

Oregon Climate Agenda: A Strong, Innovative, Inclusive Economy While Achieving State Climate Emissions Goals

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STATE OF OREGON
Office of the Governor
KATE BROWN

Vision

Oregon has a strong, innovative, and inclusive economy that achieves the state’s climate emissions goals through a complementary set of policies, including a least-cost, market-based greenhouse gas emissions pricing program.

Executive Summary

Climate change threatens our communities, our economy, our ecosystems, and our way of life in Oregon. We see the effects of climate change in record temperatures, declining snowpack, reduced summer streamflow, water scarcity, increased wildfires, and elevated public health risks. Climate change impacts every Oregonian, but our rural communities, our low-income communities, communities of color, and Tribes are especially vulnerable. Climate change also poses serious risks for many of Oregon’s natural resource-based industries. Meeting the challenge of climate change and growing our economy are not mutually exclusive goals: we must do both.



Oregon has long been a national and world leader in demonstrating the Oregon Way: policies that preserve our natural environment while also supporting long-term economic competitiveness and business growth. The world is at a crossroads on climate policy, and Oregon must continue to pursue solutions that reduce emissions while creating good jobs and building a clean energy economy. The Governor's strategies for achieving her vision are:

1. Implement a well-designed market-based program to achieve our state climate emissions reduction goals at the least possible cost, while protecting our manufacturing sector and mitigating impacts and providing opportunities for low-income and rural communities, communities of color, and Tribes.
2. Hasten the pace of electrification of vehicles in Oregon by expanding electric vehicle infrastructure and incentives to support 50,000 electric vehicles on Oregon roads by 2020.
3. Decarbonize the electricity sector by achieving the state's renewable energy targets and encouraging grid modernization, while maintaining affordable and competitive electricity rates.



4. Expand opportunities for residential, municipal, and commercial customers to access clean energy services from their utilities while ensuring utility regulation supports the utility system and does not preference new customers over existing ones.
5. Maintain and strengthen strong energy efficiency investments in residential, commercial, industrial and agricultural sectors, expand the reach of energy efficiency programs to ensure all communities benefit, and improve the energy efficiency of state building codes.
6. Support world-leading industrial efficiency initiatives by Oregon's large industrial utility customers.
7. Pursue climate solutions that benefit rural communities and Tribes, support working lands, and foster resilience to climate change.
8. Create the new Oregon Climate Authority to better align state programs and expertise to achieve the state's climate policy goals.

The Governor's strategies will create new clean energy jobs across Oregon over the next five years and put Oregon on a trajectory to achieve the state's greenhouse gas reduction goals.



1. National Oceanic and Atmospheric Association, Global Climate Report-Annual 2017, 2018. <https://www.ncdc.noaa.gov/sotc/global/201713>

2. Oregon Climate Change Research Institute, Third Oregon Climate Assessment Report, 2017. <http://www.occri.net/publications-and-reports/third-oregon-climate-assessment-report-2017/>

3. Intergovernmental Panel on Climate Change, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2013. <http://www.climatechange2013.org/report/full-report/>

4. Oregon Global Warming Commission, Biennial Report to the Legislature 2017. <https://www.keeporegoncool.org/reports>

5. United Nations Framework Convention on Climate Change, Paris Agreement, 2015. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

6. Intergovernmental Panel on Climate Change, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2013. <http://www.ipcc.ch/report/ar5/wg1/>

Background

Science

There is no doubt that the Earth's climate is warming, and Oregon is also experiencing that trend. The last three decades have been the warmest decades on record, and the five warmest years in the global record have all occurred since 2010.¹ Oregon's summers have become hotter and drier with record numbers of 90+ degree days. The Oregon Climate Change Research Institute projects average temperatures in Oregon will climb an additional 3-7 degrees Fahrenheit by mid-century under current emissions trends, or 2-5 degrees Fahrenheit if emissions level off.² The scientific consensus attributes the observed warming trend to increased greenhouse gas concentrations in the atmosphere from human activities, especially the combustion of fossil fuels.³ In Oregon, transportation is the largest single source of greenhouse gas emissions, followed by electricity and natural gas.⁴

While some impacts of warming are now inevitable, every degree of additional warming we can avoid increases the livability of the planet for future generations. The international community's goal, reflected in commitments made by nearly every country in the 2015 Paris Climate Agreement⁵, is to prevent the world from warming by more than 2 degrees Celsius (3.6 degrees Fahrenheit). This is the critical threshold beyond which the most serious consequences of climate change may become unavoidable.⁶ Though the U.S. pulled out of the Paris Agreement⁷, Oregon and 15 other states and Puerto Rico have committed to meeting their respective shares of global emissions reduction through the U.S. Climate Alliance. Together, Alliance jurisdictions represent 40% of the U.S. population and a \$9 trillion economy – larger than every economy in the world except for the U.S. and China.⁸



“Average temperatures in Oregon will climb an additional 3-7 degrees by mid-century under current emissions trends”

7. Originally signed by 200 counties, there were only three countries in 2017 who had not signed the Paris Agreement: Nicaragua, Syria, and the United States. Syria and Nicaragua have since signed.

8. U.S. Climate Alliance, <https://www.usclimatealliance.org/>

9. Oregon Climate Change Research Institute, Third Oregon Climate Assessment Report, 2017. <http://www.occri.net/publications-and-reports/third-oregon-climate-assessment-report-2017>

10. Oregon Sea Grant, The U.S. West Coast Shellfish Industry's Perception of and Response to Ocean Acidification, 2016. <https://seagrant.oregonstate.edu/sgpsubs/us-west-coast-shellfish-industrys-perception-and-response-ocean-acidification>

Oregon-Specific Impacts

Climate change threatens our communities, our economy, our ecosystems, and our way of life in Oregon. We see the effects of climate change in declining snowpack, reduced summer streamflow, and water scarcity.⁹ We're witnessing larger and more damaging wildfires, insect outbreaks, heat waves, floods, acidic oceans¹⁰, and algal blooms. Rising sea levels place homes and coastal infrastructure at risk¹¹, while changing ocean conditions compromise the health of fisheries and marine ecosystems.¹²

Climate change is already exacting significant costs on Oregon's economy. Our tourism and natural resource-based industries, including thousands of Oregon farmers, fishermen, and shellfish growers, are already experiencing significant negative effects.¹³ The state spent \$100 million this year fighting wildfires, a figure which does not include the value of lost timber, infrastructure, or economic activity.¹⁴ The closure of trails due to wildfire, cancellation of outdoor events due to heat and smoke, diminished skiing and rafting due to lack of snowfall and summer streamflow, and fishing and shellfish closures threaten Oregon's \$11.8 billion tourism industry.¹⁵

The impacts of climate change, while experienced by nearly every



11. Oregon Parks and Recreation Department, Climate Change Response: Preparedness and Action Plan, 2010. https://www.oregon.gov/oprd/PLANS/docs/coastal_plans/oprdclimatechangeplan_forcommission_forweb.pdf

12. Oregon Climate Change Research Institute, Third Oregon Climate Assessment Report, 2017. <http://www.occri.net/publications-and-reports/third-oregon-climate-assessment-report-2017>

13. Oregon Climate Change Research Institute, Third Oregon Climate Assessment Report, 2017. <http://www.occri.net/publications-and-reports/third-oregon-climate-assessment-report-2017>

14. Oregon Department of Forestry cited statistic, 2018.

15. Travel Oregon, <http://industry.traveloregon.com/>

16. Oregon Climate and Health Profile Report. 2014. <https://www.oregon.gov/oha/ph/HealthyEnvironments/climatechange/Documents/oregon-climate-and-health-profile-report.pdf>

17. Oregon Health Authority, Climate and Health Profile Report, 2014. <https://www.oregon.gov/oha/ph/HealthyEnvironments/climatechange/Documents/oregon-climate-and-health-profile-report.pdf>

Oregonian, pose even greater risks to vulnerable populations: rural communities, low-income communities, communities of color, and Tribes.¹⁶ These populations may rely heavily on climate-impacted industries and natural resources, may be the least able to afford required adaptations, have fewer resources to plan for and recover from extreme weather events, and often suffer disproportionately from exposure to other pollutants.¹⁷ Communities of color and low-income households already bear a disproportionate burden of disease and may experience cumulative health effects as climate-related disruptions increase in frequency. Climate disruptions may affect resources and habitats important to the cultural, community, medicinal, and economic health of Tribes.¹⁸

Particulate levels from wildfires may increase 160 percent in our region by mid-century, exacerbating risks to those with asthma, heart and lung disease.¹⁹ When air quality deteriorates from smoke, it is children, the elderly, and those with pre-existing conditions who suffer first and most. The good news is that actions to reduce greenhouse gas emissions can produce other public health co-benefits, including improved air and water quality. The conversion to electric vehicles or biofuels, for example, can reduce exposure to diesel pollution, a known carcinogen and respiratory health risk.

Oregon's Leadership and Legacy

Reducing greenhouse gas emissions, creating climate-resilient communities and growing our economy are not mutually exclusive goals. We have a strong legacy of environmental stewardship in Oregon, and this history has shown us that well-designed programs can deliver public health and environmental benefits while facilitating a strong economy. Oregon has already taken important steps to reduce climate emissions and build a clean energy economy. Some of the foundational legislation addressing climate change in Oregon includes:

- Land use: Oregon's nationally renowned land use planning program (SB100) laid the groundwork for mitigation and adaptation in



Oregon for 45 years by creating dense, livable communities and protecting farms, forests, and natural areas from development.

- **Energy Efficiency:** The Northwest Power Act (1980) established energy efficiency as a cost-effective priority for the region, establishing Oregon's legacy as an energy efficiency leader nationwide. SB 1149 (1999) required Oregon's largest utilities to consistently invest in energy efficiency, using utility revenues collected through a public purpose charge.
- **Renewable Energy:** Oregon was one of the early states to adopt a renewable portfolio standard in 2007 (SB 838), when only two percent of Oregon's electricity came from renewable energy.
- **CO2 Standard:** In 1997, HB 3283 became the first U.S. law to specifically reduce levels of CO2 by requiring new power plants in Oregon to either reduce or offset some of their carbon dioxide emissions.

18. Oregon Climate Change Research Institute, Third Oregon Climate Assessment Report, 2017. <http://www.occri.net/publications-and-reports/third-oregon-climate-assessment-report-2017>

19. Liu et al, 2016. "Particulate air pollution from wildfires in the Western US under climate change". Climatic Change 138(3-4): 655-666. DOI: 10.1007/s10584-016-1762-6

20. Oregon Department of Environmental Quality, Oregon Greenhouse Gas Sector Based Inventory. <https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx>

In 2007, HB 3543 established the Oregon Climate Change Research Institute (OCCRI) to advance regional understanding of climate change science, impacts, adaptation, and mitigation. HB 3543 also set specific, science-based climate emissions reduction goals for Oregon:

- Arrest the growth of emissions by 2010 (achieved)
- Achieve climate emissions levels that are 10 percent below 1990 levels by 2020 (not on track)
- Achieve climate emissions levels that are at least 75 percent below 1990 levels by 2050 (not on track)

Oregon Department of Environmental Quality produces an annual inventory of human-caused greenhouse gas emissions produced by economic sectors within Oregon. The inventory also includes emissions associated



“The impacts of climate change, while experienced by nearly every Oregonian, pose even greater risks to vulnerable populations: rural communities, low-income communities, communities of color, and Tribes”

with electricity imports that serve Oregon utility customers.²⁰ The Oregon Global Warming Commission uses this emissions inventory to track progress towards the state’s emissions goals.²¹ In its latest biennial report to the Legislature in 2017, the Oregon Global Warming Commission concluded that, despite Oregon’s successes, current programs and policies are not sufficient and additional measures are needed to achieve the state’s statutory emissions goals.²²

Clean Energy Progress

Oregon has long been recognized as a national and global leader in energy efficiency. Energy efficiency reduces energy use, lowers utility system costs, saves customers’ money on their utility bills, and avoids greenhouse gas emissions. Weatherization and energy efficiency improvements can also increase comfort, livability, improve public health, and lower health care expenditures, especially for low-income and rural communities. Energy efficiency is the lowest-cost energy resource available to Oregon utilities; for example, for every \$1 the Energy Trust invests in energy efficiency, customers across Oregon save nearly \$3.²³ Since 2002, the Energy Trust of Oregon has delivered \$7.6 billion in savings on customer utility bills, while avoiding 22.8 million tons of carbon emissions.²⁴ Public utilities across Oregon

21. According to DEQ data, total emissions in Oregon in 2016 were 62 million metric tons of carbon dioxide equivalent. To achieve our 2050 goal, emissions need to fall to 14 million metric tons.

22. Oregon Global Warming Commission, Biennial Report to the Legislature 2017, <https://www.keeporegoncool.org/reports>

23. Energy Trust of Oregon, Annual Report 2017. <https://www.energytrust.org/annualreport2017/>



24. Energy Trust of Oregon, Annual Report 2017. <https://www.energytrust.org/annualreport2017/>

25. Oregon Department of Energy, Electricity Mix in Oregon. <https://www.oregon.gov/energy/energy-oregon/Pages/Electricity-Mix-in-Oregon.aspx>

26. Feldman, Stacy, "Early Closure of Oregon's Only Coal-Fired Power Plant Has National Implications", 2010. <https://insideclimatenews.org/news/20100118/early-closure-oregons-only-coal-fired-power-plant-has-national-implications>

27. International Renewable Energy Agency, Renewable Power Generation Costs, 2018. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf

28. International Renewable Energy Agency, Renewable Power Generation Costs, 2018. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf

29. The recently released Oregon Department of Energy study required under SB 334 (2017) shows substantial technical potential for the development of renewable natural gas (RNG) in Oregon and recommends natural gas utilities be permitted to purchase RNG on behalf of their customers. <https://www.oregon.gov/energy/Data-and-Reports/Documents/2018-RNG-Inventory-Report.pdf>

also administer their own energy efficiency programs, which contribute additional monetary savings and avoided carbon emissions.

Oregon's electrical grid is progressing toward becoming one of the cleanest in the country. A natural abundance of clean, zero-emissions hydropower provides about forty-percent of our state's electricity needs.²⁵ In 2010, Portland General Electric became the first utility in the country to commit to closing a modern baseload coal plant when it agreed to shut Oregon's only in-state coal plant in Boardman twenty years ahead of schedule in 2020.²⁶ When Governor Brown signed SB 1547, she committed Portland General Electric and PacifiCorp, our state's largest utilities, to eliminating all imported coal from Oregon electricity rates by date-certain, while doubling the amount of renewable energy required to serve Oregon customers to fifty-percent by 2040.

Recent changes in technology and the marketplace have placed a clean electricity system firmly within reach. The costs of wind and solar power have fallen dramatically over the last decade; for example, utility-scale solar costs have fallen more than seventy-percent since 2010. Onshore wind, solar, hydropower, and bioenergy-for-power are very cost-competitive, and in many markets, beating the generation costs for fossil-based electricity.²⁷ At the same time, the emerging energy storage technologies needed to balance intermittent resources – batteries and smart grid advancements – are rapidly improving in efficiency and price.²⁸ Our region also shows strong potential for hydroelectric "pumped" energy storage project. Utilities are increasingly using techniques such as demand response and direct load control to shift energy use from peak times in order to reduce the amount of needed generation. The growth and expansion of organized regional electricity markets will further lower costs and risks to customers while enabling greater integration of a diversity of energy resources. There are also opportunities to further decarbonize the natural gas grid through the addition of renewable natural gas.²⁹



30. Reuters, "At Davos, Bosses Paint Climate Change as an Opportunity", 2018. <https://www.reuters.com/article/us-davos-meeting-climatechange/at-davos-bosses-paint-climate-change-as-an-opportunity-idUSKBN1FE2LK>

31. Bloomberg NEF, "Runaway 53GW Solar Boom in China Pushed Global Clean Energy Investment Ahead in 2017", 2018. <https://about.bnef.com/blog/runaway-53gw-solar-boom-in-china-pushed-global-clean-energy-investment-ahead-in-2017/>

32. World Bank, Carbon Pricing Dashboard. <https://carbonpricingdashboard.worldbank.org/>

33. Forbes, "Clean Energy Sector Employs More than 10 Million for the First Time", 2018. <https://www.forbes.com/sites/mikescott/2018/05/08/clean-energy-sector-employs-more-than-10-million-for-the-first-time/#8a1662cb500d>

34. U.S. Bureau of Labor Statistics, Fastest Growing Occupations, 2016. <https://www.bls.gov/emp/tables/fastest-growing-occupations.htm>

35. U.S. Department of Energy, U.S. Energy and Employment Report 2017, 2018. https://www.energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_0.pdf

36. Pacific Coast Collaborative, 2018. https://pacificcoastcollaborative.org/wp-content/uploads/2018/08/PCC_ReportCard_Sept2018-email.pdf

Economic Opportunity for Oregon

Oregon's emissions reduction goals reflect the state's share of global reduction efforts. But they are also an important signpost of the readiness of Oregon's economy and industries to compete in a climate-changed future. At the World Economic Forum in 2018, global business leaders identified climate change as this century's biggest business opportunity.³⁰ Led by China, global annual investment in clean energy exceeded \$335 billion last year.³¹ If positioned on the right side of this growing technological divide, Oregon can benefit from the investment fueling this global transformation. The world's economies are rapidly transitioning away from fossil fuels. Seventy jurisdictions worldwide have carbon pricing programs implemented or scheduled, representing twenty-percent of global greenhouse gas emissions. This list includes eleven U.S. states, Canada, Mexico, China, and Europe. The total value of the carbon priced under these initiatives exceeds \$81 billion.³²

The jurisdictions leading on climate change are building long-term competitiveness, creating good jobs, and improving access to affordable energy, while creating public health and environmental benefits. The clean energy sector worldwide now employs more than ten million people.³³ Nationally, the fastest growing occupations are in solar and wind power.³⁴ There are now more people employed in the U.S. in solar than in oil, coal, and gas combined.³⁵ The Pacific Coast jurisdictions of British Columbia, Washington, Oregon, and California – a region representing the world's fifth largest economy – witnessed regional economic growth of thirty-two percent since 2008, while emissions fell by six percent, demonstrating that it is possible to decouple economic growth from emissions growth. Clean economy jobs in these jurisdictions grew more than twice as fast as regional job growth overall.³⁶



Recent Accomplishments

In the past three years under Governor Brown's leadership, Oregon has become a leader in the U.S. and globally on reducing climate pollution and building a clean economy:

Coal to Clean Energy in SB1547 (2016)

- SB 1547 removes coal from Oregon electricity rates, effectively divesting Oregon from out-of-state coal plants.
- SB 1547 doubled Oregon's Renewable Portfolio Standard to 50%.
- SB 1547 reaffirms Oregon's commitment to pursuing all cost-effective energy efficiency and demand response.
- SB 1547 authorized community solar programs and utility investments in electric vehicle charging infrastructure.

Transit, Clean Fuels and EV Rebates in HB2017 (2017)

- The Clean Fuels Program will lower the carbon intensity of transportation fuels by 10% over 10 years. Last year alone, the program reduced emissions by nearly 1 million tons.³⁷
- HB 2017 helps modernize our transportation infrastructure, including new investments in public transit, pedestrian and bike lanes.
- A new Zero Emissions Vehicles Rebate Program will accelerate the adoption of electric cars, including specific incentives for low and moderate income households.

Executive Orders: EVs and Building Efficiency

- The Governor's Executive Order on Electric Vehicles established a goal of 50,000 zero-emissions vehicles in Oregon by 2020 (18,000 today).
- The Governor's Executive Order on Efficiency calls for new state-owned buildings to be carbon neutral in 2022; all new buildings to be solar ready by 2022; and new residential buildings to "zero energy ready" starting in 2023.

37. <https://www.oregon.gov/deq/aaq/programs/Pages/Clean-Fuels-Data.aspx>



“Oregon can no longer wait for federal action to address carbon emissions. States must act to protect their communities and grow their economies”

These efforts are contributing to a thriving clean energy jobs economy in Oregon. There are 50,000 people employed in energy efficiency, clean fuels and clean power generation in Oregon.³⁸ More than 130 wind and solar companies call Oregon home. Governor Brown is committed to growing the low-carbon economy and achieving our state emissions goals through smart policies and initiatives, including a least-cost, market-based greenhouse gas emissions pricing program that aligns economic incentives in favor of clean energy solutions. Oregon can no longer wait for federal action to address carbon emissions. States and local jurisdictions must act to protect their communities and grow their economies.

Why Oregon? Why Now?

The international scientific consensus on the human causes of climate change is clear. But climate change is a global phenomenon, leading some to question the value of state action to address a global problem of this scale. While it is true that Oregon contributes only a small portion of global greenhouse gas emissions, so too does any single jurisdiction. This is why governments worldwide are pulling together to provide leadership. As discussed above, the world is rapidly transitioning away from fossil fuels and every country in the world except for the United States has signed on to the Paris Agreement to keep the increase in global temperature to below 2 degrees Celsius.

38. U.S. Energy and Employment Report, May 2018. www.usenergyjobs.org



Governor Brown believes that state and local actions to address climate change are justified on both ethical and economic grounds. As the Governor says: “Future generations will judge us not by the fact of climate change, but by how we respond to it.” Oregon has a responsibility to address its share of global emissions and the economic evidence strongly suggests our economy will be better for it. Two different economic analyses commissioned by the Legislature, each examining a different approach to carbon pricing in Oregon³⁹, both found negligible to positive impacts on Oregon’s economy under reasonable scenarios.⁴⁰ These studies correspond to findings in the economics literature broadly, which demonstrate that well designed carbon pricing programs will not adversely impact the economy.⁴¹

39. Macroeconomic Impacts and Design Considerations for Carbon Markets: A Literature Review, Environmental & Energy Economics, 2017. <https://www.oregon.gov/deq/FilterDocs/App2LitReview.pdf>

40. Economic or Emissions Impacts of a Clean Air Tax or Fee in Oregon (SB306), Northwest Economic Research Center, Portland State University, College of Urban and Public Affairs, 2014. <http://www.pdx.edu/nerc/sites/www.pdx.edu/nerc/files/carbontax2014.pdf>

41. Climate Change Economics. Special Issue on EMF 32 Study on U.S. Carbon Tax Scenarios; Guest Editors: A. A. Fawcett, J. McFarland, A. C. Morris and J. P. Weyant. Volume 9, Issue 1. 2018



The Governor's Strategies to Achieving Our Climate and Economic Goals

ONE: Implement a Market-Based Program to Reduce Emissions

Achieve our state climate emissions reduction goals, while protecting our manufacturing sector and mitigating impacts on low-income and rural communities, communities of color, and Tribes

TWO: Add 50,000 Electric Vehicles to Oregon Roads by 2020

Expand electric vehicle infrastructure and incentives to support 50,000 electric vehicles on Oregon roads by 2020

THREE: Decarbonize the Electricity System

Achieve the state's renewable energy targets and encourage grid modernization while maintaining affordable and competitive electricity rates

FOUR: Expand Access to Clean Energy Services

Expand opportunities for residential, municipal, and commercial customers to access clean energy services from their utilities

FIVE: Strengthen Energy Efficiency Investments

Maintain and strengthen energy efficiency investments in residential, commercial, industrial and agricultural sectors, expand the reach of energy efficiency programs to ensure all communities benefit

SIX: Increase Industrial Energy Savings and Competitiveness

Support world-leading industrial efficiency initiatives by Oregon's large industrial utility customers

SEVEN: Invest in Climate Solutions That Foster Resilience

Pursue climate solutions that benefit rural communities and Tribes, support working lands, and foster resilience to climate change

EIGHT: Create the New Oregon Climate Authority

Align state programs and expertise to achieve the state's climate policy goals



The Governor's strategies will create new clean energy jobs and put Oregon on a trajectory to achieve the state's greenhouse gas reduction goals.

ONE: Implement a Market Based-Program to Reduce Emissions

Implement a well-designed market-based program to achieve our state climate emissions reduction goals at the least possible cost, while protecting our manufacturing industry and mitigating impacts on low-income and rural communities, communities of color, and Tribes.

The state must set a gradually declining cap on emissions to achieve the state's emissions reduction goals with certainty. A market-based, cap-and-trade program will allow the state to achieve those emissions reductions at the least possible cost.

The basic construct of cap-and-trade is straightforward: large emitters either adopt technology to reduce emissions on-site or they purchase an emission allowance. The state caps the total amount of allowances economy-wide and gradually lowers the number of allowances over-time. Entities that can't reduce emissions cost-effectively will purchase allowances from entities that can attain reductions at a lower cost. The state sets the total cap on emissions at levels consistent with its goals, while the market determines where the actual reductions take place.

Cap-and-trade is an approach for reducing emissions widely supported



by economists because it aligns market incentives in favor of clean technologies, while providing regulated sectors flexibility in how they choose to comply. A federal cap-and-trade program in the 1990s reduced sulfur dioxide emissions from power plants and the associated acid rain at considerable savings.⁴² Cap-and-trade programs have been adopted by many jurisdictions worldwide to address climate pollution, including Europe, China, California, Quebec, and ten Northeast states in the U.S. Oregon has the opportunity to connect its cap-and-trade program to existing programs, achieving administrative efficiencies and providing regulated sectors access to larger, established carbon markets.

Unlike a carbon tax, the goal of a cap-and-trade program is least-cost emissions reduction with certainty. A carbon tax can also reduce emissions cost-effectively, but may need to be continuously adjusted upward to drive the behavioral and technological change required to hit state emissions goals. Whereas with cap-and-trade, the cap sets a carbon budget across the economy and the cap is slowly and gradually reduced over time to achieve an emissions goal. The cap provides emissions reduction with certainty, and lets the market determine where the lowest cost reduction opportunities are. There is typically more flexibility for regulated industries under cap-and-trade unlike with a carbon tax, where they pay the tax for every ton of emissions, or adopt technologies to reduce emissions on-site. With a cap-and-trade program, industries can reduce emissions on-site, purchase allowances from other regulated entities, purchase allowances at auction, or receive a distribution of allowances from the state. Moreover, if a jurisdiction links its cap-and-trade program to established carbon markets, its regulated sectors may access a larger market of allowances, offsets, and emissions reduction opportunities.

42. The SO₂ Allowance Trading System and the Clean Air Act Amendments of 1990: Reflections on Twenty Years of Policy Innovation, Harvard Kennedy School, 2012. https://www.belfercenter.org/sites/default/files/legacy/files/so2-brief_digital4_final.pdf



A well-designed cap-and-trade program will take preventative measures to protect manufacturers in certain trade-exposed industries from competition in markets where climate emissions are not currently regulated. Once identified, sectors such as cement, pulp-and-paper, and steel could receive some free allowances to level the playing field with their competitors. Some utilities could also receive allowances to maintain competitive and affordable rates for customers. The distribution of allowances from within the state's allowance budget does not change the cap and the level of emissions reduction required economy-wide; it simply eases compliance while maintaining economic incentives to innovate and find ways to lower emissions. If the state auctions allowances, it can redirect proceeds to activities that further reduce emissions or help communities adapt to climate change impacts.

Governor Brown has identified the following priorities for a cap-and-trade program in Oregon:

- Science-based targets and innovation: The program goals should reflect the best available science and incentivize best-in-class technologies and carbon sequestration on natural and working landscapes.
- Protect vulnerable Oregonians: Protect vulnerable Oregonians from increased costs, especially low-income families, communities of color, Tribes, and people in rural areas.
- Maintain adequate cost-controls, certainty and transparency: The program must protect existing jobs and industries and provide certainty and transparency for covered sectors, including workers in those industries.



- Complement existing policies: Work alongside existing state policies to reduce emissions, transition to clean energy, and modernize our transportation infrastructure without duplicating costs.
- Link to the Western Climate Initiative (WCI): Oregon should seek to link its program to the larger, established WCI carbon market. This option could ensure greater price stability, certainty, access to wider range of emission reduction opportunities and administrative

TWO: Add 50,000 Electrical Vehicles to Oregon Roads by 2020

Hasten the pace of electrification of vehicles in Oregon by expanding electric vehicle infrastructure and incentives to support 50,000 electric vehicles on Oregon roads by 2020.

As EVs have entered the mainstream over the past several years, Oregon has consistently been a national leader in EV market share, boasting some of the highest rates of EV sales in the country. There are currently nearly 18,000 electric vehicles in Oregon⁴³, and in November 2017, Governor Brown established an ambitious target to reach 50,000 EVs by the end of 2020.⁴⁴ Executive Order 17-21 outlines a range of state actions to provide additional support to this growing market for clean cars. The executive order deploys more EVs in public fleets, establishes recognition programs for EV champions, helps school and transit districts deploy clean buses, and provides support to many other state programs around low-carbon transportation. The 2017 transportation package (HB2017) created one of the nation's leading rebate programs to incentivize EV purchases.

43. As of 6/30/18, there were 17,893 actively registered electric vehicles in the Oregon Department of Motor Vehicles database.

44. State of Oregon Office of the Governor, 2017. "Executive Order 17-21: Accelerating Zero Emission Vehicle Adoption in Oregon to Reduce Greenhouse Gas Emissions and Address Climate Change." Available at: https://www.oregon.gov/gov/Documents/executive_orders/eo_17-21.pdf



Governor Brown is committed to seeking innovative ways to reduce transportation emissions. The state will continue to be a national leader in EVs through successful implementation of the components of Executive Order 17-21, successful marketing of the EV rebate, collaboration with utilities, dealerships, auto manufacturers, and other private sector entities, and successful implementation of the Clean Fuels Program. Electric vehicles may play the biggest role in the near term, but hydrogen fuel cell vehicles and vehicles powered by renewable biofuels are also an important part of the Governor's vision for a low-carbon transportation system.

THREE: Decarbonize the Electricity System

Achieve the state's renewable energy targets and encourage grid modernization while maintaining affordable and competitive electricity rates.

For decades, Oregon utilities have served Oregon customers well with reliable, affordable electricity. Looking ahead, our utilities are well-positioned to deliver a wider range of clean energy services and emissions reductions to help the state meet its emissions goals. Utilities are actively investing in clean energy, energy efficiency, grid modernization, and electric charging in response to market demand and existing state policies. To hasten this transition while maintaining low rates for customers, Governor Brown supports:

- Complementing existing policies without duplicating costs: Oregon's energy efficiency programs, the renewable portfolio standard, and coal-to-



clean requirements have set utilities along a path to significant emissions reductions. Customers pay for these investments in their electricity rates. A market-based emissions trading program provides the flexibility to incentivize a faster transition to clean energy without duplicating costs, by allocating carbon allowances to utilities on behalf of their customers to account for emissions reductions already reflected in customer rates. This approach maintains market incentives, while maintaining affordable electricity rates. The cap-and-trade program also provides clear direction to the Public Utility Commission to consider regulated-climate emissions as part of its role as economic regulator of investor-owned utilities.

- Regionalization: Oregon must actively coordinate with neighboring states and utilities to ensure regulatory alignment and safeguard the emergence of regional power markets as it transitions to clean energy and implements a cap-and-trade program. The goal is to ensure that regional electricity markets can continue to enhance reliability, reduce costs, and facilitate greater integration of renewable energy resources, while providing new market opportunities for the low-carbon and hydropower resources abundant in our region.



FOUR: Expand Access to Clean Energy Services

Expand opportunities for residential, municipal, and commercial customers to access clean energy services from their utilities while ensuring utility regulation is designed to support the utility system and does not preference new customers over existing ones.

As technologies improve, residential, municipal, and commercial customers of natural gas and electric utilities increasingly seek more choices in clean energy services from their utility, including options such as rooftop solar, electric vehicle charging, renewable natural gas, carbon offsets and renewable power. These emerging green power options provide utility customers the flexibility they seek to meet their own sustainability and renewable energy goals.

Governor Brown supports expanding green power options and tariffs for residential, municipal, and commercial utility customers, provided these options do not compromise the efficiency and reliability of the utility system or impose costs on existing customers. Designed well, utility green power options can enhance the quality of utility services, continue to attract sustainability-minded businesses to Oregon, create good jobs in the clean power sector, and reduce Oregon's emissions.



FIVE: Strengthen Energy Efficiency Investments

Maintain and strengthen energy efficiency investments in residential, commercial, industrial and agricultural sectors, expand the reach of energy efficiency programs to ensure all communities benefit, and improve the energy efficiency of state building codes.

Energy efficiency is the cornerstone of a low-carbon economic development strategy and Oregon should continue aggressive efforts to acquire energy efficiency in all sectors. At the same time, Oregon needs to expand energy efficiency and weatherization programs to reach traditionally under-served communities by identifying and overcoming barriers to serving these communities. Oregon also needs to capture a wider range of energy efficiency improvements beyond the lowest cost, “low hanging fruit” measures that have already been picked. Carbon pricing can help level the playing field for energy efficiency, just as it does for renewable energy resources, by better accounting for the climate and public health costs of fossil fuels in resource decisions by utilities and other actors in the economy.

Buildings are large consumers of electricity and natural gas. In addition to increasing our efforts to update our existing buildings with energy efficiency improvements, Oregon needs stronger building codes for new construction. By adopting state-of-the-art building codes, Oregon can lock in energy savings and avoided emissions from new residential and commercial buildings for decades to come. Governor Brown’s Executive Order No. 17-20 focused specifically on the built environment - residential, commercial, and public buildings across the state. Specifically, the Governor’s Executive Order directs:



- **Solar-ready buildings.** New residential buildings should be ready for solar panel installation by 2020 for residential buildings and 2022 for commercial buildings.
- **Zero-energy homes.** For new residential construction, structures will need to achieve at least equivalent performance levels with the U.S. Department of Energy “Zero Energy Ready Standard” by 2023.
- **High performance buildings.** For new commercial construction, buildings will exceed national model energy codes and meet energy efficiency levels of high-performance standards by 2022.
- **High efficiency H2O.** For new construction, the commercial code will require high-efficiency water fixtures by 2020, and the ability to capture and safely reuse water for irrigation or other uses by 2025.
- **Building Retrofits:** Calls for coordinated agency action to increase energy efficiency in existing buildings, with emphasis on affordable housing, multi-family dwellings, and buildings that are well below current building code requirements.

In these efforts, the state will demonstrate leadership by leading by example, ensuring that existing state-owned buildings operate efficiently and that new buildings operate as carbon-neutral by 2022.



SIX: Increase Industrial Energy Savings and Competitiveness

Support world-leading industrial efficiency initiatives by Oregon's large industrial utility customers.

Oregon's large industrial utility customers have pursued a variety of energy saving measures, including waste heat utilization, lighting modifications, energy management systems, energy efficient pumps, and industrial process modifications. But there is more potential to capture industrial energy efficiency savings in the market. Governor Brown supports a focused effort to reduce the energy intensity of Oregon's industries through creative partnerships and innovative approaches to identify and overcome barriers preventing the acquisition of all cost-effective energy efficiency in the industrial sector. This could include dedicating proceeds from Oregon's cap-and-trade program to help Oregon industries adopt more efficient technologies and equipment. These efforts can help Oregon industries maintain global competitiveness while reducing emissions at the same time.

In addition, Oregon should leverage existing efforts to become a global leader in industrial energy efficiency technologies. Collaborations between industry, universities, and government, such as the Oregon Manufacturing and Innovation Center, can lead to world-class innovations in advanced manufacturing, as well as new jobs and career pathways for Oregonians. Oregon's climate policy should support these and related efforts to build centers-of-excellence in green technologies here in Oregon.



SEVEN: Invest in Climate Solutions That Foster Resilience

Pursue climate solutions that benefit rural communities and Tribes, support working lands, and foster resilience to climate change.

Natural and working lands, including Oregon's farms, forests, ranchlands, grasslands, and wetlands, are vital to the health and resilience of rural communities but are threatened by the impacts of climate change. Working and natural lands also sequester and store carbon emissions at significant levels and play an important role in addressing climate change. Governor Brown is committed to maintaining and enhancing the health and viability of our working and natural lands in the face of climate change. This includes:

- Protecting the resources and habitats threatened by climate change that are important to the cultural, community, medicinal, and economic health of Tribes.
- Working with landowners, producers, and stakeholders to keep agricultural lands in production and avoid the conversion to more emissions-intensive uses.
- Providing technical and other assistance to producers looking to implement practices and technologies that improve soil health, increase productivity, and sequester carbon.
- Exploring innovative investments in working and natural lands that address water scarcity, reduce energy use, foster resilience to climate change, and increase carbon sequestration and storage.



EIGHT: Create the Oregon Climate Authority

Align state programs and expertise to achieve the state's climate policy goals.

In response to the urgency of the climate crisis and the need to better align state programs and expertise to achieve the state's climate goals, Governor Brown proposes a new Oregon Climate Authority and ceasing the operations of the Department of Energy and Carbon Policy Office. The Governor's vision is for a new entity, transparent and responsive to stakeholders and the regulated community, with exceptional domain and market expertise that is responsible for implementing the state's climate and clean energy strategies and tracking progress toward the state's climate goals. This would include the new carbon marketplace, greenhouse gas emissions reporting and accounting, energy markets data collection and analysis, as well as energy programs central to the state's climate and clean energy goals. The Governor would appoint a Director, subject to Senate approval, and work with the Legislature to appoint an advisory board and move existing energy programs to the new entity or other state agencies. By aligning state programs in this new capacity, the state can significantly reduce the Energy Supplier Assessment currently paid by utility rate payers.

