RENEWABLE ENERGY IN OREGON

Siting, Technologies, Opportunities and Challenges

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Renewable energy matters to Oregon!

Climate change is already threatening the natural places we love, the wildlife we enjoy, and the ecological systems that provide us with water, food, and other services. To minimize these threats, we need to invest in a sustainable energy economy based on energy conservation and renewable energy.

However, renewable energy is not without its own impacts. The technologies, infrastructure, and footprint associated with large industrial-scale energy projects can harm those resources and open spaces we all enjoy and have worked for generations to protect.

Renewable energy development, the potential conflicts associated with it, and the policies that guide it can be difficult to understand. This booklet is intended to give a brief overview of the policies, technologies, and issues related to Oregon's ever-growing energy resource. It also provides recommendations for a more efficient and responsible energy future.

We need to invest in a sustainable energy economy based on energy conservation and renewable energy

What can renewable energy do for us?

Renewable energy can help communities by providing:

- Jobs
- Business opportunity
- Tax revenue
- New economic and social opportunities

Renewable energy helps the environment by:

- Reducing our need to use fossil fuels
- Creating a non-polluting form of energy
- Mitigating our carbon footprint and curbing climate change

Renewable Energy helps our nation by:

- Reducing our dependence on foreign oil
- Facilitating job growth and developing a competitive industrial sector
- Creating more economic stability in the future
- Allowing the US to become a new world leader in energy and sustainability

"... instead of subsidizing yesterday's energy, let's invest in tomorrow's." President Obama, State of the Union Address (January 25, 2011)

Why renewables?

The United States has been a world leader and the driving force behind new technologies and innovation in the industrial sector for centuries. However, with new nations dominating the manufacturing sector like China and India, the U.S. needs to find innovative ways to compete on a global scale. At the same time, we are challenged to do this without further contributing to global emissions of carbon dioxide and other greenhouse gases. Energy generated by using natural, renewable resources like sunshine, wind, water, and geothermal can allow us to meet our energy needs while curbing our carbon-footprint.

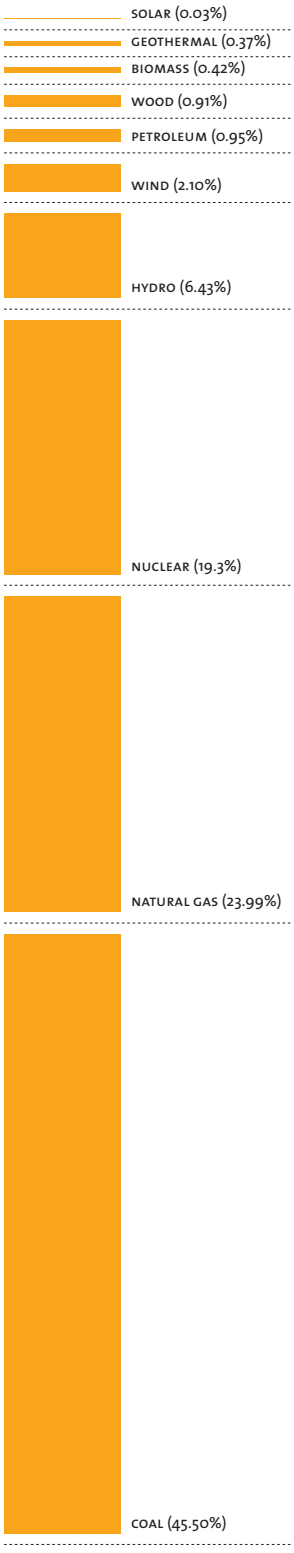
How can energy development be smart from the start?

Although renewable energy has enormous potential here in Oregon and elsewhere, large-scale industrial energy development is not without controversy. Birds and bats often run into wind turbine blades and bats suffer lung damage from sudden drops in air pressure caused by the moving blades. Service roads, out-buildings and transmission lines needed to support industrial-level energy production can fragment habitat, interfering with migration corridors for pronghorn, elk, and deer and disrupt greater sage-grouse habitat.

Conflicts can be reduced when energy is planned smart from the start to minimize environmental and social conflicts. When industrial-scale energy is developed in places that will have low impacts on our natural resources, we are encouraging a responsible energy future that truly benefits the environment.

Some principles that guide "smart" planning include: proximity to transmission lines, avoidance of sensitive wildlife habitat, and effective on-the-ground mitigation that can create a net-benefit for the environment. Without proper planning with all stakeholders, a new energy economy that is truly green is unlikely.

For Oregon, that means building a program that guides projects to low-conflict zones – areas with solar, wind, or geothermal resources that do not contain critical wildlife habitat, wilderness quality lands, or sensitive cultural resources. Policy makers have an opportunity to help advance renewable energy policies that incentivize smart and responsible development, while fixing loopholes that promote unfair markets.

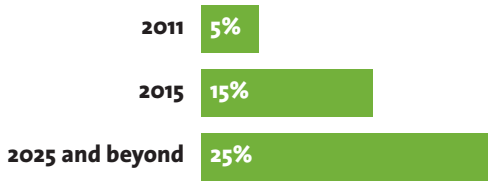


Graph: U.S. net generation of electricity by source from January to August, 2010

Energy basics in Oregon

A number of factors contribute to the development and growth of renewable energy in Oregon including incentives, regulations, access to transmission, and environmental review. Multiple state and federal agencies participate in the regulatory processes necessary to permit industrial-scale energy projects. Below are some key issues and entities involved in energy development in Oregon.

Renewable Portfolio Standard: The 2007 Legislature created a renewable portfolio standard (RPS) that requires the largest utilities in Oregon to provide 25 percent of their retail sales of electricity from newer, clean, renewable sources of energy by 2025. Smaller utilities (such as co-ops) have similar, but lesser, obligations. Below is the percentage of renewable energy large utilities are required to have by each designated year:



Energy Incentives Program: The Energy Incentives Program, formally called the Business Energy Tax Credit (BETC), was established through the Oregon Legislature to support green building, green energy, and energy conservation programs. The overhaul of this program in 2011 (and subsequent name change) now focuses on incentivizing small-scale residential and commercial renewable energy projects (like roof top solar) rather than large industrial-scale energy projects. This program also incentivizes individuals and companies to invest in energy saving technologies to increase energy efficiency.

Energy Facility Siting Council: The Energy Facility Siting Council (EFSC) is a seven-member governor-appointed group which was established by the Oregon Legislature in 1975 to act on the state's behalf when determining whether to site a proposed energy facility in Oregon. The Oregon Department of Energy siting team serves as staff to EFSC and works with a developer to complete a project application before submitting it to EFSC for consideration of a site certificate. Although EFSC has the sole authority to approve or deny a project it reviews, it will seek input from a variety of stakeholders including communities, state, local and federal agencies.

Power Purchase Agreements: Power Purchase Agreements (PPAs) are very important to sellers of energy to ensure a fair price for energy and the ability to make a profit. These agreements are legal contracts between buyers and sellers of energy and capacity. For renewable energy projects such as wind, solar and geothermal, PPAs also include "Green Tags" or Renewable Energy Credits sold with the power. Other considerations, agreed to for the protection of both parties, often include development timeline, permitting, interconnection, performance, operation, and billing.

County vs. State: Who permits what?

Energy Permitting: Conditional Use Permit or Site Certificate: Energy project siting can be confusing to understand in Oregon because we have two potential venues for permitting. Depending on factors such as land ownership and project size, there are sometimes complex and varied regulatory mechanisms at the state, federal, and local levels which developers have to navigate. Here in Oregon, energy producers must obtain either a "site certificate" from the EFSC or a "conditional-use permit" from a county (or other local authority). This bifurcated system was created so that large projects go through the State's Energy Facility Siting Council for review and smaller projects go through local permitting processes.

Wind, solar or geothermal electric generating facilities must obtain a site certificate from the Energy Facility Siting Council if they have an average capacity of 35 megawatts or greater from a "single facility." ORS 469.300(11)(a)(J). For wind and solar facilities, statute defines "average" as the peak generating capacity divided by a factor of three. Therefore, a wind facility is exempt from EFSC regulation if it has peak generating capacity under 105 megawatts. Projects that do not exceed the threshold go through the local conditional use permit process. The county process is designed to review and permit smaller facilities, while the State process is designed to be more rigorous and thorough so that cumulative impacts are properly addressed.

Currently, there are few state-wide guiding principles that counties must follow when issuing conditional-use permits for energy development – therefore review varies county by county. Counties have ample discretion under Oregon's Land Use Act to issue conditional use permits, but often do not have in-house expertise to evaluate the social or environmental issues associated with development. This has caused some conflicts with stakeholders. However, certain counties have included community members, experts, and outside groups in the permitting process. In this way, creative solutions have been developed by some counties to alleviate conflicts. For example, Crook County required a Technical Advisory Committee to guide the conditions of a permit for a 104 MW wind farm. This allowed agencies, landowners, conservationists, the county, and the developer to talk about issues and conflicts up front.

What is a single energy site?

Due to ambiguity in statutory language, there is a need for a better definition of a single energy facility. There have been abuses of the current policy as developers have subdivided larger projects into smaller projects to avoid State review.

Intentional or unintentional evasion of the Oregon Department of Energy's jurisdiction allows projects to circumvent review by state agencies such as the Oregon Department of Fish and Wildlife.

Clarification will prevent delays and conflicts in the siting and permitting process.

Wind energy

Sage-grouse are on the decline due to factors like habitat fragmentation. There is evidence that this species, which evolved in sagebrush flats without predator perches, will avoid tall above-ground structures such as wind turbines.

Wind energy is a source of non-polluting electricity. Unlike conventional power plants such as coal-burning plants, wind plants emit no air pollutants or greenhouse gases. In Oregon, wind resources in the Columbia River Gorge have been developed and many rural counties along the Gorge have profited from this new industry.

Energy is created when wind moves the blades and rotor of the turbine which in turn spin a generator to create electrical output.

The cost of wind power has decreased dramatically in the past decade, yet the technology requires a higher initial investment than fossil-fueled generation. After that initial installation, wind costs are much more competitive with other generating technologies because there are minimal operating expenses. Approximately 80% of the project cost is the machinery. The rest of costs go to site preparation and installation.

Although wind power plants have a small carbon-footprint which is confined to the manufacturing, transport, and installation of turbines, wind energy still has a significant ecological "footprint" associated with development.

A few major concerns include:

- Birds and bats collisions with structures and blades
- Fragmentation of wildlife habitat and wildlife avoidance of structures
- Noise produced by the rotor blades
- Aesthetic (visual) impacts and changes to the landscape

By addressing these issues upfront with stakeholders and avoiding critical wildlife habitat we can reduce conflicts and help facilitate responsible energy development.

For more information, go to ONDA's website for a full report on 'Wind Energy and Wildlife.' **www.onda.org**

Solar energy

Like wind energy, solar energy can provide us a non-polluting form of energy. There are two dominant types of solar technologies including solar photovoltaic (PV) and concentrating solar. Here in Oregon, solar PV is the most effective solar technology due to our low temperatures (relative to places like the Mohave Desert) and frequent sunshine in eastern Oregon's high desert.

Solar PV technologies convert solar energy into useful energy forms by directly absorbing particles of light called solar photons that act as individual units of energy. Solar cells for PV are made of layers of semiconductor materials just like those used in computer chips. When sunlight is absorbed by these materials, the solar energy essentially loosens electrons from their atoms, allowing the electrons to flow through the material to produce electricity.

Solar cells are combined into modules of about 40 cells and then assembled into PV arrays up to several meters on a side. PV arrays are usually mounted to be south-facing, and sometimes can pivot and track the sun. For large utility-scale sites, hundreds of arrays need to be interconnected.

Here are a few steps that can help alleviate conflicts:

- Conduct environmental review, including wildlife surveys, prior to siting and permitting
- Talk to nearby landowners and user groups upfront about visual impacts
- Plan appropriate mitigation for unavoidable impacts
- Site on already degraded land or degraded, retired, or marginal agricultural lands
- Site near existing infrastructure, such as transmission lines, to avoid additional impacts from lines

Land Footprint – Impacts vary between renewable technologies. Wind projects can have a very large footprint while solar projects can have more intensive impacts over a smaller area.

Other energy

Geothermal Energy: To date, there has been no large-scale generation of electricity from geothermal sources within Oregon. However there are many proposals and projects underway because Oregon is one the few states with extraordinary geothermal potential.

Biomass, hydro and geothermal energy

Geothermal energy is a renewable energy source because the heat is continuously produced inside the earth. Naturally occurring large areas of hydrothermal resources are called geothermal reservoirs. Nearly all geothermal reservoirs are so deep underground that there are no visible clues showing above ground. When we see geothermal energy on the surface, it comes in the form of volcanoes and fumaroles, hot springs, and geysers. Most geothermal resources are found in the Western United States.

Hydro Energy: Hydro energy refers to energy that is taken from moving water and converted to electricity. Hydro energy can be obtained by using many methods of capture. The most common method is a hydroelectric dam, where gravity moves water through a restricted area and causes turbines to rotate and run a generator. Power can also be generated from the energy created by tidal forces or wave power.

Hydro can impact aquatic species, including sensitive fish by blocking their migration, harming young fish, and changing natural river flows. More information can be found at: http://energy.gov/science-innovation/energy-sources/renewable-energy/water.

Biomass Energy: Biomass is often considered a renewable energy source because biological material from living, or recently living, organisms is burned to create energy or converted into other energy products such as biofuel. In the Northwest, most biomass comes from various species of coniferous trees. Plant matter is used to produce heat or generate electricity with steam turbines and gasifiers, usually through direct combustion.

In areas like Eastern and Central Oregon, there are opportunities to manage unwanted juniper expansion and use waste plant material for biomass facilities.

Concerns about biomass include:

- Pollution from burning process
- Water consumption
- Introduction and proliferation of invasive species such as Giant Reed (*Arundo Donax*)
- Deforestation or over logging
- Land impacts from road construction and harvest method

Wildlife issues

Any type of development in natural areas will have some impacts on land, fish and wildlife in the area. Planning projects in areas that will have the least amount of impacts will reduce conflicts and help provide a greener energy future.

Energy development affects wildlife like eagles.

Many types of wildlife are known or expected to be sensitive to industrial energy development, and each form of renewable energy development has potential impacts. In the Columbia and Snake Rivers, large hydro-electric dams have impacted endangered migrating salmon populations. In Union County, golden eagle collisions have been recorded at a local wind farm. Throughout the high desert, transmission lines contribute to habitat fragmentation and can harm perching raptors.

With proper siting and planning upfront, impacts from energy can be decreased or avoided. For instance, because wind turbines can potentially kill birds through collisions with spinning blades, and bats from air pressure trauma, it is preferable to site turbines in areas where there are low concentrations of bird and bat activity. Planning also needs to account for cumulative impacts associated with development. Roads, powerlines and other developments associated with renewable energy can lead to habitat fragmentation and the displacement of wildlife from preferred habitats, particularly for sensitive species such as the Greater sage-grouse. In this instance, burying transmission lines, avoiding sensitive habitat, and siting near existing infrastructure are all potential solutions to avoid significant impacts to wildlife.

Mitigation can help alleviate impacts on wildlife by either taking measures onsite to avoid impacts, or off-site to restore habitat or create permanent protections on nearby lands. ODFW has a statutory mitigation policy (OAR 635-415-0025) which concludes that: 1) no loss of habitat quantity or quality can occur in "irreplaceable" habitats (defined as Category 1); 2) there is no net loss of habitat and that mitigation must provide a net-benefit when unavoidable impacts are in "essential" habitat (defined as Category 2); and 3) there is no net loss of habitat in "important" habitat (defined as Category 3). Unfortunately, this mitigation policy cannot be enforced by ODFW, and therefore it is essentially a formal recommendation. However, agencies, such as the Bureau of Land Management, are increasingly incorporating ODFW recommendations into their planning.

Crafting new policies, encouraging research, and creating regulatory frameworks to protect wildlife habitat will not hinder development, but instead will provide certainty to developers while allowing Oregon to maintain landscapes and habitat important to our way of life.

Oregon's special landscapes

Oregon is known throughout the world for its iconic western landscapes. Many of these places, like national parks, historic sites, Wilderness Areas and wilderness study areas have been placed off-limits to industrial activities by federal law or regulation. Others, such as roadless areas and Areas of Critical Environmental Concern (ACEC), have certain provisions that would limit development. Citizen proposed wilderness areas lack formal protection at present but have strong scenic values and sensitive wildlife habitat that agencies need to take into account when planning.

Authorities need to take into account the effect of power generation and transmission on the Oregon landscape.

Historical and cultural sites, including historic trails are typically protected by federal law which requires that the sites as well as their historic settings be protected. Overall, open spaces in Oregon are highly valued, which means that projects that do not impair prominent viewsheds are less likely to face local opposition. By steering wind projects away from lands where industrial development would be controversial, wind developers can reap the benefits of maintaining their "green" credentials and achieve a speedier approval process that enjoys strong and broad public support.

Transmission Planning: Most people pass by large transmission lines without even considering what they do – but, these power lines make up our electric grid. Transmission plays a vital role in creating a responsible energy future. Not only is transmission necessary to transport energy from the generation site to the customer, it will influence where energy projects are sited and where development will occur.

Transmission can also cause its own set of conflicts when sited through wild places. It can fragment habitat and cause casualties to avian species like golden eagles through electrocution. Therefore, when working towards responsible energy future, we need to consider where transmission will be sited, how to reduce impacts, and how to facilitate responsible renewable energy.

Best Practices for transmission include:

- Planning upfront
- Siting lines near developed areas
- Siting lines to facilitate responsible renewable energy development
- Working with local communities, agencies, and tribes to understand social concerns and reduce impacts
- Siting outside important sensitive areas, including sage-grouse habitat and golden and bald eagle habitat

Solutions for a smart energy future

In December 2012, Governor John Kitzhaber released the final version of his *10-Year Energy Action Plan*, which places a strong emphasis on improvements in energy efficiency and conservation to meet additional new demand for electricity. But the governor's plan also recognizes the need for additional renewable energy sources and proactive planning to ensure that development of new energy infrastructure is "smart from the start," also addressing the needs of local communities and protecting other natural resources. Consistent with the governor's plan, the state can take the following actions to ensure responsible renewable energy development in Oregon:

1. **Create programs that help Oregon citizens use less energy and employ renewable energy technologies at home.** *This can be achieved by providing incentives for energy audits, energy saving devices and behavior changes, as well as programs* that encourage home-owners and businesses to put solar on rooftops and "feed-in" tariff programs that allow individuals to save money by putting this energy back on the grid.

2. **Identify areas appropriate for renewable energy development and create protections for high-conflict areas with significant environmental or social values.** Proactive planning for renewable energy and protection of areas with significant other values would give developers more certainty, allow for streamlined permitting, and help communities prepare for future development. *State support for landscape-level planning can help guide and inform siting decisions and direct mitigation investments to priority conservation areas.*

3. **Clarify laws that guide energy permitting and development to protect natural resources.** Ambiguity in definitions of terms such as "single energy facility" have created loopholes for developers to avoid more stringent state review of large-scale projects and consideration of cumulative impacts. *Formal adoption of EFSC's existing informal criteria for single energy facilities would be an important first step in this direction.*

4. **Provide incentives for counties and local permitting authorities to strengthen their requirements and review for industrial-scale energy projects.** Current jurisdictional thresholds encourage forum-shopping by developers to avoid more stringent state siting requirements. *This can be addressed through the governor's recommendation for creation of a tiered threshold structure to encourage local adoption of standards consistent with state requirements.* Local governments with requirements consistent with the state's standards would be authorized to review larger projects; those with less stringent requirements would be limited to smaller projects.

About this publication

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