable energy standard currently requires that the following percentages of electricity be generated from renewable energy, including wind, solar, hydropower, and other sources, by 2020:

- IOUs - 30 percent;
- RECs serving 100,000 or more meters (i.e., IREA) – 20 percent;
- RECs serving fewer than 100,000 meters – 10 percent; and
- Municipal electric utilities – 10 percent.

Electricity Transmission and Distribution

After electricity is generated, it is transmitted through the electric grid to individual consumers. Figure 1 shows how electricity is transmitted from its generating source to transfer stations and ultimately to retail customers.

Figure 1. Electricity Transmission and Distribution



Source: U.S. Department of Energy

In Colorado, the electricity transmission and distribution grids are generally owned by the investor-owned utilities and wholesale utilities producing the energy, or by the federal government, which transmits energy created through hydropower sources on federal lands.

As the mix of energy generating sources changes, the transmission system becomes more important and complex. For instance, rural areas of the state may be ideally located to generate solar or wind energy, but that electricity must be transported to communities, most often located along the state’s populated Front Range, that have the greatest demand. Managing transmission and distribution

effectively is a key challenge for Colorado utilities. In recent years, utilities in Colorado have considered joining a regional transmission organization, which is a unified transmission grid that operates over several states, in the hopes of creating efficiencies in the transmission and distribution systems.

In the traditional model of energy transmission, energy traveled in one direction – from the generating source to the consumer. However, improving renewable energy technologies are increasingly allowing energy customers to generate their own energy where it is used (such as through solar panels) and, in some cases, distribute excess energy back into the energy grid. This system of “distributed generation” may increase the security and reliability of the transmission and distribution systems. However, the increasing complexity and evolution of the energy grid presents challenges for utilities as they must adapt to new technologies and make the grid more interactive and efficient.

Public Utilities Commission

Colorado’s PUC is a three-member board that oversees water, energy, telecommunication, and transportation utilities in the state. The members of the commission are appointed by the Governor and confirmed by the Senate for four-year terms.

The PUC has the full authority to regulate the rates charged and the services provided by IOUs in Colorado in order to ensure fair pricing and reliable delivery of service. IOUs are required to file all rate changes with the PUC for approval. The PUC also reviews IOUs’ infrastructure improvement plans and the effect of those plans on consumer electricity rates.