

Energy Use in Oregon



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Electricity

Electricity accounts for about 20 percent of Oregon’s total energy use. This percentage has been constant since 1980.

Electricity Sources

Electricity generation in Oregon and the Northwest relies on hydropower, coal and natural gas. (See Figure 1.) Natural gas will likely play an increasing role in the future because it is relatively clean and cheap.

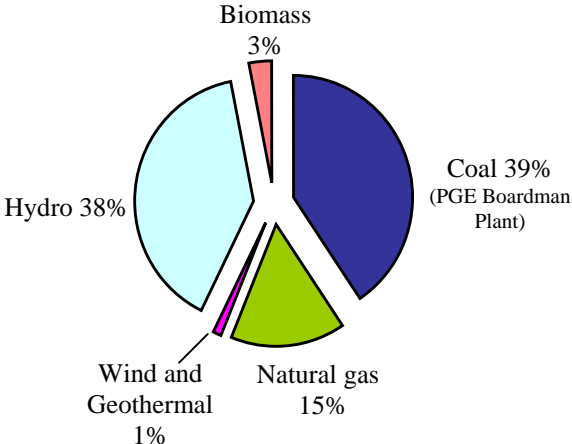


Figure 1: Oregon Electric Mix-2001
Total Energy Generation in Oregon
5,362 aMW

Provided by



OREGON
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Electricity Providers in Oregon

There are two types of utilities in Oregon. One is investor-owned utilities that provide over 70 percent of Oregon’s electricity: Portland General Electric (PGE), Pacific Power and Idaho Power. The other is consumer-owned utilities; 36 of these provide much of the remainder of Oregon’s electricity. Most of the consumer-owned utility power comes from the Bonneville Power Administration, a federal power-marketing agency. Bonneville also services some industrial customers directly.

The electrical system in Oregon is part of a regional network. Utilities and Bonneville buy, sell and deliver electricity using transmission lines that link the region and connect the Northwest to California and Canada.

What’s an aMW?

An aMW is 8,760 megawatt hours. This is the continuous output of a resource with one megawatt of capacity over a full year. A megawatt hour is 1,000 kilowatt-hours (kWh), which is the amount of electricity the average Oregon household uses in a month.

Electricity Prices

Wholesale

Normal wholesale electricity prices in the West range from \$10 to \$50 per megawatt-hour and hover around \$30 per megawatt-hour. From May 2000 through June 2001, wholesale prices spiked to over \$1,000 per megawatt-hour and were often 10 times the normal price.

A combination of market factors caused wholesale prices to soar:

- ❖ Growth in electricity use outpaced the growth of supplies.
- ❖ A severe drought in the West reduced hydropower supplies.
- ❖ The price of natural gas to fuel power plants increased.
- ❖ Flawed deregulation of California retail markets affected prices throughout the region.

Retail

Average retail price in Oregon has been relatively steady. In 2001, the retail price for electricity sold by investor-owned utilities was about 5.5 cents per kWh.

Source: Public Utility Commission's 2001 Oregon Utility Statistics

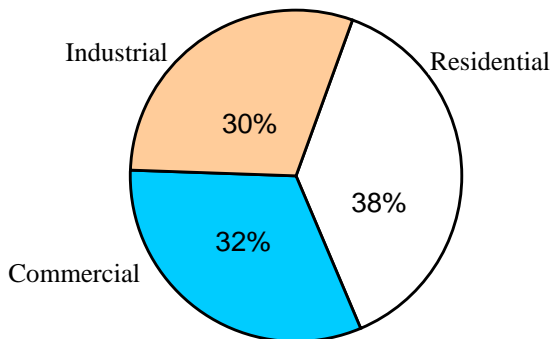


Figure 2: Oregon Electricity Use - 1999

Typical Electric Energy Use



Aluminum smelter 300 aMW



Emerald People's Utility District 50 aMW



Factories:
Paper mill 110 aMW
Steel mill 46 aMW



Average home 0.001 aMW



Food processor 2-3 aMW



Office building 1-5 aMW



Elementary school 4 aMW



Oregon State University 9 aMW



Large hospital 5-10 aMW

Electricity Use

Figure 2 shows the percentage of electricity by Oregon's residential, commercial and industrial sectors.

Electricity Supply

Approximately 4,000 megawatts (MW) of new natural gas-fired plants were constructed in 2001 in the West, including 667 MW in Oregon. An additional 20,000 MW gas-fired plants in the West likely will be finished by 2003, making these new plants enough to satisfy 30 percent of the region's electric load.

Natural Gas

Natural Gas Sources and Providers

Oregon’s natural gas comes from British Columbia, Alberta, Wyoming, Colorado and New Mexico. (See Figure 3.) Two natural gas pipelines serve Oregon customers: the Williams Northwest Pipeline and the Pacific Gas and Electric Pipeline.

Three natural gas utilities serve Oregon. Northwest Natural serves most of the state. Avista Corporation serves parts of southern Oregon and La Grande. Cascade Natural Gas serves parts of central and eastern Oregon.

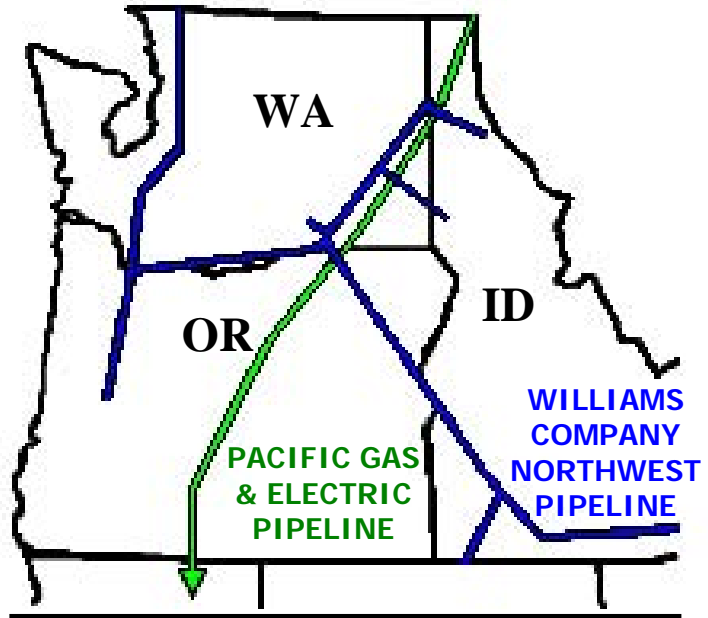


Figure 3: Natural Gas Pipelines Serving in Oregon

Natural Gas Prices

Wholesale

Natural gas prices for Oregon and elsewhere are volatile. Oregon’s wholesale natural gas prices averaged between 20 and 30 cents per therm during the 1990s. In 2001, wholesale prices rose sharply to almost 50 cents per therm. In 2002, wholesale prices stabilized a little below the 2001 level but well above the 1990-1999 level.

Retail

Retail prices followed a similar pattern. Figure 4 shows natural gas retail average price in 2001.

| Natural Gas | Price (Dollars per Therm) |
|-------------|---------------------------|
| Residential | 0.96 |
| Commercial | 0.79 |
| Industrial | 0.61 |

Figure 4: 2001 Natural Gas Retail Price in Oregon






Source: www.eia.doe.gov

Conversions:

- 1 kWh-----3,412 Btu
- 1 therm natural gas ----- 100,000 Btu
- 1 ft³ natural gas ----- 1,000 Btu
- 1 Mcf natural gas----- 1,000 ft³ natural gas
- Mcf----- 1,000,000 cubic feet

British thermal unit (Btu) is the amount of heat required to raise the temperature of 1 pound of water 1° Fahrenheit.

Natural Gas Deliveries 2001

| Sector | Million Cubic Feet | Percent of Oregon Total |
|--|--------------------|-------------------------|
|  Residential | 38,271 | 17.5 % |
|  Commercial | 27,884 | 12.7 % |
|  Industrial | 69,760 | 31.8 % |
|  Vehicle fuel | 59 | 0.03% |
|  Electric power | 82,472 | 37.7 % |
| Total | 218,446 | 99.73% |

Source: Energy Information Administration

Petroleum

Petroleum Sources and Distribution

Oregon imports 100 percent of the petroleum it uses and, unlike other Western states, does not have refineries or internal crude oil resources. More than 90 percent of Oregon’s refined petroleum products are provided by four refineries in the Puget Sound area of Washington State. Refineries in Salt Lake City and British Columbia provide the remainder. Oregon has about 2,250 retail fueling stations, with more than 29,000 registered fuel pumps.

Petroleum Prices

U.S. retail prices reflect volatility in world crude oil prices. Oregon’s prices have followed similar patterns.

Gasoline prices range between \$1.60 per gallon and \$2.00 per gallon. Figure 5 shows U.S. retail prices for gasoline and heating oil from 1984 through 2001.

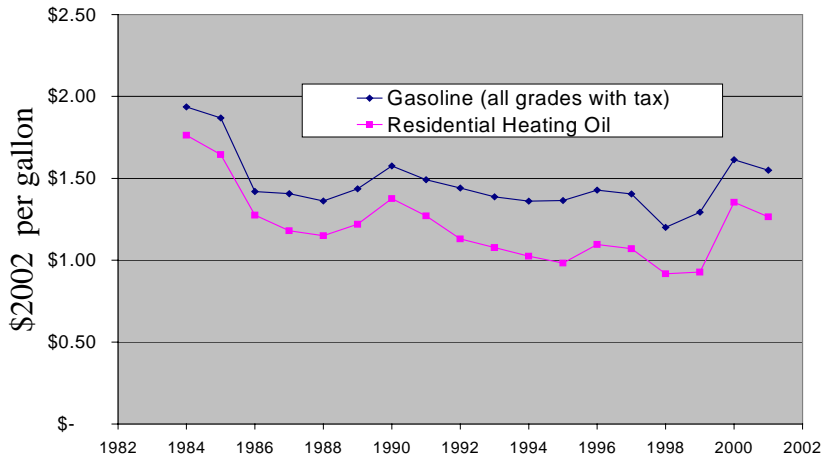


Figure 5: U.S. Petroleum Products-Retail Prices (2002 dollars/gallon)

Petroleum Use

Petroleum use in Oregon has nearly tripled in the past 40 years, driven mainly by transportation uses. In 1999, petroleum products accounted for almost half of the energy used in the state. More than 80 percent of petroleum used in 1999 went to transportation. Virtually all of Oregon's transportation fuel is petroleum based (Figure 6).

Alternative Fuels

Alternatives to gasoline and diesel play an important role in meeting the state's goal for cleaner air, reducing imports of foreign petroleum and diversifying of transportation fuels. Alternative fuels identified are ethanol, methanol, bio-diesel, compressed natural gas, liquefied natural gas, liquefied petroleum gas (propane) and electricity. Many of these transportation fuels burn cleaner, come from renewable sources and originate in North America. Most alternative-fueled vehicles are eligible for Oregon's energy tax credits.

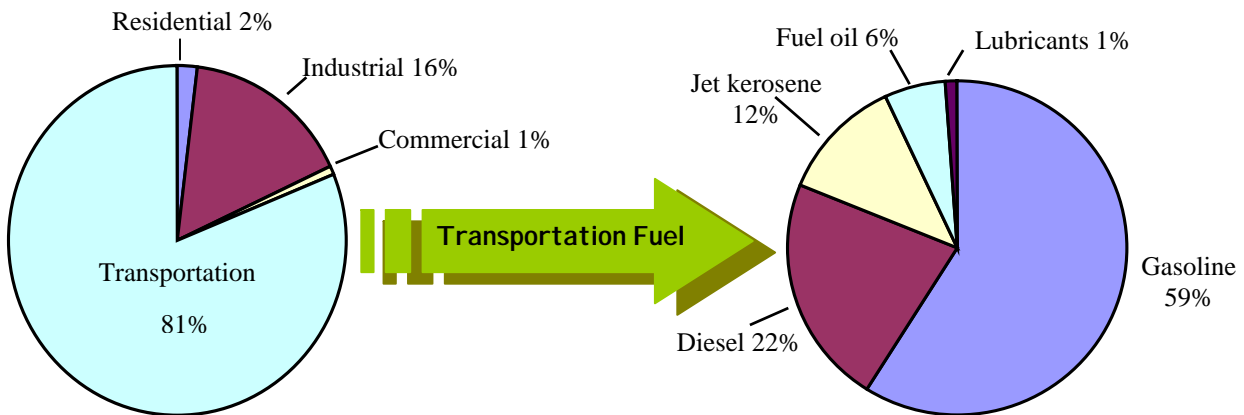


Figure 6: Oregon's 1999 Petroleum Use and Oregon Transportation Fuel Mix 1999

Conservation

Conservation is a cornerstone of Oregon's energy policy because it is the most environmentally clean resource and, over the long run, it is the cheapest. The Oregon Office of Energy provides information, demonstrates new technologies, and offers a variety of programs to encourage Oregonians to use energy more efficiently and to use renewable energy sources.

Oregon's conservation and renewable resource programs include energy loans and tax credits. Estimated savings in 2001 are:

| | | |
|--------------------|-------|------------------------|
| Electricity | 5.2 | billion kilowatt-hours |
| Natural gas | 145.0 | million therms |
| Oil | 8.7 | million gallons |
| Wood & other fuels | 1.4 | trillion Btu |

The savings are cumulative beginning in 1979. Altogether, annual energy savings are 36 trillion Btu—enough to meet the energy needs of 430,000 Oregon homes. Those savings cut energy bills for Oregonians by \$397 million a year.

Renewable Energy

The Office of Energy provides tax credit and low-interest loans for all types of renewable resource projects. Many utilities offer consumers green power options to support generation from renewable resources. Oregon law requires electric utilities to buy power from customers who invest in small on-site renewable-resource generation. A 3-percent public purpose charge on the bills of PGE and Pacific Power customers provides an estimated \$10 million per year to support generation from renewable resources.

| Renewable Energy Resource | Uses in Oregon |
|---------------------------|---|
| Water | Hydroelectric dam generated 38 percent of Oregon's power in 2001. |
| Biomass | Biomass facilities produce electricity and heat or steam from wood waste or waste gas (methane) from landfills, sewage treatment plants and manure. Biomass provides 98 trillion Btu of energy, equivalent to 47 percent of Oregon's natural gas use. |
| Wind | Wind-generated electricity is becoming increasingly competitive as turbine and other costs decline, the price of natural gas increases, and the federal wind-production tax credit continues. Oregon now has four large wind projects with a maximum output of about 200 megawatts. |
| Solar | Solar water heating can supply about half of the hot water for a typical Oregon home. More than 17,000 home solar water-heating systems and over 250 solar electric systems have been installed in the state in the last 20 years. |
| Geothermal | About 1,800 ground-source heat pumps provide space and water heating for Oregon homes. Geothermal sources also supply heat for buildings, swimming pools, resorts and industrial uses. |



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