



# OREGON LEGISLATIVE POLICY, RESEARCH, & COMMITTEE SERVICES

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## Basics on **ELECTRICITY** *The Vertically Integrated Utility and Its Recent Evolution*

### **The Basic Components of the Electric Utility Industry**

The electric utility industry, until relatively recently, was dominated by regulated, investor-owned, vertically integrated utilities - protected, to a large extent, from competition and guaranteed the opportunity to earn a reasonable, though not spectacular, rate of return and locally controlled, community-owned utilities. The regulatory scheme arose, in part, as a result of the policy decision that the electric utility industry is a natural monopoly. The industry required the development of large, capital intensive power plants and rapid expansion of a broadly dispersed delivery system. The development of duplicative delivery systems was considered to be impractical, inefficient and potentially unsafe. In exchange for the financial stability and investment-risk reduction that come with a protected customer base, investor-owned utilities undertook the obligation to provide universal electric service within protected service areas. Community-owned utilities (COUs) developed as an alternative to investor-owned utilities (IOUs) prior to the initial implementation of regulation in the mid-1930s. COUs, with their emphasis on local control and the elimination of a profit motive, generally resulted in lower electric service costs for customers and encouraged access to electric service for lower density rural customers. Electric service is comprised essentially of three components typically bundled for end users: generation, transmission and distribution.

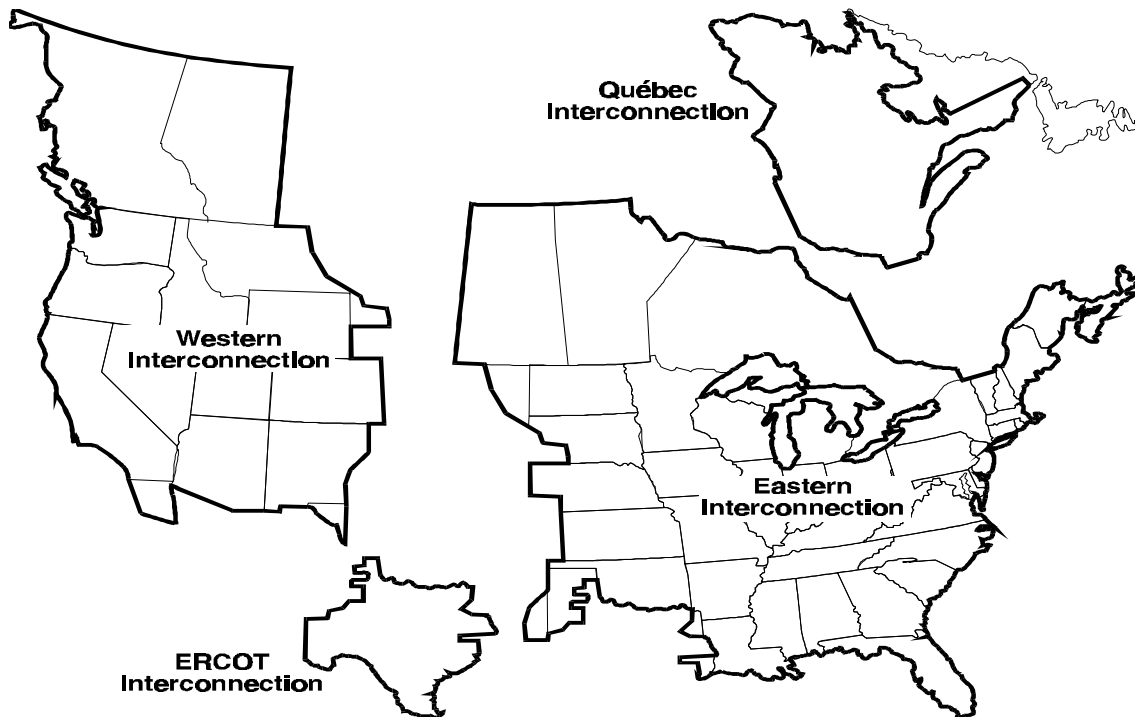
The generation component consists of facilities designed to produce electricity using a variety of fuel types. In the Northwest, most electricity is produced by hydroelectric dams, coal-fired thermal plants and natural gas combustion turbine facilities. Typically, generation facilities are located near their fuel source because it is cheaper to move electricity to load centers through the delivery system than to transport the fuel to a power plant built nearer the load center. Once generated, electricity is moved in huge quantities over transmission lines.

The transmission system component consists of a complex network of high-voltage, long-distance power lines crisscrossing the United States like an interstate highway system. The system, which is composed of three grids with limited interconnects between grids, connects electricity generators and utilities to each other and to the distribution system. Owned primarily by investor-owned utilities and some community-owned utilities, the grid began developing about fifty years ago when utilities in different parts of the country concluded that it was more economical to share power than for each to build sufficient generation capacity to meet its peak power needs independently.

The distribution system component consists of substations, transformers and low-voltage power lines that deliver electricity to end users. While the transmission lines move large power loads from the generating facilities to load centers, distribution lines carry much smaller loads directly

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to homes and businesses. Distribution lines run along urban and rural roadways - overhead on wooden poles or underground in buried cables.



Source: "How the Transmission System Really Works," North American Electric Reliability Council (03-19-97), <http://www.nerc.com/~filez/presentations.html>

Electricity by its very nature is a difficult commodity to transfer, track and deliver. Electricity cannot be stored for later use; it must be generated and delivered as it is consumed. Power providers must necessarily build generation, transmission and distribution capacity to meet peak demand and permit resources to lie idle during non-peak usage. Further, electricity placed into the system cannot readily be linked to its generator or the customer it is intended to serve. Though computer modeling and metering simulate flow for accounting purposes, individual electrons are not readily identifiable. Additionally, line capacity is limited by line loss: the tendency of power to be lost as heat while flowing through power lines. Grid operators perform a continuous balancing act - limiting fluctuations in frequency, voltage and current to promote stability and to limit line loss.

### **The Evolving Regulatory Scheme**

The industry is also complicated by a multi-faceted regulatory scheme. Wholesale power rates and unbundled transmission rates are regulated by the Federal Energy Regulatory Commission (FERC). Retail rates for investor-owned utilities are regulated by the states, generally through public utility commissions. Community-owned utilities are regulated by local elected officials or boards of directors. Additionally, federal power marketers and transmission owners, like the Bonneville Power Administration, operate in some parts of the country based on various federal statutory schemes.

Recent changes in federal policy have encouraged competition at the wholesale level. In 1978, Congress passed the Public Utility Regulatory Policies Act (PURPA) to promote renewable resources and to reduce utility reliance on imported oil. PURPA required investor-owned utilities to buy electricity from certain non-utility generators at the price the utilities would have had to pay to develop their own resources - their so-called "avoided cost." In 1992, Congress passed the Energy Power Act (EPAAct) mandating open access to transmission lines for energy generators.

FERC rules implementing the EPAAct require utilities under their jurisdiction to "unbundle" generation and transmission functions by separating decision making about each activity within the corporate structure and by charging separately for these products. The utilities were also directed to adopt transmission tariffs guaranteeing "comparability," i.e., charges, terms and conditions for transmission services that are comparable to what the utility applies to itself for these services. FERC's intent was to limit the ability of transmission owners to use their transmission capacity to give their own generated resources an advantage. The federal policy changes, combined with lower natural gas prices and surplus generation capacity on the West Coast, have led to lower wholesale prices. Lower wholesale prices, in turn, have led to an increased demand from large industrial power users for retail access to independent power marketers.

Still, access to transmission lines remains problematic for independent power marketers. Current federal regulations permit a two-tiered system of access to the transmission grid. A utility that owns transmission capacity has priority for transmission service to meet demand within its service territory (a recognition of the historical role of utilities providing service within their territory). Power marketers must accept a lower priority for power transactions originating or heading out of the region. Additionally, because the transmission grid was not built to accommodate competition; capacity limitations and bottlenecks sometimes prevent completion of scheduled transactions.<sup>1</sup> Some industry observers have suggested that functional unbundling and requirements for comparability will not be sufficient to ensure non-discriminatory open transmission access, and that pressure will continue building for utilities to divest themselves of either their transmission or generation assets or for the establishment of statewide or regional independent system operators (ISOs) to operate the transmission grid in a neutral and nondiscriminatory manner.

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**For further reading:**

*Northwest Power in Transition: Opportunities and Risks*, Draft Fourth Northwest Conservation and Electric Power Plan. Portland, OR: Northwest Power Planning Council, 1996.

*Restructuring and Small Electric Customers*, Matthew Brown, Joel Eisenberg and Lawrence Hill. Denver, CO: National Conference of State Legislatures, July 1998, online at <http://www.ncsl.org/programs/esnr/mbslr.htm>.

*Special Report: Electric Deregulation*, Wall Street Journal Interactive Edition, New York, NY: Dow Jones, September 14, 1998.

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<sup>1</sup> Despite surging demand for access, capacity is not being built as fast. According to the Electric Power Research Institute, transmission capacity has increased only 18% since 1987 while demand grew 35%. In light of uncertainty in the industry, most utilities are working to "right-size" their organizations, not expand transmission capacity.