

CLEAN JOBS OREGON

55,179 CLEAN ENERGY JOBS ACROSS OREGON¹

OREGON POISED TO BUILD ON CLEAN ENERGY SUCCESS IN 2019

More than 55,000 Oregonians work in the state's clean energy sector. Policies like the Renewables Portfolio Standard, Clean Fuels Program and Coal to Clean are driving local development of infrastructure projects like solar arrays and wind farms. All this economic activity is fueling private-sector job growth. Oregon's rural clean energy workforce is robust, and the state ranks No. 14 nationally in solar jobs—this despite a population of just 4 million. But Oregon's clean energy sector is just warming up. Additional job opportunities and clean energy markets remain untapped.

To stay competitive in a rapidly shifting energy market—and to take full advantage of the clean energy job creation happening at the state, regional and national levels—the Oregon legislature should pass the Clean Energy Jobs Bill during the 2019 legislative session.

CLEAN ENERGY JOBS IN PERSPECTIVE

50x There are 50X more clean energy jobs in Oregon than fossil fuel jobs

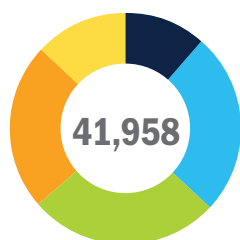
All 36 COUNTIES in Oregon employ workers in clean energy

11,000 RURAL OREGONIANS work in clean energy

10.5% VETERANS of Oregon clean energy workers are veterans

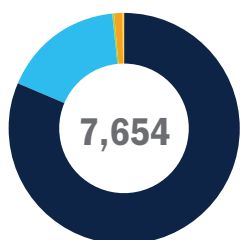
OVER 70% of clean energy workers are involved in construction or manufacturing

INDUSTRY BREAKDOWN: JOBS



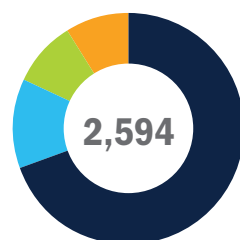
ENERGY EFFICIENCY:

- ENERGY STAR & Lighting: **4,863**
- Trad. HVAC: **10,675**
- High-Efficiency HVAC & Renewable H&C: **11,215**
- Adv Materials: **9,791**
- Other: **5,414**



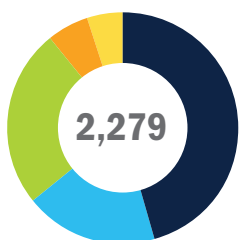
RENEWABLE ENERGY:

- Solar: **6,212**
- Wind: **1,288**
- Geothermal: **21**
- Bioenergy/CHP: **94**
- Low-Impact Hydro: **40**



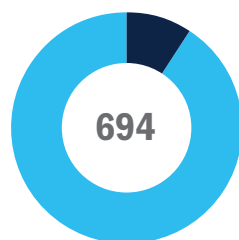
GRID & STORAGE:

- Storage: **1,806**
- Smart Grid: **322**
- Micro-Grid: **238**
- Other Grid Modernization: **228**



CLEAN VEHICLES:

- Hybrid Electric Vehicles: **1,041**
- Plug-In Hybrid Vehicles: **422**
- Electric Vehicles: **574**
- Natural Gas Vehicles: **129**
- Hydrogen & Fuel Cell: **112**



FUELS:

- Other Ethanol/ Non-Woody Biomass: **65**
- Other Biofuels: **629**

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For more information, contact E2 Western States Advocate **Andy Wunder** at awunder@e2.org.

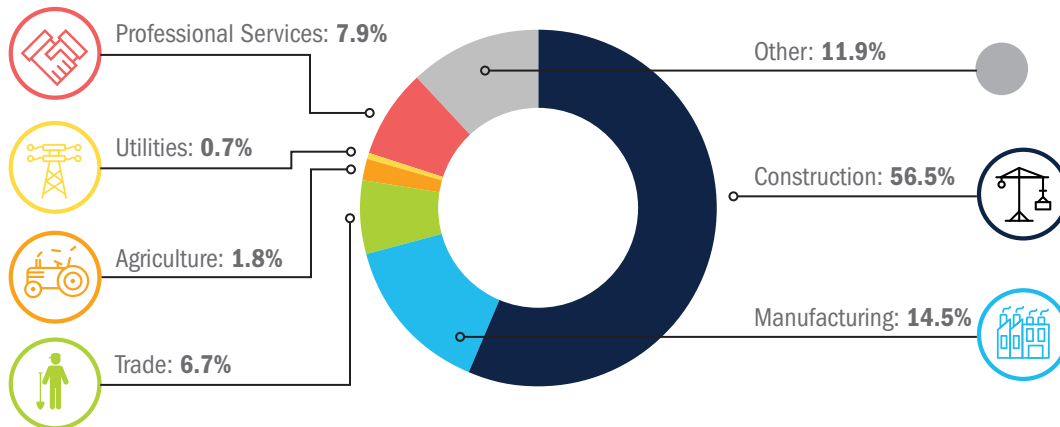
For questions regarding this report, visit E2's Clean Jobs America FAQ at www.e2.org/cleanjobsamerica/FAQ.



IN PARTNERSHIP WITH:



CLEAN JOBS BREAKDOWN BY VALUE CHAIN



POLICIES MATTER

One of the primary ways to ensure Oregon’s clean energy sector remains competitive—and keeps creating good jobs from Portland to Baker City to Klamath Falls—is to enable the business community to more fully join the battle against climate change. With federal leadership sputtering, opportunities to generate economic benefits through climate policy increasingly occur at the local, state and regional levels. In Oregon, the biggest opportunity in 2019 is for the legislature to pass a cap-and-invest program, also known as cap-and-trade.

An effective, jobs-first, cap-and-invest policy would be based on science and place an enforceable, declining cap on the state’s greenhouse gas emissions. Specifically, the cap-and-invest policy should ensure greenhouse gas emissions decline 45 percent by 2035, and at least 80 percent by 2050, compared to 1990 levels. Emissions must decline between now and 2050 with real and enforceable mid-term GHG targets in advance of 2050. Such a program would reduce emissions in line with Oregon’s updated climate change goals.

Cap-and-invest will send a strong market signal to Oregon’s private sector, helping scale up renewable energy development as the cost of producing power from the wind and sun continue to plummet. At the same time, cap-and-invest will generate new investments in energy efficiency, helping businesses save money on energy bills—money that can be reinvested in capital expenditures, technological innovation and human resources.

CAP-AND-TRADE’S TRACK RECORD OF ECONOMIC GROWTH AND EMISSION REDUCTIONS

Putting a price on carbon emissions to drive growth in clean energy is not an untested idea unique to Oregon. In fact, across North America

it has proven to be an elegant and cost-effective means of reducing the GHG emissions fueling climate change. As California, nine Northeastern states and the Canadian province of Quebec have experienced, cap-and-trade programs have driven emission reductions while GDP growth has frequently outpaced national averages.

In Quebec under cap-and-trade, unemployment has fallen to its lowest level on record going back to 1976. California, meanwhile, has leveraged its own climate program—anchored by cap-and-trade—to make significant reductions in carbon emissions. With cap-and-trade providing a backstop, California met its 2020 greenhouse-gas emission reduction goals four years ahead of schedule, and program revenue is funding further reductions in the emissions fueling climate change.

From 2013 to 2016, California appropriated \$2.2 billion in revenue from its program to projects throughout the state, which support over 75,000 jobs. California’s cap-and-trade program has coincided with record economic expansion, and the state now boasts the fifth-largest economy in the world.

Another metric showing these programs work for business: both California and Quebec are posting 100-percent industry compliance for their cap-and-trade programs.

OREGON’S OPPORTUNITY

Through 2019 cap-and-invest legislation, Oregon has an opportunity to join California and Quebec in an established, successful regional carbon market called the Western Climate Initiative (WCI). By leveraging the experience and market competencies of California and Quebec, and linking with their existing market, Oregon will be able to design its own cap-and-invest model, all while ensuring it complements existing successful policies like the Renewable Portfolio Standard, the Clean Fuels Program and Coal to Clean.

Moving forward with the cap-and-invest policy now is expected to generate the kinds of private-sector market signals that help attract innovative clean energy companies to Oregon. It will save businesses money through energy efficiency, offer companies a clearer, long-term market signal, reduce the carbon emissions fueling climate change and build on the 55,000 jobs already employing Oregonians in clean energy across the state.

METROS BY CLEAN ENERGY JOBS

Rank	Metro Area (MSA)*	Clean Energy Jobs**	Renewable Energy Jobs	Energy Efficiency Jobs
1	Portland-Vancouver-Beaverton	27,664	4,484	20,493
2	Eugene-Springfield	5,280	616	4,125
3	Salem	4,151	457	3,255
4	Medford	3,543	393	2,770
5	Bend	2,665	340	2,054
6	Corvallis	972	122	751

* An additional 10,903 clean energy jobs are in Oregon's rural areas, including 8,511 in energy efficiency and 1,242 in renewables.

** Total includes all clean energy jobs categories, including solar, wind, energy efficiency, clean vehicles, battery storage, advanced biofuels, low-impact hydro and other areas.

COUNTIES BY CLEAN ENERGY JOBS


Rank	County	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
1	Multnomah	14,748	1,041	12,213
2	Washington	14,075	3,495	9,486
3	Clackamas	5,201	389	4,253
4	Marion	3,694	342	2,978
5	Lane	3,428	435	2,598
6	Deschutes	2,492	270	2,013
7	Jackson	1,900	258	1,443
8	Linn	1,017	79	821
9	Benton	951	137	737
10	Yamhill	695	64	555
11	Douglas	684	94	516
12	Umatilla	561	57	362
13	Klamath	504	81	375
14	Josephine	481	91	328
15	Coos	396	55	299
16	Polk	392	29	279
17	Hood River	352	36	282
18	Clatsop	343	52	267
19	Lincoln	339	57	245
20	Morrow	315	224	32
21	Columbia	284	20	242
22	Union	260	26	168
23	Baker	231	122	96
24	Crook	177	18	97
25	Curry	175	28	135
26	Wasco	172	17	134
27	Malheur	145	27	100
28	Tillamook	140	28	96
29	Jefferson	76	14	46
30	Wallowa	74	12	58
31	Harney	38	5	29
32	Grant	37	6	27
33	Sherman	33	15	3
34	Lake	32	8	22
35	Gilliam	19	8	3
36	Wheeler	6	2	3

* Total includes all clean energy jobs categories, including solar, wind, energy efficiency, clean vehicles, battery storage, advanced biofuels, low-impact hydro and other areas.

RURAL JOB OPPORTUNITIES

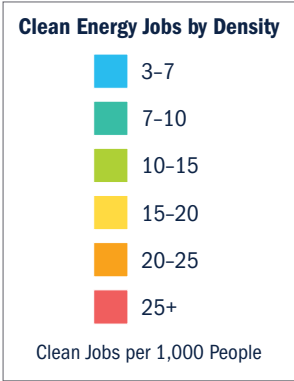
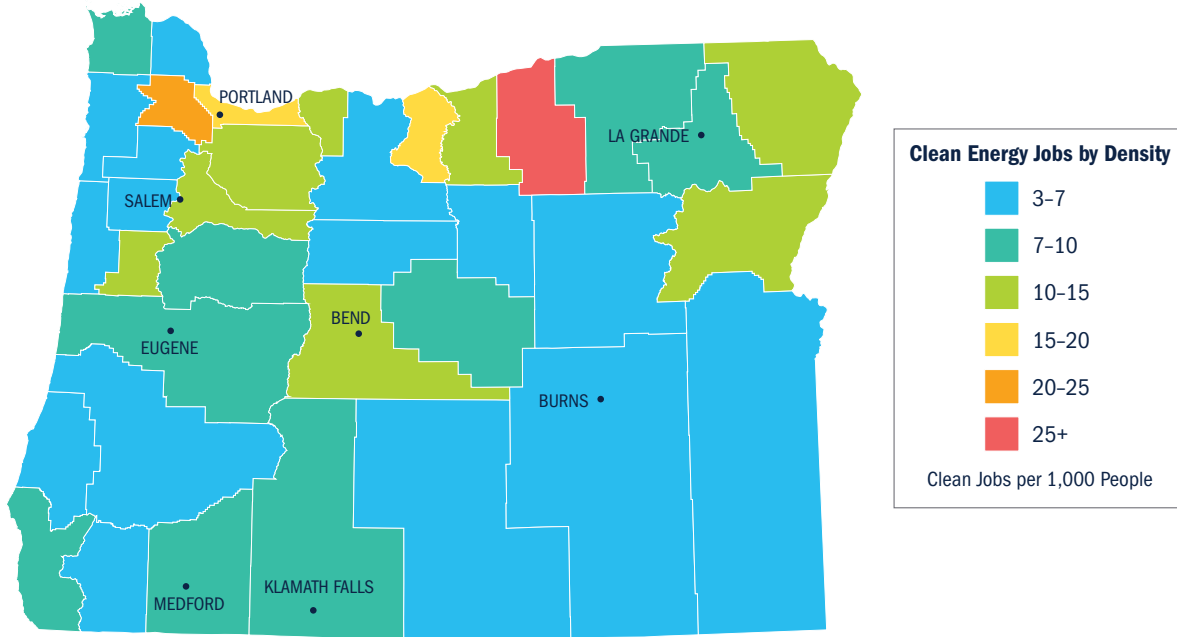
50+%
 MORE THAN HALF OF OREGON'S CLEAN ENERGY JOBS ARE OUTSIDE THE PORTLAND METRO AREA

11,000
 NEARLY 11,000 RURAL OREGONIANS ARE EMPLOYED IN CLEAN ENERGY



MORROW COUNTY LEADS THE STATE IN CLEAN JOBS DENSITY WITH MORE THAN 28 CLEAN ENERGY JOBS PER 1,000 RESIDENTS

OREGON CLEAN JOBS BY DENSITY²



PROFILE: WORKING IN ENERGY EFFICIENCY



Name: **Jered Kropholler**
 Age: **26**
 Hometown: **Klamath Falls**
 Company: **Cypress Creek Renewables**
 Position: **Quality Control Engineer**

How did you end up in solar?

I worked as an electrician for about four years and I got my journeyman’s license. I ended up working on solar projects in Lakeview and Bend and was made a foreman then a general foreman. We were working through a brutal winter. There was 2-3 feet of snow on the ground and the temperature got down to 18-below. That’s when I got to know Cypress Creek. I was offered a full-time job with them in June 2017. I was brought on as a construction manager and I was all over Oregon. We had 10 projects going on across the state—one in Klamath Falls where I’m from, eight in Salem and a 10-megawatt project in Medford. Those projects were a lot of fun. It was busy, but I was learning about permitting and logistics. I’m a quality control engineer now, so I make sure everything that’s being built is done so properly—the solar panels, racking, bolt stacks, torque marks, and so on.

Do you like working in solar?

For me it’s super exciting to be on the cutting-edge. I pay attention to what’s happening with various technologies, because it’s changing fast. I pay attention to battery technology. When we can figure out how to store solar power overnight, that’s going to be a game-changer. I don’t have kids, but someday if I do I’d be very blessed to be able to take them on a drive around Oregon and show them some solar projects. I’ll be able to say, ‘I built that.’

As lawmakers in Salem consider policies that can help expand solar markets in Oregon, what do they need to know about the industry?

I’m a boots-on-the-ground solar worker. They should realize just how many people solar supports and how it helps people put food on the table. The industry hires a lot of locals, and most times we can’t hire enough workers. In Klamath Falls—where the economy isn’t really that strong—solar has created a lot of jobs. I’ve even helped my friends get jobs on solar projects. And there are lots of jobs working for companies you wouldn’t associate with solar—rental yards, surveyors, excavators, water trucks, fence contractors, even nurseries and landscaping companies are hired by solar developers to replant vegetation around the arrays.

I travel all over the country working on solar projects, because the solar industry is strong in states that have strong solar policies. Recently I’ve been traveling to Colorado and Indiana and I’m probably headed to North Dakota and Minnesota for projects soon. I know North Carolina has strong solar policies and a lot of jobs in solar. The travel isn’t too bad, but to be honest I’d prefer to be able to work on more solar projects in Oregon. I’d rather be able to sleep in my own bed in Klamath Falls.

CLEAN ENERGY CASE STUDY: MAJOR BIODIESEL PRODUCER FUELS JOB GROWTH ACROSS OREGON

SeSequential Biodiesel is one of the largest vertically integrated biodiesel producers in the United States, and the only commercial-scale biodiesel producer in Oregon. The company was founded in 2001 by a group of University of Oregon students who began selling biodiesel—a locally produced, low-carbon alternative to petroleum-based diesel fuel—out of five-gallon jugs from the back of a pickup.

After attracting private investors, SeSequential expanded rapidly. It now produces more than 8 million gallons of biodiesel annually, and it's on track to top 9 million gallons in 2018. SeSequential operates facilities in Portland, Eugene, Salem and Medford.

Rachel Shaver is SeSequential's marketing manager. She said SeSequential employs 228 people, including 146 in Oregon, with the balance at operations across the West. These workers include commercially licensed truck drivers who collect waste vegetable oil from restaurants like Taco Time and Burgerville, dispatchers, depot managers, sales and IT professionals, contract specialists, finance experts and chemical engineers.

SeSequential also employs several military veterans who work as plant operators helping to refine used fryer oil into biodiesel that can be used to power a vehicle, or heat a home.

"Lots of our jobs do not require higher education but are well-paying, living-wage jobs," Shaver said. "There are long-term professional growth opportunities at our company. We've had truck drivers who have worked their way up to become managers and supervisors. You are judged by how well you perform your job."

For an innovative, fast-growing and entrepreneurial company like SeSequential, a 90-day in-house biodiesel production training program is critical to ensuring its workforce shares the skills necessary to keep the company's far-flung operations moving along efficiently. New hires are buddied up with more experienced employees who demonstrate safety protocols, proper collection of raw materials and biodiesel production.

In addition to its contracts with fast-food restaurant chains, SeSequential collects waste vegetable oil from some of the biggest institutions in the region, including both major public universities in Oregon, Nike, the Oregon Air National Guard, several U.S. Coast Guard stations and the potato chip maker Kettle Foods.

After dispatching its 92 trucks, the used grease is collected and transported to depots like the one in Medford, where the vegetable oil goes through a preliminary drying process before being shipped to Salem to finalize biodiesel production. From there, some of the finished product is distributed to about 85 fuel retailers across Oregon, including several owned and operated by SeSequential.

Shaver said several policies have enabled the company to expand and add more workers. "[The Clean Fuels Program] has been a great policy for us," she said. "It's really strengthened the market for clean fuels in Oregon."

Not surprisingly for a company with nearly 150 employees in Oregon, SeSequential also supports the Clean Energy Jobs Bill, a cap-and-invest policy which the legislature is expected to take up in 2019 and which will help SeSequential by further cementing the state's burgeoning carbon market.

"SeSequential is a company that believes you don't have to pick between what it means to do right by the environment, what's right for people in the community and making some money," Shaver said.



SeSequential truck drivers are involved in various stages of biodiesel production, from collecting waste vegetable oil from restaurants to delivering the refined finished product to fueling stations across Oregon. (Photo courtesy of SeSequential)



SeSequential has a fleet of 92 trucks. It operates facilities in Portland, Eugene, Salem and Medford, and is on track to produce more than 9 million gallons of biodiesel in 2018. (Photo courtesy of SeSequential)

OREGON TOP LAWMAKER DISTRICTS FOR CLEAN ENERGY JOBS

Data shows that distribution of clean energy jobs in Oregon crosses all political boundaries, with clean energy jobs in every congressional and state senate district.

U.S. CONGRESSIONAL DISTRICTS

District	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
1 (Rep. Bonamici)	15,864	3,240	11,185
2 (Rep. Walden)	11,245	1,321	8,728
3 (Rep. Blumenauer)	11,731	1,228	9,258
4 (Rep. Peter DeFazio)	10,656	1,221	8,344
5 (Rep. Schrader)	5,682	644	4,443

* Total includes all clean energy jobs categories, including solar, wind, energy efficiency, clean vehicles, battery storage, advanced biofuels, low-impact hydro and other areas.

STATE SENATE DISTRICTS

District	Clean Energy Jobs
1 (Sen. Heard)	3,547
2 (Sen. Baertschinger, Jr.)	1,729
3 (Sen. Golden)	1,559
4 (Sen. Prozanski)	4,279
5 (Sen. Roblan)	1,418
6 (Sen. Beyer)	1,532
7 (Sen. Manning)	210
8 (Sen. Gelser)	1,811
9 (Sen. Girod)	2,863
10 (Sen. Winters)	2,187
11 (Sen. Courtney)	359
12 (Sen. Boquist)	1,759
13 (Sen. Thatcher)	2,953
14 (Sen. Hass)	1,641
15 (Sen. Riley)	3,094

District	Clean Energy Jobs
16 (Sen. Johnson)	1,645
17 (Sen. Steiner Hayward)	883
18 (Sen. Burdick)	3,984
19 (Sen. Wagner)	1,789
20 (Sen. Olsen)	1,941
21 (Sen. Taylor)	2,640
22 (Sen. Frederick)	2,564
23 (Sen. Dembrow)	874
24 (Sen. Fagan)	420
25 (Sen. Monnes Anderson)	856
26 (Sen. Thomsen)	384
27 (Sen. Knopp)	2,254
28 (Sen. Linthicum)	1,458
29 (Sen. Hansell)	1,768
30 (Sen. Bentz)	778

ENDNOTES

- 1 Unless otherwise stated, all data is from the 2018 U.S. Energy and Employment Report, May 2018, NASEO and EFI. See Pages 15-17 for methodology questions. For additional information regarding the methodology, visit www.e2.org/cleanjobsamerica/FAQ.
- 2 County population data based on 2017 estimates from the U.S. Census Bureau accessible at <https://factfinder.census.gov>.

PRESENTED BY:



E2 is a national, nonpartisan group of business leaders, investors and others who advocate for smart policies that are good for the environment and good for the economy.

IN PARTNERSHIP WITH:



Oregon Business for Climate provides a forum for Oregon industry leaders to collaborate in policy and business engagements aimed at promoting investment, job creation, competitiveness and economic growth towards Oregon's low-carbon economy.



Clean Jobs Count is a campaign to raise awareness of the economic importance of the clean economy. Visit www.cleanjobscount.org to join thousands of business leaders, workers and others to tell lawmakers and policymakers that clean jobs count.