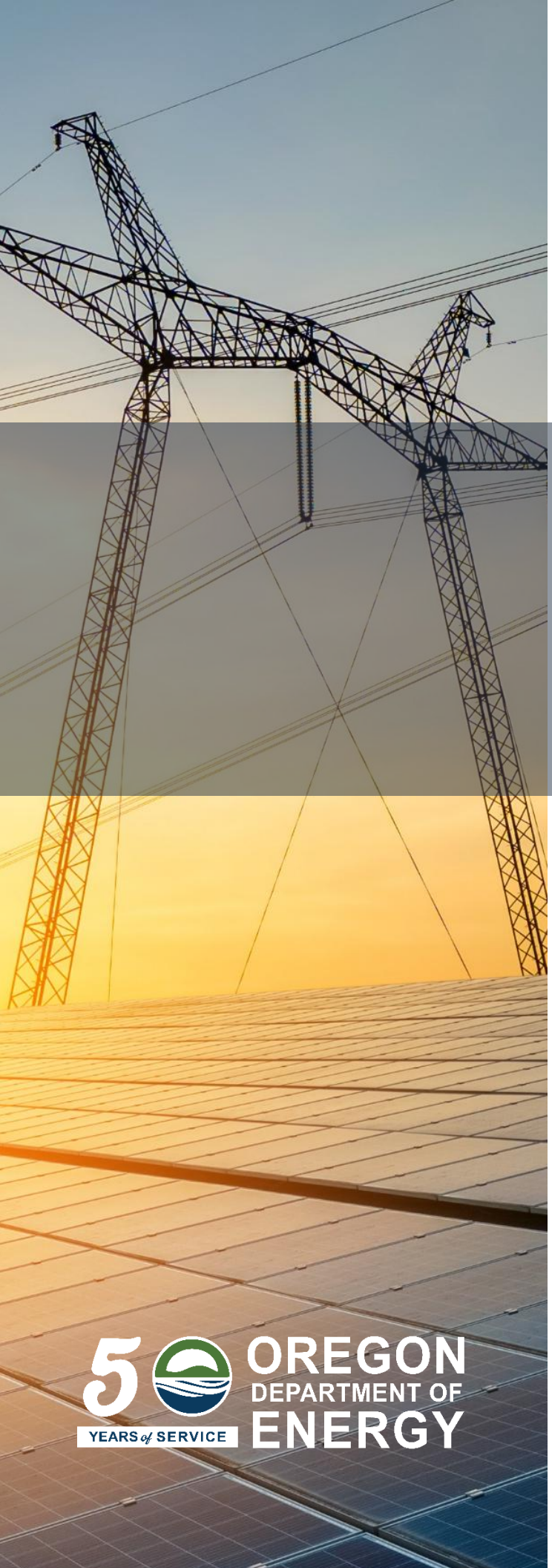

OREGON ENERGY STRATEGY

Submitted to the
GOVERNOR and OREGON LEGISLATURE

by the
OREGON DEPARTMENT OF ENERGY

November 2025

Developing this Oregon Energy Strategy would not have been possible without the support and expertise of ODOE staff, consultants, and many partners. Thank you!

Oregon Department of Energy

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Letter from the Director

Fifty years ago, Oregon leaders created the Oregon Department of Energy following the oil crisis of the early 1970s. The statute creating the agency noted that continued growth and demand for non-renewable energy poses a serious and immediate – and future – problem. “It is essential that future generations not be left a legacy of vanished or depleted resources, resulting in massive environmental, social, and financial impact," reads the statute. It also declared that ODOE should promote the efficient use of energy resources and develop permanent sustainable energy resources.

It’s only fitting that now, after 50 years serving Oregon, we embrace our origins and proudly present a new state energy strategy that will serve as a north star for making decisions and taking action to achieve an affordable, equitable, and reliable clean energy future.

The five pathways outlined in the Oregon Energy Strategy – energy efficiency, clean electricity, electrification, low-carbon fuels, and resilience – may not seem surprising. Oregon has long been a leader in these areas, from adopting advanced building energy codes to supporting transportation electrification to developing clean energy resources. Yet until now, Oregon has not had a clear vision for how these pathways can come together to achieve our bold energy and climate objectives.

The pathways set the tone as guiding principles, and a set of policy recommendations for each pathway outlines steps Oregon can take to ensure that the energy transition that we’re experiencing maximizes benefits to and minimizes burdens on Oregonians. The pathways were selected after extensive modeling and discussions because they represent not only the least-cost pathway for Oregon’s economy but also protect the most vulnerable Oregonians. We know the cheapest and best energy resource is energy efficiency, so one recommendation is to improve efficiency and conservation in buildings and prioritize households with high energy burden. We also recommend expanding efforts to electrify the transportation sector – the largest contributor of greenhouse gas emissions – while removing barriers to ensure all Oregonians can participate in this opportunity to reduce energy costs. As the state’s energy demand grows, we want it to be as clean and renewable as possible, with enough infrastructure to move energy where it needs to be. We need infrastructure not just for electricity but also for low-carbon fuels, which will be necessary to ensure that the hardest-to-electrify sectors can be part of the clean energy transition. As Oregon’s energy system decarbonizes, it’s also important to fund resilience measures in communities to strengthen Oregon’s ability to adapt to climate change and mitigate other risks like a Cascadia Subduction Zone earthquake. In developing the Oregon Energy Strategy policies and potential actions, we asked the tough questions – including who benefits and how we ensure equity and justice are at the heart of decisions, what could hinder progress, how to balance land use and development, the cost of inaction, and opportunities to bolster the state’s economy and energy workforce.

The Oregon Energy Strategy has been a major undertaking and wouldn’t have been possible without the expertise and guidance from our consulting partners, the Clean Energy Transition Institute and Kearns & West; government-to-government engagement with Oregon’s nine federally recognized Tribes; our partner state agencies; members of our Advisory Group; several policy and technical working groups; and the Oregonians who joined us for webinars and information sessions. I especially appreciate the hard work of the ODOE staff who brought their dedication, expertise, and experience while diving into

model findings, engaging with Oregonians, and drafting the strategy. We're also grateful to everyone who read our August draft strategy and provided thoughtful feedback to help us finalize the energy strategy.

This work won't be easy, and it's more important than ever for Oregon to articulate the paths and actions we want to take. The state is facing significant challenges, including state budget constraints and federal priorities that don't match Oregon's. Now is the time to reaffirm and commit to the direction we want to go as a state. We get to shape the future.

I hope this strategy serves as a call to action for the Oregon Legislature, other decision makers, and potential implementers to move us forward. There's a menu of actions to choose from, including potential new work for the Oregon Department of Energy. We look forward to providing our expertise and support alongside our partner state agencies and Oregon communities as we walk down these pathways together.

Janine Benner, ODOE Director

Solar at Mt. Angel Middle School

Executive Summary

Why Develop an Energy Strategy?

Oregon policymakers have enacted recent and decades-old laws, programs, and regulations to support a shift to cleaner, more sustainable sources of energy. Together, Oregon's energy policies are transforming the energy system toward clean energy to power our homes, transportation systems, businesses, and industry. Yet until now, Oregon has not had a clear vision for how the various pieces come together. In 2022, the Oregon Department of Energy published its *Biennial Energy Report* and in it identified the need for a state energy strategy that can take an economywide look at available resources, technologies, and energy needs, and develop a shared vision for the state.

Legislative Direction: HB 3630 (2023) directed the Oregon Department of Energy to develop a state energy strategy and to submit a final report to the Governor and Legislature that:

1. summarizes the state energy strategy and pathways to achieving Oregon's energy policy objectives;
2. describes ODOE's engagement process and how perspectives informed the energy strategy; and
3. recommends legislation or changes to policy necessary to implement the state energy strategy.

HB 3630 does not define Oregon's "energy policy objectives." After consultation with other state agencies, experts, and interested parties, ODOE has determined that key clean energy policy drivers include statutory and regulatory directives like HB 2021, the Climate Protection Program, and Executive Order 20-04. Through these and other policies and programs, the legislature and executive branch are helping transition Oregon to a cleaner energy future.

While the energy strategy does not list or serve to interpret the nuances of Oregon's many energy policies, the modeling and public engagement considered statutory targets and goals and aimed to support consistency and compliance with existing law. ODOE considered affordability and reliability as essential energy policy objectives, and the Energy Strategy looks not at *whether* Oregon can meet its objectives but *how* it can do so while maintaining an affordable, reliable system.

The Energy Strategy comes at a pivotal moment and transition in the energy sector. Many rapid changes have occurred in the last 5 years – including during the development of the Energy Strategy. These include rising electric loads, increasing energy bills and energy cost burdens, and an increase in extreme weather events that impact Oregonians. Until recently, unprecedented opportunities, bolstered by new policies and federal support, had been driving historic levels of investment in clean energy technologies including renewable energy, electric vehicles, and energy efficiency. Over the last nine months, there has been a stark reversal of federal policy as clean energy, energy efficiency, and even basic infrastructure projects have seen tax credits and funding eliminated or reduced.

The Energy Strategy evaluates these trends in the context of Oregon's energy policy objectives and recommends **five pathways to guide Oregon: energy efficiency, clean electricity, electrification, low-carbon fuels, and resilience.** These pathways are the result of two years of technical analysis and policy discussions. They represent a portfolio of solutions that must be advanced together. They are interconnected and mutually reinforcing, building on each other and interacting in complex ways.

The first pathway, **energy efficiency**, is essential to reduce energy demand as much as possible, trimming the size of the overall energy demand that must be served by clean energy sources. Energy efficiency is a least-cost resource that can lower energy bills for consumers while supporting reliability. The second

pathway, **clean electricity**, is expected to power a growing share of our energy system. As electricity demand increases and many end-uses electrify, the modeling conducted for the energy strategy found that the electricity system must grow significantly. This elevates the need to build and upgrade transmission, generation, and distribution infrastructure. The third pathway, **electrification**, involves adoption of electric technologies to replace fossil fuels in many end uses over the next 25 years, including transportation and space heating in buildings. It is also a powerful energy efficiency measure because many electric technologies are much more energy efficient than their fossil fuel counterparts. The fourth pathway, **low-carbon fuels**, is essential in areas where in the near or longer term, electrification is not feasible and to support reliable electricity. Finally, it is important to consider **resilience** across all these areas, ensuring that as measures are undertaken to mitigate climate change, opportunities to strengthen resilience are captured.

Key Modeling Takeaways

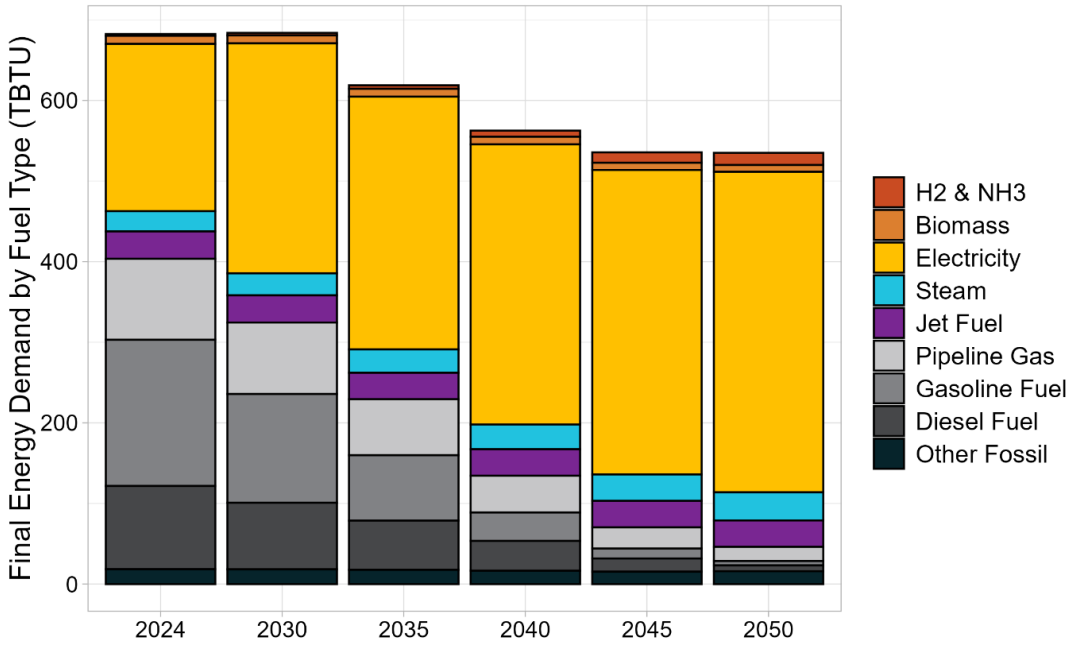
The energy strategy looks at expected trends, and at the elements of a least-cost pathway to meeting Oregon's energy policy objectives. To inform the energy strategy, the Oregon Department of Energy contracted with the Clean Energy Transition Institute and Evolved Energy Research to undertake a modeling exercise that considers different approaches to meeting Oregon's energy policy objectives for the period 2024 to 2050. That exercise informed policy discussions, and ultimately the five pathways.

Much of the agency's engagement around the modeling focused on selecting the best available data for modeling inputs and assumptions to create a Reference Scenario that would serve as a point of comparison for other alternative scenarios. Unlike studies that model emissions levels associated with different scenarios, the energy strategy Reference Scenario was structured to help understand what a least-cost pathway to achieving Oregon's goals might look like. It incorporates high levels of demand-side energy efficiency measures and electrification of end-uses, based on an evaluation of the least-cost actions identified in numerous other energy transition studies.

The results of the modeling showed that energy efficiency and electrification can help reduce the amount of energy needed to fuel the economy and can significantly reduce Oregon's overall demand for energy while its population and economy grow. In 2050, energy demand was 22 percent lower than in 2024 due to high levels of energy efficiency and electrification, particularly in the transportation sector. This is represented by the descending columns in the figure below.

Another key takeaway from the modeling is that electricity loads increase significantly, doubling by 2050. In the very near term, tech/data center loads are the greatest driver of growing electricity demand; after 2030, electric vehicles drive electricity demand growth, followed by demand growth across the commercial, industrial, and agricultural sectors. Electrification is therefore an important driver of growth in *electricity* demand, while at the same time reducing overall *energy* demand.

Energy Demand by Fuel Type in Oregon, 2024 Actuals and Modeled Future



The modeling also looked at alternative scenarios and sensitivities, each of which changed one key aspect of the Reference Scenario and held everything else constant.[i] This helped to isolate the impact of the change and draw out lessons learned.

Scenarios and sensitivities explored what would happen if there were lower levels of energy efficiency and/or slower rates of electrification to test the hypothesis that these were key elements for ensuring Oregon's energy transition follows a least-cost pathway. This hypothesis was correct. Scenarios that delayed action on energy efficiency and building electrification, transportation electrification, and demand response led to higher overall costs to the economy, as did scenarios that included less in-state generation and more imported renewable resources or constrained transmission compared to the Reference Scenario. Another scenario showed increased costs if the power system cannot rely on a combination of fossil and low-carbon gas for reliability.

This exercise also resulted in a deeper understanding of interactions across the transportation, buildings, industrial, and electricity sectors in Oregon. It provided valuable insights into the direction the state must take to achieve its energy policy objectives.

The Cost of Inaction

There are many drivers of rising energy costs today. In recent years, higher wholesale power costs, wildfire risk reduction and insurance, maintenance and upgrades to aging infrastructure, inflation, and severe weather events have all been primary contributors. Global events, like the COVID-19 pandemic, Russia's war against Ukraine, periods of high inflation, and political unrest have caused large fluctuations in fuel prices that affect transportation, heating, and electricity costs. Oregon's decarbonization policies

[i] Alternative scenarios were defined earlier in the process, while sensitivities were added to test additional questions that emerged toward the end of the modeling process as scenario results began to emerge. There were six alternative scenarios and four sensitivities that we modeled. The results of the energy pathways analysis are available online.

and goals have not been the primary driver of recent price increases, though over time they will require significant investment.

The scale of expected demand growth in the electricity sector is historic. In addition, many other areas will require significant investment. Many of these are investments that were going to happen anyway. Cars, furnaces, and boilers will eventually need to be replaced. The energy strategy modeling helped identify low-carbon replacement options that generated the least overall energy system costs across the economy and complied with Oregon policies like HB 2021, the Climate Protection Program, and Advanced Clean Cars II.

Across the energy sector, the question posed in the energy strategy – and the choice facing Oregon – is not whether to invest in our energy system; it is *how* to direct and resource that investment to maximize benefits to Oregonians, minimize harms, avoid disproportionate impacts to environmental justice and energy burdened communities, and advance key priorities like energy affordability, public health, and economic development. This was a key question asked in the technical and modeling analysis, and discussed in working groups to identify policy gaps and solutions.

A key backdrop to this discussion is the growing cost of climate change in Oregon. Even as energy costs are rising, climate change is driving additional costs for Oregon households, businesses, industries, and government. In the coming decades, it is estimated that the average Oregonian could lose about $12,000 in income each year from the effects of greenhouse gas emissions. Climate change is also affecting the electricity sector, increasing costs and threatening reliability. Effects of climate change include changing precipitation patterns and drought, increased wildfire risk, and the rising frequency and duration of extreme summer and winter weather.

Unless global emissions decline considerably, these impacts will happen at a faster pace and intensify over time, committing Oregonians and the rest of the world to increasingly higher costs from climate inaction. Costs will continue to accrue the longer it takes to reduce emissions. While Oregon cannot reduce global emissions alone, it is in a position to lead as a state, and as part of a region driving solutions that reduce emissions and provide economic opportunities associated with the energy transition. Oregon's energy production and use account for over 80 percent of the state's greenhouse gas emissions, making it one of the focal points for mitigating climate change and meeting statewide greenhouse gas reduction goals.

Many of the measures identified in the energy strategy can deliver benefits on top of mitigating climate change. Complementary analysis, conducted for the energy strategy to explore air quality, affordability, and employment effects of meeting Oregon's energy policy objectives, provides additional insights. The technical analysis and engagement also identified challenges, such as job displacement in certain areas, and increased costs for some households of adopting a heat pump. Just as policies are needed to drive uptake of clean energy technologies and deliver their benefits, policies will also be important to address costs and to ensure that those costs do not disproportionately impact environmental justice and energy burdened communities.

The costs of climate change and our current energy system are not borne equally. An intentional approach is needed to ensure that historic and current inequities are not perpetuated as we advance along the five pathways, and that low-income and marginalized groups have access to the benefits of the energy transition. The equity and justice framework, along with specific legislative and policy actions, aims to advance meaningful engagement and equitable and just outcomes.

Input and Engagement

Oregon's Energy Strategy has been informed by a robust public engagement process. This included information sharing and comments about technical modeling from May 2024 – December 2024 (Phase 1), followed by engagement to inform development of the policy recommendations from February 2025 – May 2025 (Phase 2), and a written comment period on the Draft Report from August 2025 – September 2025. Through these phases, ODOE sought and incorporated input regarding the data and assumptions of the energy strategy; perspectives on policy priorities, challenges, and opportunities from a diverse range of interests and backgrounds; and comments from members of the Advisory Group, Inter-Agency Steering Group, Working Groups, and the public. ODOE has published comprehensive summaries of the input received during Phase 1 technical modeling, Phase 2 policy discussions, and written comments of the strategy development, reflecting input on the technical modeling, policy discussions, and draft Energy Strategy report. Copies of public comments and recordings from public meetings are available on ODOE's website.

The robust engagement of partners and the public throughout both phases of the strategy's development significantly contributed to its shape and content. Public engagement informed the design and focus of the technical analyses. Conversations with interested parties supported policy discussions, including evaluation of current progress, barriers, and options to advancing Oregon's energy policy objectives. Dialogue and feedback helped define priorities in the Equity and Justice Framework. Partner and public input considered the merits of proposed legislative and policy actions and contributed to the recommendations and organization of this report.

ODOE heard throughout the strategy's development that partner perspectives should be considered critically and that dissenting voices be visible in the report. ODOE is committed to presenting an evenhanded, realistic view of the direction Oregon needs to follow to meet its energy policy objectives, and has incorporated information about barriers and challenges to the section on Pathways and Policies in the main report – heard during Phase 2 discussions. The written comment summary is a compilation of Phase 2 discussions and written comments, structured to match the organization of the August draft of the energy strategy to facilitate review of what ODOE heard concerning each report section. This approach highlights where and how the Energy Strategy reflects partner input and where partners and members of the public expressed dissenting opinions.

Nine Federally Recognized Tribes: Feedback and Themes

Through the engagement process, ODOE reached out to the nine federally recognized Tribes through formal government-to-government letters, staff-to-staff discussion, individual in-person or virtual meetings with Tribal leaders and staff, and presentations through the Legislative Commission on Indian Services and cluster groups. ODOE heard concerns about how existing energy systems overlook tribal sovereignty, cultural knowledge, and priorities, as well as support for incentive programs that can help tribal members shift to clean energy and energy efficient opportunities.

In the report, ODOE is not including any specific priorities of Tribes or a level of detail that would run counter to our government-to-government process. Rather, staff synthesized feedback and reflected what was heard through these conversations so it could be internalized and applied in the development of the Oregon Energy Strategy. As policymakers consider policies and actions to move Oregon forward on the five pathways in the Oregon Energy Strategy, the themes below should be considered and incorporated into the design of programs and regulations.

- Energy Independence & Sovereignty
- Affordable Energy Options
- Access to Decision Making
- Stabilization of Funding Cycles
- Consultation, Cultural, and Natural Resources Values

Equity and Justice Framework

To create equitable strategies for accomplishing our state's climate and energy goals, it is important to recognize there are disparities in how Oregonians experience benefits from or are burdened by our energy system. For example, Oregonians who are energy burdened spend a greater proportion of their annual household income on home energy costs. Factors including age and income can affect vulnerability to climate impacts. Of the 116 confirmed deaths from the 2021 heat dome, the majority of people were older than 60, living alone, and without access to air conditioning in their homes. The 2020 Labor Day fires destroyed or damaged 4,000 homes. These wildfires devastated Talent and Phoenix in particular, destroying more than 1,700 mobile or manufactured homes and the financial security of community members, many of whom still do not have permanent replacement housing five years later.

As part of the Oregon Energy Strategy, the Equity and Justice Framework serves to guide decision-making processes and deliver improved outcomes by reducing burdens and expanding access to benefits. This includes reducing the disproportionate costs of energy burden, negative health effects from energy-related pollution, and impacts of infrastructure development on natural and working lands, rivers, lakes, and coastal waters. It also serves to improve resilience against extreme weather, broaden access to technologies that improve resilience, health, and safety, and ensure access to workforce training and jobs.

The Equity and Justice Framework presents six key approaches for decisionmakers to consider that advance meaningful involvement and equity when crafting and implementing energy policy. These were developed in consultation with an Environmental Justice and Equity Working Group. They build on existing efforts and identify needs to ensure meaningful participation and outcomes for environmental justice communities.

- Provide equitable access to decision-making processes.
- Ensure equitable access to infrastructure development processes.
- Invest in long-term incentive programs for environmental justice communities.
- Promote holistic workforce development in environmental justice communities.
- Develop partnerships and resources in environmental justice communities.
- Consider the effects of energy policies on natural and working lands, cultural resources, and the broader environment.

Five Pathways and Policies

The Energy Strategy recommendations are structured as **pathways → policies → actions**.

- **Pathways** define direction that Oregon needs to pursue to meet our energy policy objectives and are meant to guide decisions over time.
- **Policies** build on the pathways and provide more detail to inform near-term actions and decisions over time.
- **Actions** are near-term legislative and policy recommendations that focus on the next four years, addressing existing barriers and needs while delivering progress on the pathways and policies.

Following the technical analysis/modeling and public engagement, ODOE has put forth five pathways representing the direction Oregon needs to go to meet its energy policy objectives – including an energy transition that will deliver clean, reliable, and affordable energy to all Oregonians. While the pathways work together to define high-level direction for the state, more specificity is required to set a framework for action. Policies serve to advance the five pathways by providing more detailed direction for Oregon. Similar to pathways, the policies are meant to provide a long-term framework for the development of near-term actions.

1. Energy Efficiency.

Advance energy efficiency across buildings, industry, and transportation sectors, including expanding access to and appeal of multimodal transportation options, to deliver the benefits of a more efficient energy system.

ENERGY EFFICIENCY POLICIES
1a. Deliver energy efficiency and conservation improvements in existing and new residential and small commercial buildings to align with state decarbonization goals. Prioritize programs to serve low- and moderate- income and energy burdened households.
1b. Evaluate, promote, and allocate funding to opportunities to improve energy efficiency in large commercial and industrial sectors.
1c. Prioritize policies and increase support for programs that expand access to multimodal transportation options – including public transit, biking, and walking infrastructure – and promote development patterns that make it easier and more appealing for people to live, work, and access services without relying on a personal vehicle.

2. Clean Electricity.

Secure reliable, affordable, and clean electricity by expanding the electricity system and incorporating load flexibility.

CLEAN ELECTRICITY POLICIES
2a. Facilitate energy infrastructure enhancement and expansion while avoiding, minimizing, and mitigating negative impacts on energy burden, natural and working lands, Tribal cultural resources, and communities.
2b. Enable consumers to support grid needs by shifting the timing of electricity consumption for distributed flexible loads like EVs or water heaters and larger commercial and industrial loads.
2c. Consult and engage with Tribes to understand their concerns around energy development and to identify opportunities where state policies, funding, and programs can support Tribal priorities while minimizing the effects of development on environmental and cultural resources.
2d. Collaborate with the Bonneville Power Administration, neighboring states and other regional entities to address Oregon's needs as part of a regional grid.

3. Electrification. Increase electrification of end uses across transportation, buildings, and industry, while safeguarding reliability, promoting affordability, and maximizing opportunities to use load flexibility as a resource.

ELECTRIFICATION POLICIES
3a. Advance and expand efforts to electrify transportation, with a focus on removing barriers to ensure the state meets its zero-emission vehicle goals.
3b. Facilitate and accelerate the interconnection of EV charging infrastructure and related distribution system upgrades to enable faster deployment, lower costs and complexity, and improve grid readiness.
3c. Promote strategic electrification across the residential, commercial, and industrial sectors to align policies and investment to deliver affordable, reliable, and clean energy.

4. Low-Carbon Fuels. Advance the use of low-carbon fuels in the hardest-to-electrify end uses and to maintain a reliable electric grid.

LOW-CARBON FUELS POLICIES
4a. Foster development and expansion of low-carbon fuels and fuel infrastructure in Oregon to serve the hardest-to-electrify sectors in Oregon as a strategic resource, while mitigating environmental and community impacts.
4b. Support low-carbon fuel adoption in the hardest-to-electrify sectors including aviation, rail, marine transport, long-haul trucking, agricultural and off-road equipment, high-heat industrial processes and resources that support electric system reliability.
4c. Support a managed fuels transition that minimizes stranded assets as end-uses electrify, identifies opportunities to leverage existing infrastructure and expertise to support clean fuel alternatives, and encourages technological innovation to advance new opportunities.

5. Resilience. Strengthen resilience across all levels of the energy system, including utilities, communities, and customers, enhancing Oregon's ability to adapt to climate change and mitigate other risks.

RESILIENCE POLICIES
5a. Evaluate cross-fuel interdependencies and vulnerabilities to better ensure long-term reliability of the electric grid. This specifically includes strengthening coordination of electricity and natural gas system planning and exploring other cross-fuel areas requiring strategic coordination.

5b. Fund resilience measures across the energy system, including at utility scale and in homes, businesses, and communities through a combination of ratepayer and taxpayer dollars, particularly where climate adaptation measures can also help advance climate mitigation.
5c. Maintain emergency response capabilities, including the adaptability and readiness of vehicles, supply of fuels, and fuel storage needs during the energy transition.

Implementing the Oregon Energy Strategy

The Oregon Energy Strategy includes 42 near-term actions that build on existing policy frameworks, serve to overcome barriers, and lay a foundation for continued progress over time. These actions will require partnership among many organizations and individuals within Oregon to accomplish. Each action advances one or more pathways and policies, and requires application of one or more approaches from the equity and justice framework.

After the Oregon Energy Strategy is published, ODOE will work with partner agencies, the Governor's office, and other interested parties to plan for how to advance these actions and determine next steps. In some cases, this will involve agencies advancing actions that are within their authority and resources. In others, implementation may require legislation to support agency resources or to create new programs, policies, or authorities. Recent developments have made certain actions more urgent. While ODOE considers each of the 42 actions important, the energy strategy includes a smaller set of actions that would contribute to addressing near term, immediate challenges such as reliability and affordability. These include:

- Actions focused on electricity system reliability and resilience
- Actions focused on protecting affordability and access to clean technologies
- Actions that can be advanced with minimal additional state budget allocation

As these immediate next steps are considered, it will be necessary for policy makers to use the Equity and Justice Framework as a guide to ensure meaningful engagement and equitable outcomes. The Oregon Department of Energy will work to advance actions that are within its authority and resources. It will further work and collaborate with Tribes, other state agencies, Legislators, the Governor's Office, and public partners to support development of details on how to take actions forward.

The energy strategy can be found in its entirety at

https://energystrategy.oregon.gov

or

https://www.oregon.gov/energy/Data-and-Reports/Pages/Energy-Strategy.aspx

The Oregon Department of Energy welcomes comments, questions, and requests for presentations or webinars on the energy strategy: https://odoe.powerappsportals.us/en-US/energy-strategy/

Tribal Land Acknowledgement

Indigenous Tribes and Bands have been with the lands that we inhabit today throughout Oregon and the Northwest since time immemorial and continue to be a vibrant part of Oregon today. We would like to express our respect to the First Peoples of this land, the nine federally recognized Tribes in Oregon:

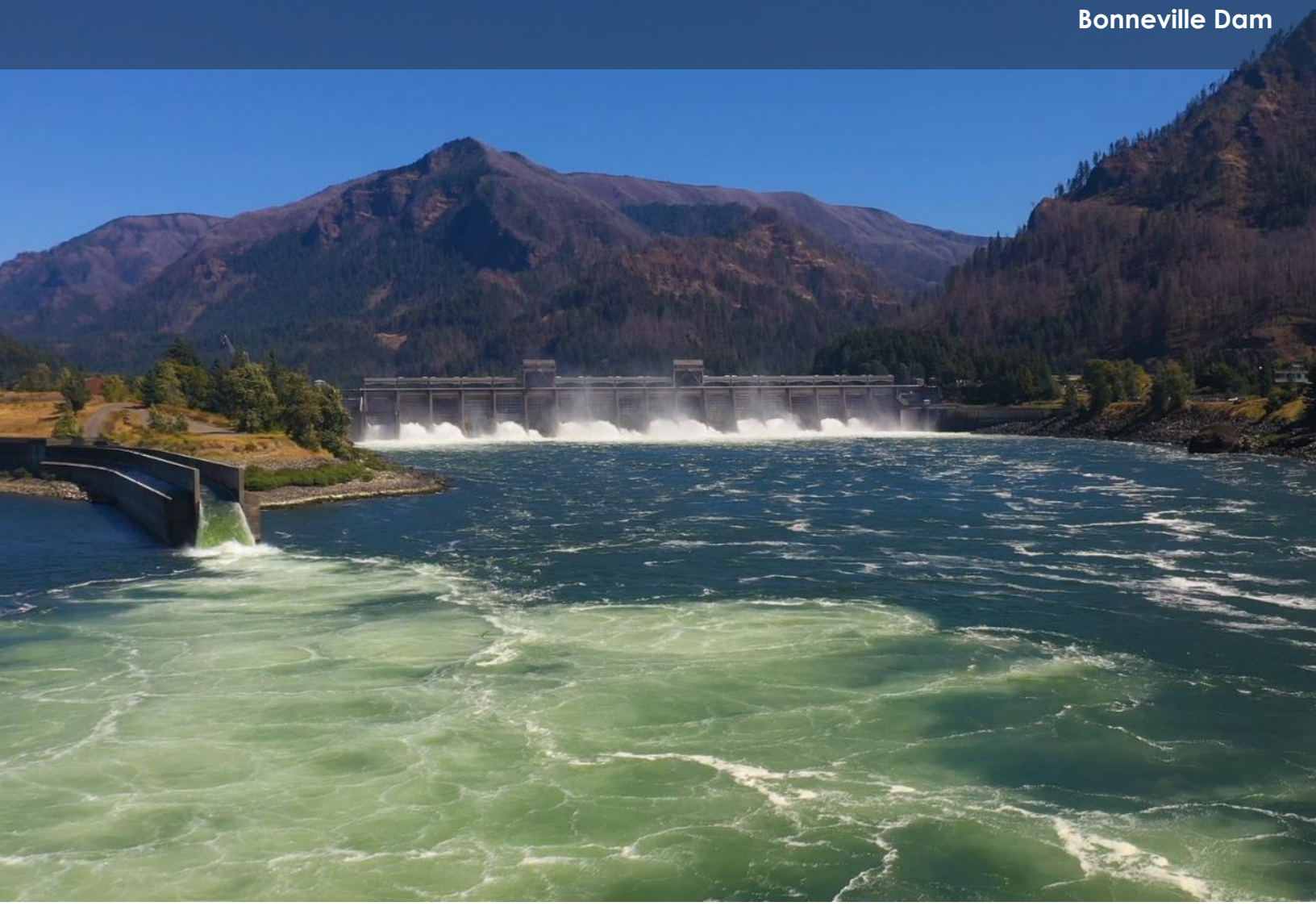
- Burns Paiute Tribe
- Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
- Confederated Tribes of Grand Ronde
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of the Warm Springs Reservation
- Coquille Indian Tribe
- Cow Creek Band of the Umpqua Tribe of Indians
- The Klamath Tribes

It is important that we recognize and honor the ongoing legal and spiritual relationship between the land, plants, animals, and people indigenous to this place we now call Oregon. The interconnectedness of the people, the land, and the natural environment cannot be overstated; the health of one is necessary for the health of all. We recognize the pre-existing and continued sovereignty of the nine federally recognized Tribes who have ties to this place and thank them for continuing to share their traditional ecological knowledge and perspective on how we might care for one another and the land, so it can take care of us.

We commit to engaging in a respectful and successful partnership as stewards of these lands. As we are obliged by state law and policy, we will uphold government-to-government relations to advance strong governance outcomes supportive of Tribal self-determination and sovereignty.

List of Acronyms and Abbreviations

aMW	Average Megawatts
BPA	Bonneville Power Administration
BPS	Building Performance Standards
COU	Consumer-owned Utility
DEQ	Oregon Department of Environmental Quality
DLCD	Oregon Department of Land Conservation and Development
EV	Electric Vehicle
GHG	Greenhouse Gases
GW	Gigawatt
HB	House Bill
IOU	Investor-owned Utility
IRA	Inflation Reduction Act (2022)
kWh	Kilowatt Hour
MHD	Medium- and Heavy-Duty
MTCO2e	Metric Tons of Carbon Dioxide Equivalent
MW	Megawatt
MWh	Megawatt Hours
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OHCS	Oregon Housing and Community Services
OPUC	Oregon Public Utility Commission
ORESA	Oregon Renewable Energy Siting Assessment
ORS	Oregon Revised Statute
PV	Photovoltaic
RUC	Road Usage Charge
SB	Senate Bill
VMT	Vehicle Miles Traveled
ZEV	Zero-emission Vehicle



PART ONE: INTRODUCTION

Oregon Energy Strategy: Five Pathways

Following the technical analysis/modeling and public engagement outlined in this report, ODOE proposes five pathways that together represent the direction Oregon needs to take to meet its energy policy objectives – including an energy transition that will deliver clean, reliable, and affordable energy to all Oregonians. These pathways have been optimized to account for a direction that advances a least-cost economy-wide trajectory over time while supporting reliability, affordability, and seeking to reduce costs while maximizing benefits. Implementation of each pathway must consider burdens and benefits to environmental justice communities, applying an equity framework to prevent further disproportionate impacts to historically and currently marginalized communities.

1. Energy Efficiency. Advance energy efficiency across buildings, industry, and transportation sectors, including by expanding access to and appeal of multimodal transportation options, to deliver the benefits of a more efficient energy system.

2. Clean Electricity. Secure reliable, affordable, and clean electricity by expanding the electricity system and incorporating load flexibility.

3. Electrification. Increase electrification of end uses across transportation, buildings, and industry, while safeguarding reliability, promoting affordability, and maximizing opportunities to use load flexibility as a resource.

4. Low-Carbon Fuels. Advance the use of low-carbon fuels in the hardest-to-electrify end uses and to maintain a reliable electric grid.

5. Resilience. Strengthen resilience across all levels of the energy system, including utilities, communities, and customers, enhancing Oregon's ability to adapt to climate change and mitigate other risks.

These five pathways should not be viewed as distinct or independent areas of activity, but should be considered a portfolio of solutions that result in a cohesive strategy. They are interconnected and mutually reinforcing, building on each other and interacting in complex ways.

The first pathway, **energy efficiency**, is essential to reduce energy demand as much as possible, trimming the size of the overall energy demand that must be served by clean energy sources. Energy efficiency is a least-cost resource that can lower energy costs for consumers while supporting reliability. The second pathway, **clean electricity**, is expected to power a growing share of our energy system. As electricity

demand increases and many end-uses electrify, the modeling conducted for the energy strategy found that the electricity system must grow significantly to meet increased demand. This elevates the need to build transmission, generation, and distribution infrastructure. The third pathway, **electrification**, involves adoption of electric technologies to replace fossil fuels in many end uses over the next 25 years, including transportation and space heating in buildings. It is also a powerful energy efficiency measure because many electric technologies are much more energy efficient than their fossil fuel counterparts. The fourth pathway, **low-carbon fuels**, is essential in areas where in the near or longer term, electrification is not feasible and where low-carbon fuels are needed to support electricity system reliability. Finally, it is important to consider **resilience** across all these areas, ensuring that as measures are undertaken to mitigate climate change, opportunities to strengthen resilience are captured.

Oregon Waste Trucks Refuel with Compressed Natural Gas

Implementing the Oregon Energy Strategy

The process of developing a state energy strategy will be complete with submission of this final report to the Governor and Legislature. However, this is just the beginning of the Oregon Energy Strategy.

Moving forward, decision-makers can now consider the policy and legislative actions outlined in Part Two and identify next steps. In some cases, this will involve agencies advancing actions that are within their authority and resources. In others, implementation may require legislation to support agency resources or to create new programs, policies, or authorities.

After the Oregon Energy Strategy is published, ODOE will work with partner agencies, the Governor's office, and other interested parties to plan for how to advance these actions and determine next steps. In some cases, this will involve agencies advancing actions that are within their authority and resources. In others, implementation may require legislation to support agency resources or to create new programs, policies, or authorities. Recent developments have made certain actions more urgent. While ODOE considers each of the 42 actions important, the energy strategy includes a smaller set of actions that would contribute to addressing near term, immediate challenges such as reliability and affordability.

Actions Focused on Electricity System Reliability and Resilience

Electricity system reliability and resilience are increasingly urgent as load growth threatens to outpace construction of new resources and severe weather increasingly strains the electricity system. The power system has already come close to having insufficient resources in recent years. Events that disrupt reliability cause widespread economic harm, adverse health effects, the loss of human life, and disproportionately impact people of color, low-income households, and people who are medically vulnerable. The actions here focus on advancing reliability now and accelerating resource development in the next 5-10 years.

- The Oregon Public Utility Commission, in coordination with the Department of Energy, should commission an expert review of balanced wildfire utility liability solutions that enable both utility accountability and ongoing customer cost containment, reliability, and decarbonization investments.

  Increasingly frequent and intense wildfires have affected many Oregonians and represent a growing risk for households and businesses. They further threaten utilities' ability to finance and build utility-scale electricity infrastructure, which raises reliability and cost concerns for ratepayers. It is important to consider policy options to mitigate these impacts.

- Review and share key findings with the Legislature regarding near-term transmission needs and opportunities, and identify opportunities for the state to support transmission. ODOE would lead this work and build on it to inform the role that a state transmission entity may play in enabling investment.

  The pace of transmission expansion along existing and new corridors is creating a critical bottleneck to meeting reliability, affordability, and clean energy goals. This action would consider ways to advance siting and investment, and identify changes to policy that might be needed.

- Prioritize measures in energy efficiency incentive programs that relieve pressure on the power system. In the near term, maintain – and where possible accelerate – building weatherization, replacement of less efficient electric heating with efficient electric heat pumps, rooftop solar and storage, and expand demand flexibility.

  Oregon has utility and state programs supporting energy efficiency and demand response. This action serves to double-down on these efforts as the fastest way to secure system reliability. Progress on this action will also save money for many energy consumers.

- Expand the Oregon Department of Energy's statewide energy infrastructure resilience programs, including increasing funding for and amending the Community Renewable Energy Grant Program to support projects that improve energy resilience.

  If current trends continue, it is likely that some communities will lose power at some point in the next four years due to extreme weather, causing events like downed power lines and public safety power shutoffs. Rural and coastal communities in particular face more frequent and longer duration outages. Oregon must remain focused on resilience to protect communities throughout the state.

- Facilitate the sharing of data and joint planning to enhance energy resilience and reliability. The Oregon Department of Energy should identify relevant actions that support the Oregon Energy Security Plan.

  One of the keys to energy reliability is ensuring coordination between electricity and gas systems around extreme weather events. As the 2024 ice storm illustrated, coordination in this area must be a priority.

Actions Focused on Protecting Affordability and Access to Clean Technologies

Record disconnections and the loss of federal support for heating assistance and basic needs are deepening an affordability crisis, which disproportionately affects environmental justice communities. Energy efficiency measures can reduce costs for consumers, increase their resilience, and deliver benefits to the electric grid. It is essential to prioritize programs that provide the needed upgrades and technologies to improve health and affordability for Oregon's most vulnerable residents.

- Establish and identify a source of funding for a revolving loan fund to provide a stable source of low-cost and no-cost loans to support the energy transition and resilience.

  The energy transition will require significant investment in new technologies and infrastructure. A revolving loan fund can provide a stable and growing pool of money to support the adoption of clean energy technologies that reduce energy demand, such as electric vehicles and heat pumps, particularly for low- and moderate-income households. It can complement areas where direct funding support continues to be needed.

- Prioritize existing incentive programs offering essential energy efficiency and weatherization improvements, particularly those focused on low- and moderate- income households.

  Continue utility ratepayer-funded programs and restore or expand state programs that provide essential support for household energy efficiency, weatherization, emergency appliance replacement, and installation of high efficiency equipment and appliances.

- Earmark flexible funding for deferred maintenance measures necessary to enable low- and moderate- income homes to install efficiency and weatherization technologies and measures.

  The need to address deferred maintenance measures, such as a new roof or replacing rotting walls, is often a prerequisite to weatherization or other energy efficiency improvements. There is a lack of funding for these kinds of upgrades, including in owner-occupied and rental housing, creating a barrier to new technologies. Supporting these measures is essential to ensuring equitable access to health- and bill- saving energy efficiency measures.

- Update energy efficiency and demand response programs to promote strategic electrification.

  This action is essential to provide access to efficient electric technologies, particularly among low- and moderate- income households, while helping to reduce household bills and support reliability.

Actions That Can Be Advanced with Minimal Additional State Budget Allocation

The state budget is facing an immediate multi-million-dollar funding gap, which is expected to worsen as the state loses billions of dollars in federal funding. This gap is the result of changes in federal policy, which have been evolving throughout the development of the energy strategy. Following is a subset of actions for which undertaking first steps would have minimal budget impact, and that are likely to advance Oregon's energy policy objectives over time. They aim to ensure that as Oregon invests in its energy future, it supports clean, affordable, reliable solutions that improve public health and generate economic opportunities.

- Review Oregon's transportation funding mechanisms, recommend strategies for alignment with the state's energy and climate policy priorities, and identify new revenue sources – particularly to support the deployment of ZEVs and ZEV infrastructure – through a Climate Aligned Transportation Funding Task Force.

  The Task Force is essential to enabling Oregon's transportation system to meet the demands of the 21st century, including addressing climate change. The state must maintain reliable funding for system maintenance and operations while increasing investments in transportation electrification and multimodal infrastructure. The Task Force will evaluate these dual priorities and offer recommendations for legislative or administrative measures that align transportation funding with climate goals and expand resources for climate-focused investments.

- Expand local governments' authority to generate and direct transportation revenues toward climate-aligned transportation infrastructure that meets local needs and priorities.

  Many local governments are constrained by limited authority to raise and direct transportation revenue for transportation infrastructure. Expanding authority gives communities the flexibility to meet the scale and urgency of climate and equity-driven transportation challenges. With greater autonomy, localities could accelerate investments in multimodal, zero-emission, and equity-focused transportation infrastructure and target resources toward local priorities.

- Align the Oregon Economic Development Strategy and the Oregon Energy Strategy through collaboration between Business Oregon and the Oregon Department of Energy to foster decarbonization and economic growth through consideration of industrial symbiosis, clean energy innovation, emerging technologies, and incentives.

Oregon will only achieve its energy policy objectives if they are paired with a focus on economic development and quality jobs and careers. This action would strengthen cooperation between the Oregon Department of Energy and Business Oregon to grow our economy and build on opportunities that new, clean technologies, and innovation offer.

- Require investor-owned utilities to publish and maintain interactive, feeder-level Hosting Capacity Maps (HCMs) showing available capacity for EV charging infrastructure, building electrification, distributed generation, and battery storage.

  Consistent, accessible, and regularly updated information on distribution grid capacity is essential for accelerating the deployment of clean energy technologies, particularly EV charging stations. This action supports informed planning and strategic investment decisions and builds on existing efforts to establish uniform standards and processes for IOUs to regularly publish feeder-level data on grid hosting capacity. Any process developed should identify the minimum essential information to advance clean energy and electrification projects, carefully balancing the level and frequency of data with potential impacts on ratepayers.

While these actions represent immediate next steps in implementing the energy strategy, ODOE recommends moving forward on all 42 actions over the next four years. All actions represent important priorities to realize Oregon's energy policy objectives. As these immediate next steps are considered, it will be necessary that policy makers use the Equity and Justice Framework as a guide to ensure meaningful engagement and equitable outcomes. The Oregon Department of Energy will work to advance actions that are within its authority and resources. It will further work and collaborate with Tribes, other state agencies, legislators, the Governor's Office, and public partners to support development of details on how to move actions forward.

The Process

Why an Energy Strategy?

Energy is the foundation of modern life. It powers cars, heats homes, and supports our economy. Building and maintaining energy infrastructure requires investment, and that infrastructure affects local communities, cultural resources, and the environment. The energy sector is responsible for most of Oregon's greenhouse gas emissions, which negatively affect air quality and public health.[1] These effects have disproportionately impacted some more than others — environmental justice communities in particular — and continue to do so today.[ii]

In Oregon, the transportation sector is responsible for 37 percent of energy use, followed by industry (27 percent), households (21 percent), and commercial (15 percent) sectors. The largest source of energy to power these sectors is transportation fuels like gasoline and diesel (36 percent), electricity (32 percent), and direct use fuels including natural gas, biomass, and other fuels (31 percent). Much of Oregon's energy comes from fossil fuels. Oregon also benefits from clean sources of energy, including clean electricity resources like hydropower, which generates about a third of Oregon's electricity statewide, and contributes more than half of the region's electricity capacity. It also supplies most of the electricity used by consumer-owned utility customers.[2]

The cost of inaction on climate change is already being felt by Oregonians.[3] While climate change is occurring through emissions globally, and Oregon's contribution is relatively small, Oregon policymakers have recognized the economic and public health benefits of advancing clean energy technology in the state. Oregon policymakers have enacted laws, programs, and regulations to support a shift to cleaner, more sustainable sources of energy. Some of these policies have been in place for decades, while others have been enacted recently. Together, Oregon's energy policies are transforming the energy system toward clean energy to power our homes, transportation systems, businesses, and industry. Yet until now, Oregon has not had a clear vision for how the various pieces come together. In 2022, the Oregon Department of Energy published its *Biennial Energy Report* and in it identified the need for a state energy strategy that can take an economywide look at available resources, technologies, and energy needs, and develop a shared vision for the state.[4]

ODOE's Community Renewable Energy Grant Program supports projects like this community solar installation in Ontario, OR.

There have been many developments since that publication. Oregon ramped up programs to support Oregon households and businesses in adopting new technologies, enabled by new policies and federal support. These included programs such as the Oregon Clean Vehicle Rebate Program, Community Renewable Energy Grant Program, and County Energy Resilience Grant Program. Federal incentives encouraged renewable energy development, electric vehicle adoption, and

[ii] HB 4077 defines "environmental justice community" and defines frames the work of the Environmental Justice Task Force. https://olis.oregonlegislature.gov/liz/2022R1/Downloads/MeasureDocument/HB4077/Enrolled.

transmission expansion. At the same time, Oregon and the region have seen rapid development of tech loads, including data centers, which exacerbates concerns over electric system resource adequacy and reliability.[5] Oregon faces a housing and homelessness crisis requiring accelerated construction of housing to meet the needs of Oregonians.[6] Customers are feeling the pinch of inflation and higher energy rates.[7] [8] [9] Wildfires and extreme weather are affecting public health, electricity system operations, and utilities' ability to finance necessary investments.[10]

Since January 2025, rapid and aggressive federal policy shifts have reduced federal support for these efforts and threatened or cut future funding for Oregon's policies and the programs supporting uptake of clean, modern technologies across the state. State budget constraints – in some cases linked to federal policy changes – have reduced state resources available to support the clean energy transition. Many programs that support achieving the state's energy goals are on pause or have an uncertain funding future.

These changes make state leadership and action more important than ever. The energy transition requires an understanding of today's needs and challenges and a vision of how to steer near-term decisions to achieve long-term outcomes. Oregon's leaders strive for a high quality of life, strong economy, and responsible stewardship of natural and working lands, waters, and cultural resources. These outcomes rely on successfully navigating a transition from fossil fuels to clean sources of energy in our electricity, transportation, buildings, industry, and agriculture sectors while maintaining energy affordability and reliability. They rely on successfully advancing equity and inclusion of environmental justice communities to ensure that they are not disproportionately burdened by new energy development and can benefit from the clean energy transition. Meeting our goals requires recognition that addressing Oregon's energy needs will have a footprint, so they should include a commitment to seeking least-regrets solutions wherever possible while working to maximize benefits.

Public Process

In 2023, HB 3630[11] directed the Oregon Department of Energy to develop a state energy strategy and to submit a final report to the Governor and Legislature by November 1, 2025. That report must: (1) summarize the state energy strategy and pathways to achieving the state's energy policy objectives; (2) describe the department's engagement process and how perspectives informed the energy strategy; and (3) recommend legislation or changes to policy necessary to implement the state energy strategy.

HB 3630 does not define Oregon's "energy policy objectives." However, it includes criteria that require consideration for how Oregon meets its clean energy policy objectives while protecting affordability and reliability. This includes meeting the goals in HB 2021, the Climate Protection Program, and in Executive Order 20-04.[12] [13] [14] There are many other policies driving Oregon's energy transition. While the energy strategy does not list or serve to interpret the nuances of Oregon's many energy policies, the modeling and public engagement considered statutory targets and goals, and aimed to support consistency and compliance with existing law.

Oregon's Energy Strategy has been informed by a robust public engagement process. This included information sharing and comments about technical modeling from May 2024 – December 2024 (Phase 1), followed by engagement to inform development of the policy recommendations from February 2025 – May 2025 (Phase 2), and a written comment period on the Draft Report from August 2025 – September 2025. Through these phases, ODOE sought and incorporated input regarding the data and

assumptions of the energy strategy; perspectives on policy priorities, challenges, and opportunities from a diverse range of interests and backgrounds; and comments from members of the Advisory Group, Inter-Agency Steering Group, Working Groups, and the public. ODOE has published comprehensive summaries of the input received during both Phase 1 technical modeling and Phase 2 policy discussions and written comments of the strategy development, reflecting input on the technical modeling, policy discussions, and draft energy strategy report. Copies of public comments and recordings from public meetings are available on ODOE's website.

Table 1: Oregon Energy Strategy Engagement Opportunities

Tribal Engagement	Government-to-Government outreach and engagement with the nine federally recognized Tribes in Oregon to ensure Tribal perspectives informed the energy strategy.
Advisory Group	Group of experts that advised ODOE throughout the process and helped inform decisions. Group represented diverse perspectives and lived experiences across the state.
Focus Area Working Groups (Phase 1)	Eight Focus Area Working Groups informed early development of the strategy, and particularly key assumptions and scenarios for the model.
Policy Working Groups (Phase 2)	Five Policy Working Groups included subject matter experts to dive into specific topics and identify gaps and needs to inform policy recommendations that built on previous analysis.
Interagency Steering Group	Representatives from the Oregon Departments of Energy, Land Conservation and Development, Transportation, Environmental Quality, and State Lands; Oregon Public Utility Commission; Business Oregon; the Governor's office; and other agencies provided agency perspectives and guidance to develop a statewide energy strategy.
Public Listening and Information Sessions	Public forums held to provide updates on the process and gather broad views from across the state to inform the strategy.

The technical analysis (the focus of Phase 1) involved numerous opportunities to provide input and evaluate the assumptions that went into the energy pathways modeling, to tailor the alternatives analyzed by the pathways modeling to provide the most useful insights to inform policy discussions, and to shape the complementary analyses. Phase 1 public input resulted in numerous adjustments to modeling assumptions and alternative scenario design and informed the focus of the complementary analyses. Phase 1 started in May 2024 and culminated with the presentation of the modeling results in a public informational session on January 31, 2025. The modeling results were further evaluated and discussed in the Policy Working Groups in Phase 2.

During the policy discussions (the focus of Phase 2,) ODOE held 17 Policy Working Group meetings, four Advisory Group meetings, four Inter-Agency Steering Group meetings, three public forums, and three information sessions to share technical modeling results and inform ODOE's policy drafting. Phase 2 policy discussions built on key findings from the modeling and data on current trends. Materials and recordings of these meetings are available on ODOE's website. Phase 2 policy discussions informed ODOE's development and structuring of the energy strategy and the draft recommendations by providing diverse perspectives from across Oregon on barriers to meeting our state's energy policy objectives, opportunities to overcome these barriers, and potential policy solutions.

ODOE's consultation with the Inter-Agency Steering Group and individual agencies was used to advance inter-agency alignment and to ensure that recommendations build on, and are complementary to, existing state policies and processes.

ODOE also reached out to the nine federally recognized Tribes in Oregon through formal government-to-government letters, staff-to-staff discussion, individual in-person or virtual meetings with Tribal leaders and staff, and presentations through the Legislative Commission on Indian Services and cluster groups. While ODOE continues government-to-government outreach and requests for consultation, where appropriate, ODOE has heard important themes that include: advancing Tribal energy sovereignty and self-determination, ensuring equitable access to decision-making processes, ensuring energy affordability and energy access for Tribal members, securing stable and culturally responsive funding mechanisms, including dedicated Tribal set-asides in state funding programs, and integrating Traditional Ecological Knowledge into energy and climate planning.

ODOE published a draft of this energy strategy report on August 14, 2025 and accepted written comments through September 22, 2025. In total, ODOE received 115 submissions through this period. Based on this input, ODOE made multiple revisions to the strategy; in particular, ODOE has supplemented the definitions and glossary, added narrative discussion and additional detail in several places, drafted a section on implementing the strategy to highlight actions that advance near-term priorities, and updated and reorganized several of the recommended legislative and policy actions. ODOE has published the written comments received in full and has included them in the written comment summary.

The robust engagement of partners and the public throughout both phases of the strategy's development has significantly contributed to the shape and content of this report. Public engagement informed the design and focus of the technical analyses. Conversations with interested parties supported policy discussions, including evaluation of current progress, barriers, and options to advancing Oregon's energy policy objectives. Dialogue and feedback helped define priorities in the Equity and Justice Framework. Partner and public input considered the merits of proposed legislative and policy actions and contributed to the recommendations and organization of this report.

ODOE heard interest throughout the strategy's development that partner perspectives be considered critically and that dissenting voices be visible in the report. ODOE is committed to presenting an evenhanded, realistic view of the direction Oregon needs to follow to meet its energy policy objectives, and has incorporated information about barriers and challenges to the section on Pathways and Policies – consistent with where Phase 2 organized meetings to discuss these barriers. The written comment summary is a compilation of Phase 2 discussions and written comments, structured to match the organization of this report to facilitate review of what ODOE heard around each report section. This approach highlights where and how the energy strategy reflects partner input and where partners and members of the public expressed dissenting opinions.

HB 3630 directs ODOE to update the energy strategy over time to reflect current information, data analysis, and state energy policy objectives. Energy policies and technologies are evolving quickly, which will necessitate an adaptive strategy that can adjust to address new barriers and challenges while also incorporating new opportunities that arise. ODOE recommends updating the energy strategy every four years to enable it to have a near-term, actionable focus, and to provide opportunities for updates and course corrections over time to keep Oregon on track to meet its long-term energy policy objectives.

Modeling and Technical Analysis

The modeling conducted by the consultants to the Oregon Energy Strategy — The Clean Energy Transition Institute and Evolved Energy Research — examined potential pathways to reach Oregon's energy and climate objectives while maintaining reliability across the energy system. ODOE worked with the consultants to develop the model using an analysis of existing policies, energy and integrated resource plans, energy-related studies and data analysis, and state energy policy objectives.[iii]

The Reference Scenario

Much of the energy strategy's Phase 1 engagement focused on selecting the best available data for modeling inputs and assumptions for a least-cost Reference Scenario to create a point of comparison for the other scenarios. Unlike some other studies that define a reference scenario as a business-as-usual path that may fall short of meeting energy policy goals, the energy strategy Reference Scenario was structured to help understand what a least-cost pathway to achieving those goals might look like. The Reference was developed to understand what actions it would take to achieve Oregon's energy policy objectives, and then use it as a point of comparison to other scenarios. In this way the modeling explored different pathways to achieving Oregon's goals, as directed by HB 3630.

The starting point for the modeling was to capture energy demand across all sectors of the economy, and how that demand is met by different energy sources – a sector-based analysis. Greenhouse gas emissions were attributed to all energy resources used in serving that demand. However, the energy model did not evaluate emissions unrelated to the production of energy nor incorporate the potential role of biological sequestration — such as storing carbon in land sinks and on natural and working lands — as a decarbonization strategy.[iv] Those emission reductions or natural climate solutions are part of other work being done by ODOE.

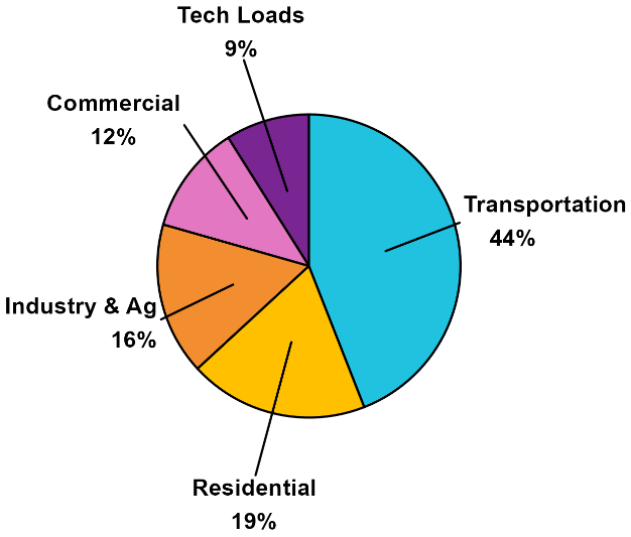
The modeling divided energy demand into sectors. The following are some examples of the types of demand that falls within each sector. **Transportation** includes things like cars, trucks, ships, and planes. **Residential** refers to energy use in homes, including for lighting, heating, cooling, and cooking. **Industry and agriculture** covers areas like manufacturing and energy used to power tractors or greenhouses. The **Commercial** sector includes shops, laundromats, and distribution centers. **Tech loads** include data centers and chip manufacturing. They can be considered commercial or industrial, but here are broken out due to their large energy demand.

[iii] See OES-CETI-EER-Technical-Approach-to-Modeling.pdf, Sections E (Current Policy Assessment) and F (Data Approach) for more details.

[iv] Currently, Oregon does not track or regulate biological emissions, nor does it permit carbon offsets as a compliance mechanism in any of its greenhouse gas emission reduction regulatory programs. As a result, biological sequestration was not included in the modeling for the Oregon Energy Strategy. However, the Oregon Department of Energy and the Oregon Climate Action Commission are producing an inventory to assess the amount of carbon sequestered and stored on natural and working lands, as well as the potential of natural climate solutions. Oregon could use its natural resources to act as carbon sinks to further the state's efforts to achieve a net-zero and net negative emissions future. The findings from this effort, expected in early 2026, may inform future iterations of the Oregon Energy Strategy.

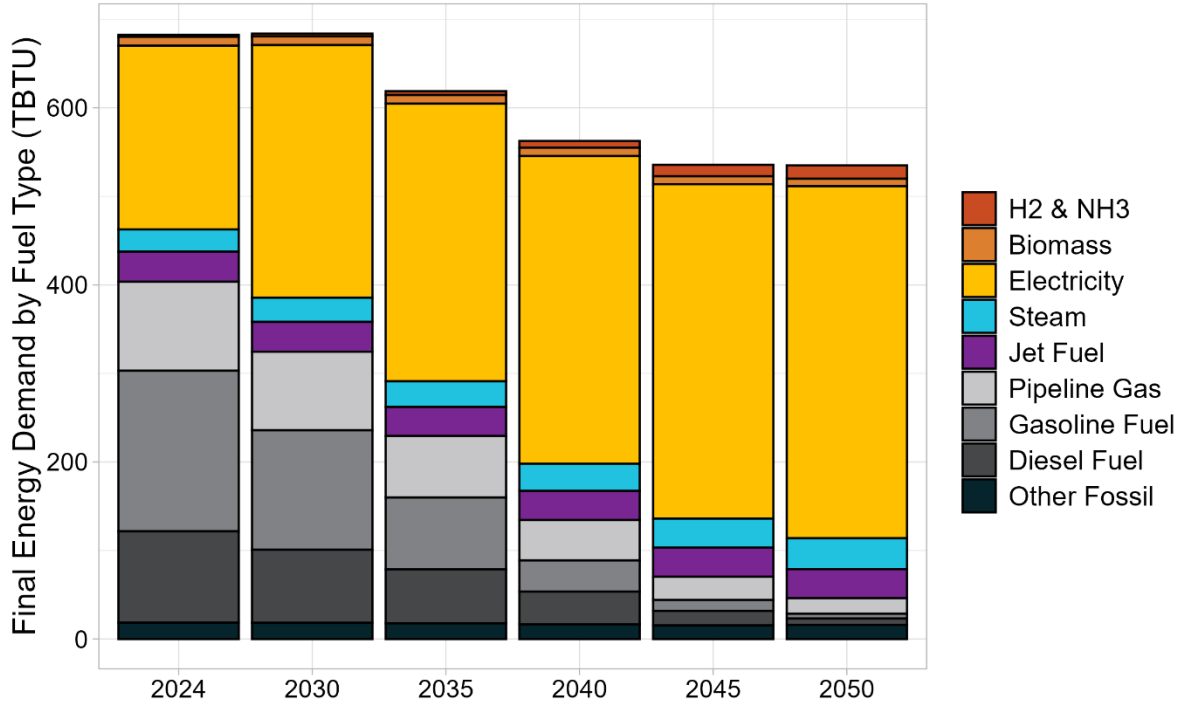
The following is a snapshot of energy demand share by sector in 2024, the baseline year for the modeling. Transportation accounted for the greatest share of energy demand (44 percent), followed by the residential sector (19 percent), industry and agriculture sector (16 percent), commercial sector (12 percent), and tech loads (9 percent).

Figure 1: Share of Energy Demand by Sector in Oregon (2024)



Energy for these sectors was supplied by a variety of technologies and fuels. The fuel mix of all energy consumed in Oregon in 2024 is represented by the left-most column of Figure 2.

Figure 2: Energy Demand by Fuel Type in Oregon, 2024 Actuals and Modeled Future



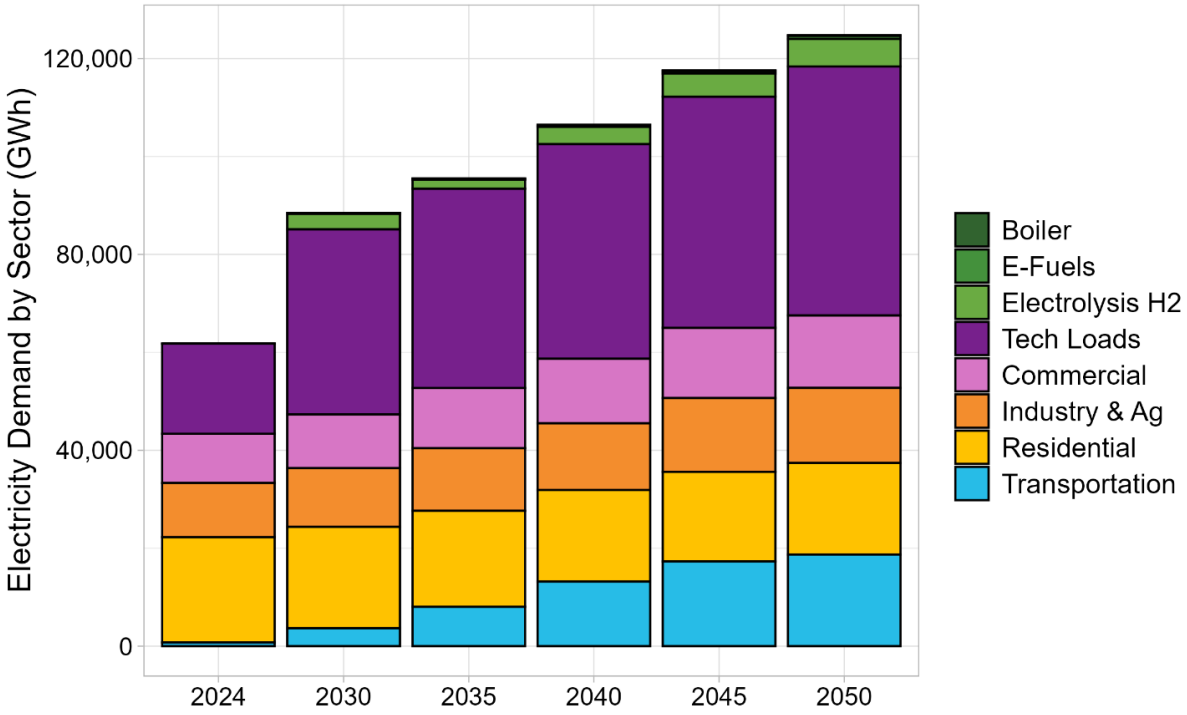
Gasoline and diesel combined, which are primarily used in transportation, supplied the largest share of energy to meet Oregon's total 2024 demand at 42 percent. Electricity met the next largest share of Oregon's overall energy demand that year at 30 percent, with hydropower being the most prominent

resource, supplying about one-third of all electricity used in Oregon. Pipeline gas served 15 percent of the state's total 2024 demand. Electricity, transportation fuels, and direct-use fuels consumed across the state in 2024 were produced by a diverse portfolio of renewable and fossil sources of energy.

The Reference Scenario incorporated high levels of demand-side energy efficiency measures and electrification of end-uses. High levels of energy efficiency, including through electrification, resulted in two major takeaways from the Reference. First, energy efficiency and electrification can help reduce the amount of energy needed to fuel Oregon's existing economy and can significantly reduce Oregon's overall demand for energy while Oregon's population and economy grow. It found energy demand in 2050 was 22 percent lower than in 2024 due to high levels of energy efficiency and electrification, particularly in transportation. This is represented by the descending columns in Figure 2.

Second, electricity loads increase significantly and double by 2050. In the very near term, tech loads are the greatest driver of growing electricity demand. From 2024 – 2030, tech load demand in Oregon increases rapidly in the Reference.[v] After 2030, electric vehicles drive electricity demand growth, followed by electricity demand growth across the commercial, industrial, and agricultural sectors. Electrification is therefore an important driver of growth in *electricity* demand, while at the same time reducing overall *energy* demand.

Figure 3: Electricity Demand by Sector in Oregon, 2024 Actuals and Modeled Future

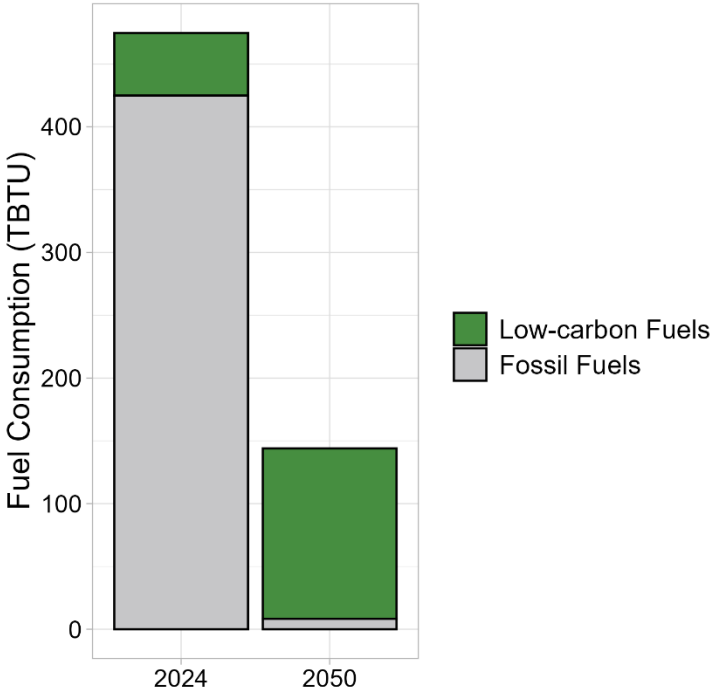


Electrification represents a shift from liquid transportation fuels and other fossil fuels like natural gas to electricity. This reduces the amount of fuels in the economy. Figure 4 illustrates the reduction in fuel consumption from 2024 to 2050 as many end-uses shift to more energy efficient electric technologies over time in the Reference Scenario. The model accounted for this shift in determining the amount of

[v] This estimate is built on projections of mid-high tech load growth from the Northwest Power and Conservation Council's 2029 Resource Adequacy Forecast, first published in 2024. One of the key takeaways from public engagement was the importance of applying this forecast to the modeling.

electricity needed to reliably serve these new loads over time.[vi] At the same time, fuels continue to represent a critical energy source for sectors where it is very expensive or not currently technically feasible to electrify. In these cases, meeting our carbon goals means shifting to low-carbon fuels. These are represented by the top section of the bars and must significantly expand from 2024 to 2050 to meet growing demand. Both changes happen over the next 25 years, providing time for different sectors to develop their respective decarbonization trajectories.

Figure 4: Fuel Consumption in Oregon, 2024 Actuals and Modeled 2050



The energy strategy modeling occurred during a time of rapid load growth and significant concern that the pace of growth in electricity demand — from new tech loads in particular — will outstrip the pace of growth in electricity supply and the ability of utilities, independent power producers, and the Bonneville Power Administration to construct new transmission infrastructure and/or electricity generation. However, important advancements have also happened during this period to move toward day-ahead electricity markets, which are expected to share electricity resources across broader regional footprints more efficiently and at lower cost to ratepayers.[vii] At the same time, the sheer pace and volume of resource development needed in Oregon and across the Pacific Northwest significantly exceed what we have experienced over the past few decades. This alone is likely to increase already rising electricity rates.[viii] Policy decisions by the federal government in 2025 have made building new resources more difficult and more expensive. This includes reducing or eliminating investment and production tax credits for renewable resources, as well as hundreds of millions of dollars of support for energy reliability infrastructure in Oregon – and *billions* of dollars throughout the region.

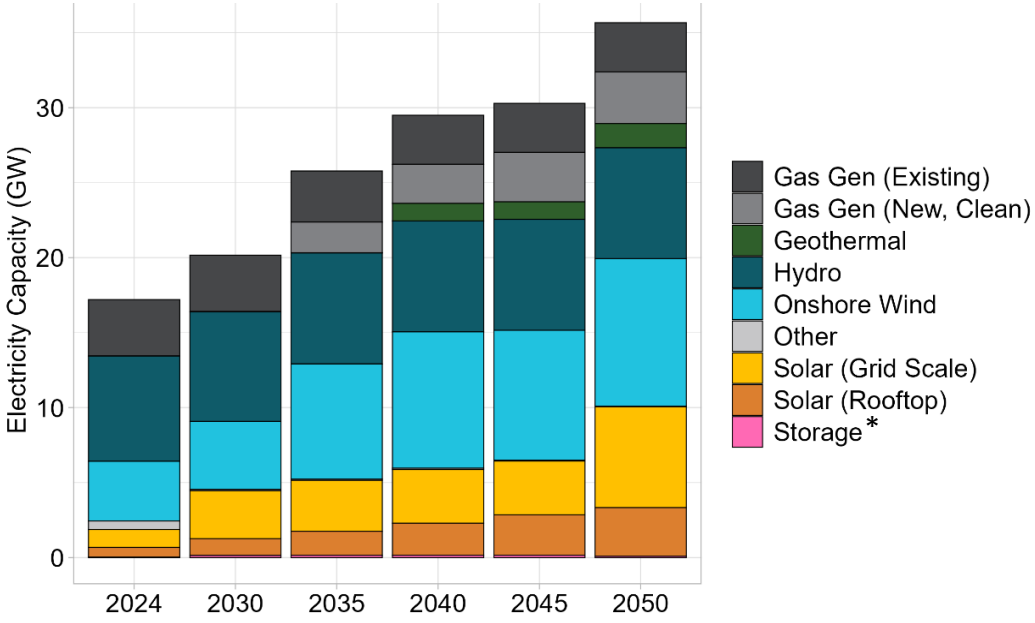
The modeling accounted for significant load growth from tech loads and other economic activity but was completed before these drastic changes in federal policy occurred. The model sought the least-cost resource mix to reliably meet load growth while also meeting the clean energy and climate policy

[vi] CETI-Evolved Technical Approach to Energy Pathways Modeling, Page 37
[vii] California ISO - Extended day-ahead market and Markets+ - Southwest Power Pool
[viii] See, e.g., Northwest Regional Forecast – Pacific Northwest Utilities Conference Committee

objectives of Oregon and many other states. Wind and solar play an important role in the least-cost resource portfolio selected by the model because they are the least-cost resources available. Despite withdrawals of federal support for these resources, they are likely to remain a competitive part of the region's electricity portfolio moving forward.

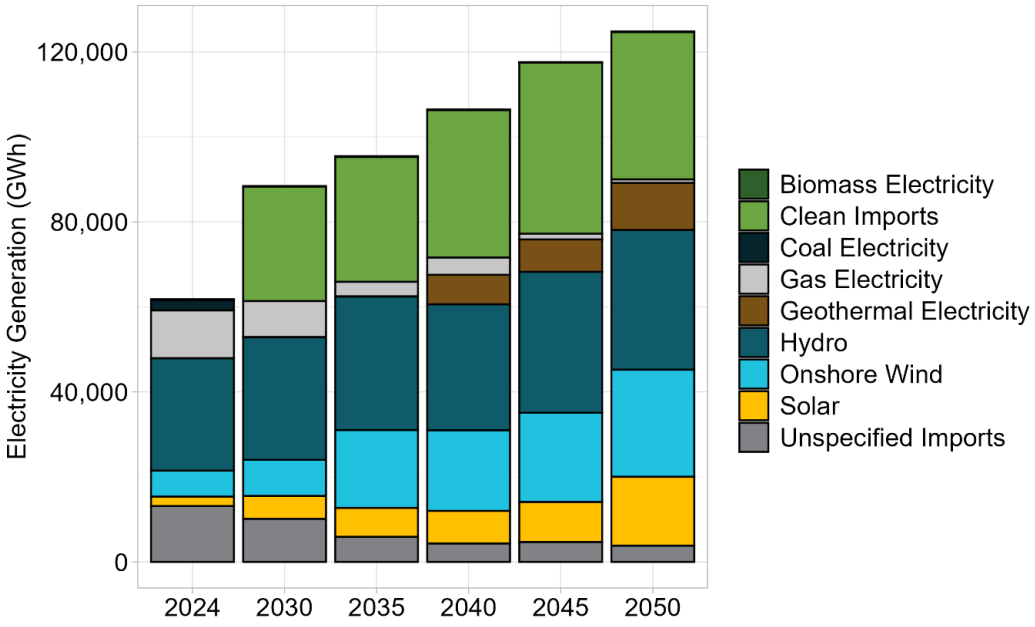
Figures 5 and 6 summarize the results from the modeling under the Reference Scenario for the electricity resource mix from 2024 to 2050. Figure 5 shows the installed resource capacity, while Figure 6 shows the generation expected from this mix of resources. Both are important to keep in mind. Capacity represents how much is built, while generation represents how these resources work together to deliver needed electrons to electricity customers over time.

Figure 5: Installed Electricity Capacity in Oregon by Resource, 2024 – 2050



**Represents less than 1 GW*

Figure 6: Electricity Generation in Oregon by Resource, 2024 – 2050



As the chart shows, the electricity system will rely on existing resources and will need to construct new resources to meet growing electricity demand. Hydropower remains a foundation of the electricity system, and natural gas continues to play an essential role. In the Reference Scenario, the installed capacity of existing natural gas plants largely remains through 2050. This dynamic is visible in Figure 5 by the bars representing an increase in existing and new gas capacity, while in Figure 6, these same resources increasingly serve as a strategic resource for a diverse, low-carbon portfolio and run less frequently, providing fewer gigawatt hours.[ix]

The main growth in electricity supply in the near-term comes from onshore wind and solar PV (both distributed and utility scale). The model allowed emerging technologies to come online in 2035 or 2040, depending on the specific technology, to give them time to mature to market. The most cost-effective emerging resource in the model was enhanced geothermal electricity, but it was delayed an additional five years to account for uncertain timelines and therefore could only come online in 2040 or later. The portfolio after 2035 also introduced small, new, clean gas plants for reliability purposes, running entirely on hydrogen or biogas. Because enhanced geothermal and other emerging technologies like offshore wind, wave energy, and small modular nuclear reactors are still under development, these modeling results are less certain. It will be important to closely track them to ensure that Oregon is poised to leverage the most competitive technologies to help meet its growing electricity needs over time.

Finally, imports play a significant role in meeting load. In the model, as in current operations, Oregon imports and exports electricity. As part of an integrated, regional electricity system, ratepayers benefit from a mix of in-state and out-of-state generation, spreading costs and resource availability across a broader footprint.

Alternative Scenarios

The Reference Scenario provided insights into the mix of least-cost resources needed to meet energy demand over time with a strong focus on energy efficiency and electrification, while each alternative scenario and sensitivity changed a key aspect of the Reference Scenario and held everything else constant.[x] This helped to isolate the impact of the change and draw out lessons learned.

Changes to scenarios and sensitivities[xi] included things like exploring lower levels of energy efficiency and/or slower rates of electrification to test the hypothesis that, based on evaluation of other studies,

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[ix] Carbon capture and storage for emissions from energy producing technologies was included in the modeling as a viable energy decarbonization strategy. It was not selected in the scenarios tested due to its higher projected cost. That said, continued federal support, technological advancements, and global market growth suggest that CCS may become a more cost-effective option for Oregon in the future and remains a potential tool for achieving the state's energy decarbonization goals.

[x] Alternative scenarios were defined earlier in the process, while sensitivities were added to test additional questions that emerged toward the end of the modeling process as scenario results began to emerge.

[xi] There were six alternative scenarios and four sensitivities that we modeled.

The six scenarios are:

1. Delayed Energy Efficiency and Building Electrification (Delayed EE & BE);
2. Delayed Transportation Electrification (Delayed TE);
3. Limited Demand Response (Ltd DR);
4. Limited Utility-Scale Electricity Generation in Oregon (Ltd Gen);
5. High Distributed Energy Resources + Limited Transmission (High DER + Ltd Tx); and
6. Alternative Flexible Resources (Alt Flex Res).

The four sensitivities are:

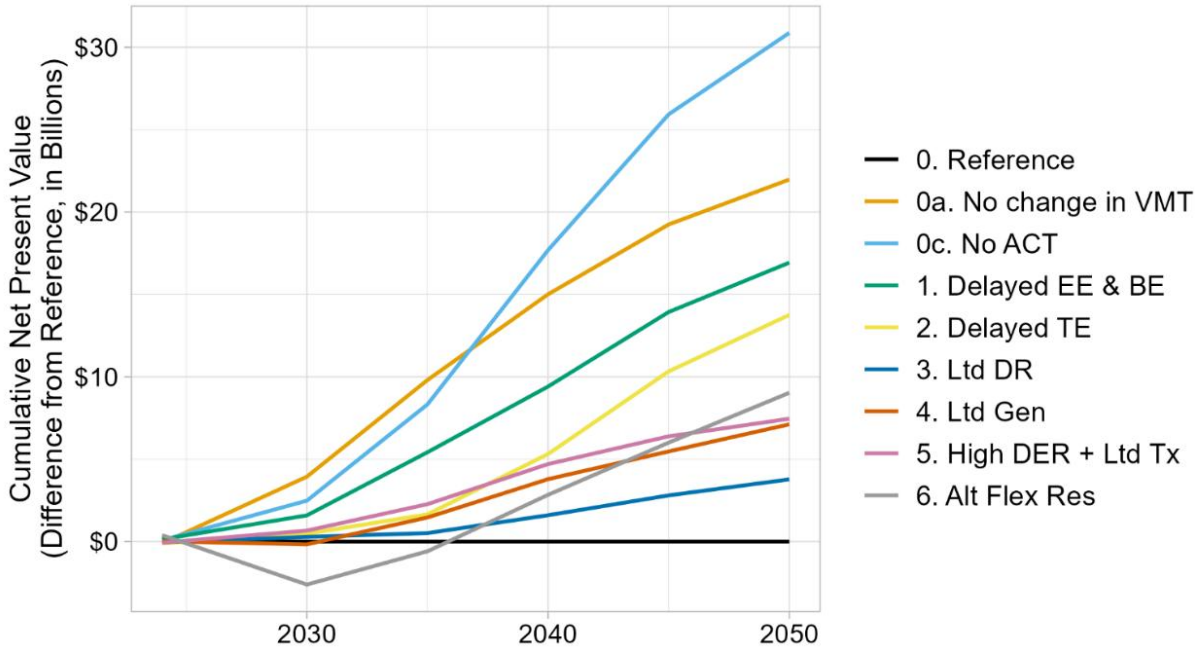
0a. No Change in VMT in Reference Scenario;

0b. 50% Lower Tech Load Growth in Reference Scenario;

high levels of these in the near term would be key elements for ensuring Oregon's energy transition is on the least-cost pathway. This hypothesis was correct. This exercise also resulted in a deeper understanding of interactions across the transportation, buildings, industrial, and electricity sectors in Oregon. It also provided valuable insights into the direction the state must take to achieve its energy policy objectives.

A key takeaway from the scenario analysis was that the alternative scenarios and sensitivities (with the exception of the lower tech load sensitivity) *increased* the economywide cost of meeting our energy policy objectives. Figure 7 summarizes these results.

Figure 7: Cost of Alternative Scenarios Compared to the Reference



Scenarios 1-3 demonstrate the cost of delaying action on energy efficiency and building electrification (Delayed EE & BE), transportation electrification (Delayed TE), and demand response (Ltd DR). Scenario 4 demonstrates the cost of relying less on in-state generation and more on imported renewable resources (Ltd Gen), compared to the Reference, which sought the least cost combination of in-state generation and imports. Scenario 5 shows the increased cost of relying on distributed resources in a transmission-constrained situation (High DER+Ltd Tx). Scenario 6 shows the increased cost if the power system cannot rely on a combination of fossil and low-carbon gas for reliability, though notably this scenario's increased costs are due in part to significant economic development occurring in the state to produce more low-carbon fuels (Alt Flex Res).

Two sensitivities led to the highest cost increases modeled. The most expensive explores the cost of not having an Advanced Clean Trucks rule (No ACT), thereby eliminating near-term electrification targets for medium- and heavy-duty vehicles. The second assumes that there is no change in per capita light-duty vehicle miles traveled by 2050 compared to today (No change in VMT). Both result in a much higher cost of economy-wide decarbonization. However, it is important to note that the modeling does not account for any investment that may be required to achieve the level of VMT reduction assumed in the Reference

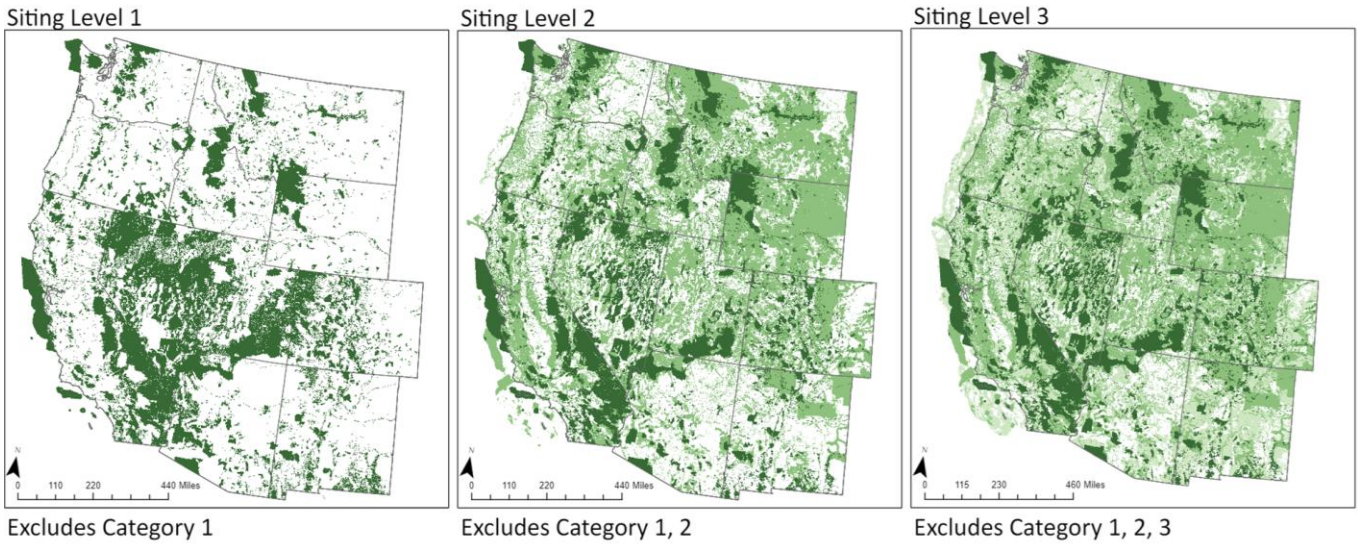
0c. No Advanced Clean Trucks Regulation in Delayed Transportation Electrification Alternative Scenario; and
5a. No Change in VMT in High Distributed Energy Resources + Limited Transmission Scenario.
The results of the energy pathways analysis are available online.

Scenario. Some level of investment would be necessary, including capital for infrastructure that makes alternative modes of transportation more convenient and desirable. Therefore, these results are best interpreted as providing an investment value for VMT reduction measures, rather than cost savings resulting from them.

Not pictured here is a sensitivity where only half of the tech loads from the Reference are built. The difference in costs for this scenario was not calculated, as the focus of this exercise was to understand the costs of supplying the energy needed to power the economy without limiting economic development.

All scenarios, including the Reference Scenario, applied a conservative approach in determining where new electricity generating resources could be sited. The analysis applied siting levels developed by The Nature Conservancy in the Power of Place West study,[xii] which were determined to be consistent with data in Oregon's Energy Siting Assessment tool (ORESA).[xiii] Siting Levels 1, 2, and 3 lands were excluded from development across Oregon. This includes legally protected, administratively protected, and high conservation value land, including Tribal lands, prime farmland, and big game priority habitat and corridors among other criteria.

Figure 8: Siting Levels Developed by The Nature Conservancy in the Power of Place West Study



Note: shaded areas on the maps represent areas where the analysis does not allow for development to occur.

One of the key questions public partners asked was how much land area might be needed to develop resources to supply reliable, affordable, clean power. While the modeling does not provide a definitive answer, it did provide a sense of scale and the factors affecting how much land area might be needed.

Before considering land area numbers, it is important to understand that significant variation may occur over the next 25 years. The amount of grid-scale solar deployed in Oregon in 2050 would be 6.73 GW in the Reference Scenario but ranges from a low of 3.95 GW in the Limited Generation scenario to a high of 13.04 GW in the Alt Flex Resources scenario. The amount of onshore wind deployed in Oregon in 2050 is somewhat less variable, ranging from a low of 6.8 GW in the Limited Generation scenario, to 9.83 GW in

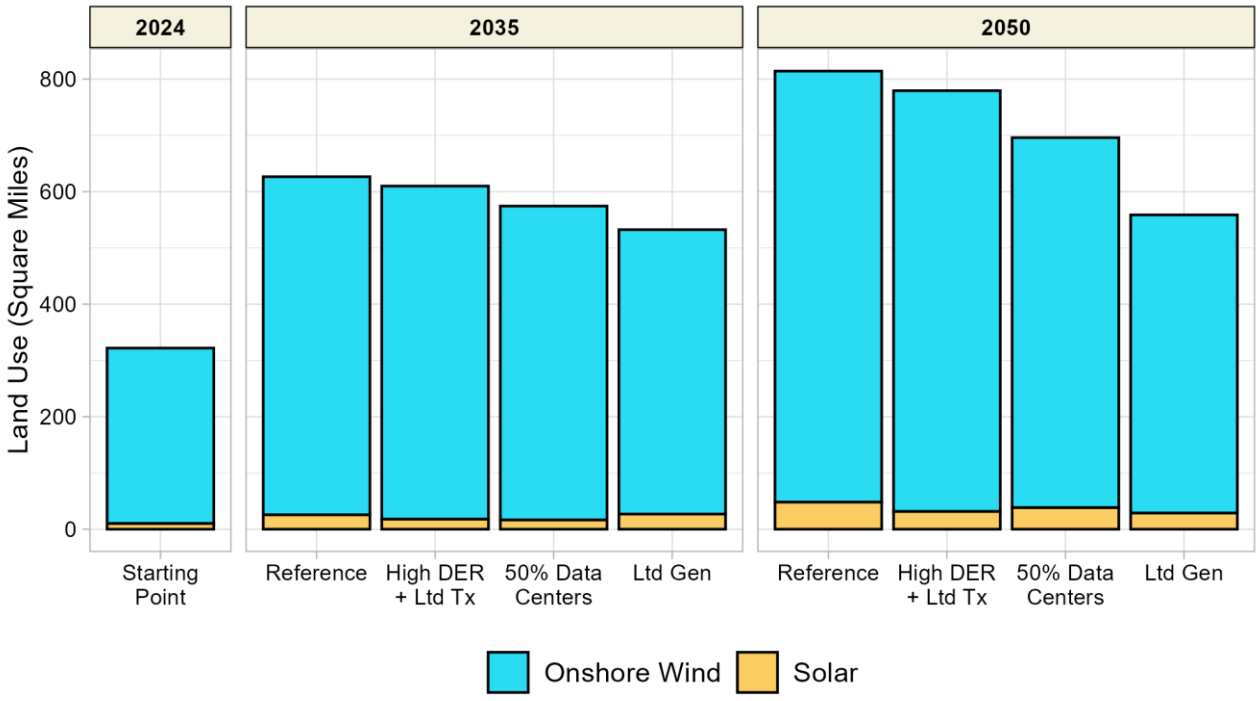
[xii] Nature Conservancy, Power of Place West, Technical Briefing
[xiii] State of Oregon: Energy in Oregon - Oregon Renewable Energy Siting Assessment (ORESA)

the Reference, to a high of 10.87 GW in the Alt Flex Resources scenario.[xiv] More or less wind and solar may be deployed in Oregon, depending on electricity demand, transmission availability or constraints, technological advancements, and other factors.

Wind and solar resources have the largest land footprint of resources evaluated and were therefore selected to provide a sense of the scale that might be expected. In 2024, the total land area used for wind and solar capacity was 322 square miles, equivalent to 0.3 percent of Oregon's land area. In the Reference case, by 2035, this increases to 627 square miles, and by 2050, to 814 square miles. This is equivalent to less than 1 percent (0.8 percent) of Oregon's land area by 2050. The footprint of onshore wind accounts for most of this area. While the base of wind turbines has a small footprint, dedicated land area is bigger to account for the size of turbines and the need for space between them — but this land can still be used for other purposes. Solar, on the other hand, has a much smaller footprint per MW installed than wind, but more complete ground coverage and more limited land use once installed.

Figure 9 illustrates the land area used for wind and solar power in the Reference Scenario in 2024, 2035, and 2050. In 2024, wind accounted for about 97 percent of the land area hosting wind and solar development, and solar accounted for about 3 percent. Most of the solar development occurs east of the Cascades. Over time, wind continues to account for more than 90 percent of the land area for renewable energy development. While this is not a forecast, it reflects what the model found to be the level of cost-effective development of wind and solar in Oregon balanced with other resources in areas not excluded from the Power of Place categories. It provides a sense of scale and opens the door to conversations on how to align the need for renewable energy development with competing – and in certain cases, complementary – land uses.[xv]

Figure 9: Land Area for Wind and Solar, Reference and Scenarios with Less In-State Buildout by 2050



[xiv] The 2050 numbers are not incremental as they include the 1.19 GW of grid-scale solar and 3.98 GW of onshore wind operating in 2024 (reflecting that these resources may be rebuilt in the same location, or repowered, as solar panels or wind turbines wear out).

[xv] One example of complementary land uses are agrivoltaics. Oregon researchers propose innovative path forward for farming's water woes - OPB

Most of the other scenarios and sensitivities resulted in a similar level of buildout of wind and solar resources in the model. More economic development, such as in Scenario 6 (Alt Flex Res), may increase the level of buildout. A few scenarios led to lower volumes of wind and solar development:

- Limiting in-state generation (Ltd Gen) reduces land area needed for development by 15 percent in 2035 and 31 percent by 2050, though at a higher cost to ratepayers compared to the Reference and with reduced employment benefits in Oregon. Notably, this scenario requires more transmission to be built to make up from the lost generation through higher imports. Land area for transmission was not calculated for this modeling analysis.
- Building fewer data centers (50% Data Centers) reduces land area needed for solar and wind development by 8 percent in 2035 and 15 percent in 2050 compared to the Reference. This scenario also significantly reduces the model's selection of enhanced geothermal in 2040.
- Relying more on distributed PV and limiting transmission to reconductoring (High DER + Ltd Tx) reduces some utility-scale investment, including land area needed for solar and wind development by 3 percent in 2035 and 4 percent in 2050 compared to the Reference. The main reductions are in utility-scale solar east of the Cascades and utility-scale wind west of the Cascades.

More details on the takeaways from each of the alternative scenarios are available in the detailed technical report and data library from the modeling, as well as in the key findings documents prepared for the policy working groups.

Complementary Analysis

The takeaways from the modeling establish important directional insights. As ODOE engaged with the Advisory and Policy Working Groups, the process turned from the "what" (what is needed to meet our energy policy objectives?) to the "how" (how do we act to meet our goals?).

To inform this discussion, ODOE worked with our consultants to develop additional, complementary analyses to more deeply inform policy discussions. The Energy Pathways modeling looked at effects on Oregon's economy as a whole but could not specify how different employment sectors, businesses, or households may be individually affected. The complementary analyses aimed to fill some of these gaps.

The Environmental Justice and Equity Working Group continued to meet between Phases 1 and 2 to inform the first three analyses listed below. They provided insights into the needs of environmental justice communities and perspectives on how to frame the analysis to inform future policies. The analyses were then shared more broadly for public input. These analyses included:

- A household energy wallet analysis.
- Air quality modeling and associated public health impacts analysis.
- Geospatial mapping.
- A study of employment effects.

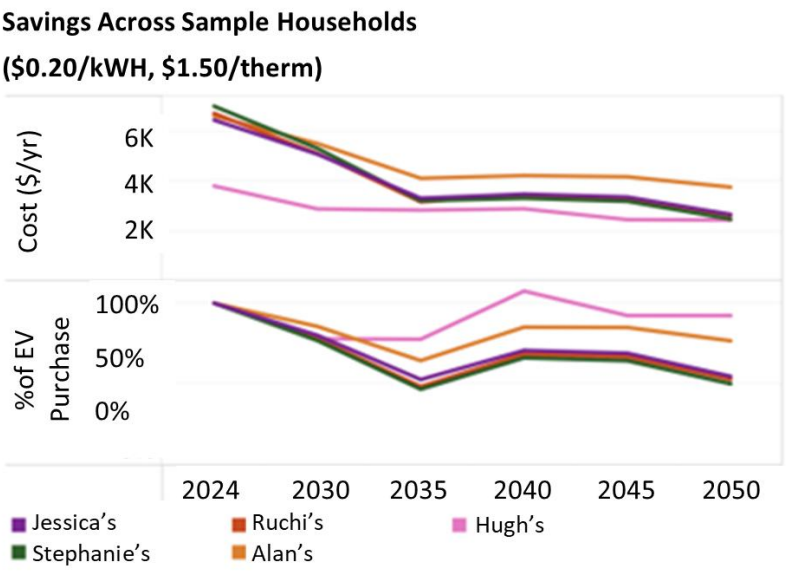
The household energy wallet[xvi] analysis served to better illuminate the benefits and challenges to five different sample Oregon households of adopting electric vehicles and efficient electric heat pumps when their old car or heater needs replacing. Parameters for five sample households were developed through engagement with the Environmental Justice and Equity working group, and with broader public input.

[xvi] View the Household Energy Wallet in the Complementary Analysis Technical Report.

The analysis considered adoption of these new technologies across different housing types and climates, and under a range of electricity and gas prices.

The analysis concluded that for the five sample households evaluated, electric vehicle and heat pump adoption generated significant reductions in energy use. However, while most households also saw financial savings, this was not the case for everyone. Electric vehicles delivered financial savings for most households, while heat pumps delivered bill savings in fewer circumstances. Several factors affected access and affordability to efficient electric cars and heating in the analysis. These include the upfront cost of new technologies, electricity and natural gas prices, and access to at-home charging. The type of building stock (single versus multifamily) also mattered. For gas heated homes, the switch to an efficient electric heat pump was often more expensive when different electricity and gas prices were modeled, though the need for air conditioning and lower electricity prices were found to improve its cost-effectiveness.[xvii] Through the engagement process, ODOE heard that barriers such as affordability, living in rental housing, and access to clean technologies were particularly likely to affect Tribes and low-income, rural, and coastal communities.

Figure 10: Energy Wallet Costs for Households Replacing Their 2 Vehicles with EVs in 2030 and 2035



Note: Customers are assumed not to receive an IRA credit. Assumes customers make no heat pump purchase.

The Policy Working Groups provided further detail and context to inform policy recommendations around adoption of efficient electric technologies.

To assess air quality, ODOE calculated changes in criteria air pollutants by modeling changes in energy demand and resource supply. This data was entered into the U.S. Environmental Protection Agency's Co-Benefits Risk Assessment, or COBRA model, to evaluate how changes in emissions of harmful air pollutants affect public health and health costs. In particular, reductions in air pollution can help prevent health conditions like respiratory and cardiovascular diseases and benefit some of the most vulnerable populations, including communities of color, pregnant women, older adults, children, and people who work outdoors.[15] [16] The analysis found significant health benefits associated with achieving Oregon's GHG reduction emission and clean energy targets. The benefits were relatively similar across scenarios from the energy sector modeling and translated into cumulative benefits between $6.3 billion to $14.1 billion by 2050 from reduced mortality, fewer hospital admissions, and fewer missed workdays.

ODOE also worked with our consultants to develop a series of maps representing important economic, environmental, and social considerations to help support an equitable clean energy transition.[xviii] These

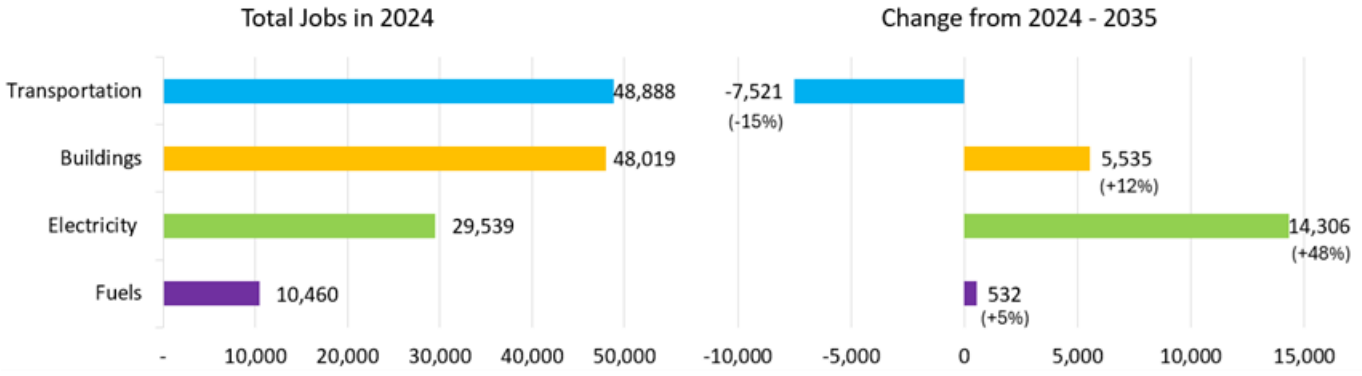
[xvii] The energy wallet analysis considered electricity rates of $0.10/kWh, $0.15/kWh, $0.20/kWh, and $0.40/kWh and gas rates of $1/therm, $1.25/therm, and $1.50/therm. Both rates also included a $10 monthly charge. More details can be found on page 31 of the Complementary Analysis Technical Report.

[xviii] View the Geospatial Mapping in the Complementary Analysis Technical Report.

maps can be used to assess the potential effects of energy policy options on different communities and help inform more equitable policy development.

The jobs analysis was built off of the economywide energy strategy modeling, and identified the scale of job growth minus job losses (resulting in net jobs) that might be expected across the seven scenarios modeled. The jobs analysis suggests that Oregon stands to realize significant net gains in jobs by achieving its energy policy objectives. There was significant net total job growth across all scenarios, with net job gains in the electricity, buildings, and fuels sectors, consistently outpacing net job losses in the transportation sector.

Figure 11: Energy Employment by Sector in Oregon 2024 - 2035, Reference Scenario



The Reference Scenario resulted in a total of roughly 12,900 more aggregate jobs across the four energy sectors in 2035 compared to 2024. Employment gains are most pronounced in the electricity sector while employment losses are most pronounced in the transportation sector. Looking across scenarios, the jobs analysis suggests a range of approximately 10,700 to 18,200 jobs could be gained in the electricity sector through 2035, and a range of approximately 6,700 and 7,500 jobs could be displaced from the transportation sector by 2035. With respect to the transportation sector, while employment in charging stations, vehicle manufacturing, and wholesale trade parts subsectors are expected to grow, these gains are expected to be outstripped by job losses in the fueling stations and vehicle maintenance subsectors. In considering these effects, the idea of co-locating fast charging stations at existing gas stations – which often offer food services, cashiering, and maintenance and site management – could be explored as a possible strategy to mitigate job losses in the fueling station subsector.

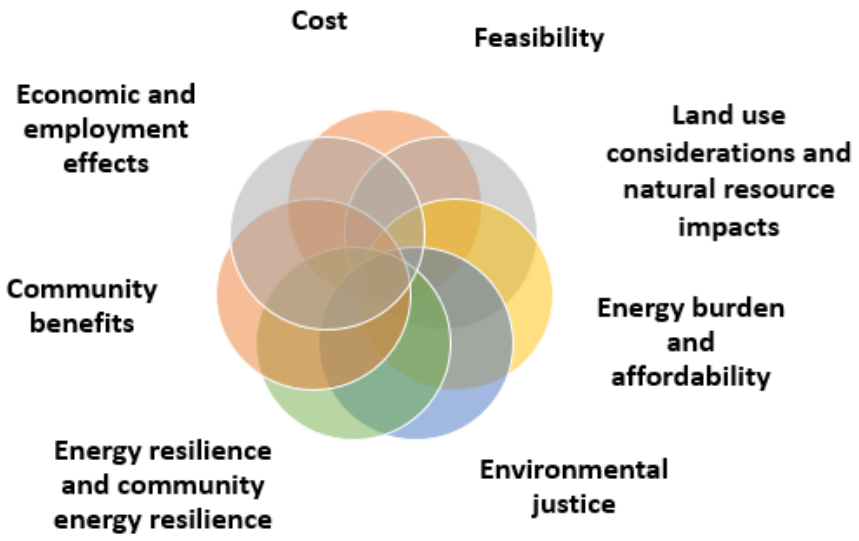
The technical analysis estimates similar levels of net job growth in Eastern and Western Oregon by 2035: roughly 6,500 jobs east of the Cascades and roughly 6,400 jobs to the west. This amounts to a 33 percent increase in energy sector jobs compared to 2024 in Eastern Oregon and a 5 percent increase in jobs in Western Oregon. This reflects the different starting points of the two areas, with Western Oregon having roughly 10 times more energy sector jobs in 2024 than Eastern Oregon. This means that relative to western Oregon, eastern Oregon is expected to see markedly larger job growth as a percentage of its 2024 baseline employment in the fuels and electricity sectors, highlighting a potential need for location-based workforce development strategies to help rural communities take full advantage of these employment opportunities.

Additional occupation-level analysis was conducted for the Reference Scenario. This modeling suggests that electricians, construction laborers, and HVAC and refrigeration mechanics and installers are the occupations likely to see the greatest numbers of new employees by 2035. This additional analysis also estimated job growth across three wage tiers, namely: Below a Living Wage (less than $33/hour), At a

Living Wage ($33-$48/hour) and Above a Living Wage (more than $48/hour). Jobs are estimated to grow across all wage tiers with the distribution of energy sector jobs across wage tiers remaining essentially unchanged in 2035.[xix]

Throughout the engagement process and during the development of recommendations, ODOE focused on quantitative and qualitative data. The modeling provided information on pathways to meet the state's clean energy objectives reliably and at least cost economy wide. Further technical analysis provided insights into effects on household affordability, air quality, and employment. However, there are broader considerations that go beyond the ability of these analytical tools that address the many interactions between energy-related actions and broader areas of public interest. HB 3630 directed ODOE to evaluate these other areas in identifying pathways to achieving Oregon's energy policy objectives. Figure 12 illustrates additional key considerations in applying the pathways from the modeling to define specific pathways, policies, and actions.

Figure 12: Key Considerations in Determining Benefits and Risks of Actions



In evaluating the complex interactions between the energy sector and these considerations, it is critical to identify approaches that maximize benefits while minimizing risk. Processes must also be equitable and follow the four pillars of energy justice described in the Equity and Environmental Justice Framework section to reduce disparities and bring along communities who have been left behind. Investing in the energy transition requires a recognition of areas where trade-offs exist and to navigate choices with as much information and transparency as possible. For example, tensions frequently exist between development of needed energy infrastructure and protection of natural and working lands, waters, and ecosystems. The energy transition is an economic transition and will create shifts in job and career opportunities and losses. In developing pathways, policies, and actions, ODOE has worked to recognize these tensions and to seek solutions that maximize positive effects while minimizing and mitigating negative impacts.

[xix] View Jobs Analysis Presentation. ODOE will publish jobs analysis technical reports to accompany the final energy strategy.

Cost of Inaction

Over the Oregon Department of Energy's 50 years of public service, the agency has been evolving and changing alongside the energy system. Even from ODOE's beginnings, Oregon has been in the midst of an energy transition – from the 1970s oil crises to the challenges we face today as we've developed the Oregon Energy Strategy. Energy costs have been rising for many consumers, increasing energy burdens and contributing to record disconnection rates. Even expanded consumer protections and programs have struggled to keep pace with growing need. Historic levels of growth in electricity demand threaten to outpace construction of resources to meet that demand. And changes in federal policy have led to cuts in critical areas, including support for energy resource development, energy efficiency, and low-income assistance programs – all of which threaten to further raise costs for Oregonians. This makes Oregon's goals of reliable, affordable, clean energy more important than ever. It also emphasizes how vital the direction set by Oregon policies – and bolstered by the energy strategy – is for affordability and economic growth in our state.

There are many drivers of rising energy costs today. In recent years, higher wholesale power costs, wildfire risk reduction and insurance costs, maintenance and upgrades to aging infrastructure compounded by inflation, and responses to severe weather events have been primary contributors.[61] Global events, like the COVID-19 pandemic, Russia's war against Ukraine, periods of high inflation, and political unrest have caused large fluctuations in fuel prices that affect transportation, heating, and electricity costs.[62] Oregon's decarbonization policies and goals have not been the primary driver of recent price increases, though over time they will require significant investment.[63]

The energy strategy looks at expected trends, and at the elements of a least-cost pathway to meeting Oregon's energy policy objectives. There is a strong focus on the electricity sector, which in the energy strategy Reference Scenario doubles in size by 2050. The biggest driver behind this growth is tech loads, particularly over the next five years, followed by vehicle electrification and other economic growth. Over time, increasing use of electric vehicles, heat pumps, and other electric technologies will contribute to load growth as many end-uses electrify. These various demand drivers are coming at a time when the state's largest investor-owned utilities and electricity service suppliers will need to eliminate coal and decarbonize other sources of fossil fuel emissions from the electricity they sell, while meeting demand with non-emitting resources to comply with House Bill 2021.

The scale of expected demand growth in the electricity sector is historic, but it is not the only sector where investments are expected to occur. Many of the measures identified in the energy strategy, including those related to energy efficiency and electrification, would require investment — investments that were going to happen anyway. Cars, furnaces, and boilers will eventually need to be replaced. The energy strategy modeling did not assume accelerated replacement of these items. Rather, it helped identify low-carbon replacement options that generated the least overall energy system costs across the economy, and complied with Oregon policies like the Climate Protection Program and Advanced Clean Cars II.

Across the energy sector, the question posed in the energy strategy – and the choice facing Oregon – is not *whether* to invest in our energy system, but *how* to direct and resource that investment to maximize benefits to Oregonians, minimize harms, avoid disproportionate impacts to environmental justice and energy burdened communities, and advance key priorities like energy affordability, public health, and

economic development. This was a key question asked in the technical and modeling analysis, and discussed in working groups to identify policy gaps and solutions.

A key backdrop to this discussion is the growing cost of climate change in Oregon. Even as energy costs are rising, climate change is driving additional costs for Oregon households, businesses, industries, and government. Responding to, recovering from, and adapting to extreme heat waves, widespread drought conditions, severe wildfires, flooding, coastal erosion, and other extreme weather events driven by climate change are increasingly hitting Oregonians' bottom lines. Climate driven events like the 2018 wildfire season, 2020 Labor Day fires, and the 2021 Pacific Northwest heatwave cost Oregonians hundreds of lives and billions of dollars.[64] [65] In the coming decades, it is estimated that the average Oregonian could lose about $12,000 in income each year from the effects of greenhouse gas emissions.[66]

Climate change is also affecting the power sector. Changing precipitation patterns and drought are affecting the timing and availability of hydropower electricity, which provides some of the most affordable energy for Oregonians. These factors, along with rising temperatures, are also exacerbating stress on fish, further increasing costs to mitigate those effects. Wildfires are threatening homes and businesses. Wildfire risk is also a growing source of utility costs due to infrastructure and maintenance investments necessary to mitigate the risk of igniting wildfires, rising insurance costs, infrastructure rebuilding after damaging fires, and growing liability risk. The increasing frequency and duration of extreme summer and winter weather is further straining energy systems, creating extreme prices during peak events. Hotter summers are driving higher air conditioning demand in summer, and analysts project the confluence of severe winter weather and lower hydropower availability in drought years could create capacity shortfalls in the near future.[67]

Photo: ODOT

Unless global emissions decline considerably, these impacts will happen at a faster pace and intensify over time, committing Oregonians and the rest of the world to increasingly higher costs from climate inaction. Costs will continue to accrue the longer it takes to reduce emissions. While Oregon cannot reduce global emissions alone, it is in a position to lead as a state, and as part of a region driving solutions that reduce emissions and provide economic opportunities associated with the energy transition. Oregon's energy production and use account for over 80 percent of the state's greenhouse gas emissions, making it one of the focal points for mitigating climate change and meeting statewide greenhouse gas reduction goals.

Many of the measures identified in the energy strategy can deliver benefits on top of mitigating climate change. Energy efficiency can shrink the overall size of the "energy pie," reducing investments that would otherwise be needed across the energy system, and alleviating impacts of development on land and water. A complementary analysis conducted for the energy strategy to explore air quality, affordability, and employment effects of meeting Oregon's energy policy objectives provides additional insights. The analysis finds air quality and public health benefits across the state resulting from decarbonization measures, including electrification of cars and trucks and reduced fossil fuel combustion in power plants. The jobs study finds significant opportunities for employment growth across much of the energy sector. The Energy Wallet illustrates the potential cost savings to many households of purchasing an electric vehicle or electric heat pump. Finally, many of the measures that are part of a least-cost pathway, such as weatherization, distributed resources, and heat pumps for cooling can strengthen resilience to the effects of climate change.

The technical analysis and engagement also identified challenges that will need to be considered in implementing the energy strategy. For example, the jobs study found displacement in jobs at fueling stations and in vehicle maintenance. While job growth in other sectors significantly outpaced this displacement, the results signal a need to address potential job losses and create options for displaced workers. The energy wallet found that some households may see increased energy costs when switching to an electric heat pump, indicating that support may be needed to help overcome cost barriers to heat pump technology adoption. Just as policies are needed to drive uptake of clean energy technologies and deliver their benefits, policies will also be important to address costs and to ensure that those costs do not disproportionately affect environmental justice and energy burdened communities.

The costs of climate change and our current energy system are not borne equally. An intentional approach is needed to ensure that historic and current inequities are not perpetuated as we advance along the five pathways, and that low-income and marginalized groups have access to the benefits of the energy transition. In developing the energy strategy, the Oregon Department of Energy convened an environmental justice and equity working group to help understand the challenges facing different communities and to identify policy gaps and opportunities. This engagement informed the technical analysis and policy recommendations. It led to the development of the equity and justice framework, and to specific legislative and policy actions that aim to advance meaningful engagement and equitable and just outcomes.

The pathways, policies, and actions in the energy strategy come at a time when, in the very near term, there are competing priorities for limited funding. State and local governments play an important role in funding and supporting the policies and programs needed to meet our energy challenges intentionally and equitably. This has become significantly harder in the last nine months as the federal government has cut, rescinded, defunded, or dismantled programs that provided critical assistance for many Americans. This includes reductions in energy assistance programs that are lifelines for low-income and rural Oregonians, especially those living in areas of the state that experience colder winters and hotter summers.

At the same time, Oregon has tremendous opportunities. Access to reliable, affordable, and clean energy can promote economic growth across sectors. Through activities such as the buildout of new electricity resources, development of energy efficient technologies, and expanded use of low-carbon fuels, the transition to clean energy offers potential for bringing new business opportunities and jobs to Oregon. For example, Oregon is a leader in research and development, including two projects testing cutting-edge electricity generation technologies: the Mazama Energy Enhanced Geothermal Systems demonstration project and PacWave test facility off Oregon's coast. Oregon also has deep experience with energy efficiency and distributed energy programs, such as those implemented by Energy Trust of Oregon, consumer-owned utilities, and state agencies; they provide a strong foundation to lower bills and increase the competitiveness of Oregon industries.

It is important to prioritize funding to where it can advance the strongest near-term needs, including affordability and reliability, as outlined in the section on Implementing the Energy Strategy. Over time, as more funds become available, it will be important to continue to shape equitable policies and programs to deliver benefits of a clean, affordable, reliable energy system to homes and businesses. The challenge is not whether we need to invest, but how we invest in our future. The energy strategy serves to guide that vision, advancing Oregon's clean energy policies, and providing a foundation for increased cooperation across government agencies, utilities, businesses, non-profit organizations, and Oregonians.

Nine Federally Recognized Tribes: Feedback and Themes

Indigenous Tribes and Bands have been with the lands that we inhabit today throughout Oregon and the Northwest since time immemorial and continue to be a vibrant part of Oregon today: Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians, and The Klamath Tribes.

As the State of Oregon charts its path toward a clean energy transition, it must ensure that the nine federally recognized Tribes in Oregon — sovereign nations with deep ties to the land, water, and natural resources — are purposefully included in planning, policy and investment decisions. To build an energy future that is just, effective, and inclusive, Oregon must shift how it engages with Tribes, how it structures funding, and how it integrates traditional knowledge and long-standing values into its energy work.

State law (ORS 182.164) requires state agencies like ODOE to promote government-to-government relations with Oregon's nine federally recognized Tribes, including processes to identify agency programs that affect tribes and promoting communication and positive relations between state agencies and the tribes. In addition, the state must take into consideration treaties and obligations related to ceded lands and resources.

Through the energy strategy engagement process, ODOE reached out to the nine federally recognized Tribes through formal government-to-government letters, staff-to-staff discussion, individual in-person or virtual meetings with Tribal leaders and staff, and presentations through the Legislative Commission on Indian Services and cluster groups. ODOE heard concerns about how existing energy systems overlook Tribal sovereignty, cultural knowledge, and priorities, as well as support for incentive programs that can help Tribal members shift to clean energy and energy efficient opportunities.

As ODOE continues government-to-government outreach and requests for consultation, where appropriate, ODOE has heard important themes. In this report, ODOE is not including any specific priorities of Tribes or a level of detail that would run counter to our government-to-government process. Rather, staff have synthesized feedback and reflected on what was heard through these conversations so it could be internalized and applied in the development of the Oregon Energy Strategy. As policymakers consider policies and actions to move Oregon forward on the five pathways in the Oregon Energy Strategy, the themes and synthesis below should be considered and incorporated into the design of programs and regulations.

Energy Independence & Sovereignty

For many Tribes, energy sovereignty, the ability to control and determine their own energy infrastructure and priorities, is essential to self-determination and long-term resilience. Oregon should consider establishing a Tribal Energy Block Grant Program that would allow Tribes to assess their risks, identify priority investments, and develop implementation strategies tailored to their communities (See Cross-Cutting Action 3). Legislative and agency-level program design should also include options for

Tribes to directly administer funds for their members, with adequate administrative resources built into budgets (See Buildings Action 6). In addition, support for community-scale energy projects and microgrids would allow Tribes to maintain electricity during grid outages, reducing dependence on large utility infrastructure while increasing local control. Currently, these types of projects are funded by ratepayers and often require utility regulatory reforms and creative funding strategies to ensure that they are cost-effective and do not impose disproportionate costs on other ratepayers. State support could help broaden support for these projects, recognizing that they serve a crucial resilience function. With the passage of HB 2065 and HB 2066 in the 2025 legislative session, there is opportunity through implementation of these new laws to help make microgrids for Tribes more likely.

The Confederated Tribes of the Umatilla Indian Reservation's Ántukš-Tińqapapt, or "sun trap," solar array produces renewable energy for the Tribe.

Photo: U.S. Department of Energy

Affordable Energy Options

Energy affordability also remains a major concern. Rising electricity, propane, natural gas, and gasoline prices are placing increasing financial stress on Tribal households. At the same time, cleaner and more efficient technologies like solar panels, heat pumps, and electric vehicles remain unaffordable for many Tribal members due to high upfront costs – even though they would likely reduce long-term energy bills and improve indoor air quality. Oregon can support more affordable energy options by working with utilities and Tribes to align investments with affordability needs, including through rate design or shared infrastructure projects. Expanding funding for energy efficiency and weatherization programs for Tribal households is also critical (see Buildings Action 1). The State can further support Tribes by coordinating technical assistance and making it less administratively burdensome to access funding for clean energy upgrades.

Access to Decision Making

There is strong concern about lack of meaningful inclusion of Tribes in energy decision making. Tribes are often brought into conversations only after policies or projects have already been developed. This approach disregards the Tribes' sovereign status and misses critical opportunities to incorporate cultural and ecological perspectives early in the planning process. Oregon should continue to develop state-level

processes that require engagement with Tribal representatives at the earliest stages of energy-related work, during idea generation, before decisions are finalized or public comment periods begin. In addition, Tribes should be invited to participate directly in the state's energy-related advisory bodies, commissions, or working groups. To support this participation, Oregon must also invest in financial and administrative support to ensure that Tribes are compensated for their time and expertise. Without this support, participation becomes another burden on already stretched Tribal governments.

Stabilization of Funding Cycles

One of the most persistent challenges facing Tribal energy development is the instability of federal and state funding. Short-term, competitive, one-time-funded grants often require significant administrative time. This cycle creates uncertainty and hinders long-term planning. Oregon should take steps to stabilize funding by setting aside a minimum percentage of funds for Tribes in energy incentive and grant programs, shifting from competitive awards to formula-based allocations when possible, and designing programs with multi-year funding structures. These changes would provide more predictable support and better reflect the long-term nature of energy planning in Tribal communities. The uncertainty of the federal government programs makes partnership with the state even more vital.

Consultation, Cultural, and Natural Resources Values

The protection of cultural and natural resources remains a critical component of energy work with Tribes. Traditional Ecological Knowledge (TEK), sacred landscapes, and culturally significant sites are often left out of state energy planning and infrastructure decisions. Consultation processes are inconsistent across agencies and often do not meet Tribes' expectations or legal requirements. Oregon should build on the work of the Governor's Tribal Consultation Task Force to develop standardized consultation procedures that reflect each Tribe's unique protocols, establishes clear timelines, and protects sensitive information. State agencies should also partner with Tribes in applying for federal and philanthropic funding that supports TEK-informed planning and implementation. Where possible, the state should support projects that allow Tribes to co-develop or co-own energy infrastructure, in ways that both protect cultural resources and build economic opportunity. Existing efforts, such as the Department of Land Conservation and Development's Goal 5 rulemaking, provide an example for balancing resource protection and development and could be expanded.

An Equity and Justice Framework for Decision-making and Program Implementation

As part of the Oregon Energy Strategy, the Equity and Justice Framework was informed by an Environmental Justice and Equity Policy Working Group and is designed to be used in the development and implementation of energy policy by policy makers, agencies, and other implementors. The framework may be used as a resource and tool to follow best practices with recognition that some agencies have or are in the process of developing their own strategies that address their specific needs, statutory requirements, and other regulations. When developing energy policies, lawmakers are in the unique position to ensure meaningful engagement and equitable and just outcomes as they determine how to best serve the needs of environmental justice communities in an equitable energy transition. The framework serves to guide decision-making processes by reducing the disproportionate costs of energy burden, negative health effects from energy-related pollution, negative effects of energy infrastructure development on natural and working lands, and insufficient resilience against extreme weather induced by climate change. At the same time, the framework considers bolstering opportunities and benefits to environmental justice communities as the state adopts new programs, regulatory structures, and business models to move the state toward cleaner energy sources. It can help determine what equity and justice approaches could be used to develop and implement policies that move Oregon toward its energy goals.

The energy strategy's Equity and Justice Framework adopts the **four pillars of energy justice** from the University of Michigan's 2022 Energy Equity Project.

Using targeted universalism, meaningful involvement, and the four pillars of energy justice, the Environmental Justice and Equity Working Group informed a framework for centering equity and justice in Oregon's energy goals. Each approach has potential supporting metrics to understand if progress is made toward equitable outcomes. The four pillars of energy justice:

Procedural: All groups who stand to benefit or are burdened are provided space to participate and their input should be taken seriously throughout the process.

Recognition: No one group should dominate a process. The process addresses demographic, socio-economic, and geographic variables, disproportionate burdens, and lived experiences of environmental justice communities.

Distributive: Understanding of indirect and community benefits (health, jobs, environment, etc.) and intentional distribution of benefits to overburdened communities.

Restorative: Recognizing and reflecting on past harms and injustices caused by the energy system and actively working to prevent future harms and maximizing future benefits.

The Equity and Justice Framework is not a one-size-fits-all approach. Justice and equity meet the needs of communities and people where they are, and use of the framework must adapt to serve these needs.

Often, there is not a simple answer or a linear process to realizing state energy objectives in an equitable manner. Policymakers may need to consider multiple approaches within the framework to accomplish one. For example, there may be a need to build community capacity to engage in decision-making, and the different ways to accomplish this may be tailoring translated resources *and* holding in-person, onsite listening sessions to meet varying community needs.

Implementing the Framework

The Equity and Justice Framework presents six key approaches to embedding equity and justice throughout the energy policy process. Implementing the framework will provide an opportunity to create more just and equitable practices that include access to the decision-making process, access to infrastructure development, investment in long term incentive programs, promotion of holistic workforce development, development of partnerships and resources, and consideration of cultural priorities as well as natural and working lands throughout environmental justice communities.

ODOE and the Environmental Justice and Equity Policy Working Group identified the five steps below to apply when developing and implementing energy policies.

1. Determine the **universal goal** for the issue being addressed and who may benefit, be harmed, or be burdened when taking action.
2. Use the **four pillars** of energy justice to provide direction to achieving just and equitable outcomes in energy policies.
3. Use the approaches in the framework table to develop targeted actions (**targeted universalism**) to meet the universal goal while keeping the **four pillars** in mind.
4. **Identify metrics** that can be collected before, during, and/or after implementation to demonstrate success and understand gaps in the policy implementation.
5. **Review the outcomes** through the lens of the determined universal goal, targeted strategies, and metrics. Complete an analysis to understand if there are gaps and if a new goal or strategy is needed to meet the metrics.

In defining, implementing, and tracking progress on policies, it is important to endeavor to advance the following six approaches to ensure an equitable energy transition that advances energy justice. These approaches should be considered broadly and across many areas of energy policy such as energy efficiency adoption, prioritizing energy burdened households, and environmental justice communities. In addition to ODOE's commitment to meaningful engagement with environmental justice communities through HB 4077, we further commit to incorporating the framework into our work as an agency to reduce barriers and increase equitable and just outcomes in our programs and workstreams.

Potential metrics are meant to create a starting point for conversation and should be made more specific depending on the particular policy and implementation. These potential metrics are only some ideas and not a finite list. Additionally, while the majority of these metrics are written as quantitative approaches, it is recommended to include qualitative methodologies for a complete picture of benefits, burdens, barriers, and outcomes.

The Framework

APPROACHES	POTENTIAL METRICS
1. Provide Equitable Access to Decision-Making Processes • All policies or programs to develop energy infrastructure and allocate funding for energy measures are designed to ensure environmental justice and energy burdened communities have equitable access to meaningful involvement in decision-making processes and bodies. This includes using accessible language, language translations, and encouraging participation from non-technical experts and experts with community-based knowledge to include those with lived and professional experience. • Intentionally reduce barriers to the participation of environmental justice groups and community members in decision-making processes and bodies, including evaluating the feasibility of providing direct financial support and indirect support for participation and incorporating the cost into agency program planning.	• Percentage of participants with economic, health, pollution burden or other energy-burden factors such as climate vulnerability score. • Percentage of budget dedicated to supporting meaningful involvement. • Percentage of community-based organizations that participate in the process by providing feedback and/or supporting grassroot community member outreach • Percentage of feedback provided by environmental justice participants incorporated into policies and proposals. • Post-process survey on accessibility and transparency.
2. Ensure Equitable Access to Infrastructure Development Processes Design policies and programs to deliver equitable access to clean technologies and measures for environmental justice and energy burdened communities, recognizing that they often deliver multiple benefits including clean energy, resilience, health, affordability, and other benefits. • Examples include weatherization, electric vehicles and vehicle charging infrastructure, energy efficient electric heat pumps, and distributed energy resources.	• Reduced frequency and duration of power outages in environmental justice and medically vulnerable communities. • Increased weatherization and other conservation investment in environmental justice communities. • Number of heat pumps, distributed energy resources, and other clean energy technologies deployed to the benefit of environmental justice communities. • Number of public electric vehicle charging stations in under-resourced communities compared to per capita average across comparable communities/households. • Number of charging stations in low to moderate income multifamily housing compared to per capita average across nearby communities. • Proportion of technologies and measures installed in low- and moderate-income households as a percentage of total.

3. Invest In Long Term Incentive Programs for Environmental Justice Communities • Develop statewide prioritization criteria for energy funding and assistance to reduce barriers for people with the greatest assistance need. • Provide increased and stable funding and assistance for those in low-income and energy- and transportation-burdened households, commensurate with increases in energy costs. • Identify opportunities to reduce monthly bills, even where costs are rising, through deeper weatherization and energy efficiency measures. • Establish revolving loans with beneficial features such as zero- and low-interest rates the possibility for forbearance, and longer repayment terms to minimize monthly loan payments for low- and medium-income households.	• Number of energy funding/assistance programs created specifically for or serving majority energy- and transportation-burdened households within environmental justice communities. • Amount of funding allocated to serve majority energy- and transportation-burdened households in state. • Percentage of program participants who are part of an environmental justice community. • Percentage of program participants served versus eligible populations. • Reductions in negative environmental-related health conditions (such as asthma, respiratory disease, etc…) in environmental justice communities.

4. Promote Holistic Workforce Development in Environmental Justice Communities
• Develop and expand funding pathways for new and existing trainings, apprenticeships, and continuing education programs for sales, contractors, tradespeople, and landlords in relevant incentive programs to include:
  • Cultural responsiveness
  • New technologies
  • Overall benefits in underserved communities
• Promote the creation and retention of meaningful, living wage jobs.
	• Number of energy-related college, vocational, and apprenticeship programs offering energy-related training opportunities and incentives to environmental justice communities.
	• Percentage of individuals enrolled, retained, and graduating who identify as environmental justice community members.
	• Percent of environmental justice community-owned business in a specified energy-related industry dependent on the program or policy.
	• Percent of policies supporting hiring, training, and retention of people from environmental justice communities.
	• Percentage of employees who live in the community where the work is taking place.
	• Percentage of program expenditures going to environmental justice community-owned businesses.

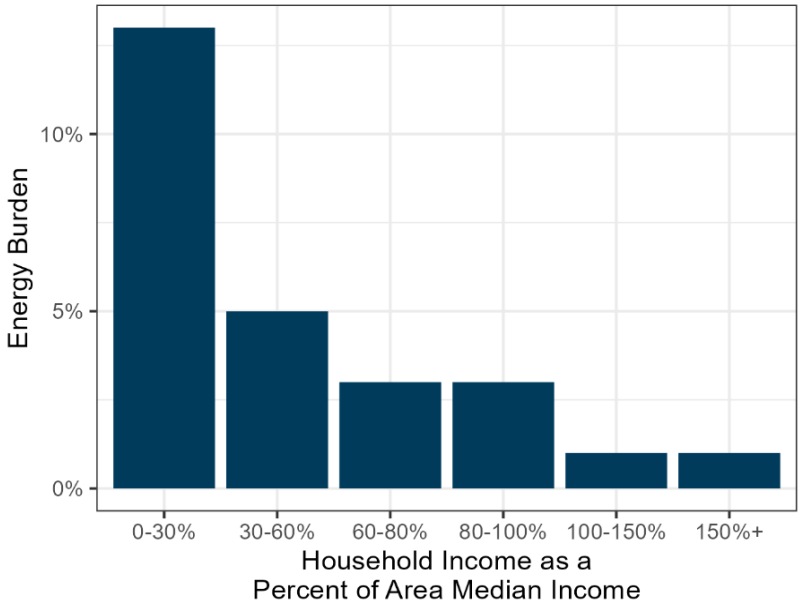
5. Develop Partnerships and Resources in Environmental Justice Communities • Provide community outreach and informational opportunities that include in-person engagement, and resources/tools that use plain/accessible language and are in multiple languages. • Partner with community organizations who are trained and compensated appropriately, with long-term funding, to be trusted partners who can design community outreach materials and act as community navigators in the field. • Consider opportunities to collaborate with city and county governments and utilities to best support communities and customers.	• Number of people participating in processes and/or programs from environmental justice communities. • Number of materials developed (e.g. fact sheets, two-pagers, and informational fliers) that are culturally specific (e.g. plain language, translated, regionally specific) and relevant and percentage of program materials available in multiple languages. • Number of partner environmental justice organizations/trusted community organizations participating in or distributing program materials. • Percentage of meetings hosted with interpretation and translation services.
6. Consider The Effects of Energy Policies on Natural and Working Lands, Cultural Resources, and the Broader Environment • Balance energy needs — like access to affordable energy and economic opportunity — with the needs of ecosystems and cultural priorities. • Make decisions that minimize harm to both communities and nature, including wildlife and natural resources, and ensure that environmental burdens and benefits are distributed equitably, without disproportionately impacting marginalized groups.	• Increased salmon/wild fish populations/increased populations of endangered or culturally significant wildlife. • Improved outdoor air quality particularly in areas with disproportionately poor air quality. • Improved indoor air quality particularly in areas with disproportionately poor air quality. • Increased investment for wildfire risk management. • Reduction in heat island effects in urban areas – measured by relative temperatures in green spaces vs adjacent city spaces and reductions in average cooling load for local buildings. • Number of projects with community benefit plans or agreements.

Oregon Context

To create equitable strategies for accomplishing our state's climate and energy goals, it is important to recognize there are disparities in how Oregonians experience benefits from or are burdened by our energy system. For example, Oregonians who are energy burdened spend a greater proportion of their annual household income on home energy costs; a household is considered energy burdened if it spends more than 6 percent of its income on energy. Figure 13 demonstrates this energy burden in Oregon. Oregon is already experiencing the effects of climate change in the increased frequency of extreme weather and natural disasters, such as the 2021 heat dome which caused an estimated 116 deaths (of which the majority were older than 60, living alone and without access to air conditioning in their homes).[17] The record 2020 wildfire season burned 1.49 million acres; the Labor Day mega fires alone burned over 850,000 acres, resulted in 11 deaths, and destroyed or damaged 4,000 homes.[18] These wildfires devastated Talent and Phoenix, in particular destroying more than 1,700 mobile or manufacture homes, and the financial security of many community members, many of whom still do not have permanent replacement housing five years later.[19] Climate change related emergencies have a direct effect on the health of the communities, and their resilience and recovery from these events is dependent on the community's access to resources like local health care and emergency preparedness. Increased incidences of extreme weather can strain already limited resources for environmental justice communities.[20]

The state is currently in the process of developing an Environmental Justice Mapping Tool to help identify communities underrepresented in government processes and harmed by environmental and health hazards. This tool, which is expected to be available in 2027, may provide more comprehensive insight into disparities created by the development and use of energy in the state and could be used in future updates of the Oregon Energy Strategy along with other relevant tools and data. These insights will be vital for developing equitable policy. However, even as that tool is under development, there should be a concerted effort by policy makers, agencies, and implementors to "meaningfully involve" and "fairly treat"[21] those who have been historically and are currently excluded from decision making processes and actions. This is the goal with the Oregon Energy Strategy's equity framework.

Figure 13: Energy Burden by Household Income[22]



Klondike Wind Facility in Sherman County

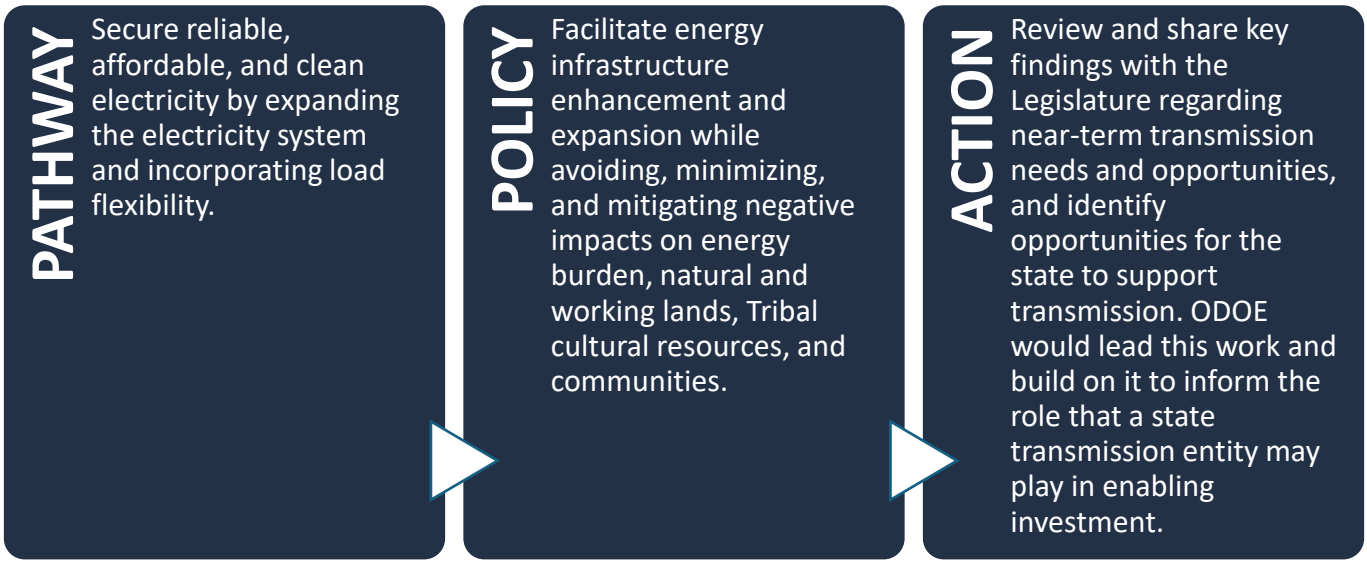
PART TWO: THE STRATEGY

Pathways and Policies

The five Oregon Energy Strategy pathways provide a foundation to align in the direction we must advance to meet our energy policy objectives. Policies and actions further define potential efforts to implement the energy strategy. Together, the energy strategy recommendations are structured as **pathways → policies → actions**.

- Pathways define direction that Oregon needs to pursue to meet our energy policy objectives and are meant to guide decisions over time.
- Policies build on the pathways and provide more detail to inform near-term actions and decisions over time.
- Actions are near-term legislative and policy recommendations that focus on the next four years, addressing existing barriers and needs while delivering progress on the pathways and policies.

Figure 14: Example of a Pathway, Policy, and Action



In advancing these recommendations, it is imperative to ensure that legislators, agencies, and others responsible for crafting and implementing policy consult with Tribes and engage meaningfully with environmental justice communities and those who are disproportionately affected or left behind by energy policies. The Equity and Justice Framework is a guide to inform policymaking and implementation and should be applied across all pathways, policies, and actions related to energy. While the framework has been structured to address the effects of energy-related policies, it applies broader concepts related to best practices that aim for inclusive processes and outcomes in policymaking and implementation.

This section outlines the five pathways and the potential policies that advance them. The italicized parentheticals provide a short-hand reference to each policy, which are used in subsequent sections.

1. Energy Efficiency

Advance energy efficiency across buildings, industry, and transportation sectors, including by expanding access to and appeal of multimodal transportation options, to deliver the benefits of a more efficient energy system.

Energy efficiency must be the starting point for how Oregon addresses the energy transition. Energy efficiency means getting the same level of service (heating, cooling, comfort) using less energy. The less energy we use, the less we need to produce and deliver. This saves households and businesses money, promotes reliability, and reduces the costs of the energy transition economy wide.[xx] In the energy strategy Reference Scenario, energy efficiency, including from electrification, brought Oregon's overall energy demand in 2050 down to 22 percent below 2024 levels. In households, energy efficiency can reduce energy bills and energy burden, while in businesses it can reduce operating costs, making them more competitive. At the same time, the upfront investment in more energy efficient technology may pose a barrier for some households and businesses, requiring additional support, such as incentives, to realize savings. Affordability is an important consideration — one that must be explicitly mitigated — in energy efficiency adoption to ensure low-income and environmental justice communities are able to participate in technology upgrades.

There are many other reasons to support energy efficiency. It can avoid the need for more energy infrastructure, relieving pressure on our natural and working lands, waters, and ecosystems. It can improve health and create jobs. Energy efficiency has traditionally focused on improving the performance of buildings and appliances, often treating transportation policy as a separate domain. But to meet economy-wide decarbonization goals, we need to broaden our understanding of energy efficiency. Reducing vehicle miles traveled cuts energy use by reducing the length of car trips and shifting travel to more energy efficient modes where feasible. In this way, VMT reduction and supportive land use are powerful forms of energy efficiency – delivering the same or better access and mobility with less total energy consumption. Supporting compact, connected communities can further advance energy efficiency in transportation and buildings, improve public health through more active transportation such as walking, biking, and rolling, and reduce energy burden through decreased energy costs.

ENERGY EFFICIENCY POLICIES
1a. Deliver energy efficiency and conservation improvements in existing and new residential and small commercial buildings to align with state decarbonization goals. Prioritize programs to serve low- and moderate- income and energy burdened households. *(Buildings efficiency)*
1b. Evaluate, promote, and allocate funding to improve energy efficiency in large commercial and industrial sectors. *(Large commercial and industrial efficiency)*
1c. Prioritize policies and increase support for programs that expand access to multimodal transportation options – including public transit, biking, and walking infrastructure – and promote development patterns that make it easier and more appealing for people to live, work, and access services without relying on a personal vehicle. (*Expand access to and appeal of multimodal transportation options)*

[xx] The Northwest Power and Conservation Council calculates that, from 1978 through 2023, the region has saved 7,865 MW through energy savings – enough to power seven Seattles. This has avoided 25 million metric tons of CO2 and saved $5 billion from avoided energy consumption. https://www.nwcouncil.org/energy/energy-topics/energy-efficiency/.

1a. Deliver energy efficiency and conservation improvements in existing and new residential and small commercial buildings to align with state decarbonization goals. Prioritize programs to serve low- and moderate- income and energy burdened households.

Reducing energy consumption in residential and commercial buildings is key to meeting Oregon's climate goals and minimizing costs. In 2022, existing commercial and residential buildings were responsible for more than 36 percent of the total energy consumed in Oregon,[2] 34 percent of Oregon's greenhouse gas emissions, and were responsible for over 36 percent of Oregon energy expenditures.[23] These energy expenditures are a significant burden, with many Oregon households having to spend more than 10 percent of their total income on home energy consumption.[24] As Oregon constructs new buildings to address the housing crisis and meet housing demand over time, it will be essential to capture all efficiency opportunities, including in building envelope (roof, walls, windows, etc.) and through efficient electric heating and cooling technologies. Smaller units in compact developments are an efficient type of housing, and land use policies should ensure that these are an option for Oregonians. Programs should be designed to deliver equitable access to clean technologies and measures for environmental justice and energy burdened communities, recognizing that they often deliver multiple benefits including clean energy, resilience, health, affordability, and others.

Need for Policies

Oregon is a national leader in residential and commercial energy efficiency,[xxi] but more work is needed to overcome upfront cost barriers, expand access to information, ensure a sufficient supply of skilled labor, and help all Oregonians lower their energy bills. Energy efficiency measures in buildings include weatherization, lighting, more efficient appliances, and passive technologies like shading and cool roofs. Oregon must continue to advance building energy codes to support lower-carbon new buildings, and continue measures to decarbonize existing small commercial and residential buildings. It is also important that when appliances or equipment break, they are replaced with high-efficiency models. This means building on existing programs and standards, including ratepayer-funded programs in utility service areas across the state and state-funded programs like the Healthy Homes Grant Program and ODOE's heat pump incentive programs. This also means working with Tribal governments in delivering energy efficiency improvements for Tribal members, as well as building out the network of community-based organizations to support energy efficiency in low- and moderate-income and energy burdened households. Finally, energy efficiency policy should prioritize electrification and shifting electricity use to off-peak times and hours of high renewable capacity to ensure alignment with a least-cost, economy-wide pathway to decarbonization.

Risks and Barriers

Delivering energy efficiency improvements relies on actions of thousands of Oregon households and businesses. Navigating available information is challenging. Most people are not experts in energy

[xxi] For example, Oregon ranks ninth in the 2025 ACEEE State Energy Efficiency Scorecard.

efficient technologies or know where to look for funding or financing support.[xxii] The contractors who install technologies or weatherize homes require continuing training to expand their expertise, inform their investments in new technology, and help customers make informed decisions. Widespread adoption of energy efficient technologies requires understanding and overcoming the various and unique challenges that Tribes, homeowners, renters, landlords, and businesses face.

One key barrier is that higher upfront investment may be needed to lower monthly bills in the long term. Small businesses may require support to make upfront investments in energy efficient technologies. Energy burdened households who would most benefit from permanent bill reductions are at highest risk of being excluded from opportunities to weatherize their home or install the most energy efficient technology because of the high upfront cost. Without access to grants or financing, the most efficient technology is less accessible, and buildings may require other repairs before energy efficiency measures can be implemented. Renters have limited opportunities to implement investments in the homes they occupy and may face higher rent when improvements are made. The loss of federal funding and policies supporting energy efficiency risk slowing progress on energy efficiency at a time that acceleration is needed. This can exacerbate energy burden, hinder one of the fastest ways to relieve load growth, and create uncertainty for businesses and workers engaged in providing energy efficiency services. It also reinforces the importance of ratepayer-funded energy efficiency programs across Oregon's utility service areas.

1b. Evaluate, promote, and allocate funding to improve energy efficiency in large commercial and industrial sectors.

Oregon's large commercial and industrial entities are a crucial contributor to jobs and activity in the state's economy. These entities account for 27 percent of total energy consumed in Oregon, about 34 percent of greenhouse gas emissions, and almost 29 percent of energy expenditures in our state.[25] [26] Energy efficiency can reduce energy waste and help businesses reduce their energy costs, improving the competitiveness of Oregon's industries while advancing our climate objectives. This may include custom measures unique to industries or collaborative process design such as industrial symbiosis that serve to optimize the use of energy by reducing waste and sharing resources through co-location of processes across businesses. Energy efficiency may also reduce emissions from local pollutants, particularly when combined with process or material efficiency, thereby reducing harm to both communities and nature, as well as ensuring that environmental burdens and benefits are distributed equitably without disproportionately affecting marginalized groups.

Need for Policies

Oregon has policies and programs in place to encourage energy efficiency improvements in large commercial and industrial sectors. These include the Climate Protection Program, which sets decarbonization objectives for fuel suppliers and will set emissions goals requirements for energy-intensive, trade-exposed industries by 2027. The Large Electric Consumer Public Purpose Program allows some of Oregon's largest electricity users in Portland General Electric and Pacific Power service areas to invest a portion of their public purpose charge on self-directed energy conservation and renewable projects on their sites. Industries will continue to need support to identify and access low-carbon

[xxii] Oregon has developed a website to provide information on available incentives across Oregon: https://incentives.oregon.gov/

solutions for their businesses to comply with these goals. The Building Performance Standard is an important mechanism to drive energy efficiency in large commercial buildings.[xxiii]

Energy efficiency improvements in commercial and industrial sectors often need to be tailored to the specific function, technologies, and processes of a facility. In addition to the policies and programs listed above, identifying and implementing energy efficiency measures may require additional technical expertise, evaluation of savings opportunities, and tailor-made solutions. It is also essential that energy efficiency measures consider electric and hybrid electric technologies wherever possible and save costly low-carbon fuels for the hardest-to-electrify applications. State policies and regulatory targets can set industry expectations and establish a runway for the adoption of new technologies so businesses know what is coming and can plan for it.

Risks and Barriers

Large commercial and industrial energy users have much larger energy loads and use a broader range of processes and technologies than households and small businesses. For example, a data center, food processing facility, and cement manufacturer will all require very different expertise and solutions to improve energy efficiency. Businesses must overcome various challenges, including information barriers, technical challenges, and high capital costs.

Investment in new energy efficient equipment often has a higher upfront cost. All businesses face financial pressure, and investments in efficiency measures need to result in operating cost savings to pay back the investments within a reasonable time frame to be considered. Investment in nascent technologies or fuels may involve taking on new risks and may temporarily disrupt a manufacturing process or change it. Improvements in industrial efficiency may result in job displacement as some processes are automated or require different skills and training. This has the potential to lead to greater social inequity as some communities may not have access to the training and experience needed to adjust to the new equipment or process.

1c. Prioritize policies and increase support for programs that expand access to multimodal transportation options – including public transit, biking, and walking infrastructure – and promote development patterns that make it easier and more appealing for people to live, work, and access services without relying on a personal vehicle.

Reducing the overall amount of driving, particularly in urban areas, is critical to achieving Oregon's clean energy goals at the lowest possible cost while maximizing potential benefits. The transportation sector is the state's largest source of greenhouse gas emissions, accounting for 35 percent of total emissions in 2023. That same year, Oregonians spent $11.2 billion on transportation fuels – more than half of all energy expenditures in the state and more than all other forms of energy combined.[2]

[xxiii] BPS is Oregon's policy addressing energy use and emissions from existing commercial buildings, which account for nearly 20 percent of energy use in Oregon, based on ASHRAE Standard 100-2024 and Oregon-specific amendments. Building performance standards differ from building codes (which apply to the construction or renovation of buildings) as they regulate buildings' operational energy use.

The energy strategy modeling finds that reducing per-capita vehicle miles traveled in light-duty vehicles represents a critical least-cost measure to reduce greenhouse gas emissions. A modeled failure to achieve Oregon's VMT reduction targets proved to be the second costliest among all pathways analyzed. Expanding access to a variety of transportation options (often referred to as multimodal options), including through increased transit service and closing critical gaps in local bicycle and pedestrian networks, reduces pressure on the energy system, cuts air pollution, improves public health, and offers more reliable, affordable mobility – reducing dependence on personal vehicles and saving people money.

Need for Policies

Oregon has long been a national leader in land use and transportation planning, effectively managing urban growth and expanding mobility options, while preserving rural lands. However, achieving the state's goal for a 20 percent reduction in light-duty VMT per capita by 2050[27] will require greater investment and a stronger prioritization of multimodal transportation infrastructure.

Reducing reliance on single-occupancy vehicle trips requires a rethinking of how we fund, design, and build our transportation, housing, and land use systems. Stable, climate-aligned funding is essential to expand diverse, low-carbon mobility options and to create neighborhoods where walking, biking, and transit are safe, convenient, and desirable. To get there, state agencies must work closely with planners, developers, Tribal transit programs, and local governments to support denser, transit- friendly development in urban and suburban areas and make it easier to access jobs, essential services, and recreation without relying on long car trips. Oregon already has several strong policies and programs designed to support these goals – including Climate Friendly and Equitable Communities, Safe Routes to School, Great Streets, and the Statewide Transportation Improvement Fund – but funding and resources for implementation remain insufficient to meet the scale of current needs.

Oregon must also work with rural communities to understand their unique transportation needs and identify opportunities to expand access to transportation options, recognizing that rural Oregonians often drive longer distances and live farther apart than those in urban areas, especially outside town centers. By centering people and climate in transportation investments, Oregon can strengthen community well-being while driving down emissions.

Risks and Barriers

Identifying funding for programs that expand access to multimodal transportation options in Oregon is challenging, in part due to a historic imbalance in transportation spending that has long prioritized highways and car-centric infrastructure. This legacy makes it politically difficult to reallocate resources toward modes that some still view as secondary or less traditional. Constitutional restrictions on how fuel tax revenues are used further constrain available funding sources. Additionally, multimodal projects often require complex coordination across agencies and jurisdictions and can face community resistance if not well-aligned with local needs or priorities. It will be important to engage trusted community organizations – ensuring they are appropriately compensated for their time and expertise – to conduct outreach, provide informational opportunities, and provide a venue for projects to adapt and improve in support of community needs. This collaboration will help ensure that community needs and priorities are understood and effectively integrated into program objectives. For example, rural communities face distinct transportation challenges, including greater distances between destinations and operational

requirements that can make traditional public transportation less feasible. Safety concerns also present a barrier, both in terms of the need for well-designed, protected infrastructure for walking and biking, and ensuring personal security and comfort for riders on public transportation – especially for women, youth, seniors, and historically and currently marginalized populations.

2. Clean Electricity

Secure reliable, affordable, and clean electricity by expanding the electricity system and incorporating load flexibility.

Electricity is a key fuel for Oregon to meet its energy and climate policy objectives. For many decades, investments in hydroelectric facilities and transmission wires have supported economic growth and equitable access to electricity in the Pacific Northwest. As the region has grown, additional generating resources have contributed to Oregon's electricity supply, including fossil fuel plants that burn coal and natural gas.

In the modeling for 2050, natural gas facilities and unspecified electricity[xxiv] continued to support Oregon grid operations, but the level of reliance upon them was significantly reduced, consistent with Oregon's climate change policies and the model's least-cost planning analysis.[xxv] By 2050, Oregon's power system continued to emit about 2 million metric tons of carbon dioxide equivalent, which is a massive decrease from the 16.9 million MTCO2e actually emitted in 2023.[xxvi] This reduction is even more impressive when considering that by 2050, the modeled power system provided more than double the amount of electricity it provides today. The main driver of near-term load growth is tech loads like data centers, with electrification of transportation contributing significantly in the long-term. To reliably serve Oregon's current and growing electricity needs, the electricity system must expand.

We must continue to invest in clean electricity resources and grid infrastructure, including adding more generation, storage, and transmission. New investments must coincide with steps to avoid further straining Oregonians already experiencing high energy burdens. The model indicates that, just as it is today, Oregon's future growing electricity demand will likely be met with a mix of resources in Oregon and in other western states. In-state development can be expected to provide jobs and support economic growth that may reduce the pressure of higher utility costs, but may also have negative effects, including potentially burdening environmental justice communities and competing with other priorities like agriculture and conservation. The equity and justice framework in the Oregon Energy Strategy provides guidance for this work to minimize negative effects while maximizing opportunities. It will be important to continue

[xxiv] Unspecified electricity includes wholesale market purchases and other transactions where the generating resource is not known. DEQ assigns this generation an emissions factor of 0.428 MT-CO2e/MWh.
[xxv] This modeling is described in more detail in the Key Findings document, https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Generation-Transmission-Key-Findings.pdf
[xxvi] https://www.oregon.gov/deq/ghgp/Documents/ghgElectricityEms.xlsx

bringing in the voices of local communities, so they are able to contribute to conversations and speak to their energy needs.

We also must pursue opportunities to increase the efficiency of system operations, on both the supply-side and demand-side. Due to the model's design, it made perfectly efficient use of the transmission system and economically dispatched generation across the West, which does not occur today. This change in operations — not infrastructure — was able on its own to reduce modeled emissions in the baseline year to only 14.3 MMTCO2e, a roughly 15 percent decrease from actual emissions in 2023. Considering the billions of dollars the West has saved through the real-time electricity market since 2014,[28] much work is already underway to further progress toward an organized electricity market. Presently, two day-ahead markets are under development: Southwest Power Pool's Markets+ and the California Independent System Operator's Extended Day Ahead Market. Achieving system efficiencies closer to those modeled will require more action in the coming decades.

Growing electric loads must also be integrated into the electricity system in a way that maximizes use of the existing system while minimizing contribution to peak load growth. While not all loads are flexible, many significant ones are. Many electric vehicles, for example, can be charged during off-peak hours, taking advantage of times when electricity is cheap and abundant, while also making better use of existing grid infrastructure and minimizing the need for new investments. It will also be important to consider creative solutions, such as the possibility of relying on the backup power that tech loads already have, to mitigate peak demands. However, if that backup power continues to be predominantly diesel-powered generators rather than battery storage, this could support grid reliability but significantly reduce local air quality and harm local communities. While these measures will not replace the need to build resources on the power system, they comprise an essential element of the resource portfolio. They can also relieve pressure on the power system, including on the hydroelectric system, helping to reduce demand and protect fish.[29] Utility business models, markets, and incentive mechanisms must aim to identify and leverage this potential while compensating customers for their role in becoming part of "virtual power plants."

POLICIES
2a. Facilitate energy infrastructure enhancement and expansion while avoiding, minimizing, and mitigating negative impacts on energy burden, natural and working lands, Tribal cultural resources, and communities. *(Utility-scale and distributed energy resources)*
2b. Enable consumers to support grid needs by shifting the timing of electricity consumption for distributed flexible loads like EVs or water heaters and larger commercial and industrial loads. *(Load flexibility)*
2c. Consult and engage with Tribes to understand their concerns around energy development and to identify opportunities where state policies, funding, and programs can support Tribal priorities while minimizing the effects of development on environmental and cultural resources. *(Tribal consultation and engagement)*
2d. Collaborate with the Bonneville Power Administration, neighboring states and other regional entities to address Oregon's needs as part of a regional grid. *(Regional engagement)*

2a. Facilitate energy infrastructure enhancement and expansion while avoiding, minimizing, and mitigating negative impacts on energy burden, natural and working lands, Tribal cultural resources, and communities.

There is not currently sufficient transmission capacity, generating resources, or storage to reliably power Oregon's future electricity needs, particularly if new data centers come online as quickly as forecasted. Planning for and building utility-scale projects must be a priority. This is particularly critical when considering that utility-scale projects often take years to complete the necessary siting, planning, permitting, acquisition of equipment and materials, engineering, construction, and interconnection processes. Opportunities to expedite these processes, for example by reducing duplication and implementing efficiencies, should be pursued. Grid enhancing technologies can also help improve efficiencies of existing transmission lines. While Oregon will always rely on a combination of in-state and out-of-state resources, it is important to recognize that there are benefits to in-state development. These include energy sector jobs and broader economic growth as businesses gain improved access to electricity to power their activities.

In addition to utility-scale resources, it is important to build distributed energy resources, which are often more costly to build per kilowatt hour generated, but can be constructed more quickly, provide important resilience benefits (especially when paired with battery storage), and typically have fewer effects on natural and cultural resources. Pursuing smaller utility-scale batteries and other resources like co-located generation in some areas can also mitigate the need to build new lines when strategically deployed to areas that act as bottlenecks in the transmission system. Failure to develop sufficient resources will not only threaten system reliability and hinder progress toward Oregon's clean energy objectives but will inhibit economic development and discourage new businesses from entering the state.

Need for Policies

State guidance and support is needed to expeditiously navigate the need for more resources, while recognizing that existing siting and permitting processes are intended to provide consultation and engagement with affected communities and carefully consider development benefits and burdens on communities, the environment, and cultural resources. The need for development must be carefully balanced against these competing priorities to mitigate the environmental and community impact by resource development. Both utility-scale and smaller- scale resources are being affected by changes to federal policy that is raising costs and causing uncertainty and delay. Other barriers include determining how to fairly allocate costs for transmission projects and mitigating affordability concerns from new investments.[xxvii]

Oregon has some existing programs and policies that incentivize development of community-scale or smaller resources. For example, the Oregon Department of Energy's Community Renewable Energy Grant Program provides grants for planning and developing community renewable energy and energy resilience projects. At least half of the grant funds are awarded for projects that serve environmental justice communities, such as communities of color, lower-income communities, and rural communities.[30] In addition, ORS 469A.210 sets a goal for community-based renewable energy projects to comprise at

[xxvii] For example, the Committee on Regional Electric Power Cooperation (CREPC) Transmission Collaborative, a joint committee of the Western Interstate Energy Board (WIEB) and the Western Conference of Public Service Commissioners (WCPSC), is working on bringing states together to help identify cost allocation frameworks to help advance transmission development in the region. https://www.westernenergyboard.org/crepc-transmission-collaborative/.

least 10 percent of the aggregate electrical capacity for large investor-owned utilities by 2030. In other programs, set-asides, formula, or block grants for Tribal governments have been effective, particularly in the housing and community development space, and could be effective in supporting development of distributed renewable energy. It is important to build on these and other policies over time to ensure continued growth of customer- and community- owned resources, and to expand access to historically and currently underserved communities and areas at highest risk for outages. Currently, many programs are at risk due to lack of state and federal funding. Utility investments are likely to support some smaller-scale projects, but other funding will be necessary to capture the value of resilience benefits and other benefits to local communities.

Risks and Barriers

One of the greatest risks to reliability and meeting Oregon's clean energy goals is that new resources will not be constructed quickly enough to accommodate the pace of rising demand. Limited electricity supply, and the risk of exposure to high wholesale power costs from high demand and low supply, has already been a topic of concern for the region for years. Unfortunately, even where projects already have permits and site certificates, barriers remain to get projects built, including interconnection and supply chain challenges. Cuts in federal funding and changing regulations have reduced support for renewable resources, and tariffs are increasing the costs of materials. These actions threaten to further delay clean energy projects at a time that investment and construction needs to ramp up.

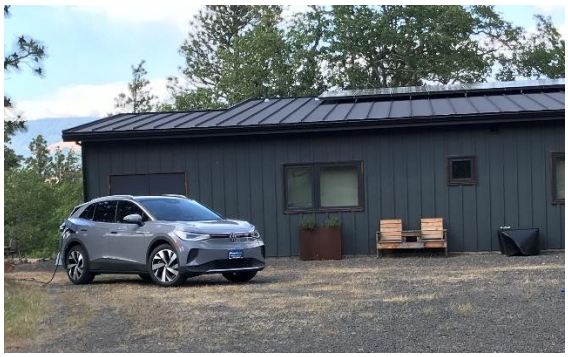
Increasingly frequent and intense wildfires are causing additional risks to Oregonians and to the ability to finance and build utility-scale electricity infrastructure. A key component of this risk is the growing scale and uncertainty of wildfire liability for utilities, which can affect the cost of debt and ability to finance projects. It is important to recognize the threat this poses to reliability and ratepayers, and to consider policy options to mitigate these impacts.

Even with aggressive cost mitigation through energy efficiency (including load flexibility), the necessary investments in clean energy infrastructure will impose higher costs on customers. Yet many Oregonian households and businesses are already struggling to afford basic needs like energy. To ensure those least able to afford rising energy costs are not further burdened, action to advance needed investments must coincide with action to promote energy affordability. Efforts like the Oregon Public Utility Commission's ongoing implementation of House Bill 2475 (2021) (the Energy Affordability Act), must continue, and the state should explore further ways to support households and businesses across the state. This is particularly critical in light of the loss of federal energy assistance dollars.

While speedy action to advance infrastructure is critical, it is important to minimize and mitigate potential negative impacts on Tribal cultural resources, affected communities, natural and working lands, and waters. This requires identifying not only barriers but potential benefits of particular types of infrastructure developments. These potential benefits include local economic development, strengthened resilience, environmental and public health benefits of a shift to low-carbon resources, as well as mitigation of effects such as through agrivoltaics.

2b. Enable consumers to support grid needs by shifting the timing of electricity consumption for distributed flexible loads like EVs or water heaters and larger commercial and industrial loads.

Oregon's electric power systems face pressure from rapidly rising loads, extreme weather, and long lead times to construct utility-scale resources. New loads driven primarily by data centers and electrification must be integrated with an increasing supply of renewable energy resources with variable power outputs. Demand response (DR) programs allow customers to play a role in balancing grid operations by encouraging them to shift their flexible electricity loads away from periods of peak demand. Many households and businesses have flexibility for when they operate electric vehicle chargers, water heaters, laundry and other flexible loads. This might mean, for example, charging a car, home battery, or pre-heating water during times of low system demand or high renewables output. It can save money by reducing peak demand and taking full advantage of available resources across the day and night. More specifically, strategically managed vehicle and battery charging, including options like workplace and off-peak home charging, can maximize the benefits of clean energy while reducing the strain on the grid. In buildings, electric water heaters, space heating, and cooling can all be managed flexibly to provide comfort while supporting the grid. Commercial and industrial electricity loads can also shift some of their operating hours and activate backup energy systems when necessary. Finding opportunities for customers' backup energy systems, particularly if they are clean, to support grid needs could be particularly valuable. For example, data centers install backup power that can be leveraged to reduce electricity drawn from the grid during peak hours.



Need for Policies

Historically, the Bonneville Power Administration has led the way in providing flexibility to the Northwest power market through its marketing of hydroelectric power and its occasional requests to customers to provide demand response by delaying power consumption, primarily to large industrial customers like aluminum smelters. Demand response programs for other retail customers have not historically been a priority because of the hydropower system's ability to provide abundant peak power, but that ability may no longer be sufficient. With growing electric loads and an increasing share of variable renewable resources, it will be important for policies to help align demand patterns with broader energy system needs. Examples might include advancing opportunities for investor-owned utilities and consumer-owned utilities to encourage time-of-use rates, promote managed charging or vehicle-to-grid programs, automation, or other enabling mechanisms to motivate and compensate consumers for their flexibility. It may also include technical assistance for utilities across Oregon to identify least-cost methods to align electrification of flexible loads with system operations.

Risks and Barriers

Load flexibility ultimately depends on the abilities and actions of end-use consumers, like households and businesses. Not all consumers have the ability to shift the timing of their consumption, particularly those who may lack access to automated technologies, like smart thermostats. Poorly designed or implemented load flexibility policies could unfairly burden these consumers. Conversely, there is a risk that those consumers least able to shift their consumption could be left behind as they are unable to take advantage of policies that reward load flexibility, including financial incentives from utilities or

others. Any new policy to promote load flexibility must be designed with these equity concerns in mind. While these risks are significant, it should also be recognized that failing to enable load flexibility will significantly increase costs and impose other negative effects for all consumers. Load flexibility is an opportunity to mitigate the need to build new resources, which lowers costs and reduces effects on natural and working lands, cultural resources, and nearby communities. Utility action is needed to create mechanisms and incentives for load shifting. However, investor-owned utility business models continue to benefit more from capital investments in infrastructure than from investments in programs like demand response and virtual power plants. For consumer-owned utilities, administrative costs associated with administering demand response programs may outweigh the financial benefits. Finally, customers may not know about programs, or may not trust that they are worth participating in.

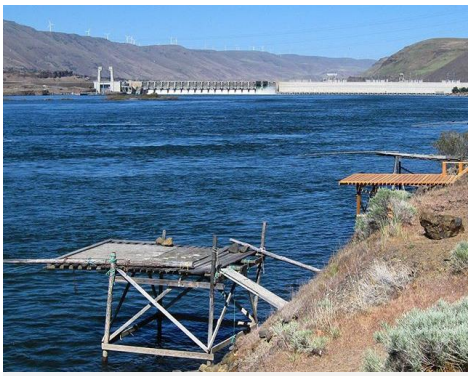
2c. Consult and engage with Tribes to understand their concerns around energy development and to identify opportunities where state policies, funding, and programs can support Tribal priorities while minimizing the effects of development on environmental and cultural resources.

Indigenous Tribes and Bands have been with the lands that we inhabit today throughout Oregon and the Northwest since time immemorial and continue to be a vibrant part of Oregon today. Coordination and formal consultation with Tribes must be an essential component of policy development and implementation. Specifically, clean electricity and transmission line projects may need permits or approval from a Tribal agency and Tribe. In addition, it is imperative to follow consultation requirements related to federal and state actions and their effects on Tribes, natural and cultural resources, and potential treaty rights. This is particularly important in the context of building clean energy infrastructure because of the potential benefits and risks that these projects carry, and the need to ensure that past harms and injustices are not repeated. It is important to understand Tribes' concerns around energy development and to identify opportunities where state policies, funding, and programs can support Tribal priorities. Identifying opportunities to advance Tribal energy sovereignty can further help align with Oregon's goals of clean energy, resilience, and reliability.

Need for Policies

As explained in 2a, policies are needed to advance construction of needed electricity infrastructure. As policies, programs, and projects are developed, it is critical to engage Tribes in their development and implementation.

Tribal consultation requirements stem from the federal government's trust responsibility to 574 federally recognized Tribes — in particular, consulting with Tribes on federal actions or decisions, such as permits for proposed energy projects, that affect them and may affect Tribal lands, resources, or cultural resources.[31] In addition, Oregon law requires state agencies to maintain government-to-government relations with the nine federally-recognized Tribes in Oregon by identifying programs that affect Tribes, notifying affected Tribes, and including representatives of Tribes in developing programs.[32] While consulting with Tribes is critical for many aspects of the energy



Tribal fishing platforms near the John Day Dam on the Columbia River were constructed to reestablish fishing rights and cultural practices for Tribes after traditional fishing sites were flooded during the dam's construction in the 1960s.

strategy, consultation on issues affecting the shared electricity grid is highlighted here as a key opportunity.

Tribal engagement should not, however, be limited to formal requirements or specific programs or projects, but be an ongoing process to build relationships and understanding to better identify areas of cooperation and concern. Many Tribes in Oregon have voiced concerns for various types of projects, including utility scale solar, floating offshore wind, and high voltage transmission lines. Through consultation, proposed project designs have a stronger opportunity to avoid negative impacts to natural and cultural resources that are vital to a particular Tribe's traditional and current cultural practices. At the same time, many Tribes have concerns about the effects of climate change and recent extreme weather on natural and cultural resources, which have motivated development of Tribal plans, taskforces, or committees to consider clean energy and energy sovereignty. Partnerships and engagement with Tribes and Tribal ownership of energy projects can enable Tribes to earn revenue and build wealth for their communities. There is a need to work with each Tribe to identify opportunities where state policies, funding, and programs can support Tribal priorities while minimizing the effects of development on environmental and cultural resources.

Risks and Barriers

There continues to be significant concern and data showing that salmonoid species are declining. The federal Endangered Species Act works to prevent extinction and to recover species to the point where the law's protections are not needed. Legal and administrative actions over decades have sought to find resolution, with a significant effect on hydropower operations, electricity generation, and ratepayer costs.[33] There are several other forums where these issues are being discussed in greater detail with regard to specific hydropower facilities. The modeling for the energy strategy generally assumed continued output from the dams, and if there is a potential of reduced output through changed hydropower operations – the actions in this energy strategy become more important to consider in relieving pressure by reducing demand, creating flexibility, and better utilizing generation over a broader geographic footprint.

Failing to consult and coordinate meaningfully with Tribes raises a risk of perpetuating historical and current inequities as well as disrupting a Tribe's current cultural practices. The state must comply with formal notice requirements, and in parallel work with Tribal staff, as appropriate, to understand a Tribe's priorities and opportunities to address their concerns, interests, and needs when advancing policies, programs, or projects. Failing to work with Tribes on proposed projects also creates legal risk to the projects. Working with Tribes on energy projects may require support and time to ensure there is an understanding of the project, its potential effects, and whether the Tribe has an opportunity to benefit from the project.

2d. Collaborate with Bonneville Power Administration, neighboring states and other regional entities to address Oregon's needs as part of a regional grid.

Oregon imports and exports electricity from across the western region as part of an interconnected electricity system. Oregon is also part of the Bonneville Power Administration's service area, which covers multiple states and is federally operated. Energy infrastructure, particularly transmission lines, may require action from multiple sovereigns, such as Tribal governments, the federal government, and state governments to be permitted, developed, and operated. The state should build on engagement

with other actors to facilitate cross-jurisdictional coordination and collaboration.[xxviii] This engagement is essential to advocate for Oregon's interests, to maintain consistency between regional and state policies, and to advance priorities like transmission development that often rely on cooperation across utilities and jurisdictions.

Several initiatives are underway that will strengthen regional ties in how the electricity system is managed; these initiatives deserve support but also require close scrutiny. Considering the billions of dollars the West has saved through the real-time electricity market since 2014, much work is underway to further progress toward an organized electricity market. Presently, two day-ahead markets are under development: Southwest Power Pool's Markets+ and the California Independent System Operator's Extended Day Ahead Market. The Western Resource Adequacy Program is establishing resource adequacy requirements for the region. Work to construct much-needed interstate transmission lines continues, including through the Western Transmission Expansion Coalition.[xxix]

Need for Policies

The power sector is highly regulated. Each state has its own regulations governing in-state utility activity, while the federal government regulates interstate activity (largely transmission). In the case of consumer-owned utilities, they have their own governance structures and are also largely reliant on federal power from BPA.

Currently, the regional power marketplace is dominated by long-term bilateral contracts and long-term contract-based transmission rights. Other parts of the country have organized wholesale marketplaces, where a single independent entity dispatches resources efficiently to meet all participants' needs, and utilities and developers have increased transparency and information. Without such centralized organization, the Northwest power market has higher transactional and operational costs that ultimately increase costs for utility consumers. Since 2014, the Western Energy Imbalance Market has offered a centralized marketplace for real-time power sales, which has saved Oregon utilities and their ratepayers millions of dollars.[28] However, real-time power sales are only a small portion of marketplace transactions. Organized markets for short-term power sales do not address marketplace barriers like transmission rights and utilization.

Utilities in the region are moving toward more organized power markets to reduce costs and improve reliability. This is essential to more efficiently use existing infrastructure and to benefit from geographic and resource diversity across the region. As the power sector decarbonizes, this regional diversity will become increasingly important. A more diversified supply mix can take advantage of different weather patterns, resource mixes, and time zones to integrate more renewable generation while mitigating risks

[xxviii] The Committee on Regional Electric Power Cooperation (CREPC) and the Western Interconnection Regional Advisory Body (WIRAB) are examples of key forums for cross-jurisdictional coordination and collaboration and where OPUC and ODOE participate. CREPC is a joint committee of Western state and Canadian province energy officials and utility commissioners that focuses on regional electric power policy issues, while WIRAB advises the FERC, NERC, and WECC on grid reliability in the Western Interconnection. The two organizations frequently hold joint meetings to discuss critical regional energy challenges.

[xxix] The Western Transmission Expansion Coalition, WestTEC, is a West-wide effort to develop an actionable transmission study to support the needs of the future energy grid.

from weather changes, including extreme weather events and wildfires. Ultimately, moving toward a regional transmission organization would be an important step to improve west-wide coordination and reduce costs for consumers.

It is important that the State of Oregon engage in these activities to advance state energy policy objectives, ensure that regional activities are consistent with state policy, and strengthen Oregon's cooperation on vital areas including market development, resource adequacy, emissions accounting, and transmission planning. For example, hydropower is a key generating resource for Oregon and the Pacific Northwest, and Oregon should support regional and other planning efforts, such as by the Bonneville Power Administration and the Northwest Power and Conservation Council, to understand and mitigate the expected negative impacts of climate change and extreme weather on hydropower availability. Regional processes like these are becoming increasingly important and complex as the region moves toward day ahead markets, tackles resource adequacy, endeavors to build much needed transmission, and plans for a growing and cleaner grid that is more reliable and resilient.

Risks and Barriers

Oregon's electricity system is not an island, nor would it be desirable for it be to operated like one. While regional engagement with Bonneville Power Administration and other entities requires time and effort, such engagement is critical to understand regional challenges — and then to identify regional opportunities. While regional needs may not perfectly align with Oregon's needs, advancing dialogue is essential to identify and pursue areas of alignment. Such dialogue can also inform Oregon policymaking on solutions found and lessons learned from others in the region.

3. Electrification

Increase electrification of end uses across transportation, buildings, and industry, while safeguarding reliability, promoting affordability, and maximizing opportunities to use load flexibility as a resource.

Electrification is a powerful energy efficiency and greenhouse gas reduction tool. In the energy strategy modeling Reference Scenario, which represented the least-cost scenario modeled, electrifying on-road transportation alone reduced economy-wide energy demand by 27 percent thanks to the significantly higher efficiency of electric motors compared to internal combustion engines. In the buildings sector, electrification is the largest driver of household energy savings and – when paired with complementary measures like weatherization and efficient lighting – can reduce energy consumption in households by 47 percent.[xxx] Electrification can also deliver significant GHG reductions both today and in the coming decades, since Oregon's electric grid already produces fewer emissions than many fuels and it will become even cleaner as more renewable energy comes online. Delaying electrification in transportation and buildings leads to significantly higher economy-wide decarbonization costs. However, electrifying today does not always lead to lower energy bills for households and businesses, particularly when it comes to installing heat pumps.[xxxi] Incentives can help overcome the cost differences, as well as education on the value of heat pumps in providing cooling. Affordability for low- to mid- income

[xxx] https://www.oregon.gov/energy/Data-and-Reports/Documents/2025-OES-Technical-Report.pdf#page=108

[xxxi] The Energy Wallet analysis and NREL indicate that heat pumps are most cost-effective when paired with weatherization measures.

households and environmental justice communities, including renters, especially those in publicly supported or naturally occurring low-income multi-family housing, must be a key consideration when designing and implementing electrification measures. While the modeling demonstrates the benefits of early electrification, public engagement and additional analysis underscore the need for a carefully managed transition – one that accounts for all key considerations, including ambitious decarbonization goals, grid reliability, upfront and ongoing affordability, equitable access, and additional benefits like cleaner air and improved cooling in homes. The concept of "strategic electrification," elaborated later in this strategy, is an approach to advancing electrification while working to account for these other crucial considerations.

Widespread electrification will require a significant expansion of the electricity sector. At the same time, electrification technologies can strengthen the grid by providing load flexibility. By shifting demand away from peak periods, load flexibility can lower costs, reduce environmental impacts, minimize the need for new power plants, and better integrate variable renewable generation. Realizing this potential depends on customers – from large businesses to households to EV drivers – contributing through batteries, water heaters, and other flexible electric uses.

POLICIES
3a. Advance and expand efforts to electrify transportation, with a focus on removing barriers to ensure the state meets its zero-emission vehicle goals. *(Electrify transportation)*
3b. Facilitate and accelerate the interconnection of EV charging infrastructure and related distribution system upgrades to enable faster deployment, lower costs and complexity, and improve grid readiness. *(Distribution system readiness for EVs)*
3c. Promote strategic electrification across the residential, commercial, and industrial sectors to align policies and investment to deliver affordable, reliable, and clean energy. *(Strategic electrification)*

3a. Advance and expand efforts to electrify transportation, with a focus on removing barriers to ensure the state meets its zero-emission vehicle goals.

Near-term transportation electrification is critical to achieving Oregon's clean energy goals – and delaying action will drive up both costs and emissions. Oregon has established a strong policy foundation to accelerate near-term adoption of zero emission vehicles, notably through the Advanced Clean Cars II and Advanced Clean Trucks rules. While these rules are facing challenges at the federal and state level, the energy strategy modeling shows they are critical to advancing vehicle electrification – and support the most cost-effective pathway to a clean energy transition. Electrifying transportation not only cuts emissions but brings broad economic and public health benefits[xxxii]: lowering energy costs for most

[xxxii] https://www.oregon.gov/energy/Data-and-Reports/Documents/2025-OES-Complementary-Analysis-Tech-Report.pdf#page=5.

households, keeping more energy dollars in-state, reducing harmful air pollution, and creating a fleet of batteries that can serve as a flexible grid resource.

Need for Policies

Achieving Oregon's climate and energy goals will require a fundamental transformation of the transportation sector centered on a rapid shift to zero-emission vehicles, including battery electric and hydrogen fuel cell electric vehicles.

To accelerate the transition and create a stable funding source for Oregon's roads, the state must decouple transportation revenue from fossil fuel consumption. Current transportation funding is dependent on gas and diesel taxes and thus an inherent incentive to continue fossil fuel consumption. A more sustainable, technology-neutral revenue stream that better reflects actual road wear and tear regardless of vehicle fuel type is needed. A Road Usage Charge – a mileage-based user fee that charges drivers based on miles driven rather than fuel consumed – is one alternative approach gaining traction in Oregon and across the country.

Oregon must also dramatically increase the availability, accessibility, and reliability of zero-emission vehicle charging and fueling infrastructure, with solutions tailored to renters, homeowners, multi-family housing, ride-hailing drivers, and fleet operators. Targeted support is needed for fleet owners navigating the complex and often costly transition to zero emission technologies, as well as more information on technology readiness and feasibility that is grounded in the real-world operating needs of Oregon fleets.

By aligning infrastructure, incentives, and funding mechanisms with its climate goals, Oregon can turn its ZEV policy commitments into widespread, equitable adoption on the ground.

Risks and Barriers

Achieving rapid electrification will require removing persistent barriers that continue to hinder progress. While electric vehicles offer long-term savings through lower fueling and maintenance costs,[xxxiii] their higher upfront cost continues to be a major hurdle, particularly for low-income households and especially as federal grants and tax credits are rolled back. Even with available incentives, the upfront cost is still unaffordable for some. Special consideration is required for those who need more access to no-interest financing or stronger incentives to participate in transitioning to EVs. The erosion of federal support at a time when electrification must accelerate to meet climate goals threatens to slow adoption and widen the gap between those who can afford to transition to EVs and those who cannot.

As Oregon works to expand the availability, accessibility, and reliability of public EV charging, it must address the needs of rural drivers and those without access to at-home charging, ensuring they have convenient, affordable options to power their vehicles. Commercial and public fleets also face significant informational and operational barriers to adopting EVs, including uncertainty around vehicle availability, range, and suitability for specific use cases. In sectors like long-haul freight, further evaluation is needed to determine where and when electrification can realistically meet business needs.

Widespread transportation electrification will require a substantial expansion of electricity generation and upgrades to the electric grid to support new demand. The success of this transition is closely tied to the ability to scale the electricity system (Pathway 2), including sustained investments in clean energy and a reliable, resilient grid. Advancing this transition will also involve strategies to promote load

[xxxiii] View the Household Energy Wallet analysis. The Natural Resource Defense Council has evaluated several studies that look at the cost of purchasing and driving an electric vehicle compared to an internal combustion engine vehicle. Electric vs. Gas Cars: Is It Cheaper to Drive an EV?

flexibility, such as time-of-use rates, smart charging and vehicle-to-grid integration, to strengthen grid reliability, make better use of existing infrastructure and lower costs by reducing the need for new power generation.

3b. Facilitate and accelerate the interconnection of EV charging infrastructure and related distribution system upgrades to enable faster deployment, lower costs and complexity, and improve grid readiness.

Charging station installations will need to ramp up quickly to support growing numbers of electric vehicles.[xxxiv] Deployment of charging stations requires close coordination with local utilities to identify sites where sufficient distribution capacity exists to avoid or defer costly grid upgrades. While utilities have traditionally handled upgrade requests on a case-by-case basis, the expected surge in demand from EV charging – as well as other electrification technologies – requires a shift toward a more proactive, streamlined, and scalable planning approach.

Need for Policies

Until recently, the electricity and transportation systems operated in silos, with little need for shared data, coordinated planning, or aligned policies. But as electric vehicles become more common on Oregon's roads, the two systems are becoming increasingly interdependent. Oregon has taken important steps toward integration – for example, requiring investor-owned utilities to submit transportation electrification plans to the Oregon Public Utility Commission every three years.[34] In addition, ODOE's EV mapping project provides Oregon's consumer owned utilities with information about where electric vehicles are charging on their systems, to support growing EV adoption in Oregon. However, greater data sharing and cross-sector alignment are needed. As EV adoption accelerates, it is critical to understand where the grid has sufficient capacity to support new charging infrastructure and help guide efficient siting decisions for both public and private investments. In addition, Oregon must proactively coordinate planning across agencies and utilities to ensure the distribution grid can accommodate new demand while maintaining reliability and minimizing long-term costs for ratepayers.

Risks and Barriers

In many areas, the existing electric distribution system lacks the capacity to handle the growing EV load. This challenge is particularly acute at large sites – such as multi-family housing, fleet depots, and fast charging stations – which place intense, localized demand on the grid. Meeting these needs often requires locating sites with existing available capacity, which is not always feasible or known in advance, or undertaking costly and time-consuming grid upgrades. Compounding this issue, current distribution system planning processes are often too slow and fragmented to keep pace with the scale and urgency of this rapid growth.

[xxxiv] For more information on the current state of charging infrastructure in Oregon, see the 2025 Biennial Zero Emission Vehicle Report.

3c. Promote strategic electrification across residential, commercial, and industrial sectors to align policies and investment to deliver affordable, reliable, and clean energy.

The energy strategy modeling demonstrated that aggressive electrification of end-uses is essential to least-cost economy-wide decarbonization. Strategic electrification – also referred to as beneficial electrification – is a guiding framework for advancing electrification while supporting affordability and reliability. For electrification to be considered strategic, it must advance one of the following areas without adversely affecting the others: (1) benefits consumers over the long run; (2) enables better grid management; and (3) reduces negative environmental impacts.[35] [36] Consideration of grid management must account for resource adequacy needs, including the effects on load growth. It includes approaches to mainstream load flexibility such as time-of-use tariffs and automated load shifting that enable flexible integration of electric loads wherever possible. Other factors, such as cooling needs in some communities, must also be considered. To most effectively implement this policy the strategic electrification framework must be part of an integrated planning process for the state.

Need for Policies

While Oregon has set targets to reduce carbon emissions from electricity, transportation, and direct-use fuels, there is no state guidance on the role of electrification in achieving carbon emission reduction goals that take into account interactions between these sectors. There is also no electrification target for buildings, apart from a statutory target for the state to have 500,000 heat pumps by 2030.[37] It is important to build on the insights from the energy strategy modeling and other economy-wide studies to more clearly define an electrification pathway for the sectors and applications most able to electrify.

Applying a strategic electrification lens to inform policies to promote building, commercial, and industrial electrification can ensure that the transition will be structured to benefit consumers and the grid. It can help inform key policies including building performance standards, energy codes, appliance standards, OPUC planning processes and ratemaking, ratepayer- and publicly- funded programs, and zoning and planning. Together with the Equity and Justice Framework, it can help focus policies and programs to overcome barriers to adoption of the most energy efficient electric technologies among environmental justice populations, including heat pumps for space heating and cooling, heat pump clothes dryers and heat pump water heaters. It can inform programs that educate households and businesses about their energy use, how their buildings compare to other similar buildings, and what they can do to reduce energy use.

Load flexibility refers to the ability to shift electricity use to times when electricity is abundant and cheap. For households, this can include charging an electric vehicle, running a home battery, or preheating water during off-peak hours. These are things anyone with the necessary equipment can do, and utilities can encourage this behavior by offering lower rates at these times and supporting automation tools that make shifting energy use seamless – such as programmable thermostats or smart EV chargers. Commercial and industrial customers can also shift their consumption by adjusting operating schedules or activating backup energy systems to reduce demand during peak periods.

Risks and Barriers

While electrification is essential to achieving least-cost economy-wide emission reductions and maximizing energy efficiency, it poses several challenges. First, the electricity system is already constrained and will need to expand to accommodate new loads as they electrify. Second, while efficient electric heat pumps generate energy savings, they may not always generate financial savings for consumers. The energy wallet analysis found that factors affecting affordability included the type of housing, type of heating technology being replaced, household cooling needs, and the relative cost of electricity and gas.[xxxv] Some households – and energy burdened households in particular – may require support to transition from a natural gas or other fossil fuel reliant system to an electric heat pump. Programs to advance heat pump adoption will need to carefully balance strategically targeting households with bill savings potential and supporting energy-burdened households who may not see savings to ensure they are not inadvertently harmed or left behind. Heat pumps can increase winter peak loads, requiring additional electricity system investments. To maximize heat pump savings, the highest efficiency heat pump equipment should be used, and homes may require additional weatherization measures, increasing the amount of initial investment needed. Challenges in the large commercial and industrial sectors include technology limitations. Current heat pump technology is not suitable for high temperature processes and retrofitting existing systems can be cost prohibitive. Identifying where electrification vs. low carbon fuels are appropriate solutions will be a critical aspect of strategic electrification in these sectors. Fuel switching from natural gas to electric heat pumps erodes natural gas utility revenues, raising questions about how business models might adapt to a low-carbon future. Over time, as fewer customers remain on natural gas distribution networks, the costs of maintaining the network will fall on fewer customers, potentially raising bills and increasing energy burden in gas-dependent households. There is also a risk of stranded assets, and a need to manage retirement of parts of natural gas distribution systems that otherwise may require costly upgrades.

4. Low-Carbon Fuels

Advance the use of low-carbon fuels in the hardest-to-electrify end uses and to maintain a reliable electric grid.

Today, fuels play a critical role in providing energy for transportation, heating homes and businesses, producing electricity, and powering our industries. These include gasoline, diesel, natural gas, biomass, propane, and other fuels. Most are fossil-based and emit greenhouse gases when combusted. In the Reference Scenario, which represents the least-cost scenario modeled, most fossil fuel consumption is replaced by clean electricity or low-carbon fuel consumption over time.

Zero- or low- carbon fuels are lower carbon intensity versions of fuels we currently use such as renewable diesel, natural gas, and propane, or fuels like hydrogen and ammonia that have the potential to expand their commercial use in Oregon. These fuels are in limited supply today but will have an increasingly strategic role in powering applications where electrification is not currently feasible or cost effective. In the modeling, vehicle and building electrification was identified as a more cost-effective strategy than producing large volumes of low-carbon fuels to replace fossil fuels, while many industrial and agricultural sector applications were powered by low-carbon fuels because they can't cost effectively or feasibly electrify. Oregon will need to balance the increasing demand for these fuels and potential

[xxxv] See the Household Energy Wallet analysis.

economic development opportunities with the potential impact to land use, natural resources, health, and life cycle emissions of production and delivery. Based on available data and technology projections, these fuels are expected to remain limited in supply and costly to produce. In the least cost pathway modeled in the Reference Scenario, fuel use across the economy declined by 70 percent by 2050. It will also be important to recognize the burden that may be placed on low-income, rural, and coastal households and businesses who may not have the same access to electrification and could be stranded/left behind to carry more of the cost of maintaining fuel infrastructure with fewer users.

While fuel volume is predicted to decline gradually over time, fuels remain foundational to providing essential energy services for the foreseeable future. For these reasons, it will be important to advance the use of low-carbon fuels over time in strategic sectors, including aviation, rail, and marine transport, long-haul trucking, agricultural and off-road equipment, and high-heat industrial processes, such as steel, cement, and chemical refining, as well as for power sector reliability. Low-carbon fuels present a potential economic and resilience opportunity for Oregon to use waste feedstocks, such as woody biomass or biogas from municipal waste or wastewater facilities. These local energy sources can be distributed, used onsite, or stored to fuel local renewable energy generation or improve community resilience. These opportunities may create new revenue streams that can support community or municipal facility improvements. Improving the efficiency of how businesses and communities are using resources through measures such as industrial symbiosis can further capture opportunities to reduce emissions and increase competitiveness.

POLICIES
4a. Foster development and expansion of low-carbon fuels and fuel infrastructure to serve the hardest-to-electrify sectors in Oregon as a strategic resource, while mitigating environmental and community impacts. *(Low-carbon fuels and fuel infrastructure)*
4b. Support low-carbon fuel adoption in the hardest-to-electrify sectors including aviation, rail, marine transport, long-haul trucking, agricultural and off-road equipment, high-heat industrial processes and resources that support electric system reliability. (*Low-carbon fuels adoption)*
4c. Support a managed fuels transition that minimizes stranded assets as end-uses electrify, identifies opportunities to leverage existing infrastructure and expertise to support clean fuel alternatives, and encourages technological innovation to advance new opportunities. *(Managed fuels transition)*

4a. Foster development and expansion of low-carbon fuels and fuel infrastructure to serve the hardest-to-electrify sectors in Oregon as a strategic resource, while mitigating environmental and community impacts.

Low-carbon fuels, including liquid and gaseous fuels consumed for transportation, direct use, and electricity production, will play a growing role in Oregon's economy as the state decarbonizes. The energy strategy modeling found that electrification in transportation and buildings is part of a least-cost pathway to decarbonizing the economy, but some applications will still need to be powered by fuels. In the least-cost pathway modeled in the Reference Scenario, fuel consumption dropped 70 percent by 2050, and most remaining fuels shifted from fossil to a low-carbon fuel.

Low-carbon fuels and electricity are used in Oregon's transportation sector today but only represent about 9 percent of annual consumption.[38] Most low-carbon fuels consumed in Oregon are imported into the state and adoption is constrained by a limited supply. There is an insufficient source of low-carbon fuels to replace the fossil fuels we rely on today. Not all of Oregon's communities have affordable access to these fuels as supply is focused on meeting demand in the urban areas along the I-5 corridor. Decarbonization in Washington and California will likely drive greater regional demand for low-carbon fuels. This may lead to increasing competition and potentially higher prices for these fuels, or simply a lack of availability in Oregon as limited supply is directed to Washington or California. Oregon has potential low-carbon waste biomass feedstocks from agriculture and forest management that could be used to produce low-carbon fuels and create an economic opportunity in rural communities. Encouraging the development of low-carbon fuels regionally will be important to help meet decarbonization needs, while development of in-state fuel production and distribution will help Oregon leverage economic opportunities in the state.

Need for Policies

Oregon has existing policies guiding decarbonization of transportation and direct-use fuels but needs to develop new policies around fuel infrastructure development to ensure fuel supply access and program success. Oregon's Clean Fuels Program and the federal renewable fuel standard support clean fuels development.

To evaluate the potential of renewable natural gas production, the Oregon Department of Energy conducted a Biogas and Renewable Natural Gas Inventory Report in 2018 to identify fuel feedstocks and locations around the state.[39] Natural gas utilities have also been encouraged to incorporate biogas into their fuel mix with voluntary biogas goals.[34] Biogas collection facilities have been sited in Oregon but most of the fuel produced is used onsite or the environmental benefits are sold out of state. Oregon joined Washington and other public and private partners in the region in creating the Pacific Northwest Hydrogen Hub to create a test bed for renewable hydrogen infrastructure in the northwest, winning a $1 billion federal investment.[40] Changing priorities at the federal level have currently canceled this funding opportunity[xxxvi] but there is interest in fostering renewable hydrogen or other low-carbon fuel opportunities to power the hardest to electrify applications.

With a growing demand for low-carbon fuels, complementary policies are needed to facilitate fuel production in Oregon and help ensure low-carbon fuels are available to support targeted deployment in strategic sectors.

Risks and Barriers

While the limited amount of fossil and biofuel production in Oregon has led to economic dependence on other states, it also shielded Oregon communities from some of the environmental and social impacts associated with producing these fuels. New low-carbon fuel production facilities offer jobs and economic development but they may also add air, water, and noise pollution to communities. Identifying existing brownfields for potential development may mitigate some environmental harms of new development but may also continue historic negative health and social impacts on vulnerable communities located near industrial sites. It will be necessary to intentionally reduce barriers to participation for those communities so they are able to meaningfully engage in conversations and decision-making processes.

[xxxvi] On October 1, 2025, the U.S. Department of Energy announced it was cutting $8 billion in clean energy projects across the nation, including the $1 billion award to the Pacific Northwest Hydrogen Hub.

Biofuels are made from organic materials or biomass and are the most beneficial when produced from agricultural, municipal, and wood waste feedstocks instead of from crops grown for energy. Oregon has abundant forest resources that can provide wood waste as a feedstock for fuel production and the collection of wood waste through forest management can reduce wildfire risk and support rural economies, but these resources are widely dispersed and can be challenging to efficiently collect at a cost-effective scale. As demand for fuel increases and competition for waste feedstocks increases, there is a risk that non-waste feedstocks could be used, potentially leading to deforestation, habitat loss, and farmland being used to produce energy crops rather than food. The need for expansion of energy infrastructure and resources needs to be balanced by the potential negative impacts to natural resources, wildlife, and the health of local communities.

Investment in low-carbon fuel production facilities carries risk as some of these fuels, such as hydrogen or ammonia, are nascent technologies with limited existing production and distribution infrastructure, resource tradeoffs, and health and safety concerns. Some low-carbon fuels may also be considered transitional as they provide an immediate decarbonization solution but may be phased out over time with advancements in electric or other fuel options. Low-carbon fuels are more expensive to produce than petroleum fuels and are dependent on government subsidies and tax credits to be competitive in the fuel market. Federal and state policies may change over time, and that can have a dramatic effect on the demand for and the economics of these fuels. Technologies and the best applications of these fuels are also evolving and uncertain, creating a need for the state to track and share industry innovation.

Increasing fuel production in Oregon has potential social, environmental, and economic risks as well as benefits to decarbonization and economic growth and independence. Oregon needs to evaluate the options and develop a comprehensive approach to attracting fuel production in the state while mitigating negative effects, evaluating fuel life cycle emissions and preventing unintended consequences.

4b. Support low-carbon fuel adoption in the hardest-to-electrify sectors including aviation, rail, marine transport, long-haul trucking, agricultural and off-road equipment, high-heat industrial processes and resources that support electric system reliability.

Shifting demand from fossil to low-carbon fuels in transportation and industry may require technical guidance and financial support from the state. Drop-in fuels or those that can be used in existing equipment and fuel storage are the easiest to adopt but some fuels and applications will require equipment retrofits and/or a change in how fuels are consumed. In the least-cost pathway modeled in the Reference Scenario, by 2050 most industrial processes were powered by low-carbon gas from biogenic sources or low-carbon hydrogen where electrification of applications was not cost-effective or feasible. In transportation, the energy strategy model indicated that low-carbon fuels were needed to decarbonize aviation, rail, and marine transport as well as some long-haul trucking and agricultural and off-road equipment. In the electricity sector, while less gas overall was burned over time across the scenarios, the system relied on existing fossil and new low-carbon gas facilities in Oregon operating at low capacity factors to provide system flexibility and reliability. To achieve this shifting demand in how

we use fuels and what fuels we do use will require clear and early direction from the state so Oregon businesses and communities have time to prepare. Businesses and communities may need information in accessible language, so they are able to be prepared and participate in decision-making processes. State government can support this transition through research, technical guidance, and resources.

Need for Policies

Oregon's fuel decarbonization policies are focused on reducing the emissions of fuels used in transportation and direct use but are limited in their support of consumers and industries that need to make the energy transition. The Clean Fuels Program aims to reduce the carbon intensity of Oregon's transportation fuels over time. The Climate Protection Program establishes a declining limit on greenhouse gas emissions from fossil fuels used throughout Oregon, including diesel, gasoline, and natural gas, out to 2050. Support is needed to drive implementation of these programs, including overcoming cost, information gaps, and technical barriers, as well as expanding the availability of low-carbon fuels in Oregon.

While some low-carbon fuel solutions such as renewable diesel, biodiesel, and ethanol are in use in transportation today, others like hydrogen and ammonia are not yet at market scale. These may be viable solutions in the future, and the state can help Oregon businesses vet the opportunity by tracking their commercial development, determining the best uses for Oregon consumers, identifying opportunities to integrate them into Oregon's energy system, and evaluating the state's role in securing access.

Existing policies do not offer clear direction around a decarbonization pathway or timeline for fuel applications like maritime, aviation, and rail transportation fuels. These transportation categories and other fuel applications without clear direction may benefit from state policies such as fuel decarbonization targets or support, allowing Oregon businesses to plan for the transition and begin to secure regional low-carbon fuel supply. Sectors that are covered by policies with direct regulatory decarbonization goals, such as energy-intensive trade-affected industries (in the Climate Protection Program) and commercial buildings (in the Building Performance Standard program) face technical, informational, and financial barriers as they transition how they use energy. There are opportunities for the state to offer research, technical, and financial assistance to support the transition and help Oregon businesses decarbonize successfully while remaining competitive.

Risks and Barriers

Decarbonization of fuels, electrification, and increased energy efficiency have the potential to reduce operating costs and offer savings for Oregon businesses over time but the initial investment and potential increased risk are significant hurdles for most businesses.

Increased adoption of low-carbon fuels may pose economic, technological, and social risks, and policies must be structured to understand and help navigate these risks. Adopting low-carbon fuel technologies may require significant upfront capital, and use of low-carbon fuels may lead to higher costs, making it more difficult to compete outside of Oregon or leading to higher costs for consumers and businesses. Shifting federal policies creates additional risk and uncertainty. There is a limited supply of low-carbon fuels, which means Oregon businesses may be competing for access to the fuels unless new production comes online in Oregon and the region. Onsite generation and storage of fuels such as renewable hydrogen may be a viable option but will require a greater initial investment, may potentially pose new safety hazards, and increase dependence on access to resources such as feedstocks or water.

Developing and scaling up new technologies and fuels requires continuous innovation, investment, and overcoming knowledge and technical limitations in energy efficiency and storage. Existing infrastructure

may need to be retrofitted or replaced, consumer behavior and manufacturing processes may need to change, and workforce training may be needed.

4c. Support a managed fuels transition that minimizes stranded assets as end-uses electrify, identifies opportunities to leverage existing infrastructure and expertise to support clean fuel alternatives, and encourages technological innovation to advance new opportunities.

Transitioning existing fuel consumption to electricity and low-carbon fuels is an important component of a least-cost pathway to decarbonizing transportation and buildings — but the transition poses challenges for existing fossil fuel suppliers and customers, as well as for power system resilience and reliability. Liquid and gaseous fuels play an important day-to-day role as a foundational resource for building heating, commercial and industrial processes, and electricity generation. They are also critical to disaster recovery, wildfire response, and as a backup energy supply. Emergency management operations are currently designed to take advantage of the ability of petroleum-based fuels to be stored and mobilized quickly during emergencies.

Shifting energy use from the existing natural gas system to the electricity system as well as growing demand from new loads will require expansion of clean electricity generation, transmission, and storage infrastructure. Rapid expansion of Oregon's electricity system will be challenging and there will remain a need for on-demand resources like natural gas to provide support as energy resources and demands fluctuate. Fossil fuel applications in buildings and transportation will need to electrify to meet decarbonization targets on a least cost path. This will lead to a gradual decline in end-users, leaving fewer remaining customers to cover the costs of the fuel and maintaining the existing fuel distribution system. Oregon's energy system will still be dependent on petroleum fuels but as consumption volumes decline it may be more challenging for fuel suppliers to remain economically viable and still provide service. It is important to consider the state's role in managing this risk, guiding gradual change while supporting innovation, and capturing opportunities to repurpose existing infrastructure for low-carbon fuels or other energy applications.

Managing this transition requires a recognition of the role of strategic electrification in decarbonizing buildings, industry, and transportation as a cost containment approach while balancing the reality of Oregon's current dependence on fossil fuels. The transition will require policy and strategic support from Oregon's Legislature, state agencies, and fuel providers to spur the energy transition in a way that addresses the effects of declining fuel demand on distribution systems over time. Electric and natural gas utilities will need to share data and planning information to ensure system resilience and infrastructure cost containment. Additional solutions may include retrofitting or repurposing existing infrastructure to support low-carbon fuel adoption in the hardest-to-electrify end uses and electricity generation, as well as investment in new infrastructure that uses waste feedstocks or other Oregon resources to produce fuels such as ammonia, renewable natural gas, and renewable hydrogen. Before investing in new fossil fuel distribution infrastructure, Oregon should consider alternative solutions — such as investment in efficiency and electrification to mitigate the risk of stranded assets, weigh resilience benefits, and plan for a transition to a low-carbon fuel alternative over time. Finally, it is

important to explore how to use existing fuel supplier expertise and infrastructure to help deliver deeper carbon reductions through new approaches, such as through construction and management of thermal energy networks and capturing geothermal or industrial waste heat with the potential to serve multiple buildings and even entire neighborhoods.

Need for Policies

A managed energy transition will not happen alone. The economywide interactions between sectors are not captured by the planning of any single entity and cross-fuels coordination will be needed to support resource adequacy and reliability during the transition. State policy is needed to balance the risk of investment in resources or infrastructure that may become obsolete or uneconomical to operate due to changing energy demands — for example, paying for upgrades on a distribution line to a community with declining natural gas consumption over time. Absent explicit policies and analysis, it can be challenging to predict changes in consumer demand that could result in much higher natural gas costs for customers remaining on the distribution line. During this transition, non-pipe solutions such as energy efficiency or electrification as an alternative to new distribution infrastructure could reduce the risks associated with large investments. This will require a data-driven approach, regulatory guidance, and collaboration with Oregon communities. California, for example, is deploying several pilot projects to test strategies to manage the shift to electric end-uses in buildings by focusing electrification initiatives in areas where the gas distribution network is in need of upgrades.[41] It will also be important to consider policies that support innovation, leveraging expertise from the oil and gas sectors to support low-carbon fuels and other technologies like district heating and enhanced geothermal power generation.

Risks and Barriers

Decarbonizing fuel applications by transitioning from petroleum fuels to electricity or an alternative low-carbon fuel has a variety of short term economic and social risks. In the long term, it is clear that mitigating climate change and reducing Oregon's dependence on finite imported petroleum fuels is beneficial. In the short term, the transition will require significant investments in new infrastructure and there will be risk associated with investing in nascent technologies and fuels. Not all consumers will be interested in transitioning to new fuels or changing how they use energy. Tribal and public engagement will be important to a successful transition.

A declining customer base for the existing fuel distribution networks is likely to raise costs for the remaining customers, elevating affordability, equity, and environmental justice concerns for those customers unable to afford switching to efficient electric technologies. It will be important to apply a strategic electrification approach to reduce and mitigate effects on environmental justice households and communities, and for policies to reduce risks of stranded assets. Some industrial users in Oregon may continue to use natural gas for their operations and/or as a backup power source because there isn't an affordable or viable alternative, but they may be subject to increasing fuel costs. Fuel suppliers may gradually lose customers but will need to remain viable where they are providing a critical service to Oregon's energy system. It will be important to mitigate the risks of relying on new markets for new fuels and technologies during the transition.

5. Resilience

Strengthen resilience across all levels of the energy system, including utilities, communities, and customers, enhancing Oregon's ability to adapt to climate change and mitigate other risks.

To successfully navigate the energy transition, Oregon must incorporate measures that mitigate vulnerabilities to the energy system, including growing risks due to climate change, ongoing hazards such as earthquakes, wildfires, windstorms, and winter storms, and cyber risks identified in Oregon's Energy Security Plan. The changing climate is being felt in Oregon today. Extreme events are increasing in intensity, straining our energy systems and economy and threatening public health and safety, particularly in vulnerable and environmental justice communities. This includes strains on the hydropower system, transmission and distribution networks, and on homes and businesses. Available data[17] and comments from external engagement indicate a need to strengthen resilience across the energy system, create community-level solutions, and help adapt the built environment to better protect people from extreme weather, wildfires, and wildfire smoke.

Many measures that mitigate climate change have strong resilience benefits. For example, weatherization can help maintain healthy indoor temperatures when extreme weather hits. Heat pumps can provide life-saving cooling in summer, and protect indoor air from wildfire smoke by avoiding the need to open windows to stay cool. Distributed solar and batteries can make power available during outages, and can be combined into microgrids to support communities. It is also important to recognize that Oregon is dependent on the flexibility and availability of fossil fuels such as gasoline and diesel fuel or natural gas and propane to maintain resilience, reinforcing the need to carefully adjust what resources we use and how we use them in deploying the strategic electrification pathway.

These five pathways serve to set a shared direction for our state. That shared direction must recognize the interactions between each pathway, and work to improve visibility, planning, and coordination to capture synergies and reduce the risk of inefficiencies or siloed approaches. A shared approach must also be adaptable to change. Our climate goals extend to 2040 and 2050 – a time period during which technologies will evolve and different policy approaches will offer opportunities to learn from experience. HB 3630 directs ODOE to periodically update the energy strategy to reflect current information, data analysis, and state energy policy objectives. ODOE recommends updating the strategy every four years to track progress and recommend actions to ensure that the pathways and policies remain on track and are leading to equitable and just outcomes.

POLICIES
5a. Evaluate cross-fuel interdependencies and vulnerabilities to better ensure long-term reliability of the electric grid. This specifically includes strengthening coordination of electricity and natural gas system planning and exploring other cross-fuel areas requiring strategic coordination. *(Cross-fuels planning)*
5b. Fund resilience measures across the energy system, including at utility scale and in homes, businesses, and communities through a combination of ratepayer and taxpayer dollars, particularly where climate adaptation measures can also help advance climate mitigation. (*Resilience measures)*

5c. Maintain emergency response capabilities, including the adaptability and readiness of vehicles, supply of fuels, and fuel storage needs during the energy transition. *(Emergency response capabilities)*

5a. Evaluate cross-fuel interdependencies and vulnerabilities to better ensure long-term reliability of the electric grid. This specifically includes strengthening coordination of electricity and natural gas system planning and exploring other cross-fuel areas requiring strategic coordination.

Oregon's energy systems are under increasing pressure from wildfire, extreme weather, and other effects of climate change while they are tasked with decarbonizing. To mitigate risks and better prepare for and respond to system stress, it is important to strengthen coordination between sectors to manage climate risks and the increasing complexity of cross-sector interdependencies. This is particularly true for the power and natural gas sectors, which face confluent vulnerabilities during extreme weather events. In January 2024, the Governor declared a state of emergency after freezing rain and downed trees led to widespread power outages that disproportionately impacted environmental justice communities.[42] During that event, electricity demand across the region exceeded historic records at the same time many electricity generating resources faced performance challenges. Simultaneously, natural gas supply — critical not only for some home heating but also for gas-powered electricity generating resources — was restricted due to an issue at a key gas storage facility.[43]

As more end uses electrify and the power and natural gas systems decarbonize, it will be important to evaluate how we maintain reliability during times of peak system stress. The Oregon Energy Security Plan identifies relationships between these and other sectors and recognizes the growing need for more coordination to ensure a reliable energy transition. The plan identifies additional risks that will be important to plan for, including the risk of an earthquake in the Cascadia Subduction Zone, cyber security threats, and domestic and international terrorism.[17] Other regional studies have similarly identified a critical need for more coordination to ensure a reliable energy supply from the electric and gas systems.[xxxvii]

Need for Policies

Separate entities provide energy services for different fuels, such as transportation fuels, electricity, and natural gas. Those entities have historically focused on their own individual systems, without significant cross-system coordination. Yet such coordination is important to address the interconnected nature of Oregon's energy sector and the growing threats like climate change that threaten all systems. With regulatory oversight over investor-owned electric utilities, the Oregon Public Utility Commission has been encouraging regulated entities to coordinate and share information, particularly in their long-term planning processes; some energy providers have initiated this process. More guidance and support from the state is needed to enable the robust energy security planning needed for a resilient and affordable energy future, not only in investor-owned utility service areas but broadly across the state. In the near term, Oregon should focus on facilitating multi-fuel conversations to inform and improve energy reliability and resilience, particularly between the electricity and natural gas sectors. Over time, more

[xxxvii] For example, the Pacific Northwest Utilities Conference Committee and Northwest Gas Association commissioned a third-party analysis of regional energy reports that highlights these challenges. https://www.pnucc.org/wp-content/uploads/Guidehouse-analysis-of-regional-energy-reports-2025.pdf

coordination around distribution system planning may also be needed to manage the process of implementing building electrification where customers transition from gas networks to electric grids.

Risks and Barriers

Oregon's electric and natural gas systems are interconnected and dependent on each other but decarbonization may strain that relationship as end users electrify and the current natural gas business model evolves. The total volume of natural gas used will gradually decline but the fuel will remain critical to the remaining customers and maintaining electricity system reliability as an on-demand resource. Energy planning and forecasting in the Northwest is conducted by a variety of organizations including energy utilities, Bonneville Power Administration, Northwest Power and Conservation Council, and others to ensure resource adequacy. These evaluations are independent of other energy systems and may conflict with the assumptions of other energy providers. Energy demands are increasing from tech loads, industry, and population growth that supports economic development but can be challenging for utilities to service. Utility infrastructure development independent of other energy systems may lead to the construction of redundant resources, stranded assets, or inadequate resources in areas with changing energy demands.

Maintaining system reliability while minimizing the costs of the energy transition will require energy service suppliers to share data, assumptions, and work together. The state must support utilities in getting beyond the barrier of market competition and focus on agreement around the rate of electrification in their service areas, emergency response scenarios, resources needed to meet demand, and Oregon's changing energy landscape.

5b. Fund resilience measures across the energy system, including at utility scale and in homes, businesses, and communities through a combination of ratepayer and taxpayer dollars, particularly where climate adaptation measures can also help advance climate mitigation.

Strengthening the resilience of the electric grid can reduce disruptive events, like power outages due to extreme weather. Most disruptive events are due to service issues in the distribution network, not generation.[xxxviii] Many of the measures that reduce greenhouse gas emissions also deliver resilience benefits. As temperature extremes grow, investments in measures like weatherization, heat pumps for air conditioning, and distributed renewable resources and batteries can reduce greenhouse gas emissions while protecting households from risks such as wildfire smoke, extreme temperatures, and prolonged outages. Targeted resilience investments have the potential to offer Oregon communities self-sufficiency and reduce the demand for emergency response. Climate change is also making other measures more expensive. For example, utilities invest in "grid hardening" to reduce risks of wildfire and wildfire-caused damage, which increase costs of building and maintaining transmission and distribution infrastructure. Costs have increased for utilities and could rise more from wildfire damage and litigation, which impacts

[xxxviii] NREL, Explained: Reliability of the Current Power Grid, https://docs.nrel.gov/docs/fy24osti/87297.pdf

affordability for customers.[44] Insurance against climate risks has become more expensive. Financial support to cover these infrastructure costs, such as bank loans to investors, is generally less available and more costly to secure.[45]

Need for Policies

While utilities have a critical role to play in improving the resilience of their systems, resilience measures should not be constrained by a utility's funding limitations. A utility may not be able to make the investments or operational decisions needed to improve resilience at the local level for individual communities, businesses, and households. State action is needed to ensure investments are made that consider the resilience benefits. This may include policies that can build on existing utility ratepayer funded programs, as well as existing state-funded programs such as the County Energy Resilience Grant Program, Community Renewable Energy Grant Program, and state-funded heat pump programs – all of which are now in jeopardy due to lack of available state funding. Rural, coastal, and low-income communities in Oregon, and those served by consumer-owned utilities, may need higher levels of government support to implement proactive grid-resilience measures and recover from damages caused by wildfire, winter storms, or other disasters. Absent government support, the increased costs necessary to pay for significant resilience or reliability investments will fall hardest on those households and businesses already suffering from high energy costs. It is important to continue to promote and support relationships between Tribes and utilities to focus on resilience projects that benefit Tribal communities and lands through programs like the federal Grid Resilience Grant program.

Risks and Barriers

Oregon's existing electricity grid and natural gas pipeline infrastructure is aging and will increasingly be vulnerable to outages, wildfires, and declines in efficiency. Existing infrastructure can also hinder the integration of new technologies and potential solutions to improve the efficient delivery of energy. Utility resilience measures require significant upfront investment and planning to implement, and many utilities in rural communities are the most exposed but have the least amount of resources to address the issues. Supply chain disruptions caused by geopolitical tensions, trade restrictions, and events like the COVID-19 pandemic have resulted in long lead times for equipment procurement and higher costs for utilities.

Households, businesses, and communities also face increasing risks that fall outside of utility cost-effectiveness calculations. For example, weatherization measures or installation of solar panels plus storage may not be cost-effective from an energy perspective, but can deliver significant benefits in the case of extreme weather and outages. Support is needed to encourage investment in resilience measures across investor- and community- owned utility service areas, and especially in rural and coastal communities that face higher outage frequency and duration.

5c. Maintain emergency response capabilities, including the adaptability and readiness of vehicles, supply of fuels, and fuel storage needs during the energy transition.

Every day, the thousands of Oregonians involved in emergency management, planning, and response provide critical services to the people of our state, protecting lives, property, and the environment. In turn, these Oregonians rely on vehicles, utilities, tools, and facilities, all of which are powered by energy. Today, emergency response vehicles — including fire trucks, police cars, ambulances, wildfire fighting crews, air support, and bulldozers — rely on a steady supply of petroleum liquid fuels. Additionally, when

grid power is unavailable, backup emergency power is typically provided by liquid fuels or natural gas generators.

Even as communities increase their resilience by adding distributed generation and storage, liquid and gas fuels will likely still be needed in the foreseeable future to provide on-demand power to emergency response resources, including vehicles, planes, and backup power generation. Low-carbon fuels or other innovative technologies may be able to meet these needs while lowering greenhouse gas emissions, but it will take time to transition to these alternatives, and costs will likely be higher than traditional fuels. State and local jurisdictions will need to work with partners to develop guidance on what investments to make for emergency planning while also preparing for changes in how energy is used in the future.

Need for Policies

The Oregon Department of Energy published the Oregon Energy Security Plan in September 2024 and updated it in September 2025, following direction from the federal government and SB 1567. The plan is updated annually and identifies risks to electricity, liquid fuel, and natural gas/propane systems, and proposes ways to mitigate those risks. The plan is intended to inform Tribes, the state, and local governments as they prepare for supply disruptions and make decisions related to energy systems and infrastructure investments, resilience and hardening strategies, and asset management. However, the Energy Security Plan does not specifically evaluate current statewide or local emergency planning resources or analyze how Oregon's energy transition may affect emergency response capabilities. State guidance on future emergency management resource needs can support strategic investment by governments at all levels to better prepare the state to respond and recover from future energy emergencies. It will be important for policies to explicitly include Tribes and rural communities in both the planning efforts to understand local needs as well as implementation.

With this in mind, it is necessary for Oregon to enact and implement policies that will protect our emergency response capabilities through the energy transition. This includes maintaining a resilient supply of necessary fuels, as well as the infrastructure required to procure, transport, distribute, and store those fuels. There is a need for coordinated, strategic energy emergency management planning that aligns with state greenhouse gas reduction goals and identifies short, medium, and long-term energy needs for emergency response. This work should build upon the Oregon Energy Security Plan as well as ongoing coordination between Tribal governments, state agencies, and local governments.

Risks and Barriers

There are limited alternatives to liquid fuels for most emergency response vehicles and heavy equipment. Specifically, the need for diesel fuel (or its lower-carbon variation, renewable diesel) and the need for aviation fuel (or its lower-carbon variation, sustainable aviation fuel) will be necessary and vital for Oregon's emergency response systems. This is especially true for emergency response vehicles serving locations far from the power grid that must be able to operate when the power grid is down and have to respond immediately (and not wait for charging, for example). Oregon faces regular significant natural hazards including major wildfires, winter storms, and floods that are becoming 'routine' and seasonal. Additionally, the state must continue to prepare for a potential Cascadia Subduction Zone earthquake, as well as non-natural hazards such as acts of terrorism and cybersecurity threats, all of which can affect energy systems that we rely upon for life safety.

Legislative and Policy Actions

HB 3630 directs ODOE to recommend legislation or changes to policy necessary to implement the state energy strategy.[11] The previous sections presented strategies and policies to align decisions with direction needed to meet our energy policy objectives. This section identifies near-term actions that build on existing policy frameworks, serve to overcome barriers, will lay a foundation for continued progress over time.

Oregon faces several immediate challenges that affect the state's ability to meet its energy goals. These include:

- Increasing demand for electricity at a pace and scale that threatens to potentially outstrip supply
- A shift in federal funding and policy that has resulted in cuts to key programs and policies
- Extreme weather events exacerbated by climate change
- Erosion of federal support for social services
- Economic uncertainty

These challenges will affect Oregon's economy and state budget and require that near-term actions operate in a context of competing priorities and heightened uncertainty and risk.

In identifying actions, ODOE staff focused on actions needed to overcome near-term barriers to addressing our energy policy objectives. This work was informed by Tribal coordination and collaboration and by engagement with working groups, the Advisory Group, Inter-Agency Steering Group, and public forums. In identifying near-term priorities, and building on inputs from engagement, staff sought to answer the following questions:

Some actions will involve agencies advancing actions that are **within their authority and resources**. In others, implementation **may require legislation** to support agency resources or to create new programs, policies, or authorities.

- Does the action address a critical near-term barrier to achieving one of the five strategies and related policies?
- Might the action support longer-term needs to achieving the strategies and policies?
- What are the benefits and risks of the action, accounting for both energy and non-energy considerations?
- Does the action improve, worsen, or make no change to existing disparities. How can we address benefits and/or unintended consequences for environmental justice communities?
- How would the action affect affordability and reliability in the state?

The recommended policy actions have been informed by engagement, technical analysis, and evaluation of existing policy frameworks and energy trends. This includes engagement with Tribes and with other state agencies, the Policy Working Groups, Advisory Group, public forums, and written comments. The technical analysis includes the energy strategy modeling and complementary analyses summarized earlier in this document. Evaluation of existing policies and trends was undertaken by ODOE staff and informed by resources and perspectives shared during public engagement and comment periods. Actions do not necessarily represent consensus among the Advisory Group or Working Groups, and there may be actions that members of these groups do not agree with. The full summary of policy discussion and written input and comments can be found on the energy strategy webpage.

This section presents the 42 near-term actions that ODOE recommends for consideration by the Governor's office, legislators, and by state agencies. Actions are presented by sector (cross-cutting, transportation, buildings, industry, electricity, and fuels). Each sector begins with a description of the vision for that sector, near-term priorities, and longer-term outlook, followed by actions.

Each action advances one or more pathways and policies, and requires application of one or more actions from the equity and justice framework. To help see these connections, each action is followed by italicized headings identifying the pathways, policies, and equity and justice approaches that relate to that action.

Cross-Cutting Actions

The following actions advance progress in more than one sector.

Cross-Cutting Action 1. Impose registration and reporting requirements upon all new large electric loads to inform greenhouse gas emissions analyses, and evaluate whether policy changes are needed to bring emissions in line with state policies. This would require an action from the Environmental Quality Commission.

Pathways: 2 (Clean Electricity); 4 (Low-Carbon Fuels)

Policies: 2a (Utility-scale and distributed energy resources); 4b (Low-carbon fuels adoption)

Equity and Justice Approaches: 1 (decision-making)

Although new tech loads, such as data centers, are expected to be the biggest near-term driver of electricity demand growth, relatively little information is available for these loads — or what resources will serve them. Some will be served by investor-owned utilities with clean energy requirements pursuant to HB 2021 (2021), but others — potentially a majority — will not. Most of Oregon's consumer-owned utilities receive all or nearly all of their electricity supply from the Bonneville Power Administration. Yet federal law restricts BPA's ability to supply new large loads at its lowest rates. Any service to those loads by BPA would be at a much higher rate that covers the full cost of that service or would be served by an alternative power supply that the COUs procure. A new large load is defined as "any new load, or expansion of an existing load, at a single facility that grows by 10 average megawatts (aMW) or more in any 12-month monitoring period."[xxxix] This means a significant and growing amount of electric load in Oregon is not subject to HB 2021's clean energy targets and might not be supplied by BPA, leading to potential increases in Oregon's reliance on emitting electricity sources.

It is unclear at this time what the implications of these new loads may be for Oregon's energy policy objectives, including Oregon's economy-wide decarbonization goals. Many of the larger new tech load companies, including Amazon and Google, have adopted voluntary climate goals that prioritize the use of clean electricity and aim for net-zero carbon emissions in the coming decades. But the state does not have sufficient data to know how many of the new loads are subject to voluntary climate goals or not, nor does the state have sufficient data to assess whether progress toward voluntary goals is occurring consistent with Oregon's economy-wide decarbonization goals.

[xxxix] For more on this, see BPA's New Large Single Load fact sheet, available at fs-202011-new-large-single-load.pdf.

Currently, the Oregon Department of Environmental Quality, pursuant to direction from the Environmental Quality Commission, requires all electricity suppliers operating in Oregon to register and report greenhouse gas emissions data for Oregon electricity sales. While this data provides utility level information, it is insufficient to evaluate new tech loads energy needs or their implications for the state's goals.

Additional reporting — directly from new large loads about their operations and energy consumption — is needed to inform state decision-making. This policy action proposes a new statewide registration and reporting requirement for all new large loads. A statewide approach is more appropriate than focusing only on areas not covered by HB 2021, which could cause confusion or unduly affect business decisions about where to locate. A statewide approach may also provide insights on the potential effects of the largest businesses across the state that are subject to the Climate Protection Program and may be increasing their reliance on electricity. A statewide approach could also support future evaluation of impacts of new large loads on other natural resources, such as water consumption. Imposing state reporting obligations may pose a risk of discouraging new loads and new economic development in Oregon. Yet having improved data and transparency regarding the energy requirements of these large-load facilities would help the state and the communities in which the facilities are located make informed decisions.

Cross-Cutting Action 2. Establish and identify a source of funding for a revolving loan fund to provide a stable source of low-cost and no-cost loans to support the energy transition and resilience.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 3 (incentive programs); 5 (partnerships and resources)

This action would establish a dedicated revolving loan program that primarily serves to amplify the lending capacity of existing entities delivering grants and loan programs to support access to clean energy technologies for households and businesses. Examples include local credit unions, utility programs, Energy Trust of Oregon, community organizations, local governments, and state agencies. It would be necessary to work with state agencies and the legislature to identify seed funding and establish an appropriate framework. It will be important to ensure that the new financing does not result in defunding or re-prioritizing programs and/or assistance for energy efficiency measures for households with low and moderate incomes.

The energy transition will require significant investment in new technologies and infrastructure. A stable source of financing is critical to support the pace and scale of investment required to both reduce greenhouse gas emissions and enhance resilience to climate impacts. A revolving loan fund can provide a stable and growing pool of money to support measures driving uptake of clean energy technologies over time.

A revolving loan fund also provides an opportunity to support loan products that provide access to financing for low- and moderate- income and environmental justice households who have either not had access to loans or been subject to predatory lending practices. A revolving loan fund can enable existing grant and rebate programs to focus more direct assistance funding to low- and moderate-income households who do not qualify for traditional loans.

The revolving loan fund should include programs that make financing available in, at minimum, the following areas: energy efficiency and electrification measures in residential and commercial buildings; light-, medium- and heavy-duty zero emission vehicle and ZEV charging or fueling infrastructure; and distributed resources.

Cross-Cutting Action 3. Establish a Tribal Energy Block Grant Program to support Tribal energy priorities, cultural values, and community needs through alignment with their own energy planning processes or the Oregon Energy Strategy.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 3 (incentive programs); 5 (partnerships and resources)

A Tribal Energy Block Grant program would provide direct, flexible funding to federally recognized Tribes to design and implement energy programs that reflect their own priorities, cultural values, and community needs. Modeled after other successful block grant structures, such as federal housing block grants, this program would shift decision-making power to the Tribes by allowing them to determine how best to use their funds, whether for energy efficiency upgrades, renewable energy deployment, workforce development, planning and capacity building, or other strategies that align with the policy recommendations in the Oregon Energy Strategy or Tribal energy strategies. Rather than prescribing a one-size-fits-all approach, the program would recognize the sovereignty of each Tribe and support locally tailored solutions that promote energy resilience, affordability, and self-determination. The program should build in administrative support and multi-year funding to ensure the program's stability and reduce the administrative burden that often accompanies competitive grant processes. Ultimately, this program could serve as a key tool in operationalizing the state's commitment to equity and Tribal energy sovereignty.

Cross-Cutting Action 4. Develop a state-wide definition of energy burden that combines household and transportation costs to help inform Oregon's energy transition.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

Under this action, the Oregon Department of Energy would develop a consistent, cross-agency definition of energy burden[xl] that incorporates both building energy costs and transportation-related energy expenses. This updated definition can be used across agencies to assess and track how policies – particularly those related to electrification in buildings and transportation, as well as investments in multimodal transportation – affect household energy costs over time. Under this action, ODOE would cooperate with other agencies in developing this definition, including OHCS, OPUC, ODOT, DEQ, and DLCD.

Currently, transportation energy costs – often the largest single energy expenditure for many families, as demonstrated by the Energy Wallet analysis – are not included in traditional definitions of energy burden. As Oregon moves toward widespread electrification of buildings and vehicles, a modernized definition is critical for understanding how shifts in energy consumption and fuel sources affect affordability, particularly for low-income, as well as currently and historically marginalized communities.

[xl] This action can build on previous work in 2019 by Oregon state agencies.

Without updating how energy burden is calculated, the state risks overlooking significant changes in household energy spending, such as the shift from gasoline to electricity for vehicles.

Incorporating transportation into the energy burden framework would also allow agencies and policymakers to more accurately assess the impact of alternative mobility investments, such as expanded public transit, safe biking and walking infrastructure, and other strategies that reduce household transportation costs. A common, inclusive definition would provide a valuable tool for guiding equitable policy development, targeting financial assistance, and measuring progress toward affordability and environmental justice goals statewide.

Cross-Cutting Action 5. Conduct a biennial survey on energy affordability and report on trends to inform state policymaking.

Pathways: All

Equity and Justice Approaches: 5 (partnerships and resources)

Rising costs for electricity, gasoline and other energy uses are of concern to Oregon households and businesses across the state. Yet a holistic view of energy affordability is difficult to form due to lack of information, a problem exacerbated by the loss of federal tools and support. To obtain the most accurate picture of household and business energy costs and energy needs, the state should undertake a recurring survey of household and business energy costs and energy consumption patterns. Energy security includes access to affordable energy.[17] For example, electricity service is not reliable if consumers cannot afford to use electricity to meet basic needs, such as air conditioning during extreme heat events. This information would help the state make informed decisions about the potential impacts of energy policies and how to shape policy to address them.

The survey of energy affordability should include energy costs both in buildings and transportation, as well as vehicle miles traveled and usage of alternative modes of transportation. In this way, this action should link to action Cross-Cutting Action 4, which recommends developing a shared definition of energy burden that includes both building and transportation related energy costs. This will ensure that, as the transportation sector evolves and vehicles electrify, Oregon is tracking the effects of this shift on household and business energy costs and consumption patterns.

Cross-Cutting Action 6. Facilitate the sharing of data and joint planning to enhance energy resilience and reliability. The Oregon Department of Energy should identify relevant actions that support the Oregon Energy Security Plan.

Pathways: 5 (Resilience)

Policies: 5a (Cross-fuels planning), 5b (Resilience measures)

Equity and Justice Approaches: 5 (partnerships and resources)

The Oregon Energy Security Plan highlights the need for coordination between energy providers and the state to ensure that credible contingencies are part of their planning regime and there is adequate coverage across the state. Energy providers in the Pacific Northwest have already begun to explore enhanced coordination and planning, and this action would call on the state to support and build on these efforts.[46] The state would encourage participation by electric and gas utilities, fuel providers, and energy stakeholders.

Greater coordination can help energy providers share high level resource adequacy data and engage in and participate in state emergency planning. This activity would provide transparency into Oregon's

larger energy system, how energy use may change over time based on energy provider data like new large loads joining the electric system, and how the system may respond during an event. Results of planning activities and data will inform future iterations of the Oregon Energy Strategy and the Oregon Security Plan.

Cross-Cutting Action 7. Identify gaps in current and estimated occupation-level employment to meet Oregon's future energy needs. ODOE should recommend actions to support and expand workforce development efforts that complement existing efforts.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 4 (workforce); 5 (partnerships and resources)

As the energy sector evolves to meet Oregon's future energy needs and policy objectives, the energy industry workforce will need to evolve as well. The jobs analysis conducted for the energy strategy demonstrates a need for greater employment in several key occupations, including electricians, HVAC specialists, and others. If workforce development needs in these occupations are not addressed, this may lead to employee shortages and delay in meeting Oregon's energy goals, particularly in rural, frontier, and remote areas. At the same time, industries engaged in the extraction, processing and refining, distribution, and use of fossil fuel are likely to see job displacement. This may lead to greater unemployment in certain industries if retraining and new opportunities are not available.

A workforce needs assessment would serve as a step toward improving our understanding of areas of potential shortage and displacement and provide guidance on strategies to support further development and retraining of the necessary workforce. The study should consider how different potential strategies for building the clean energy workforce would affect the promotion of a just transition, including considerations around: job quality, pay, benefits, demographic diversity in hiring and training geography/location, and the role of different development opportunities such as apprenticeships, college and vocational education programs, and dedicated training programs.

Cross-Cutting Action 8. Advocate for federal policies that support advancement of state energy objectives.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

Federal policies play an important role in relation to state energy objectives. For example, the Clean Air Act Section 209(b) waivers (often referred to simply as the California waivers), ENERGY STAR program, appliance and equipment standards, and funding are examples of federal programs that support state energy objectives. Federal policy can also make it more difficult for Oregon to reach its energy policy objectives.

This action directs state agencies to identify existing federal programs that align with the Oregon Energy Strategy and advocate for policies that support achievement of state energy objectives and continue to elevate the needs of environmental justice communities. This includes engaging with Oregon's federal delegation to ensure that Oregon's voice is heard in Washington, DC.

Cross-Cutting Action 9. Increase coordination between state agencies and community-based organizations, utilities, Energy Trust of Oregon, and other partners to advance consumer education and facilitate delivery of energy related services.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

Oregon's energy transition involves Oregon households and businesses making informed decisions about building upgrades, equipment purchases, vehicle purchases and other choices with long term energy implications. Resources that build on utility efforts should be developed to ensure that every Oregon home or business has the information needed to navigate complex energy decisions. Consumer education should be shared at level of consumers, customers, and communities through culturally appropriate materials that are translated and in plain or accessible language. Community based organizations and industry partners should have access to training and funding to enable participation, to ensure all energy related measures meet quality, performance and financial expectations.

This action recommends coordination to facilitate delivery of energy-related services. Equipment installers, vehicle dealers, and other providers of clean energy services are often the main actors engaging consumers and helping them make purchase decisions. As technologies evolve and to advance the state's energy policy objectives, these service providers must be knowledgeable about new technologies and have information available for consumers, such as availability of rebates or low-cost loans, as well as information on upfront costs and operating costs over time to capture the benefits of more energy efficient technologies.

Cross-Cutting Action 10. Align the Oregon Economic Development Strategy and the Oregon Energy Strategy through collaboration between Business Oregon and the Oregon Department of Energy to foster decarbonization and economic growth through consideration of industrial symbiosis, clean energy innovation, emerging technologies, and incentives.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 4 (workforce); 5 (partnerships and resources)

Business Oregon is developing an Economic Development State Strategy and modernizing their business incentives to better support growth, competitiveness, and innovation across Oregon. The Oregon Energy Strategy identifies how the changing energy landscape will bring opportunities for energy infrastructure development, innovation, and new technological solutions to the challenges we face. Business Oregon and the Oregon Department of Energy should work together to determine where and how the state's economic development goals are best aligned to realize economic benefits from the opportunities outlined in this strategy. This alignment effort should also take into consideration previous work on this topic, including the findings from the Governor's Clean Tech Task Force. Both state agencies will share data and research and foster communications with key public partners to inform strategy development and implementation. The aligned strategies will advance solutions to Oregon businesses needing to modernize operations and foster home-grown technology innovations from Oregon industries, leading to an affordable and prosperous energy transition.

Cross-Cutting Action 11. Increase resources, funding, and staff levels at agencies as needed, and as funding becomes available, to implement actions necessary to advance Oregon's energy policy objectives.

Pathways: All

Equity and Justice Approaches: 1 (decision-making)

As legislators and the Governor consider actions in the energy strategy, this action urges them to provide needed funding and to implement those actions. While current financial challenges at the state level may mean additional investment may not be possible in the near term, this action signals the importance of making investments when resources are available.

It is clear that the clean energy transition will be most effective and equitable if managed well. Yet no single entity has explicit authority to undertake this management work. Instead, a number of different Oregon state agencies play a role in enabling, supporting, and overseeing the energy transition. The scale of the challenge brought to these agencies often outbalances the scope of resources currently available to them.

Agencies named in the energy strategy include key agencies responsible for implementing energy policy and providing essential analysis and information across the transportation, fuels, utilities, and broader energy systems. This includes the Oregon Department of Transportation, Department of Environmental Quality, Public Utility Commission, Department of Energy, and Department of Land Conservation and Development. There are many other agencies involved in supporting implementation of Oregon's energy policies in way that protects natural and working lands, inland and coastal waters, economic development, housing development, public health, and many other essential public services.

Wherever named or included in the implementation of an action, it is important to ensure that resources are made available to enable agency action.

Cross-Cutting Action 12. Develop a community benefits framework at the Oregon Department of Energy that can be used as appropriate across the agency to address outreach and engagement, workforce needs, prioritizing environmental justice communities, and equitable practices.

Pathways: All

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

Federal uncertainty highlights the need for a formalized state community benefits framework that provides meaningful involvement with Environmental Justice communities as defined in HB 4077. Community Benefits Plans were required in many Inflation Reduction Act and Infrastructure Investment and Jobs Act grant funded programs. Changes in federal policy will likely result in community benefits plans no longer being required or funded by the federal government.

A community benefits framework would provide a foundation to continue supporting and funding community benefits through the state. It would provide an opportunity for ODOE-administered projects/programs to learn more about community needs and interests as well as direct benefits through metrics and then develop an implementation plan that carries those benefits throughout the life of the project. It could serve as a starting point for broader consideration of how to incorporate community benefits considerations in programs across the state. ODOE commits to applying the Equity and Justice Framework in developing and implementing the community benefits framework.

Transportation Actions

Vision

The transportation sector includes on-road vehicles like cars, trucks, and buses; industrial and agricultural vehicles and equipment; and modes such as aviation, marine shipping, and rail. It includes personal vehicles and public transportation, as well as infrastructure for active transportation, including sidewalks and dedicated bicycle lanes. This sector is responsible for 35 percent of Oregon's greenhouse gas emissions, making it the largest source of emissions in the state.

The energy strategy modeling found that transportation electrification and reducing vehicle miles traveled offer the greatest cost and energy savings, compared to strategies that rely more heavily on replacing fossil fuels with low-carbon fuels. While electrification is a viable and cost-effective strategy for most on-road transportation, some segments of the sector – such as aviation, marine and rail transport, long-haul trucking, and agricultural or other off-road equipment – are more difficult to fully electrify and will require increasing shares of low-carbon fuels to achieve decarbonization. The Low-Carbon Fuels Actions section describes near-term priorities to support this transition, while this section focuses on strategies to electrify on-road vehicles and expand access to and appeal of multimodal transportation options.

Achieving Oregon's climate and energy goals will require a fundamental transformation of the transportation sector – accelerating the transition to zero-emission vehicles, reducing reliance on single-occupancy trips, and shifting to low-carbon fuels. Meeting this challenge demands a strong and sustained commitment to expand existing programs and establish new ones that directly support these shifts. Current funding levels are inadequate to address the scale of the challenge.

Meeting the state's transportation-related climate goals – and ensuring compliance with programs like Advanced Clean Cars II and Advanced Clean Trucks[xli] – requires a coordinated strategy between state agencies, electric utilities, and industry to understand needs, close funding gaps, remove barriers, and provide targeted support across the zero-emission vehicle landscape. With the withdrawal of key federal tax incentives, it's critical for the state to step in with new and expanded funding mechanisms, including sustainable support for vehicle incentives and infrastructure through direct financial assistance and tools like the revolving loan fund. These funding and financing mechanisms must be inclusive of low-income households who are often left behind due to upfront costs and lack of affordability, as well as rural and coastal communities, who have distinct needs and infrastructure challenges. Broadening access to clean, affordable mobility options through initiatives like a statewide e-bike incentive program would further support a more equitable and inclusive transition.

Significant attention must be directed toward electrifying Oregon's medium-and heavy-duty vehicles. Although MHD vehicles represent less than 10 percent of the vehicles on the road, they are responsible for a disproportionate share of transportation-related emissions and fuel use, producing more than 40 percent of on-road greenhouse gas emissions, over 70 percent of nitrogen oxides, or NOx, and 64 percent of particulate matter. These pollutants degrade air quality and harm public health, particularly in

[xli] Using the Congressional Review Act, the Trump Administration revoked California's authority to exceed federal pollution limits and enforce the Advanced Clear Cars II and Advanced Clean Trucks programs. This action affects the dozen states that follow California's standards, including Oregon. California, Oregon, and nine other states are currently in the process of litigating the revocation, citing the U.S. Government Accountability Office and the Senate parliamentarian ruling that California's air quality standards cannot legally be blocked using the Congressional Review Act.

low-income and disadvantaged communities located near freight corridors and industrial areas. Further, the MHD ZEV market remains less mature than the light-duty sector, and fleet transitions present distinct technical, financial, and operational challenges. Together, these factors highlight the critical need for targeted policies and investments to accelerate MHD ZEV adoption. This includes expanding technical assistance and financial support programs for public and private fleets, developing strategic planning tools, such as a statewide MHD ZEV roadmap and hosting capacity maps, and aligning infrastructure deployment with grid readiness. Simultaneously, Oregon must prepare for the deployment of hydrogen fuel cell electric vehicles through the coordinated development of minimum standards and regulations for heavy-duty hydrogen refueling infrastructure in Oregon.

In addition, policy barriers must be addressed. For example, the way Oregon funds its transportation system limits investments in multimodal infrastructure and transportation electrification.[xlii] It is essential to align transportation funding with the state's climate goals. This requires reevaluating how transportation is funded and where those funds are directed – shifting away from traditional reliance on fossil fuel revenues and highway-centric investments, and toward a fuel-neutral revenue source and support for zero-emission vehicles and multimodal transportation options. To guide this transition, the state needs a Climate-Aligned Transportation Funding Task Force to review existing funding structures and recommend strategies to ensure stable, sustainable funding that supports the sector's energy transition. Similarly, expanding local governments' authority to generate and direct transportation revenues toward climate-aligned infrastructure would provide critical flexibility to meet the scale and urgency of the sector's transition, while enabling funding mechanisms that reflect local needs and priorities.

At the same time, near-term funding is needed and must be directed toward programs that address immediate priorities, such as expanding multimodal options and deploying zero-emission vehicles and infrastructure. Aligning long-term structural funding reform with targeted, program-level investments is essential to building a transportation system that is sustainable and supports climate goals while also addressing immediate priorities.

These near-term actions will lay the groundwork for deeper shifts over the next 5-10 years to keep Oregon on track toward its transportation electrification and decarbonization objectives.

Transportation Action 1. Review Oregon's transportation funding mechanisms, recommend strategies for alignment with the state's energy and climate policy priorities, and identify new revenue sources – particularly to support the deployment of ZEVs and ZEV infrastructure – through a Climate Aligned Transportation Funding Task Force.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1c (Expand access to and appeal of multimodal transportation options); *3a (Electrify Transportation)*

Equity and Justice Approaches: 1 (decision-making); 3 (incentive programs)

Convene an ODOT-led Climate-Aligned Transportation Funding Task Force comprising legislators, state and local government entities, public interest and environmental justice advocates, and industry

[xlii] For further discussion of the funding mechanisms for transportation in Oregon, refer to Transportation Action 1 (relating to a Climate-Aligned Transportation Funding Task Force).

representatives, to review existing and potential transportation funding mechanisms for alignment with the state's energy and climate policy priorities – while ensuring stable, long-term funding. DEQ should co-lead ZEV-related workstreams in coordination with ODOT.

The Task Force should report to the legislature on:

1. Evaluation of Existing Funding Mechanisms
    - Assess how current revenue sources support or hinder Oregon's transportation decarbonization goals, including vehicle electrification, VMT reduction, multimodal transportation infrastructure, and equitable access to clean mobility.
    - Identify statutory or constitutional barriers that restrict the use of transportation revenues for climate-aligned investments and recommend reforms to better align funding policies with climate outcomes.
2. Recommendations for New or Reformed Revenue Options
    - Identify and assess new or reformed revenue mechanisms that incentivize zero emission vehicle adoption, support VMT reduction and multimodal transportation options, and advance equitable transportation access.

      At a minimum the Task Force should:

        i. Develop a proposal for a dedicated, sustainable, and long-term state revenue source to support the rapid deployment of public and private zero-emission vehicle charging and fueling infrastructure for the light-, medium-, and heavy-duty sector across Oregon. New revenue identified should support the Medium- and Heavy-Duty Electrification Charging Fund and a new fund established for public ZEV infrastructure.

        ii. Recommend strategies to increase and stabilize funding for the state Zero Emission Incentive Fund (light-duty vehicles) and establish a long-term revenue source for the state's Zero-Emission Medium- and Heavy-Duty Vehicle Incentive Fund to accelerate ZEV adoption across all vehicle classes.

Oregon's transportation funding system, established in the 1930s and 1940s, was designed around car travel and fossil fuel consumption. As the state's transportation system adapts to 21st century needs, including addressing climate change, it requires a more integrated, forward-looking approach. Oregon must ensure stable, sufficient revenue for system maintenance and operations while expanding investments in transportation electrification and multimodal infrastructure, both essential for achieving Oregon's long term decarbonization goals. The Task Force would assess this dual challenge and provide recommendations for legislative or administrative action that align transportation funding with climate priorities and expand revenue for climate-aligned investments.

A specific responsibility of the Task Force would be to identify new or expanded revenue options for zero emission vehicles and zero emission vehicle infrastructure in Oregon. State support for the ZEV transition is critical to meeting the state's climate and transportation goals. Oregon has adopted ambitious zero-emission vehicle targets across light-, medium-, and heavy-duty sectors through the Advanced Clean Cars II and Advanced Clean Trucks rules. The next four years represent a pivotal window for meeting these targets. Sustaining progress will require continued and expanded state funding for ZEVs and ZEV infrastructure, particularly as key federal incentives, including the light-duty EV tax credit (Section 30D), the Commercial Clean Vehicle Credit (Section 45W), and the Alternative Fuel Vehicle Refueling Property Credit (Section 30C) have been eliminated under H.R. 1.

Federal tax credits have historically reduced the total cost of ownership for ZEVs. Without them, costs will rise, especially for low- and moderate-income households and small businesses. In addition, proactive deployment of accessible, reliable infrastructure – built in advance of vehicle adoption – is necessary to give consumers and fleet operators confidence that ZEV refueling is convenient, dependable, and aligned with operational needs. Currently, Oregon lacks a long-term state funding source to support this critical infrastructure, and existing incentive programs depend heavily on limited and uncertain federal funding. Similarly, state investment in ZEVs is insufficient. Medium- and heavy-duty fleets in particular – which are costly and complex to electrify – require dedicated, sustained public support. A stable state revenue stream targeted at MHD ZEV procurement ensures continued progress toward electrifying fleets that have disproportionate impacts on air pollution and emissions.

State funding for incentive programs must fill these gaps to maintain momentum and prevent adoption from stalling. Doing so also sends a clear market signal, attracting private investment in charging infrastructure, vehicle availability, and workforce development, while keeping businesses confident in Oregon's ZEV market. New revenue identified by the Task Force should support the light-duty focused Zero Emission Incentive Fund and the Zero Emission Medium- and Heavy-Duty Vehicle Incentive Fund as well as the Medium- and Heavy-duty Electrification Charging Fund and a new fund established for public ZEV infrastructure, ensuring coordinated state investment.

Creating these revenue streams presents significant political and legal challenges. Oregon faces major constraints on how transportation revenue can be raised and spent. With existing revenue sources already stretched thin and many earmarked for traditional road projects, reallocating or introducing new funding to support the deployment of ZEVs and ZEV infrastructure will likely require navigating legal constraints, competing budget priorities, and differing perspectives. Despite these challenges, identifying a sustainable funding path forward is critical to enabling the widespread transition to zero-emission transportation and realizing the state's climate goals.

Transportation Action 2. Implement a Road Usage Charge program for all light-duty passenger vehicles to stabilize transportation funding and support accelerated adoption of zero emission vehicles.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1c (Expand access to and appeal of multimodal transportation options); *3a (Electrify Transportation)*

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

A Road Usage Charge is a mileage-based user fee that charges drivers based on miles driven rather than fuel consumed. Oregon has piloted this approach for more than a decade through its voluntary OReGO program, and it is gaining national traction as a fairer, more stable alternative to the fuel tax. By tying user fees directly to how much and how far people drive, a RUC can stabilize revenue, promote fairness, support climate and equity goals, and encourage more efficient travel.

In September 2025, the Oregon Legislature passed HB 3991 in Special Session, establishing a mandatory road usage charge for electric, plug-in hybrid, and conventional hybrid vehicles. While this is an important step, the Road Usage Charge program should be broadly adopted for all vehicles, not just hybrid and electric. Broader adoption would avoid disincentivizing electric vehicles, send consistent price signals to all users for every mile they drive, and reinforce efforts to reduce vehicle miles traveled.

Replacing regressive fuel taxes with a road usage charge also creates an opportunity to ease the burden on low-income motorists through income-based discounts.

The program should be designed to reflect the hidden climate costs of things like heavier vehicles, which use more energy, create more wear on roads, and cause more pollution over their lifetime, and to support investments in electrification and multimodal transportation options. However, without broader transportation funding reforms, revenues from a RUC will remain subject to Highway Trust Fund restrictions, which limits spending to investments inside the road right-of-way and excludes most investments in electrification or VMT reduction. This underscores the importance of Transportation Action 1: aligning transportation revenues with state climate priorities.

Transportation Action 3. Increase statewide support for public and active transportation in Oregon by expanding the statewide payroll tax to fund transit and boosting investments in Safe Routes to School and Great Streets at levels that reflect the scale of community needs.

Pathways: 1 (Energy Efficiency)

Policies: 1c (Expand access to multimodal transportation options)

Equity and Justice Approaches: 1 (decision-making); 2 (infrastructure development); 5 (partnerships and resources)

Access to multimodal transportation options in Oregon – including public transit, walking, and biking – is essential for reducing Oregon's dependence on single-occupancy vehicles and lowering vehicle miles traveled. These shifts are critical to meeting the state's climate goals, improving air quality, and reducing traffic congestion. But to achieve meaningful reductions in VMT and build a transportation system that truly supports climate action, equity, and public health, Oregon must significantly increase its investment in transit and multimodal infrastructure. That means further expanding the Statewide Transit Tax as well as securing dedicated state funding for Safe Routes to School and Great Streets. These investments would enable more Oregonians to choose cleaner, safer, and more affordable ways to get around – and are essential to building healthier, more sustainable communities.

The Statewide Transit Tax is the primary state funding source for transit. Without a significant increase, many transit agencies face the prospect of cutting service by up to 25 percent in the next several years.[47] Such cuts would disproportionately affect low-income and transit-dependent communities, particularly in rural and underserved areas. In contrast, adequate funding would allow agencies to expand routes and service hours, increase frequency, and serve more people – making transit a more viable and attractive option statewide. In September 2025, under HB 3991, the state doubled the existing payroll tax for transit from 0.1 to 0.2 percent. But this tax increase is temporary, sunsetting on January 1, 2028, and far below what transit advocates say is needed to maintain or expand levels of service.

Active transportation must also play a much larger role in reducing VMT – especially for short trips, which make up a large share of daily travel. Enabling more people to walk, bike, and roll not only reduces emissions but also saves money and improves public health and community livability. However, safety concerns are a major barrier, especially for vulnerable populations. Existing programs like Safe Routes to School and Great Streets directly address these concerns by investing in infrastructure that makes active travel safer and more appealing. Yet, demand far outpaces available resources: Safe Routes to School, currently funded through the Highway Trust Fund, is currently oversubscribed by 2.5 to 1,[48] and Great Streets lacks a dedicated funding stream, relying heavily on limited federal dollars. Identifying new

revenues streams and increasing funding for these programs and new programs focused on multimodal infrastructure is essential for meeting the state's VMT reduction goals.

Transportation Action 4. Expand local governments' authority to generate and direct transportation revenues toward climate-aligned transportation infrastructure that meets local needs and priorities.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1c (Expand access to multimodal transportation options); 3a (Electrify Transportation)

Equity and Justice Approaches: 1 (decision-making); 2 (infrastructure development)

Many of Oregon's local governments face mounting pressure to address climate change, equity, and mobility needs, but are constrained by limited authority to raise and direct revenue for transportation infrastructure. Current state laws often require voter approval for local fuel taxes or vehicle fees, and many transportation districts lack authority to levy payroll taxes – creating delays and restricting communities' ability to respond quickly to evolving transportation needs or invest in timely, climate-aligned solutions. Expanding local authority to generate and allocate transportation revenues – through tools like fuel taxes, vehicle registration fees, and payroll taxes – would give communities the flexibility to meet the scale and urgency of climate and equity-driven transportation challenges. This policy would enable local governments to implement funding mechanisms more quickly, reduce reliance on state and federal funding cycles, and establish stable, sustainable revenue streams. With greater autonomy, localities could accelerate investments in multimodal, zero-emission, and equity-focused transportation infrastructure and target resources toward local priorities such as transit expansion, active transportation networks, and ZEV infrastructure. To ensure these new funding tools do not exacerbate existing disparities, strategies should include safeguards such as income-based exemptions, discounts for low-income households, or reinvestment of revenues in historically and currently underserved communities to improve transit access, reduce transportation costs, and expand mobility options.

Transportation Action 5. Require investor-owned utilities to publish and maintain interactive, feeder-level Hosting Capacity Maps (HCMs) showing available capacity for EV charging infrastructure, building electrification, distributed generation, and battery storage.

Pathways: 2 (Clean Electricity); 3 (Electrification)

Policies: 2a (Utility-scale and distributed energy resources); 2b (Load flexibility); 3a (Electrify transportation); 3b (Distribution system readiness for EVs)

Equity and Justice Approaches: 5 (partnerships and resources)

A lack of accessible, consistent, and up-to-date information on grid capacity is a significant barrier for transportation electrification, particularly for projects requiring large new electrical loads. While Oregon's investor-owned utilities currently publish hosting capacity maps, these are primarily focused on distributed generation and vary widely in scope, detail, and update frequency.

This policy action would build on existing efforts to establish uniform standards and processes for IOUs to regularly publish feeder-level data on grid hosting capacity. Initially, this process should consider the minimum essential information needed to accelerate clean energy and electrification projects – enough to guide investment decisions and identify grid constraints while avoiding unnecessary software, data collection or reporting costs that could be passed on to consumers. In this way, the level of detail and

frequency of updates can be carefully balanced against potential impacts on ratepayers. Over time, the data should be refined and expanded as the benefits of more granular or regular information outweigh additional costs. These maps should reflect the grid's ability to accommodate both transportation and building electrification loads – such as EV charging infrastructure and heat pumps – as well as distributed energy resources like solar PV and battery storage. As electrification advances, consumer-owned utilities may also find value in undertaking this exercise, and technical assistance to support these sorts of efforts will be important for the state to support.

Greater transparency and consistency in hosting capacity data will support informed planning, reduce project delays, and enable more strategic investments in electrification infrastructure across sectors.

Transportation Action 6. Establish a statewide incentive program for both standard and cargo e-bikes, with enhanced incentives and prioritization for income-qualifying Oregonians to ensure equitable access to clean, affordable transportation options.

Pathways: 1 (Energy Efficiency)

Policies: 1c (Expand access to multimodal transportation options)

Equity and Justice Approaches: 3 (incentive programs)

Electric bikes, or e-bikes, offer a clean and affordable alternative to car trips, particularly for short and medium-distance travel common in urban and suburban areas. They produce zero tailpipe emissions, reduce traffic congestion, and are more likely than conventional bicycles to replace car trips, thereby helping to lower transportation emissions. E-bikes are an especially attractive low-carbon alternative for households that do not have access to at-home charging for EVs, such as multi-family housing residents. They are also significantly more affordable to own and operate than conventional vehicles, expanding access to low-carbon mobility for a wider range of Oregonians.

While e-bikes are significantly more affordable than cars, upfront costs remain a barrier for many households, especially for cargo e-bikes which are more expensive but can transport multiple passengers or large loads. A statewide incentive program, especially one that offers higher rebates for low- to moderate-income individuals, would improve equitable access to clean mobility options. Without targeted support, e-bike adoption may be concentrated among higher-income households, exacerbating existing mobility and economic disparities. This action would be complementary to work underway by many municipalities to make biking infrastructure available and to reduce emissions, cost, and traffic congestion associated with driving.

Transportation Action 7. Establish a statewide technical assistance program to support public and private fleets in planning and executing a successful transition to zero-emission vehicles (ZEVs).

Pathways: 3 (Electrification); 4 (Low-Carbon Fuels)

Policies: 3a (Electrify transportation); 2b (Load flexibility); 4a (Low-carbon fuels and fuel infrastructure)

Equity and Justice Approaches: 4 (workforce); 5 (partnerships and resources)

A lack of technical expertise and resources remains a significant barrier for fleets looking to transition to zero emission vehicles. The shift to ZEVs involves a steep learning curve, from understanding vehicle options to planning for infrastructure, fuel, and grid impacts. This program would provide comprehensive

support to fleets across Oregon by equipping them with the tools and knowledge they need. The proposed program should provide hands on guidance and analytical support, including through the development of fleet transition plans, infrastructure and site readiness assessments, electricity and fuel cost analyses, and evaluation of load management strategies to optimize energy use and reduce operational costs. The program would accelerate ZEV adoption, reduce attrition rates of existing incentive programs, and ultimately lower administrative burdens and costs for state agencies and fleets alike.

Transportation Action 8. Develop a MHD ZEV Roadmap to guide and accelerate the deployment of medium- and heavy- duty zero-emission vehicles across the state. The Roadmap should provide actionable insights to inform state policy and investment, support fleet decision-making, and ensure alignment with climate, air quality, and equity goals.

Pathways: 3 (Electrification); 4 (Low-Carbon Fuels)

Policies: 3a (Electrify transportation); 2b (Load flexibility); 4a (Low-carbon fuels and fuel infrastructure)

Equity and Justice Approaches: 1 (decision-making)

Oregon has adopted ambitious targets and strategies for the electrification of medium- and heavy-duty vehicles through adoption of the Advanced Clean Trucks rule and the Statewide Transportation Strategy. However, the state lacks a clear, sector-specific strategy to operationalize these goals for MHD vehicles, which are among the most difficult to electrify. A strategic Roadmap would provide the actionable steps needed to meet regulatory targets in a coordinated and cost-effective way. The MHD Zero-Emission Vehicle Roadmap should include both a technology feasibility assessment, to evaluate the maturity, availability, and suitability of MHD ZEV technologies for Oregon fleets, and an implementation plan, to outline phased deployment strategies, define the role of and need for public and private infrastructure, and establish investment priorities and policy recommendations.

MHD ZEV technologies are rapidly evolving, but their commercial availability and suitability vary significantly by fleet type, application, and geography. A Roadmap that includes a technology feasibility assessment, and that is developed in collaboration with Oregon fleets and in consideration of their real-world operating needs, ensures that state investments are grounded in technical and economic reality. Engaging fleets early and meaningfully would provide critical insights into vehicle availability, performance in diverse operating conditions, maintenance considerations, and total cost of ownership. It would also help identify deployment barriers unique to specific sectors. By incorporating fleet perspectives, the Roadmap can prioritize solutions that are both practical and scalable. The technology feasibility assessment should provide actionable information for fleets on technology readiness, costs, and deployment timelines.

Similarly, an implementation plan is a critical component of the MHD ZEV Roadmap because it translates high-level goals into concrete, actionable steps. By outlining phased deployment strategies, the plan would provide a clear timeline for rolling out electrification across fleets and corridors, helping stakeholders anticipate infrastructure needs and operational challenges. Clearly defining the role of and need for public and private charging and fueling infrastructure ensures deployment is strategic, efficient, scalable, and equitable, while providing guidance to fleets, utilities, and investors. Identifying investment priorities helps ensure that limited resources are directed where they can achieve the greatest impact. Policy recommendations included in the plan would guide regulatory and funding decisions, creating a

supportive environment for ZEV adoption while addressing equity, reliability, and economic considerations. Together, these elements would help ensure the roadmap moves beyond vision to practical, measurable progress toward decarbonizing MHD transportation.

MHD vehicles are major contributors to local air pollution, particularly in low-income and historically marginalized communities located near highways, ports, and freight hubs. The Roadmap should consider ways to prioritize fleet electrification in these high impact areas, supporting both climate and environmental justice goals.

Transportation Action 9. Amend DEQ's Clean Fuels Program to extend Advance Crediting eligibility to high-mileage private fleet operators whose vehicles operate predominantly in Oregon.

Pathways: 3 (Electrification); 4 (Low-Carbon Fuels)

Policies: 3a (Electrify Transportation); 4a (Low-carbon fuels and fuel infrastructure)

Equity and Justice Approaches: 3 (incentive programs)

High mileage fleets – such as delivery vans, ride-hailing vehicles, logistics carriers and service fleets – have a disproportionate impact on greenhouse gas emissions and local air quality due to their intensive vehicle use. Targeted support for these fleets can accelerate emissions reductions by prioritizing the electrification of the vehicles that drive and pollute the most. As upfront costs remain a barrier, providing early access to credits would offer predictable, much-needed capital to help fleet operators invest in ZEVs and infrastructure before they realize long-term savings from reduced fuel and maintenance costs. This amendment to the Clean Fuels Program would create strong financial incentives for electrification where climate and health benefits are greatest while strengthening market certainty, attracting private investment, and reinforcing Oregon's broader climate and transportation electrification goals.

Transportation Action 10. Develop regulations and minimum standards for public heavy-duty hydrogen refueling infrastructure in Oregon. A working group could address key elements such as technical specifications, safety protocols, fuel quality standards, consumer protection measures, and streamlined permitting processes to ensure that stations are safe, reliable, and accessible. The working group should also establish targets for the carbon intensity of hydrogen supplied at fueling stations and recommend inclusive processes for community engagement in station siting decisions to align with Oregon's climate and equity goals.

Pathways: 3 (Electrification); 4 (Low-Carbon Fuels)

Policies: 3a (Electrify Transportation); 4a (Low-carbon fuels and fuel infrastructure)

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

The absence of hydrogen refueling infrastructure in Oregon presents a major barrier to the deployment of heavy-duty hydrogen fuel cell vehicles. Without existing infrastructure, the state lacks established regulations and protocols to ensure public safety, fuel quality, and consumer protection. This action aims to proactively prepare Oregon for future deployment by establishing clear, statewide regulations and minimum standards for hydrogen refueling infrastructure. These standards should address equipment testing, fuel quality assurance, public safety protocols, and station certification processes, ensuring a reliable and safe fueling experience.

The effort would enhance coordination among key state agencies – including ODOE, ODOT, DEQ, and the Oregon Department of Agriculture – to ensure a streamlined, consistent approach to infrastructure deployment. To support a consistent and coordinated regional hydrogen fueling network, the working group should also collaborate with neighboring jurisdictions, including California, Washington, and British Columbia, that are also advancing hydrogen infrastructure, particularly along the I-5 corridor. Harmonizing standards and regulatory frameworks across the regions would support seamless vehicle operations across jurisdictions, create certainty for infrastructure developers, and strengthen the West Coast's position as a leader in zero-emission freight.

Recognizing the importance of equity in infrastructure planning, the working group should also develop best practices for inclusive community engagement in station siting decisions. This includes ensuring that environmental justice organizations and impacted communities are provided with transparent information, early, ongoing, and meaningful opportunities for participation, and the resources needed to advocate for their interests in station siting and decision-making processes.

Buildings Actions

Vision

The buildings sector includes residential and commercial buildings. Within these designations are single- and multi-family homes, commercial buildings like stores, hotels, and warehouses, and public buildings like hospitals, schools, and universities. There is a wide diversity of building types, ages, designs, and construction materials, making building decarbonization a complex challenge.

Oregon is facing a housing and homelessness crisis, and building more housing quickly is a top priority for the state. Decarbonization measures in new buildings present an important opportunity to align housing construction with affordability. Housing must be not just available, but also cost effective to build and affordable to live in. Poorly insulated housing and inefficient appliances may be less expensive to install but drive up monthly energy bills that can only be overcome with expensive retrofits and replacements. Multifamily housing can help meet housing and decarbonization goals affordably, due to the higher energy efficiency of shared wall construction and lower landscaping per unit.

Oregon has experience implementing energy efficiency and decarbonization measures in buildings, providing a strong foundation to increase the pace and scale of action needed to achieve our state's energy policy objectives. This experience includes measures identified by the energy strategy modeling as essential to a least-cost pathway to decarbonization like weatherization, adoption of efficient heat pump technologies, and distributed energy resources. These measures can also advance resilience. Weatherization can help buildings withstand greater temperature swings while protecting indoor air quality from wildfire smoke, and heat pumps can provide efficient cooling and heating. Distributed energy resources, which include solar PV panels paired with battery storage and electric vehicles, can provide backup power as outage frequency increases with extreme weather and public safety power shutoffs.

As the energy wallet analysis showed, heat pump technologies yield significant energy savings, but today would result in higher operating costs for some households or building owners – even when they represent a least-cost economywide option in the long term. In addition to maintaining existing utility- and state- funded programs, additional incentives for heat pumps will be necessary to overcome the

upfront cost barrier to purchasing a heat pump and to expand access to efficient cooling for households without it. Programs must include standards for equipment and installation quality to ensure heat pumps live up to their promised energy savings. Programs should also evaluate how to ensure energy burdened households are able to access efficient heat pumps for heating and cooling and to mitigate any bill associated increases. Similarly, it may be necessary to consider how to protect renters where rents may go up following energy efficiency improvements. The strategic electrification steps defined in Building Action 2 will be important to help inform the approach to efficient heat pump adoption.

Four main areas of statewide policy support building decarbonization today: the Climate Protection Program sets fuel decarbonization targets; new Building Performance Standards and steadily progressing efficient energy codes will lead to lower-carbon new and existing buildings; appliance standards and labeling programs drive the market toward efficient models; and incentive programs, including federal, state, and utility ratepayer-funded programs, support uptake of the most efficient technologies and measures. Evaluation of these existing policies finds gaps that near-term actions aim to help fill:

- The state lacks an electrification strategy for buildings – particularly residential buildings. A detailed analysis is needed to guide a reliable, affordable, and largely electric trajectory, and to identify least-cost strategies to realize the shift from fossil fuel to clean infrastructure.
- The Building Performance Standard does not cover small commercial buildings or single-family homes, leaving a gap in setting clear direction for this sector.
- The Building Performance Standard is an energy efficiency policy, and while improved efficiency will reduce emissions, the Standard alone will not result in the deep, sector wide decarbonization needed to achieve the State's clean energy and decarbonization goals.
- Existing building code and appliance standards set minimum thresholds, and still allow for inefficient and high carbon emitting technologies, equipment and appliances to be sold and installed.

Guidance on strategic electrification would help identify a path to a deliberate transition for residential and commercial buildings, informing compliance with existing regulations, development and updates to Oregon's Building Performance Standards for new and existing buildings, and setting clear direction for small commercial and residential buildings not covered under the BPS. In addition, it will be important to continue to track federal appliance standards and to be ready to step in with Oregon standards should they be removed.

Existing funding streams are insufficient to achieve the pace and scale of investment needed to decarbonize buildings. An essential feature of existing energy efficiency programs is that support is offered to low- and moderate- income households, and this program focus must continue. At the same time, there are many able-to-pay households, including some low- and moderate- income homeowners, for whom a low- or no-cost loan can overcome the upfront cost barrier of purchasing a high-efficiency appliance. Shifting support to loans for able-to-pay households would help replenish public funds over time as loans are paid back, creating a revolving source of financing that can grow over time. A revolving loan fund would provide attractive financing options for households and allow direct funding to focus more strongly on low- and moderate- income households who are unable to afford upfront costs or financing. The revolving loan fund could complement existing financing programs as well as other mechanisms like on-bill financing supporting clean energy investment in Oregon.

In addition to these priorities, existing state, utility and local programs must continue to be funded. A particular priority is to earmark flexible funding for deferred maintenance measures like a new roof or

replacing rotting walls to enable households requiring deeper upgrades to benefit from energy efficiency and other decarbonization measures.

These near-term actions are essential to set the groundwork for increased activity over the longer term. As the revolving loan fund gets established and grows, more Oregonians will be able to benefit from low-cost loans. Guidance on strategic electrification should provide a vision for investment in building decarbonization, filling gaps in existing policy, informing recommendations for Oregon's Building Performance Standards for existing buildings, expected in 2030, and providing background for updates to the BPS for existing buildings over time.

Buildings Action 1. Prioritize existing incentive programs offering essential energy efficiency and weatherization improvements, particularly those focused on low- and moderate- income households.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1a (Buildings efficiency); 3c (Strategic electrification)

Equity and Justice Approaches: 3 (incentive programs)

Continue utility ratepayer-funded programs and restore or extend state programs that provide essential support for household energy efficiency, weatherization, emergency appliance replacement, and installation of high efficiency equipment and appliances. For federally funded programs that will lose funding, consider how state funds can support the revolving loan fund as well as programs that offer direct support for low- and moderate- income households. Ensure that programs align and can be stacked to fund projects, rather that supersede existing programs. This can help drive greater carbon reductions in our state with less money by prioritizing direct funding for the households with the most needs, while shifting other funds to finance our clean energy future. A revolving loan fund can offer a revolving source of low-cost loans for able-to-pay households and expand financing options to help low- and moderate- income homes who are often subject to predatory lending practices.

Buildings Action 2. Earmark flexible funding for deferred maintenance measures necessary to enable low- and moderate- income homes to install efficiency and weatherization technologies and measures.

Pathways: 1 (Energy Efficiency)

Policies: 1a (Buildings Efficiency)

Equity and Justice Approaches: 3 (incentive programs); 5 (partnerships and resources)

Many low-income households require maintenance measures to be completed before any equipment or weatherization measures can be installed. There is a lack of funding for these kinds of upgrades, including in owner-occupied and rental housing, creating a barrier to new technologies. Earmarked funding would help overcome this barrier.[49] Eligible entities to distribute funds should include Community Action Partnership agencies and other community partners that provide energy-related services, including consumer-owned utilities and community-based organizations. The revolving loan fund could, over time, provide additional financing support for qualifying households.

Buildings Action 3. Allow higher administrative costs for energy programs that serve or benefit[xliii] Environmental Justice Communities, to better manage cost shortfalls experienced by programs and projects that benefit the overall system.

Pathways: 1 (Energy Efficiency); 2 (Clean Electricity); 3 (Electrification)

Policies: 1a (Buildings efficiency); 2a (Utility-scale and distributed energy resources); 3a (Electrify transportation)

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

Administrative cost limits for energy programs that benefit communities and do equity work represent a barrier to effectively administering programs. Often, program funding and grant recipients must seek additional funding to support the staff necessary to manage grant programs before they can access funds. Some examples of cost shortfalls this could address are related to providing a higher level of service or "wrap-around" services to low- and moderate- income families, including more rigorous quality assurance, translation services, project planning and management, increased and targeted outreach, education and more. This measure recommends that policy makers and program developers and implementers adjust program framework to raise the cost limits for the share of funding that can go to support administration of grants and programs, including those that support Tribes. Additionally, policymakers and program developers should consider allowing for advance funding to begin work, especially where the cost of the work creates significant cash flow issues for implementers and grant recipients waiting on reimbursement.

The updated administration cost level should be established through consultation with organizations that implement energy programs and projects and a review of best practices. Changes to legislative funding allocations for state programs, Public Utility Commission metrics for utility program cost effectiveness metrics, OHCS and ODOE rulemaking for state funded energy programs, and federally funded grant program rules (and associated laws) would be necessary to address this issue across all energy programs in Oregon.

Buildings Action 4. Prioritize measures in energy efficiency incentive programs that relieve pressure on the power system. In the near term, maintain – and where possible accelerate – building weatherization, replacement of less efficient electric heating with efficient electric heat pumps, rooftop solar and storage, and expand demand flexibility.

Pathways: 1 (Energy Efficiency); 2 (Clean Electricity); 3 (Electrification)

Policies: 1a (Buildings efficiency); 3c (Strategic electrification); 2a (Utility-scale and distributed energy resources); 2b (Load flexibility)

Equity and Justice Approaches: 3 (incentive programs); 4 (workforce)

This action serves to redouble efforts on energy efficiency and demand flexibility that can quickly alleviate pressure on the electricity system. This includes utility ratepayer programs in IOU and COU service territories as well as state programs such as Home Efficiency Rebates and Home Electrification and Appliance Rebates. Ensure that programs and incentives prioritize low-income households. This is especially important given federal policy changes that reduce or cut federally funded programs and

[xliii] For more on the benefits of energy efficiency programs, see 2022-BER-Policy-Briefs.pdf

eliminate federal tax credits for consumer efficiency and renewable energy devices. Federal programs support and stack with ratepayer funded programs and with the tax credits to provide greater access to energy efficiency and clean energy projects for people of all incomes.

Energy efficiency and electrification are key strategies for Oregon. In the near-term, the power system faces pressure from rapidly rising loads, extreme weather, and long lead times to construct utility-scale resources. Weatherization and replacing inefficient heating systems, including electric resistance-based systems, with efficient electric heat pumps can trim winter peak loads and provide lifesaving cooling during increasing summer peaks. Installing heat pumps as dual fuel systems (e.g., heat pump primary and natural gas reserve) in some homes can further electrification goals and provide options for resilience and peak reduction during the winter months. Grid interactive buildings provide occupants and utilities with opportunities to improve comfort and reduce operating costs while supporting grid operations. Load flexibility can leverage existing electric loads to shift off peak or to switch to backup sources of heat, further alleviating the highest-stress times on the power system.

While these measures are already being implemented under existing programs, it is important to maintain existing programs during a time of public budgetary pressures, and where possible to accelerate them in the near-term given the challenge of meeting rising demand. This includes programs that enable renters to implement energy efficiency measures, such as through the Rental Home Heat Pump Program. For ratepayer-funded programs, re-visiting the limits of current cost benefit analyses could help better quantify the many non-energy benefits of energy efficiency measures, such as improved indoor air quality and protection from wildfire smoke from weatherization and access to efficient cooling from heat pump installation.[50]

Buildings Action 5. Advance strategic electrification in buildings in conjunction with other measures that support state decarbonization and resilience goals reliably, affordably, and equitably. Develop a building decarbonization roadmap, led by the Oregon Department of Energy, with recommendations to advance strategic electrification and other decarbonization measures, and as necessary, to provide data and analysis on building decarbonization to inform policies and programs.

Pathways: All

Policies: 1a (Buildings efficiency); 3c (Strategic electrification); 2a (Utility-scale and distributed energy resources); 2b (Load flexibility); 4c (Managed fuels transition); 5a (Cross-fuels planning); 5b (Resilience measures)

Equity and Justice Approaches: 1 (decision-making); 3 (incentive programs)

The energy strategy modeling found that electric heat pumps for water and space heating and cooling play an essential role in a least-cost economy-wide pathway to decarbonization. Delaying the high levels of energy efficiency and electrification in the Reference Scenario cost $17 billion more in 2050. The energy wallet analysis, however, found that while efficient electric technologies generated energy savings across sample households, they do not always generate cost savings for that household. Factors including the technology being replaced, need for weatherization and air conditioning, and differences between single- and multi- family housing all contributed to the level of household costs and savings. There are also uncertain technology and energy costs that can make adoption of efficient heat pump technologies more or less accessible to a household. Maintaining affordability and supporting low income and environmental justice communities through the electrification transition will require

supportive funding. It will also be important to consider how to electrify in a way that supports electric system reliability through measures such as demand flexibility, pairing electrification with weatherization, and leveraging dual fuel heat pumps to shift electric loads away from peak hours.

In larger commercial and industrial buildings, the pathway toward electrification is clearer in low temperature applications where highly efficient heat pump technology can be applied, but there are still many considerations for the most cost-effective pathway to decarbonization including the duration and sensitivity of the end use, local electric system capacity, peak facility demand and available resources.

More detailed analysis is needed to evaluate and apply available data and trends on building stock and technologies to help establish a building decarbonization trajectory and incorporate strategic electrification into policies and programs as part of an integrated planning approach. Current analysis of building data is largely based on limited survey data. While this data can help inform policies, expanding analysis is important to help provide more detailed recommendations that can serve the needs of different communities across Oregon. This may include actual utility energy use data, incorporating building characteristic data from local jurisdiction permitting offices, existing state and utility programs, and from available real estate databases.

Agencies may develop interim recommendations for their own policy and regulatory purposes that can inform the roadmap. For example, the OPUC may seek to develop realistic and data driven electrification forecasts for utility service areas that consider trajectories for building electrification from a systems perspective. It will be important to work across agencies to ensure the roadmap integrates such analyses.

As a repository for energy data, information, and analysis, ODOE is positioned to lead development of a building decarbonization roadmap, and to provide ongoing support to inform state policies and programs. These include building performance standards, energy codes, appliance standards, OPUC planning processes and ratemaking, ratepayer- and publicly- funded programs, and zoning and planning. The analysis should inform how to incorporate environmental justice community needs into policies and planning.

The roadmap should consider, at a minimum, existing building stock and technologies, energy costs and cost uncertainties, and benefits of efficient heat pump technologies and other energy efficiency measures. It should incorporate planning for strategic electrification across the state identifying areas where aging infrastructure, remoteness or other factors affect the priority for electrification or increase risks to affordability. It should consider emerging options, such as district energy networks. The roadmap should take into account affordability, reliability, regulatory principles, and prioritize equity considerations.

Buildings Action 6. Update energy efficiency and demand response programs to promote strategic electrification.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1a (Buildings efficiency); 3c (Strategic electrification)

Equity and Justice Approaches: 1 (decision-making); 3 (incentive programs); 5 (partnerships and resources)

To decarbonize, it is necessary to shift buildings toward greater overall efficiency and to reduce their carbon footprint. Cost-effectiveness evaluations should look beyond a single-fuel appliance efficiency and consider the total energy usage of a building. This lens would help identify the role of strategic

electrification as an energy efficiency and decarbonization measure. It would provide a mechanism to advance the key finding from the energy strategy modeling that electrification of buildings is a lower cost, lower risk pathway to meeting Oregon's climate goals than continued reliance on direct use fuels and transitioning them to low-carbon fuels over time. In addition to heating, electric heat pumps also provide efficient cooling, which benefits households that need to adopt air conditioning to manage higher summer temperatures and protect indoor air quality from wildfire smoke. These benefits should also be accounted for, where appropriate.

As appliances and equipment electrify, demand response will be increasingly important to manage electricity system peaks, as well as to take advantage of abundant wind and solar resources. Acquisition of cost-effective demand response resources should account for these system benefits. Customers should be compensated for the flexibility they provide and demand response programs must ensure consumer privacy. The value of dual-fuel systems should be recognized as a reliability resource to mitigate system peaks, particularly during extreme winter weather events.

More broadly, energy efficiency and demand response programs should incorporate a strategic electrification lens, and adopt approaches that recognize the value of strategic electrification as a least-cost decarbonization resource. Additional financial support should be made available to households facing cost barriers to adopting efficient technology, including utility bill support for those who cannot afford the potential increase to their monthly bills. The building decarbonization roadmap (Buildings Action 5) would consider this broader picture and the role of different approaches to reduce carbon emissions in buildings. Some of these changes may require legislative action. Those actions should be informed by findings from the analysis and roadmap in Building Action 5.

Buildings Action 7. Continue to update the Oregon Residential Specialty Code and Oregon Energy Efficiency Specialty Code as outlined in HB 3409. Continue progress on energy efficiency and decarbonization requirements for new buildings that complement other actions in this document and include consideration of lower carbon materials and quantification of global warming potential values to realize embodied carbon savings in new construction and existing buildings. The Reach Code should reflect goals for economy wide decarbonization.

Pathways: 1 (Energy Efficiency); 3 (Electrification)

Policies: 1a (Buildings efficiency); 3c (Strategic electrification)

Equity and Justice Approaches: 2 (infrastructure development); 4 (workforce)

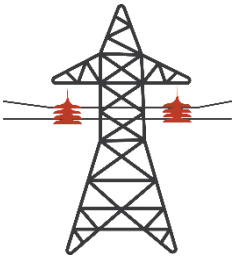
This policy action addresses greenhouse gas emissions in new buildings. Electric resistance and fossil fuel powered appliances used for primary space and water heating are significantly less energy efficient than electric heat pumps and result in direct emissions of greenhouse gases during drilling, transportation through pipelines, and end use combustion. While the electricity sector also has associated emissions from generation sources, emissions are expected to decrease over time. This means that an electric appliance installed today will have a declining emissions profile over time. The draft updates for the residential specialty code for 2026 reflect these considerations by proposing that, where air conditioning is provided, this service is met with a heat pump that provides both heating and cooling functions. This would either result in new buildings heated by heat pumps or hybrid systems with heat pumps that can reduce fossil fuel consumption. This action includes the recommendation to continue code development to ensure newly constructed buildings are compatible and ready for the addition of EV charging

infrastructure, solar generation resources, battery back-up and grid connectivity for equipment and appliances that can be used as distributed energy resources to manage peak demand on the grid.

This action aims to balance the goal of advancing energy efficient buildings with considerations for affordability and the preference by some customers for installing non-electric primary heating systems. It also leaves flexibility for non-electric backup systems. It steers the market toward efficient electric heat pumps, which have the added benefit of enabling summer cooling — an increasing public health necessity in much of the state.

Electricity Actions

Vision



Electricity actions cover investment in the electricity sector, from utility-scale generation, storage, transmission, and distribution to distributed renewable resources that include customer-sited generation and storage. They also include load flexibility as an increasingly important resource.

Electricity is a key fuel for Oregon to meet its energy and climate policy objectives. Oregon's electric utilities provide an essential service that supplies energy for nearly every Oregon home and business, for many industries, and increasingly for transportation. The hydroelectric system in the Northwest has provided Oregon and the region important benefits, including non-emitting electricity and grid flexibility benefits. The model indicated that hydropower will continue to remain an important electricity resource. At the same time, rapid load growth, primarily from data centers, is increasing the region's need for new generating resources. Currently, expanding the electricity system is critical to maintain reliability while accommodating rapid load growth. Access to affordable and reliable electricity supply is necessary for Oregonians today and for the economic development that can come from new businesses and industries entering the state. Solutions to address this challenge must include all available options, including an enhanced focus on load flexibility to mitigate growth in peak demand and better leverage existing infrastructure.

Meeting these current and growing needs for electricity requires a pace and scale of construction of new electricity infrastructure that is not being met today. This problem is not unique to Oregon. According to the Western Electricity Coordinating Council, resource plans for utilities across the West call for an unprecedented amount of development in the next ten years.[51] Failure to construct the necessary resources increases the risks of power supply disruptions, including power outages. Even those areas without load growth face heightened risks of disruptions due to extreme weather events, and those utilities need to be empowered to invest in resilience measures to mitigate outage risks.

This is a challenge that utilities should not face on their own. Electricity prices have already increased across the state, and many utility customers cannot afford the rate increases needed to support new investments. Yet the existing policy landscape asks utilities to manage these costs on their own. Although solar and wind technology is cost-competitive even without federal tax credits, the loss of clear federal support makes this transition much harder. Absent intentional public sector investment at the state level, there will be pressure for utility customers to bear a disproportionately high share of the costs for Oregon's economy-wide clean energy transition and for many significant adaptations to the changing climate.

There are several reasons underpinning the need for state support. Investment is needed on a rapid timeline and scale to meet rising demand and clean electricity goals. This means concentrating capital investments in a much shorter timeframe than has been seen in many decades. Inflation has significantly increased the cost of new infrastructure, and these cost increases are already affecting customer bills. Climate change is increasing risk and cost. For example, extreme weather is sharply increasing winter and summer peak demand. Changing precipitation patterns are affecting hydroelectric system operations. And more intense wildfire seasons are leading to increased costs for resilience measures like grid hardening and public power safety shutoffs. Without state support, these factors threaten to overwhelm ratepayers at a critical time for electricity sector investment.[xliv]

The state must consider opportunities to reduce these costs and ways to leverage other funding sources to support this transition. State support is particularly critical to help historically and currently underserved communities that could be unduly burdened in the transition or otherwise left behind. Facilitating new development should not undermine past and current efforts to minimize the effects of development on our natural and working lands and waters, to engage environmental justice communities, and to mitigate energy burden. At the same time, the state should carefully consider opportunities to promote more in-state development of clean electricity resources, in order to generate local jobs and economic development. If Oregon does not accelerate new resource development within the state, utilities will increasingly rely on out-of-state resources to serve growing loads. While importing electricity is critical and part of a least-cost portfolio, an over-reliance on out-of-state generation would mean Oregon misses out on potential jobs and other economic benefits from in-state development, and the costs of these necessary investments will primarily flow out of state rather than directly or indirectly supporting Oregon households and businesses.

The following actions aim to deliver progress on this vision in the near-term. In this time frame, the top priority is facilitating enhancement and expansion of clean electricity infrastructure to maintain reliability. Local resilience should be advanced through expanding energy infrastructure resilience programs. Grid resilience is also critical to consider. This includes increased wildfire risk for communities and utilities, and the need for balanced wildfire utility liability solutions. Larger developments such as transmission enhancements and expansions require state support to prioritize shared needs and facilitate co-investment opportunities. Generation development, whether by incumbent utilities or by independent developers, is needed both regionally and in the state. Updating the Oregon Renewable Energy Siting Assessment Tool will help guide in-state development assessments. Oregon should also continue its engagement and support for regional activities, particularly as federal policies threaten to diverge from shared Northwest clean energy goals.

The state should monitor the evolution of emerging technologies through a study, evaluate barriers preventing construction and interconnection of permitted projects, and undertake a review of government incentives for local generation investments. These studies should provide recommendations that facilitate the expedited development of clean energy infrastructure while still mitigating the negative effects of infrastructure investments on Oregon's natural and working lands as well as on electricity rates and energy affordability. Finally, addressing the scale of investment needed requires steps to ensure that utility incentives are aligned with supporting independent resource development

[xliv] It will also be important to track demand projections closely to avoid over-investment, which can burden ratepayers even more with stranded costs. The example of the Washington Public Power Supply System investments in large nuclear projects in the 1950s should serve as a cautionary tale where over-investment and cost overruns led to the largest municipal bond default in US history. Washington Public Power Supply System (WPPSS) - HistoryLink.org

and flexible demand-side resources, both of which can reduce pressure on costs as well as on natural resources.

Electricity Action 1. Expand the Oregon Department of Energy's statewide energy infrastructure resilience programs, including increasing funding for and amending the Community Renewable Energy Grant Program to support projects that improve energy resilience.

Pathways: 2 (Clean electricity); 5 (Resilience)

Policies: 2a (Utility-scale and distributed energy resources); 4a (Low-carbon fuels and fuel infrastructure); 4c (Managed fuel transition); 5a (Cross-fuels planning); 5b (Resilience Measures)

Equity and Justice Approaches: 2 (infrastructure development), 3 (incentive programs); 6 (natural and working lands, cultural resources, broader environment)

Oregon has several existing programs to fund energy and energy infrastructure resilience projects, including as examples ODOE's Grid Resilience Grant Program, Community Renewable Energy Grant Program and County Energy Resilience Grant Program. With uncertainty around the availability of federal funding dollars to support these investments for Tribes, local governments, communities, and households, it is important for the state to provide funding for electric system resilience.

These programs are critical to enhancing energy security. The Oregon Energy Security Plan highlighted the importance of improving the resilience of community owned electric utility infrastructure. These improvements reduce the frequency and duration of power outages as well as decrease the need for liquid-fueled back-up power generation. Improved resilience supports decarbonization and reduced reliance on imported liquid petroleum fuels. Many small electric utilities in Oregon do not have the rate payer base to increase costs and fully pay for robust grid resilience infrastructure improvement projects. A more robust grant program funded by the state could spur needed improvements that reduce the risk of costly wildfires and other hazards.

Similarly, resilience funding should support efforts to advance community energy resilience measures like microgrids. HB 2066 (2025) directs the OPUC to develop a regulatory framework for microgrids. However, communities that want to make use of the new regulatory framework will need access to technical knowledge to effectively engage with utility partners. With major federal funding sources of microgrids recently cut, it will be difficult for many projects to move forward absent state support in securing adequate technical assistance and project funding.

Electricity Action 2. The Oregon Public Utility Commission, in coordination with the Department of Energy, should commission an expert review of balanced wildfire utility liability solutions that enable both utility accountability and ongoing customer cost containment, reliability, and decarbonization investments.

Pathways: 2 (Clean electricity); 5 (Resilience)

Policies: 2a (Utility-scale and distributed energy resources); 2c (Tribal consultation and engagement); 2d (Regional engagement); 5b (Resilience measures)

Equity and Justice Approaches: 1 (decision-making); 2 (infrastructure development); 3 (incentive programs); 5 (partnerships and resources); 6 (natural and working lands, cultural resources, broader environment)

Oregon is facing longer wildfire seasons, more frequent wildfires, and greater areas burned when a fire occurs. For communities, this increased risk has led to more frequent and extreme poor air quality days, increased insurance costs, and a rising danger of loss of livelihood. Wildfire risk also threatens to slow the necessary buildout of electricity infrastructure – at both the distribution and transmission scale. The financial risk and slow build out is expected to lead to higher rates for households and businesses by increasing utility costs. Oregonians would benefit from consideration of policy solutions that other states have implemented, such as a catastrophic wildfire fund that can help victims rebuild their lives as quickly as possible, and other measures to mitigate the impact of wildfire risk on electricity rates and reliability.

Utilities have reacted to growing wildfire risk by increasing expenditures to both mitigate against and respond to events. In Oregon, the PUC has required utilities to present wildfire mitigation plans since 2019, with a formal review and approval role for investor-owned utility plans codified by SB 762 in 2021. Expenditures include efforts such as increased vegetation management, investments in hardening grid infrastructure, and replacement costs for damaged equipment. While these efforts can reduce the risk of utility-ignited wildfires, it is infeasible for utilities to mitigate this risk entirely. Factors outside of utility control, such as increasingly frequent and severe heatwaves, prolonged drought, and housing developments in wildfire-prone areas, are exacerbating the risk and increasing the consequences of wildfires across Oregon and the country.

> "This rising credit risk results in higher overall costs for utilities, in turn leading to higher rates for customers, and can slow or outright block the financing and construction of energy infrastructure. This is a growing problem not just for investor-owned utilities, but also for not-for-profit electric providers like municipal utilities and electric cooperatives. For states where new infrastructure is needed to meet rising demand for electricity, but fires are becoming increasingly dangerous, this means that finding a way to reduce utilities' overall wildfire risk exposure will be key to maintaining a functioning electric grid."
>
> - Stanford Blog
> Environmental and Natural Resources Law & Policy Program
> August 2025

As wildfire risks increase, so do the financial risks to Oregon's investor-owned utilities and consumer-owned utilities, particularly rural electric cooperatives. Utility wildfire liability serves to hold utilities accountable where their negligent actions caused or contributed to damage, provides recourse for wildfire victims, and incentivizes utilities to take reasonable precautionary measures. However, this growing and uncertain wildfire liability is leading to higher premiums and reduced availability of utility insurance, lower bond ratings that increase the costs of debt, decreased reliability, and an increasing likelihood of utility bankruptcy. The result is increased concern that resources needed for reliability will not be built at the pace and scale needed, and that already rising utility rates will rise even higher. Oregon needs to arrive at a balanced approach to reduce the uncertainty around liability, which raises significant financial risks for utilities and ratepayers, and at the same time maintain avenues for accountability and redress after a fire.

This action acknowledges the financial risks associated with the status quo and calls on the state to explore various policy options aimed to mitigate the risks.

Electricity Action 3. Review and share key findings with the Legislature regarding near-term transmission needs and opportunities, and identify opportunities for the state to support transmission. ODOE would lead this work and build on it to inform the role that a state transmission entity may play in enabling investment.

Pathways: 2 (Clean electricity); 5 (Resilience)

Policies: 2a (Utility-scale and distributed energy resources); 2c (Tribal consultation and engagement); 2d (Regional engagement); 5b (Resilience measures)

Equity and Justice Approaches: 1 (decision-making); 2 (infrastructure development); 3 (incentive programs); 5 (partnerships and resources); 6 (natural and working lands, cultural resources, broader environment)

Across the Pacific Northwest, transmission constraints hinder access to least-cost generation and contribute to reliability concerns. Yet in Oregon and much of the region, transmission development is not occurring at the pace needed to meet growing demand. Several workstreams are underway to address this challenge, such as the Bonneville Power Administration's Grid Access Transformation Project and the work of the Western Transmission Expansion Coalition (WestTEC). With dwindling federal support and a lack of federal leadership on advancing needed infrastructure, the state must prepare to play a more active role in facilitating the development of transmission. This should include short-term action within existing authorities and build toward forward-looking efforts such as potentially establishing a new state entity.[xlv] This policy action identifies near-term opportunities and how those could inform targeted and efficient state action.

In the near term, ODOE would gather and synthesize technical information to inform state action on transmission. Oregon is part of a regional, interconnected electricity system, and an understanding of activities in Oregon and in the region is important to support development of a shared vision of potential transmission options. While some improvements are already expected due to the legislature's actions in 2025 (including HB 3336 and HB 3681),[xlvi] under this action, ODOE would synthesize suggestions and opportunities from ongoing, highly technical workstreams in the state and across the region. It is anticipated that state action would focus on enabling low-cost financing and addressing siting.

Siting: In the near to medium term, ODOE would work to identify potential priorities for development in new and existing corridors[xlvii] in Oregon, including development in existing utility rights-of-way. As long linear infrastructure projects, transmission lines often cross multiple jurisdictions and may trigger reviews at the local, state, Tribal and federal levels. ODOE would work with different siting jurisdictions as well as with Tribes, utilities, the Bonneville Power Administration, state agencies, community organizations, and others to identify how the state can advance development of transmission infrastructure. For example, there may be opportunities to streamline siting and permitting processes at the state and local levels, while continuing to facilitate public participation and protection of resources.

Investment: Many large-scale transmission projects or upgrade projects are needed to maintain reliable service but are too expensive for a single utility to finance. Some projects, such as the Boardman-to-Hemingway line, have relied on utility-to-utility co-investment, though even then capital is scarce. Investment support from non-utility entities, particularly new large loads with significant interest in transmission upgrades, could be key to stretching limited utility and other capital. By recognizing and

[xlv] The state legislature considered establishing a state transmission authority in the 2025 legislative session but did not do so. HB 3628 (2025). As noted in the final paragraph here, any new state entity should be carefully designed, have clear authority to undertake the necessary work while mitigating the risks of this approach, and not duplicate existing entities and authorities.

[xlvi] These and other bills are summarized in ODOE and the OPUC's legislative reports, 2025-Legislative-Report.pdf

[xlvii] Corridors are designated geographic areas for high-voltage electricity transmission lines with goals of co-locating infrastructure to minimize impacts while streamlining permitting and construction.

convening the beneficiaries of large infrastructure projects, the state could facilitate needed investments.

Transmission Entity: This analysis and engagement would inform whether existing state government agencies and their statutory authorities would be adequate to accelerate transmission development, what more might be needed, and which of these new responsibilities would be better suited for a new state transmission entity. In addition to prioritizing corridors, a key function the entity might play would be to facilitate joint investments in projects that benefit all utility customers across Oregon.

Electricity Action 4. Update and enhance the Oregon Renewable Energy Siting Assessment Tool, with a goal of providing a robust database of lands that may be suitable for various types of electricity infrastructure projects.

Pathways: 2 (Clean Electricity)

Policies: 2a (Utility-scale and distributed energy resources)

Equity and Justice Approaches: 2 (infrastructure development); 6 (natural and working lands, cultural resources, broader environment)

The Oregon Department of Energy maintains the Oregon Renewable Energy Siting Assessment tool, which is an interactive application that allows users to review data and gain a coarse level perspective of potential land use, military, natural resources, and other considerations related to land use across Oregon. The information serves to help the public and developers understand land use and natural resource constraints and limitations when exploring potential development opportunities for electricity infrastructure. Currently, funding is not available to update all datasets in the tool or add new data layers. Some valuable data layers are not even available to add and would require investments in surveys to collect the underlying data. For example, during the development of the ORESA tool, it was identified that it would be helpful to support renewable energy reporting functionality for larger areas (e.g., regions or statewide) to show areas where constraints are minimal and renewable energy opportunities are relatively high. In addition, DSL is drafting the Renewable Energy Analysis for School Lands, which will explore a new classification, “renewable energy lands.” Additionally, it is important to remember that while the tool may be helpful for initial reviews, it cannot guarantee an area is appropriate for development. For instance, protected cultural resources may not be mapped, either due to lack of comprehensive data or due to a need for data protection.

This action does not recommend updating any one specific dataset. A report from the Eastern Oregon Solar Siting Rules Advisory Committee, managed by the Oregon Department of Land Conservation and Development, is expected to make recommendations informing strategic direction for ORESA and its data sets in late 2025. The Legislature should carefully consider those recommendations in that forthcoming report and provide funding to implement them.

Electricity Action 5. Conduct a study on barriers preventing construction and interconnection of permitted projects and recommend actions to overcome barriers.

Pathways: 2 (Clean Electricity)

Policies: 2a (Utility-scale and distributed energy resources); 2c (Tribal consultation and engagement

Equity and Justice Approaches: 1 (Decision-making); 2 (Infrastructure development); 6 (natural and working lands, cultural resources, broader environment)

Much work goes into developing electricity resources, including financing, equipment procurement, permitting, and site control and local engagement. Siting and permitting are often cited as primary barriers to new resource development in Oregon. Yet, a number of large-scale renewable projects have received approval from the Energy Facility Siting Council only to wait months or years before beginning construction or simply abandoning their project. A study could shed light on the barriers these projects are encountering and where regulatory reforms could improve the overall development process.

For example, interconnection delays have been recognized as a significant barrier to development. The OPUC[54] [55] and Bonneville Power Administration[56] both have ongoing workstreams to address this issue. These efforts must continue. This action builds on those processes to identify opportunities to overcome barriers to construction and interconnection of permitted projects, as well as evaluation of where governmental siting and permitting processes and generator interconnection processes might be better aligned.

ODOE undertook a similar study in 2022 prior to the launch of the Oregon Renewable Energy Siting Assessment Tool,[xlviii] but much has changed since then particularly in the last ten months. This new study would provide an updated look at conditions on the ground with input from entities with jurisdiction over interconnection reform.

Electricity Action 6. Report on developments in emerging technologies, including long-duration storage options, enhanced geothermal, floating offshore wind, marine energy, and advanced nuclear options, to identify the role they can play in meeting the state's electricity needs; also explore opportunities for pilot programs in the near-term.

Pathways: 2 (Clean Electricity)

Policies: 2a (Utility-scale and distributed energy resources)

Equity and Justice Approaches: 1 (Decision-making); 2 (infrastructure development); 6 (natural and working lands, cultural resources, broader environment)

The energy strategy modeling clearly indicated the value of having high-capacity resources to complement hydro and variable renewable resources on the electricity system. Several emerging technologies may help meet this need; however, today it is not clear which will present the most cost-competitive opportunities for Oregon.

These projects would require large capital investments and have long lead-times, meaning that any state support would be needed well in advance of when these technologies would be expected to come online. Oregon is currently engaged in development of an Offshore Wind Roadmap that will evaluate the steps needed to develop floating offshore wind off the Oregon Coast. This roadmap will advance analysis on the value of offshore wind and policy actions that would set the stage for future development.[57] The Mazama Energy Enhanced Geothermal Systems demonstration project is underway near Newberry Volcano in central Oregon, exploring the role that enhanced geothermal power might play in our energy future.[58] The PacWave test facility for wave energy off Oregon's coast is expected to come online soon and deliver up to 20 megawatts per hour of test energy to Bonneville Power Administration.[59] And while Oregon law does not practicably allow siting nuclear facilities in Oregon, an Oregon-based company is undertaking research and development to develop modular nuclear reactor design.[60]

[xlviii] ODOE REIMA Report

This study, led by the Oregon Department of Energy, would evaluate emerging technologies in Oregon, regionally, and in light of shifting federal incentives to ensure state policymakers have up-to-date information as these processes advance and requests for state support arise. ODOE would also look for opportunities to access federal funding and resources for the evaluation and potential demonstration projects.

Electricity Action 7. Study government incentives for local electricity generation investments and identify opportunities for the state to better advance infrastructure needs, economic development and energy justice objectives.

Pathways: 2 (Clean Electricity); 5 (Resilience)

Policies: 2a (Utility-scale and distributed energy resources); 5b (Resilience measures)

Equity and Justice Approaches: 2 (Infrastructure development); 3 (Incentive programs); 4 (workforce); 6 (natural and working lands, cultural resources, broader environment)

This action aims to inform government incentive and policy support for local electricity generation investments to align Oregon's energy policy objectives with economic growth, energy justice and resilience. Absent informed state support, some Oregon communities, including existing environmental justice communities, may face higher costs and other burdens from a statewide energy transition without enjoying commensurate local benefits. Similarly, some cultural resources or natural resources, like high value habitats or working lands, may be unduly affected in certain areas of the state.

State support, such as tax credits, for local electricity generation investments can support local economies by providing power for new businesses, creating local energy jobs, and otherwise promoting local economic development. This action proposes to review existing incentives and policy support and identify opportunities for enhancement. For example, there is some interest in better supporting agrivoltaics, and this study could propose ways for the state to encourage such innovations to support economic development in rural Oregon. Providing incentives for in-state development of various generation and storage projects is an important state support. Traditional utility investing focuses on the greatest economic value to that utility's system and does not consider opportunities to redress historic or current inequities that may extend beyond one utility's purview. With support from other agencies such as Business Oregon, the Oregon Department of Energy could be well-positioned to lead this study. This study would identify areas where additional incentives or improvements to existing program design would best advance infrastructure needs, economic development, and energy justice objectives. Policymakers should be prepared to implement recommendations from this study once undertaken.

Electricity Action 8. Investigate opportunities to modify utility business models and ratemaking practices to enhance marketplace competition and thereby lower costs in utility planning and resource procurements.

Pathways: 1 (Energy efficiency); 2 (Clean Electricity); 3 (Electrification); 5 (Resilience)

Policies: 1a (Buildings efficiency); 1b (Large commercial and industrial efficiency); 2a (Utility-scale and distributed energy resources); 2b (Load flexibility); 3b (Distribution system readiness for EVs); 5b (Resilience measures)

Equity and Justice Approaches: 2 (Infrastructure development); 4 (Workforce)

Traditional ratemaking rewards utility investors for making capital investments and does not reward non-capital spending like procuring power via a contract or pursuing non-wires solutions such as energy

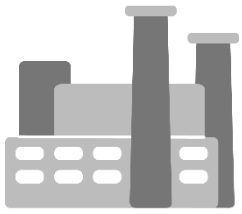
efficiency and customer flexibility. This structure disincentivizes investor-owned utilities from pursuing or facilitating non-utility owned resources at all scales, a phenomenon recognized as the "utility build-vs.-buy bias." It is difficult to know with certainty the lost opportunity of adhering to historical methods, but it is likely that this regulatory structure deters independent non-utility investment in needed resources, from customer-sited storage and flexibility to microgrids and large-scale generation projects to transmission upgrades. Regulatory mandates and rules endeavor to overcome this structure's shortcomings, and continuing enforcement and modernization efforts should be continued.[xlix]

With additional funding and staff capacity, the Oregon Public Utility Commission could undertake the long process needed to adequately evaluate potential reforms like performance-based ratemaking that could ultimately ensure investor-owned utilities deliver the services that customers need at reduced cost. Reforms would aim to remove utility disincentives to the diverse ownership of clean generation, storage, and transmission resources, and to drive deployment of demand-side flexibility in utility resource portfolios. This investigation will likely not provide near-term benefits to ratepayers, but it could provide significant long-term value after (1) reporting metrics are identified, then (2) a foundational baseline of information is established, and finally (3) performance incentives or penalties are established if appropriate. Without sufficient resources for investigation or baseline-setting, such changes to traditional ratemaking could increase risks to ratepayers without improvements to service or utility spending methods.

SB 688 (2025) explicitly authorizes the OPUC to consider performance-based ratemaking for varied purposes. The proposed action would build on that new law with more specific direction and additional funding for OPUC. The proposed action in no way proposes to limit the scope of SB 688, which includes a broad definition for the "public interest" that the OPUC must consider in undertaking any investigation of performance-based ratemaking. For more information on this and the 13 other bills passed in the 2025 session that the OPUC will be implementing, see the OPUC's 2025 Legislative Implementation – PUC Staff Work Plan.

Industrial Actions

Vision



Oregon's industrial sector needs policy direction and support to comply with state decarbonization targets while remaining competitive in a world of rising energy costs. Current operations are dependent on imported fossil fuels to power manufacturing processes that result in a significant amount of GHG emissions. To meet state decarbonization targets, Oregon industry will need to transition to cleaner and more efficient manufacturing processes. Identifying cost effective pathways for businesses to reduce their emissions, mitigate energy costs, and remain competitive in regional and global markets will be critical to transitioning Oregon's industrial sector. Historically, there has been limited state support for decarbonization and innovation in the industrial sector; the energy transition is an opportunity to invest in Oregon businesses to help them modernize their operations and reduce future costs. In addition to supporting industrial

[xlix] For example, OPUC Docket No. UM 2348 (Staff Investigation into Integrated Resource Plan and Request for Proposal Modernization) is a critical effort. The proposed policy action furthers that ongoing workstream and does not replace it.

competitiveness and sustainability, these actions have the potential to reduce emissions in affected communities.

Energy modeling conducted for the Oregon Energy Strategy determined that investment in energy efficiency and electrification can reduce some energy demand, and adoption of low-carbon fuels will be essential to decarbonize the hardest-to-electrify processes. Many high heat applications do not have an equivalent electricity technology replacement and will continue to be dependent on combustible fuel to meet energy demand. Low-carbon fuels have the potential to meet this energy demand while reducing lifecycle emissions. Low-carbon fuels such as biofuels or renewable hydrogen also present the opportunity of onsite production and storage using waste feedstocks, water, or other local resources.

These industrial policy actions highlight the need to collaborate with Oregon businesses to research and better understand the barriers and opportunities available to decarbonize Oregon industry.

Industrial Action 1. Identify and evaluate short and long term decarbonization options for large industrial entities in Oregon.

Pathways: 1 (Energy Efficiency), 3 (Electrification), 4 (Low-Carbon Fuels)

Policies: 1b (Large commercial and industrial efficiency), 3c (Strategic electrification), 4b (Low-carbon fuels adoption), 4c (Managed fuels transition)

Equity and Justice Approaches: 1 (decision-making); 4 (workforce)

Under this action ODOE and Business Oregon would collaborate with large industries such as manufacturing to identify opportunities for decarbonization, including energy efficiency, demand response, industrial symbiosis, electrification of thermal processes, low-carbon fuels, carbon capture and storage and other opportunities to support strategies to reduce greenhouse gas emissions and support competitiveness. Industrial findings and demonstration projects would inform potential solutions for the rest of Oregon's industrial sector and lead to policies to be implemented by state agencies and the legislature.

Many industries in Oregon combust solid, liquid, and gaseous fuels to produce their products and need proven decarbonization solutions to reduce greenhouse gas emissions and remain competitive. Reducing industrial emissions requires tailored solutions to address a range of different processes and technologies. For example, low and medium temperature fossil fuel heating applications may be electrified through thermal energy storage, industrial scale heat pumps and heat recovery systems, electric boilers, and other electricity-enabled technologies. The cost of electricity can strain the cost effectiveness of these projects, and development of on-site generation may be a way to mitigate cost. Industrial high-heat processes will likely be dependent on the development and deployment of low-carbon fuels to meet energy demands. Promotion and support of Oregon businesses siting near each other and exchanging materials, energy, water, and by-products through industrial symbiosis offers the opportunity to improve efficiency and production while reducing demand for energy, water, and other resources. This action will help advance understanding of what those solutions might look like across Oregon's industrial landscape.

Industrial Action 2. Fund an industrial modernization revolving loan fund to bolster adoption of energy efficiency improvements, electrification of thermal processes, industrial symbiosis, smart manufacturing, and application of low-carbon fuels where electrification is not feasible for large industrial entities.

Pathways: 4 (Low-carbon fuels)

Policy: 4b (Low-carbon fuels adoption), 4c (Managed fuels transition)

Equity and Justice Approaches: 3 (incentive programs); 4 (workforce)

This action would build on the previous action and support implementation of measures to decarbonize Oregon's industrial sector. Industries will require support to help identify innovations that can help decarbonize their processes while maintaining competitiveness in the national and global economy. Support may include technical assistance, collaborative forums, low-cost financing, or grants to help industries identify and deploy approaches to decarbonization.

Low-Carbon Fuels Actions

Vision

Low-carbon fuels include both liquid fuels such as ethanol, renewable diesel, and biodiesel, primarily used for transportation, as well as gaseous fuels, such as renewable natural gas and hydrogen, used for heating, manufacturing, and other direct uses. The shift to low-carbon fuels requires investment on the demand side, including in industries reliant on high-heat industrial processes as well as aviation, rail, and marine transport. It also requires supply-side investments to ensure that both transportation and direct use fuels are available where and when needed.

Some low-carbon fuels are already being used in Oregon to reduce emissions in transportation. Renewable diesel consumption has grown from 16 million gallons in 2019 to almost 171 million gallons in 2024, and renewable natural gas consumption, including out-of-state purchases, has increased from just over 2 million diesel gallons equivalent in 2019 to almost 4 million diesel gallons equivalent in 2024.

In the near-term, the focus on the demand-side is to explore the opportunities for low-carbon fuels in hardest-to-electrify industries in Oregon and generating opportunities to fund and finance measures that shift operations to low-carbon fuels.

On the supply-side, the focus is on aligning policies, programs, and incentives for low-carbon fuels in Oregon with that of neighboring states while identifying lowest-impact sites for low-carbon fuel facilities in Oregon. This would allow Oregon to define approaches to support technologies that have the support of our broader regional economy, reducing the risk of stranded costs or of Oregon "going it alone." Oregon is currently researching and investing in a potential renewable hydrogen economy with Washington and Montana by supporting demonstration projects in the Pacific Northwest Hydrogen Hub.[l] Identifying regional demand for low-carbon fuels as well as the lowest-impact sites for fuel production

[l] On October 1, 2025, the Pacific Northwest Hydrogen Hub Association received notice of a decision by the Department of Energy to cut funding for the Pacific Northwest Hydrogen Hub. The PNWH2 Association is currently considering options for how to continue the hub's efforts.

would help enable development of strategic sectors to our economy while minimizing negative effects such as harmful emissions on neighboring communities.

Fuels Action 1. Expand access to low-carbon fuels, including assessing opportunities for in-state production, identifying strategies for regional coordination, and establishing safeguards to protect communities and natural resources, through coordination between the Oregon Department of Energy, Oregon Department of Land Conservation and Development, Oregon Department of Environmental Quality, and Business Oregon.

Pathways: 4 (Low-carbon fuels)

Policy: 4a (Low-carbon fuels and fuel infrastructure)

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources); 6 (natural and working lands, cultural resources, broader environment)

Low-carbon fuel production potential exists in Oregon and energy modeling demonstrated a growing demand for these fuels. Some low-carbon fuels are already produced in Oregon, including ethanol made from corn as well as renewable natural gas from agricultural, wood, and municipal waste, and wastewater. Oregon imports nearly all the fuels that it uses other than electricity, making us dependent on the resiliency of the existing fossil fuel supply network. Support for in-state low-carbon fuel production could help local economies, agriculture and forest waste management, and increase access to those fuels. In-state production could deliver other benefits, such as improved reliability of fuel supply if there are logistical issues outside of Oregon, such as pipeline failures, and could help improve power system reliability by co-locating renewable natural gas or renewable hydrogen production with electricity generation to help meet peak demand. State agencies can also lead work with industry, ports, and other public partners to increase the supply of low-carbon fuels to Oregon and a more balanced distribution throughout the state.

Finding a suitable location for low-carbon fuel production is one of the main barriers identified to producing these fuels in Oregon. State agencies could develop tools and resources to help identify criteria for sites with the greatest opportunity for low-carbon-intensity fuel production development in Oregon and those likely to have the lowest impact on communities and the environment by focusing on industrially zoned and brownfield areas. Developed resources should also identify regulatory, technical, and economic barriers to increasing in-state production and identify opportunities for collaboration with neighboring states and regional entities, including through coordinated planning, infrastructure sharing, and market integration. Potential estimated carbon intensity analysis must also be considered when evaluating site and fuel recommendations to ensure projects align with state decarbonization targets. Local and environmental justice communities must be considered in the evaluation process both in criteria selection, and in evaluating ways to improve engagement with local communities when siting facilities.

Fuels Action 2. Support strategic planning and investment by Oregon businesses through a low-carbon fuels deployment roadmap, led by the Oregon Department of Energy, and informed by existing studies, data, analysis, and public partner information and guidance.

Pathways: 4 (Low-carbon fuels)

Policy: 4a (Low-carbon fuels and fuel infrastructure); 4b (*Low-carbon fuels adoption*); *4c (Managed fuels transition)*

Equity and Justice Approaches: 1 (decision-making); 2 (infrastructure development); 6 (natural and working lands, cultural resources, broader environment)

An evaluation of current and forecasted fuel markets, existing infrastructure, and state and federal support mechanisms for low-carbon fuels would deliver a forward-looking guide on how Oregon can most constructively support decarbonization of fuel consumption. The cost of fuels, production and availability, technologies, and methods of distribution for many low-carbon fuels are uncertain and likely to evolve over time as demand for these fuels grows. Low carbon fuels unavailable today may be viable solutions in the future, and the state can help Oregon businesses vet opportunities. This may include tracking their commercial development, researching best uses for Oregon consumers, identifying opportunities to integrate them into Oregon's energy system, and evaluating the state's role in securing access. Shifting demand in how we use fuels and what fuels we use will require clear and early direction from the state, so Oregon businesses and communities have time to prepare.

The Oregon Department of Energy would collaborate with state agencies and public partners to evaluate and recommend fuel decarbonization targets over time for maritime, aviation, and rail transportation as well as industry, providing Oregon businesses with guidance on decarbonizing operations over time. The evaluation should include an investigation of potential low-carbon waste feedstocks available in Oregon, existing infrastructure and how it could be repurposed, economic opportunities, and which gaseous and liquid fuels make the most economic sense for Oregon to produce to meet demand while protecting public health. The roadmap would identify how different low-carbon fuels can be prioritized across sectors to maximize economy-wide decarbonization while considering economic, technical, emission, and equity impacts. The development process would include engagement of industry and fuel suppliers to learn more about fuel availability and best uses and be balanced by engagement with environmental justice and other affected communities to ensure that their views inform the roadmap.

Fuels Action 3. Research and forecast fuel needs for emergency preparedness to ensure these needs are met as technologies evolve throughout the energy transition. ODOE would work in collaboration with Tribes and public partners across the state.

Pathways: 5 (Resilience)

Policy: 5c (Emergency response capabilities)

Equity and Justice Approaches: 1 (decision-making); 5 (partnerships and resources)

State, Tribal, county, and local jurisdiction emergency management teams are evaluating the ability of Oregon communities to respond during an event. Most emergency response vehicles and fuel storage are dependent on fossil fuels to meet their community needs. The decarbonization of Oregon's energy systems will lead to the adoption of new technologies, electrification, and greater use of low-carbon fuels. The rate of the change to new technologies or fuels and the impact to emergency management is evolving, which can be challenging for jurisdictions to know what to invest in and plan for.

To support resilience of the energy system, Oregon should analyze areas around the state where fuel may be in limited supply for emergency response needs, and identify specifically where and how the state, local governments, Tribes, and private sector partners can build fuel storage capacity and maintain a reliable supply of liquid fuels. Analysis of future fuel storage locations must be done in conjunction with local governments and Tribal governments, the private sector, and communities, and must not

cause undue impacts to disadvantaged neighborhoods. New and existing fuel storage will also be evaluated and receive recommendations for resilience improvements based on potential exposure to seismic or other risks. Emergency response capabilities must be able to respond and have immediate access to energy at any location in our state, and the most remote areas of Oregon are frequently those that face significant risk from wildfire or other natural disasters, and may have limited means to respond to those disasters.

The Oregon Department of Energy would collaborate and coordinate with energy and emergency management Tribal and public partners to research and map the fuel needs of local jurisdictions, track adoption rates of new technologies and fuels, and provide guidance to local jurisdiction emergency management teams on how to prioritize investments in emergency management energy resources. This work would expand the depth and reach of the existing County Energy Resilience Grant Program and Energy Security Plan. A grant program for participating Tribes and local governments would need to be funded to support the sharing of data as well as help governments implement findings from the research. Results of the research project would refine and support the development of emergency plans and procedures at the Oregon Department of Energy.

Full List of Legislative and Policy Actions

Cross-cutting Actions

1. Impose registration and reporting requirements upon all new large electric loads to inform greenhouse gas emissions analyses, and evaluate whether policy changes are needed to bring emissions in line with state policies. This would require an action from the Environmental Quality Commission.
2. Establish and identify a source of funding for a revolving loan fund to provide a stable source of low-cost and no-cost loans to support the energy transition and resilience.
3. Establish a Tribal Energy Block Grant Program to support Tribal energy priorities, cultural values, and community needs through alignment with their own energy planning processes or the Oregon Energy Strategy.
4. Develop a state-wide definition of energy burden that combines household and transportation costs to help inform Oregon's energy transition.
5. Conduct a biennial survey on energy affordability and report on trends to inform state policymaking.
6. Facilitate the sharing of data and joint planning to enhance energy resilience and reliability. The Oregon Department of Energy should identify actions that support the Oregon Energy Security Plan.
7. Identify gaps in current and estimated occupation-level employment to meet Oregon's future energy needs. ODOE should recommend actions to support and expand workforce development efforts that complement existing efforts.
8. Advocate for federal policies that support advancement of state energy objectives.
9. Increase coordination between state agencies and community-based organizations, utilities, Energy Trust of Oregon, and other partners to advance consumer education and facilitate delivery of energy related services.
10. Align the Oregon Economic Development Strategy and the Oregon Energy Strategy through collaboration between Business Oregon and the Oregon Department of Energy to foster

decarbonization and economic growth through consideration of industrial symbiosis, clean energy innovation, emerging technologies, and incentives.

11. Increase resources, funding, and staff levels at agencies as needed, and as funding becomes available, to implement actions necessary to advance Oregon's energy policy objectives.
12. Develop a community benefits framework at the Oregon Department of Energy that can be used as appropriate across the agency to address outreach and engagement, workforce needs, prioritizing environmental justice communities, and equitable practices.

Transportation

1. Review Oregon's transportation funding mechanisms, recommend strategies for alignment with the state's energy and climate policy priorities, and identify new revenue sources – particularly to support the deployment of ZEVs and ZEV infrastructure – through a Climate Aligned Transportation Funding Task Force.
2. Implement a Road Usage Charge program for all light-duty passenger vehicles to stabilize transportation funding and support accelerated adoption of zero emission vehicles.
3. Increase statewide support for public and active transportation in Oregon by expanding the statewide payroll tax to fund transit and boosting investments in Safe Routes to School and Great Streets at levels that reflect the scale of community needs.
4. Expand local governments' authority to generate and direct transportation revenues toward climate-aligned transportation infrastructure that meets local needs and priorities.
5. Require investor-owned utilities to publish and maintain interactive, feeder-level Hosting Capacity Maps (HCMs) showing available capacity for EV charging infrastructure, building electrification, distributed generation, and battery storage.
6. Establish a statewide incentive program for both standard and cargo e-bikes, with enhanced incentives and prioritization for income-qualifying Oregonians to ensure equitable access to clean, affordable transportation options.
7. Establish a statewide technical assistance program to support public and private fleets in planning and executing a successful transition to zero-emission vehicles (ZEVs).
8. Develop a MHD ZEV Roadmap to guide and accelerate the deployment of medium- and heavy-duty zero emission vehicles across the state. The Roadmap should provide actionable insights to inform state policy and investment, support fleet decision-making, and ensure alignment with climate, air quality, and equity goals.
9. Amend DEQ's Clean Fuels Program to extend Advance Crediting eligibility to high-mileage private fleet operators whose vehicles operate predominantly in Oregon.
10. Develop regulations and minimum standards for public heavy-duty hydrogen refueling infrastructure in Oregon. A working group could address key elements such as technical specifications, safety protocols, fuel quality standards, consumer protection measures, and streamlined permitting processes to ensure that stations are safe, reliable, and accessible. The working group should also establish targets for the carbon intensity of hydrogen supplied at fueling stations and recommend inclusive processes for community engagement in station siting decisions to align with Oregon's climate and equity goals.

Buildings

1. Prioritize existing incentive programs offering essential energy efficiency and weatherization improvements, particularly those focused on low- and moderate- income households.

2. Earmark flexible funding for deferred maintenance measures necessary to enable low- and moderate- income homes to install efficiency and weatherization technologies and measures.
3. Allow higher administrative costs for energy programs that serve or benefit Environmental Justice Communities, to better manage cost shortfalls experienced by programs and projects that benefit the overall system.
4. Prioritize measures in energy efficiency incentive programs that relieve pressure on the power system. In the near term, maintain – and where possible accelerate – building weatherization, replacement of less efficient electric heating with efficient electric heat pumps, rooftop solar and storage, and expand demand flexibility.
5. Advance strategic electrification in buildings in conjunction with other measures that support state decarbonization and resilience goals reliably, affordably, and equitably. Develop a building decarbonization roadmap, led by the Oregon Department of Energy, with recommendations to advance strategic electrification and other decarbonization measures, and as necessary, to provide data and analysis on building decarbonization to inform policies and programs.
6. Update energy efficiency and demand response programs to promote strategic electrification.
7. Continue to update the Oregon Residential Specialty Code and Oregon Energy Efficiency Specialty Code as outlined in HB 3409. Continue progress on energy efficiency and decarbonization requirements for new buildings that complement other actions in this document and include consideration of lower carbon materials and quantification of global warming potential values to realize embodied carbon savings in new construction and existing buildings. The Reach Code should reflect goals for economy wide decarbonization

Electricity

1. Expand the Oregon Department of Energy's statewide energy infrastructure resilience programs, including increasing funding for and amending the Community Renewable Energy Grant Program to support projects that improve energy resilience.
2. The Oregon Public Utility Commission, in coordination with the Department of Energy, should commission an expert review of balanced wildfire utility liability solutions that enable both utility accountability and ongoing customer cost containment, reliability, and decarbonization investments.
3. Review and share key findings with the Legislature regarding near-term transmission needs and opportunities, and identify opportunities for the state to support transmission. ODOE would lead this work and build on it to inform the role that a state transmission entity may play in enabling investment.
4. Update and enhance the Oregon Renewable Energy Siting Assessment Tool, with a goal of providing a robust database of lands that may be suitable for various types of electricity infrastructure projects.
5. Conduct a study on barriers preventing construction and interconnection of permitted projects and recommend actions to overcome barriers.
6. Report on developments in emerging technologies, including long-duration storage options, enhanced geothermal, floating offshore wind, marine energy, and advanced nuclear options, to identify the role they can play in meeting the state's electricity needs; also explore opportunities for pilot programs in the near-term.
7. Study government incentives for local electricity generation investments and identify opportunities for the state to better advance infrastructure needs, economic development and energy justice objectives.

8. Investigate opportunities to modify utility business models and ratemaking practices to enhance marketplace competition and thereby lower costs in utility planning and resource procurements.

Industry

1. Identify and evaluate short and long term decarbonization options for large industrial entities in Oregon.
2. Fund an industrial modernization revolving loan fund to bolster adoption of energy efficiency improvements, electrification of thermal processes, industrial symbiosis, smart manufacturing, and application of low-carbon fuels where electrification is not feasible for large industrial entities.

Low-carbon Fuels

1. Expand access to low-carbon fuels, including assessing opportunities for in-state production, identifying strategies for regional coordination, and establishing safeguards to protect communities and natural resources, through coordination between the Oregon Department of Energy, Oregon Department of Land Conservation and Development, Oregon Department of Environmental Quality, and Business Oregon.
2. Support strategic planning and investment by Oregon businesses through a low-carbon fuels deployment roadmap, led by the Oregon Department of Energy, and informed by existing studies, data, analysis, and public partner information and guidance.
3. Research and forecast fuel needs for emergency preparedness to ensure these needs are met as technologies evolve throughout the energy transition. ODOE would work in collaboration with Tribes and public partners across the state.

APPENDICES

Appendix A: Additional Energy Strategy Reports and Resources

Oregon Energy Strategy Advisory Group Materials
https://www.oregon.gov/energy/Data-and-Reports/Pages/Energy-Strategy-Advisory-Group.aspx

Oregon Energy Strategy Policy Working Group Materials
https://www.oregon.gov/energy/Data-and-Reports/Pages/Energy-Strategy-Working-Groups.aspx

Technical Approach to Modeling Document
https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-CETI-EER-Technical-Approach-to-Modeling.pdf

Modeling Assumptions and Sources
https://www.oregon.gov/energy/Data-and-Reports/Documents/Oregon-Energy-Strategy-Modeling-Assumptions-Sources.pdf

Energy Pathways Technical Report
https://www.oregon.gov/energy/Data-and-Reports/Documents/2025-OES-Technical-Report.pdf

Complementary Analyses Technical Report
https://www.oregon.gov/energy/Data-and-Reports/Documents/2025-OES-Complementary-Analysis-Tech-Report.pdf

Key Model Findings:

- Jobs Analysis: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Jobs-Analysis-Key-Findings.pdf
- Environmental Justice and Equity: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Complementary-Analysis-Key-Findings.pdf
- Building Efficiency, Electrification, and Distributed Energy Resources: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Buildings-Key-Findings.pdf
- Developing Clean Electricity Generation and Transmission: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Generation-Transmission-Key-Findings.pdf
- Low-carbon Fuels: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Low-Carbon-Fuels-Key-Findings.pdf
- Transportation Electrification: https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Transportation-Electrification-Key-Findings.pdf

Phase 1 Comment-Response Document
https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Phase1-Comment-Response-Document.pdf

Phase 2 Comment Summaries
https://www.oregon.gov/energy/Data-and-Reports/Documents/OES-Policy-Discussion-Comment-Summaries.pdf

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Appendix C: Glossary

This glossary provides definitions of terms used in this energy strategy report. It also includes links to sources for supporting and additional information.

Term	Definition
Actions	Near-term legislative and policy recommendations intended to build on policy frameworks, overcome barriers, and lay a foundation for continued progress toward state energy policy objectives over time.
Advanced Clean Cars II	A regulation adopted by Oregon Department of Environmental Quality in continuation of the first Advanced Clean Cars regulation, governing the sales of passenger cars, SUVs, and light duty trucks in Oregon. Advanced Clean Cars II applies to the 2026-2035 model year; will require auto manufacturers to deliver 100 percent new zero emission battery electric and plug-in hybrid electric vehicles by 2035; and ensures new gasoline and diesel vehicles sold through 2024 have the cleanest emissions possible. Language from Oregon Department of Environmental Quality's Oregon's Clean Car Standards Additional information in 2025 Biennial Zero-Emission Vehicle Report
Advanced Clean Trucks	A regulation adopted by Oregon Department of Environmental Quality to reduce tailpipe and greenhouse gas emissions through advanced clean technology. The rule requires manufacturers of medium- and heavy-duty vehicles (Class 2b – 8) to sell zero-emission trucks as an increasing percentage of their overall sales from vehicle model year 2025 through 2035. Language from Oregon Department of Environmental Quality's Advanced Clean Trucks Reporting Additional information in 2025 Biennial Zero-Emission Vehicle Report
Advisory Group	A group of subject matter experts and interested parties convened by the Oregon Department of Energy to provide a diverse range of perspectives for the development of a comprehensive and well-informed Oregon Energy Strategy. Language from Terminology Guide Additional information in AG Charter.
Agrivoltaics	Agrivoltaics, sometimes called dual-use solar or agrisolar, refers to the practice of producing both agricultural crops and electricity using solar panels on the same parcel of land. Language from and additional information in the Agrivoltaics in Oregon section of the 2024 Biennial Energy Report
Air quality modeling	For Oregon's Energy Strategy, the air quality modeling interfaced with EPA's COBRA model and the energy pathways modeling results to provide insights on the benefits of reduced pollutant emissions on public health outcomes associated with several scenarios. Language from Energy Wallet, Air Quality, and Geospatial Mapping Complementary Analyses

	Additional information in Environmental Protection Agencies COBRA Tool
Ammonia	A colorless gas compound with a characteristic pungent smell, made from hydrogen and nitrogen. Today, ammonia is mainly used to make fertilizer, cleaning products, and plastics, but is also seen as a promising carbon-free resource to power maritime or other heavy transport, generate electricity, and store and distribute hydrogen. Language from NZNW Glossary Additional information in Renewable Hydrogen Report and US Department of Energy's Potential Roles of Ammonia in a Hydrogen Economy
Biomass	Any organic matter that is available on a renewable or recurring basis, including agricultural crops and trees, wood and wood residues, plants, algae, grasses, animal manure, municipal residues, and other residue materials, especially when this matter is used for or space heating, cooking, electricity generation, and transportation. Biomass can be burned directly for heat or converted to liquid and gaseous fuels through various processes. Wood and wood waste is Oregon's largest source of biomass. Oregon used biomass to produce renewable natural gas, a biogas that has been purified to be a substitute for fossil natural gas, often to meet specifications required for injection into a natural gas distribution pipeline. Oregon also produces plant-derived ethanol fuel and biodiesel from used cooking oil to be used as transportation fuels. Language from U.S. Department of Energy's 2023 Billion-Ton Report Glossary Additional information in the 2023 Billion-Ton Report and Energy by the Numbers section of the 2024 Biennial Energy Report
Bonneville Power Administration	A federal agency that markets the power produced by Federal Columbia River Power System resources and other resources acquired under the provisions of the Northwest Power Act of 1980. Bonneville sells power to public and private utilities, direct-service industrial customers and various public agencies. The Northwest Power Act charges Bonneville with other duties, including pursuing conservation, acquiring sufficient resources to meet its contract obligations, funding certain fish and wildlife recovery efforts, and implementing the Northwest Power and Conservation Council's Power Plan and Fish and Wildlife Program. Language from Northwest Power and Conservation Council's 2021 Power Plan Glossary Additional information in Our History - Bonneville Power Administration and Northwest Power Act (USC numbered)
Building Performance Standard (BPS)	Oregon's policy addressing energy use and emissions from existing commercial buildings, which account for nearly 20 percent of energy use in Oregon, based on ASHRAE Standard 100-2024 and Oregon-specific amendments. Building performance standards differ from building codes (which apply to the construction or renovation of buildings) as they regulate buildings' operational energy use.

	Language from and additional information on the Building Energy Performance Standards site
Clean Electricity	Clean electricity is not a defined term in Oregon law. Here, the Oregon Department of Energy uses the term to mean electricity that produces zero or very few greenhouse gas emissions under the Oregon Department of Environmental Quality's Greenhouse Gas Emissions Reporting Program and which comes from a facility that is operated in accordance with all applicable legal requirements. Additional information in Oregon House Bill 2021 and 2024 Biennial Energy Report.
Climate Protection Program	A program administered by Oregon Department of Environmental Quality that establishes a declining cap, or limit, on greenhouse gas emissions from fossil fuels used throughout Oregon, including diesel, gasoline, and natural gas. The program is designed to reduce these emissions 50 percent by 2035 and 90 percent by 2050. Language from and additional information on Oregon Department of Environmental Quality's Climate Protection Program site
Community energy resilience	The ability of a specific community to maintain the availability of energy needed to support the provision of energy-dependent critical public services to the community following nonroutine disruptions of severe impact or duration to the state's broader energy systems. Language from Oregon House Bill 2021
Community Renewable Energy Grant Program	A grant program established by House Bill 2021 and administered by the Oregon Department of Energy to offset the cost of planning and developing community renewable energy and energy resilience projects; make community renewable energy projects economically feasible for qualifying communities; promote small-scale renewable energy projects; and provide direct benefits to communities across the state in the form of increased community energy resilience, local jobs, economic development or direct energy cost savings to families and small businesses. Language from and additional information on Community Renewable Energy Grant Program site
Complementary analyses	Analytical efforts that followed on the energy pathways modeling to further inform the energy strategy. The complementary analyses included a Household Energy Wallet analysis, air quality modeling, geospatial mapping, and a study on employment effects. Language from and additional information in Energy Wallet, Air Quality, and Geospatial Mapping Complementary Analyses
Consumer-owned utility (COU)	A not-for-profit utility governed by a local, elected board. Oregon COUs have a long history of contracting with BPA for significant amounts of their power supply. Language from 2022 Biennial Energy Report Additional Information in 2024 Oregon Utility Statistics and 2024 Biennial Energy Report

Day-ahead market	A regional transmission organization or independent system operator-administered market where the RTO or ISO schedules electricity production to meet forecasted demand one day in advance, based on factors, including weather, the day of the week, and planned power plant outages. Day-ahead markets function as auction markets for next-day electricity service. Entities that would like to buy or sell electricity for the next day can enter bids with the market operator. These bids indicate the price at which an entity is willing to buy or sell a quantity of electricity for a given time period, often a specific hour(s) of the next day. The market operator takes the bids it receives, and for each time period of the next day, creates supply and demand curves. The market operator creates the supply curve by ordering each of the sell bids from lowest to highest price and creates the demand curve by ordering each of the buy bids from highest to lowest price. Examples of forthcoming day-ahead markets include Southwest Power Pool's Markets+ and California Independent System Operator's (CAISO's) Energy Day Ahead Market. Language from and additional information in Federal Energy Regulatory Commission's Introductory Guide to Electricity Markets and 2024 Biennial Energy Report
Demand response	A deliberate change in a customer's normal electricity usage pattern in response to a change in price, contract, or request from a utility or grid operator. Language from 2020 Biennial Energy Report Technology Review: Demand Response
Distributed energy resources	Small, modular, energy generation and storage technologies that provide electric capacity or energy near sites of use. Examples include rooftop solar panels and customer-sited battery storage. An electric vehicle may be a distributed energy resource if it has the ability to provide vehicle-to-grid power; otherwise, it is a flexible load. Language from *NZNW glossary* Additional information in 2025 Oregon Energy Security Plan
Distribution infrastructure	For electricity, the physical equipment used to distribute electric power at voltages below 38,000 volts, including but not limited to poles, primary lines, secondary lines, service drops, transformers, and meters. For natural gas and liquid fuels, the infrastructure that stores and distributes fuels to consumers including transmission pipelines, compressor and pumping stations, storage tanks and terminals, marine, rail, and trucking transportation, and retail outlets. Language from *NZNW glossary* Additional information in 2025 Oregon Energy Security Plan, Transmission and Distribution, Fuel Supply and Distribution System
Electric vehicle	A vehicle that uses one or more electric motors for propulsion. The electricity that powers the motor may come from a battery, as in a battery electric vehicle, or from a hydrogen fuel cell, as in a hydrogen fuel cell electric vehicle.

	Language from *NZNW glossary* Additional information in 2025 Biennial Zero-Emission Vehicle Report
Electricity load	The amount of electricity drawn from the electrical grid. Load may also refer to a specific use of electricity, such as heating load. Language from *NZNW glossary*. Additional information in 2024 Biennial Energy Report's Energy 101 Peak Electricity Demand
Electric resistance heating	An electric resistance heater produces heat when an electric current passes through the resistance of a conductor. Electric resistance heating equipment can include baseboard heaters, electric furnaces, and electric wall heaters. Language from *NZNW glossary* Additional information in US Department of Energy's Electric Resistance Heating
Energy	The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Electrical energy is often measured in kilowatt hours (kWh), while heat energy is usually measured in British thermal units (Btu). In the electricity context, energy may refer to electricity available in a given moment, as distinct from capacity that represents the ability to produce electricity in a specific future moment. Energy capacity is further defined below. Language from U.S. Energy Information Administration Glossary and Northwest Power and Conservation Council's 2021 Power Plan Glossary
Energy burden	Home energy burden is the percent of household income spent on home energy bills. Energy bills include electricity, natural gas, and other home heating fuels, and are compared to the total income of the people in that household. If a household is spending more than 6 percent of its income on home energy costs, it is considered burdened. Language from American Council for an Energy-Efficient Economy's Understanding Energy Affordability Additional information in 2024 Biennial Energy Report
Energy capacity	The maximum power that a machine or system can produce or carry under specified conditions. The capacity of generating equipment is generally expressed in kilowatts or megawatts. In terms of transmission lines, capacity refers to the maximum load a line is capable of carrying under specified conditions. Language from Northwest Power and Conservation Council's 2021 Power Plan Glossary Additional information in 2024 Biennial Energy Report's Energy 101 Peak Electricity Demand
Energy efficiency	Using less energy to perform the same task or produce the same result. Language from and additional information in 2024 Biennial Energy Report and 2022 Biennial Energy Report

Energy justice	The goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those historically harmed by the energy system ("frontline communities"). Energy justice explicitly centers the concerns of marginalized communities and aims to make energy more accessible, affordable, clean, and democratically managed for all communities. The practitioner and academic approaches to energy justice emphasize these process-related and distributive justice concerns. Language from Initiative for Energy Justice's Defining Energy Justice: Connections to Environmental Justice, Climate Justice, and the Just Transition Additional information in Environmental Justice Council Annual Report 2024
Energy pathways modeling (the modeling)	A planning tool that calculates energy needed to power an economy while meeting policy targets, such as a greenhouse gas emissions target, and the economy-wide least-cost way to meet those energy needs with efficiency, clean electricity, electrification, clean fuels, and carbon sequestration. For the Oregon Energy Strategy, Evolved Energy Research used their EnergyPATHWAYS and RIO modeling tools, which use a "backcasting" approach that, based on current circumstances, optimizes ways to achieve given policy targets rather than forecasting a future based on current information and trends. Additional information in OES-CETI-EER-Technical-Approach-to-Modeling.pdf
Energy reliability	The degree to which the performance of the elements of the electrical system results in power being delivered to consumers within accepted standards and in the amount desired. Reliability encompasses two concepts, adequacy and security. Adequacy implies that there are sufficient generation and transmission resources installed and available to meet projected electrical demand plus reserves for contingencies. Security implies that the system will remain intact operationally (i.e., will have sufficient available operating capacity) even after outages or other equipment failure. The degree of reliability may be measured by the frequency, duration, and magnitude of adverse effects on consumer service. Language from U.S. Energy Information Administration's Glossary Additional information in 2024 Biennial Energy Report's Energy 101 Peak Electricity Demand, 2022 Biennial Energy Report Energy 101: Electric Sector Resource Planning and Acquisition, 2020 Biennial Energy Report Energy 101: Resource Adequacy
Energy resilience	The ability of energy systems, from production through delivery to end-users, to withstand and restore energy delivery rapidly following nonroutine disruptions of severe impact or duration. Language from Oregon House Bill 2021

	Additional information in Energy System Resilience and 2024 Biennial Energy Report Energy 101 Energy Resilience
Environmental justice	The equal protection from environmental and health risks, fair treatment and meaningful involvement in decision making of all people regardless of race, color, national origin, immigration status, income or other identities with respect to the development, implementation and enforcement of environmental laws, regulations and policies that affect the environment in which people live, work, learn and practice spirituality and culture. Language from Oregon House Bill 4077 Additional information Environmental Justice Council and Environmental Justice Council Annual Report 2024
Environmental justice community	As defined in ORS 182.535, "environmental justice community" includes communities of color, communities experiencing lower incomes, communities experiencing health inequities, Tribal communities, rural communities, remote communities, coastal communities, communities with limited infrastructure and other communities traditionally underrepresented in public processes and adversely harmed by environmental and health hazards, including seniors, youth and persons with disabilities. Language from Oregon House Bill 4077 Additional information Environmental Justice Council and Environmental Justice Council Annual Report 2024
Flexible load	An appliance or device with power consumption that can be varied to shift electricity demand in response to a change in price, contract, or request from a utility or grid operator. Additional information 2025 Biennial Zero-Emission Vehicle Report and 2022 Biennial Energy Report
Focus-area Working Groups	The topic-focused groups convened by Oregon Department of Energy to provide specific input or feedback to inform the modeling and technical analysis for the Oregon Energy Strategy. Language from Terminology Guide
Grid interactive buildings	Energy efficient building with smart technologies characterized by the active use of distributed energy resources to optimize energy use for grid services, occupant needs and preferences, and cost reductions in a continuous and integrated way. Language from and additional information in 2020 Biennial Energy Report Policy Brief: Grid-interactive Efficient Buildings
Heat pumps	Unlike other heating devices that produce heat through the combustion of fossil fuels, such as furnaces, heat pumps exchange heat from one space to another. Air-source heat pumps run on electricity and use a refrigerant to absorb heat from outside air and release it into an indoor space. They can also provide cooling by running in the opposite direction. Air-source heat pumps are the most common type of heat pump in residential buildings in the United States. Language from *NZNW Glossary*

	Additional information on Heat Pump Incentive Programs
Household Energy Wallet analysis	An analysis of the effects of the energy strategy scenarios on sample household energy burdens and affordability based on the cost of delivering energy to customers according to factors like household vehicle miles traveled, vehicle type, home size, and heating and cooling technology and needs. Language and additional information in Energy Wallet, Air Quality, and Geospatial Mapping Complementary Analyses
Hydrogen	The most abundant element in the universe and the lightest of all gases. Hydrogen occurs naturally on Earth only in compound form with other elements in liquids, gases, or solids. Hydrogen combined with oxygen is water (H_2O), and hydrogen combined with carbon forms different compounds (hydrocarbons) found in natural gas, coal, and petroleum. Hydrogen can be produced — separated — from water, fossil fuels, or biomass and used as a source of energy/fuel that has a high energy content per unit of weight. Language from *NZNW Glossary* Additional information in Renewable Hydrogen in Oregon: Opportunities and Challenges
Industrial symbiosis	Voluntary collaboration among businesses or organizations to share and exchange materials, energy, water, and by-products to optimize resource use, reduce waste, and enhance economic and environmental outcomes. Language from Oregon House Bill 3246
Interagency Steering Group	A group of Oregon state agency and government representatives, from the Oregon Departments of Energy, Land Conservation and Development, Transportation, Environmental Quality, and State Lands; Oregon Public Utility Commission; Business Oregon; the Governor's office; and other agencies provided agency perspectives and guidance to develop a statewide energy strategy.
Integrated resource planning	Planning by utilities to meet the future energy and capacity needs of their customers through a "least-cost, least-risk" combination of energy generation and demand reduction. IRPs include estimates of future energy needs, analysis of the resources available to meet those needs, and the activities required to secure those resources. IRP drafting is a large, stakeholder-driven process that results in a comprehensive and strategic document that drives utility investments, programs, and activities. Language from and additional information in Oregon Public Utility Commission's Energy - Planning and 2022 Biennial Energy Report Electric Resource Planning
Internal combustion engine vehicle	Vehicles that are powered by combustion of fuel, such as gasoline, diesel, biofuels, or compressed natural gas. Language from *NZNW glossary*.

Investor-owned utility (IOU)	A for-profit corporation that provides a utility service like electricity or natural gas and which is overseen by Oregon's Public Utility Commission. Language from and additional information in 2022 Biennial Energy Report Electric Resource Planning and Public Utility Commission : Energy - Who We Regulate : Utility Regulation : State of Oregon
Low-carbon fuels	Fuels that when combusted provide thermal energy with fewer greenhouse gas emissions than petroleum based or traditional fuels. These fuels are used to heat buildings, cook, generate electricity, fuel transportation, and power industrial processes. Examples include gaseous fuels like renewable hydrogen, ammonia, renewable propane, or renewable natural gas or liquid fuels like biodiesel, renewable diesel, or ethanol. Language from and additional information in US Department of Energy's Low Carbon Fuels and Energy Sources Basics
Managed charging	Adapting the charging cycle of electric vehicles or other battery-powered devices to both the conditions of the power system and the needs of users. Language from *NZNW glossary* Additional information in 2025 Biennial Zero-Emission Vehicle Report
Meaningful involvement	An element of environmental justice in policymaking where (a) members of vulnerable populations have appropriate opportunities to participate in decisions about a proposed activity that will affect their environment or health; (b) public involvement can influence a decision maker's decision; (c) the concerns of all participants involved are considered in the decision-making process; and (d) decision makers seek out and facilitate the involvement of members of vulnerable populations. Language from Oregon House Bill 4077 Additional information Environmental Justice Council Annual Report 2024
Microgrid	A group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that functions as a single controllable system, irrespective of whether the microgrid is operating independently of or in conjunction with an electric grid. Language from Oregon House Bill 2066 Additional information in 2024 Biennial Energy Report
Multimodal transportation	Multiple modes of transportation, including but not limited to pedestrians, bicyclists, transit, personal vehicles, freight, and micromobility, such as scooters, skateboards, or services that enable sharing and rental of these devices. Language from and additional information in Oregon Transportation Plan
Oregon's Energy Security Plan	An Oregon Department of Energy report developed in collaboration with the Oregon Public Utility Commission, Tribal Nations, and interested parties that provides an overview of the state's energy

	infrastructure, quantifies the threats and hazards that could cause energy insecurity, and proposes mitigation measures that the state and its partners can implement to reduce risk. Language from and additional information in Oregon Energy Security Plan
Pathways	The Pathways are guidance meant to inform and align policies and actions to meet Oregon's energy policy objectives of clean, reliable, and affordable energy. They are intended to represent a stable, long-term framework for action out to 2050.
Peak loads	Peak electricity demand, or peak load, is the highest demand for electricity from all customers across a specific service area during a specified period of time (such as an hour, a month, or a year). It is one of the key metrics utilities and transmission providers track and forecast to assess future electricity demand — and plan for adequate levels of generating resources needed to keep the lights on. Language from 2024 Biennial Energy Report's Energy 101 Peak Electricity Demand. Additional information in 2022 Biennial Energy Report Energy 101: Electric Sector Resource Planning and Acquisition, 2020 Biennial Energy Report Energy 101: Resource Adequacy
Phase 1	The period of Oregon Energy Strategy development focused on technical analyses and fact-finding to support and inform exploration of pathways to achieving the state's energy policy objectives. Language from Terminology Guide
Phase 2	The period of Oregon Energy Strategy development focused on discussing policy gaps and opportunities to inform policy recommendations. Language from Terminology Guide
Policies	More detailed directives that advance the high-level pathways and provide a long-term framework for the development of more specific, near-term actions.
Policy Working Groups	Topic-focused groups convened by Oregon Department of Energy in Phase 2 to discuss policy gaps and opportunities to inform Oregon Energy Strategy policy recommendations. Language from Terminology Guide
Ratepayer-funded	Collections added to utility bills — often labeled as system benefits charges, public purpose charges, or similar — that go directly into energy programs and may be used to support low-income energy assistance, energy efficiency upgrades, renewable energy projects, utility bill discounts, weatherization efforts, or other initiatives. Also referred to as "customer-funded" programs. Additional information in State of Oregon: Energy in Oregon - Public Purpose Charge and Utility Customer-Funded Programs | Energy Markets & Policy
Reference Scenario	The core set of assumptions and data that the energy pathways modeling uses to inform and constrain the model's selection of a least-

	cost pathway to achieving Oregon energy policy objectives. This pathway was selected to strike a balance of "aggressive but achievable" assumptions that, based on numerous sources, are likely to yield the lowest-cost pathway to meet our objectives. However, many risks and uncertainties remain, and there is no one "correct" solution for the full combination of technologies and measures needed to meet our goals. To more fully inform the evaluation of pathways and policies, the Reference Scenario is compared to several Alternative Scenarios. Language from Terminology Guide
Regional transmission organization	An RTO is an independent, nonprofit organization that operates and ensures reliability of the bulk power system and optimizes supply and demand for wholesale electricity. One of the primary functions of an RTO is operation of the electric transmission grid across a large, multi-state geographic region. Language from and additional information in Regional Transmission Organization Study: Oregon Perspectives
Resource adequacy	The ability of the electricity system to meet demand for electricity under a broad range of conditions, subject to an acceptable standard of reliability, as well as plan to meet future demand with sufficient supply-side and demand side resources. Language from and additional information in Oregon Public Utility Commission's Resource Adequacy and 2020 Biennial Energy Report: Resource Adequacy
Strategic electrification	Strategic electrification – also referred to as beneficial electrification – is a guiding framework for advancing electrification while supporting affordability and reliability. For electrification to be considered "strategic" it must advance one of the following areas without adversely affecting the others: (1) benefits consumers over the long run; (2) enables better grid management; and (3) reduces negative environmental impacts. Language from and additional information in Strategic Electrification | Northeast Energy Efficiency Partnerships and Beneficial Electrification - Regulatory Assistance Project
Targeted universalism	An approach to policymaking that establishes a common goal for all groups concerned and then tailors solutions and approaches to achieve those goals based on different groups' structure, culture, and geographies. Targeted universalism recognizes that while policy goals may be shared universally, achieving those goals requires approaches tailored to the specific needs and circumstances of different communities. The approach incorporates the idea that conversations, policies, and programs must be informed by the needs of different communities, and that decisionmakers must engage with communities to understand and co-create solutions. With this approach, we can better understand burdens, benefits, and barriers for communities across the state to help ensure an equitable energy transition. Language from and additional information in University of California Berkley's Othering and Belonging Institute

Traditional ecological knowledge	Traditional ecological knowledge is the evolving knowledge, practice, and belief about the relationships that exist between humans and the natural environment over hundreds or thousands of years through direct contact with the environment. Rooted in a familial relationship with the plants, animals, and the environment, traditional ecological knowledge is passed down the generations through oral traditions, such as storytelling, songs, and ceremonies. It encompasses the world view of indigenous people which includes ecology, spirituality, human and animal relationships, and more. Language from and additional information in Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon): The Columbia River Anadromous Fish Restoration Plan and Oregon State University's Traditional Ecological Knowledge Lab
Transmission lines	Conductors, insulators, supporting structures, and associated equipment used by electrical power systems to transfer electric power at voltages at or above 38,000 volts from one point to another. Language from *NZNW Glossary* Additional information in 2024 Biennial Energy Report and Oregon Energy Security Plan
Transportation electrification plans	Investor-owned utilities are required to submit transportation electrification plans for Oregon Public Utility Commission approval covering the electric company's portfolio of near term, long-term, future, and other transportation electrification actions. Transportation electrification plans should seek to address areas most affected by market barriers in the electric company's service territory and to provide benefits for traditionally underserved communities. Language from Oregon Public Utility Commission Order number 19-134 Additional information in 2025 Biennial Zero Emission Vehicle Report
Variable energy resource	An electric generating resource that is non-dispatchable due to the fluctuating nature of its energy production. For example, wind and solar PV. Language from Northwest Power and Conservation Council 2021 Power Plan Glossary
Virtual power plant	Grid-integrated aggregations of distributed energy resources such as batteries, electric vehicles, smart thermostats, water heaters, and other connected devices. Also referred to as distributed power plants. Language from and additional information in 2024 Biennial Energy Report
Western Resource Adequacy Program	A Western regional reliability planning and compliance program to deliver a region-wide approach for assessing and addressing resource adequacy. The WRAP coordinates participating utilities to set a regional reliability metric and use a consistent approach for counting resources. WRAP also allows participants to pool and share resources during tight grid operating conditions. The WRAP is composed of voluntary participating utilities and is governed by a fully independent board of

	directors at the Western Power Pool. The Southwest Power Pool serves as the Program Operator for the WRAP. Language from and additional information in Western Power Pool Western Resource Adequacy Program
Western Transmission Expansion Coalition (WestTEC)	An industry-led, West-wide effort to develop an actionable, West-wide transmission needs study looking out over 10- and 20-year periods to support the needs of the future energy grid. Language from and additional information in Western Power Pool Western Transmission Expansion Coalition
Zero-emission vehicle (ZEV)	Any vehicle with zero tailpipe emissions, including battery electric vehicles and fuel-cell electric vehicles. Language from NZNW Glossary Additional information in 2025 Biennial Zero Emission Vehicle Report