Oregon Global Warming Commission

KeepOregonCool
Oregon Global Warming Commission

Biennial Report to the Oregon Legislature

2023

KeepOregonCool
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EXECUTIVE SUMMARY

The Oregon Global Warming Commission is responsible for tracking and evaluating the impacts of climate change in Oregon, Oregon's greenhouse gas (GHG) emissions, Oregon's progress in reducing GHG emissions, and the effectiveness of Oregon's policies and programs to reduce GHG emissions. The 2023 Report to the Legislature presents the OGWC's current findings.[i]

Unlike previous biennial reports, this year's report does not include recommendations. Instead, the OGWC developed its Oregon Climate Action Roadmap to 2030 (Roadmap) in parallel, which includes extensive recommendations to inform state climate action moving forward, some of which are highlighted in this 2023 Report to the Legislature.[1] However, the 2023 Report to the Legislature continues to provide key foundational information on state climate impacts, emission trends, and progress towards achieving Oregon's GHG emission reduction goals.

Climate change is already having a measurable impact on Oregon's landscape, communities, and economy. Oregon is experiencing increased temperatures, changing precipitation patterns, reduced snowpack, drier summers, and more frequent and damaging wildfires. Since the 2020 Report to the Legislature, extreme heat events, severe drought conditions, shifting precipitation patterns, and high-intensity wildfires have continued to inflict significant damage on Oregonians, communities, the environment, and the economy. These impacts are projected to become more frequent and severe as temperatures increase and global climate conditions become more extreme and unpredictable. Oregon's average annual temperature has increased by around 2.2°F over the past century. Without significant reductions in greenhouse gas emissions, Oregon's annual temperature is projected to increase by 5°F by mid-century and by 8.2°F by the 2080s.[2]

The Intergovernmental Panel on Climate Change's Global Warming of 1.5°C special report and most recent Sixth Assessment Report makes it clear that we are in an all-hands-on-deck climate crisis with a need for faster, more ambitious, and sustained action across all economic sectors.[3, 4] Climate change and the secondary effects it triggers, impact human health and safety, infrastructure, economic growth, food and water supplies, and the environment. The costs of inaction are significant and growing. In 2021 and 2022 alone, extreme weather events caused $4.8 billion in damages in the Pacific Northwest, including $1.8 billion in damages in Oregon.[5]

Multiple sectors, industries, and communities across the state are highly vulnerable to future climate risk. Oregon's agricultural and natural resource sectors, including the state's timber, fisheries, and recreation industries, face the greatest and most immediate risks from changing climate conditions and unpredictable weather events. Climate change is also a significant equity issue, multiplying a series of threats—from food and housing insecurity to health hazards— that disproportionately impact disadvantaged and vulnerable communities, including low-income, Black, Indigenous, and rural households.

While climate change is already negatively affecting Oregon's economy and communities, actions to mitigate and adapt to climate change can significantly benefit Oregon's communities, economy, and environment. Well-designed climate mitigation actions can make Oregonians healthier and Oregon's

[i] The OGWC is required to submit its biennial report to the Legislature by March 31 of odd-numbered years. The previous biennial report to the Legislature was submitted in 2020. The OGWC has typically tried to submit the report by the December prior to the odd-numbered year so the latest information is available by the start of the regular legislative session. This time, the OGWC wanted to deliver the 2023 Report to the Legislature and its Oregon Climate Action Roadmap to 2030 at the same time so decision makers have the latest and most complete information available to them during the legislative session.

communities more resilient, especially communities that have suffered the greatest impacts from climate change as well as many other social injustices.

According to the Intergovernmental Panel on Climate Change, limiting global warming (the rise in average global temperatures) to no more than 1.5°C (2.7°F) requires rapid and ambitious action to reduce GHG emissions. In 2007, the Oregon Legislature adopted a statewide goal to reduce GHG emissions to 10 percent below 1990 levels by 2020 and at least 75 percent below 1990 levels by 2050. In 2020, Governor Kate Brown updated Oregon's GHG emission reduction goals through Executive Order 20-04, which calls for the state to reduce emissions to at least 45 percent below 1990 levels by 2035, and at least 80 below 1990 levels by 2050.

While the COVID-19 pandemic and associated economic shutdown caused Oregon's sector-based GHG emissions to drop in 2020, Oregon still failed to achieve its 2020 emission reduction goal. At the same time, since 2020, Oregon has taken unprecedented action to mitigate the state's contributions to the climate crisis and advance an equitable clean energy transition in the state. Analysis done as part of the OGWC's Roadmap projects that if Oregon's existing programs and regulations – many of which were recently adopted – are implemented and operated as planned with necessary staffing and resources, they can achieve meaningful GHG emission reductions and put Oregon on track to achieve its 2035 GHG reduction goal.

As part of developing the Roadmap, the OGWC also concluded that Oregon needs to act with greater ambition to advance a just and equitable clean energy transition and achieve the state's GHG reduction goals on an accelerated timeline. The Roadmap's technical modeling found that Oregon can feasibly reduce emissions to 45 percent below 1990 levels by 2030—five years ahead of the state's 2035 goal—while also creating thousands of new jobs and more than $120 billion in economic and health cumulative net benefits in the state. The Roadmap identifies a set of additional actions to achieve these emissions reductions by the end of the decade.

In addition to recommending accelerating the state's 2035 goal to 2030, the Roadmap recommends setting more ambitious GHG goals for the state including: a 2040 goal of at least 70 percent below 1990 levels; a 2050 goal of at least 95 percent below 1990 levels; a goal of achieving net zero emissions by 2050 or as soon as practicable; and a goal to achieve and maintain net negative emissions thereafter. Informed by the OGWC's 2021 Natural and Working Lands Proposal, the Roadmap also recommends further developing carbon sequestration goals for Oregon's natural and working lands.

The Roadmap ultimately provides a total of six overarching recommendations and 26 sub-recommendations for designing and implementing climate policies and programs to reduce emissions, advance equity, and produce tangible benefits for Oregon's communities, economy, and natural environment. A lot of work is ahead to ensure the Roadmap Recommendations are accomplished.

This Report to the Legislature is available online: https://www.keeporegoncool.org/reports

INTRODUCTION

The Oregon Global Warming Commission was established in 2007 and directed in statute to track and evaluate:

- The economic, environmental, health, and social assessments of climate change impacts on Oregon;
- Greenhouse gases emitted by various sectors of the state economy;
- The state's progress toward the greenhouse gas emissions reduction goals established by the Legislature; and
- Existing greenhouse gas emissions reduction policies and measures.

The OGWC is also authorized to make recommendations for new policies and actions that should be taken to meet the state's greenhouse gas (GHG) goals.

In March 2020, Governor Brown issued Executive Order 20-04, establishing new GHG emission reduction goals for 2035 and 2050, and provided climate-focused directives to 16 state agencies, including the OGWC.

Executive Order 20-04 (EO 20-04) directed the OGWC to:

- Report on the state's progress toward the newly established GHG emission reduction goals;
- Report on the state's progress toward the Senate Bill 1044 (2019) zero emissions vehicle adoption goals;[ii, 6] and
- Develop a proposal for a state goal for carbon sequestration and storage in Oregon's natural and working lands

In 2021, the OGWC launched a comprehensive analysis of existing and proposed climate policies, programs, and public investments to evaluate how these collective actions may impact Oregon's GHG emissions and develop a plan for meeting the state's 2035 GHG emission reduction goal. With grant funding from the U.S. Climate Alliance and support from the Oregon Department of Energy, the OGWC worked with consulting firm Sustainable Solutions Group to develop an economy-wide, Oregon-specific model to forecast potential emission reductions from existing policies and regulations and new mitigation actions the state could take to reduce GHG emissions. This technical analysis, called the Transformational Integrated Greenhouse Gas Emissions Reduction (TIGHGER) Project, was used to inform the development of the Oregon Climate Action Roadmap to 2030 (Roadmap) published in March 2023.[7] The Roadmap includes extensive recommendations (six overarching recommendations and 26 sub-recommendations) for state climate action moving forward, some of which are highlighted in this 2023 Report to the Legislature.

In addition, in August 2021, the OGWC approved and published a Natural and Working Lands Proposal (Proposal) in response to EO 20-04.[8] The OGWC worked closely with Tribes, landowners and managers, federal and state agencies, conservation organizations, environmental justice leaders, technical assistance providers, and scientists to inform the Proposal. The Proposal recommends a preliminary goal for sequestration and storage in natural and working lands; it makes recommendations for how to track progress toward the goals; and it identifies key strategies and programs needed to achieve the goal. The Roadmap includes recommendations for key next steps for implementing the Proposal.

[ii] The Oregon Department of Energy is required to produce an in depth look at the SB 1044 (2019) goals every two years. ODOE delivered its first Biennial Zero Emission Vehicle Report in 2021 and the next one is expected in September 2023. ODOE also maintains the Oregon Electric Vehicle Dashboard, which provides the latest data on zero emission vehicle adoption in Oregon. Oregon missed its 2020 goal of at least 50,000 ZEVs, but as of November 2022, there were 60,623 ZEVs. The upcoming goal is at least 250,000 registered ZEVs in Oregon by 2025.

In keeping with the OGWC's statutory and executive directives, the OGWC's 2023 Report to the Legislature provides an overview of the climate impacts the state is facing and the growing costs of inaction. It reports on Oregon's sectoral GHG emissions and describes the state's progress toward achieving its GHG emission reduction goals. In contrast to previous biennial reports, the 2023 Report to the Legislature does not provide recommendations for future action. Instead, as mentioned above, the OGWC developed its Roadmap in parallel, which includes extensive recommendations to inform state climate action moving forward.

Additional State Climate Mitigation and Adaptation Information Resources

In addition to the information contained in this Report, several other resources are available to help Oregonians understand the climate mitigation and adaptation challenges and opportunities facing our state:

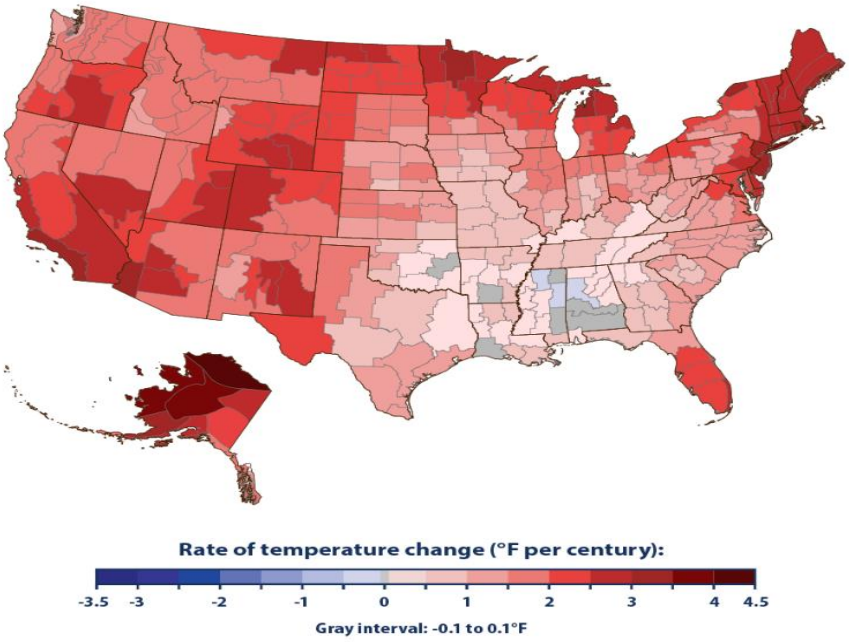
- The Oregon Climate Change Research Institute produces reports on current and projected impacts of climate change. The Sixth Oregon Climate Assessment Report was released in January 2023.
- The Oregon Department of Land Conservation and Development updated Oregon's Climate Change Adaptation Framework, and the Oregon Health Authority released a Climate Equity Blueprint for state agencies in January 2021.
- The Oregon Department of Environmental Quality produces an annual assessment of GHG emissions in Oregon.
- The Every Mile Counts multi-agency partnership collaborates on actions to implement the Oregon Statewide Transportation Strategy to reduce GHG emissions from transportation. The Oregon Transportation Emissions Website provides a deep dive on Oregon's public sector actions to reduce GHG emissions from transportation.
- The Oregon Department of Energy produces a Biennial Energy Report (BER) with information on state and local policies and actions to reduce GHG emissions. The 2022 BER includes a catalog of state climate programs.

IMPACTS OF CLIMATE CHANGE IN OREGON

As detailed in the Oregon Climate Change Research Institute's Sixth Oregon Climate Assessment Report (2023), Oregon is already experiencing increased temperatures, changing precipitation patterns, reduced snowpack, drier summers, and more frequent and damaging fires as a result of climate change. This section describes some of the key findings from OCCRI's Sixth Assessment on the effects of climate change that are already occurring in Oregon, and the climate impacts that are expected if emissions continue to rise.[9] Text not otherwise cited in this section describes findings from OCCRI's Sixth Assessment.

The state's average annual temperature has increased by around 2.2°F over the past century. According to National Oceanic and Atmospheric Administration data, temperature increases have been more pronounced in some parts of the state; average temperatures in parts of southeastern Oregon have already increased by over 5°F since the early 1900s (Figure 1).

Figure 1: Rate of Temperature Change in the United States, 1901–2021 (in Degrees Fahrenheit).[10]



Increasing temperatures and their cascading affects threaten Oregon's natural resources, human health, and infrastructure. Without significant reductions in GHG emissions, Oregon's annual temperature is projected to increase by 5°F by mid-century and by 8.2°F by the 2080s. Warming will be most pronounced in the summer, when temperatures are projected to increase by 6.3°F by mid-century and 10.2°F by the 2080s.

Extreme heat presents a growing threat to Oregon's communities and its natural environment. Over the past seventy years, the number of extremely warm days increased significantly across Oregon. In June 2021, a record-shattering heat wave caused an estimated 116 deaths in Oregon. The summer of 2021 was the hottest in Oregon's recorded history, but similar heat conditions are expected to be more common in the second half of this century. Within the next three decades, most locations in Oregon are likely to have more frequent heatwaves, often measured as consecutive days above a particular high temperature threshold. By mid-century, most locations in Oregon are projected to experience 15 to 40 additional days with a heat index above 90˚F, which are known to result in heat-related illnesses. Climate change is also projected to increase the intensity and frequency of extreme heat events in the state. If GHG concentrations do not decrease, the frequency of extreme heat events like the 2021 heat dome are expected to increase from once in every 1,000 or more years to once every six years by the end of the century.

Rising temperatures have caused precipitation patterns to shift in the Northwest. Oregon's precipitation was below-average for 17 of the past 23 years. As a result, **drought conditions** have become more frequent, widespread, and severe across the state. Nearly all of Oregon is in a multi-year drought, and southern and eastern parts of the state are experiencing a megadrought that may be the most severe in 1,400 years. Under current emissions trends, seasonal droughts are projected to last 11 to 33 percent longer and be at least 40 percent more severe by the end of the century.

The amount of seasonal precipitation is expected to change, resulting in increased precipitation in winter months and decreased precipitation in summer months. **Extreme precipitation**—heavy downpours that can result in flooding—may change significantly across the state by 2050.

Precipitation patterns heavily influence the amount of snowpack and streamflow, which are critical resources for hydropower production—the backbone of Oregon's power sector. Spring snowpack and glacial ice have declined across the state and will continue to decline significantly in the coming decades. In some basins, summer flows may be reduced by up to 50 percent, reducing the amount of hydropower available while summer temperatures and demand for electricity rise. Reduced streamflows also threaten commercial and tribal fisheries.

While winter precipitation is expected to increase slightly by 2100, warmer temperatures may cause more of this precipitation to fall as rain rather than snow. Annual **snowpack** across Oregon is projected to decline by 25 percent by 2050 and could decline by more than 60 percent by mid-century if emissions continue to rise. Snowpack and glacial declines threaten irrigation water supplies in parts of the state. Reduction in snowpack also contributes to declines in soil moisture, which can exacerbate wildfire risk.

Warmer temperatures and drier conditions increase the risk of more frequent and severe **wildfires**. The total area of land burned by wildfire each year has increased in Oregon over the past 35 years, and wildfires have grown larger and spread into higher elevations during this period. In the Pacific Northwest and California, the number of days with extreme wildfire danger have more than doubled since 1979. Drought, increased aridity, and reductions in relative humidity contribute to the growing fire risk in Oregon. As global temperatures increase, wildfires are expected to become larger and fire seasons increasingly extreme in Oregon and across the West. Wildfire smoke aggravates health hazards for Oregonians, particularly for those with existing respiratory conditions, outdoor laborers, and children, who are most susceptible to poor air quality. If GHG emissions do not decrease, particulate matter pollution from wildfire smoke could double or triple by the end of the century.

Wildfire suppressant dropping from plane. Courtesy of ODOT.

COST OF INACTION—AND BENEFITS OF ACTION

The costs of inaction on climate change are significant and growing. Since 1980, the U.S. has experienced 341 weather and climate disasters that caused damages of $1 billion; the aggregate cost of these events exceeded $2.475 trillion and caused 15,821 deaths.[11] The number of events, costs and deaths have increased decade-over-decade throughout this period. From 2017 to 2021, a billion-dollar disaster occurred every 18 days on average in the U.S.[12] For each extra degree of global warming, economic damages are expected to increase.

In 2021 and 2022, extreme weather events caused $4.8 billion in damages in the Pacific Northwest, including $1.8 billion in Oregon.[13] Wildfires burned more than 1.3 million acres in the state between 2021 and 2022.[14, 15] The Bootleg Fire of 2021 burned 413,717 acres in Southern Oregon and was so large and intense that it generated its own weather.[16] Oregon also experienced its most intense period of drought in more than two decades in 2021, with more than a quarter of the state suffering from exceptional drought in late August of that year.[17]

Sector-Specific Climate Impacts

	Sector	Threat
	**Agriculture**	Warmer temperatures, decreasing irrigation water supplies, wildfire, adverse outdoor working conditions
	**Forests and Timber Production**	Warmer and drier conditions, increasing size and intensity of wildfires
	**Fisheries**	Rising water temperatures, algal blooms, ocean acidification, reduced stream flows
	**Recreation**	Snowpack declines, heat waves, shifts in precipitation patterns, wildfires

Multiple sectors, industries, and communities across the state are highly vulnerable to future climate risk. OCCRI's Sixth Climate Assessment describes many of the threats climate change presents to certain economic sectors and communities, which are summarized below.[18]

In the **agricultural sector**, warmer conditions will reduce some crop yields, affect the quality of other crops, and cause more problems from pests and weeds in many other parts of the state. For example, climate change has the potential to substantially reduce yields and quality of specialty fruit crops by decreasing irrigation water supplies, reducing late spring and early fall precipitation, exposing crops to higher temperatures, and contributing to the spread of disease and insect infestations. Wildfires can destroy, contaminate, or impact the flavor of crops that are exposed to smoke. Warming temperatures may significantly impact the availability and use of irrigation water, particularly in areas of the state at higher risk of extreme drought or that are reliant on snowmelt. Agricultural production could be affected by water availability and the ability of outdoor laborers to work in rising summer temperatures for extended periods of time.

Climate change also presents a threat to **forests and timber production** in Oregon. In addition to increasing the size and intensity of wildfires, warmer and drier conditions may already be altering the composition of Oregon's forests and reducing productivity of Douglas fir, which is currently the most valuable tree species in the state. Private timberland in Western Oregon and Washington could potentially lose 39 percent of its value by 2050 due to climate change.

Oregon's **fisheries** are highly vulnerable to climate change. Marine species like Dungeness crab, the state's most valuable commercial fishery, and Pacific oysters are susceptible to algal blooms caused by rising temperatures and ocean acidification caused by increased absorption of CO2. Climate change also threatens the survival of multiple salmon species in Oregon, which are vulnerable to rising water temperatures and reduced stream flows.

The **recreation** sector in Oregon is also impacted by climate change, though these impacts will likely vary between activities. Snowpack declines will impact winter recreation activities and could reduce ski industry revenues by $19 million per year by mid-century. Recreational fishing and other outdoor activities could be affected by heat waves and shifts in precipitation patterns, and wildfires will reduce recreation opportunities on public lands. In September 2022, wildfires forced the closures of 150 trails and 86 recreational sites, including 28 campgrounds, in the Central Oregon Cascades. As of January 2023, many trails, forest roads, and recreation sites have yet to reopen following the 2020 Labor Day fires.

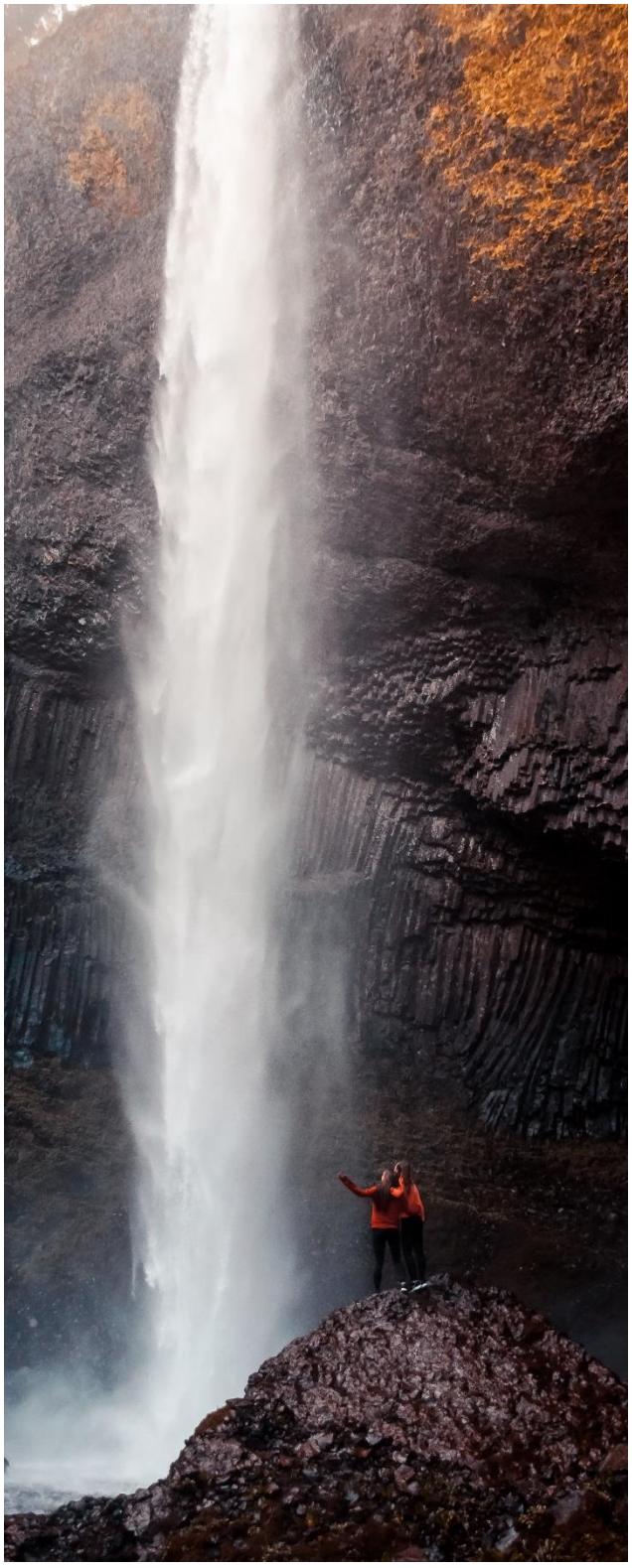
Public Health and Community Climate Impacts

Climate change presents a serious threat to public health. Further, lower-income communities, communities of color, tribal communities, and individuals who work outdoors face disproportionate risks. OCCRI's Sixth Climate Assessment describes many of the health and community impacts and threats from climate change in Oregon, and some of its key findings are summarized below.[19] The Oregon Health Authority's 2020 Climate and Health in Oregon Report provides a more detailed discussion of the public health impacts of climate change.[20]

Extreme heat, a climate change impact, is the leading cause of weather-related death in the United States. In addition to contributing to fatalities from heart attacks and strokes and increasing hospitalizations for heat-related illnesses, heat waves increase air pollution that causes or exacerbates respiratory illnesses and other health risks.

Wildfire smoke also presents a serious threat to public health and increases strains on local health care systems. Exposure to particulate matter pollution from wildfire smoke increases risk of premature death and has a detrimental impact on physical and mental health. Communities impacted by wildfire smoke experience surges in hospitalizations when air quality deteriorates. As wildfires become more severe in Oregon, smoke exposure will likely cause seasonal surges in respiratory hospitalizations and medical demands that increase strain on Oregon's health care systems.

Exposure to wildfire smoke also influences human behaviors and perceptions around climate change. Following the unprecedented 2020 Labor Day fires, Oregonians reported increased concern over climate change and growing support for greenhouse gas emissions regulations and other policies to reduce the risk and impact from extreme climate events in the future. Support for climate action will likely continue to grow as Oregonians experience the intensifying impacts of climate change.



Waterfalls are popular Oregon recreation destinations. Corbett, OR

Benefits of Climate Action

As described in the OGWC's 2020 Report to the Legislature, while climate change is already negatively impacting Oregon's economy and communities, actions to mitigate and adapt to climate change have the potential to significantly benefit Oregon's communities, economy, and environment.

Increased use of energy efficiency and renewable energy produced in Oregon keeps more of Oregonians' energy dollars at home and in Oregonians' pocketbooks, while reducing use of fossil fuels also improves Oregon's air quality. Building out a clean energy system with distributed generation, renewables, microgrids, and storage will increase the resilience of our communities. Investments in soil heath and forest management practices that encourage more sequestration can increase the productivity of natural and working lands, improve water quality, and provide better wildlife habitat. Planting trees in urban areas reduces heat island effects, provides better air quality, and produces health benefits and savings. Restoring coastal wetlands improves fish habitat and protects coastal communities from increasing impacts of storm surges.

Businesses can benefit, too. Businesses that pursue innovations to reduce their own GHG emissions footprint and produce and develop products that help others reduce theirs will have a significant market advantage as carbon emissions become more constrained and expensive around the world. Similarly, jurisdictions that have a low-carbon, low-cost energy supply and supportive policies for reducing GHG emissions will be well positioned to attract new businesses and encourage business expansion in their communities.

The benefits of climate action are particularly well-illustrated by the TIGHGER analysis done as part of the Roadmap. The TIGHGER analysis identified a set of additional actions the state could take to accelerate achievement of the 2035 goal in 2030. The analysis estimates that these additional near-term actions could create $47 billion in net economic benefits and $76 billion in public health benefits in Oregon through 2050 and beyond – over $120 billion cumulatively. In addition, implementing the actions identified is projected to create between 283,000 and 357,000 new job-years (a job-year represents one full-time job for one year) and provide numerous other public health and equity co-benefits. As the Roadmap illustrates, the long-term benefits from achieving our emission reduction goals will far outweigh the near-term investments that will be required to mitigate emissions.

OREGON'S GREENHOUSE GAS GOALS

In 2023, as part of the Roadmap, the OGWC recommended a package of GHG goal updates including:

- By 2030, Oregon will achieve at least a 45 percent reduction below 1990 levels.
- By 2040, Oregon will achieve at least a 70 percent reduction below 1990 levels.
- By 2050, Oregon will achieve at least a 95 percent reduction below 1990 levels.
- By 2050, or as soon as practicable, Oregon will achieve net zero emissions and achieve and maintain net negative emissions thereafter.

The Oregon Legislature established the following GHG emission reduction goals in 2007:

- By 2010, Oregon will arrest the growth of greenhouse gas emissions and begin to reduce emissions;
- By 2020, Oregon will achieve greenhouse gas levels that are 10 percent below 1990 levels; and
- By 2050, Oregon will achieve greenhouse gas levels that are at least 75 percent below 1990 levels.

In 2015, the OGWC recommended an interim goal of 44 percent below 1990 levels by 2035.[iii]

In 2020, through Executive Order 20-04, Governor Brown added a 2035 interim goal similar to the OGWC-recommended goal and updated the 2050 goal:

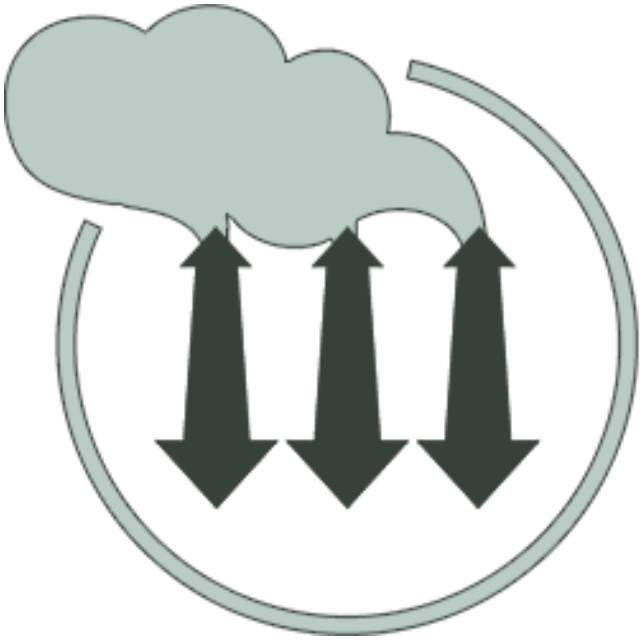
- By 2035, Oregon will achieve at least a 45 percent reduction below 1990 levels.
- By 2050, Oregon will achieve at least an 80 percent reduction below 1990 levels.

As part of developing the Roadmap, the OGWC studied updated goals to recommend to the Legislature. The TIGHGER modeling specifically assessed accelerating achievement of the EO 20-04 2035 goal to 2030 to more closely track the best available science.

To limit global warming (the rise in average global temperatures) to 1.5°C (2.7°F), the IPCC's Global Warming of 1.5°C report calls for rapidly reducing anthropogenic GHG emissions and reaching net zero emissions by 2050 – where any remaining anthropogenic CO2 emissions are balanced by CO2 removals.[1] The IPCC's most recent Sixth Assessment Report also reinforces the need for emissions reductions and net zero emissions on a similar time frame.[2] However, they caution that the longer we take to start making significant reductions in GHG emissions, the sooner we would need to reach carbon neutrality to keep global warming at or under 1.5°C.

The OGWC observed that more than half of all U.S. states have set or are in the process of setting GHG emissions reduction goals.[21] For states in the U.S., the specifics of the goals vary by baseline year (the year by which the reduction is measured from), the date and percent reduction of interim targets, and the 2050 goal (Table 1). Many states have also identified net zero goals and/or aspirations so that any remaining emissions will be counterbalanced by removing the same amount of emissions from the atmosphere.[iv] Table 1 provides a comparison of state goals across the U.S.

In addition, the OGWC observed that multiple states have stronger goals than Oregon – some also included multiple interim goals to help ensure emission reductions stay on track. Additionally, the OGWC observed that many states also set net zero targets in addition to numerical emission targets, with one state (California) also setting a net negative goal.



[iii] Calculated at the time by drawing a straight-line projection between 1990 emissions and the 2050 statutory goal of 75 percent below 1990 levels.

[iv] In the context of climate change, "net emissions" refers to the difference between the total amount of GHGs emitted over a period of time (typically one year) and the total amount of GHGs removed from the atmosphere over that same time period. "Net zero" and "net negative" emissions represent the point at which the total quantity of GHGs removed from the atmosphere equals or exceeds the total amount of GHGs emitted into the atmosphere, respectively.

Table 1: U.S. State Emissions Reduction Goals and Net Zero Goals.[v, 22]

State	Baseline Year	Interim GHG Reduction Target(s)	2050 Goal
California	1990	48% below by 2030*	85% below Net Zero by 2045
Colorado	2005	26% below by 2025; 50% by 2030	90% below
Connecticut	2001	45% below by 2030	80% below
Delaware	2005	26–28% below by 2025*	N/A
Hawaii	N/A	N/A	Net Zero by 2045
Illinois	2005	26–28% below by 2025*	N/A
Louisiana	2005	26–28% below by 2025; 40–50% by 2030*	Net Zero*
Maine	1990	45% below by 2030	80% below Net Zero by 2045*
Maryland	2006	60% below by 2031	80% to 95% below Net Zero by 2045
Massachusetts	1990	33% below by 2025*; 50% below by 2030*; 75% below by 2040	85% below Net Zero
Michigan	2005	28% below by 2025*; 52% below by 2030*	80% below Net Zero*
Minnesota	2005	30% below by 2025	80% below
Montana	1990	N/A	Net Zero (2045–2050)*
Nevada	2005	28% below by 2025; 45% below by 2030	Net Zero/Near-Net Zero
New Hampshire	1990	20% below by 2025*	80% below
New Jersey	2006	N/A	80% below
New Mexico	2005	45% below by 2030*	N/A
New York	1990	40% below by 2030	85% below Net Zero
North Carolina	2005	40% below by 2025*; 50% below by 2030*	Net Zero*
Oregon	1990	45% below by 2035*	At least 75% below At least 80% below*
Pennsylvania	2005	26–28% below by 2025*	80% below*
Rhode Island	1990	45% below by 2035	80% below Net Zero
Vermont	1990	26% below 2005 by 2025; 40% by 2030	80% below Net Zero
Virginia	N/A	N/A	Net Zero by 2045 (electricity only)
Washington	1990	45% below by 2030; 70% below by 2040	95% below Net Zero
Wisconsin	2005	26–28% below by 2025*	N/A

* *Established through executive order or other executive action*

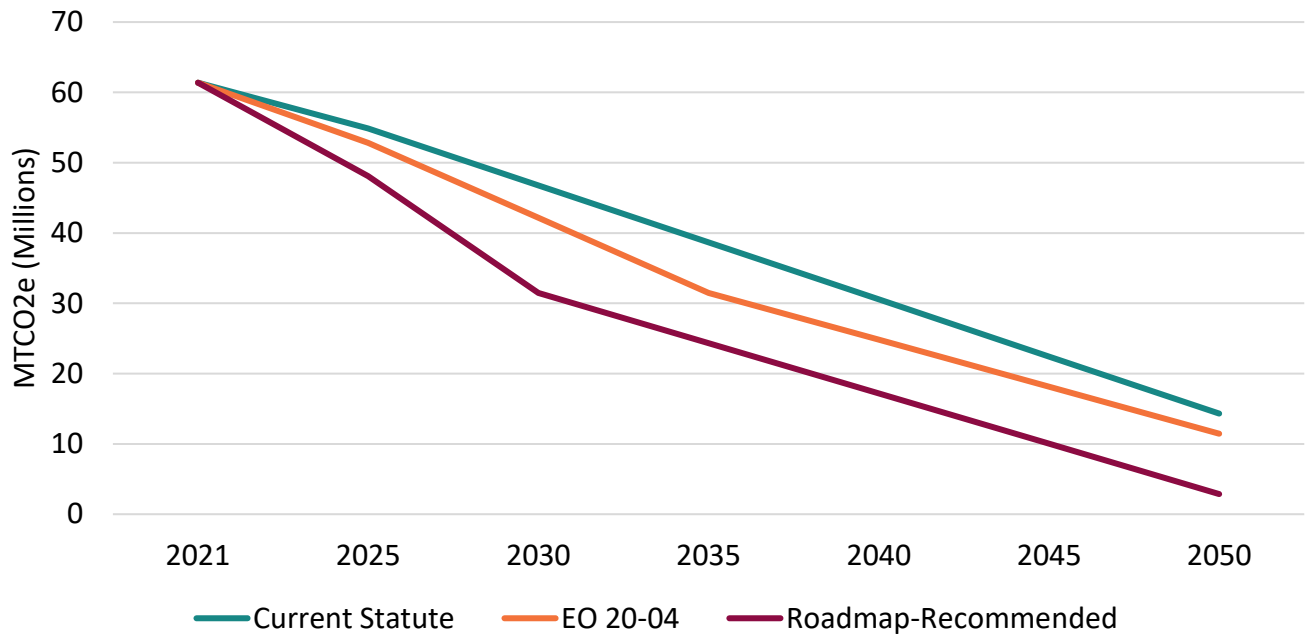
[v] The Center for Climate and Energy Solutions maintains a map of U.S. state greenhouse gas emissions targets which was largely relied on for developing Table 1, but Table 1 was also supplemented with additional state-specific research.

The OGWC ultimately determined the state needs more ambitious GHG goals. The OGWC zeroed in on California's and Washington's goals for comparison given that they have some of the most ambitious state GHG emission reduction goals, share many similar climate policies with Oregon, and collaborate with Oregon on climate action as West Coast neighbors. To be more consistent with the best available science and the state's West Coast neighbors, the OGWC recommended the following sector-based GHG emission reduction goals in the Roadmap:

- By 2030, Oregon will achieve at least a 45 percent reduction below 1990 levels.
- By 2040, Oregon will achieve at least a 70 percent reduction below 1990 levels.
- By 2050, Oregon will achieve at least a 95 percent reduction below 1990 levels.

A comparison of Oregon's current statutory goals, the EO 20-04 goals, and the Roadmap-recommended sector-based goals can be seen in Figure 2 below. Achieving the Roadmap-recommended goals would reduce emissions by approximately 225 million metric tons of carbon dioxide equivalent (MTCO2e) more than the EO 20-04 goals through 2050.

Figure 2: Comparison of Oregon's Sector-Based GHG Emission Reduction Goal Trajectories [vi]



Following best available science and its West Coast neighbors, the OGWC also recommended the following net zero and net negative goals:

- By 2050, or as soon as practicable, Oregon will achieve net zero emissions and achieve and maintain net negative emissions thereafter.

In addition, the OGWC observed that some states directly connect their climate policy to the 1.5℃ temperature limit identified by the IPCC and some states also include mechanisms for periodic updates to the GHG goals. The OGWC also recommended that Oregon do both of these particularly given Oregon's previous delays in updating the GHG goals consistent with the best available science.

[vi] Applies the targets to Oregon emissions data (DEQ, 2023) using straight-line projections to each target.

Finally, separate from the sector-based emission reduction goals and net zero and net negative goals, the OGWC recommended that the Legislature direct the OGWC to recommend natural and working lands carbon sequestration goals to the Legislature by January 2025. These goals would be separate from, and in addition to the state's sector-based emission reduction goals. Roadmap Recommendation 2 provides additional detail on all of the GHG goal-related recommendations summarized above.

PROGRESS TOWARD MEETING OREGON'S GHG EMISSION REDUCTION GOALS

Assessing progress toward meeting Oregon's GHG emission reduction goals requires both a look at recent and historical emissions as well as a forecast of future emissions. While the COVID-19 pandemic and associated economic shutdown caused Oregon's sector-based GHG emissions to drop in 2020, the state still missed its 2020 emission reduction goal by 13 percent. Despite the state's failure to achieve the 2020 goal, Oregon has taken unprecedented action in the past few years to mitigate the state's contributions to the climate crisis and advance an equitable clean energy transition in the state. Analysis done as part of the OGWC's Roadmap projects that if Oregon's existing programs and regulations – many of which were recently adopted – are implemented and operated as planned with necessary staffing and resources, they can achieve meaningful GHG emissions reductions and put Oregon on track to achieve the EO 20-04 2035 goal. At the same time, the OGWC recommended more ambitious GHG emission reduction goals as part of the Roadmap which will require additional actions to achieve.

Recent and Historical Emissions

While the COVID-19 pandemic and associated economic shutdown caused Oregon's sector-based GHG emissions to drop in 2020, Oregon still missed its 2020 emission reduction goal by 6.6 million metric tons of carbon dioxide equivalent (MTCO2e) or 13 percent.

The Oregon Department of Environmental Quality maintains two GHG emissions inventories: a sector-based inventory and a consumption-based inventory.[vii] The OGWC uses the sector-based inventory to track progress toward the state's GHG goals. This inventory tracks GHG emissions that occur inside the state from Oregon's transportation, residential, commercial, industrial and agriculture sectors. The sector-based inventory also includes emissions from electricity generated outside of Oregon and used in the state.[23] Emissions data was available through 2019 for the OGWC's 2020 Report to the Legislature. The current sector-based inventory includes emissions data through 2021.[24]

Oregon had a goal of reducing its emissions 10 percent below 1990 levels by 2020. While the COVID-19 pandemic and associated economic shutdown caused Oregon's sector-based GHG emissions to drop in 2020, Oregon still missed its 2020 emission reduction goal by 6.6 million metric tons of carbon dioxide equivalent (MTCO2e) or 13 percent. In 2020, according to preliminary data, Oregon's sectors emitted 58 million MTCO2e. While there was a notable decline in Oregon's sector-based GHG emissions in 2020, reflecting a reduction of 5 million MTCO2e compared to Oregon's 2019 emissions, these emissions savings stemmed from temporary reductions in motor vehicle use and economic activity due to the COVID-19 pandemic.

As economic activity in the state gradually increased in 2021, Oregon's emissions rebounded, rising by 3 million MTCO2e between 2020 and 2021. Oregon's sector-based emissions for 2021 totaled 61 million MTCO2e, just 2 million MTCO2e lower than the state's 2019 pre-pandemic emissions of 63 million MTCO2e. As a result, in 2021, the latest emissions data available, emissions grew to 19 percent above

[vii] The consumption-based emissions inventory tracks emissions produced in Oregon and around the world due to the products and services Oregonians consume (e.g., cars, food, appliances, and clothing) – another important area for action for Oregon to reduce its carbon footprint.

the 2020 goal. As another point of comparison, 2021 statewide emissions are 7 percent higher than 1990 levels.

In 2019, prior to the COVID-19 pandemic, Oregon's per capita emissions were 15 MTCO2e per person.[viii, 25] Based on preliminary emissions data, Oregon's 2020 per capita emissions were 13.7 MTCO2e per person – a drop correlating with lower total emissions resulting from the COVID-19 pandemic.[ix, 26] As points of comparison with available data, Oregon's per capita emissions were lower than U.S. 2020 per capita emissions of 18 MTCO2e per person, but higher than California's 2020 per capita emissions of 9.3 MTCO2e per person.[x, 27, 28, 29] In 2021, Oregon's per capita emissions increased to 14.4 MTCO2e per person – an increase correlating with Oregon's total emissions rebounding after the height of the pandemic.[xi, 30]

The tables and figures that follow present the state's historical emissions first by sector and then by sector and source using the DEQ sector-based inventory data. When analyzing the data, various methods of categorization can reveal new insights. Data for 2020 and 2021 are preliminary and are marked in italics.[xii]

Table 2: Oregon Emissions in Million Metric Tons of CO2e by Sector: 1990-2021 (Source: DEQ, 2023)

Sector	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	*2020*	*2021*
Transportation	21	22	24	24	23	22	22	21	21	22	23	24	24	23	*20*	*22*
Residential & Commercial	16	20	23	22	23	22	20	21	21	21	20	20	20	22	*20*	*21*
Industrial	14	17	18	14	11	11	11	11	12	12	12	11	11	12	*12*	*12*
Agriculture	7	7	6	7	7	7	7	7	7	7	7	7	7	7	*7*	*7*
Totals	**57**	**66**	**70**	**67**	**64**	**62**	**60**	**60**	**60**	**63**	**61**	**62**	**62**	**63**	***58***	***61***

[viii] Calculated using DEQ GHG emission inventory data of 63.45 million metric tons of CO2e in 2019 and 2019 population data from Portland State University's Population Research Center of 4.24 million.

[ix] Calculated using DEQ GHG emission inventory data of 58.16 million metric tons of CO2e in 2020 and 2020 population data from the U.S. Census Bureau of 4.24 million.

[x] U.S. per capita emissions were calculated by using U.S. 2020 emissions data from the U.S. EPA of 5981.35 million metric tons of CO2e and 2020 population data from the U.S. Census Bureau of 331.45 million people.

[xi] Calculated using DEQ GHG emission inventory data of 61.38 million metric tons of CO2e in 2021 and 2021 population data from the U.S. Census Bureau of 4.26 million.

[xii] To provide the most current emissions estimates possible to decision makers, DEQ develops preliminary greenhouse gas estimates. These estimates are based on reported data that is often available up to a year earlier than data from EPA's State Inventory Tool. When an updated version of the inventory tool becomes available, DEQ updates and finalizes preliminary emission estimates.

Figure 3: Oregon Emissions in Million Metric Tons of CO2e by Sector and Source: 1990-2021 (Source: DEQ, 2023)

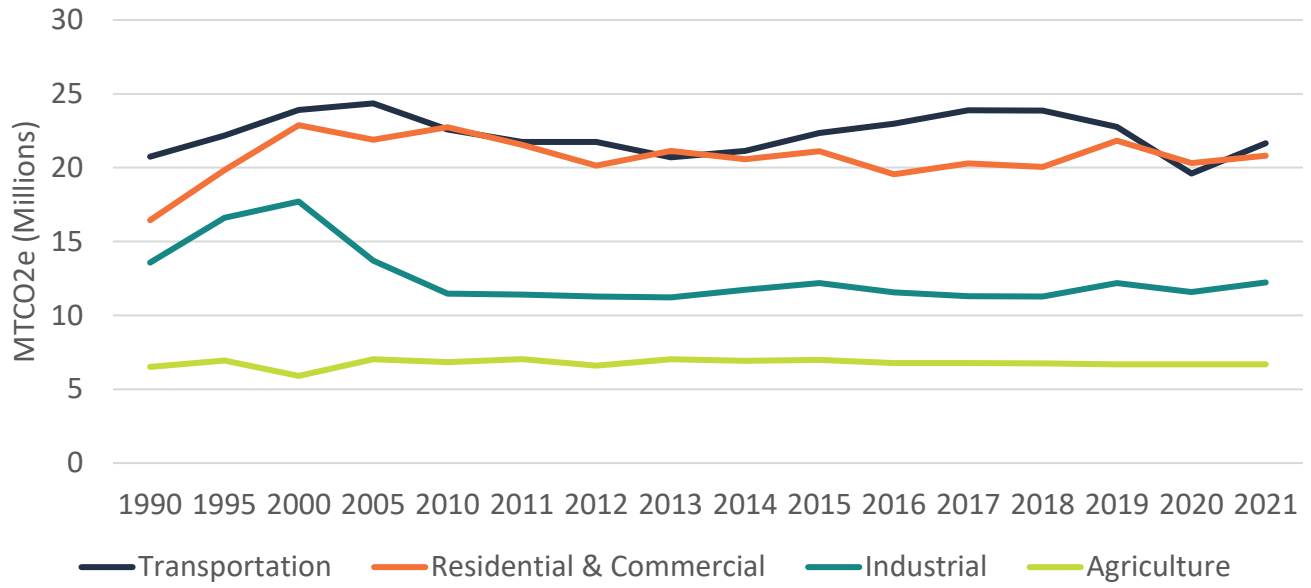
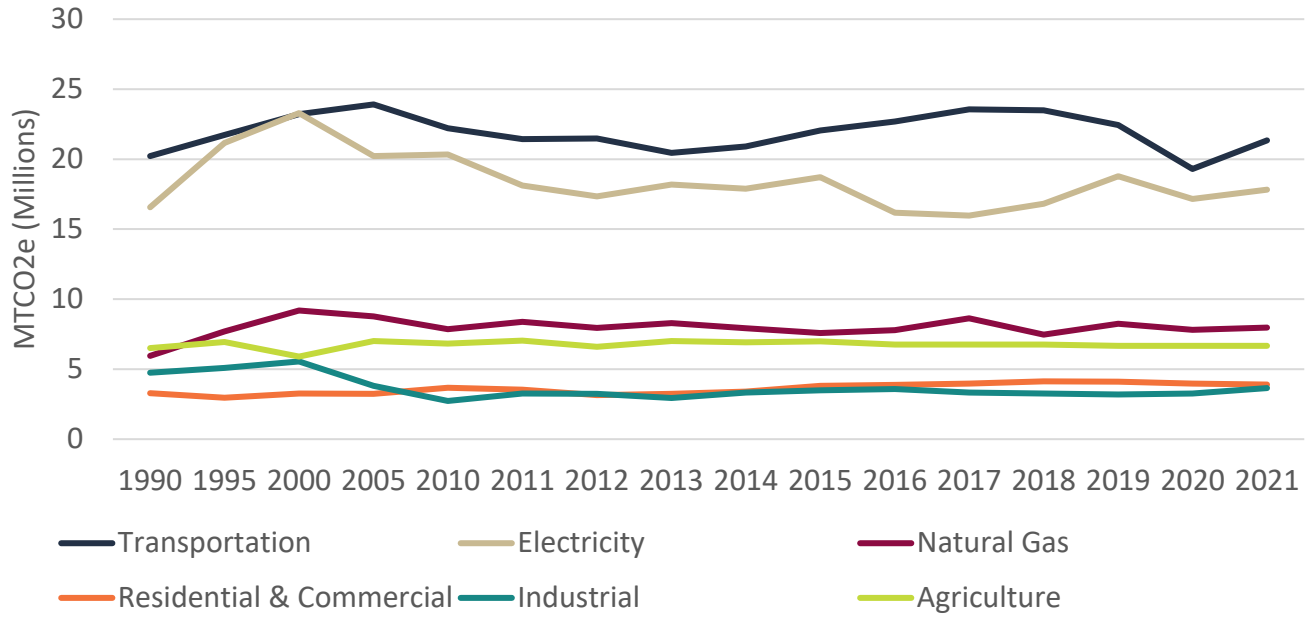


Table 3: Oregon Emissions in Million Metric Tons of CO2e by Source: 1990-2021 (Source: DEQ, 2023)

Sector/Source	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	*2020*	*2021*
Transportation	20	22	23	24	22	21	21	20	21	22	23	24	24	22	*19*	*21*
Electricity	17	21	23	20	20	18	17	18	18	19	16	16	17	19	*17*	*18*
Natural Gas	6	8	9	9	8	8	8	8	8	8	8	9	7	8	*8*	*8*
Residential & Commercial	3	3	3	3	4	4	3	3	3	4	4	4	4	4	*4*	*4*
Industrial	5	5	6	4	3	3	3	3	3	3	4	3	3	3	*3*	*4*
Agriculture	7	7	6	7	7	7	7	7	7	7	7	7	7	7	*7*	*7*
Totals	**57**	**66**	**70**	**67**	**64**	**62**	**60**	**60**	**60**	**63**	**61**	**62**	**62**	**63**	***58***	***61***

Transportation is Oregon's largest sector of emissions.

Figure 4: Oregon Emissions in Million Metric Tons of CO2e by Sector and Source: 1990-2021 (Source: DEQ, 2023)



Transportation is Oregon's largest sector of emissions, and transportation emissions have remained relatively stagnant over the last 30 years (Figure 3; Table 2). Following a slight pandemic-related decline in 2020, Oregon's transportation emissions rebounded in 2021 to 21.7 million MTCO2e or 35 percent of the state's 2021 emissions.

Emissions from Oregon's **industrial sector** increased by 0.8 million MTCO2e over the past decade, while emissions from the **residential and commercial sectors** declined 0.8 million MTCO2e from 2011 to 2021.

Emissions from Oregon's **agriculture sector** have remained relatively constant over the past three decades. Oregon's sector-based GHG inventory includes CO2 emissions from urea fertilizer use and soil liming; methane emissions from enteric fermentation, manure management, and agriculture residue burning; and nitrous oxide emissions from agricultural soil management, manure management, and agricultural residue burning. Emissions associated with agriculture in the sector-based inventory do not include removals associated with carbon sequestration in soils and crops. The OGWC adopted its Natural and Working Lands Proposal in 2021 which included recommendations for increasing carbon sequestration in Oregon's natural and working lands, including setting goals for carbon sequestration separate from the sector-based emission reduction goals.

Oregon DEQ also reports the sector-based emissions in more detail to be able to pull out the emissions from electricity and natural gas use across the sectors (Table 3, Figure 4).[xiii] While natural gas use fluctuates slightly from year to year depending on weather conditions, annual emissions from natural gas used in buildings and industrial facilities remained relatively constant over the past decade. Similarly, while electricity use and the amount of electricity from different generation sources (e.g. hydropower) fluctuates from year to year, electricity emissions have remained relatively constant over the past decade.

[xiii] Almost all of Oregon's electricity and natural gas emissions are from the residential, commercial, and industrial sectors. The DEQ GHG emissions data for the transportation sector includes a very small amount of electricity emissions from light rail and a small amount of emissions from natural gas. DEQ does not separate out specific electricity and natural gas emissions for the agriculture sector.

Projected Emissions

As a result of the Roadmap, the OGWC now has the most detailed forecast of emissions it has ever had. This forecast shows that the programs and regulations already adopted by Oregon put it on track to meet its 2035 GHG emission reduction goal. However, Oregon can only achieve its 2035 goal if these existing programs and regulations are implemented and operated as planned with necessary staffing and resources. In addition, the analysis found that these programs and regulations also have the potential to get the state most, but not all the way, to the EO 20-04 2050 goal. And even more action will be needed to meet the Roadmap-recommended goals. The Roadmap considered scenarios focused on meeting the first leg of the Roadmap-recommended goals – the 2030 goal. A discussion of the forecast to achieve the EO 20-04 goals and the projection for the Roadmap-recommended goals follows.

EO 20-04 Goals Projection

Oregon has adopted several climate policies and regulations over the past few years that, if fully implemented as planned, create a pathway to achieve the EO 20-04 GHG emission reduction goal of at least 45 percent below 1990 levels by 2035. Key climate actions included the Legislature's adoption of HB 2021, which established 100 percent clean energy targets for investor-owned electric utilities and electricity service suppliers serving Oregon customers, and the Environmental Quality Commission's adoption of DEQ's Climate Protection Program, which establishes an economy-wide cap on emissions from fossil fuels used in the state's transportation and building sectors. In 2021 and 2022, the state also adopted complementary actions to support the transition to electric vehicles through the adoption of the Advanced Clean Trucks and Advanced Clean Cars II rules, expanded Oregon's Clean Fuels Program, and established equity-centered programs and incentives to reduce building-related emissions.

These recently adopted or expanded policies strengthen the foundation established by numerous existing programs and regulations administered by at least 17 state agencies, boards, or commissions to help mitigate climate change and its impacts in Oregon. The Oregon Department of Energy's 2022 Biennial Energy Report describes the major climate policies, programs, and initiatives currently in effect in Oregon.[31]

The TIGHGER analysis conducted to inform the Roadmap specifically analyzed 15 of Oregon's climate programs and regulations adopted or under development at the time.[xiv] The two programs and regulations "under development" were eventually adopted and the full group of programs was referred to as the Programs and Regulations Adopted (PRA). The PRA includes the following:

- Advanced Clean Cars
- Advanced Clean Cars II
- Advanced Clean Trucks
- Clean Fuels Program
- Clean Fuels Program Expansion
- Community Renewable Energy Program
- Climate Protection Program
- Energy efficiency standards for appliances
- HB 2021

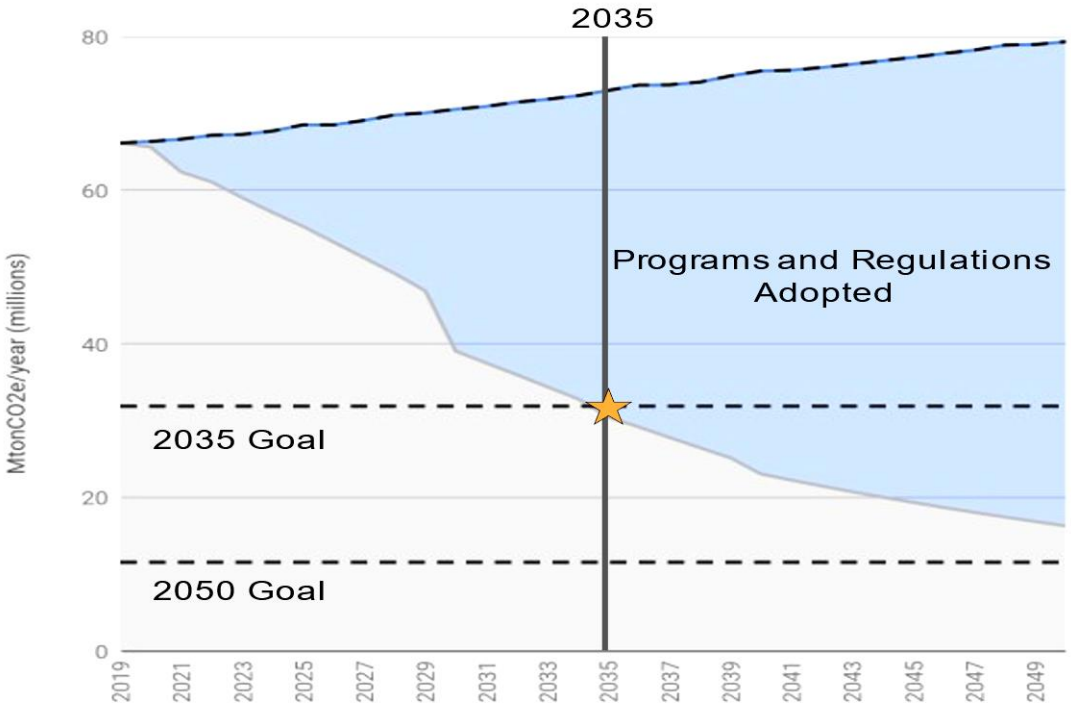
[xiv] The two programs and regulations under development were Advanced Clean Cars II and the Clean Fuels Program Expansion. Both of those were adopted by the Environmental Quality Commission by the end of 2022. The TIGHGER modeling included an annual average carbon intensity reduction of 20 percent below 2015 levels by 2030 and 25 percent below 2015 levels by 2035 for the Clean Fuels Program Expansion. The program ultimately adopted targets of 20 percent below 2015 levels by 2030 and 37 percent below 2015 levels by 2035. The overall TIGHGER modeling outcome would likely not change significantly with the higher target included as fuels are covered under multiple programs. The higher target would likely instead shift the amount of reductions these programs would result in, with the Clean Fuels Program accounting for a higher share of emission reductions.

- Heat Pump Rebate Program
- Healthy Homes Grant Program
- Landfill Program
- Manufactured home replacement
- Recycling Modernization Act
- Solar + Storage Rebate Program

The TIGHGER analysis determined that if these 15 existing state programs and regulations, along with federal fuel economy standards for cars and trucks, are fully implemented as planned, they will put Oregon on track to meet the EO 20-04 2035 goal.

In Figure 5 below, the reference case emissions forecast is represented by the dashed line on the top of the graph; the forecasted emission reductions from the PRA are represented by the blue wedge; and the middle-dashed line is the 2035 GHG emission reduction goal amount.[xv] The dashed line towards the bottom represents the EO 20-04 2050 goal. The gray area represents the remaining emissions.

Figure 5: Projected Emission Reductions from Programs and Regulations Adopted



While the OGWC's analysis indicates that the policies and regulations already in place put Oregon on track to reduce emissions by 45 percent by 2035, an extraordinary amount of work needs to be done to fully implement these programs. Oregon will only achieve this level of emissions reductions if its existing programs and regulations are implemented and operated as planned with necessary staffing and resources. In addition to the specific programs and regulations evaluated as part of the TIGHGER analysis, there are several other existing state programs and regulations that play an important role in reducing emissions either directly or indirectly but could not be analyzed in the TIGHGER analysis for a variety of reasons, yet still require similar support and attention (See Roadmap Recommendation 1).

Roadmap-Recommended Goals Projection

Informed by the best available science, the OGWC, through the TIGHGER analysis, assessed accelerating achievement of the EO 20-04 2035 goal in 2030. The TIGHGER analysis found that the 2030 goal could be

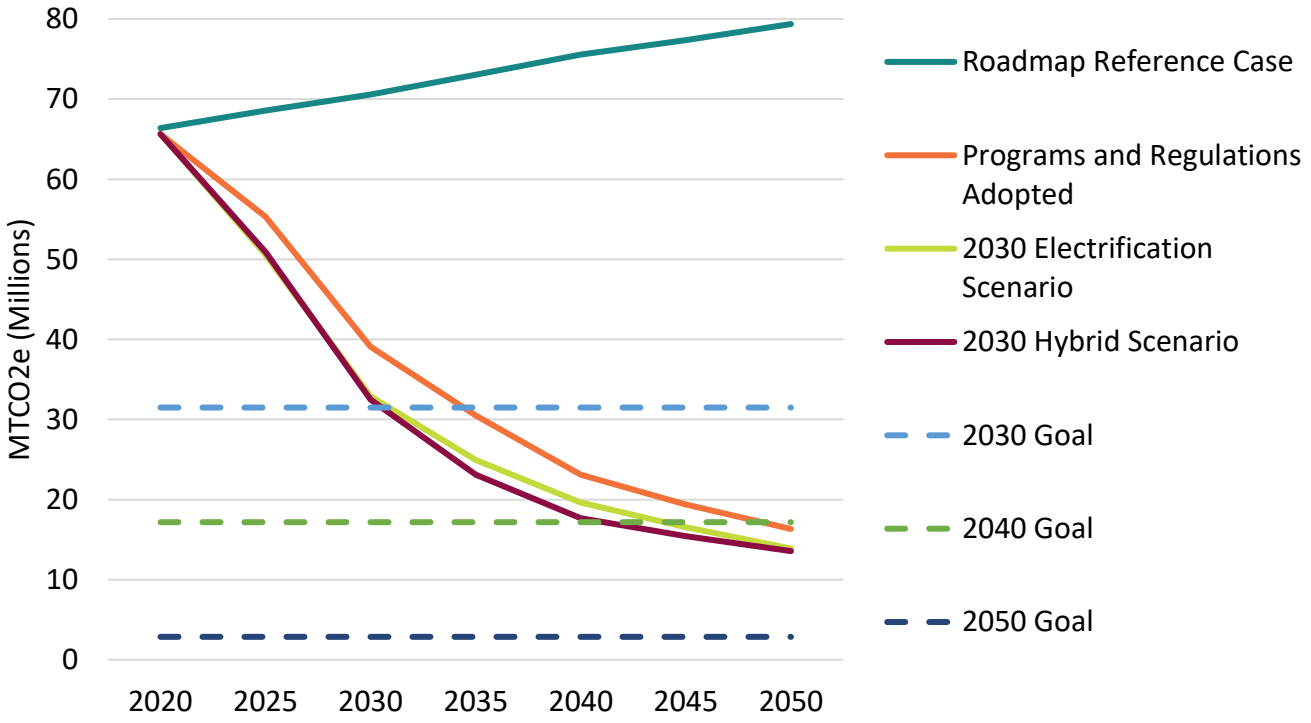
[xv] A more detailed discussion of the projection with a program-by-program emissions breakdown can be found in the TIGHGER Project Final Report.

met with an additional set of actions – the TIGHGER Actions. While the TIGHGER analysis did not model how to achieve the 2040 and 2050 Roadmap-recommended goals, given that 2030 is the first leg of the Roadmap-recommended goals, the 2030 goal analysis provides an instructive projection.

Understanding that there are different pathways to achieve the 2030 goal, the OGWC explored construction of two scenarios of grouped actions: an Electrification Scenario and an Alternative Fuels Scenario. Modeling determined that a scenario relying on alternative fuels alone could not meet the accelerated goal (i.e., there was insufficient RNG and renewable hydrogen to meet the goal). As a result, the OGWC developed a Hybrid Scenario that augmented alternative fuels actions with electrification actions. The Electrification Scenario focused exclusively on energy efficiency and incentivizing efficient electric equipment.

Given the need for numerous electrification actions in both scenarios, the majority of actions were common to both scenarios with about a dozen actions unique to each of the two scenarios. A total of 35 actions were included across the scenarios – 23 common actions, and 12 unique actions (5 in the Hybrid Scenario and 7 in the Electrification Scenario).[xvi] The TIGHGER analysis found that both the Electrification and Hybrid scenarios provide pathways to achieve the accelerated 2030 goal. In addition, the TIGHGER projection shows that both of the scenarios would also come close to achieving the 2040 goal.[xvii] But, a lot more work would be needed to get to the new 2050 goal. See Figure 6 below comparing the TIGHGER Scenario projections and the Roadmap-Recommended goals.

Figure 6: Projected Emission Reductions Compared to Roadmap-Recommended Goals



The analysis also estimated that these additional near-term actions could create $47 billion in cumulative net economic benefits and $76 billion in public health benefits in Oregon through 2050 and beyond – over $120 billion cumulatively. In addition, implementing the actions identified in the Roadmap is projected to create between 283,000 and 357,000 new job years (a job year represents one full-time job for one year), and provide numerous other public health and equity co-benefits.

[xvi] A list of the TIGHGER Actions sorted by their GHG reduction amounts (highest first) are included in Table 3 in the Roadmap Recommendations and more detailed analysis of the actions can be found in the TIGHGER Project Final Report.
[xvii] Oregon would be on track for a 66-69 percent reduction in emissions below 1990 levels by 2040.

Given the need for urgent climate action, the fact that ALL of the identified actions in each scenario are needed to achieve the 2030 accelerated goal, and the majority of the actions are common to each scenario, the OGWC recommended moving forward ALL of the actions from both scenarios and provided specific recommendations for doing so (see Roadmap Recommendation 3).

Future Roadmaps (see Roadmap Recommendation 4) can further inform and recommend actions to position the state to meet all of the Roadmap-recommended goals moving forward.

UPDATE ON STATE EFFORTS TO ADVANCE EQUITABLE CLIMATE SOLUTIONS

In its 2020 Report to the Legislature, the OGWC identified serving impacted communities as a key cross-cutting recommendation. The impacts of climate change do not hit all communities equally. Climate change multiplies a series of threats—from food and housing insecurity to health hazards—that are already facing historically marginalized and vulnerable communities, including low-income, Black, Indigenous, and rural households. Climate change disproportionately affects the physical, financial, and mental well-being of these communities. At the same time, these communities can also benefit the most from the co-benefits of climate solutions including reductions in air pollution, jobs, and lower energy bills.

Climate policies can and should be designed to address past inequities and protect low-income Oregonians, provide for a just transition, address the different needs of rural and urban settings, and help Oregon's communities and businesses adapt to the impacts of climate change.

Climate policies can and should be designed to address past inequities and protect low-income Oregonians, provide for a just transition, address the different needs of rural and urban settings, and help Oregon's communities and businesses adapt to the impacts of climate change. Oregon has made progress to advance equity and environmental justice through state climate actions, but there is more work to be done.

Several efforts led by community and advocacy groups and governmental entities have been created to address climate and racial justice in Oregon. The Environmental Justice Task Force was created by the Legislature in 2007 to advise the Governor and state natural resource agencies on environmental justice issues.[32] In 2022, the Environmental Justice Task Force was reorganized and renamed the Environmental Justice Council (EJC). The EJC meets with communities across the state and reports directly to the Governor about environmental justice concerns facing Oregonians. The group also created a best practices handbook in 2016 to provide guidance to state agencies on how to comply with these obligations.[33]

In EO 20-04, Governor Brown directed 16 agencies to participate in the Interagency Workgroup on Climate Impacts to Impacted Communities. The workgroup's purpose is to engage in interagency collaboration to enhance and elevate climate justice in Oregon's climate initiatives by centering equity in climate policy discussions, prioritizing frontline communities, and developing policies to reduce harmful climate impacts in environmental justice communities. Governor Brown also created the Racial Justice Council to inform the state's 2021-2023 budget and provide advice on opportunities to reform state policies and programs to address racial inequities. The EJC was directed to create a Racial Justice Action Plan for six specific areas: criminal justice reform and police accountability; housing and homelessness; economic opportunity; health equity; environmental equity; and education.[34]

An interagency group led by the Oregon Health Authority released the Oregon Climate Equity Blueprint in 2021.[35] The Blueprint incorporates the best practices identified by the EJC and recommendations gathered through discussions with community groups and input from the Interagency Workgroup on Climate Impacts to Impacted Communities. The Blueprint provides guidance and recommendations on

how to apply an equity lens in the design and assessment of state agency policies, processes, and programs. Specifically, it describes how to: (1) build internal capacity; (2) embed equity and accountability into the design of policies, processes, and programs; (3) lead meaningful community engagement; and (4) improve data collection and use.

Oregon state agencies have started to make progress in operationalizing diversity, equity, and inclusion best practices and centering equity and environmental justice in climate policy decisions. For example:

- The Oregon Public Utility Commission developed an Impacted Communities Work Plan to help guide the agency's actions to address disproportionate climate affects in frontline and underrepresented communities.[36] The OPUC brought on a Diversity, Equity, and Inclusion Director in 2021, and an Energy Justice Program Manager in 2022.[37]
- The Oregon Department of Environmental Quality established a Diversity, Equity, and Inclusion Council in 2021-22. The Council is self-governing and works in collaboration with the Director's Office and DEI Coordinator and DEI Policy Analyst to build and sustain an inclusive work environment that embraces and values diversity. DEQ has also worked closely with the Environmental Justice Council and partner agencies, such as the Oregon Health Authority, to help fill new EJ-focused positions and support the EJC's development of an environmental justice mapping tool for Oregon. Further, as part of development of its Climate Protection Program, DEQ provided resources to community-based organizations to facilitate engagement of environmental justice communities and has set up an Equity Advisory Committee to inform implementation of the Community Climate Investments portion of the program moving forward.[38, 39]
- The Oregon Department of Energy's Strategic Plan includes an imperative to build practices and processes to achieve more inclusive and equitable outcomes, and the department is actively working to promote participation in ODOE programs and expand access to ODOE services in historically and currently underserved communities.[40]
- The Oregon Department of Transportation worked with a consultant on a Social Equity White Paper to serve as a primer on the topic of Social Equity in transportation policymaking and as a tool to inform the development of the Oregon Transportation Plan (OTP) and Oregon Highway Plan (OHP), which are in progress and continuing to be developed through 2023.

The Legislature has also played an important role in making progress – providing funding to support agency equity work, passing a number of equity-focused bills, and including equity provisions in climate-related legislation.[41, 42] Continued efforts by state agencies and the Legislature will be needed to advance equitable climate solutions moving forward. Almost all of the six overarching Roadmap Recommendations include specific equity-related recommendations.

UPDATE ON STATE CLIMATE ADAPTATION EFFORTS

In addition to advancing climate change mitigation through measures that reduce GHG emissions, the state is pursuing strategies to address the impacts of climate change on Oregon's diverse communities, sectors, and ecosystems. The 2021 Oregon Climate Adaptation Framework recommends strategies to plan for and respond to climate impacts in a coordinated and equitable manner.[43] Developed through a collaborative effort of 24 state agencies, the Framework is intended to guide state agency decisions and investments to address climate impacts in Oregon.

The Framework presents three guiding principles for agencies engaged in climate adaptation activities:

- Embrace flexibility in the face of climate change uncertainty, through Oregon's use of adaptive management frameworks and community driven scenario planning.

- Recognize that climate change is a "stress multiplier" that exacerbates existing political, economic, social, and environmental tensions throughout Oregon.
- Acknowledge climate change will not be borne equally by all people, thus requiring Oregon state agencies to tailor programs and investments to redress inequities.

The Framework also identifies five administrative actions that are needed to create a coordinated and integrated climate change adaptation program for Oregon. These actions are detailed further in the Framework and include:

- Establish a multi-agency leadership structure.
- Ensure use of best practices in diversity, equity, and inclusion (DEI).
- Complete a comprehensive climate change vulnerability assessment.
- Improve interagency coordination and information sharing.
- Integrate responses to climate change throughout agency operations.

Finally, the Framework identifies a variety of climate change adaptation strategies within several "themes": economy, natural world, built environment and infrastructure, public health, cultural heritage, and social relationships and systems. The strategies and approaches identified in the Framework require coordinated implementation by multiple state agencies and robust community engagement centered around equity and inclusion.

As part of implementing the Framework, the Department of Land Conservation and Development (DLCD) is currently working to complete a climate change vulnerability assessment.[44] Through a series of 12 regional workshops, DLCD is providing people in all regions of the state with opportunities to share how climate change is, or might affect, their well-being, livelihoods, and cultural identity. The first round of six-in person workshops was held in Eastern Oregon in Fall 2022, and the current round of workshops are being held in Western Oregon in March 2023. A virtual workshop for youth was also held. The information from these workshops will be used to inform the climate change vulnerability assessment.

CONCLUSION

The experienced and projected effects of climate change and the secondary effects they trigger are impacting Oregon—undermining human health and safety, hindering economic growth, and damaging natural resources. Despite failing to achieve its 2020 GHG emission reduction goal, Oregon recently took unprecedented action that puts the state on track to meet the EO 20-04 2035 GHG emission reduction goal. But an extraordinary amount of work remains to be done to robustly implement Oregon's programs and regulations. In addition, the OGWC recommended even more ambitious goals which will require additional actions to achieve. The OGWC's Roadmap provides a total of six overarching recommendations and 26 sub-recommendations for state climate action moving forward. A lot of work is ahead to ensure the Roadmap Recommendations are accomplished.

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