Chapter 7. Electric Utility Policies

States are adopting new or modifying existing utility policies in order to enable greater investment in energy efficiency, renewable energy, and combined heat and power (CHP). State public utility commissions (PUCs) are aligning electricity resource planning and ratemaking processes to encourage utilities to fully incorporate these resource options into their infrastructure investment and operational decisions. PUCs are also modifying customer electricity rates and interconnection standards to support greater investment by families and businesses in energy efficiency, distributed renewable energy, and CHP. States are also providing policy direction to ensure that new electric grid investments are made and deployed in a manner that maximizes energy efficiency and renewable energy.

This chapter focuses on the authorities that state legislatures have granted to PUCs to regulate electricity rates and reliability, as these authorities directly affect utilities' and customers' investments in energy efficiency, renewable energy, and CHP. Other state agencies, such as air offices, energy offices, and consumer advocates, can work with their PUCs to provide collaborative input and/or formally intervene during policy design and implementation. Some of the policies in this chapter could also apply to municipally and cooperatively owned utilities—which are not subject to PUC regulation in most states—to the extent that states, elected officials, and local boards can direct or encourage these utilities to take action. For more context, see the overview of the U.S. electricity system later in this chapter.

State Policy Options in the *Guide to Action*

Type of Policy	For More Information
Funding	
Funding and Financial Incentive Policies	Chapter 3
Energy Efficiency Policies	
Energy Efficiency Resource Standards	Section 4.1
Energy Efficiency Programs	Section 4.2
Building Codes for Energy Efficiency	Section 4.3
State Appliance Efficiency Standards	Section 4.4
Lead by Example	Section 4.5
Renewable Portfolio Standards	
Renewable Portfolio Standards	Chapter 5
Combined Heat and Power	
Policy Considerations for Combined Heat and Power	Chapter 6
Electric Utility Policies	
Electricity Resource Planning and Procurement	Section 7.1
Policies That Sustain Utility Financial Health	Section 7.2
Interconnection and Net Metering Standards	Section 7.3
Customer Rates and Data Access	Section 7.4
Maximizing Grid Investments to Achieve Energy Efficiency and Improve Renewable Energy Integration	Section 7.5

Table 7.1 lists examples of states that have implemented policies to incentivize energy efficiency, renewable energy, and CHP through electricity resource planning, ratemaking, terms of service, and direct grid investment. States can refer to this table to identify other states they may want to contact for additional information about their clean energy policies or programs. The *For More Information* column lists the *Guide to Action* section where each in-depth policy description is located.

In addition to the five policy areas covered by this chapter, states are adopting many other policies that maximize the benefits of energy efficiency, renewable energy, and CHP through utility policy approaches. These additional policies are addressed in other chapters of the *Guide to Action* as follows:

- "Funding and Financial Incentive Policies" describes additional ways states provide funding for clean energy supply through grants, loans, tax incentives, and other funding mechanisms (see Chapter 3).
- "Energy Efficiency Policies" presents policies that states have adopted to support cost-effective energy efficiency programs by removing key market, regulatory, and institutional barriers (see Chapter 4).
- "Renewable Portfolio Standards" describes how some states are requiring electric utilities and other retail electric providers to supply a specified minimum percentage (or absolute amount) of customer load with eligible sources of renewable electricity (see Chapter 5).
- "Policy Considerations for Combined Heat and Power" highlights policy options that states are using to capture the environmental, energy, economic, and reliability benefits of CHP technologies (see Chapter 6).

Table 7.1: Electric Utility Policy Options for Supporting Energy Efficiency, Renewable Energy, and CHP

Policy	Description	State Examples	For More Information
Electricity Resource Planning and Procurement	Many states require electric utilities to engage in resource planning through integrated resource planning, pre-approval of large capital investments, and resource procurement processes. These policies provide a mechanism for utilities, regulators, and other stakeholders to assess the long-term costs, benefits, and risks of existing and new supply- and demand-side resources. They also create a more level playing field for energy efficiency, renewable energy, and CHP.	CT, GA, NJ, NV, OR	Section 7.1
Policies That Sustain Utility Financial Health	Traditional regulatory approaches discourage investment in cost-effective demand-side resources that reduce sales. State PUCs can encourage energy efficiency, distributed renewable generation, and CHP by decoupling profits from sales volumes, enabling program cost recovery, and providing performance incentives.	AZ, CA, NV, NY	Section 7.2
Interconnection and Net Metering Standards	Interconnection and net metering rules play a critical role in promoting clean distributed generation (DG) systems such as renewable energy and CHP. Interconnection rules establish system requirements and application procedures, while net metering policies allow DG systems to receive credit for electricity generated on site that is exported to the grid. States can develop interconnection policies and net metering standards that remove barriers and facilitate clean DG.	MA, OR, UT	Section 7.3
Customer Rates and Data Access	Utility rates and other charges can influence the economic attractiveness of energy efficiency, distributed renewables, and CHP. Some rate structures have greater potential for clean energy benefits than others. Providing customers with access to energy usage data can serve a complementary role by helping them make informed and efficient decisions about their energy use.	CA, CT, GA, HI, IL, NY	Section 7.4
Maximizing Grid Investments to Achieve Energy Efficiency and Improve Renewable Energy Integration	States can take steps to ensure that new investments in electricity distribution infrastructure are planned and operated in a manner that increases energy efficiency and enables high penetrations of renewable energy.	CA, IN, MA, MD, Pacific Northwest	Section 7.5

Overview of the U.S. Electricity System

To understand how these electric utility policies work, it helps to understand the U.S. electric power grid and the roles that states play. As the diagram on page 7-6 shows, the power grid is a complex, interconnected system. Most of the nation's electricity is generated at centralized power plants, transmitted over long distances through high-voltage transmission lines (sometimes across multiple states), and then delivered through local distribution wires to residential, commercial, and industrial end-users.

The system must generate enough electricity supply to meet demand from all end-users and deliver supply through a network of transmission and distribution lines. This balancing act takes place in real time, as the grid is limited in its ability to store excess power for later use. Maintaining this balance is challenging because the need for electric services is dynamic, with demand fluctuating depending on the season, the time, and the weather. Supply may also fluctuate based on operating conditions, as well as on weather conditions and time of day for renewable sources such as solar and wind.

Many companies and other organizations play a role in generating and delivering electricity. These entities are subject to regulations and oversight at the state, regional, and federal levels. States vary in their authorities over the types of power plants and delivery infrastructure that utilities build and maintain, as well as the terms of service for and rates charged by the utilities that deliver power to customers. Regional balancing authorities coordinate the transmission of electricity across states. In some areas of the country, this coordination takes place through organizations known as independent system operators (ISOs) or regional transmission organizations (RTOs). The Federal Energy Regulatory Commission (FERC)[52] approves the RTO/ISO market rules and recognizes the North American Electric Reliability Corporation (NERC)[53] as the national Electric Reliability Organization.

At the distribution system level, where electricity is delivered to retail customers, utility ownership type and state regulatory structure varies. About 75 percent of the nation's electricity is delivered by investor-owned utilities (IOUs)—which are for-profit corporations—or other private entities (Figure 7.1). The remaining electricity is delivered to customers by cooperatively owned utilities; utilities owned by local governments; and other publicly owned entities, including those owned by the federal government. For example, the Tennessee Valley Authority—a federally owned utility—generates electricity that it sells to certain large customers and other utilities. Similarly, four federal Power Marketing Administrations (PMAs) sell electricity generated by federally owned and operated hydroelectric dams in 33 states to other utilities and a few large customers.[54] Figure 7.1 shows how the prevalence of different types of utilities varies by state.

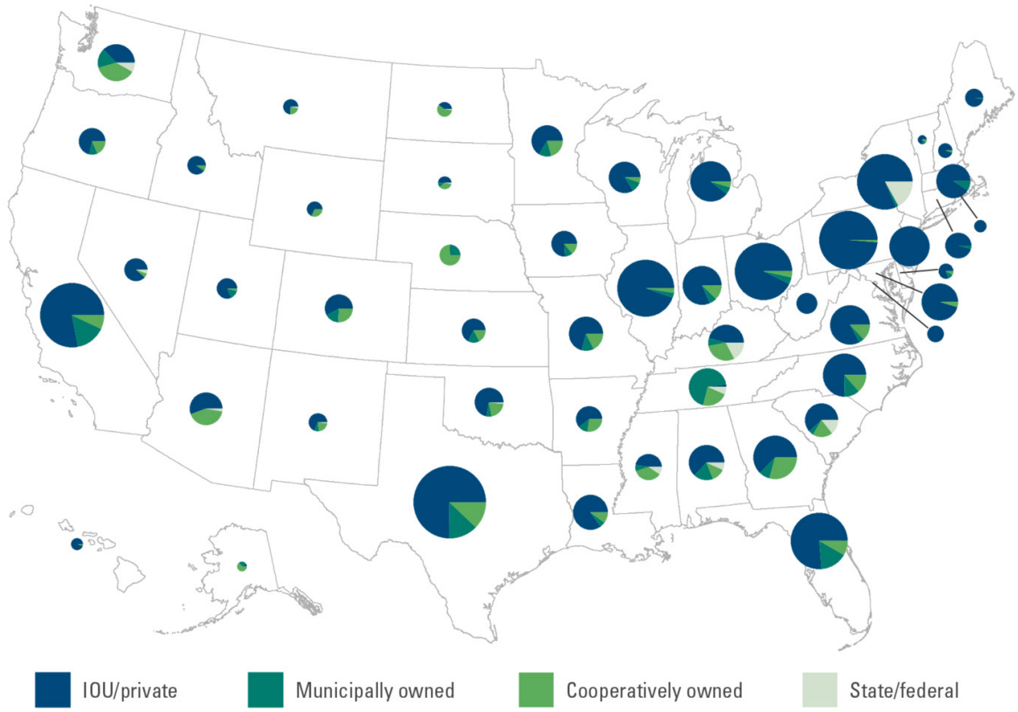
---

52 Visit http://www.ferc.gov for more information about FERC's roles and responsibilities.

53 Visit http://www.nerc.com for more information about NERC and its eight regional entities.

54 Visit http://www.eia.gov/todayinenergy/detail.cfm?id=11651 for more information about the four federal PMAs.

Figure 7.1: Share of Electricity Delivered to Customers by Utility Ownership Type, 2012



"IOU/private" includes IOUs, retail power marketers, and unregulated utilities. "Cooperatively and municipally owned" includes utilities classified as "cooperative" or "political subdivision."

Source: U.S. Energy Information Administration, Annual Electric Power Industry Report, Form 861, 2012 data.

Role of State Public Utility Commissions

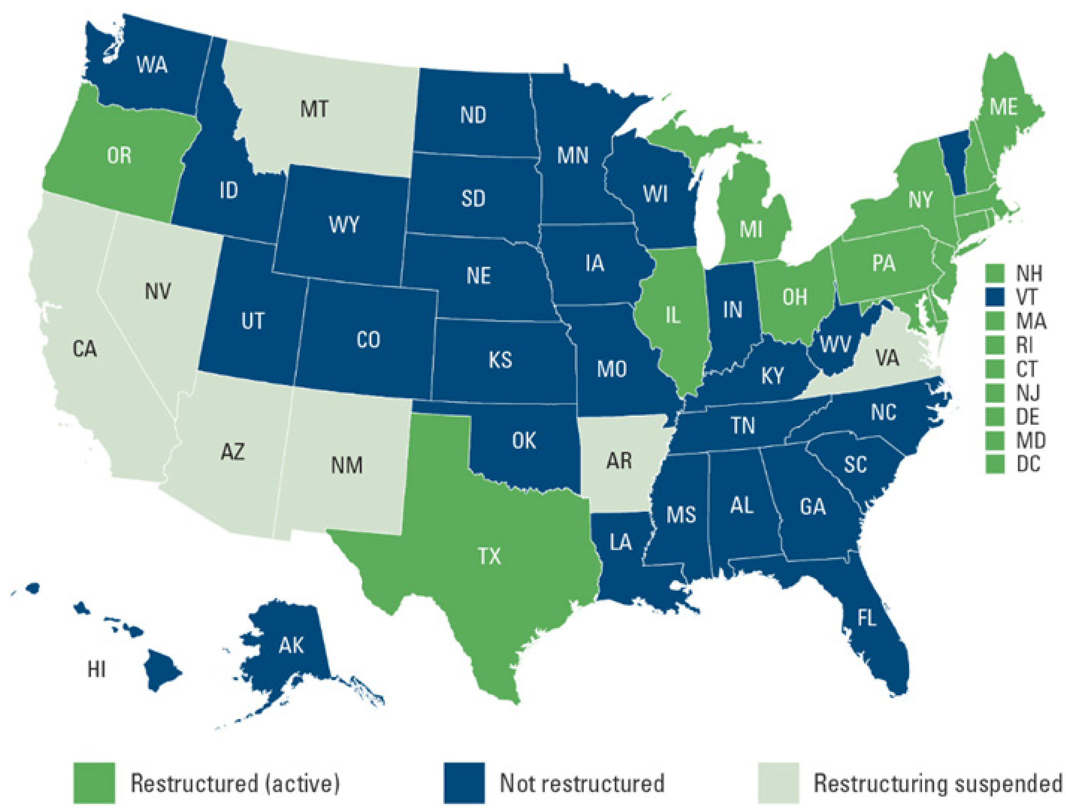
PUCs typically have authority over planning, ratemaking, and terms of service, which can all affect deployment of energy efficiency, renewable energy, and CHP. PUC processes vary by state, according to the authorities granted to them by the state legislature. The regulatory structure for the electricity market is a key difference across states. PUCs have traditionally regulated IOUs that generate, transmit, and distribute electricity. However, in the mid-1990s, some states restructured their electricity markets (also referred to as deregulated or retail choice states), which means that electricity generation may be owned and operated by independent power producers, with the PUC regulating the distribution service that is still provided by IOUs. Figure 7.2 shows these states. Although customers can purchase electricity from competitive suppliers in restructured states, PUCs still approve the rates the IOUs may charge for delivering the electricity to customers, as well as the electricity supply rates for those customers who do not purchase electricity from competitive suppliers.

Utility Costs and Revenues: A Bird's-Eye View

Electric utilities' costs fall into two main categories: *fixed costs*, such as infrastructure, and *variable costs*, such as the fuel used to generate electricity. Utilities recover these costs and earn money through the rates they charge to their customers. Some utilities earn a portion of their revenue through fixed charges, such as flat monthly service fees, but utilities typically earn most of their revenue through variable charges—that is, a charge per kilowatt-hour of electricity delivered. If a utility relies on volumetric charges to pay for a substantial portion of its fixed costs, as is often the case, the utility will have an incentive to increase electricity sales instead of decreasing them (e.g., by investing in energy efficiency). Section 7.2 discusses state policies that sustain utility financial health while increasing investment in energy efficiency, distributed renewable energy, and CHP.

PUCs typically have less authority over publicly and cooperatively owned utilities, though some states do regulate their rates to customers and oversee their electricity resource planning processes. For example, TVA has little to no direct state oversight, but the utility transmits electricity supply to 155 local distribution utilities that are subject to state requirements. Although municipally and cooperatively owned utilities may not be subject to the same PUC regulations as IOUs, they are overseen by elected local officials and/or boards of directors that require some form of public disclosure of the utility's performance and investment decisions.

Figure 7.2: Electricity Market Regulatory Structure by State



Source: U.S. Energy Information Administration, http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html. Status as of April 2015.

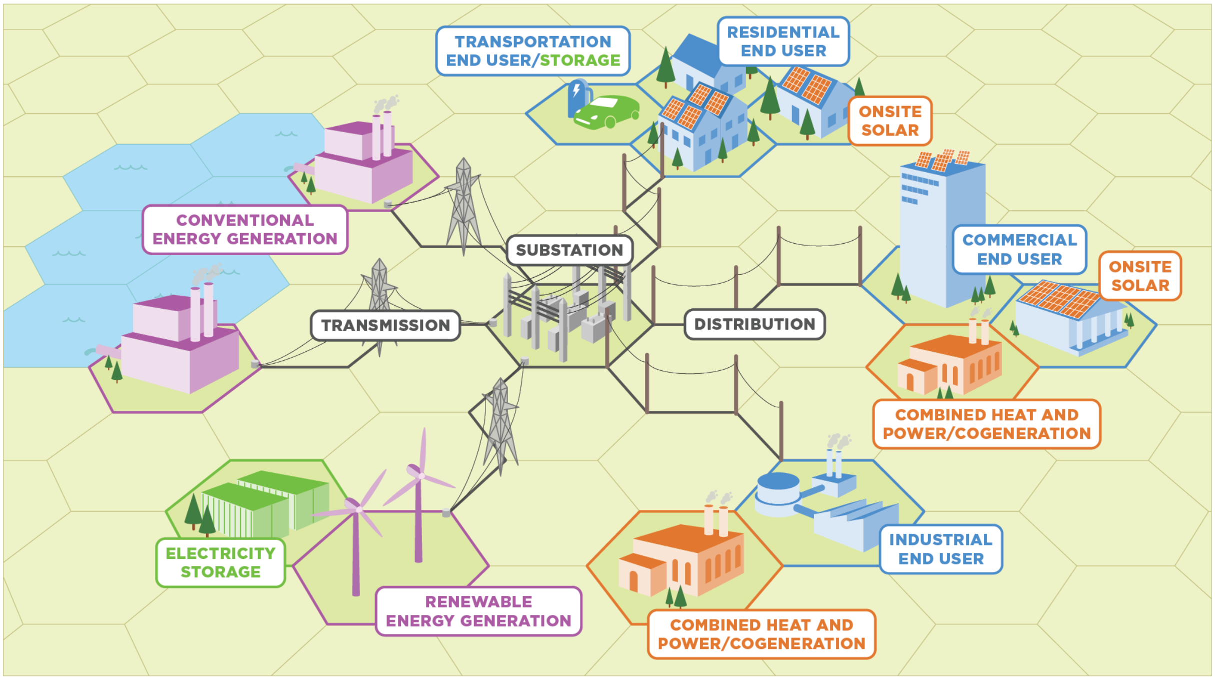
Role of State Environmental Agencies

Regardless of utility ownership and electricity market structure, state air agencies and other environmental regulators have authority over the electric power sector because of its substantial environmental impacts. The carbon dioxide emitted from generating electricity accounts for about one-third of all the nation's greenhouse gas emissions—more than any other activity. Most of the United States' electricity is generated by burning fossil fuels, which also emits other forms of air pollution that contribute to environmental problems such as acid precipitation, regional haze, and smog. Electric power generation can also require large quantities of water for cooling, discharge warmer water into local water bodies, and produce waste.[55]

[55] For more information on the environmental impact of electricity generation, see www.epa.gov/energy.

Figure 7.3: A Quick Guide to the U.S. Electric Power Grid: How Electricity Is Generated and Delivered to Customers

The U.S. electricity system is a complex network of power plants, transmission and distribution lines, and end-users of electricity. This system is called the **electric power grid**.



CENTRALIZED GENERATION

The United States generates most of its electricity at centralized power plants, which are usually located away from end-users. In 2013, most U.S. electricity generation came from **conventional sources**, including coal, natural gas, and other fossil fuels (67%), and nuclear power (19%). **Renewable sources** include hydroelectricity (7%) and wind and solar (6%). Large wind and solar installations are considered centralized generation, and their share of total generation is projected to increase.

DISTRIBUTED GENERATION

Distributed generation refers to technologies that generate electricity at or near where it will be used, such as **onsite solar panels**, **combined heat and power**, and diesel generators. Distributed generation may serve a single structure, such as a home or business, or be part of a system such as a microgrid at an industrial complex, military base, or college campus. When connected to the grid, onsite solar and combined heat and power have the potential to support delivery of clean, reliable power to additional customers and to reduce electricity losses along transmission and distribution lines. Distributed sources produce far less electricity than centralized power plants, but their use is growing.

STORAGE

Thermal and electricity storage technologies can be used to improve reliability, save excess power for when it is needed, and reduce costs. Though not widespread today, storage options are increasingly being used to support renewable energy generation. Electric vehicles may be used for storage if they charge when power demand from the rest of the grid is low (e.g., at night) and feed power back into the grid when demand is high.

DELIVERY

Once electricity is generated at a centralized power plant, it travels long distances through a series of interconnected high-voltage **transmission** lines. **Substations** "step-down" high-voltage power to a lower voltage, sending the lower voltage electricity to consumers through a network of **distribution** lines.

END-USERS AND ENERGY EFFICIENCY

U.S. electricity use is approximately evenly split among **residential**, **commercial**, and **industrial** customers. The **transportation** sector accounts for a small fraction of electricity use, though this may increase due to electric vehicles. End-users can meet some of their needs by adopting energy-efficient technologies and practices. In this respect, energy efficiency is a resource that reduces the need to generate electricity.