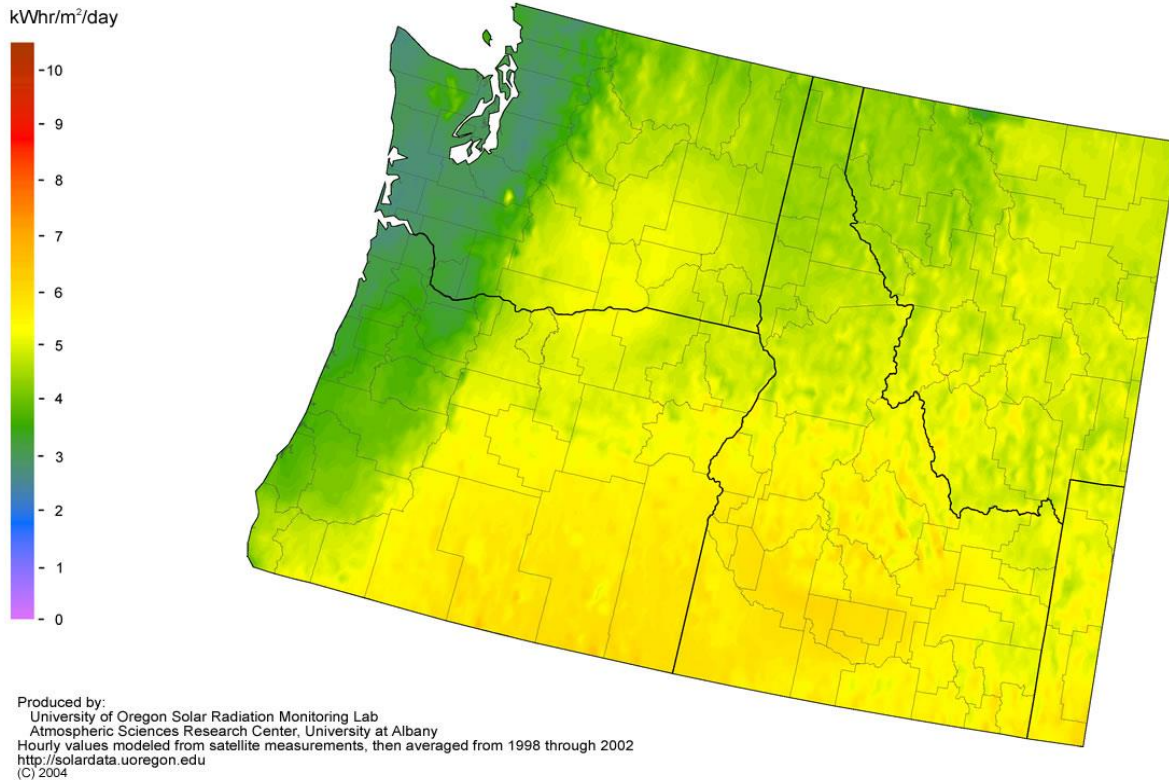


## Solar Energy

### Direct Normal Solar Radiation - Annual



**Figure 1:** University of Oregon solar map

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.

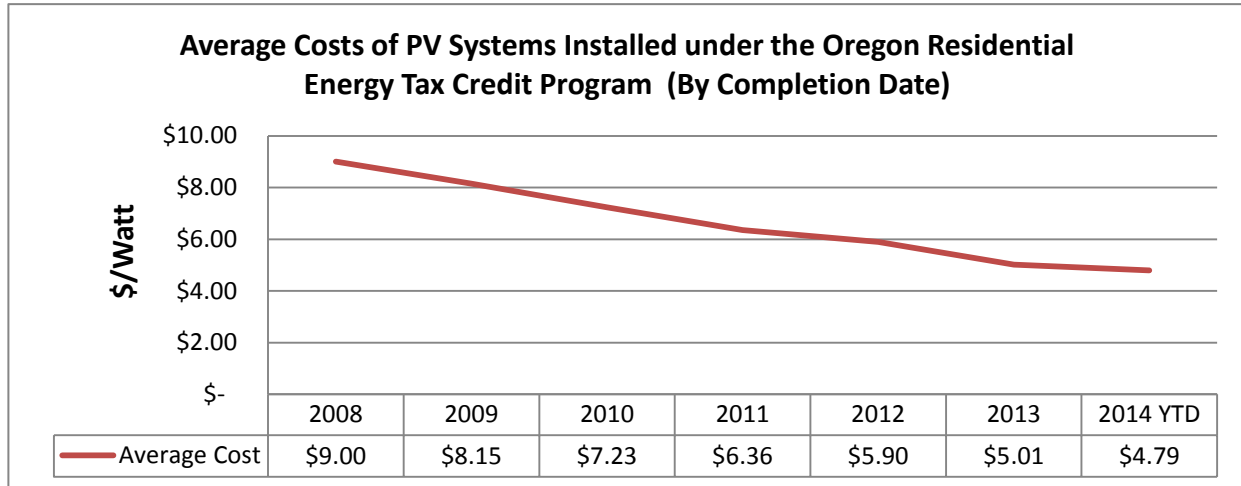
Common solar technologies include daylighting, passive solar space heating, solar water heating, and solar electric or photovoltaic systems. PV systems generate electricity, which is typically back fed to the grid through an electric service panel.

The majority of solar energy projects being installed in Oregon are PV systems. In 2013, there were more than 1,000 PV systems that

used the Oregon Department of Energy's Residential Energy Tax Credit program, compared to about 100 solar water heating systems.

### PV Cost Reductions

The cost of PV systems, conventionally represented in terms of dollars spent per watt installed, has declined significantly in recent years. In 2008, the average cost of a residential PV system in Oregon was \$9.00 per watt. The average cost of residential projects in 2013 was \$4.80 per watt with 10 percent of the projects priced below \$3.90 per watt. Over the same period, the average size of individual residential systems has nearly doubled from 2,600 watts in 2008 to more than 5,000 watts today. These declining prices have primarily been driven by reductions in hardware costs.



**Figure 2:** Declining PV installation costs

Future solar cost reductions are likely to be driven by reduction in non-hardware costs. These “soft costs” include labor, permitting fees, customer acquisition, and all other administrative costs associated with installing a system. Soft costs currently represent more than half of total residential PV project costs in the United States.<sup>1</sup>

market in the next few years. 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.

### Financial Incentives

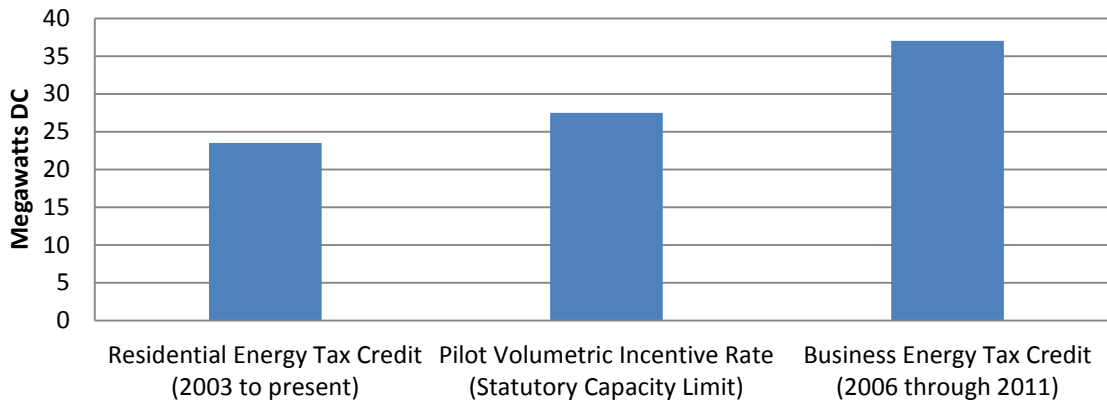
The combination of federal, state and utility incentives has helped to accelerate demand and increase the volume of solar energy projects installed in Oregon. State-supported incentive programs have included residential tax credits and commercial grants, utility-sponsored rebates, and a pilot volumetric incentive rate (VIR) program.

Figure 3 indicates the capacity installed in each of these state, financial-incentive programs. Installations that received utility-sponsored rebates are not shown separately but are included in the numbers shown for residential and commercial tax credit programs, since rebates and tax credits may be combined.

The PV market in Oregon is still dependent upon incentives. Uncertainty in the future of these incentives may cause disruption to the

<sup>1</sup> NREL Non-Hardware (“Soft”) Cost-Reduction Roadmap for Residential and Small Commercial Solar Photovoltaics, 2013-2020.

## Total Installed Capacity by Program



**Figure 3:** Installed capacity by incentive type

### Large-Scale PV Projects

In 2012, seven large projects ranging from 800 kilowatts to five megawatts of capacity were installed in Oregon under the Business Energy Tax Credit program. There have also been four

500-kilowatt systems installed under the pilot VIR program. The cost for these large systems has been reported as low as \$2.10 per watt, which is less than half of the average residential system rate.



5.7 megawatt solar installation in Christmas Valley. Photo courtesy of Obsidian Renewables.