

Portland, Oregon

Summary

This report is part of a series on best-practice municipal energy strategies within Europe and North America. The series is part of a larger project of recommendation on *TransformTO*, with other series' discussing waste, transportation, and buildings. This document highlights strategies & recommendations from Portland to improve *TransformTO*. Similar reports are written for Vienna, Munich, Lyon, Manchester, New York City, San Francisco, and Vancouver. This report is focused on heating/cooling, renewables, energy efficiency, electricity, district/community energy, utilities & intergovernmental co-operation. The report concludes that although Portland has a warmer climate with a smaller population, some strategies can be adapted in Toronto to reduce energy-related emissions including overcoming conflicting priorities with higher levels of government and transitioning city operations to 100% renewable energy.

Background on City

Portland is situated in the county of Multnomah on the northwestern coast of the United States with a population of 664 103 (World Population Review, 2020). Most of Portland's residents are employed in manufacturing, healthcare, and technology (Portland Relocation Guide, n.d.). Temperatures in Portland range from 2 °C to 27 °C and the city has approximately 144 days of sunshine per year, below the American average of 205 (Best Places, n.d.). Portland is windier in the winter months, from the end of October to mid-April, with average wind speeds reaching approx. 5.3 mph. (Weather Spark, n.d.).

Energy/Climate Change Plans

Overview

Portland released the first climate action plan in the US in 1993, committing to reducing emissions 20% below 1988 levels by 2010 and establishing 400 MW of renewable energy capacity (City of Portland, 1993). In 2001 the city released the *Local Action Plan on Global Warming* which backtracks the 1993 goal, aiming for a 10% reduction in emissions by 2010 (City of Portland & Multnomah County, 2001). The *Climate Action Plan* in 2009 outlined long-term emissions reductions targets: 40% by 2030 and 80% by 2050. The 2009 plan also committed to 25% reduced building energy use by 2010, carbon neutrality in new buildings by 2030, deriving 10% of energy from renewables/low-carbon district energy systems by 2030 and city operation emissions cut by 50% by 2030 (City of Portland & Multnomah County, 2009). The 2015 *Climate Action Plan* aims to obtain 50% of building energy from renewables with 10% of energy derived on-site and increases the reduction goal for city operations to 53% (City of Portland & Multnomah County, 2015). Progress reports were released in 2010, 2011, 2017 & 2020, accompanied by a 2018 emissions inventory and various reports on equity, justice, resiliency & adaptation.

On June 30, 2020, city council adopted a *Climate Emergency Declaration Resolution (C.E.D.R.)* which acknowledges the COVID-19 pandemic, amplifies Portland's emission reduction targets from 40% to 50% by 2030, reaching net-zero by 2050 and creates a new renewable energy goal (Portland City Council, 2020; ACEEE, 2020a). This declaration argues any response to the climate crisis be inclusive, ensuring vulnerable communities are consulted and receive equitable benefits (Portland City Council, 2020).

Key Initiatives (1990 baseline)

- *2020 C.E.D.R.*: Reduce emissions 50% by 2030 & 100% by 2050
- *2020 C.E.D.R.*: 100% of community electricity from renewable sources by 2030 & utilities companies expected to provide low-carbon renewable electricity
- *2017 Progress Report*: Increase home/business efficiency 25% above 2010 levels
- *2009 Climate Action Plan*: Achieve carbon neutrality in new buildings by 2030
- *2015 Climate Action Plan*: 50% of building energy from renewables with 10% derived on-site
- *2015 Climate Action Plan*: Reduce city operation emissions by 53%

Energy

Most energy-related emissions come from electricity, gasoline and natural gas as displayed in Figure 1 and most electricity is supplied by natural gas, coal or other non-renewable sources as displayed in Figure 3 (City of Portland & Multnomah County, 2020; PGE, 2018a). Portland General Electric (PGE) is the largest electrical utility in Portland, producing 70% of its electricity at utility-owned plants (hydro, coal, gas, solar and wind) while the other 30% originates from the wholesale market (Portland General Electric, 2018b). Most people in Portland heat their homes through natural gas or electricity as displayed in Figure 4 (Oregon Department of Energy, 2018b). 40% of emissions in Portland are attributed to commercial buildings & residential dwellings as displayed in Figure 2 (City of Portland, 2018). Portland still generates a significant proportion of its electricity from in and out of state coal as displayed in Figure 3 (Portland General Electric, 2018a). The single greatest contributor of emissions in the state is the only coal plant in Oregon, scheduled to close in 2020 (Oregon Department of Energy, 2018a).

Implementation Status

In 2018, emissions had decreased 19% below 1990 levels with 13% of climate actions completed and 64% on track to be completed out of 247 total actions from the 2015 *Climate Action Plan* (City of Portland & Multnomah County, 2020). Per capita emissions have decreased 42% below 1990 levels while the city's population has increased by 39% (Portland City Council, 2020).

Heating & Cooling

Multnomah county has developed a program to assist low-income homeowners and renters with heating, cooling, and energy efficiency upgrades. The Weatherization Program includes energy audits, floor, wall & ceiling insulation, inspections of furnaces, improvements to heat ducting, air sealing & ventilation, roof replacements, and energy education at no cost (Multnomah County, n.d.). In 2016, this program reached 562 households and resulted in utility bill reductions of up to 40% ([Multnomah County](#), 2017).

Cully is a neighborhood in Portland with a large proportion of low-income families. Cully residents organized a community energy plan incorporating multiple energy pilot projects to increase resiliency and reduce emissions while being advised by a city employee (Living Cully, 2018). One pilot was a *Ductless Heat Pump (DHP) Buyer's Cooperative*. A minimum of 20-25 households were required to participate so that DHP's could be purchased in bulk, resulting in reduced purchase and installation prices (Living Cully, 2018). This project also provided participants with a home electricity monitoring system accessible by computers to track energy usage (Living Cully, 2018).

Renewables

Portland has focused substantial efforts on expanding solar PV array installations. The city has invested in solar hot water systems, streamlined the process to obtain solar permits and has prioritized solar installations in low-income communities (City of Portland, 2017). The Energy Trust of Oregon, a non-profit, provides rebates and incentives that can offset solar installation costs by up to 50% (Energy Trust of Oregon, n.d.). The annual number of installations of solar electric systems from 2002-2017 is displayed in Figure 5. The County of Multnomah produced 6.1 million kWh of solar energy in the year 2019 (Oregon, 2019).

Portland has achieved 100% renewable electricity for city operations ahead of schedule as displayed in Figure 6. From 2016-2018, the city sourced their electricity through a combination of REC's, onsite & offsite resources (City of Portland, 2017; ACEEE, 2020a; City of Portland, 2020b). 9% of energy was sourced within city facilities including cogeneration produced by biogas fueled turbines at wastewater treatment facilities and 7 MW of solar PV arrays on 17 city facilities (City of Portland, 2017; ACEEE, 2020a; City of Portland, 2020b). 77.7% of the city's electricity is considered renewable through the purchase of REC's from numerous wind facilities in the northwestern United States. The city states REC's are a transitional strategy and it will decrease reliance on them over time (City of Portland, 2020b).

Energy Efficiency

Portland's energy use in buildings has increased since 1990 while total building emissions have decreased (City of Portland & Multnomah County, 2020). Residential building emissions have dropped 29% below 1990 levels due to retrofitting, transitioning

to natural gas from oil for heating and increasing renewable energy (City of Portland & Multnomah County, 2020). There has been a 10% decline in emissions in the commercial sector and 51% decline in the industrial sector due to a transition to lower carbon fuels and less-polluting industries (City of Portland & Multnomah County, 2020). The city initiated *Planned Development Bonuses* to incentivize builders/developers to design more efficient buildings in exchange for a greater floor-to-area ratio (ACEEE, 2020a; City of Portland, n.d.). The city utilizes a *Commercial Property Assessed Clean Energy* (C-PACE) financing model, *PropertyFit* which has resulted in \$6.8 million in funding for building retrofits (City of Portland & Multnomah County, 2020).

In 2001, the city passed the Green Building Policy and has made numerous amendments since. The policy applies to all city-owned facilities and requires new buildings to meet LEED Gold standards or Living Building Challenge Status, and all renovations to meet the Silver LEED standards (Elmore & Mahl, 2020). The city of Portland was forced to reconstruct one of its most iconic administrative buildings, The Portland Building. The reconstruction was required for structural issues but the renovations will meet the LEED gold building certification standards and the state of Oregon's *Path to Net Zero* planning guidelines (City of Portland, 2020a; [Bell](#), 2017; City of Portland; n.d b). The City of Portland requires commercial buildings over 20000 sq. feet to participate in a benchmarking/energy performance system through ENERGY STAR and has achieved benchmarking in 15% of municipal buildings (ACEEE, 2020a). The city requires all homes being sold to complete a home energy scorecard (City of Portland, 2017).

Electricity

Energy usage for city operations has decreased 28% below 2006/2007 levels largely due to the conversion of 45000 streetlights to LED which saved the city \$1.5 million (City of Portland, 2020a).

District/Community Energy

Enwave operates a district energy cooling system in a five-block portion of the city which provides efficient air conditioning and heats water with solar power and rooftop wind turbines (Enwave, n.d.). PGE uses smart grid technologies in select neighborhoods to collect information on energy usage and improve efficiency ([Portland General Electric, 2020](#); [Pope](#), 2020). This data is being incorporated into demand response programs which allows consumers to reduce energy consumption when grids are overloaded (PGE IRP, 2019). A fire station in Portland has installed a micro-grid supported by solar PV and battery storage that generates 30 kW of solar PV, and provides 60 kWh of battery storage or 3-4 hours of power and is linked to an on-site generator (ACEEE, 2020a; (City of Portland & Multnomah County, 2020)). Portland intends to expand this system city-wide (ACEEE, 2020a).

Utilities

Portland power is provided by investor-owned utility companies. Portland General Electric (PGE) and Pacific Power provide electricity for most of the city and Northwest Natural Gas (NWG) provides most of the natural gas (ACEEE, 2020a; City of Portland & Multnomah County, 2020). PGE & NWG are participating in efficiency initiatives and have reduced their annual energy usage in addition to offering incentive programs for customers (ACEEE, 2020a). PGE invested \$7 million in incentives for the development of renewable energy resources resulting in 16020 kW total capacity (ACEEE, 2020a).

Portland utilities companies provide an opt-in alternative for customers wishing to source their electricity from renewables. Pacific power customers can opt-in to *blue sky* to buy renewable energy in fixed blocks and support renewable infrastructure projects (Pacific Power, n.d.). PGE offers 100% renewable electricity for homes and businesses (PGE IRP, 2019). PGE created the *Green Future Impact* program which permits industrial & commercial customers over a certain size to obtain 100% renewable electricity (City of Portland & Multnomah County, 2020). In 2019, PGE's renewable energy program was the largest in the United States, with one quarter of its' customers opting in for renewables (Pope, 2020). The city reports that these programs "account for 7 % of all electricity" (City of Portland, 2017).

The city and the county source 50% of their electricity needs through this program and that revenue is directed towards a solar development elsewhere in Oregon since Portland lacks the physical space for sufficient renewable infrastructure (City of Portland & Multnomah County, 2020). The city claims to encourage the utility companies to undertake decarbonization studies and advocates for a 3% reduction in carbon content in electricity annually (City of Portland & Multnomah County, 2020). The city was vocally opposed to the construction of two new gas-fired power plants proposed by PGE (City of Portland & Multnomah County, 2020).

Intergovernmental Relations

The State of Oregon has established its own climate action policies, many of which involve less ambitious goals than those that Portland has outlined. The state passed Senate Bill 1547 also known as the *Oregon Clean Electricity and Coal Transition Plan* (City of Portland, 2017; PGE IRP, 2019). This bill requires state utilities to derive 50% of electricity from renewables by 2040 and phase out coal by 2035 (City of Portland, 2017; PGE IRP, 2019).

The city has been advocating for adoption of a carbon tax or cap by the state of Oregon. Portland states if the state does not adopt one, the city will consider adopting its own mechanism for carbon pricing (City of Portland & Multnomah County, 2020). A proposed cap and trade program which would have allowed integration with California's model failed to pass in Oregon (Union of Concerned Scientists, 2019). In March of 2020, the governor of Oregon signed an executive order known as the *Oregon Climate Action Plan* which mandates the Oregon Department of Environmental Quality to design a *Cap and Reduce Program* to target the state's largest emitters (industrial, transportation &

fuels sectors) (Oregon Environmental Council, 2020). An initial report was submitted in July of 2020 outlining this program and a deadline has been set to have the program in place by January of 2022 (Oregon Environmental Council, 2020).

Portland is required to follow state-set energy efficiency codes for buildings but the city has been advocating for the state to develop stricter energy codes including supporting net-zero targets by 2030 (ACEEE, 2020a; City of Portland & Multnomah County, 2020). The state has passed an order amending the building code so that newly constructed residential and commercial buildings must integrate solar-ready infrastructure for 2020 and 2022 respectively (ACEEE, 2020a).

Other

The Portland Clean Energy Community Benefits Fund (PCEF) is designed for residents living in low-income or racialized communities, "The Fund prioritizes these communities living on the "frontlines" of climate change with clean energy funding, job training programs and green infrastructure projects," (PCEF, n.d.). This program was initiated by a community-supported ballot that passed with 65% support and will receive \$44-61 million for funding supported by a new 1% retail sales surcharge (PCEF, n.d.). Approximately 40-60% of this money will be put towards funding clean energy projects in these frontline communities and is distributed based on grants submitted by community members (PCEF, n.d.)

Discussion

Portland proves that it is possible for cities such as Toronto to make progress without co-operation from higher levels of government. Portland's emissions have decreased 19% while national emissions have increased 4.6% since 1990 and Oregon has delayed enacting a carbon tax or cap (Portland City Council, 2020). COVID-19, anti-racism protests & the defund the police movement have drastically changed the lives of Portland's and Toronto's citizens, but Portland is working towards improved quality of life and inclusivity for all citizens through its climate action initiatives.

Recommendations for Toronto

- Consider weatherization program or co-op model to make efficiency upgrades more affordable
- Emphasize solar installations with more incentives for homeowners/businesses/landlords
- Transition city operations to 100% renewably sourced electricity using REC's
- Fund retrofits with Planned Development Bonuses & PACE funding models
- Require new buildings to meet net-zero standards particularly when owned by the city

- Expand benchmarking and require home energy scorecard for houses being sold
- Self-sustained micro-grids on city facilities, district energy expansion & LED streetlights
- Advocate for utility companies to increase efficiency and offer 100% renewable energy options
- Adapt PCEF model for low-income/frontline communities

Appendix

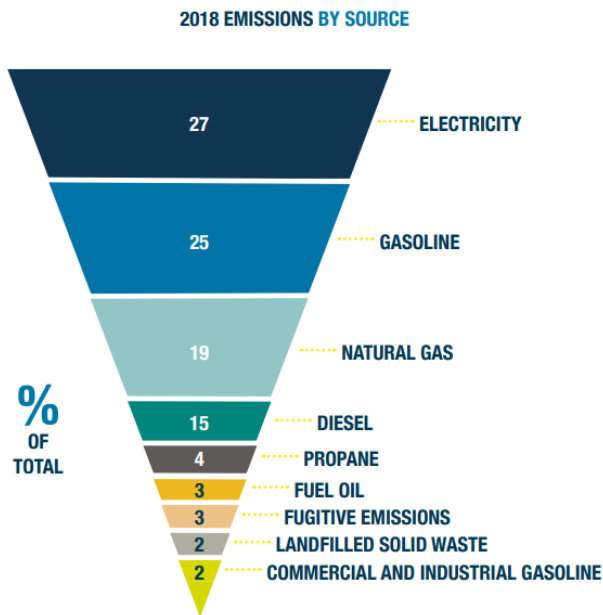


Figure 1: Sources of Emissions in Portland (City of Portland & Multnomah County, 2020)

Where do Portland's carbon emissions come from?

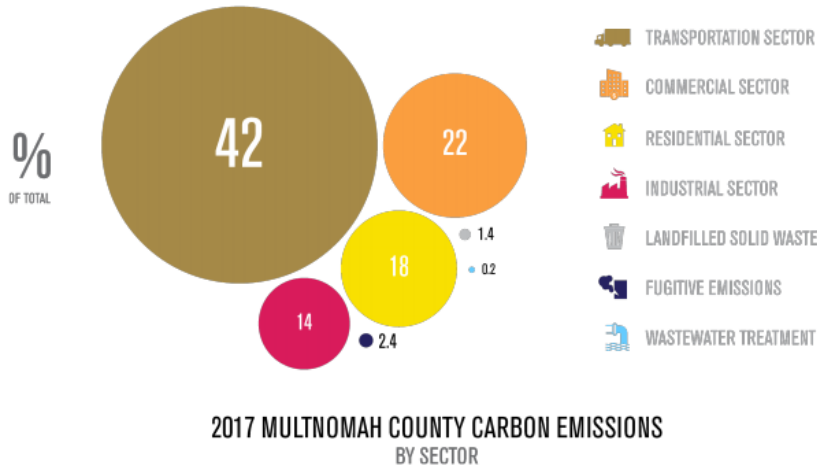


Figure 2: Multnomah County Emissions 2017 (City of Portland, 2019)

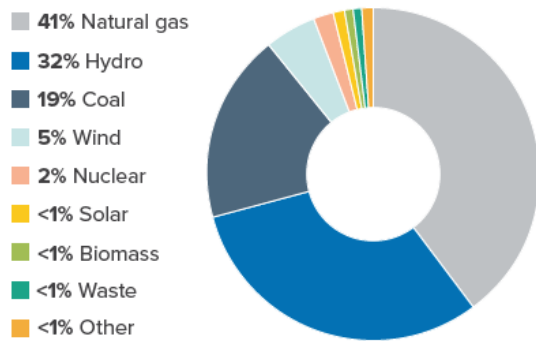


Figure 3: 2018 PGE/Portland Electricity Supply Mix (Portland General Electric, 2018a)

How do residents in Multnomah County heat their homes?

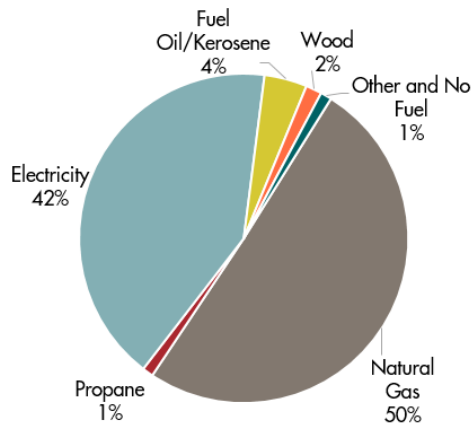


Figure 4: (Oregon Department of Energy, 2018b)

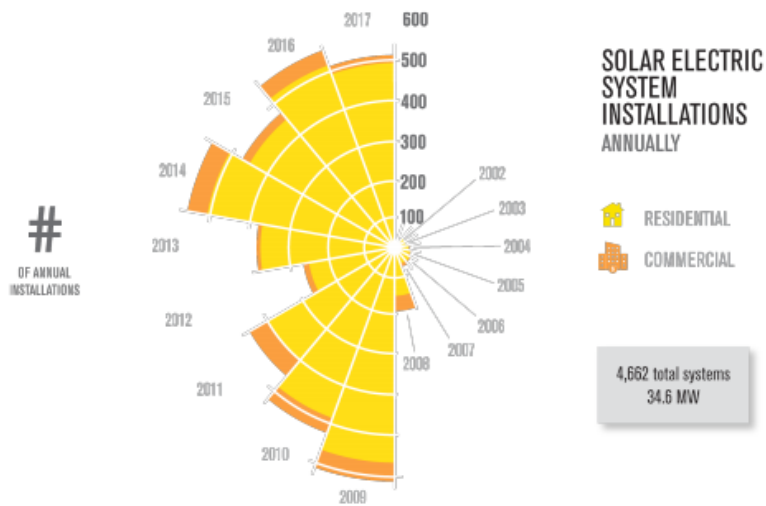


Figure 5: Solar system Installations (City of Portland, 2019)

Renewable energy sources

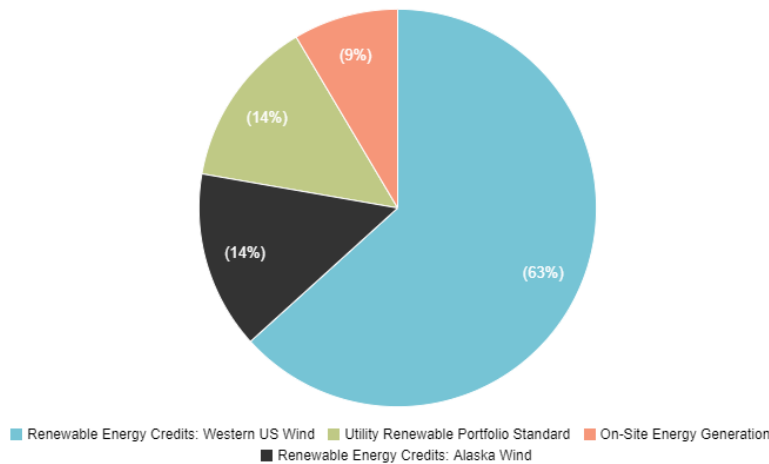


Figure 6: Sources of Portland's Renewable Energy 2017-2018 (City of Portland, 2020b)

References

ACEEE. (2020a) *Portland: City scorecard rank*. <https://database.aceee.org/city/portland-or>

Bell, J. (2017, November 29). *City set to kick off \$195M reconstruction of the Portland building, shroud Portlandia statue*. Portland Business Journal. <https://www.bizjournals.com/portland/news/2017/11/29/city-set-to-kick-off-195m-reconstruction-of-the.html>

Best Places. (n.d.). *Climate in Portland, Oregon*. <https://www.bestplaces.net/climate/city/oregon/portland>

City of Portland. (2020a). *Energy Efficiency*. <https://www.portland.gov/bps/scg/energy-efficiency>

City of Portland. (2020b). *Renewable Energy*. <https://www.portland.gov/bps/scg/renewable-energy>

City of Portland. (2019, September 18). *Multnomah county 2017 emissions and trends*. <https://www.portland.gov/sites/default/files/2020-02/climate-data-report-final-31janupdate.pdf>

City of Portland. (2017). *City of Portland Oregon and Multnomah county climate action plan: Progress report*. <https://multco.us/sustainability/climate-action-plan-progress-report-2017>

City of Portland & Multnomah County. (2015, June). *Climate action plan*. <https://multco.us/sustainability/2015-climate-action-plan>

City of Portland & Multnomah County. (2009). *Climate action plan 2009*. https://www.portland.gov/sites/default/files/2019-08/cap_may_2010_web_0.pdf

City of Portland & Multnomah County. (2001, April). *Local action plan on global warming*. <https://www.portland.gov/sites/default/files/2019-08/local-action-plan-on-gw-april-2001.pdf>

City of Portland. (1993, November). *Global warming reduction strategy*. <https://www.portland.gov/sites/default/files/2019-08/global-warming-reduction-strategy-nov-1993.pdf>

City of Portland & Multnomah County. (2020). *2015 climate action plan: Final progress report*. <https://www.portland.gov/sites/default/files/2020-06/2015-climate-action-plan-final-progress-report-single-pages-v8.pdf>

City of Portland. (n.d. a). *Planned Development Review*. Development Services <https://www.portlandoregon.gov/bds/article/74094>

City of Portland. (n.d. b). *The Portland Building*. Office of Management & Finance. <https://www.portlandoregon.gov/omf/66129>

Elmore & Mahl. (2020, May 13). City of Portland: Green building policy and LEED certification. *DSIRE* <https://programs.dsireusa.org/system/program/detail/254#:~:text=In%202001%2C%20the%20City%20of,the%20Certified%20level%20of%20LEED.&text=At%20that%20time%2C%20the%20Green,meet%20the%20LEED%20Gold%20standard.>

Enwave. (n.d.). *Portland: Greening the pearl district*. <https://www.enwave.com/locations/portland.htm>

Energy Trust of Oregon. (n.d.). *Solar*. <https://www.energytrust.org/programs/solar/>

Living Cully. (2018, March). *Living Cully community energy plan*. <http://www.livingcully.org/living-cully-community-energy-plan/>

Multnomah County (n.d.). *Weatherization*. <https://multco.us/dchs/weatherization>

Multnomah County (2017, November 7). *Multnomah county weatherization program improves housing livability, affordability*. <https://multco.us/multnomah-county/news/multnomah-county-weatherization-program-improves-housing-livability>

Oregon. (2019). *Oregon solar dashboard*. <https://www.oregon.gov/energy/energy-oregon/Pages/Oregon-Solar-Dashboard.aspx>

Oregon Department of Energy. (2018b, December 31). *Multnomah County*. <https://energyinfo.oregon.gov/counties/2018/12/31/multnomah-county>

Oregon Department of Energy. (2018a). *2018 biennial energy report*.
<https://energyinfo.oregon.gov/ber>

Oregon Environmental Council. (2020, July 2). *Capping climate emissions in Oregon: Status update*. <https://oeonline.org/capping-climate-emissions-in-oregon-status-update/>

Pacific Power. (n.d.). *Together we're making a difference*.
<https://www.bizjournals.com/portland/news/2017/11/29/city-set-to-kick-off-195m-reconstruction-of-the.html>

PCEF. (n.d.). *About the Portland clean energy community benefits fund*. City of Portland. <https://www.portland.gov/bps/cleanenergy/about-portland-clean-energy-community-benefits-fund>

Pope, M. (2020, January). *Oregon's clean energy future*. Portland General Electric. <https://www.portlandgeneral.com/our-company/energy-strategy/oregons-clean-energy-future>

Portland City Council. (2020, June 30). *Resolution number 37494: As amended*.
<https://www.portlandoregon.gov/auditor/article/763389>

PGE. (2019). *Integrated resource planning*. <https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning>

Portland General Electric. (2018a). *Basic services: Our standard plan*.
<https://www.portlandgeneral.com/business/power-choices-pricing/pricing-plans/basic-service>

Portland General Electric. (2018b). *How we generate electricity: A diverse mix for a dependable future*. <https://www.portlandgeneral.com/our-company/energy-strategy/how-we-generate-electricity>

Portland General Electric (2020). *Smart grid test bed: Rethink energy, shape the future*.
<https://www.portlandgeneral.com/our-company/energy-strategy/smart-grid/smart-grid-test-bed#>

Portland Relocation Guide. (n.d.). *The industries fueling Portland's hot job market*.
<https://portlandreloquide.com/the-industries-fueling-portlands-hot-job-market/>

Unions of Concerned Scientists. (2019, July 1). *Oregon leaders fail to take aggressive climate action*. [https://www.ucsusa.org/about/news/oregon-leaders-fail-take-aggressive-climate-action#:~:text=Salem%2C%20Ore.,Jobs%20bill%20\(HB%202020\)](https://www.ucsusa.org/about/news/oregon-leaders-fail-take-aggressive-climate-action#:~:text=Salem%2C%20Ore.,Jobs%20bill%20(HB%202020)).

Weather Spark (n.d.) *Average weather in Portland*.
<https://weatherspark.com/y/757/Average-Weather-in-Portland-Oregon-United-States-Year-Round>

World Population Review. (2020). *Portland, Oregon population 2020*.
<https://worldpopulationreview.com/us-cities/portland-or-population>