THE OREGON SOLAR PLAN 2017–2027

OREGON SOLAR ENERGY INDUSTRIES ASSOCIATION

PREPARED BY THE GREEN ENERGY INSTITUTE
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OSEIA
Oregon Solar Energy Industries Association

GREEN ENERGY INSTITUTE
AT LEWIS & CLARK LAW SCHOOL

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OSEIA
Oregon Solar Energy Industries Association

THE OREGON SOLAR INDUSTRIES ASSOCIATION

OSEIA is a trade association founded in 1981 to promote clean, renewable, solar technologies. OSEIA works with industry leaders, academic scholars, legislators, government, and non-profit agencies to advocate for solar technologies and raise awareness of its potential to help secure an affordable, reliable, and clean energy future.

For more information, please visit **oseia.org**

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The **Green Energy Institute** is an independent renewable energy law and policy organization within Lewis & Clark Law School's Environmental, Natural Resources, and Energy Law program. GEI develops comprehensive strategies to transition to a 100% renewable energy system.

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THE OREGON SOLAR PLAN AT A GLANCE

THE OREGON SOLAR PLAN OUTLINES A PATH TO ACHIEVE THE FOLLOWING:

- Solar can be 10 percent of Oregon's energy mix…
- … in 10 years…
- … by installing enough solar to power 500,000 homes

HOW MUCH SOLAR DOES OREGON HAVE TODAY?

By December 2016, Oregon had installed 264 MW of solar:

- 54 MW of residential solar
- 55 MW of commercial solar
- 155 MW of utility-scale solar

That's enough solar to power more than 30,000 Oregon homes.

HOW MANY PEOPLE HAVE SOLAR-RELATED JOBS IN OREGON TODAY?

Approximately 4,500 people work within Oregon's solar industry, according to the Solar Foundation's Solar Jobs Census, published in February 2017.

WHAT HELPED SOLAR GROW TO THIS POINT?

A set of very effective existing policies have supported solar development in Oregon:

- Net Metering
- Residential Energy Tax Credit (RETC)
- Utility Ratepayer Incentives, especially from the Energy Trust of Oregon
- Property Tax Exemption
- Federal Tax Incentives
- Federal Public Utility Regulatory Policies Act (PURPA)

THE OREGON SOLAR PLAN IS A BLUEPRINT FOR OREGON'S SOLAR FUTURE!

- Keep the policies that work
- Fill in the policy gaps: provide market signals that solar has a predictable future in Oregon
- Grow Oregon's solar workforce: we'll need up to 8,000 solar workers by 2027
- Align land use and renewable energy policies
- Examine transmission issues

THE OREGON SOLAR PLAN:

10 YEARS
10 PERCENT OF OREGON'S ENERGY MIX
500,000 OREGON HOMES

> *"The way that you change the future is you change the story that people tell themselves about the future that they will live in.... If you can change that story, people will actually make different decisions."*
>
> *Brian David Johnson, Arizona State University Center for Science and Imagination*

In the very near future, thriving communities will share a common commitment: to harness and use power from the sun. These communities will have robust solar industries that support local economic growth and provide local job opportunities. These communities will have resilient energy systems and stable electricity costs. And they will be equitable.

Oregon is home to diverse communities with their own unique challenges and opportunities. Yet in each of these communities, from the smallest town to the largest city, solar power has the potential to improve the quality of life. Though it provides less than 1 percent of Oregon's electricity, solar is already making life better for thousands of Oregonians. In order to enjoy all the benefits that solar power can provide, Oregon must develop strategies to grow its solar industry and advance solar development in the state.

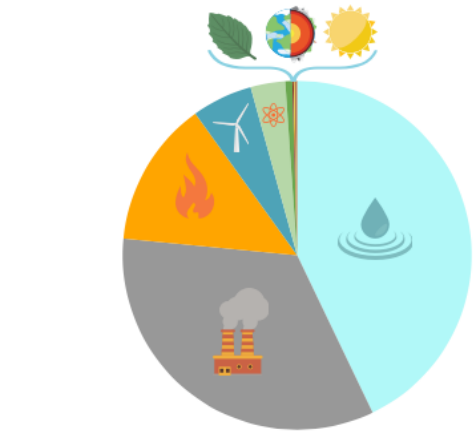
In 2016, the Oregon Solar Energy Industries Association (OSEIA) enlisted the technical expertise of the Green Energy Institute to work with a wide variety of industry stakeholders to establish a blueprint for Oregon's solar energy future. This blueprint, the Oregon Solar Plan, seeks to support the energy transition by showing where Oregon can be in ten years in terms of solar deployment and offers strategies for how to get there.

By the end of 2027, Oregon can get 10 percent of its total electricity from solar power. The Oregon Solar Plan outlines the current status of Oregon's solar power, proposes targets for deploying solar power in Oregon over the next ten years, and provides a pathway to deploy solar to reach these targets in 10 years.

THE ENERGY TRANSITION: AN OPPORTUNITY TO BUILD A GREENER FUTURE

The U.S. energy system is in the midst of a transformation, after operating in the same manner for more than a century. Advances in renewable energy technology combined with a growing awareness of the detrimental impacts associated with the combustion of fossil fuels have spurred a fundamental shift in how we produce and use electricity. The energy transition towards clean, renewable resources is altering the way we think about electricity. This includes how it is produced, managed, and how we plan for future energy demands.

The energy transition is currently underway in Oregon, and the state has an opportunity to decide what it wants its energy system to look like. Today, nearly 50 percent of the electricity consumed in Oregon is produced from fossil fuels. Solar power provides less than 1 percent of the state's electricity. However, the state is in the process of transitioning away from polluting energy sources like coal-fired power. This provides Oregon with the opportunity to strengthen its electricity supply and grow a sustainable energy economy in the state. Oregonians must decide now where they want their energy to come from over the next half-century.



Oregon Energy Mix 2012–2014

Hydro (42.88%) Coal (33.65%) Natural Gas (13.55%) Wind (5.62%)
Nuclear (3.21%) Biomass & Biogas (0.65%) Geothermal (0.12%)
Solar (0.07%) Other (0.25%)

Data from the Oregon Department of Energy, 2017

**A detailed companion report prepared by the Green Energy Institute contains full references and citations for information and data presented in the Oregon Solar Plan.*

WHY SOLAR?

Solar power is a clean, sustainable, renewable energy resource that offers substantial energy, environmental, economic, and social benefits for Oregonians. Though solar currently provides a small portion of Oregon's electricity, the solar industry is already providing significant benefits for the state by fueling local economic development, creating jobs, and promoting energy independence in the state.

- **Solar benefits Oregon's energy system:** Solar offsets the demand for energy from fossil fuel plants and reduces ratepayer exposure to rising fuel and environmental compliance costs. Solar also reduces strain on local grid networks and increases resiliency of local energy systems. In addition, solar can reduce the need to invest in new power plants and new transmission lines.
- **Solar benefits people and communities:** Solar power supports local economic development and creates jobs for Oregonians that cannot be outsourced. By keeping investment and revenue in local communities, solar benefits a larger number of Oregonians than other energy sources, such as natural gas plants. Solar also helps stabilize electricity rates and reduces long-term energy costs for local homes and businesses.
- **Solar benefits the environment:** By offsetting demand for electricity from fossil fuel plants, solar helps reduce air and water pollution. Solar also helps mitigate climate change by offsetting greenhouse gas emissions.
- **Solar is economical:** The costs of solar technologies have dropped significantly in recent years. Average installed system costs have dropped 66 percent since 2010, and costs are expected to continue falling faster than other energy resources. Solar power is now cost competitive with fossil fuels and has the potential to become the cheapest electricity source on the planet in the next ten years.

HOW MUCH SOLAR DOES OREGON HAVE TODAY?

As of December 2016, Oregon has deployed approximately 264 megawatt (MW)dc of solar PV capacity. This includes approximately 54 MW of residential solar, 55MW of commercial solar, and 155 MW of utility-scale solar. Oregon's 264 MW of solar capacity currently generates enough electricity to power more than 30,000 homes. Utility-scale solar development surged in Oregon in 2016, and the state deployed four times as much solar as it did in 2015.

Oregon's Solar Photovoltaic Capacity, 2007 to 2016

FIG. 1 Cumulative PV Capacity

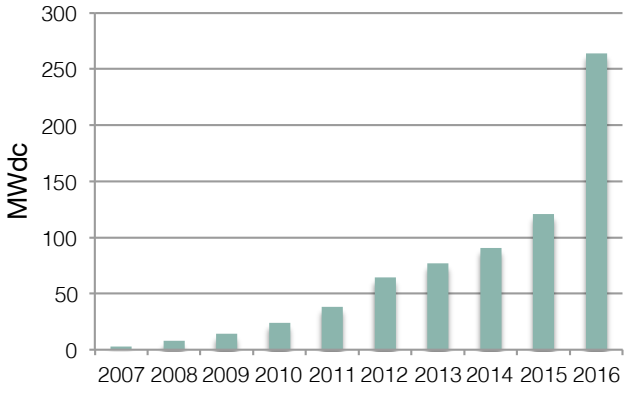
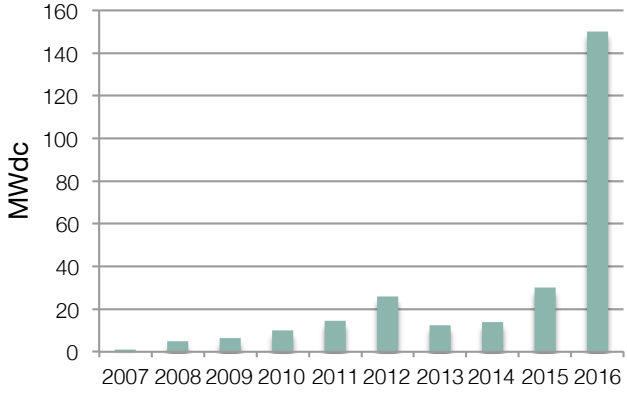


FIG. 2 Annual PV Capacity Additions

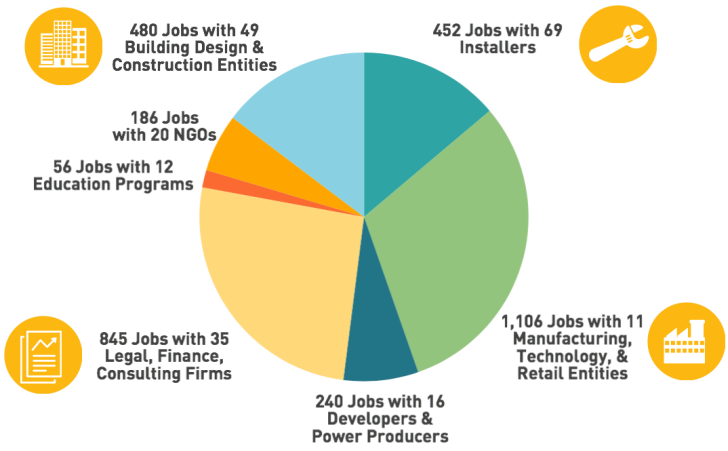


PV Capacity data from the U.S. Energy Information Admin., the Interstate Renewable Energy Council, and the Energy Trust of Oregon. 2016 capacity projections from Greentech Media and the Solar Energy Industries Association.

OREGON'S SOLAR WORKFORCE

The state's solar industry currently supports a workforce of 4,500 Oregonians. In addition to employing hundreds of electricians, apprentices, and general laborers, the diversity that makes up the solar industry provides career opportunities in a variety of fields. An estimated 200 public and private businesses and organizations participate in Oregon's solar economy, covering a wide variety of sectors, including solar panel manufacturers, engineering and architectural firms, and technology developers to educational and training entities. These sectors provide high-paying jobs for Oregon residents in a wide variety of professions.

FIG. 3 Oregon's Solar Workforce Composition, 2016



Data from the Green Energy Institute, 2016.

EXISTING POLICIES THAT WORK

A variety of local, state, and federal policies guide solar development in Oregon. In many cases, multiple policies support a single solar project. Currently, a combination of six key state and federal policies are aligned with solar development in Oregon.

Policy	State/Federal	Status	Beneficiaries
Net Metering	State	Active	Homes and Businesses
Residential Energy Tax Credit (RETC)	State	Set to expire in 2017	Homeowners
Energy Trust of Oregon Incentives	State	Active	PGE and PacifiCorp customers
Property Tax Exemption	State	Set to Expire in 2018	Property owners
Federal Investment Tax Credit	Federal	Phases down 2019 to 2022	Homes, businesses, and developers
PURPA	Federal	Active	Independent power producers

OREGON SHOULD STRIVE FOR SOLAR LEADERSHIP

Oregon was an early leader in solar deployment, ranking 9th in the nation in installed solar capacity in 2008. In recent years, however, Oregon has fallen behind. According to the Solar Energy Industries Association, in 2016 Oregon ranked 19th in installed solar PV capacity. Solar leadership creates jobs and attracts private investment. By allowing other states to build significant leads in solar development, Oregon has lost many of the advantages that this leadership provides. The state has retained its status at the forefront in solar manufacturing, ranking 5th in the nation in 2015. Many solar components built in Oregon are exported out-of-state, so the manufacturing sector is not as dependent on in-state development as other industries.

State	Solar Capacity (MW, 2016)	Solar Rank	Solar Workforce (2016)	Population (millions)	% Electricity from Solar (2015)
California	18,296	1	100,050	38.8	10%
North Carolina	3,012	2	7,112	10	1.5%
Nevada	2,191	4	8,371	2.8	4.8%
New Jersey	2,003	5	6,056	9	2.6%
Massachusetts	1,487	7	14,582	6.7	4.2%
Oregon	264	19	4,509	4	0.2%
Vermont	168	24	1,767	0.6	5.8%

10% SOLAR ENERGY IN 10 YEARS

Oregon can feasibly install enough solar capacity to produce 10% of the state's electricity by 2027. Oregon can reach this generation target by installing 4 gigawatts (GW) of solar capacity over the next 10 years, including 600 MW of residential installations, 600 MW of small commercial systems, 800 MW of large commercial installations, and 2,000 MW of utility-scale solar projects. **This amount of solar capacity would generate enough electricity to meet the needs of nearly 500,000 homes, or 30% of homes in the state, by 2027.** This deployment will attract private investment to local economies and hedge against future increases in Oregon's electricity costs. While solar power is already an economical energy source, costs will continue to drop as Oregon's solar deployment increases over time. Average solar PV costs have dropped dramatically over the past decade, from approximately $7.50 per watt in 2009 to around $2.00 per watt in 2016, and average PV costs could fall to around $1.30 per watt within the next decade. Costs will vary depending on the sizes of the various systems installed.

Oregon Solar Plan PV Deployment Trajectory

FIG. 4 Cumulative PV Capacity, 2016–2027

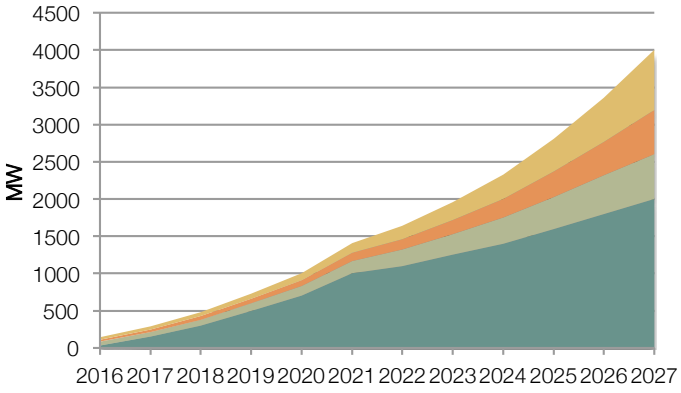
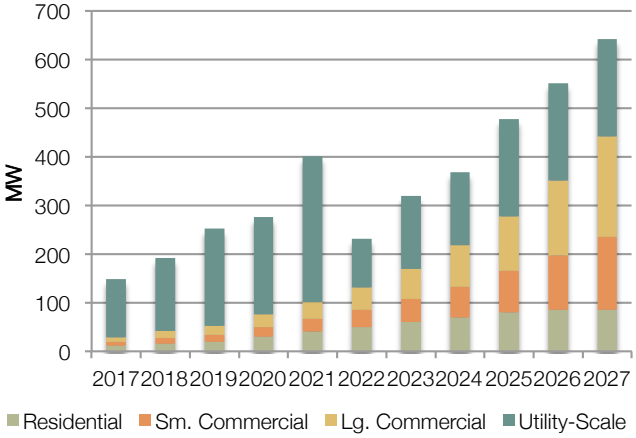


FIG. 5 Annual PV Capacity Additions, 2017–2027



BENEFITS OF REACHING A 4 GIGAWATT SOLAR TARGET

- **Modernizing Oregon's Electricity System:** By installing 4 GW of solar power, Oregon will increase the resiliency of its energy system, offset the need for new fossil fuel-fired generating resources and associated infrastructure, reduce impacts from rising fuel costs, and reduce wear and tear on existing generating and transmission resources. In addition, Oregon will modernize its grid infrastructure to create a more flexible and reliable energy system.
- **Increasing Private Investment in Oregon's Solar Industry:** In 2015, more than $70 million of private capital was invested in solar power installations in Oregon. Under the Oregon Solar Plan's targets, Oregon's solar industry could attract between $5 billion and $8 billion in private investments between 2017 and 2027. This market growth would support high-paying jobs for Oregonians and generate revenue for local communities.
- **Reducing Greenhouse Gas Emissions:** By generating 10% of its electricity from solar, Oregon could reduce its annual greenhouse gas emissions by 1.8 million metric tons of CO_2—the equivalent of taking 380,000 cars off the road or planting 46,000,000 trees.
- **Creating High-Paying Jobs for Oregonians:** Oregon's solar industry supports local jobs in local communities, and developing 4 GW of solar PV could create up to 8,000 new jobs in the installation and electrical sectors alone. Increased solar deployment at sustainable growth rates would create additional jobs in solar component manufacturing and other industry sectors as well—installing 4 GW of solar could create an estimated 100,000 job-years for Oregon workers (with one job-year equating to one year of full-time employment).
- **Equitably Increasing Access to Solar Power:** With the enactment of Oregon's community solar program in 2016, the state has the opportunity to equitably increase access to solar power in local communities. With an effective regulatory framework in place to build a viable community solar market, Oregonians in low-income communities will be able to share in the economic and environmental benefits of solar power.

A BLUEPRINT FOR OREGON'S SOLAR FUTURE

Oregon's existing renewable energy policies provide a regulatory foundation for the state's solar industry, and it is essential that Oregon retain existing policies that effectively support solar development in the state. Oregon's legal and regulatory framework also contains policy gaps that currently impede certain types of solar development in the state. To meet the Oregon Solar Plan's deployment targets, the state and the solar industry must work together to meet the following goals:

- Ensure payback period for rooftop and distributed PV systems does not exceed 10 years
- Grow the solar workforce and stabilize existing jobs within the solar industry
- Reduce solar soft costs while supporting and maintaining living wages for solar workforce
- Reduce or eliminate persistent barriers to market entry or participation
- Develop a solar policy framework for Oregon to sustain a stable solar industry

To achieve these goals, Oregon must provide certainty and predictability within policy, governance, regulation and workforce. The following strategies will help Oregon reach the goal of 10% solar electricity within 10 years:

- **Keep Policies that Work**
  - Extend the Residential Energy Tax Credit (RETC)
  - Extend the property tax exemption for alternative energy systems
  - Protect state net metering and PURPA policies
- **Enact Policies to Fill in the Gaps**
  - Adopt effective community solar program rules
  - Support in-state solar development through a solar capacity standard, renewable energy portfolio standards solar carve-out, or some other similar means to make solar development predictable
  - Enact policies to support commercial solar development
  - Local governments should adopt property assessed clean energy (PACE) programs
  - Adopt solar building standards
- **Grow Oregon's Solar Workforce**
  - Determine optimal licensing to ensure a competitive workforce
  - Increase access to training programs
  - Create a plan to ensure adequate workforce levels to achieve targeted installation levels
- **Align Land Use and Renewable Energy Policy**
  - Create an online landscape-level energy planning tool
  - Coordinate state land use planning goals with energy goals
- **Examine Transmission Issues**
  - Evaluate strategies to increase transmission capacity within the existing system
  - Adopt a combination of strategies to mitigate Oregon's transmission constraints

CONCLUSION

Imagine an Oregon where local contractors are busy installing solar panels on thousands of rooftops; solar arrays and other renewable resources replace polluting fossil fuel plants; electrical vehicles fuel up at roadside solar-powered charging stations; electricity costs fall in low-income communities that share power from community solar projects; Oregonians find easy entry into a strong solar workforce; and local manufacturing plants produce the highest-quality solar panels in the world. Imagine an Oregon powered by the sun, wind, and rain, rather than fuels mined from miles beneath the earth and transported thousands of miles to power plants that emit greenhouse gases and other pollutants into Oregon's air.

This type of clean, sustainable energy system is a future that is coming, and this future is not far off. The Oregon Solar Plan's target of 10% solar power in 10 years to power 500,000 Oregon homes presents an achievable and feasible goal for advancing solar energy development in Oregon. Building toward the Oregon Solar Plan's targets can help the state regain its status as a solar leader to reap the benefits that come from a larger solar workforce and clean, affordable energy. Making a clean, sustainable energy system a reality will require commitment and determination from policymakers, the solar industry, and many other energy sector stakeholders. It is time to build this energy future and start making decisions that will make it a reality.