2015-17

STATE OF OREGON
BIENNIAL ENERGY PLAN

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2015-2017
State of Oregon
Energy Plan

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INTRODUCTION

The American Council for an Energy Efficient Economy ranks Oregon third in the country in energy efficiency efforts. Even with that ACEEE rating, Oregonians spend nearly $15 billion annually on energy; most of that money leaves the state. The Oregon Department of Energy works to reduce the long-term costs of energy— including environmental and public health costs.

The Oregon Department of Energy was established in 1975 to:

- Provide leadership on energy conservation, renewable energy and protection of the Columbia River from radioactive waste at Hanford
- Engage in energy planning and siting of energy facilities
- Promote conservation and renewable energy projects through a variety of programs
- Research emerging energy technologies
- Provide educational and technical assistance to industry professionals and the public

> "It is essential that future generations not be left a legacy of vanished or depleted resources…"
>
> 1975 Oregon Legislature

While energy conservation is the cornerstone of Oregon energy policy, the Oregon Department of Energy works to reduce all the long-term costs of energy, including the expense of cleaning up the Hanford Nuclear site. Other efforts include streamlining the energy facility siting process, designing incentives to stimulate energy efficiency, and providing loans for fleet conversions to alternative fuels.

When it created the Oregon Department of Energy in 1975, the legislature noted that "continued growth in demand for nonrenewable energy forms poses a serious and immediate, as well as future, problem. It is essential that future generations not be left a legacy of vanished or depleted resources, resulting in massive environmental, social and financial impact."

Some of the current challenges and opportunities for Oregon include:

- Accelerated Demand for Energy Efficiency: Oregon's population will continue to increase in the coming years, driving energy use and the demand for energy efficiency opportunities.
- Continued Development of Clean Energy: Oregon is rich in renewable resources. These clean energy sources, including renewable electricity and alternative fuels, can help reduce the environmental impact of energy use.

- Reducing Carbon Emissions: ODOE provides staffing to the Oregon Global Warming Commission and works with other agencies to implement legislation on ways to adapt to and mitigate climate change. Along with other agency partners, the Department also participated in providing comments on EPA's Clean Power Plan proposal, which falls under Section 111 (d) of the Clean Air Act.

- Energy Supply: There are numerous market forces that affect the type, number and geographic diversity of energy siting projects. The availability and price of natural gas has resulted in new thermal gas plant projects being proposed. The need to bring remote renewable energy generation resources to load areas and create greater resiliency to the western electric grid has led to the first significant transmission line project in 30 years.



To help evaluate energy resources and electricity demand, Congress passed the Northwest Power Act in 1980. Market prices for electricity and natural gas are also part of the Council's forecasts and are used by state energy offices, utilities and others. The Council is working on developing its 7th Power Plan for the region.

The Oregon Department of Energy's Biennial Energy Plan will:

- Explain Oregon's energy supply and consumption
- Show how long-term energy costs have been reduced
  Highlight energy issues and trends

ENERGY MATTERS

Oregon's 10-Year Energy Action Plan, released in December 2012, outlines three core strategies:

- Maximize energy efficiency and conservation to meet 100 percent of new electricity grown.
- Enhance clean energy infrastructure development by removing finance and regulatory barriers.
- Accelerate the market transition to a more efficient, cleaner transportation system.

One component of maximizing energy efficiency is to work on public buildings. The plan calls for Oregon to meet all new electric load growth through energy efficiency and conservation. Every occupied state-owned building is to establish baseline energy use, undergo an energy audit and identify cost-effective retrofits in the next ten years. This will improve the performance of up to four million square feet of identified office space and use the state as a market driver for greater energy efficiency and conservation projects.

State Building Innovation Lab

SBIL is an umbrella covering statutory and directed activities within the Department, relating to energy efficiency in buildings, with a focus on state-owned buildings. The Lab pilots innovations in financing and program design to drive deeper energy savings into public buildings.

One goal of SBIL is 20 percent energy use reduction in all state-owned buildings by 2023. This is in addition to a statutory mandate for state agencies to reduce building energy use by 20 percent by 2015, compared to a 2000 baseline. Agencies achieved their aggregated 2015 goal and are on track for the 2023 goal. Energy use reporting by state agencies is required by OAR 330-130-0080.

The SBIL umbrella also covers the State Energy Efficient Design program that directs state agencies to work with the Department to ensure cost-effective energy conservation measures are included in new and renovated state-owned buildings. The program was revised in 2001 to require that all state facilities constructed on or after June 30, 2001, exceed the energy conservation provisions of the Oregon building code by at least 20 percent. In addition, for all public buildings, ORS 279C.527 and 279C.528 require 1.5 percent of project costs for major construction and renovation projects be invested in solar or geothermal energy devices and design.

SBIL's focus in 2015 is benchmarking state building energy use, which will create the foundation for agency energy reduction activities to meet the 20 percent by 2023 goal. Benchmarking includes developing data models through coordination with other entities and shaping data standardization. The 10-Year Energy Action Plan specifies that occupied state-owned buildings and industry standards for energy disclosure should guide selection of target buildings. SBIL will also continue to gather agency-level energy use data and capture all facility use to monitor total building usage.

Energy Efficient Schools

The passage of SB 1149 (1999) created the three percent public purpose charge, first assessed in 2002 on Portland General Electric and Pacific Power customers. School districts in the service territory of these utilities receive 10 percent of these funds, which may be used to conduct energy audits or implement energy efficiency measures such as lighting, insulation, or heating system retrofits. The *Report to the Legislative Assembly on Public Purpose Expenditures* (Dec. 2014) listed receipts for Jan. 2013 through June 2014 at $13,261,388.

The administration of the school PPC funds is facilitated by the Oregon Department of Energy in cooperation with individual school districts. SB 1149 Schools Program Guidelines were first developed in March 2002 to assist eligible K-12 school districts in the implementation of cost-effective energy efficiency improvements. Those guidelines were revised in 2005, 2008, 2011, and 2013 and additional guideline changes are expected in 2015.

Public purpose charge funds must first be used for energy audits, then to approved measures recommended by those audits. The Oregon Department of Energy provides business and technical oversight for the energy audits and projects to ensure consistency with the program guidelines.

Klamath City High School, a Cool Schools participant.

For schools outside PGE and Pacific Power territory, ODOE provides technical assistance and training for school staff and contractors on building highly efficient and environmentally sound buildings. ODOE provides lists of qualified energy auditors and commissioning agents to facilitate contracting for energy efficiency improvements in schools, which are budget-constrained and face challenges in keeping aging facilities operating.

Energy efficiency retrofits save energy, the second highest operating expense for most districts. Less money spent on utility bills translates to more money available for teacher salaries and other expenses.

The Oregon legislature passed HB 2960 (2011) which created a High Performance Schools Pilot Program. Also known as Cool Schools, this is a voluntary four-year pilot designed to accelerate energy efficiency investments in all of Oregon's 197 public schools districts. The initiative provides a combination of technical and business assistance, and leverages financial resources to support energy efficiency project development. Cool Schools is a complementary effort for the school in PGE and

Pacific Power territory that receive public purpose charge funds for required energy audits and measures.
Through its pilot program authority, ODOE provides:

- Energy efficiency project analysis and implementation
- Business and financial consulting and connections with local vendors
- Access to incentives, rebates, grants, and low-interest loans

Regional Efforts
The Pacific Coast Collaborative is composed of Alaska, British Columbia, Washington, Oregon, and California. As part of the 2013 Pacific Coast Action Plan, members agreed to coordinate regional efforts in the areas of climate change and resiliency, clean energy, and transportation. A component of this plan includes market transformation in the area of building energy efficiency.
In 2014, the Washington State Department of Commerce began facilitating a work group on energy efficiency in public buildings that is focused on information exchange and identification of opportunities for future collaboration. Topics include existing program overviews, building energy benchmarking and disclosure, performance contracting, financing, procurement, and new construction. This work group was also awarded a USDOE grant to explore and develop regional benchmarking and disclosure policy, with activities planned in 2015.

Public Buildings and the Role of the Small-scale Energy Loan Program
In 1979, the Oregon legislature created the Small-scale Energy Loan Program. In 1980, voters approved an amendment to the Oregon Constitution authorizing sale of general obligation bonds to finance small-scale, local energy projects. SELP made its first loan in 1981.
SELP's purpose is to promote energy conservation and renewable energy resource development. Renewable resources include solar, geothermal, biomass, hydro, wind, and waste heat. SELP also can fund projects that use alternative fuels. The Small-scale Energy Loan Program serves individuals, businesses, non-profit organizations, schools, and local, state, federal and tribal governments.

The Small-scale Energy Loan Program issues four types of bonds:

- Governmental Purpose, for energy projects in publicly owned and operated facilities
- Private Activity, for projects that use renewable resources to produce energy or for energy projects for non-profit organizations
- Federally Taxable, for energy-saving projects in homes and businesses
- Qualified Energy Conservation Bonds, for energy conservation projects for states, tribes, and local governments

Loan due diligence includes such things as:

- Borrowers undergoing technical and business reviews
- The Small-scale Energy Loan Program being in first position on the loan
- The borrower meeting benchmarks before any money is released
- Large loans coming with loan guarantees, such as from USDA or USDOE

As of Dec. 31, 2014, the Small-scale Energy Loan Program had disbursed 874 loans totaling $612 million. These projects save or produce substantial energy savings each year. There are currently 167 loans open for $208 million. Below are examples of projects financed during that period.

School Loans
SELP loans have gone to a number of school districts as part of the Cool Schools pilot project. The goal of the pilot is to install cost-saving energy measures and controls that allow students to be cool in the summer and warm in the winter thereby improving their learning environment. The resulting energy savings from installed measures reduce the overall cost of the improvements to the school districts.

The Vernonia School District received $1.2 million and Lowell School District received $902,000. The Vernonia project anticipates 425,277 kWh of electricity savings, as well as 37,005 therms of natural gas savings. Lowell anticipates 1,550 kWh in electricity savings and 1,660 gallons of fuel oil savings.

Higher Education Loans
SELP loans supported the following Oregon university system projects:
- University of Oregon – $8.9 million for deferred maintenance and seismic upgrades to Straub Hall
- Southern Oregon University – $100,000 for conservation measures to Taylor Hall

County Loans
During 2013-2014 SELP loaned $2.08 million to Lane County to finance renovations and upgrades to its data center in Eugene. It is anticipated that this project will save 506,457 kWh of electricity.

Business Energy Tax Credit Program
The Business Energy Tax Credit, called the longest-running tax incentive program in the country, helped schools, tribes, nonprofits, businesses, industries, farms and ranches save energy and invest in renewable energy. From 1979 to the sunset of the program on July 1, 2014, BETC awarded more than 24,700 final certificates for projects that leveraged nearly $6 billion in total energy investments in Oregon. Among those awards were many for city, county, state, tribal and federally owned buildings.

State Energy Efficient Design Program
The SEED program is governed by ORS 276.900 - ORS 276.915 and was created in 1991 during a time of increasing national awareness of the environmental impacts of energy consumption, the importance of energy efficiency, and of sustainability issues in general. The Oregon legislature recognized that state government should be a leader in conserving energy and that state facilities should be constructed to serve as models of energy efficiency.

By constructing and renovating buildings with energy efficiency in mind, state agencies can significantly reduce long-term operating costs. Those savings can be redirected to fund essential services. In addition, the benefits of energy efficiency help improve comfort for building occupants.
The SEED process calls for state agencies to involve the department in the initial design of their building projects so that cost-effective energy efficiency measures are incorporated into building designs. Depending on the size and complexity of the project, SEED program staff provides technical consulting services to the state agency throughout the course of a project. SEED staff also works closely with state agencies and their building design teams to develop a list of potential energy conservation measures for each project.

The Ore. Dept. of Forestry's Tillamook Forest Center won a SEED award in 2008 for being an outstanding example of energy efficiency.

ENERGY SUPPLY AND DEMAND

Solar shines on the West Wind Forest Products warehouse in Eugene.

Overview

In 2013, energy expenditures made up about five percent of disposable income nationwide, according to the U.S. Energy Information Administration. While electricity, natural gas and petroleum prices fluctuate, overall energy expenditures are expected to rise as the population and demand for energy increases. Oregon's Office of Economic Analysis says the state had about 3.9 million residents in 2013, a number which is predicted to grow to 4.3 million by 2020.

For nearly 40 years, the Oregon Department of Energy has worked to reduce the long-term costs of energy for Oregon's growing population by focusing on energy conservation and efficiency. The dollar value of ODOE's programs (some of which began in 1978), equaled just over $1.8 billion in 2013, when adjusted for the life of the measures. This value represents energy saved and generated through incentives, loans, and other energy efficiency programs.

Energy conservation is the foundation of Oregon's energy policy and traditionally its first "fuel" of choice to meet energy demand. The Oregon Department of Energy provides information, evaluates new technologies and offers a variety of programs to assist Oregonians in conserving energy.

Second to conservation and efficiency is the development of clean energy resources. Solar, wind, geothermal, hydroelectricity, biomass (wood and organic solid waste), and wave energy, along with alternative fuels, can provide Oregon with a diversified energy portfolio and reduced emissions.

Oregon is one of the leading generators of conventional hydroelectric power in the country, second only to Washington in 2013. The Energy Information Administration notes that Oregon's hydroelectric power contributed to residential electricity prices well below the national average. The largest non-hydroelectric renewable resource is wind energy, with most wind farms constructed in the Columbia Gorge and eastern Oregon. The EIA lists Oregon's geothermal potential as third highest in the country, behind Nevada and California.

A geothermal drilling rig in central Oregon.

Energy Use and Trends

Consumption

The most current EIA data (2012) shows that total Oregon energy use (electricity, petroleum, natural gas, renewable energy) was 986 trillion British thermal units, ranking Oregon 32nd in the country. Texas residents and businesses consume the most energy at 12,282 trillion Btu and Vermont the least, with 129 trillion Btu per capita.

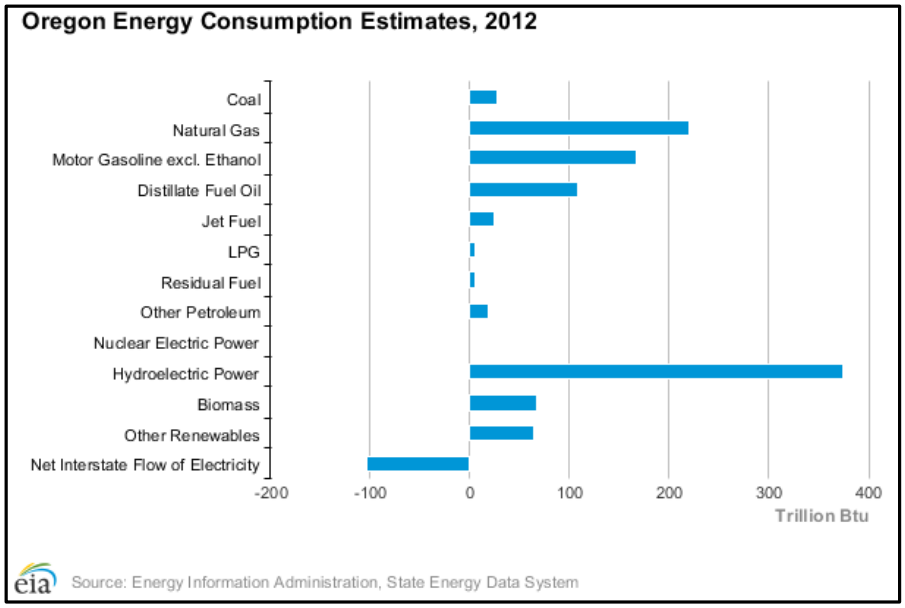


Figure 1: Oregon ranks 39th in the U.S. in energy consumption, most of which is hydroelectricity.

About half of the net electricity generated in Oregon comes from hydropower, and good precipitation can drive than percentage even higher. The Columbia River generating facilities at John Day, McNary, The Dalles and Bonneville are Oregon's four largest hydropower plants.

With generation greater than consumption, some of Oregon's electricity flows to other states by way of the Western Interconnection, one of the main North American power grids. The transmission lines are known as the Pacific Intertie, connecting Oregon to California, and allowing electricity transfers between the Pacific Northwest and the Southwest.

The main energy source used for Oregon home heating is electricity at 50 percent of households. Natural gas comes in second at 37.5 percent, fuel oil makes up 2.5 percent, LPG is 1.8 percent and other/none is 8.2 percent.

But most of Oregon's energy consumption is related to transportation, which translates to the consumption of 63 million barrels of petroleum annually.

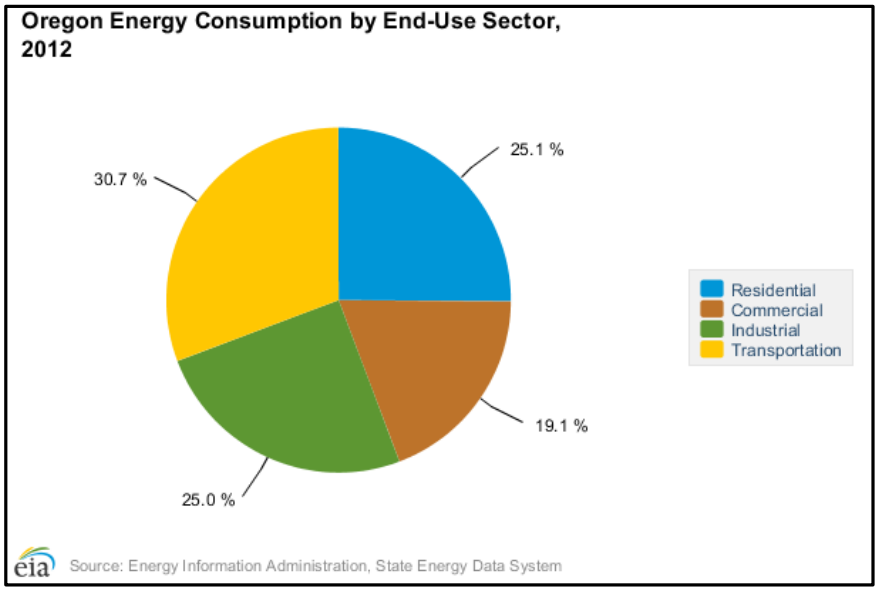


Figure 2: Energy Information Administration data related to energy use by sector. Petroleum for transportation led the way in Oregon consumption.

The transportation sector uses the most energy in Oregon at 301 trillion Btu, followed by the residential (246 trillion Btu), industrial (245 trillion Btu), and commercial (188 trillion Btu) sectors.

For all forms of energy, Oregonians annually spend about $3,825 per person, ranking the state 40th in 2012. Alaska residents have the highest energy expenditures at $10,484 per year.

Production

Oregon produced about 497 trillion Btu of energy in 2012, ranking it 30th in the country, up from 35th in 2010. Most of Oregon's energy is classified as renewable energy, with the majority of that being hydroelectricity. Texas and Wyoming are the top two energy producers in the country, with the sources mainly coal and natural gas.

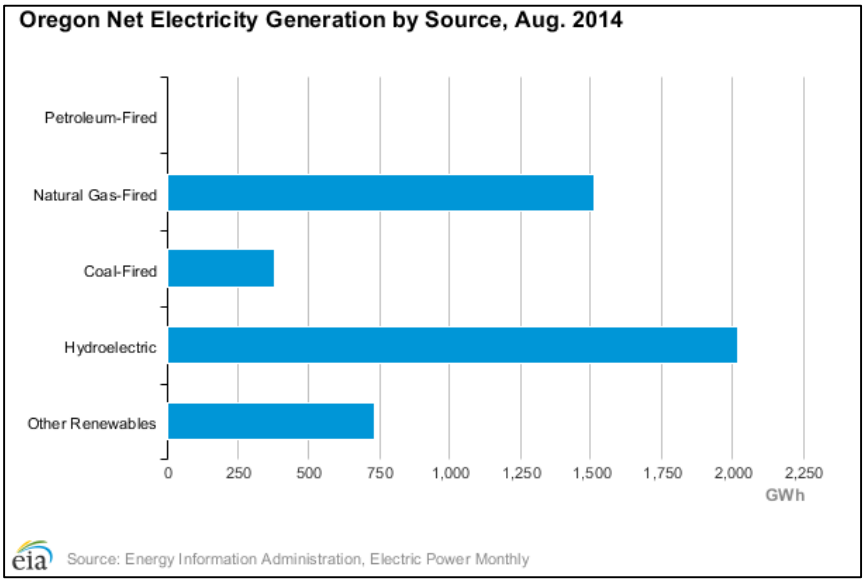


Figure 3: Hydropower generates most of the electricity in Oregon.

Fuel Supply, Use and Pricing

Petroleum

Toward the end of 2014, gasoline prices were dropping nationwide, down from an average of 59 cents per gallon from December 2013 to an average of $2.78 per gallon. The price for regular gasoline fell even further at the start of 2015, down to $2.14 as of January 12.

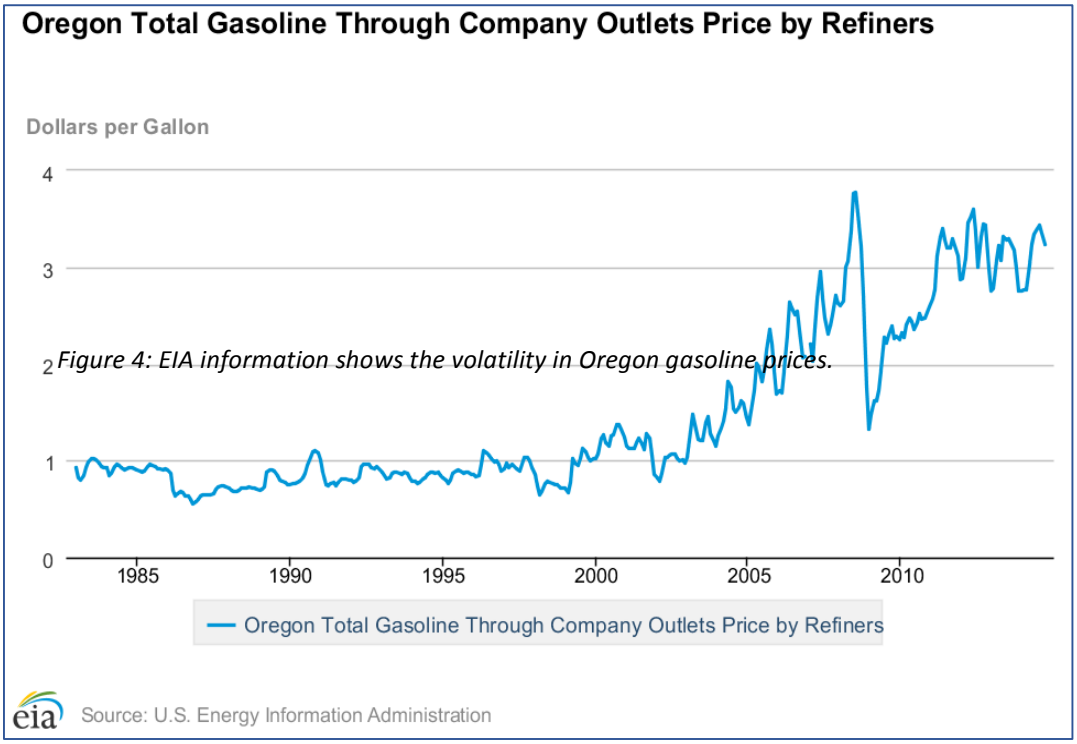


Figure 4: EIA information shows the volatility in Oregon gasoline prices.

The Energy Information Administration says the decline is a combination of national and international factors including U.S. production growth, reduced demand and the ramp-up of overseas crude oil production.

As Figure 4 shows, gasoline in 1983 was selling for less than $1 dollar per gallon.

Oregon's 3.1 million registered drivers spent more than $5.3 billion dollars on gasoline in 2013. Oregon has about 3.26 million registered passenger cars and trucks, which use about 35 million barrels of gasoline annually. Oregon has more than 65,000 registered hybrid vehicles and 4,000 electric vehicles.

Oregon has few fossil fuel resources, imports 100 percent of its petroleum, and unlike other Western states, does not have refineries or internal crude oil resources. Oregon, along with Alaska, Arizona, California, Hawaii, Nevada and Washington form a nearly self-contained system of petroleum production and consumption, referred to by the federal government as Petroleum Administration Defense District Five. Although the system is relatively stable, a major disruption in any part of the

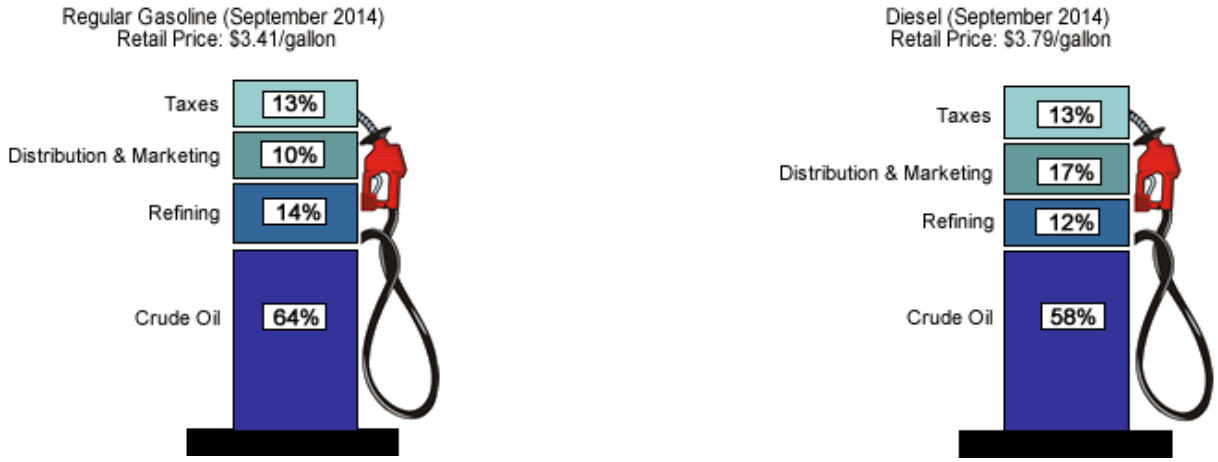


Figure 5:
The Energy Information Administration diagram shows what goes into the cost of a gallon of gasoline and diesel.

supply and distribution chain could create a severe and prolonged petroleum shortage, and/or significant price volatility.

Petroleum Sources

Four refineries in the Puget Sound area of Washington provide more than 90 percent of Oregon's refined petroleum products. The Washington refineries transport their products to Oregon and Washington markets via the Olympic Pipeline and barges.

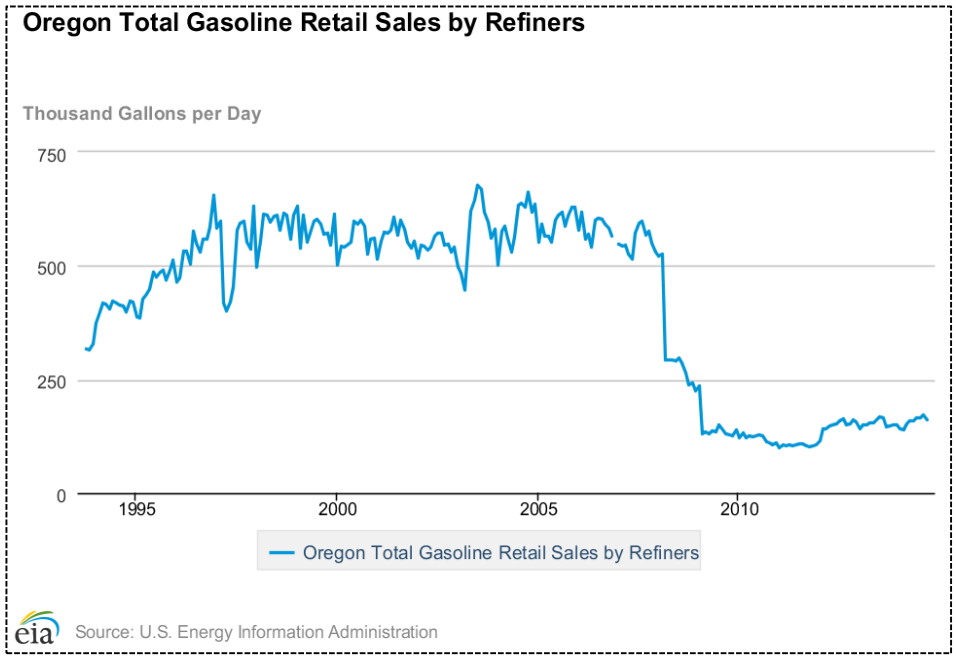


Figure 6: Retail gasoline sales declined substantially over the last decade.

The bulk of Oregon's oil enters through Port of Portland, to eight petroleum delivery stations located on the Willamette River near Swan Island. While the current system of supplying and distributing petroleum products in Oregon is effective, the state has virtually no refining capacity and no crude oil reserves;

therefore, Oregon faces unique challenges in the event of a petroleum shortage.

Some specialty petroleum products (jet fuel, lubricants, ultra-low sulfur diesel) enter Oregon on tankers from California Bay Area refineries.

More than 80 percent of the crude oil the Puget Sound refineries export to Oregon originates in the Alaska North Slope oil fields. The Trans-Alaska Pipeline transports crude oil 800 miles from the oil fields on the state's northern coast to the Valdez terminal on its southern coast. From there, barges and tankers ship the crude oil to the Washington refineries and other destinations.

The Western Canada Sedimentary Basin is another significant source of crude oil for the refineries. The remaining crude, less than five percent, comes from the continental U.S., Mexico, Indonesia or the Middle East.

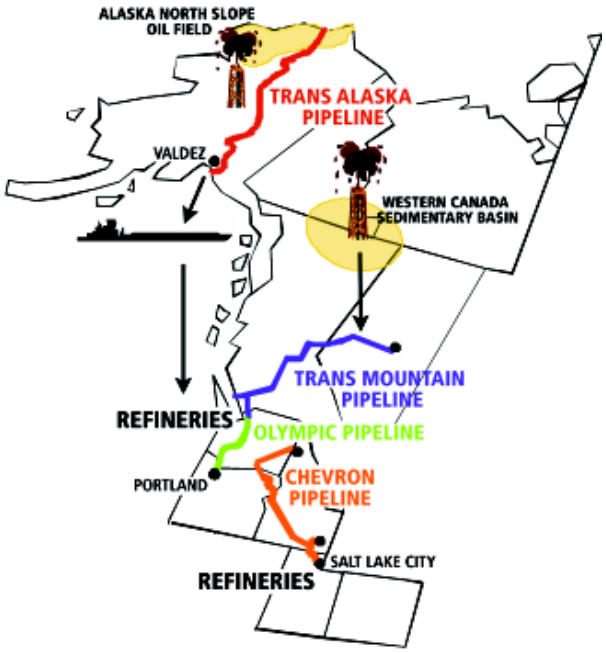


Figure 7: Illustrates the interconnection of the source, refineries and transportation of Oregon's petroleum.

In addition to Washington, refineries in Salt Lake City and British Columbia provide about 10 percent of Oregon's refined petroleum products. Under normal conditions, only minor amounts arrive on tanker ships from California and the Pacific Rim countries of Indonesia, South Korea and Japan.

In northeastern Oregon, some portion of all petroleum products enters by truck or rail from Pasco, Washington. The Pasco delivery station receives refined product from a pipeline that starts in Salt Lake City, travels through southern Idaho and crosses through northeastern Oregon along Interstate 84. In southeastern and southern Oregon, a portion of petroleum products is trucked from Idaho and northern California respectively.

Petroleum Contingencies

Oregon law (ORS 176.809) authorizes the Oregon Department of Energy to prepare for and respond to potential petroleum shortages or disruptions that threaten the health and safety of Oregonians.

Oregon's Petroleum Contingency Plan includes a fuel allocation program that provides gasoline and diesel to state emergency services such as law enforcement, fire and medical services. Essential service providers including utilities, telecommunications, public works, public transit and sanitation services are also covered. An ODOE official or a state designee would implement the plan by coordinating a rapid response from industry, federal, state and local organizations with a goal to restore the fuel supply and distribution system while minimizing the effect to Oregonians.

Natural Gas

Oregon imports 100 percent of its natural gas from British Columbia, Alberta, Wyoming, Colorado and New Mexico. Three interstate pipelines deliver the natural gas.

The Williams Company's Northwest Pipeline brings natural gas to Portland from British Columbia and the U.S. Rocky Mountains. The British Columbia gas enters the U.S. near Sumas, Washington and roughly follows Interstate 5. Gas from the Rocky Mountains comes into Oregon near Ontario. One lateral pipeline transports gas from Washougal, Washington to the Portland area and another from the Willamette Valley to Grants Pass.

Natural gas from Alberta arrives in a Gas Transmission Northwest pipeline. It enters the U.S. near Kingsgate, Idaho and moves through eastern Oregon, leaving the state near Malin, before traveling on to California and Nevada. A lateral line transports natural gas from Klamath Falls to Medford. The GTN pipeline is owned by TransCanada and connects with the Williams Northwest pipeline at Stanfield, Oregon.

GTN has applied to the Federal Energy Regulatory Commission to build a 24-mile long natural gas pipeline in Morrow County. The Carty Lateral Pipeline would supply PGE's Carty Generating Station, a 900 MW natural gas-fired power plant that received an Energy Facility Siting Council site certificate in 2012.

The Ruby Pipeline, which crosses four states, has been in operation since July 2011. About 75 miles of the 675-mile, 42-inch natural gas pipeline are in Lake and Klamath counties. The pipeline transports domestic natural gas from Opal, Wyoming to Malin, Oregon.

Figure 8: The natural gas Ruby Pipeline began operation in July 2011.

Three natural gas investor-owned utilities serve Oregon:

- Northwest Natural serves about 80 percent of Oregon's retail customers, including the Willamette Valley and the coast.
- Avista Corporation serves parts of southern Oregon and La Grande.
- Cascade Natural Gas Corporation serves parts of central and eastern Oregon.

Northwest Natural receives natural gas from the Williams pipeline. Northwest Natural owns underground gas storage facilities in Mist, Oregon and liquefied natural gas storage facilities in Newport and Portland.

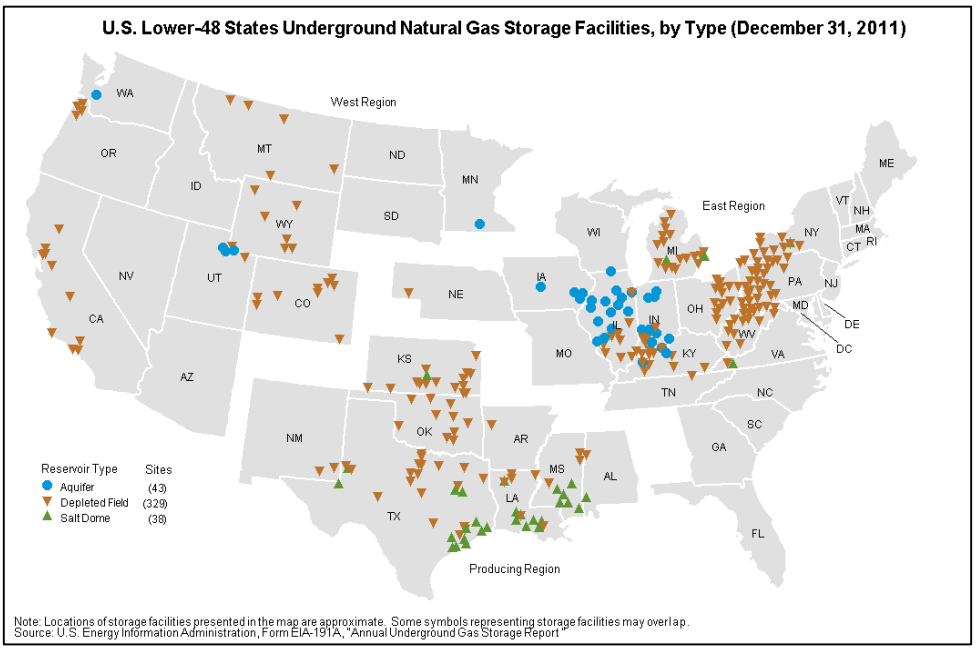


Figure 9: Underground natural gas storage facilities.

The Mist gas field in northwestern Oregon is the only producing natural gas field in the Pacific Northwest. Total natural gas production has exceeded 65 billion cubic feet of gas since its discovery in 1979.

The Mist field includes two underground natural gas storage projects, using three depleted natural gas reservoirs that can store 14 billion cubic feet of natural gas to meet peak demands during colder months.

The Energy Information Administration says that as of Sept. 2014, Oregon had 29,201 million cubic feet of natural gas in storage.

Avista obtains natural gas from the Williams Company's Grants Pass lateral as well as the TransCanada's GTN pipeline and the Medford lateral. Cascade customers, from Madras to Chemult, receive natural gas from TransCanada's GTN pipeline. The Williams Northwest pipeline serves Cascade customers from Umatilla to Ontario. Cascade and Avista either own or have contracts to use natural gas storage facilities.

Liquefied Natural Gas

As part of the current and future energy mix, the U.S. is looking to export natural gas in its liquefied form. This is a reversal of federal policy, which as recently as 2011 emphasized importation. In either case, the natural gas is super-cooled and liquefied for ocean transport. In its liquid state, the natural gas is called Liquefied Natural Gas or LNG.

The Oregon LNG Project (Clatsop County) has changed from a proposed import to a "bi- directional" terminal. OLNG is also planning a pipeline to connect the terminal to the existing Williams Northwest

interstate natural gas pipeline in Woodland, Washington. The Federal Regulatory Energy Commission is preparing one Environmental Impact Statement for both the terminal and the pipeline.

Further south, FERC is preparing an Environmental Impact Statement analyzing the proposed Jordan Cove Energy Project/Pacific Connector Gas Pipeline. The 234-mile, 36-inch pipeline would cross Coos, Klamath, Jackson and Josephine counties, running from Malin to Coos Bay. FERC issued a draft EIS in November 2014.

As part of its emergency preparedness obligations, the Oregon Department of Energy prepares plans to protect the health and safety of Oregonians in the event of a LNG emergency along the transport channel as well as at any potential facility.

Natural Gas Regulation

The Federal Energy Regulatory Commission regulates siting of interstate natural gas pipelines as well as prices for the use of pipelines. The Oregon Energy Facility Siting Council sites and regulates large in-state pipelines.

The Oregon Public Utility Commission regulates the rates Oregon's natural gas utilities charge their retail customers. Wholesale natural gas prices are not regulated.

Retail natural gas rates generally include pass-through of the wholesale cost of natural gas to retail customers. The Oregon PUC sets retail rates so utility companies have the opportunity to earn a fair rate of return on their investments.

Natural gas utilities must prepare integrated resource plans for the PUC. These plans outline ways to meet natural gas demand, proposed pipeline expansions, new storage facilities and energy conservation budgets and programs.

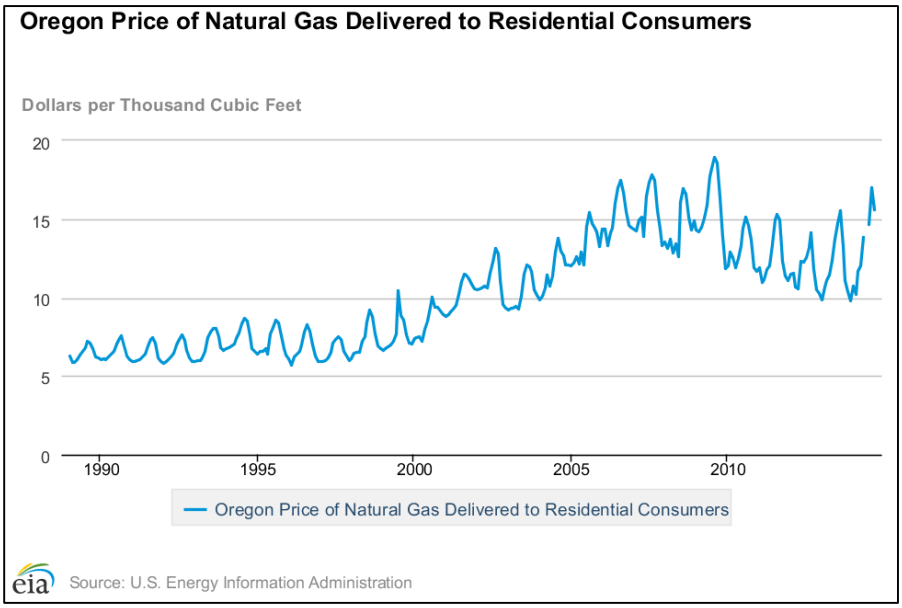


Figure 10: EIA data shows the annual residential price of natural gas in Oregon through 2014.

Electricity

Electricity Mix

Figure 11 illustrates a three-year average resource mix for Oregon's investor and consumer-owned utilities. The nuclear power comes to Oregon's consumer-owned utilities through the Bonneville Power Administration from the Columbia Generating Station at Hanford, Washington.

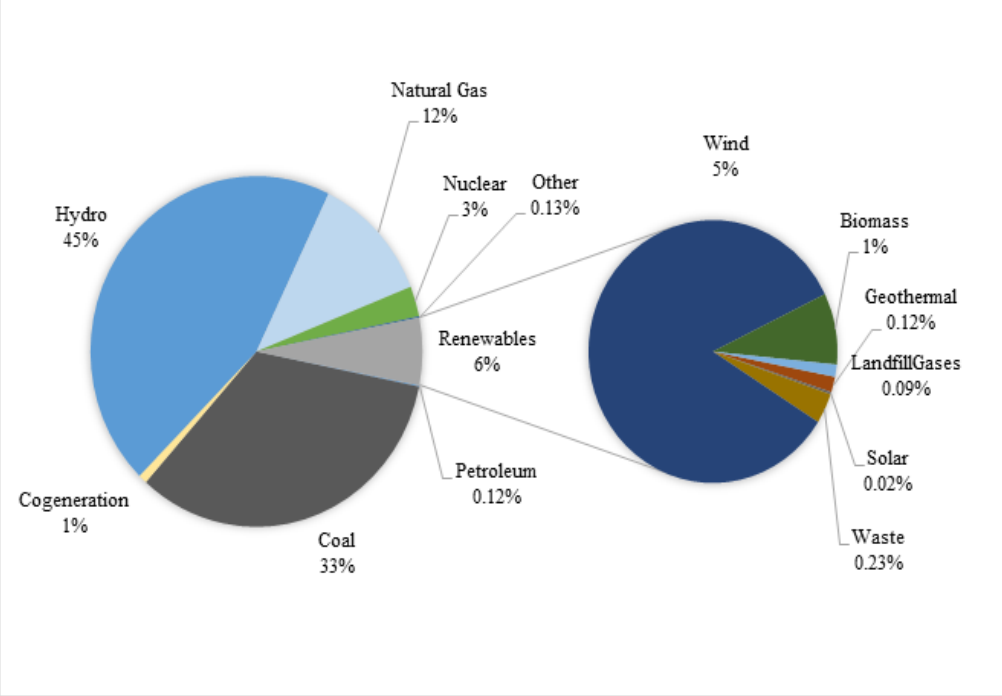


Figure 11: Oregon's 2010-2012 three-year average fuel mix shows that electricity comes mainly from hydropower plus in-state and out-of-state coal.

Hydroelectric power makes up the largest portion of Oregon's electricity resource mix, followed by coal and natural gas. The most significant change in electricity consumption from 2005 to 2010 is the growth of natural gas, from 3.3 percent to 16.24 percent. Wind has also seen consistent growth, increasing from 0.25 percent to 4.31 percent. Oregon's mix includes power generated outside of the state and delivered to Oregon consumers.

Coal power comes from Portland General Electric's (PGE) Boardman plant in Oregon and from plants in Utah, Wyoming, and Montana. Significant new wind facilities have been added since 2001. PGE plans to end the use of coal at Boardman, the state's only coal-fired power plant, by Dec. 31, 2020.

The West depends on natural gas-fired power plants, but Renewable Portfolio Standards mean more states are trying to meet new electricity needs with renewable energy, mainly wind power at this time. Oregon's top electricity producers are still hydroelectric facilities.

	Plant	Primary Energy Source	Operating Company	Net Summer Capacity (MW)
1	John Day	Hydroelectric	USACE Northwestern Division	2,160
2	The Dalles	Hydroelectric	USACE Northwestern Division	1,823
3	Bonneville	Hydroelectric	USACE Northwestern Division	1,093
4	McNary	Hydroelectric	USACE Northwestern Division	991
5	Hermiston Power Partnership	Natural Gas	Hermiston Power Partnership	615
6	Boardman	Coal	Portland General Electric Co	585
7	Beaver	Natural Gas	Portland General Electric Co	487
8	Klamath Cogeneration Plant	Natural Gas	Pacific Klamath Energy Inc.	470
9	Hermiston Generating Plant	Natural Gas	Hermiston Generating Co LP	464
10	Biglow Canyon Wind Farm	Wind	Portland General Electric Co	450

Source: U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report."

Figure 12: According to the U.S. Department of Energy's Energy Information Administration, the top four electricity generators in Oregon are hydroelectric.

Hydroelectricity

Hydropower dominates Oregon's electricity portfolio. The Bonneville Power Administration markets power from 31 hydropower facilities in the Northwest, 14 of which are located in Oregon. These facilities account for 82 percent of all power that BPA markets.

New growth in the hydropower sector is most likely to occur in three areas: irrigation systems, pumped storage, and the addition of power facilities on existing dams, especially federal dams.

Geothermal

Geothermal has been used for direct space heating since the turn of the century and for a variety of uses including heating homes, schools, businesses, swimming pools and for snow melt systems for sidewalks.

The first Oregon commercial geothermal electricity production is at U.S. Geothermal's Neal Hot Springs facility in Malheur County. Idaho Power is purchasing the electricity. Other projects include Surprise Valley Electric Co-op near Paisley.

The Geothermal Energy Association has ranked Oregon the third busiest in the country in terms of geothermal project activity. Most areas of high heat flow are in the Cascades, central Oregon, southeast Oregon and parts of northeast Oregon.

Solar

Solar energy is Oregon's most abundant and available renewable energy resource. The solar resource east of the Cascades is typically 30-to-40 percent greater than the Willamette Valley or Coast. However, solar energy technologies work throughout Oregon and generate electrical and thermal energy in all parts of the state.

Common solar technologies include daylighting, passive solar space heating, solar water heating, and solar electric or photovoltaic systems. PV systems generate electricity, which is typically back fed to the grid through an electric service panel.

The majority of solar energy projects being installed in Oregon are PV systems. In 2013, about 1,000 PV systems used the Oregon Department of Energy's Residential Energy Tax Credit program, compared to about 100 solar water heating system. The federal investment tax credit is set to expire on December 31, 2016, and the state residential energy tax credit is scheduled to expire after January 1, 2018.

Wind

Most of Oregon's large-scale wind development takes place primarily in the central and eastern Columbia River area and in northeastern Oregon. The American Wind Energy Association ranks Oregon 5th in the country for installed wind capacity at 3,153 MW. The U.S is home to more than 500 manufacturing facilities producing products for the wind industry, including blades and towers. AWEA says nine of those facilities are in Oregon.

Wind farm proposals of 105 megawatts and above go through Oregon's Energy Facility Siting Council, a one-stop process with a direct appeal of decisions to the Oregon Supreme Court. Developers of less than 105 MW may also choose to go through EFSC. Of the operational wind farms in Oregon, about 75 percent have a capacity below the state's 105 megawatt threshold and were approved at the county level through the land use process.

Biogas

A growing area of the bioenergy sector is in the production and use of biogas. Biogas is produced through the breakdown of biomass into methane that is used to produce electricity. The Oregon Department of Energy has helped grow the anaerobic digester industry in Oregon. These digesters provide important nutrient management services, help improve water quality, and integrate a new revenue source while generating a local, renewable energy source.

Oregon's dairies, water treatment plants, municipal solid waste collectors and food processors have the potential to develop more than 100 MW of biogas energy from anaerobic digesters. Landfills in Oregon have installed methane capture systems and use the gas to produce electricity and where possible, capture the heat for thermal applications such as food processing or heating greenhouses.

Electricity Rates

The Energy Information Administration lists the Oregon residential electric rate at 10.75 cents per kilowatt-hour (kWh) in August 2014, compared to a nationwide average of 13.01 cents/kWh. Hawaii has the most expensive rates (38.12 cents/kWh) and Washington has the cheapest (8.95 cents/kWh). Commercial rates have increased from 7.57 cents per kWh in 2010 to 8.68 cents per kWh in 2014.

Oregon's industrial electric rates rose from 5.65 cents per kWh in 2010 to 6.29 cents per kWh in 2014.

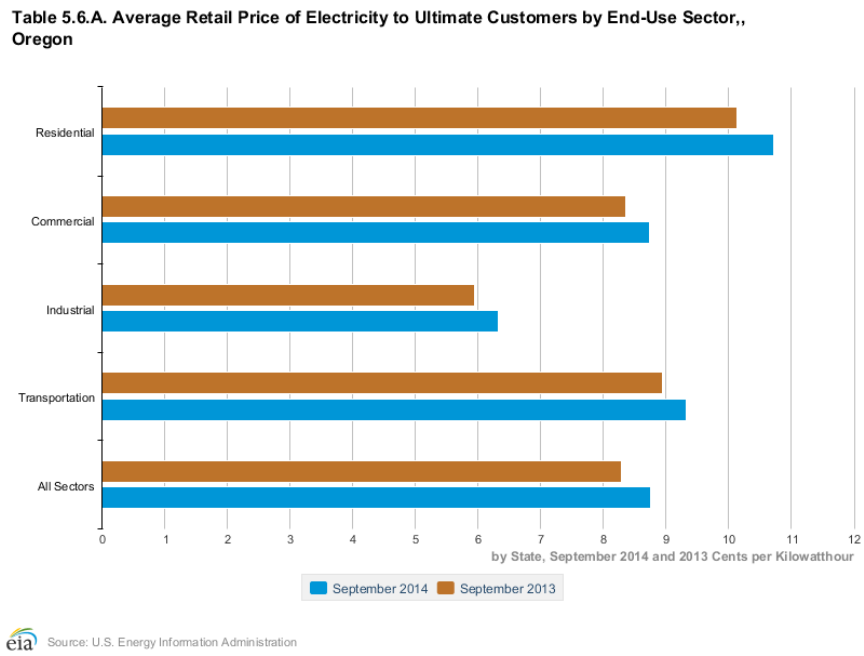


Figure 13: 2012 Oregon Electricity Prices by sector Source: Energy Information Administration

Transmission and Distribution

The U.S. consists of three major electricity transmission grids: the Western Grid, Eastern Grid and Texas. Information and communication technologies are being used to improve these systems through an effort known as the smart grid.

The U.S. electric grid is made up of electricity generation, distribution and transmission. More than 9,200 electric generating units are connected to about 300,000 miles of transmission lines.

The Bonneville Power Administration, a federal power agency, operates about 75 percent of the high voltage transmission in the Pacific Northwest. Most of the rest is operated by PacifiCorp and other investor-owned utilities.

Federal Projects

Bonneville Power Administration transmission upgrade projects are occurring at:

- Buckley Substation Rebuild (Sherman County). BPA is proposing to allow the interconnection of the 299 MW of electricity from the Brush Canyon Wind Facility, which requires a rebuilt substation.
- I-5 Corridor Reinforcement Project – (Multnomah County). A 79-mile 500 kV line between Castle Rock, Washington and a new substation in Troutdale. BPA released the Draft Environmental Impact Statement in November 2012 naming the preferred alternative to be

the Columbia River crossing near Troutdale. The Final Environmental Impact Statement is expected in late 2015.

- Pacific Direct Current Intertie – (Wasco County). Improvements will boost a portion of the 846-mile line's capacity and improve reliability between the Northwest and California. Most of the upgrades will happen at the Celilo Substation in The Dalles, with construction expected to last through late 2016.

Energy Facility Siting Council Projects

- Boardman to Hemingway is approximately 300 miles of single circuit 500-kilovolt (kV) transmission line proposed to connect the power plant near Boardman and the planned Hemingway substation near Murphy, Idaho. This project, proposed by Idaho Power, requires the approval of Oregon's Energy Facility Siting Council and the Bureau of Land Management. ODOE expects to receive an amended preliminary Application in late 2015.

Power Plants

The Oregon Department of Energy serves as staff to the Governor-appointed and Senate-confirmed Energy Facility Siting Council. A large number of applications for and amendments to site certificates are being reviewed, continuing a trend that began in 2007.

The Energy Facility Siting Council Process

EFSC makes siting decisions for large energy facilities. ODOE reviews an application for site certificate, coordinates the review of other state agencies and governments and issues a proposed decision for public comment and Energy Facility Siting Council consideration.

EFSC has the authority to exempt proposed developments if certain criteria are met. High-efficiency cogeneration power plants, grain-based ethanol plants and temporary power plants are among those the Energy Facility Siting Council has exempted from siting standards.

EFSC uses all relevant state and local criteria in making its siting decisions. In addition to its own standards, it applies applicable requirements from the Oregon Departments of Environmental Quality, State Lands, Fish and Wildlife, and Water Resources, along with local land use requirements. Only DEQ's federally delegated water and air quality permits are excluded from EFSC review.

The Energy Facility Siting Council affords the public a single review and set of hearings in which to participate. Developers have one process for all state and local government requirements. A siting decision can only be appealed to the Oregon Supreme Court.

Below are some of the types of energy facilities requiring an EFSC site certificate before construction:

- Electric power plants with a nominal electric generating capacity of 25 megawatts or more from thermal power or combustion turbines.
- Electric power plants with an average electric generating capacity of 35 megawatts or more if the power is produced from geothermal, solar or wind energy at a single energy facility or

within a single energy generation area.
- Transmission lines of 230 kilovolts or more that are more than 10 miles in length and that are to be constructed in more than one city or county in the state.
- Liquid fuel pipelines that are 6 inches or larger in diameter and 5 miles or more in length.
- Intrastate natural gas pipelines that are 16 inches or more in diameter and 5 miles or more in length.
- Plants that convert biomass to gas, liquid or solid fuel products if any one of such products is capable of being burned to produce the equivalent of 6 billion Btu of heat per day.

Proposals Under Review

The Energy Facility Siting Council is actively reviewing site certificates applications for renewable energy and fossil fuel plants.

ODOE is reviewing site certificate applications for:

- 500 megawatts of wind generation known as Baseline Wind in Gilliam County
- 399 MW of wind at the Saddle Butte Wind Park; Gilliam and Morrow counties
- 653 MW of natural gas at the Troutdale Energy Center
- 420 MW of natural gas at the South Dunes Power Plant in Coos County
- 500 MW of wind, Wheatridge Wind; Morrow and Umatilla counties
- 400 MW of natural gas at Perennial Wind Chaser Station in Umatilla County

Nuclear Power Plants

In large part because of climate change, as well as the new design of nuclear power plants, there has been some interest nationally in expanding nuclear energy.

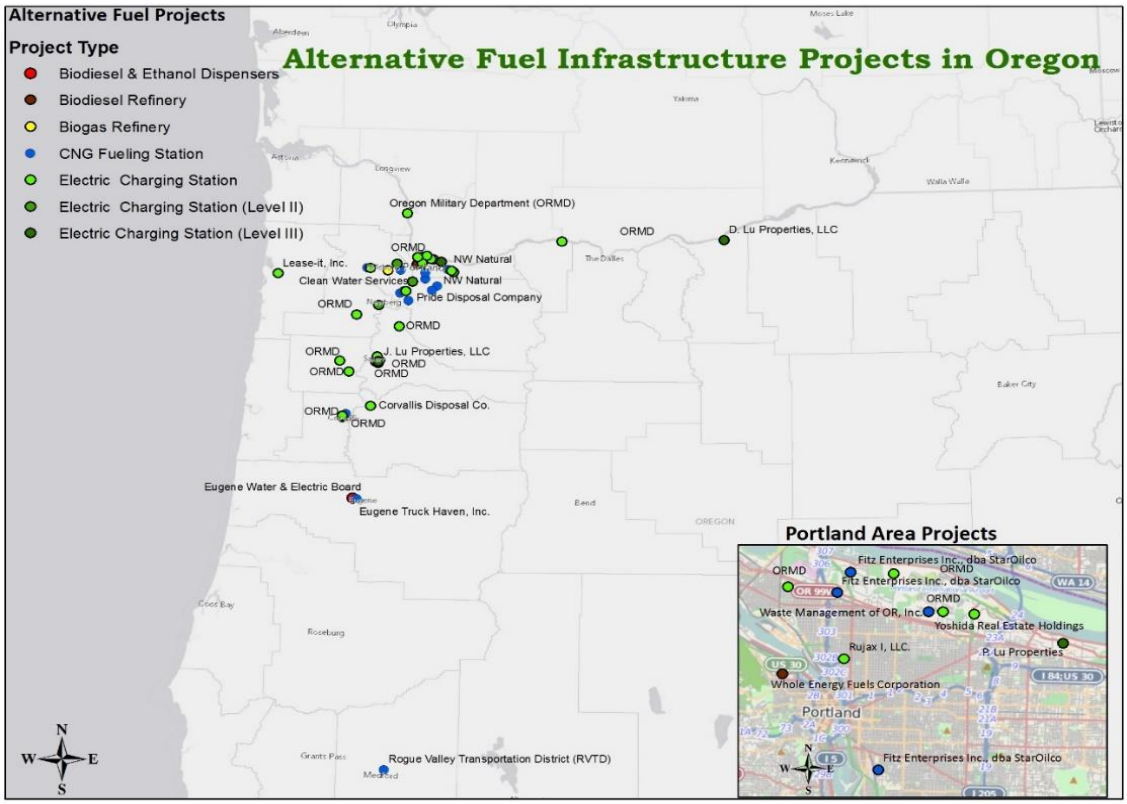
Oregon voters approved an initiative in November 1980 that establishes – in law – limits on the licensing of a new nuclear power plant. The plant may be licensed only with voter approval and only if a permanent repository exists for disposal of high-level waste produced by the plant. Below is the text of the Oregon Revised Statutes established by voters:

- **469.595 Condition to site certificate for nuclear-fueled thermal power plant.** Before issuing a site certificate for a nuclear-fueled thermal power plant, the Energy Facility Siting Council must find that an adequate repository for the disposal of the high-level radioactive waste produced by the plant has been licensed to operate by the appropriate agency of the federal government. The repository must provide for the terminal disposition of such waste, with or without provision for retrieval for reprocessing.

- **469.597 Election procedure; elector approval required.** (1) Notwithstanding the provisions of ORS 469.370, if the Energy Facility Siting Council finds that the requirements of ORS 469.595 have been satisfied and proposes to issue a site certificate for a nuclear-fueled thermal power plant, the proposal shall be submitted to the electors of this state for their approval or rejection at the next available statewide general election. The procedures for submitting a proposal to the electors under this section shall conform, as nearly as possible to those for state measures, including but not limited to procedures for printing related material in the voters' pamphlet. (2) A site certificate for a nuclear-fueled thermal power plant shall not be issued until the electors of this state have approved the issuance of the certificate at an election held pursuant to subsection (1) of this section.

Electric Vehicles

The Energy Information Administration says Oregon has about 4 percent of all the public electric vehicle charging stations in the U.S. Fast chargers are located about every 25-50 miles on 585 miles of Interstate 5 running through Oregon and Washington. EIA says plug-in electric vehicle drivers recharged 18,522 times in Oregon from March 2012 through April 2014, using 153,256 kWh of electricity. Oregon and Washington created plans in 2008 to increase PEV travel by installing recharging stations on major travel corridors. Fast chargers take 15 to 30 minutes to charge, while Level 2 chargers take about four hours.

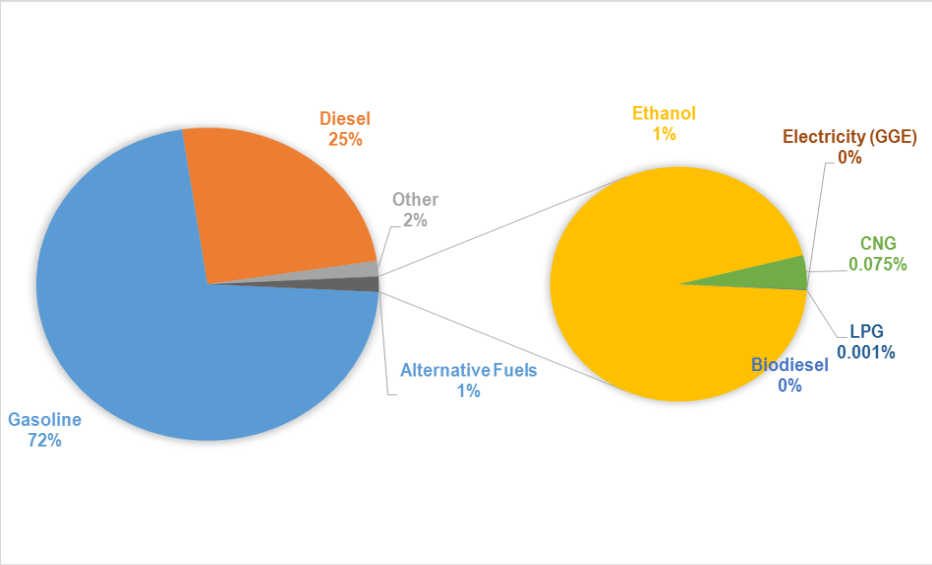


The Oregon Department of Energy offers incentives for residential and business alternative fuel vehicle charging infrastructure.

Figure 14: Oregon had about 4,000 registered electric vehicles as of fall 2014.

Transportation

Transportation accounts for approximately 33 percent of energy use in Oregon. Gasoline and diesel are the most common transportation fuels at 60 and 20 percent, respectively. These two fuels account for more than 50 percent of the amount paid by Oregonians for energy use.

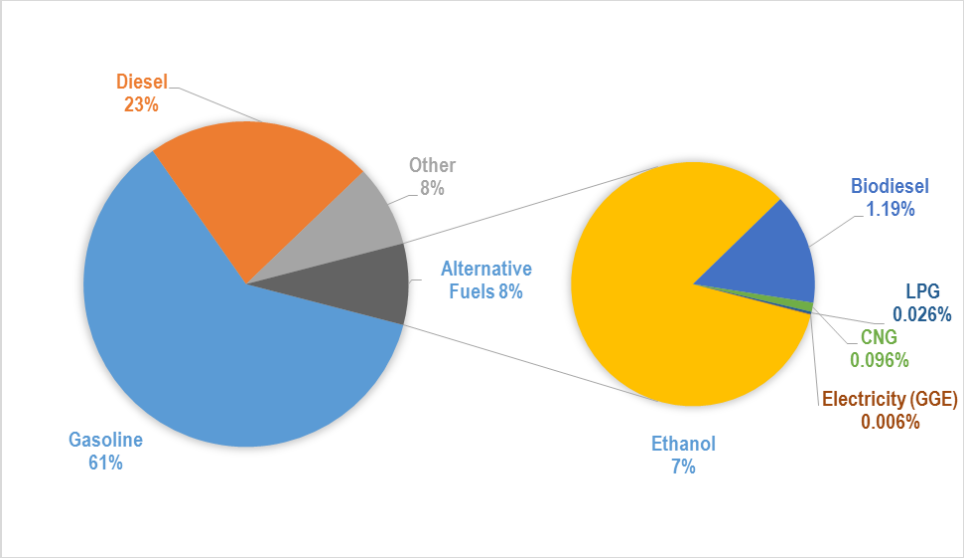


Oregon's Changing Transportation Fuel Mix and Use

Oregon's transportation fuel mix and consumption, compared from 2005 to 2013, shows significant changes. Oregon has reduced petroleum (gasoline and diesel) fuel demand by 14.9 percent (from 2.1 billion to 1.8 billion gallons per year). The largest portion of this reduction can be attributed to alternative fuels. The passage of the Oregon Renewable Fuel Standard in 2007 requires 10 percent ethanol in gasoline by volume (with some exceptions) and 5 percent biodiesel in diesel by volume.

The RFS has affected Oregon in several ways. In 2005 no transportation fuel was sourced or processed in Oregon; all fuel was imported from other states and abroad. In 2013 nearly 40 million gallons of ethanol was produced in-state, representing 27 percent of Oregon's required ethanol demand. The 6 million gallons of biodiesel produced in-state also accounted for 23 percent of the biodiesel needed to meet the RFS requirements. In the case of ethanol, cattle feed and corn oil are also byproducts of the ethanol process and are used in-state. Producing fuel in Oregon helps keep energy dollars in-state.

Additionally, there are signs of increased use of natural gas, LPG (propane) and electricity in vehicles as well as high blends of biofuels such as B20, B99 and E85. These percentages are small but increasing.



Total transportation fuel use, which includes alternative fuels have seen a decline of 8.12 percent over the same period. Decreased fuel consumption can be attributed to several factors, such as improved fuel economy, reduction in vehicle miles traveled, the recession and mode shifting (carpool, bus, bike, or walking).

Figure 16: 2013 Oregon Transportation Fuel Mix

	2005		2013	
Fuel Type	**Gallons**		**Gallons**	
Gasoline	1,499,996,000	69.61%	1,316,406,407	66.49%
Diesel	620,634,000	28.80%	488,617,693	24.68%
Ethanol	32,500,000	2%	146,267,379	7.39%
Biodiesel	0		25,716,721	1.30%
CNG	1,600,000	0.07%	2,083,239	0.11%
LPG	29,400	0.00%	566,561	0.03%
Electricity(GGE)	0		121,532	0.01%
Petroleum	2,120,630,000	98.40%	1,805,024,101	91.17%
All Others	34,129,400	1.60%	174,755,431	8.83%
Total	**2,154,759,400**		**1,979,779,532**	

Figure 17: Oregon gasoline consumption has declined from 2005 to 2013.

ENERGY TRENDS AND ISSUES

Proposed Rule on Carbon Emissions from Existing Power Plants

In June 2014 the EPA issued draft rules that would regulate carbon dioxide emissions from existing fossil fuel power plants. EPA uses four "building blocks" to set emission reduction goals that each state must meet, starting in 2020. The building blocks are increased efficiency at existing power plants, switching dispatch from existing coal to existing gas plants within the state, increasing the amount of renewable power that serves state electricity demand, and increased efficiency by retail electricity customers.

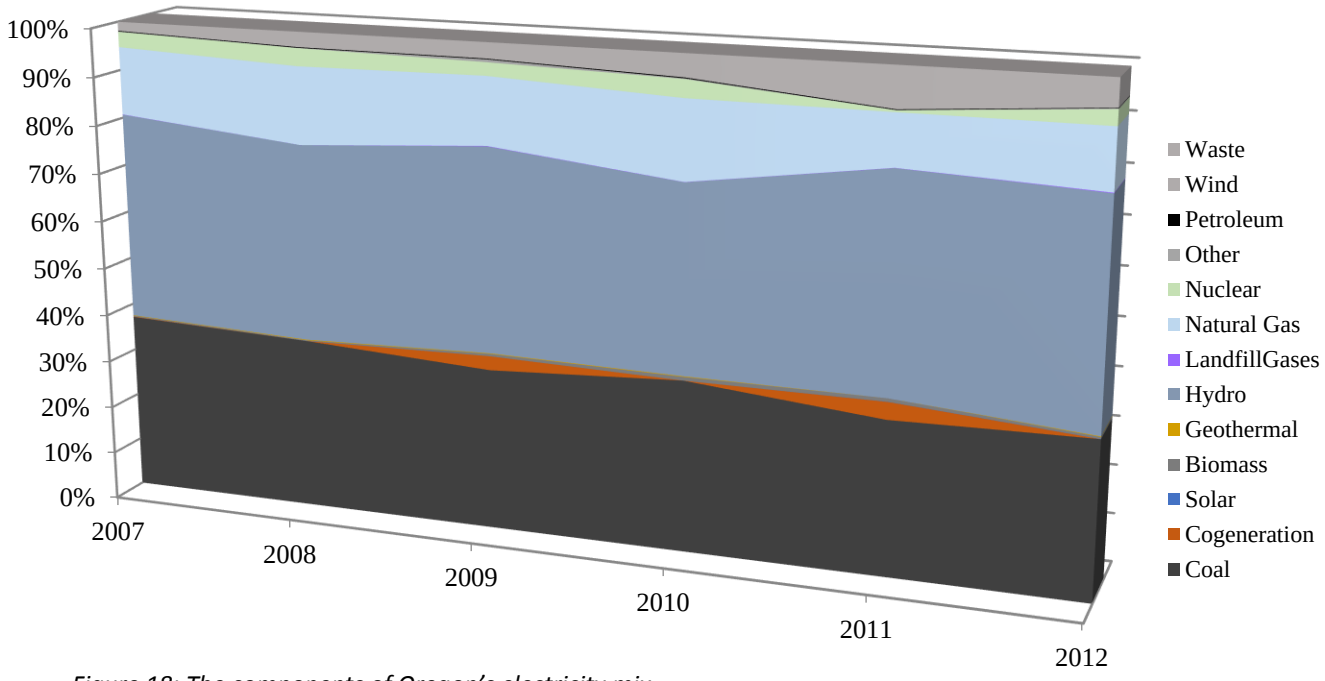


Figure 18: The components of Oregon's electricity mix.

In October 2014 the State of Oregon submitted comments to EPA on its draft rule. Oregon supports EPA's effort to address climate change, and generally supports EPA's methods of setting the emission reduction goals. The final rule, expected in summer 2015, will likely contain several changes from the draft rule. States will then propose carbon reduction plans by 2016 to comply with the final rule (an extension to this date is possible if certain conditions are met).

Oregon's Department of Environmental Quality will develop Oregon's plan, in cooperation with other state agencies. Oregon may rely on a variety of mechanisms to achieve carbon reductions required by the rule. The already-existing agreement to discontinue coal burning at Boardman in 2020 will help the state achieve roughly 50 percent of the carbon reductions required for Oregon in the draft rule.

Oregon's Greenhouse Gas Emissions Inventory

Inventorying greenhouse gas emissions is a necessary step for tracking progress toward Oregon's legislatively adopted goals for arresting emissions growth by 2010 and reducing emissions to 10 percent below 1990 levels by 2020 and 75 percent below 1990 levels by 2050. In 2013 Oregon agencies compiled a comprehensive inventory that utilizes data reported directly to the state via the Oregon Greenhouse Gas Reporting Program.

The inventory also provided data on both in-boundary emissions (those occurring within Oregon's borders and associated with electricity use in Oregon) and consumption-based emissions (those occurring globally as a result of satisfying Oregon's consumption of goods and services). The in-boundary inventory showed that transportation remains the largest contributor to the state's emissions, but that overall emissions have declined since 2007. The consumption-based inventory showed that there has been essentially no change in total emissions from Oregonian's consumption between 2005 and 2010, the only two years for which data is available.

Regional Haze Rules

Under the Clean Air Act of 1990, the U.S. Environmental Protection Agency requires coal plants to meet increasingly stringent requirements to reduce regional haze in the West. EPA has also issued rules to reduce emissions of mercury and other toxics. In some cases, it makes more economic sense for the plant owner to cease coal operations rather than install the required pollution controls. At the end of 2020, Portland General Electric will stop burning coal at its Boardman Plant. This plant is the only coal plant in Oregon. PGE supplies 37 percent of Oregon electricity sales.

Pacific Power supplies almost 28 percent of Oregon electricity sales. It gets about two-thirds of its power from 11 coal plants in five western states. It plans to shut down its Carbon Coal Plant in Utah in 2015 and to convert one unit of its Naughton Coal Plant in Wyoming to natural gas by 2016 or 2017. Pacific Power's plans for its other coal plants will be announced in spring 2015.

Federal Regulations on Water Use at Power Plants

According to the EPA, more than half of all water withdrawn in the United States each year is for cooling purposes. By far, the largest industrial use of cooling water is for "thermoelectric generation," or generating electricity with natural gas, coal, nuclear, or another heat-based generation process.

In 2014, the EPA finalized regulations for water intakes at existing power plants that use more than 2 million gallons of water per day. Water intakes that are not well screened can pull aquatic life into the cooling system. Even where screens exist but water is pulled too quickly, aquatic life can be stuck or "impinged" on the screen. The new regulations set standards for intake water velocities, screening criteria and other compliance paths.

The EPA is also developing regulations for water released after it is used in the cooling system. Water discharged from the cooling system can be too warm and may have toxic loading. According to EPA, thermal power plants "alone contribute more than half of the toxic pollutants discharged to water bodies by all industrial categories currently regulated in the United States." These effluent guidelines will set limits on the temperature and the pollutants in the water discharge.

Thermal Energy

About a quarter of the energy that Oregonians use is for thermal purposes. This energy provides heating and cooling for our homes and buildings, and energy that is used by industries such as food processing and pulp and paper. An initial analysis of thermal energy in Oregon estimates that industrial uses comprise 51 percent of the thermal energy consumed in 2009. The residential sector used 32 percent and the commercial sector used 17 percent.[1]

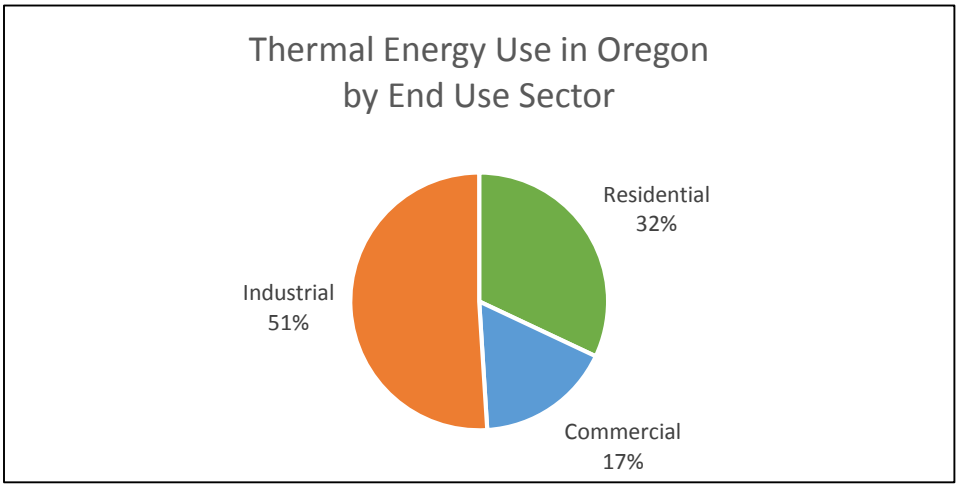


Figure 19: More than half the thermal energy consumed in 2009 was by the industrial sector.

Natural gas and electricity provide more than 80 percent of Oregon's thermal energy needs. Electricity, geothermal, biomass and solar energy provide a good portion of the thermal energy that heats our schools, homes and offices.

The Oregon Department of Energy provides incentives for residents making more efficient use of thermal energy in their homes through the Residential Energy Tax Credit program and the State Home Oil Weatherization program. These incentives support heat pumps, furnaces, water heaters, solar thermal, and high-efficiency wood or pellet stoves. Additional incentives may be offered through a local utility, the Energy Trust of Oregon, or through local community action agencies and community service providers.

Industrial Efficiency

Oregon is ranked as the third most industrial state. Whether it's wood products, clean technology or food processing, Oregon has proved to be the place for industrial innovation and leadership. The industrial sector has quietly shown leadership in energy efficiency for years.

The Oregon Industrial Energy Efficiency Program is an integrated structure of programs and activities serving the energy-related needs of industrial sector businesses. The widely diverse size and activities of industry in Oregon require similar diversity of programs to effectively serve these needs. Since the mid-1990s, the Oregon Department of Energy has worked with regional stakeholders to efficiently integrate and operate a variety of programs including the Oregon Industrial Collaborative and Senate Bill 1149 Self-direction.

The Oregon Industrial Collaborative is a group of regional organizations who provide energy efficiency incentives and services to the industrial sites in Oregon. Members of this group include the Energy

[1] C. Remington, C. Davis, and M. Krumenauer. (August 2012). *Oregon's Thermal Energy Baseline*. Retrieved from http://sustainablenorthwest.org/uploads/resources/2012_Thermal_Energy_Baseline_FINAL.pdf

Trust of Oregon, Bonneville Power Administration, Northwest Energy Efficiency Alliance, Oregon State University, and Washington State University. The Oregon Department of Energy coordinates with the Collaborative. The objective of this Collaborative is to maintain communication and coordination between their programs operating in Oregon.

The SB 1149 Self-direction allows electric users to opt out of paying portions of the Public Purpose Charge if they are large enough and conduct appropriate energy efficiency projects. The Department is charged with certifying that sites are eligible, and that subsequent projects are properly implemented. Most of the participants are industrial sites.

A current ODOE effort is targeting the use of combined heat and power systems on industrial sites, which improves overall resource utilization and reduces operating cost. The Department is conducting this work in partnership with the US Department of Energy, Washington State University, and industry organizations like the Northwest Food Processors.

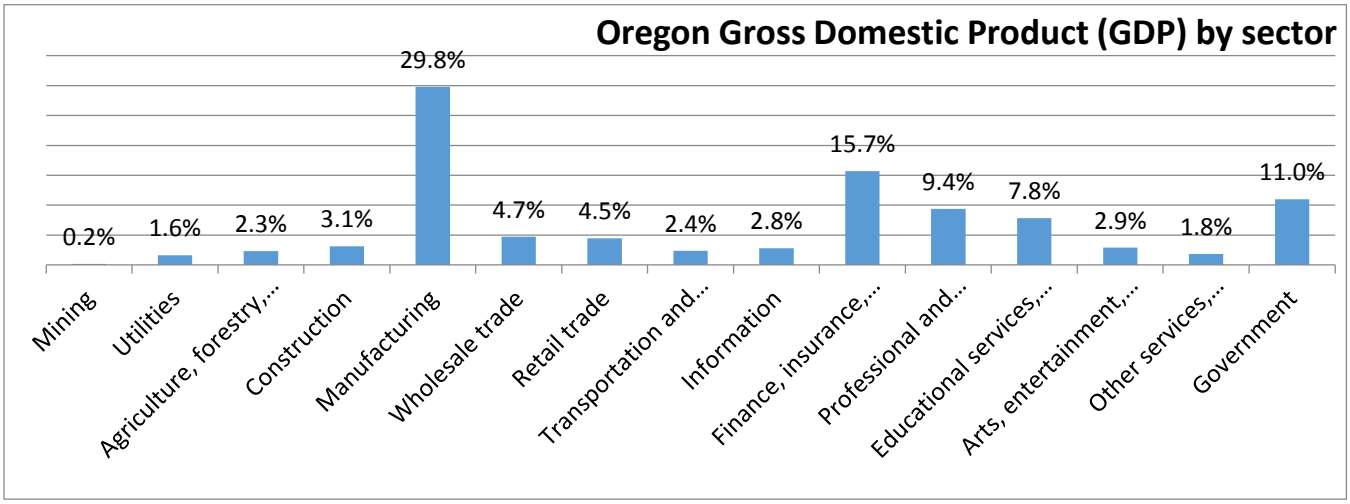


Figure 20: Manufacturing leads Oregon's Gross Domestic Product by sector.

Marine Energy Testing

Oregon is at the crossroads of a developing marine energy industry, with a powerful wave climate and an environment suited for testing wave energy device technologies. Oregon is becoming the place to deploy devices from concept to full-scale deployment and learn how well they work in the marine environment.

For early-stage concept and design, Oregon State University houses Hinsdale Wave Research Laboratory in Corvallis with indoor wave tanks and a tsunami basin.

The Northwest National Marine Renewable Energy Center, a partnership between Oregon State University and the University of Washington, developed the Pacific Marine Energy Center's North Energy Test Site, a one square mile area off the coast of Newport. This site was designed to offer scaled-down wave energy devices an open water test site in summer climates, connected to the Ocean Sentinel, a 20-foot floating platform with technical capabilities.

In September 2014, M3 (www.m3wave.com) successfully deployed a device about one kilometer off the coast of Camp Rilea, near Astoria. M3's device, APEX, rests on the seafloor and captures the power potential of shifting wave dynamics. In Camp Rilea waters, the device was submerged beneath 50 feet of water.

Oregon State is seeking federal permits to construct the Pacific Marine Energy Center's South Energy Test Site, about six kilometers off the coast of Newport. The Pacific Marine Energy Center will offer grid-connected test berths for full utility-scale deep-water wave energy devices.

The Bureau of Ocean Energy Management has given Principle Power, Inc. approval to submit a formal plan to build five, 6-megawatt floating wind turbine devices about 13 miles off the shore of Coos Bay.

Known as the WindFloat Pacific project, this 15-square mile proposed lease area is one of a series of leasing efforts being pursued by BOEM. The Bureau is also conducting research into the renewable energy potential off the Oregon Coast.

Peak Electricity Load Management

Oregon has long-standing energy efficiency programs that reduce consumption and help offset the need for electricity generation within the state. Several utilities in the state also offer programs that reduce energy consumption and demand at peak times.

Ironwood lowering APEX into the Pacific Ocean as seen from the dive boat September 4th, 2014. Photo courtesy of Mike Delos-Reyes, M3 Wave.

Energy efficiency programs help Oregonians use electricity as efficiently as possible by ensuring that they get the most benefit, such as light or heat, from the energy they buy. Peak load reduction programs target energy efficiency to times when electricity demand or wholesale energy prices are high. They offer enhanced incentives for efficiency devices that reduce consumption during these peak times. Those devices help reduce energy costs for individual using the device, and help reduce costs for all consumers by using the electricity system more efficiently.

Direct load control programs shift consumption to times when less expensive sources of generation are available, which helps reduce the cost of energy by offsetting the need to use expensive sources of electricity. These programs help integrate intermittent energy sources by controlling consumption so that it matches generation. They can also increase electric system reliability by providing grid operators with additional resources to respond to demand which, ultimately, can help prevent blackouts and power surges.

Time-of-use rates also help reduce peak electricity demand by sending a price signal to conserve electricity when regional electricity use is typically high, and offering lower prices when regional electricity use is typically low. Oregon's two largest electric utilities, Portland General Electric and PacifiCorp, are required to offer a market-based rate to customers, but several other utilities also offer market-based rates in the form of time-of-use rates.

Participation in voluntary direct-load control and time-of-use rates programs is still low in Oregon, but will likely increase in the future because of the ability of these programs to keep electricity rates low and help make electricity service more reliable.

Energy Storage

One of the central principles of the electric grid is that generation must match demand in real time. One of the challenges of developing new renewable energy resources such as wind, solar and wave energy is managing the variability of the generation to the variability of load.

Storing energy has the potential to change the fundamental equation and make the grid more flexible. Energy storage can offer buffers between generation and load, which reduces operational complexity, builds resiliency in our distribution systems and backs up power for emergency services. Although project costs are high, the technology is changing rapidly and there are specific applications where utility-scale storage has a strong business case today.

Storage Types

There are many forms of electricity-related energy storage. Most existing technologies fall into one of these categories: pumped hydropower, batteries, flywheels and compressed air.

A pumped storage system consists of two reservoirs, one at an elevation higher than the other. When electricity demands (and prices) are high, water moves down to the lower reservoir – similar to how power is generated through a hydroelectric dam. When price and electricity demand is low, usually at night, the water is pumped back up to the higher reservoir.

Batteries – which convert chemical energy into electrical energy – are among the most commercially ready energy storage technology. Today, both traditional and advanced batteries are available:

- Lead-acid batteries are the traditional battery; common in the automotive industry
- Lithium-ion batteries are increasingly popular due to their performance, cost, and standardization in the electronics industry, including electric vehicles
- Flow batteries (such as vanadium redox and zinc-air) keep one or both active materials in solution at all times
- Sodium sulfur batteries have enjoyed moderate-scale demonstrations by utilities in the United States

The PGE Smart Power project is 5 MW of battery storage, primarily for renewable energy power output firming and shaping.

Flywheels use energy to cause an object to spin. The energy is stored as kinetic energy in a rotor. When the electricity is needed, the rotor is used to drive a generator and create electricity.

Compressed air energy storage systems use energy to compress air and store it in a reservoir. When electricity is needed, the air is expanded to generate electricity. The storage reservoir can be underground (an air-tight salt cavern) or above ground (tanks). These systems can be large (greater than 100 megawatts) and provide grid-level services. Two underground compressed air energy storage systems are in operation today, in Alabama and Germany.

With increasing interest in energy storage in the Pacific Northwest, numerous entities are investigating or collaborating on energy storage projects, including Portland General Electric, PacifiCorp, Bonneville Power Administration, Snohomish PUD (Wash.), Pacific Northwest National Laboratory, Sandia National Laboratory, California PUC, energy storage technology vendors and renewable energy project developers.

Despite a significant body of work, a more detailed understanding is needed of energy storage valuation, applications and financial mechanisms and policy, and integration into utility systems.

Energy Storage has Multiple System Values

Distributed energy storage has multiple value streams which can be accessed given the resource size, location, charge and discharge characteristics, and communication capabilities. Work ongoing for USDOE to characterize these value streams involved interviewing utilities and energy storage vendors to assess those applications most likely to provide the greatest value. Below is the list of applications, as ranked by utilities.

1. Voltage Support
2. Fast Regulation
3. Renewable energy ramp control - solar
4. Service Reliability
5. Distribution Upgrade Deferral
6. Renewable energy time shift – solar
7. Renewable energy ramp control – wind
8. Renewable capacity firming
9. Load following
10. Renewable energy time shift - wind

Another insight from the survey is that utilities across the U.S. do not have a strong preference for a particular technology type, and the majority does not expect the energy storage systems to be located within the utility substation.

The challenge is to build a technical and economic framework for utilities in Oregon considering energy storage investments. Considerations include: system benefits for a given utility, geographic area or system challenge; integrating renewable energy into the transmission and distribution grid; and reducing power costs and customer charges by shifting consumption away from peak hours.

Community Renewables

Oregon has long supported the development of small distributed renewable energy systems. In 2007, the Oregon legislature established a goal that by 2025, eight percent of Oregon's retail electric load should come from small-scale renewable energy projects with a generating capacity of 20 megawatts or less.[2] Since 2007 over 200 MW of these small renewable energy systems have been installed in Oregon.

Developing small-scale or community renewable energy projects provides challenges including the cost and complexity associated with developing and operating a renewable energy project.

Industry innovations can offer additional models for deploying renewable energy systems. Volume purchasing programs, like the Solarize programs, have proven successful in reducing costs of solar installations. New models such as cooperative businesses and third-party ownership can offer additional options for community development of renewable energy systems. In 2014 the Oregon legislature authorized an exemption for renewable energy cooperatives from registering membership shares or stock as securities.[3] The administrative rules for this law were issued in the fall 2014.

Energy – Waste Nexus

Energy is integral to most aspects of modern life. This includes the way Oregon communities manage waste. Oregon waste management companies capture methane from landfills and use it to generate electricity. Water treatment plants use the biogas from anaerobic digesters to power their operations. With new materials management approaches, tools and technologies exist that can help extract even more energy from waste streams and realize multiple co-benefits.

Municipalities around Oregon have implemented residential and commercial food waste collection programs. These programs are helping to isolate food waste from the other waste streams and provide opportunities for anaerobic digestion projects that can use this material to generate biogas. In turn, biogas can be used to generate electricity or upgraded and used as renewable natural gas in vehicles.

Waste grease, such as that found in restaurants, provides another opportunity for municipalities to save money and create a source of energy. When this material is released into the waste water system, it can clog water pipes, resulting in expensive maintenance and overflows. Water treatment plants are developing programs and facilities to collect this waste and use it directly in their anaerobic digesters, creating additional energy production and lowering maintenance costs.

[2] Oregon Revised Statutes §469A.210
[3] 2014 Senate Bill 1520

There are also opportunities to optimize the management of organic wastes from Oregon's food processing industry, with a number of projects underway already. To help identify and support these opportunities the Oregon Department of Energy is researching anaerobic digestion.

Maintaining Hanford Cleanup Progress

More than 40 years of plutonium production for America's nuclear weapons program led to the extensively contaminated the Hanford Site in southeastern Washington State. As plutonium production was winding down in the late 1980s, Oregon joined with Washington State, federal and local governments, Native American Tribes, and citizen groups to advocate for and compel Hanford cleanup. Hanford Site workers are now engaged in the world's largest environmental cleanup project. The cleanup encompasses more than 1,900 waste sites, ranging from small areas of surface contamination to million-gallon underground storage tanks containing about 56 million gallons of highly radioactive and chemically hazardous waste.

Columbia River

Hanford cleanup is necessary to prevent further contamination of the Columbia River; to comply with environmental laws and restore the damaged environment; and to eliminate or reduce risks to people who live in, work in, or visit the area. While significant cleanup progress has been made, success is still far from assured. A number of challenging technical issues remain to be solved and public and regulatory agreement on and acceptance of some cleanup strategies is still needed. Successful cleanup will require a sustained, candid dialogue and substantial agreement and cooperation among stakeholders, regulators and governments. It will also require significant federal funding for the remaining four decades or more needed to complete the work.

Oregon's involvement with the Hanford cleanup focuses on work needed to protect the Columbia River. During Hanford's operating years, an estimated 444 billion gallons of contaminated liquids were disposed to the soil, resulting in extensive contamination of the groundwater. During the past few years, the U.S. Department of Energy, which owns and operates Hanford, expanded treatment systems to contain and clean-up the contaminants.

Construction continues on a $12+ billion dollar Waste Treatment Plant to immobilize Hanford's most toxic wastes, which are currently stored in 177 underground tanks. Because major technical design problems have yet to be fully addressed, it is unknown when these facilities will become operational. They will not likely be operational until sometime well after 2020. In the meantime, one of Hanford's 28 double-shell tanks – the newest and most robust of the tanks – is leaking from its inner shell. Given that the double-shell tanks were counted on to safely hold the waste for several decades until treatment could be complete, this raises serious concerns about the potential failure of more tanks and the possibility that cleanup funding may end up being diverted to construct new storage tanks.

Oregon strongly supports efforts to accelerate treatment of Hanford's tank wastes. As long as the wastes remain in these aging tanks, it poses a threat to the groundwater and eventually to the Columbia River.

Waste Shipments

As part of the Hanford cleanup, a specific type of radioactive waste (called transuranic) has been trucked to a disposal site in New Mexico. Hanford shipped 649 truckloads of transuranic waste to this disposal facility and to a federal facility in Idaho for treatment, from 2000 through 2011. The shipments

traveled along Interstates 82 and 84 in northeast Oregon. Because of other priorities at Hanford, shipments were not expected to resume for at least a few years.

The disposal site is currently shut down because of a February 2014 accident that resulted in a release of radioactive material in the facility and to the environment. The facility is expected to be shut down for about two years, likely further delaying the resumption of shipments from Hanford. Once they resume, shipment numbers are likely to be in the neighborhood of 200-350 each year. Oregon will continue to ensure these shipments are conducted safely, and do not travel when the road or weather conditions are unsafe.

Emergency Preparedness

The Oregon Department of Energy is responsible for preparing and responding to nuclear emergencies, handling petroleum disruptions or shortages, improving the resiliency of critical energy infrastructure and preparing for emergencies related to the operation of a liquefied natural gas import facility.

Nuclear Emergency Preparedness

About 29,000 Oregonians live in the communities of Boardman, Irrigon, Hermiston and Umatilla, which are located within the 50-mile nuclear emergency planning zone for both Hanford and the Columbia Generating Station nuclear power plant in Washington. A fire, explosion, or other accident involving Hanford's contaminated facilities or underground waste storage tanks could cause an airborne release of radioactive materials. Similarly, an accident at the Columbia Generating Station could also cause an airborne radioactive material release.

Oregon's primary concern with a radioactive material release from Hanford or the Columbia Generating Station reaching Oregon is protecting people from consuming contaminated water or food products and restricting movement of these products into the marketplace. ODOE works with Morrow and Umatilla counties and several other state agencies to regularly test the nuclear emergency preparedness program. In 2012, both counties lost federal funding for emergency preparedness planning due to completion of the incineration of the last of the nerve agents at the Umatilla Depot. These funding cuts have reduced both counties' overall emergency preparedness programs, though both remain involved with ODOE's nuclear emergency planning.

Petroleum

ODOE develops and maintains a statewide contingency plan in response to severe or long- term petroleum shortages or disruptions that impact the state. Oregon's Petroleum Contingency Plan includes fuel allocation procedures to ensure adequate fuel is provided to the state's emergency and essential services providers in case of a fuel shortage or crisis. The purpose of the plan is to provide an effective response, well-coordinated with industry, governments and local organizations. The plan is also designed to ensure a rapid recovery of the fuel supply and distribution system while minimizing impacts to Oregonians. The Oregon Department of Energy will implement the plan, as appropriate, if it anticipates a potential or actual fuel emergency situation in the state.

Energy Assurance

To protect public health and safety, the environment, and the region's economy, ODOE is and has been working to improve the resiliency of critical energy infrastructure. This will ensure Oregon is prepared to respond to and recover from catastrophic events. This includes assessing seismic vulnerabilities of the petroleum, natural gas, and electricity infrastructures; evaluating the interdependencies of the

energy sectors; and considering the use of renewable resources and smart grid technologies to supplement emergency response efforts. This work, which was done in coordination with the Oregon Public Utility Commission, helps ensure a rapid recovery of energy systems in the event of an energy emergency.

Liquefied Natural Gas

As part of its emergency preparedness obligations, the Oregon Department of Energy is responsible for protecting the health and safety of Oregonians in the event of a liquefied natural gas emergency along the transport channel as well as at any potential facility. There are two proposed LNG terminals in Oregon currently in the federal siting process, one near Astoria and the other near Coos Bay. Each is at a different stage in the process.

The Oregon Department of Energy works with LNG developers, the U.S. Coast Guard and local emergency response organizations to develop a comprehensive emergency response plan to be completed prior to construction. ODOE, in conjunction with the U.S. Coast Guard, assesses waterway suitability for the transportation of LNG shipments. The agency also reviews facility security plans to ensure federal and state requirements are met and evaluates the Liquefied Natural Gas Vessel Transit Management Plan so that foreign vessels follow federal and state protocols when entering LNG transit corridors in Oregon.

Natural Gas

Oregon's gas utilities maintain emergency procedures. The utilities have systems in place to address interruptions. The Public Utility Commission regularly visits utilities to address emergency requirements related to excavation-caused line breaks, leaks, storage problems and other disruptions.

Abandoned Uranium Mines

During the 1950s, two uranium mines were developed in Lake County in southern Oregon. The White King and Lucky Lass mines were abandoned in the 1960s. In the mid-1980s, the U.S. Department of Energy and State of Oregon completed a cooperative cleanup of the uranium mill site near Lakeview. The mines themselves, however, were not cleaned up at that time.

The EPA added the mines to the Superfund list in September 2001. Besides the EPA, others involved include the Oregon Department of Energy, the U.S. Forest Service and the Oregon Department of Environmental Quality. The EPA, DEQ and ODOE negotiated a consent decree in which Kerr-McGee Corp. agreed to perform the cleanup work, which occurred during the 2005 and 2006 construction seasons.

Following the winter of 2006-2007 corrective action was taken to repair excess erosion on the White King site, and "liming" of the White King pond was completed. Additional actions taken to restore the meadows and develop wetlands are progressing well.

The Oregon Department of Energy continues to monitor the cleanup work and performs annual inspections with DEQ, the EPA and U.S. Forest Service to ensure the protective measures are working.

REDUCING ENERGY COSTS

The 1975 Oregon legislature set as state goals the promotion of "the efficient use of energy resources" and the development of "permanently sustainable energy resources." Oregon is recognized for being a long-time leader in energy efficiency and clean energy development.

The 2012 U.S. Clean Energy Leadership Index issued by Clean Edge listed Oregon as the number three national leader (behind California and Massachusetts) in clean-energy states. The Index evaluated states based on incentives, regulations and mandates, financial and human capital and clean-energy technology.

In its 2014 ranking, the American Council for an Energy-Efficient Economy placed Oregon third in the nation. The scoring is based on state government incentives, appliance efficiency standards, transportation, building codes, public benefits fund and combined heat and power.

What follows is a snapshot in time of energy savings and energy generation; a look at what

Oregonians have achieved over the years. These estimated savings, a cumulative number captured in 2013, are adjusted for the life of the measures, excluding savings from projects assumed to have reached the end of their useful life.

The Willow Lakes cogeneration facility.
Photo Credit: D.A. Black

Energy Efficient Schools

This program consists of both the SB 1149 (Public Purpose Charge) schools program and the Cool Schools initiative.

Oregon's electric industry restructuring law (SB 1149 in 1999) sets aside money for improving the energy efficiency of schools in the service areas of Portland General Electric and Pacific Power; the funds go directly to school districts. Funds must first go to energy audits, then to measures recommended by those audits. The Oregon Department of Energy provides business and technical oversight for the energy audits and projects to ensure consistency with the program guidelines.

For schools outside PGE and Pacific Power territory, ODOE provides technical and business assistance. ODOE provides lists of qualified energy auditors and commissioning agents to facilitate contracting for energy efficiency improvements in schools.

Energy savings in 2013: 533,627 million Btu
Value of savings in 2013: $9.2 million

Business Energy Tax Credits

Legislation ended the BETC program July 1, 2014. The program, which had operated since 1979, offered tax credits for energy efficiency and conservation, clean transportation and renewable energy.

The numbers below represent cumulative savings in British thermal units (Btu) from the Business Energy Tax Credit program in 2013. The calculations are adjusted to exclude savings from projects that are assumed to have reached the end of their useful life by 2013.

Energy saved/displaced in 2013: 37,988,757 million Btu
Energy generated/produced in 2013: 45,737,984 million Btu

Value of savings/generation in 2013: $1.65 billion

Energy Incentive Program

The Business Energy Tax Credit program was replaced by three smaller programs, a tax credit program for conservation and transportation projects, and a grant program for development of smaller renewable energy projects.

Energy savings in 2013: 1,140,762 million Btu
Energy generation in 2013: 369 million Btu
Value of savings/generation in 2013: $34 million

The Energy Incentives Program resulted from the merger of Business Energy, Residential Energy and Biomass Producer/Collector Tax Credit programs. This merger was to leverage the expertise across the tax credit programs and allow for more efficiency in processing work.

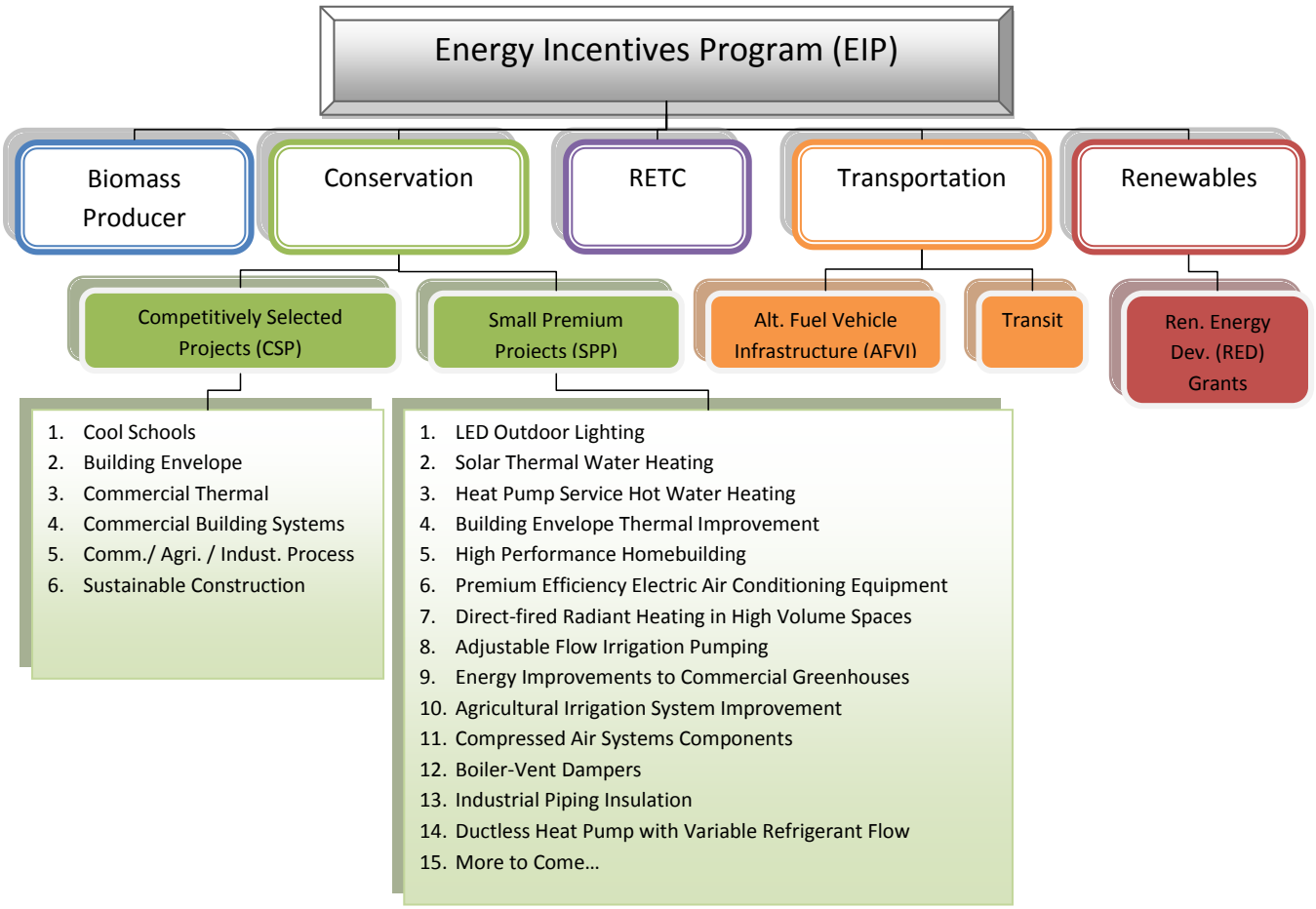


Figure 21: An illustration of the increased complexity of the Energy Incentives Program.

The structure above shows the new program's components, including the capped incentives that replaced the Business Energy Tax Credit. The new program has levels of complexity that did not exist before.

As seen in the following chart, not only are there caps for conservation, transportation and renewable projects, but each type of incentive has its own handling needs to accommodate the statutory mandate of having projects compete. Throughout the year, the availability of different tax credits and grants is made known through opportunity announcements.

Opportunity	Distribution Method	Notes
Conservation – Small Premium Projects	First in, first out	Part of $28 million cap Projects under $20 K in project cost, prescriptive
Conservation – Commercial Building	Competitive	Part of $28 million cap
Conservation – Commercial, Agricultural and Industrial Processes	Competitive	Part of $28 million cap
Conservation – Cool Schools	Competitive	Part of $28 million cap; one time offering
Conservation – Thermal	Competitive	Part of $28 million cap
Conservation – Sustainable Building	Competitive	Part of $28 million cap
Conservation – Building Envelope	Competitive	Part of $28 million cap
Transportation – Transit	Allocation of credits among projects based on formula	Part of $20 million cap
Transportation – Alternative Fuel Vehicle Infrastructure	First in, first out	Part of $20 million cap
Renewable Energy Development Grants	Competitive	Amount available depends on Department of Revenue auction; capped at $3 million per biennium

Figure 22: The numerous components of the Energy Incentives Program that replaced the Business Energy Tax Credit.

Residential Energy Tax Credit

As new energy-saving technologies have come on the market, the legislature modified the Residential Energy Tax Credit to encourage their adoption.

Highly efficient appliances, including heating ducts and certain water heating systems, were added in 1997. The program expanded in 2000 to include fuel cells and in late 2001 to include high-efficiency furnaces, boilers, heat pumps, ventilation systems and air conditioning systems.

In 2005, the legislature increased the solar electric tax credit to $6,000, which is $1,500 taken over four years. In 2007, wind systems and fuel cells also went to $6,000 taken over four years and very highly efficient wood and pellet stoves were added.

On Dec. 31, 2009 the tax credit for new gasoline-electric hybrid vehicles, such as the Toyota Prius, Honda Civic and Ford Escape, came to an end (HB 2078). Alternative fuel vehicles such as those powered by electricity, natural gas and propane lost their RETC eligibility on Jan. 1, 2012 under HB 3672 (2011).

Systems and equipment that are still eligible for a Residential Energy Tax Credit include:

- Solar and wind
- Ground source heat pumps; highly efficient furnaces and heat pumps
- Premium-efficiency wood stoves
- On-demand gas water heaters

Energy savings/generation in 2013: 1,636,767 million Btu
Value of savings/generation in 2013: $36 million

State Home Oil Weatherization Program

For households that heat primarily with oil, propane or wood, the Oregon Department of Energy's State Home Oil Weatherization Program offers homeowners an Energy Audit Checklist and rebates for weatherization and heating measures. Oil companies doing business in Oregon fund the program.

About 100,000 Oregon homes are heated with oil or propane. Most of them were built before energy standards were part of the building code and are often in need of weatherization and heating measures. Since 2004, homeowners have been able to conduct their own audits.

Energy savings in 2013: 91,331 million Btu (658,000 gallons of oil)
Value of savings in 2013: $2.52 million

Large Electric Consumer Public Purpose Program

Under Senate Bill 1149 (1999), Portland General Electric and Pacific Power must collect a public purpose charge from both residential and business consumers within their service areas. The public purpose charge, three percent of the total electric costs on customers' bills, went into effect on March 1, 2002.

Large electric consumers (over one average megawatt or 8,650,000 kilowatt-hours a year) may be eligible to self-direct portions of their public purpose charges. The Oregon Department of Energy reviews and certifies applications by large electric consumers for conservation projects and renewable energy resources. ODOE administers the program through an interactive website.

Energy savings in 2013: 598,586 million Btu (electricity)
Value of savings in 2013: $10.3 million

State Energy Efficient Design Program

An Oregon law enacted in 1990 requires that new state buildings and major renovations be as energy-efficient as possible, within cost-effectiveness guidelines. In response to the electricity crisis of 2001, legislation established a standard that is 20 percent better than the energy building code.
The Oregon Department of Energy, through its State Energy Efficient Design program, recommends energy savings measures to consider in the design and reviews the plans to ensure targets are achieved. Typical measures adopted include energy efficiency improvements for windows, lighting, controls and heating, ventilation and air conditioning equipment.

Energy savings in 2013:

Electricity	189,323 million Btu
Natural gas	134,818 million Btu
Other	267,612 million Btu

Value of savings in 2013: $12 million

Energy Loans

Approved by the voters in 1980, the State Energy Loan Program has made more than 872 loans totaling about $611 million. SELP is designed to promote energy conservation and renewable energy development.

The program offers fixed-rate, long-term loans for projects that:

- Save energy
- Produce energy from renewable resources such as water, wind, geothermal, solar, biomass, waste materials or waste heat
- Use recycled materials to create products
- Use alternative fuels

The Loan Program serves individuals, businesses, tribes, schools, cities, counties, special districts, state and federal agencies, public corporations, cooperatives, and nonprofits. The loans are funded by the sale of state general obligation bonds. Borrowers pay the costs of administering the program.

Energy saved in 2013:	1,188,718 million Btu
Energy generated in 2013:	3,549,108 million Btu
Value of savings in 2013:	$123 million

Biomass Producer/Collector Tax Credit

The State of Oregon provides tax credits for the production, collection and transportation of biomass that is used for energy production.

To be eligible for this credit, an applicant must be an agricultural producer or biomass collector and the biomass material must be sourced from within Oregon. In addition, the biomass must be used as biofuel or to produce biofuel in Oregon.

The tax credit was initially created by HB 2210 (2007) with authority for the program later moving from the Oregon Department of Revenue to the Oregon Department of Energy.

For calendar year 2013 the biomass material types included woody biomass, manure, used oil/grease, and vegetative biomass.

Number of certifications issued: 85
Energy saved in 2013: 2,746,864 million Btu
Value of savings in 2013: $14 million

Energy Efficiency and Sustainable Technology Act (EEAST)

The Oregon legislature created the Energy Efficiency and Sustainable Technology Program with House Bill 2626. EEAST provides authority to finance residential and commercial energy efficiency and renewable energy projects.

Energy saved in 2013: 71,315 million Btu
Value of savings in 2013: $775,187

View overlooking La Grande.
Photo Credit: D.A. Black

APPENDIX A—ENERGY GLOSSARY

ASTM standards—Formed in 1898, the American Society for Testing and Materials (ASTM), develops international voluntary consensus standards. About 12,000 ASTM standards are used around the world to enhance safety and product quality.

Average megawatt—An aMW is 8,760 megawatt hours. This is the continuous output of a resource with one megawatt of capacity over a full year.

Avoided costs—The costs the utility would incur but for the existence of an independent generator or other energy service option. Avoided cost rates have been used as the power purchase price utilities offer independent suppliers.

Base Load—The minimum amount of electric power or natural gas delivered or required over a given period of time at a steady rate. A facility that produces energy at a constant rate.

Biofuels—Alcohols, ethers, esters, and other chemicals made from raw biological material such as herbaceous and woody plants, agricultural and forestry residues, and a large portion of municipal solid and industrial waste.

Biomass—Organic waste from agricultural, livestock, and lumber industry products, dead trees, foliage, etc., and is considered a renewable energy source. Biomass can be used as fuel and is most often burned to create steam that powers steam turbine generators. It is also used to make transportation fuels like ethanol and biodiesel.

Btu—British thermal unit; the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit under stated conditions of pressure and temperature (equal to 252 calories, 778 foot-pounds, 1,005 joules and 0.293 watt hours). It is the U.S. customary unit of measuring the quality of heat, such as the heat content of fuel.

Building Envelope—Outer walls, windows, doors, etc. of a building or the building shell.

Carbon Offset—A mechanism by which the impact of emitting a ton of CO_2 can be negated or diminished by avoiding the release of a ton elsewhere, or absorbing a ton of CO_2 from the air that otherwise would have remained in the atmosphere.

Carbon Sequestration—The fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes, such as photosynthesis.

Carbon sink—A reservoir that absorbs or takes up released carbon from another part of the carbon cycle. Vegetation and soils are common carbon sinks.

Cellulosic ethanol—alternative fuel made from such things as grain straw and poplars, using plant fibers instead of the soft starch of corn.

CO—Carbon Monoxide

CO_2—Carbon Dioxide

Cogeneration—(also Combined Heat and Power)
Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.

cf—cubic foot; the U.S. customary unit of measurement of gas volume. It is the amount of gas required to fill a volume of one cubic foot under stated conditions of temperature, pressure and water vapor. One cubic foot of natural gas equals 1,000 British thermal units under standard conditions of atmosphere (one) and temperature (60 degrees Fahrenheit).

Cooperative electric association or utility—utility owned and operated by its members.

Demand—The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts (kW), megawatts (MW), or gigawatts (GW), at a given instant or averaged over any designated interval of time. Demand should not be confused with Load or Energy.

Deregulation—The elimination or restructuring of regulation from a previously regulated industry or sector of an industry.

Distillate Fuel Oil—Light fuel oils distilled during the refining process and used primarily for space heating, on-and-off highway diesel engine fuel (including railroad engine fuel and fuel for agricultural machinery), and electric power generation.

Distribution—The delivery of electricity to the retail customer's home or business through low voltage distribution lines.

DOE—U.S. Department of Energy, also called USDOE.

Electric Energy—The generation or use of electric power by a device over a period of time, expressed in kilowatt-hours (kWh), megawatt-hours (MWh), or gigawatt-hours (GWh).

Electric System Losses—Total electric energy losses in the electric system. Losses are primarily due to electric resistance within transmission system lines and transformers.

End-Use Energy—Energy consumed by end-users in the end-use sectors.

End-Use Sector—The residential, commercial, industrial, and transportation sectors of the economy.

Energy Conservation—Using less energy, either by greater energy efficiency or by decreasing the types of applications requiring electricity or natural gas to operate.

Energy Efficiency—Using less energy (electricity and/or natural gas) to perform the same function at the same level of quality. Programs designed to use energy more efficiently — doing the same with less.

EPA—U.S. Environmental Protection Agency.

Federal Energy Regulatory Commission (FERC)—The Federal Energy Regulatory Commission regulates the price, terms and conditions of power sold in interstate commerce and regulates the price, terms and conditions of all transmission services. FERC is the federal counterpart to state utility regulatory commissions.

Fossil Fuels—Sources of energy from the earth, primarily crude oil, natural gas, and coal.

Fuel Switching—The substitution of one type of fuel for another, either temporary or permanent. Permanent might include someone who replaces gasoline-powered fleet vehicles with electric cars.

Geothermal Energy—The energy from the internal heat of the Earth, which may be residual heat, friction heat, or a result of radioactive decay. The heat is found in rocks and fluids at various depths and can be extracted by drilling or pumping.

GWh—gigawatt-hour; the unit of energy equal to that expended in one hour at a rate of one billion watts. One GWh equals 1,000 megawatt-hours.

Green Tags—are created when a renewable energy facility generates electricity. Each certificate or tag represents all of the environmental attributes or benefits of a specific quantity of renewable generation. Those include the benefits that everyone receives when conventional fuels, such as coal, oil, or gas, are displaced.

Greenhouse gases—Greenhouse gases are water vapor, carbon dioxide, tropospheric ozone, nitrous oxide, methane, and chlorofluorocarbons.

Grid—A system of interconnected power lines and generators that is managed so that power from generators is dispatched as needed to meet the requirements of the customers connected to the grid at various points.

Horizontal-axis wind turbine (HAWT)—A wind turbine with a rotor axis that lies in or close to a horizontal plane. Often called a "propeller-style" wind turbine.
Hub—That component of a wind turbine to which the blades are affixed.

Hub Height—The distance from the foundation to which the tower is attached to the center of the hub of a HAWT.

Investor owned utility (IOU)—Common term for a privately owned (shareholder owned) gas or electric utility regulated by the Oregon Public Utilities Commission.

Interconnected System—A system consisting of two or more individual electric systems that have connecting tie lines and whose operations are synchronized.

Integrated Resource Plan (IRP)—A utility's complete look at future energy demands and how it plans to meet them.

KV—A kilovolt equals 1,000 volts.

Kilowatt (kW)—This is a measure of demand for power; the rate at which electricity is used during a defined period (usually metered over 15-minute intervals). Utility customers generally are billed on a monthly basis; therefore, the kW demand for a given month would be the 15- minute period in which the most power is consumed.

Kilowatt-hour (kWh)—This is a measure of consumption. It is the amount of electricity that is used over some period of time, typically a one-month period for billing purposes. Customers are charged a rate per kWh of electricity used.

Load—An end use device or customer that receives power from an energy delivery system. Load should not be confused with Demand, which is the measure of power that a load receives or requires.

Load Shifting—A type of load management that shifts use from peak to off-peak periods.

Liquefied natural gas (LNG)—Natural gas (primarily methane) that has been liquefied by reducing its temperature to -260 degrees Fahrenheit at atmospheric pressure.

Microturbines—Small, combustion turbines used for small-scale power generation.

MW—A megawatt equals 1,000 kilowatts or 1 million watts.

MWh—megawatt-hour; the unit of energy equal to that expended in one hour at a rate of one million watts. One MWh equals 3,414,000 Btus.

Nameplate Capacity—The maximum rated output of an electric power plant under specific conditions designated by the manufacturer. It is commonly expressed in megawatts (MW).

NERC—The North American Electric Reliability Corporation is a nonprofit corporation that develops and maintains mandatory reliability standards for the bulk electric system. Their goal is to maintain and improve the reliability of the system.

Net metering—For electric customers who generate their own electricity, net metering allows for the flow of electricity both to and from the customer. When a customer's generation exceeds the customer's use, electricity from the customer flows back to the grid, offsetting electricity consumed by the customer at a different time during the same billing cycle. In effect, the customer uses excess generation to offset electricity that the customer otherwise would have to purchase at the utility's full retail rate. Net metering is required by law in most U.S. states, but state policies vary widely.

NOx—Nitrogen Oxides

PV—Photovoltaic or solar electricity

Peak Load or Peak Demand—The electric load that corresponds to a maximum level of electric demand within a specified time period, usually a year.

Pulping liquor—A substance primarily made up of lignin, other wood constituents and chemicals that are by-products of the manufacture of chemical pulp. It can be burned in a boiler to produce steam or electricity through thermal generation.

Reliability—Electric system reliability has two components—adequacy and security. Adequacy is the ability of the electric system to supply the aggregate electric demand and energy requirements of the customers at all times, taking into account scheduled and unscheduled outages of system facilities. Security is the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system facilities. Reliability also refers to the security and availability of natural gas and petroleum supply, transportation and delivery.

Renewable Resources—Renewable energy resources are naturally replenished, but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Some (such as geothermal and biomass) may be

stock-limited in that stocks are depleted by use, but on a time scale of decades, or perhaps centuries, they can probably be replenished. Renewable energy resources include biomass, hydro, geothermal, solar and wind. In the future they could also include the use of ocean thermal, wave, and tidal action technologies.

Ship Bunker C—A very heavy, residual fuel oil left over after other fuels have been distilled from crude oil. Also called No. 6 Fuel, it is used in power plants, ships and large heating installations.

Site Certificate—A site certificate is a consolidated license for energy facilities. "Site certificate" means the binding contractual agreement between the State of Oregon and the applicant, authorizing the applicant to construct and operate a facility on an approved site, incorporating all standards imposed by the council on the applicant. A site certificate brings together all state and local government permit requirements into a single decision by the Energy Facility Siting Council, a seven member citizen Commission appointed by the Governor. A decision of the Council is appealable only to the Oregon Supreme Court. The Oregon Department of Energy serves as staff to the Council.

Substation—A facility for switching electric elements, transforming voltage, regulating power, or metering.

Telework—A program allowing an employee, with training, permission and the technology, to work part-or full-time in a location other than their employer's main office. The alternate location is often the teleworker's home. It conserves fuel, relieves traffic congestion and improves air quality.

Therm—One hundred thousand (100,000) British thermal units (1 therm = 100,000 British thermal units). This is approximately the energy in 100 cubic feet of natural gas.

Transmission—Transporting bulk power over long distances.

Utility—A regulated entity that exhibits the characteristics of a natural monopoly. For the purposes of the electric industry, "utility" generally refers to a regulated, vertically integrated monopoly electric company. "Transmission utility" refers to the regulated owner/operator of the transmission system

Watt—The unit of measure for electric power or rate of doing work. The rate of energy transfer equivalent to one ampere flowing under pressure of one volt.

WECC— The Western Electricity Coordinating Council is the Regional Entity responsible for coordinating and promoting bulk electric system reliability in the Western Interconnection. In addition, WECC assures open and non-discriminatory transmission

access among members, provides a forum for resolving transmission access disputes, and provides an environment for coordinating the operating and planning activities.

Wholesale Power Market—The purchase and sale of electricity from generators to resellers (who sell to retail customers and/or other resellers) along with the ancillary services needed to maintain reliability and power quality at the transmission level.

Wind farm—A group of wind turbines, often owned and maintained by one company. Also known as a wind power plant.

APPENDIX B—ENERGY LEGISLATION

SUMMARY OF ENERGY LEGISLATION PASSED BY THE 2013 LEGISLATIVE SESSION

HOUSE BILLS

ENERGY

HB 2105 – Energy Facility Siting Council Study Bill Related to Energy Facility Siting
HB 2105 requires the Oregon Department of Energy to study several substantive and procedural issues related to energy facility siting, such as encouraging more public participation and finding efficient ways to ensure cost recovery of fees. ODOE is required to present a report to the Legislative Assembly on or before Nov. 1, 2013. The report must include recommendations for potential legislation.

Effective date: May 14, 2013
Chapter 107

HB 2106 – Energy Facility Siting Council Balancing Standard
HB 2106 makes revisions to ORS 469.501 and 469.503 relating to the Energy Facility Siting Council's (siting council) balancing standard. It clarifies the existing statutory requirement regarding circumstances under which the siting council may approve a site certificate that does not satisfy one or more applicable standards. Under this bill, the siting council is allowed to approve a proposed facility that does not meet an applicable standard if the overall public benefits of the facility outweigh any adverse effects on a resource or interest to be protected by the applicable standard. The siting council is directed to amend its balancing rule (OAR 345-022-0000(2)) to specify criteria for implementing the statutory balancing authority.

Effective date: June 4, 2013
Chapter 263

HB 2203 – Transmission Line Ownership
HB 2203 requires applicants for transmission lines – other than people's utility districts or public utilities – to notify each people's utility district, municipal utility, or electric cooperative or public utility through whose service territory the line would be constructed, of their intent to receive approval for the line. It requires

anyone subject to Public Utility Commission authority who operates electric power lines to provide contact information of those responsible for the operation, maintenance and safety to the PUC on a bi-annual basis, and to provide information on change of ownership to the PUC within 90 days of ownership.

Effective date: Jan. 1, 2014

HB 2435 – Biodiesel Fuel Excise Tax Exemption

HB 2435 exempts diesel fuel blended with a minimum of 20 percent biodiesel derived from used cooking oil from fuel excise tax. The exemption does not apply to fuel used in motor vehicles with a gross vehicle weight rating of 26,001 pounds or more. The exemption applies to fuel sold in retail operations but does not apply to fuel sold in operations involving fleet fuel or bulk sales. The bill adds "geothermal energy" to the definition for a net metering facility making it an eligible form of energy for net metering.

Effective date: Oct. 7, 2013
Chapter 648

HB 2436 – Energy Efficiency and Sustainable Technology (EEAST)

HB 2436 modifies the Energy Efficiency and Sustainable Technology program and adds definitions of "primary contractor" and "utility service territories." The bill clarifies the contractor certification requirement as applying only to the project's prime contractor. The bill stipulates where EEAST loan funds may be spent and who may administer EEAST loan funds. It removes a requirement on utilities to transfer an EEAST loan to a new property owner if property is transferred.

Effective date: Jan. 1, 2014
Chapter 8

HB 2704 – Transmission Line Siting

HB 2704 provides county governing bodies with the authority to determine whether an "associated transmission line" (as defined in ORS 469.300) is necessary for public service under ORS 215.213/ORS 215.283 and to approve associated transmission lines under prescribed criteria. The bill eliminates the requirement that a transmission line that is necessary for public service be established under ORS 215.275 and now requires "associated transmission lines" to either go through an over-the-counter review process if it can be demonstrated high-value farmland or arable land will not be impacted, or that it go through an alternative site analysis. Applicants for "associated transmission lines" would either go through a local (county) process exclusively for siting or they would go through the Energy Facility Siting council process which would include these new provisions.

Effective date: Jan. 1, 2014
Chapter 242

HB 2801 – Whole Building Energy Efficiency Measures
HB 2801 allows an electric company or Oregon Community Power who invests funds collected as a public purpose charge to spend public purpose charge funds on whole building energy efficiency assessments for residential and non-residential buildings. It directs the Oregon Department of Energy, in consultation with the Public Utility Commission, to adopt by rule a standard for residential energy performance scores. It requires the certification of "home energy assessors" by the Construction Contractor's Board. The bill authorizes the ODOE to adopt rules under which energy assessors can report home energy performance scores and directs the agency to maintain a database of information.

Effective date: June 13, 2013
Chapter 383

HB 2807 – Oregon Department of Energy, Energy Supplier Assessment Adjustments
HB 2807 makes several changes to the Oregon Department of Energy that statutorily establishes good governance practices and enhanced accountability, transparency and predictability. The following statutory changes are contained in the bill:

- HB 2807 - Requires ODOE to provide program-level budget information to energy resource suppliers and other interested parties during development of the agency request budget, including projected revenue needed to fund each program and the amount projected to come from the Energy Supplier Assessment – a fee charged to energy resource suppliers based on their gross operating revenue in the state.
- Requires ODOE to provide copies of account expenditure records for the preceding year by Oct. 1 to ESA payers who make a request.
- Transfers duties, functions and powers of the Department of Administrative Services relating to the Energy Facility Siting Council to the Oregon Department of Energy.
  - Currently, an MOU delegates staff support functions for the siting council from DAS to ODOE.
  - The bill simply describes more specifically what ODOE has always been statutorily authorized to do and has been doing operationally.
- Reduces the cap – or maximum allowable level – of the ESA from five-tenths of 1 percent to 0.375 percent of the supplier's gross operating revenue, a 25 percent reduction.
- Establishes an ongoing work group of interested parties to advise ODOE on its agency request budget, planning and analytical work, and legislative concepts.
- Amends ODOE's authority, in place since the agency was created, to engage in federal matters and in proceedings at other state agencies in order to: 1) clarify that such engagement is at the direction of the director and 2) require advance notification of energy resource suppliers for certain substantive proceedings.
- Makes two changes that support reporting and notification:

- Allows electronic invoicing for the ESA as an option for the energy resource supplier, instead of only registered or certified mail.
- Gives suppliers a choice of reporting gross operating revenue for a fiscal year, instead of allowing reporting only for a calendar year, with the choice tied to which of these is used for federal income tax reporting.

This provision will help carry out in a least-cost manner the Secretary of State's recommendation to require third-party verification of reported revenues by allowing suppliers to use audited financial statements they already have, regardless of whether they are for a calendar or fiscal year.

This bill also makes technical changes to provisions authorizing the department to use funds in the Jobs, Energy and Schools Fund. It clarifies the allowable use of JESF as intended, which is to reduce the cost of financing.

Effective date: Jan. 1, 2014
Chapter 656

HB 2820 – Solar Project Siting
HB 2820 amends the definition of "Energy Facility" in ORS 469.300(11), resolves the current conflict between two contradictory solar jurisdictional thresholds and establishes a clear and distinct threshold for solar thermal projects and another for solar photovoltaic projects. The solar thermal threshold established in the bill is 25MW. The solar photovoltaic threshold will be an acreage threshold and vary based on the agricultural soil capacity and the land use. A 100 acre threshold applies if the solar photovoltaic project is located on high value farmland as defined in ORS 195.300; is on land that is predominantly cultivated, or if not cultivated is predominantly composed of soils that are in capability classes I to IV (as specified by the National Cooperative Soil Survey). A 320 acre threshold would apply to a solar photovoltaic project located on any other land not encompassed by the 100 acre threshold.
This bill exempts the Oregon Military Department's facility in Christmas Valley from Energy Facility Siting Council jurisdiction.

Effective date: June 6, 2013
Chapter 320

HB 2893 – Solar Feed in Tariff Pilot Program and Study
HB 2893 makes changes to the existing solar feed in tariff pilot program by extending the end date of the program by one year to March 31, 2016; and directing the Oregon Public Utility Commission to expand the current solar feed in tariff pilot program by adding 2.5 MW of capacity, for a total capacity of 27.5 MW. The additional 2.5 MW of capacity will be made available after March 31, 2014 and will be allocated to systems between 5kW and 100 kW. The bill also requires OPUC to add an estimate of the resource value of solar energy in its annual report on the effectiveness of the program submitted to the Legislative Assembly beginning in 2015. The bill adds a new requirement for the OPUC, in consultation with the Oregon Department of Energy, to study the effectiveness of

solar incentive programs in Oregon and report the study results to the Legislative Assembly by July 1, 2014. The main components of the study are:

- Investigate the resource value of solar energy.
- Investigate the costs and benefits of the programs for retail electricity consumers and how those cost and benefits are distributed among retail electricity consumers.
- Forecast the costs associated with solar photovoltaic energy systems located in Oregon.
- Identify barriers within the programs to providing incentives for the development of solar photovoltaic energy systems.

Make recommendations for modifying the programs or establishing new programs for the purpose of providing incentives for the development of solar photovoltaic energy systems in a manner that is cost effective and protects ratepayers, including ratepayers that do not participate in the programs. Of note, the House Committee on Energy and Environment requested an interim report be presented in February/March 2014. The study shall include:

- Solar resource value.
- Costs and benefits of incentive programs to utility ratepayers
- Forecast of solar photovoltaic installation cost in Oregon.
- Market barriers.
- Recommendations for cost effective incentive programs for ratepayers.

Effective date: May 28, 2013
Chapter 244

HB 3169 – 1.5 percent Green Energy Technology Investment Obligation
This bill revises and clarifies requirements to public improvement contracts so public agencies can meet the 1.5 percent green energy technology investment obligation in statute. This requirement is tied to the construction, reconstruction or major renovation of a public building when certain monetary thresholds are met.

The bill clarifies that green energy technology means a solar or geothermal system that employs energy directly to generate electricity or building design that uses solar energy passively to reduce energy use from other sources by at least 20 percent. It requires geothermal technology to use a heat source from ground or water temperatures of more than 140 degrees Fahrenheit and disallows solar energy incorporated indirectly into other methods for energy generation.

It allows for the construction of green energy technology away from the site of the public building if the construction is more cost effective. It spells out what costs must be compared when doing a cost analysis for onsite green energy technology versus offsite green energy technology construction while allowing the contracting agency to compare like technologies. A public improvement contract is required to contain and reserve 1.5 percent of the amount of the total contract price for purposes of including green energy technology. If state funds are used for construction of green energy technology the contracting agency must fund new green energy technology that does not replace existing technology.

The bill sets a point-in-time for establishing new green energy technology. Solar capacity is considered a "new" system if it is added after the date of issuance of the original building permit. Geothermal capacity is considered a "new" system if constructed on or after January 1, 2013, which is tied directly to the date of SB 1533 (2012).

This bill restores a public body's ability to not defer funds to the next building project if state funds are not used for the original building project. The bill requires contracting agencies to collect and maintain records to indicate compliance or noncompliance with the 1.5 percent energy technology obligations. These records must be provided to the Oregon Department of Energy, which must report annually to the Legislative Assembly prior to every session.

Effective date: July 2, 2013
Chapter 612

HB 3301 – Planned Community Electric Vehicle Charging Station Installation
HB 3301 authorizes the owner of a lot in a planned community or a unit in a condominium to install and use an electric vehicle charging station. The bill establishes requirements the owner of a lot or unit in a planned community or condominium must follow to apply to install an electric vehicle charging station. The bill would prohibit a homeowner association or association of unit owners from prohibiting the installation or the use of a charging station for the personal, noncommercial use by the owner in compliance with the set requirements. The bill makes the owner responsible for all costs associated with the installation and use of the charging station, including the cost of electricity and the cost of damage to common property and to areas subject to the common use of other owners that result from the installation, use, maintenance and operation.

Effective date: Jan. 1, 2014
Chapter 438

HB 3367 – Tax Credit Expenditures
HB 3367 made several changes to the tax credit provisions. One of the changes disallows the biomass tax credit for canola grown, collected or produced in the Willamette Valley.

Effective date: Oct. 7, 2013
Chapter 750

ADMINISTRATIVE

HB 2212 – Public Contracting Small Procurement Threshold
HB 2212 would raise the amount from $5,000 to $10,000 for a small procurement of goods and services under the Public Contracting Code.

Effective date: Jan. 1, 2014
Chapter 66

HB 2370 – Department of Administrative Services' Transparency Website
HB 2370 will make the Department of Administrative Services transparency website the single point of information regarding agency public meetings, meeting minutes, rulemaking and contracts. It specifically requires the posting of all reports received by DAS, Oregon Department of Revenue, or the Oregon Business Development Department from local governments relating to properties in enterprise zones that have received tax exemptions or are eligible for tax exemptions due to their location in an enterprise zone.

Effective date: Jan.1, 2014
Chapter 645

HB 2560 – Rulemaking Advisory Committee Appointees
HB 2560 prohibits an agency that is required by law to appoint a rulemaking advisory committee from appointing an officer, employee, or agent of the agency to serve on the advisory committee.

Effective date: Jan. 1, 2014
Chapter 273

HB 2643 - Oregon License Directory
HB 2643 creates the Oregon License Directory. The Secretary of State will create and maintain the directory as a searchable, statewide database containing information about licenses, permits and registrations for which fees and fee-related regulations are imposed on small businesses. The bill requires all local and state agencies with functions related to issuance of those licenses, permits and registrations to report information to the Secretary of State. The Secretary of State will designate, by rule, the information needed to complete the reporting requirement.

Effective date: July 1, 2013
Chapter 580

HB 3035 – Oregon Transparency Website
HB 3035 requires the Oregon Department of Administrative Services to develop a plan for adding information or links to additional information to the Oregon transparency website. The bill gives explicit directions on the types of information and links to be added, such as information on expenditures made by state agencies under contracts, including text of the contract and scope of work to be performed. It also requires a plan be developed for regularly updating information on the website, and the development of a plan for the website emphasizing ease of use. The Oregon Department of Administrative Services will be required to report to the Legislature on their developments on or before Jan. 1, 2015.

Effective date: Aug. 14, 2013
Chapter 746

HB 3294 – Electronic Mail Address Exemption from Public Records
HB 3294 adds a new exemption for electronic mail addresses to the public records law. The bill exempts electronic mail addresses in the possession or custody of an agency or subdivision of the executive department, a local government or local service district, or a special government body. The exemption to electronic mail does not apply to an employee or agency that has been assigned an electronic mail address in the ordinary course of their employment.

Effective date: Jan. 1, 2014
Chapter 587

HB 3400 – Oregon Transparency Website Requirements for Goods and Services Contracts
HB 3400 requires the Oregon transparency website to make available information for each state agency on the percentages of expenditures made in the state and outside of the state under contracts for goods and services. The requirement applies to contracts made by the state agencies during each biennium.

Effective date: Jan. 1, 2014
Chapter 357

OTHER

HB 2620 – Regional Solutions
HB 2620 requires the Governor and the Department of Administrative Services to develop a plan to align state economic and community development programs with regional and community based development programs. The plan and the planning process are exempted from certain statutory rulemaking requirements. The bill requires the plan to be submitted to the Legislature for consideration during the 2014 regular session. The bill also requires the Governor to ensure that representatives of natural resource agencies participate in regional solution teams and are available at regional solutions centers.

Effective date: Jan. 1, 2014
Chapter 738

HB 3086 - Sage Grouse Habitat Mitigation
HB 3086 authorizes the Oregon Department of Fish and Wildlife to develop and administer a uniform policy for mitigating the adverse effects that proposed actions may have on core area habitat of sage grouse. The bill directs the ODFW to consult with interested local and tribal governments, state and federal agencies and private organizations prior to development of the mitigation policy. The bill allows ODFW to include provisions for the recognition or establishment of mitigation banks and encourages a landscape level approach be used in developing framework, criteria or goals developed to conserve sage grouse.

The bill also allows a person applying for permission for a proposed action that may affect core area habitat for sage grouse to file a report that describes the proposed action and possible effects on the habitat. The report must describe proposals for off-site mitigation or a mitigation bank. ODFW has 60

days to evaluate and make determinations about the proposed mitigation efforts. A one-time appropriation of $500,000 General Fund is made to ODFW for developing a policy for reviewing proposals for mitigation efforts affecting sage grouse.

Effective date: Aug. 1, 2013
Chapter 710

SENATE BILLS

ENERGY

SB 230 – Judicial Review of Certificates of Public Convenience
SB 230 creates a direct judicial review process to the Oregon Supreme Court for Public Utility Commission decisions on Certificates of Public Convenience and Necessity for transmission lines which are also subject to judicial review in the same manner as orders to the Energy Facility Siting Council. It specifies that review petition must be filed within 60 days after commission makes final order.

Effective date: Jan. 1, 2014
Chapter 335

SB 242 – Emissions Performance Standard
SB 242 corrects the emissions performance standard for purchased power so that it applies to power purchased from both in-state and out-of-state generation facilities. It modifies the definition of "baseload electricity" so that the term "site certificate" no longer limits application of the standard to Oregon-only facilities by expanding the definition to include any type of construction permit for an electric generation facility regardless of its location.

The bill eliminates the rulemaking authority for the Public Utility Commission to modify the emissions performance standard in the future for investor-owned utilities. It creates a new exemption for power plants that convert from coal to natural gas. It creates a petition process to report to the Legislature if the standard is found to be redundant or unnecessary if similar action is taken at the federal level or by other state agencies.
Effective date: Jan. 1, 2014
Chapter 172

SB 261 – Taxation of Federal Utility Property
SB 261 extends the state taxation prohibition of federal property to property leased to a federal agency on which a high voltage transmission line is located.

Effective date: Oct. 7, 2013
Chapter 336

SB 306 – Report on Clean Air Fee or Tax
SB 306 requires the Legislative Revenue Office to prepare a report on the feasibility of imposing a statewide clean air fee or tax. The bill requires a preliminary report no later than December 1, 2013 and the final report no later than November 15, 2014. The bill allows the Legislative Revenue Office to contract with third parties to prepare the report and appropriates $200,000 for the purpose of carrying out this provision.

Effective date: Aug. 14, 2013
Chapter 770

SB 536 – Electric Charging Stations on State-owned or Controlled Property
SB 536 allows a state agency to locate on premises it owns or controls, devices or facilities to deliver electricity to the public for motor vehicles and to contract with vendors that will distribute or dispense electricity. The state agency is required to set a price for using devices and facilities at a level that does not subsidize operations of a private entity or the cost of electricity to the public, or substantially exceed the costs to the state agency of making the electricity available to the public.

The bill limits the number of devises or facilities installed per biennium by agencies to 10 for Department of Administrative Services and five for other agencies. State agencies that obtain grants to support the installation of devices or installations are not subject to the installation limit. This bill moves the sunset date from 2014 to 2018 for public compressed natural gas refueling at the Department of Administrative Services facilities.

Effective date: Jan. 1, 2014
Chapter 536

SB 561 -Tariff Schedule Use by Public Utilities
SB 561 allows the Public Utility Commission to authorize a public utility to use a tariff schedule establishing rates or charges for the cost of energy resource measures provided to an individual property owner or customer pursuant to an agreement between the individual property owner or customer and the utility. The legislation broadens the list of energy measures for which tariffs may be put in place to include demand reduction, integration of renewable energy generation measures and energy conservation measures that are not cost effective. The legislation allows loans secured against the property and direct payments to third parties for energy resource measures. Tariff schedules would be subject to Public Utility Commission approval.

Effective date: Jan. 1, 2014
Chapter 344

SB 583 – Alternative Fuel Vehicle Revolving Fund
SB 583 creates the Alternative Fuel Vehicle Revolving Fund. The bill authorizes the Oregon Department of Energy to provide loans to public entities and tribes to assist in the purchase of new alternative fuel vehicles and for the conversion of existing vehicles that use gasoline or diesel to alternative fuel vehicles. The loans for new alternative fuel vehicles provide funding for the additional cost of purchasing alternative fuel vehicles as compared to vehicles that are not alternative fuel vehicles. The bill specifies that funding priority be given to vehicle conversions.

The bill gives local governments and tribes the authority to borrow from the fund and to enter into agreements with the Oregon Department of Energy in accordance with loan agreements and terms. ODOE shall establish by rule all terms, rates and conditions for loans from the Alternative Fuel Vehicle Revolving Fund. Loans must be fully amortized within six years of the purchase of a new alternative fuel vehicle or the conversion of a vehicle that uses gasoline or diesel.

The Alternative Fuel Vehicle Fund will be capitalized through an auction of $3 million of an allowable $20 million in tax credits for transportation projects. The Oregon Department of Revenue will conduct the tax credit auction and deposit proceeds directly into the Alternative Fuel Vehicle Revolving Fund.

The bill defines "alternative fuel vehicle project" to mean the acquisition of alternative fuel vehicle fleets or an alternative fuel vehicle infrastructure project. Acquisition of an alternative fuel vehicle fleet includes the replacement of two or more vehicles that are not used primarily for personal, family or household purposes and that use an alternative fuel.

Effective date: Oct. 7, 2013
Chapter 774

SB 606 - Wave Energy Facility Installations – ODOE Study of Transmission

SB 606 modifies the authorization process for wave energy facility installations. It establishes provisions for decommissioning of wave energy facilities. The bill requires the Oregon Department of Energy to study issues related to the transmission of electricity from wave energy structures and report to the Legislature on or before Nov. 1, 2014.

SB 606 requires the owners or operators of wave energy facilities and devices to:

- Demonstrate evidence of financial assurance for costs of closure and post-closure maintenance of facilities or devices.
- Provide a decommissioning plan for a facility or device prior to authorization.
- Initiate removal of facility or device within 12 months after permanent cessation of use of facility or device and to complete removal within two years after permanent cessation of use, with some exceptions.

The bill sets requirements to be included in a decommissioning plan.

Effective date: June 6, 2013
Chapter 345

SB 692 - Appliance Standards

SB 692 adds three new appliances to the current appliance energy efficiency standards statute. Included in the bill are televisions, a range of small and large battery chargers and one type of light bulb.

Effective date: Jan. 1, 2014
Chapter 418

SB 737 - Oregon Ocean Science Trust/Oregon Ocean Science Trust Fund
SB 737 establishes the Oregon Ocean Science Trust and a corollary Oregon Ocean Sciences Fund. The Trust is a five-member appointed board that is administered by the Department of State Lands. It has the responsibility for scientific development and cooperation on the Oregon Coast.

The bill directs the state on how to allocate its portion of the state "revenue share" from federal marine energy leases. The state-federal revenue share occurs when a project is located in a range of three to six miles offshore. SB 737 directs funds received from revenue share to be divided as 70 percent to the new Oregon Ocean Science Fund and 30 percent to the associated coastal county.

Effective date: Aug. 14, 2013
Chapter 776

SB 844 – Greenhouse Gas Emissions
SB 844 directs the Public Utility Commission to establish a voluntary emission reduction program for the purposes of incentivizing public utilities that furnish natural gas to invest in projects that reduce emissions and provide benefits to customers of public utilities that furnish natural gas.

Effective date: Jan. 1, 2014
Chapter 607

ENERGY BUDGET

HB 5011 – Oregon Department of Energy Budget
HB 5011 contains the operating budget for the Oregon Department of Energy. The 77th Legislative Assembly approved a Total Funds budget in the amount of $217,890,886 with 114.02 full time equivalent positions. The bill provides 4.84 FTE and $300,000 in professional services to advance priorities and projects established in the 10-Year Energy Action Plan. The bill made three limited duration positions permanent for Energy Incentive Program delivery and approved modifications to fees to ensure cost recovery for administration of the energy incentive programs created in HB 3672 (2011). SB 5011 makes two positions permanent and adds a limited duration position to address energy facility siting workload issues.

Effective date: July 19, 2013
Chapter 630

HB 5012 – Fee Ratification
HB 5012 ratifies fees enacted by the Oregon Department of Energy through administrative rule during the 2011-13 biennium. The fees were enacted to cover administrative costs associated with the pass-through activities related to the Business Energy Tax Credit program. The legislature eliminated the $400 re-inspection fee and approved changes to align fees in statute with those enacted by rule.

Effective date: July 19, 2013
Chapter 631

SB 5506 – Bonding Limits
SB 5506 limits the maximum amount of bonds and third party financing agreements that state agencies may issue and the amount of revenue state agencies may raise from such issuance. The proceeds from the issuance of bonds are included as revenues in agency budgets. The bill allocates the federal tax-exempt private activity bonds volume cap.

This bill establishes ODOE's bonding authorities for the 2013-15 biennium in the following manner:

- Sets general obligation bonding authority at $60 million.
- Sets revenue bonding authority at $20 million.
- Sets private activity bonding authority at $10 million.

Effective date: July 29, 2013
Chapter 705

SB 5532 – Lottery Allocation
SB 5532 allocates and transfers lottery funds expenditures approved in the Legislatively Adopted Budget. The bill allocates lottery debt service to Oregon Department of Energy for outstanding bonds in the amount of $2,155,050. Lottery funds expenditure limitation related to this allocation is contained in ODOE's agency budget bill (HB 5011).

Effective date: Aug. 14, 2013
Chapter 785

SB 5533 – Lottery Bond Proceeds
SB 5533 authorizes lottery bond proceeds for a number of projects. All lottery bonds authorized for the 2013-15 biennium are authorized in this bill Lottery revenue bonds will be issued in the spring of 2015. This bill provides Oregon Department of Energy with $5 million in net lottery bond proceeds to be deposited in the Clean Energy Deployment Fund. Lottery proceeds are received as "other funds" in ODOE. Debt services will not be reflected on this allotment until the 2015-17 biennium.

Effective date: Aug. 14, 2013
Chapter 786

OTHER

SB 33 – Emergency Preparedness and Creation of the Task Force on Resilience Plan Implementation
SB 33 adds 13 new agencies to the list of agencies that are required to designate an individual within their agency to act as a liaison with the Office of Emergency Management. The designated liaison for an agency must have the authority to allocate the resources and assets of the agency during an emergency. The bill establishes the Task Force on Resilience Plan Implementation. The 17 member task force shall facilitate a comprehensive plan to implement the strategic vision and roadmap of the Oregon Resilience Plan for responding to the consequences of naturally occurring seismic events associated with geologic shift along the Cascadia subduction zone. The TFRPI will report to the Legislative Assembly on or before October 2014. Staff support for TFRPI will be provided by the Oregon Military Department.

Effective date: June 26, 2013
Chapter 512

APPENDIX C
FINAL BETC DISTRIBUTIONS BY COUNTY

County	Category	Number	Final Project Costs	Tax Credit Amount
Baker				
	Conservation	126	3,265,431	1,142,900
	Recycling	7	234,252	81,988
	Renewables	18	4,928,272	2,431,013
Baker Totals		**151**	**$8,427,955**	**$3,655,902**
Benton				
	Conservation	443	44,610,577	16,831,531
	Recycling	8	4,843,702	1,695,296
	Renewables	70	12,588,305	5,854,857
Benton Totals		**521**	**$62,042,584**	**$24,381,684**
Clackamas				
	Conservation	1,250	105,242,174	36,834,807
	Recycling	138	18,097,291	6,334,052
	Renewables	70	20,700,774	10,110,732
Clackamas Totals		**1,458**	**$144,040,239**	**$53,279,591**
Clatsop				
	Conservation	111	29,543,441	10,340,214
	Recycling	10	8,679,932	3,037,976
	Renewables	7	7,050,070	3,522,006
Clatsop Totals		**128**	**$45,273,443**	**$16,900,196**
Columbia				
	Conservation	167	37,319,288	13,061,761
	Recycling	6	6,434,269	2,251,994
	Renewables	8	106,887	49,177
Columbia Totals		**181**	**$43,860,444**	**$15,362,932**

County	Category	Number	Final Project Costs	Tax Credit Amount
Coos				
	Conservation	238	8,129,346	2,845,279
	Recycling	10	152,119	53,242
	Renewables	35	7,520,774	3,300,748
Coos Totals		**283**	**$15,802,239**	**$6,199,269**
Crook				
	Conservation	75	5,323,738	1,863,311
	Recycling	2	11,597	4,059
	Renewables	19	7,605,161	2,983,980
Crook Totals		**96**	**$12,940,496**	**$4,851,350**
Curry				
	Conservation	36	1,686,275	590,198
	Recycling	6	44,690	15,642
	Renewables	11	935,931	340,480
Curry Totals		**53**	**$2,666,896**	**$946,320**
Deschutes				
	Conservation	522	57,346,444	20,071,280
	Recycling	35	1,294,515	453,081
	Renewables	140	38,233,790	18,233,382
Deschutes Totals		**697**	**$96,874,749**	**$38,757,743**
Douglas				
	Conservation	412	26,716,797	9,350,895
	Recycling	12	278,758	97,566
	Renewables	44	41,627,626	17,893,774
Douglas Totals		**468**	**$68,623,181**	**$27,342,234**
Gilliam				
	Conservation	13	947,359	331,576
	Renewables	8	79,815,723	38,406,506
Gilliam Totals		**21**	**$80,763,082**	**$38,738,082**

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County	Category	Number	Final Project Costs	Tax Credit Amount
Grant				
	Conservation	27	416,111	145,639
	Recycling	2	13,502	4,726
	Renewables	10	9,022,206	3,408,634
Grant Totals		**39**	**$9,451,819**	**$3,558,999**
Harney				
	Conservation	46	461,223	161,429
	Recycling	1	6,616	2,316
	Renewables	13	2,217,361	860,142
Harney Totals		**60**	**$2,685,200**	**$1,023,887**
Hood				
	Conservation	384	12,683,060	4,454,089
	Recycling	7	40,870	14,305
	Renewables	38	2,521,588	1,060,265
Hood Totals		**429**	**$15,245,518**	**$5,528,658**
Jackson				
	Conservation	1,213	72,223,993	25,278,482
	Recycling	30	2,467,407	863,593
	Renewables	149	35,861,022	15,321,616
Jackson Totals		**1,392**	**$110,552,422**	**$41,463,691**
Jefferson				
	Conservation	54	2,163,634	757,271
	Recycling	3	10,857	3,800
	Renewables	12	5,003,013	1,833,706
Jefferson Totals		**69**	**$7,177,504**	**$2,594,777**
Josephine				
	Conservation	237	6,930,679	2,425,745
	Recycling	3	45,862	16,052
	Renewables	51	6,760,707	3,262,174
Josephine Totals		**291**	**$13,737,248**	**$5,703,971**

County	Category	Number	Final Project Costs	Tax Credit Amount
Klamath				
	Conservation	206	12,595,623	4,408,474
	Recycling	7	75,172	26,310
	Renewables	55	25,095,527	10,916,950
Klamath Totals		**268**	**$37,766,322**	**$15,351,734**
Lake				
	Conservation	22	1,379,519	482,833
	Recycling	1	10,660	3,731
	Renewables	15	50,929,683	25,088,467
Lake Totals		**38**	**$52,319,862**	**$25,575,031**
Lane				
	Conservation	4,732	120,211,567	42,074,188
	Recycling	67	14,746,648	5,161,326
	Renewables	218	108,474,652	51,924,573
Lane Totals		**5,017**	**$243,432,867**	**$99,160,086**
Lincoln				
	Conservation	343	15,478,383	5,417,446
	Recycling	12	4,369,337	1,529,268
	Renewables	19	27,555,853	13,764,554
Lincoln Totals		**374**	**$47,403,573**	**$20,711,268**
Linn				
	Conservation	612	99,498,722	34,824,568
	Recycling	27	1,895,665	663,483
	Renewables	50	108,864,010	48,704,270
Linn Totals		**689**	**$210,258,397**	**$84,192,321**

County	Category	Number	Final Project Costs	Tax Credit Amount
Malheur				
	Conservation	71	4,743,916	1,660,373
	Renewables	10	20,209,307	10,081,649
Malheur Totals		**81**	**$24,953,223**	**$11,742,022**
Marion				
	Conservation	1,864	90,918,114	31,821,398
	Recycling	200	17,004,561	5,951,597
	Renewables	130	43,028,729	20,826,180
Marion Totals		**2,194**	**$150,951,404**	**$58,599,175**
Morrow				
	Conservation	45	7,894,731	2,763,157
	Recycling	1	9,900,000	3,464,999
	Renewables	21	221,104,158	108,942,817
Morrow Totals		**67**	**$238,898,889**	**$115,170,973**
Multnomah				
	Conservation	5,042	518,517,890	181,481,424
	Recycling	308	55,110,118	19,288,543
	Renewables	323	72,931,414	34,873,618
Multnomah Totals		**5,673**	**$646,559,422**	**$235,643,585**
Polk				
	Conservation	312	8,939,038	3,128,676
	Recycling	20	2,425,571	848,950
	Renewables	34	18,354,252	9,060,259
Polk Totals		**366**	**$29,718,861**	**$13,037,885**
Sherman				
	Conservation	3	359,162	125,707
	Renewables	10	161,278,656	79,133,739
Sherman Totals		**13**	**$161,637,818**	**$79,259,446**

County	Category	Number	Final Project Costs	Tax Credit Amount
Tillamook				
	Conservation	135	6,125,146	2,143,804
	Recycling	3	13,586	4,755
	Renewables	9	18,784,247	9,009,751
Tillamook Totals		**147**	**$24,922,979**	**$11,158,310**
Umatilla				
	Conservation	265	13,953,295	4,883,662
	Recycling	37	1,205,617	421,968
	Renewables	29	108,359,007	50,913,837
Umatilla Totals		**331**	**$123,517,919**	**$56,219,467**
Union				
	Conservation	213	9,710,657	3,398,730
	Recycling	18	278,345	97,421
	Renewables	12	26,512,649	13,247,759
Union Totals		**243**	**$36,501,651**	**$16,743,910**
Wallowa				
	Conservation	40	1,091,849	382,150
	Renewables	27	15,243,876	6,018,251
Wallowa Totals		**67**	**$16,335,725**	**$6,400,401**
Wasco				
	Conservation	162	7,238,638	2,533,533
	Recycling	11	251,410	87,994
	Renewables	21	11,290,314	4,028,921
Wasco Totals		**194**	**$18,780,362**	**$6,650,448**
Washington				
	Conservation	1,780	116,751,179	42,910,263
	Recycling	103	10,630,695	3,720,743
	Renewables	151	41,980,833	20,732,339
Washington Totals		**2,034**	**$169,362,707**	**$67,363,345**

County	Category	Number	Final Project Costs	Tax Credit Amount
Wheeler				
	Conservation	2	12,492	4,372
	Renewables	1	4,950	1,733
Wheeler Totals		**3**	**$17,442**	**$6,105**
Yamhill				
	Conservation	492	46,325,485	16,213,936
	Recycling	23	17,192,897	6,017,515
	Renewables	61	22,253,692	10,297,182
Yamhill Totals		**576**	**$85,772,074**	**$32,528,633**

APPENDIX D—ENERGY SUCCESS STORIES

New equipment cuts electricity costs by 20 percent

In the shadow of the Blue Mountains in northeastern Oregon, David Umbarger has a gold mine. Well, it's not an actual gold mine, but the little spot near the middle of a 90-acre plot on his sprawling ranch produces glittering returns all the same.

After Umbarger installed a new 150-horsepower lineshaft turbine pump and associated variable frequency drive (VFD), his irrigation pivot has been able to easily water not only the 90-acre parcel, but it can hydrate an additional 80 acres on a hill half a mile away.

"With the new system, you can run as little as you want to," beamed the farmer, who has lived on the ranch all of his life and the past 52 years with his wife, Sandy.

Before he installed the new system, Umbarger had severe limitations on watering his two parcels, which are not connected to the main 320-acre ranch about a mile to the north.
"It was pretty much run everything, run half of everything, or do nothing," shrugged Umbarger.

That didn't work too well when he was growing different crops or grazing up to 1,250 beef cows. In addition, the 80-acre parcel has a pretty severe slope, which leads to faster drainage.

But all that changed for the better when Umbarger installed his new equipment a few years ago after talking to an employee at Pendleton Grain Growers in Island City. The PGG employee informed the long-time farmer about

Oregon's Business Energy Tax Credit program, administered by the Oregon Department of Energy. Once Umbarger figured he could save on electricity and get a 35 percent tax credit for a $41,000 project, he was off and running.

Umbarger's old pumping system included a booster pump that was needed to get water to the

second plot on the hill, which has two 40-acre irrigation pivots. But not only was the system inflexible, it gobbled up too much energy. The new pump is slightly smaller but is capable of moving the same amount of water. And because the pump is smaller and the newer variable frequency drive is more efficient, the system was projected to save the ranch about 20 percent in electricity costs.

Umbarger's son, Steve, said the new system actually performed a little better than anticipated. "It seemed to me that we were getting about 22 to 23 percent savings at the time," said Steve, who left the family ranch three years ago to work as a research technician for the USDA's Agricultural Research Service northeast of Pendleton.

Steve added flexibility to the irrigation system by changing the sprinkler packages and installing a remote sensing system; the latter which can determine ground moisture and send that information to a cell phone.

"I could change the speed, direction or turn the system off from my phone," said the younger Umbarger. "I could actually move the pivots from my tractor seat."

The projected electricity savings with the pump and VFD meant the ranch would have the new equipment paid off in about 12 years. After that, the Umbarger Ranch will get the continued benefit of saving 20 percent in electricity – sort of like a gold miner hitting a new vein.

Oregon

OREGON DEPARTMENT OF ENERGY

APPENDIX E
GOVERNMENT TO GOVERNMENT REPORT

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The Oregon Department of Energy acknowledges the long-standing working relationship it has had with Oregon's tribes. The agency's executive and management teams are responsible to inform the agency's tribal liaison about issues and opportunities related to tribal interests. New employee orientation also provides a venue for discussing state-tribal relations.

Energy Facility Siting Council
The Energy Facility Siting Council has seven members. They are appointed by the Governor and confirmed by the Oregon Senate. Its members may not be employed by a company that has a facility or proposed facility under the council's jurisdiction; nor can they have ever worked for a company that owned a large energy facility.

The council is responsible for overseeing the development of large energy facilities. A proposed facility must undergo a thorough review process and must meet the council's siting standards to receive a site certificate. The site certificate authorizes the developer to construct and operate the facility.

All council members are volunteers.

Hanford Cleanup Board
The Oregon Hanford Cleanup Board is a 20-member advisory group and includes 10 citizen members, six state legislators, and representatives from the Governor's Office, the Confederated Tribes of the Umatilla Indian Reservation, and two state agencies.

The Board provides input to the United States Department of Energy and its regulators on the Hanford cleanup.

The Board and its staff at the Oregon Department of Energy also:

- Keep key cleanup issues visible;
- Hold the USDOE and its contractors accountable;
- Bring Hanford issues to the public; and
- Convey that the cleanup is a regional issue and that Oregon has a stake in the outcome.

Oregon's primary role at Hanford is to ensure that cleanup decisions are protective of the Columbia River.

Ongoing Efforts

Energy Infrastructure Siting
The Oregon Department of Energy, as staff to the Energy Facility Siting Council, works with tribes regarding the proposed siting of new energy facilities and pipelines. Some of the proposals include wind farms, natural gas-fired power plants and an electric transmission line.

The proposed Boardman to Hemingway 500-kV single circuit transmission line would cross Morrow, Umatilla, Union, Baker and Malheur counties. Idaho Power submitted a preliminary Application on February 29, 2013. Siting staff issued a first Request for Additional Information on May 23, 2013 and

a second Request for Additional Information on Sept. 25, 2014. ODOE expects to receive an amended preliminary Application in late 2015.

Jordan Cove Energy LP has proposed a 420 MW natural gas-fired power plant in Coos County to provide power to the planned Jordan Cove liquefied natural gas export facility. Approval of the LNG facility is under federal jurisdiction through the Federal Energy Regulatory Commission, but the South Dunes Power Plant is under the State's EFSC jurisdiction. ODOE has made two Requests for Additional Information from the applicant. The historic and cultural resource information provided by the applicant in the preliminary Application can be found on ODOE's website at: http://www.oregon.gov/energy/Siting/docs/SDP/pASC/SDP%20pASC%20Exhibit%20S.pdf

Tribal governments help review siting projects, but reimbursement for those efforts is not in statute even though the definition of "reviewing agency" under OAR 345-001-001(52)(n) is "any tribe identified by the Legislative Commission on Indian Services as affected by the proposed facility." The tribes have asked the Oregon Department of Energy to address this issue.

For the 2015 legislative session, LC 577 - Tribal Government Reimbursement – will be introduced because ORS 469.360 does not expressly authorize EFSC to compensate a tribe identified as a reviewing agency for the tribe's necessary expenses related to reviewing the NOI or application. The concept also proposes to amend ORS 469.360 to authorize EFSC to compensate any tribe identified by the Legislative Commission on Indian Services as affected by the proposed facility for the tribe's identified expenses.

Protecting the Columbia River

The Hanford Site in southeastern Washington State used to produce plutonium for nuclear weapons. The production process resulted in large amounts of chemical and radioactive waste. These wastes pose a long-term threat to the Columbia River. The Oregon Department of Energy is responsible for the technical review of the Hanford cleanup and assessment of potential impacts on the Columbia River and Oregon.

The State of Oregon continues to work closely with the Confederated Tribes of the Umatilla Indian Reservation regarding Hanford policy and technical issues. This is done under a Memorandum of Understanding coordinating efforts related to the Columbia River, groundwater protection, radioactive material transport, public information and emergency preparedness. The CTUIR is also represented on the Hanford Cleanup Board.

Energy staff consults and coordinates with CTUIR staff regularly on Hanford technical and policy issues. The Oregon Department of Energy also works with the CTUIR as a member of the Hanford Natural Resource Trustee Council.

Legislation

SB 583 (2013) created the Alternative Fuel Vehicle Revolving Fund. The bill authorizes the Oregon Department of Energy to provide loans to public entities and tribes to assist in the purchase of new alternative fuel vehicles and for the conversion of existing vehicles that use gasoline or diesel to alternative fuel vehicles.

Training

The Energy Facility Siting Division conducted its annual Reviewing Agency Training in September at the ODFW office in Salem and by webinar. Sally Bird and Melissa Liebert of the Confederated Tribes of the Warm Springs participated.

Agency Participation

The agency regularly attends the Natural Resource Working Group and Cultural Resource Cluster meetings, along with Tribal Information Day at the Capitol. In 2014, ODOE gave a presentation on incentives to the Economic Development Cluster.

Technical and Business Support

ODOE's solar and industrial specialists visited the Confederated Tribes of the Warm Springs in November to conduct a walk-through energy audit. Staff learned how the Kah-Nee-Ta facility is operated and what is planned for the future. The resort was built in the 1970s and is heated and cooled solely by electricity. The heated pool has its own electric boiler. The roof structures in the vicinity of the pool are flat (with new roof membranes) and may be suitable for solar water heating. ODOE will receive additional information and develop a report on energy efficiency and renewable energy concepts for Kah-Nee-Ta to consider.

In July, ODOE's loan manager attended the USDOE Tribal Leader Forum on Renewable Energy Opportunities and Strategies in Portland and explained how the tribes can use the Small-scale Energy Loan Program. The first loan SELP made was to the Confederated Tribes of the Warm Springs in 1981. That $15.3 million loan helped build a 19.5 megawatt hydroelectric plant at the Pelton Reregulating Dam.

ODOE provided letters of support to the Klamath Tribes for their grant applications to the US Department of Energy. The Clean Energy and Energy Efficiency on Indian Lands grant applications covered residential energy-efficiency measures and community-scale solar.

Incentives

The Oregon Department of Energy offers several programs for which tribes may qualify, including a renewable energy development grant program. Projects may receive up to 35% of eligible project costs, with a maximum grant of $250,000. Any entity planning to install a renewable energy production system at a business site in Oregon can apply. The grants are awarded on a competitive basis.

For the conservation tax credits, ODOE selects projects on a competitive by technology. The opportunity announcements usually offer tax credits for the following types of projects: sustainable buildings, building systems, and commercial, agricultural and industrial processes. It also has a prescriptive path for small projects with project costs less than $20,000 that also meet the technical requirements. Some available options include LED lighting, ductless heat pumps, and weatherization.

The Tamástslikt Cultural Institute received a Business Energy Tax Credit in 2014 for energy conservation measures, including high efficiency pumps. The project has improved the comfort of the building.

APPENDIX F—OREGON ELECTRIC UTILITIES

Baker	Oregon Trail Electric Cooperative, Idaho Power Company
Benton	Consumers Power Inc., Pacific Power
Clackamas	Canby Utility Board, Portland General Electric
Clatsop	West Oregon Electric Cooperative, Clatskanie People's Utility District, Pacific Power
Columbia	West Oregon Electric Cooperative, Columbia River Public Utility District, Clatskanie People's Utility District, Portland General Electric
Coos	Coos-Curry Electric Cooperative, Central Lincoln People's Utility District, City of Bandon Electric Department, Pacific Power
Crook	Central Electric Cooperative, Pacific Power
Curry	Coos-Curry Electric Cooperative, Central Lincoln People's Utility District
Deschutes	Midstate Electric Cooperative, Central Electric Cooperative, Pacific Power
Douglas	Coos-Curry Electric Cooperative, Douglas Electric Cooperative, Central Lincoln People's Utility District, City of Drain, Pacific Power, Umpqua Indian Utility Co-op
Gilliam	Wasco Electric Cooperative, Columbia Basin Electric Cooperative
Grant	Oregon Trail Electric Cooperative, Central Electric Cooperative, Columbia Power Co-op
Harney	Oregon Trail Electric Cooperative, Harney Electric Cooperative, Idaho Power Co.
Hood River	Hood River Electric Cooperative, City of Cascade Locks, Pacific Power
Jackson	City of Ashland Electric Department, Pacific Power
Jefferson	Central Electric Cooperative, Wasco Electric Cooperative, Pacific Power
Josephine	Pacific Power
Klamath	Midstate Electric Cooperative, Pacific Power
Lake	Midstate Electric Cooperative, Central Electric Cooperative, Surprise Valley Electric Cooperative, Harney Electric Cooperative, Pacific Power
Lane	Blachly-Lane Electric Cooperative, Consumers Power Inc., Lane Electric Cooperative, Midstate Electric Cooperative, Central Lincoln People's Utility District, Emerald
Lincoln	Central Electric Cooperative, Consumers Power Inc., Central Lincoln People's Utility
Linn	Consumers Power Inc., Pacific Power
Malheur	Harney Electric Cooperative, Idaho Power Company
Marion	Consumers Power Inc., Salem Electric Cooperative, Pacific Power, PGE
Morrow	Umatilla Electric Cooperative, Columbia Basin Electric Cooperative
Multnomah	City of Cascade Locks, Pacific Power, Portland General Electric
Polk	Consumers Power Inc., Salem Electric Cooperative, City of Monmouth Power & Light, Pacific Power, Portland General Electric
Sherman	Wasco Electric Cooperative, Columbia Basin Electric Cooperative
Tillamook	Tillamook People's Utility District
Umatilla	Umatilla Electric Cooperative, Columbia Basin Electric Cooperative, Columbia Power Cooperative, Milton-Freewater City Light & Power, Hermiston Energy Services, Pacific
Union	Oregon Trail Electric Cooperative, Umatilla Electric Cooperative
Wallowa	Pacific Power
Wasco	Central Electric Cooperative, Wasco Electric Cooperative, Northern Wasco County
Washington	West Oregon Electric Cooperative, City of Forest Grove Power & Light Dept. Portland General Electric
Wheeler	Wasco Electric Cooperative, Columbia Basin Electric Cooperative, Harney Electric Cooperative, Columbia Power Cooperative
Yamhill	West Oregon Electric Cooperative, McMinnville Water & Light, Portland General Electric