OREGON ENERGY SECURITY PLAN

OREGON
DEPARTMENT OF
ENERGY

September 2025

EXECUTIVE SUMMARY

The Oregon Department of Energy is proud to present the *2025 Oregon Energy Security Plan*. The plan was developed in collaboration with the Oregon Public Utility Commission and other government and private sector partners. The *Oregon Energy Security Plan* presents 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.

The energy sector — including electricity, liquid fuels, and natural gas — is vital to the health, well-being, safety, economy, and way of life for Oregonians. Nearly all commerce and critical activities in the state rely on power and liquid fuels to operate and function. A disruption to Oregon's energy infrastructure can directly affect the security and resilience of other necessary systems, such as water or wastewater, health care, education, emergency response, and many others. The Energy Security Plan primarily analyzes natural hazards and human-made risks, including cybersecurity and physical attacks on infrastructure. New risks to our energy systems also are emerging as sharply rising electricity demand is forecast for Oregon and the region. In a world facing increasing challenges from the consequences of climate change, including extreme weather events and wildfires, as well as risks from earthquakes and human-made threats from foreign and domestic terrorism, a statewide, collaborative approach to assessing threats, reducing risk, and improving energy security is vital. In addition to this version of the Energy Security Plan, readers also should review the Oregon Energy Strategy scheduled for release in November 2025 for further explanation and analysis of energy system challenges and a roadmap to how Oregon can meet energy security needs and resource adequacy considerations while meeting greenhouse gas reduction goals.

In recent years, Oregon's energy systems have sustained multiple impacts from emergency events. In January 2024, severe winter storm lasting more than a week in many areas caused power outages for more than 650,000 Oregon customers, limited liquid fuel deliveries, and created a risk of restrictions on natural gas use for power production. A few months later, in July and August 2024, central and eastern Oregon had extreme wildfires that burned more than 1 million acres and microburst storm events that caused damage to electric system infrastructure.

Physical impacts of natural hazards on Oregon energy systems also lead to extreme financial impacts on individuals, families, businesses, communities, and energy providers. Recovery from physical damage is difficult, as small cooperative utilities or locally owned utilities may not have the resources to recover in a timely manner without external support or raising rates for members and customers. A statewide coordinated effort at improving our energy security can help Oregon strengthen preparedness for the next hazard, better withstand the next impact, and reduce recovery time.

Legislative Requirements

The Oregon Energy Security Plan meets the requirements for a State Energy Security Plan as laid out in the 2021 federal Infrastructure Investment and Jobs Act and in Oregon's Senate Bill 1567 (2022), which in addition to meeting the federal requirements directs ODOE to evaluate strategies to increase geographic diversity of fuel storage throughout the state. The plan, including agency staff time and contractor support, was funded by the federal government through the U.S. Department of Energy's State Energy Program, with money allocated from the IIJA.

Structure and Synopsis

The Energy Security Plan is structured in two parts.

The first part provides a foundational overview of energy information and is comprised of Sections I-V. Section I defines energy security and provides an overview of energy security plan requirements, past Oregon energy security planning work, and the planning process for this document. Section II details the entities in Oregon responsible for various aspects of energy security planning, including Tribal Nations, federal agencies, state agencies, and local governments. Section III details Oregon's emergency response structure for energy emergencies. Section IV details the network of coordination among partners for energy security preparedness, response, and longer-term planning. Section V provides a comprehensive overview of energy generation in Oregon.

The second part of the plan, Sections VI-XI, captures more variable information that will be updated regularly. Section VI discusses energy consumption in Oregon. Section VII presents an assessment of threats to Oregon's energy infrastructure, and Section VIII provides a series of mitigation measures for those risks. Section IX provides the results of the fuel storage analysis to increase capacity and geographic diversity of liquid fuel storage across the state. Section X discusses recently completed energy security activities in Oregon and Section XI details upcoming activities and discusses opportunities for further study.

Key Findings

The risk assessment (Section VII) finds that of the natural, cyber, and physical hazards evaluated, the highest vulnerability to hazards is associated with a Cascadia Subduction Zone earthquake, wildfire, windstorms, and winter storms. Cascadia Subduction Zone earthquake vulnerabilities are highest in the western parts of Oregon, while the level of vulnerability to the other hazards is fairly consistent across the state's other regions. In terms of mitigation measures for these risks (Section VIII), redundancy, hardening, upgrading, and weatherizing are the most recommended physical measures to mitigate vulnerabilities. Other recommended operational measures include additional studies, coordination, and planning.

The fuel storage analysis (Section IX) evaluates fuel storage locations in each of the 31 identified "population islands" in Oregon. Population islands are areas predicted to become isolated from road access as a result of bridge and road failures after a Cascadia Subduction Zone Earthquake. This section also highlights next steps for increasing geographic diversity of fuel storage in the state.

Section XI identifies key future studies and data gaps to address, including: an EV adoption and gasoline demand analysis; exploration of additional uses of rail for emergency fuel delivery; additional infrastructure data; and potential evaluation of climate change, extreme heat, landslides not associated with earthquakes, and volcanic activity in the risk assessment. Finally, the 2025 Energy Security Plan connects with the forthcoming Oregon Energy Strategy, highlighting the challenges our state faces to provide sufficient electricity to meet rising power demands, the need for electric transmission, and coordination between natural gas and electricity sectors, all while meeting Oregon's greenhouse gas reduction goals and limiting costs to consumers.

ODOE will continue to review and update this Energy Security Plan, including collecting and analyzing additional data and considering new threats and risks that emerge to Oregon's energy systems.

More information: https://www.oregon.gov/energy/safety-resiliency/Pages/Energy-Security-Plan.aspx

LETTER FROM THE DIRECTOR

Every day, Oregon's energy systems are an astounding orchestration of moving parts working together to deliver energy to Oregonians to power cars, planes, homes, hospitals, and more. Trucks deliver gasoline, diesel, and heating oil from Portland and Eugene to people in Southern and Eastern Oregon; dams and wind facilities provide renewable electricity to communities across our state and the West; public and investor-owned utilities ensure we have reliable energy for our homes and businesses. Needless to say, it is a complex arrangement that requires careful planning and coordination on the best of "blue sky" days. Ensuring the continued safe, productive, and equitable operation of our energy systems also requires planning and preparing for effective emergency response and prevention of disruptions to the energy supply from hazards and threats.

The Oregon Energy Security Plan was initiated in response to federal direction in the 2021 Infrastructure Investment and Jobs Act for states to develop energy security plans. The State of Oregon built upon this foundation in the 2022 legislative session via Oregon Senate Bill 1567, offering additional direction to address Oregon-specific needs. This 2025 version of our plan includes minor updates to the primary document that was finalized in September 2024, and we plan to develop a more significant update for 2026.

The plan outlines Oregon's network of coordination and response to address energy emergencies, and includes a risk assessment of natural hazard, cyber, and physical threats to Oregon's energy systems. This threat analysis is used to identify priority mitigation measures to strengthen energy system resilience. The plan offers an analysis of priority locations to bolster liquid fuel storage across the state, which would increase community resiliency and access to fuels during a disaster.

> **"The plan outlines Oregon's network of coordination and response to address energy emergencies, and includes a risk assessment of natural hazard, cyber, and physical threats to Oregon's energy systems."**

I'm incredibly proud of the work that has gone into creating the Energy Security Plan, which will set Oregon on a course to become even more energy resilient and secure. ODOE developed this plan working with many incredible partners, including the Oregon Public Utility Commission, the Oregon Department of Emergency Management, Tribes, utilities, liquid fuel providers, local communities, and our consultants at CNA and Haley and Aldrich. At its heart, the Energy Security Plan is a guiding framework to help Oregon's policymakers and energy providers make informed decisions to increase resilience and prepare for emergencies. It also establishes a process for how ODOE and Oregon state government can support energy companies and communities to prepare for the future.

I hope Oregonians use this information to engage in collaborative discussions about how to ensure a secure and resilient energy future for our state.

Director Janine Benner
Oregon Department of Energy

EDITOR'S NOTE

The Oregon Energy Security Plan is one document presented in two parts. The document presented here is primarily the same as was submitted in September 2024. Somewhat minor updates have been made for this 2025 edition. Please see the change log in Appendix A for additional information on changes made for 2025.

The first part (sections I through V) describes the regulatory and energy landscape. The Oregon Department of Energy will update this section as the landscape changes over time.

The second part (sections VI through XI) contains data-focused sections, as well as discussion of implemented actions related to or resulting from the Energy Security Plan.

A change log is included for the document as Appendix A. At the time of this publication on September 30, 2025, the Oregon Energy Security Plan is comprised of:

Part 1: Version 1.1

Part 2: Version 1.1

LIST OF ACRONYMS

BBL	Barrels = 42 Gallons
Bcf	Billion Cubic Feet
BPA	Bonneville Power Administration
BRIC	Building Resilient Infrastructure and Communities Program
BSEE	Bureau of Safety and Environmental Enforcement
Btu	British Thermal Unit
CBP	U.S. Customs & Border Protection
CEC	California Energy Commission
CEI	Critical Energy Infrastructure
CESER	Cybersecurity Energy Security, and Emergency Response (USDOE)
CISA	Cybersecurity Infrastructure Security Agency
CSS	Cyber Security Services
CSZ	Cascadia Subduction Zone
DAS	Department of Administrative Services
DLA	Defense Logistics Agency
ECC	Emergency Coordination Center
EEAC	Energy Emergency Assurance Coordinators Program
EIA	Energy Information Administration (USDOE)
EIS	Enterprise Information Services
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
ESF	Emergency Support Function
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FMCSA	Federal Motor Carriers Safety Administration
GDC	Governor’s Disaster Cabinet
GIS	Geographic Information System
HMGP	Hazard Mitigation Grant Program
HOS	Hours of Service
IIJA	Infrastructure Investment and Jobs Act
kWh	Kilowatt Hour
LiDAR	Light Detection and Ranging
MARS	Regional Mitigation and Recovery Coordination Team
MMcf	Million Cubic Feet
MNPPS	Marathon Northwest Products Pipeline System
MRP	Mission Ready Packages
MWh	Megawatt Hours
NARUC	National Association of Regulatory Utility Commissioners

NASEO	National Association of State Energy Officials
NEMA	National Emergency Management Association
NGA	National Governors Association
NIMS	National Incident Management System
NIST	National Institute of Standards and Technology
NRCC	National Response Coordination Center
ODEQ	Oregon Department of Environmental Quality
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OE	Office of Electricity (USDOE)
OEA	Office of Enterprise Assessments (USDOE)
OEM	Oregon Department of Emergency Management
OICG	Oregon Infrastructure Coordination Group
OMD	Oregon Military Department
OPUC	Oregon Public Utility Commission
OR ESP	Oregon Energy Security Plan
ORNG	Oregon National Guard
ORS	Oregon Revised Statutes
OTFC	Oregon TITAN Fusion Center
PADD	Petroleum Administration for Defense District
PDX	Portland International Airport
PHMSA	U.S. Pipeline and Hazardous Materials Safety Administration
PNW	Pacific Northwest
P & R	Regional Preparedness & Response Coordination Team
PSPS	Public Safety Power Shutoffs
PTC	Portland Terminal Cluster
RFP	Request for Proposal
SB 1567	Senate Bill 1567
SESP	State Energy Security Plan
SLTT	State, Local, Tribal, and Territory Governments
SRF	State Recovery Function
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
US DHS	U.S. Department of Homeland Security
USDOE	U.S. Department of Energy
USDOT	U.S. Department of Transportation
WDOC	Washington Department of Commerce
WRMAG	Western Regional Mutual Assistance Group
WSPC	Western States Petroleum Collaborative

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I. INTRODUCTION

Oregon’s energy sector consists of electricity, liquid fuels, and natural gas assets that are geographically dispersed and connected by systems and networks. The energy sector is uniquely vital, as all other critical infrastructure and lifeline services depend on energy to operate – electricity to power hospitals or fuel for fire trucks, for example. Energy infrastructure is connected – a disruption can directly affect the security and resilience of other aspects of the energy sector, such as an impact to natural gas supply that limits natural gas power plant operations, or an electricity outage affecting the ability of a gas station to pump fuel. In addition, disruptions to our energy systems can have a cascading effect on other critical infrastructure systems – such as transportation, communications, or water – threatening public health and safety, the environment, the region’s economy, and even our national security. The Oregon Department of Energy, in cooperation with its partners, submitted the first Oregon Energy Security Plan in September 2024. This version is the 2025 update.

Oregon’s energy infrastructure and delivery systems are vulnerable to a variety of hazards, including natural disasters (flooding, wildfires, winter storms, earthquakes), systems and infrastructure failures, pandemics, deliberate physical or cyber-attacks, and other events. Whatever the cause, when the demand for energy is greater than the available supply as a result of an interruption to an energy system, energy insecurity is created.

Natural hazards that can affect the energy system are intensifying in frequency and magnitude, due in large part to climate change. Other threats – including cyber security and domestic and international terrorism — put increased pressure on energy systems in Oregon and beyond. Aging infrastructure that may have been constructed to less stringent standards than current requirements can also pose risks. In addition, Oregon and the Pacific Northwest face a potential earthquake from the Cascadia Subduction Zone that will strain or severely damage even the most robust and resilient energy systems in the western reaches of our state.

Beyond natural disasters and physical and cyber security threats, new risks to our energy systems are emerging as sharply rising electricity demand is forecast for Oregon and the region in the coming years.[1] Rising demand is primarily due to data center load growth, advanced manufacturing, and other large industrial users of electricity, and a push toward increased electrification of buildings and transportation, which is putting strain on the electric grid and electricity generation facilities to meet power needs in the short, medium, and long term. It is increasingly vital that all parties involved in Oregon’s energy ecosystem work together to meet our state’s needs while taking into account Oregon’s important greenhouse gas reduction goals. This involves strategic roles for state government agencies, leadership from elected officials, and planning, coordination, investment, and construction from utilities and energy providers. In the coming years, there is little doubt that Oregon will need more power generation facilities, more electric transmission lines to move electricity from where it is generated to where it is needed, and investments in infrastructure to reduce risks from wildfire and other hazards —

and all this must be done cost-effectively to lower the financial burden on Oregonians and in alignment with Oregon's greenhouse gas reduction goals. This is, to say the least, a tall order. While this 2025 version of the Oregon Energy Security Plan touches on some of these issues, we direct readers to the forthcoming Oregon Energy Strategy, to be released in November 2025, as a guiding document that further explains and analyzes the energy system challenges and provides a roadmap to how Oregon can meet its greenhouse gas reduction goals on an economy-wide scale while also meeting energy security needs, resource adequacy considerations, and transmission build-out.

Our modern society and economy depend on continuous energy to operate and thrive. Governments are more often called to assist during energy disruptions to ensure the protection of the health and well-being of communities, and governments are increasingly involved in identifying threats and risks, and undertaking planning efforts to mitigate those risks and meet our society's future energy needs in a cost-effective fashion. The Energy Security Plan and November's Oregon Energy Strategy are two important efforts from the Oregon Department of Energy and partners to support Oregonians and protect our way of life, now and in the future.

Securing and improving the resilience of energy infrastructure in the face of both man-made and natural disasters is a priority and vital to the state's overall well-being. Maintaining Oregon's energy security is an ongoing effort that requires continued vigilance, contingency planning, public-private sector partnerships, regional coordination, public awareness, and training.

The Oregon Energy Security Plan (OR ESP) is a product of the Oregon Department of Energy in close collaboration with the Oregon Public Utility Commission and many other partners. The OR ESP assesses the state's energy infrastructure and assets along with those in the region that support Oregon's needs. The OR ESP also quantifies the threats and hazards that could cause energy insecurity and proposes a series of mitigation measures and actions that the state and other partners can implement to reduce risk and improve energy stability. The OR ESP lays out a plan for continuing to work on statewide energy security issues, and ODOE will meet the legislative mandate for periodic updates with a comprehensive program that includes ongoing reviews and revisions to the plan itself, increased coordination and relationship-development with partners, collecting and analyzing additional data, and seeking to understand new threats and risks that emerge after publication of this plan.

It is important to note that many low-income Oregonians already experience barriers to energy security in their daily lives. This includes being unable to afford the necessary energy to live a comfortable and productive life, such as affording enough fuel to drive where needed, pay electric bills, or sufficiently heat and cool homes. Mitigation strategies to increase resilience must be considered with an eye to equity, and potential public or private sector funding may support historically under-resourced areas. While no specific funding mechanisms for mitigation are associated with the Energy Security Plan, this plan may be used as a resource to support future programs.

Defining Energy Security

There are many ways to describe energy security. Some commonly used definitions include:

> *"Uninterrupted availability of energy sources at an affordable price."*[2]
>
> *"Ability to maintain energy services at global, national, or local levels against disruption from natural or human sources."*[3]
>
> *"Having enough energy to meet demand and having a power system and infrastructure that are protected against physical and cyber threats."*[4]

These definitions show that energy security encompasses many aspects: availability, accessibility, reliability, and affordability. Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance. Long-term energy security primarily deals with timely investments to supply energy in line with economic developments and environmental needs. Affordability of energy is a critical component of energy security at the individual and household level – even if sufficient supply of energy is available, affordability can affect the well-being of Oregonians.

The **Oregon Energy Security Plan** is intended to help the state plan for, respond to, and recover from events that disrupt the energy supply (electricity, natural gas, and liquid fuels). Through efforts to quantify and mitigate risks to energy infrastructure, we hope to ensure a reliable and resilient supply of energy at an affordable price.

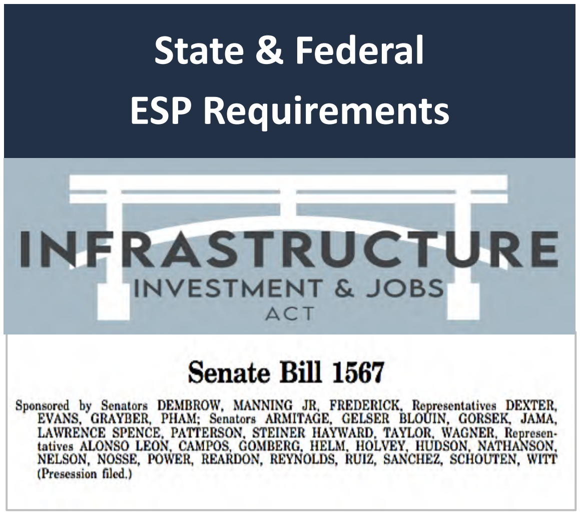
Energy Security Requirements

The federal government and Oregon state leadership recognize the importance of energy security for our state, and have provided the direction, funding, and technical assistance necessary to move this plan forward.

The Infrastructure Investment and Jobs Act (IIJA) was enacted in November 2021, authorizing the U.S. Department of Energy (US DOE) to provide financial and technical assistance for state energy offices to develop what is now called a State Energy Security Plan (SESP). The IIJA requires that SESPs include an assessment of potential hazards to all energy sectors and cross-sector interdependencies, as well as proposed methods to strengthen the state's ability to have reliable, secure, and resilient energy infrastructure. The federal law also requires states to engage in regional coordination with partners beyond a state's own borders, and an annual letter of certification from the Governor in 2025. Governor Kotek's certification letter is included as a cover letter. Finally, the federal government is providing direct funding to states to support development of SESPs through the IIJA as well as other existing funding sources to state energy offices like ODOE. Development of a SESP that is compliant with the provisions of the IIJA is required, and all states must have a plan assessed by US DOE in order to continue to receive state energy program funding.

Likewise, Oregon legislators passed a bill in the 2022 session with similar energy security provisions. Senate Bill 1567 (SB 1567) directs ODOE to develop an Oregon Energy Security Plan (OR ESP) that aligns with federal IIJA requirements.

Figure 1: Oregon Energy Security Plan Requirements



Senate Bill 1567

Sponsored by Senators DEMBROW, MANNING JR, FREDERICK, Representatives DEXTER, EVANS, GRAYBER, PHAM; Senators ARMITAGE, GELSER BLOUIN, GORSEK, JAMA, LAWRENCE SPENCE, PATTERSON, STEINER HAYWARD, TAYLOR, WAGNER, Representatives ALONSO LEON, CAMPOS, GOMBERG, HELM, HOLVEY, HUDSON, NATHANSON, NELSON, NOSSE, POWER, REARDON, REYNOLDS, RUIZ, SANCHEZ, SCHOUTEN, WITT (Presession filed.)

1. Address all energy sources *(regulated & unregulated providers)*
2. Provide state energy profile
3. Address energy sector hazards & vulnerabilities *(physical/cyber)*
4. Assess risks to energy sectors & cross-sector interdependencies
5. Provide risk mitigation approach *(enhance reliability & end-use resilience)*
6. Address multi-state & regional coordination, planning, and response *(Tribal coordination and mutual assistance in response plans)*

SB 1567 also directed ODOE to evaluate strategies to increase fuel storage capacity throughout the state to provide a safety net for local communities following major disasters. ODOE's ongoing planning with federal agencies shows that the greatest challenge following a Cascadia Subduction Zone earthquake and tsunami event will be the widespread damage to the state's transportation systems. This will limit the ability to deliver fuel to affected communities in western Oregon. It could take weeks or even months to deliver fuel to some communities due to the lack of access, and will likely take longer in the more remote areas of the state. The concept is that if relatively small quantities of additional fuel could be stored in less seismically active regions of the state, and storage tanks themselves were seismically-sound, then the area would have additional supply-ready fuel to use for emergency response purposes. This evaluation considers locations that already have bulk fuel tanks, such as public works yards, motor pools, utility maintenance yards, local airports, or other similar types of facilities. The fuel analysis associated with SB 1567 is in IX and Appendix B.

About the Oregon Department of Energy

The Oregon Department of Energy was created in 1975, two years after the international oil crisis that led to a nearly 300 percent increase in gasoline prices, changed our daily lives, and influenced global politics and economies for years.[5] ODOE began collaborating with federal partners, other state energy offices, and the private sector to implement strategies to control traffic congestion and reduce panic buying at the pumps resulting from the supply shortages nationwide.

Fuel Resilience Planning

Since the 1970s, the agency has adapted fuel policies and procedures to keep up with the changing threats to the region's petroleum supply and distribution system. In 2017, ODOE released the Oregon Fuel Action Plan, which details how the state will respond to an event that causes severe shortages of liquid fuels. ODOE developed the Fuel Action Plan pursuant to Oregon Revised Statutes (ORS) 175.750-785 to ensure that adequate fuel supplies will be provided to the state's emergency and essential service providers in the event of a severe or long-term fuel disruption or shortage.

The Fuel Action Plan addresses all hazards resulting in liquid fuel supply concerns and is a working document to be updated as needed. This ensures that all response strategies remain current and in sync with those of our federal, Tribal, military, state, local, and industry partners. Appendix C includes links to many energy security, resilience, and emergency planning reports, including the Oregon Fuel Action Plan.

Past Energy Security Planning

Supported by federal stimulus funding in 2009, ODOE and the Oregon Public Utility Commission developed the Oregon Energy Assurance Plan.[6] The plan provided an overview of the state's energy infrastructure and overall energy profile. At a high level, the Energy Assurance Plan evaluated the role of renewables and smart grid technologies in energy assurance planning. The plan also described different types of energy emergencies that could occur in Oregon and explained how the state would respond to energy emergencies.

The last significant revision to the state's Energy Assurance Plan occurred in 2012 under the American Recovery and Reinvestment Act funding.

Since 2012, key materials have been developed that inform this Oregon Energy Security Plan. This includes, but is not limited to, information contained in the agency's Biennial Energy Reports, Oregon Fuel Action Plan, State of Oregon Emergency Operations Plan, Earthquake Risk Study for Oregon's Critical Energy Infrastructure Hub, Western Petroleum Shortage Response Framework, Resiliency Assessment: Oregon Transportation Systems, and Oregon's Cyber Disruption Response and Recovery Resource Guide.

While the Energy Assurance Plan was accurate and useful in its time, there was no funding mechanism to conduct periodic reviews and it is now out of date, replaced by this Energy Security Plan.

About the Oregon Energy Security Plan

ODOE appreciates this opportunity presented by IIJA funding to develop a new comprehensive State Energy Security Plan. The OR ESP builds on work completed as part of and following the Energy Assurance Plan (2012). Together, ODOE and the Oregon PUC have incorporated our expanded knowledge base and experience in responding to real world energy emergencies and other events. The state has experienced devastating effects from emergencies at an increased rate of occurrence. Since 2019, Oregon governors have issued 180 emergency declarations and executive orders requiring statewide response to wildfires, severe winter storms, flooding, droughts, cyber-security threats, and a pandemic.

In the past five years, Oregon governors have issued 150 emergency declarations and executive orders.

Table 1: Oregon Emergency Declarations Issued by Type and Year

Year	Floods	Wildfires	Conflagrations[i]	Severe Weather (extreme heat and winter storms)	Landslides	Droughts	Pandemic Other	Total
2019	1	-	-	1	-	-	-	**2**
2020	1	3	16	-	-	7	32	**59**
2021	-	1	9	6	-	10	11	**37**

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[i] Conflagrations are defined as fires posing threats to life, safety, and property, and those threats exceed the capabilities of local firefighting personnel and equipment.

2022	-	1	5	1	1	7	4	**19**
2023	-	1	5	3	-	9	4	**22**
2024	-	1	14	4	-	4	3	**26**
2025*	3	2	6	-	-	2	2	**15**
Total	**5**	**9**	**55**	**15**	**1**	**39**	**56**	**180**

* Includes emergency declarations and executive orders issued for January through June 2025.

Even as our knowledge and experience have expanded, the statewide planning progress had not been compiled in an intentional way, and inevitable data gaps remained. In addition to collecting new information and conducting original analysis, the OR ESP serves as a bridge between a variety of planning documents generated by federal, tribal, state, and local government agencies, as well as information from utilities and private energy companies. This plan compiles existing and newly collected information to analyze threats to Oregon's energy systems, and proposes measures to mitigate identified threats and increase energy resilience over time.

ODOE, working with the Oregon Public Utility Commission and other state agencies and partners, will build on the OR ESP to develop a living resource and program. This information is used to improve the state's energy security outlook by guiding development of an ongoing strategic mitigation approach to strengthen the energy systems to better withstand and recover from extreme weather events, natural disasters, man-made threats, or issues of energy affordability. The ODOE energy security program acts as a forum for state government to support utilities, energy companies, and communities in increasing energy security. Additional studies, which may serve to fill data gaps, are identified as part of this process and are presented in Section XI.

The OR ESP is not an energy emergency response plan, but rather provides links to stand-alone emergency response plans for electricity, liquid fuels, natural gas, and cybersecurity emergencies – see Section III and Appendix C.

Plan Development Process

ODOE has overseen all aspects of OR ESP development and has authority over the final product. This includes ensuring plan compliance with state and federal requirements as well as managing the project scope, content, quality, and schedule. However, developing the plan requires close partnerships with state agencies, federal partners, Tribal governments, utilities, private sector companies, and contractor support.

In support of the OR ESP development process, US DOE conducted a Pacific Northwest Critical Energy Infrastructure Study. The PNW CEI Study identifies key and support assets in Oregon and Washington in the electricity network, liquid fuels infrastructure, and natural gas systems. Key assets are facilities and systems that, if compromised, would have a major effect on the state's energy supply and/or on the overall reliability of the region's energy system. Supporting assets include substations, power lines, and pipelines that provide energy supplies or are otherwise essential to the continued operation of the key energy assets. ODOE incorporated many of the results of the study in the energy infrastructure risk assessments and risk mitigation strategies presented in the OR ESP.

ODOE works in parallel with the Oregon Public Utility Commission on Oregon emergency energy responses and collaborates on energy security plan development. ODOE and OPUC are designated primary state agencies for preparedness, response, and recovery to energy emergencies – Emergency Support Function (ESF) 12: Energy and State Recovery Function (SRF) 6: Infrastructure Systems – that have potential impacts to Oregonians. OPUC is responsible for developing and maintaining emergency response plans involving electricity and natural gas emergencies. ODOE is responsible for developing and maintaining a fuel sector emergency response plan and statewide energy security planning. An interagency agreement was established between ODOE and OPUC for technical assistance specific to the electricity and natural gas sectors. OPUC will continue to coordinate and facilitate engagement with the utilities and provide subject matter expertise on updates to plan sections involving the electric and natural gas sectors. OPUC was an important partner in developing the OR ESP.

For more on the state's Emergency Support Functions, see Section II.

ODOE will also engage partners in agencies around the state. Every agency has a role to play, and many develop actionable resources to increase resilience, assess hazards, and plan for response/recovery coordination. A spotlight on recently published and expected products at the state level is presented in Sections X and XI, respectively.

ODOE will continue collaboration with each of the nine federally recognized Tribal governments to better understand specific energy security issues and work together to develop mitigation actions that can reduce energy insecurity for their nations.

As part of the inaugural OR ESP development, ODOE enlisted the support of contractors. One supported ODOE specifically with stakeholder engagement and facilitation services (Appendix D), and the second team led the technical analysis in the OR ESP, including the risk assessment (Appendix E), fuel screening analysis associated with SB 1567 (Appendix B), and evaluation of mitigation strategies (Appendix F).

Outreach and Engagement

As representatives of the State of Oregon, ODOE values openness, transparency, and good governance; the OR ESP engagement strategy reflects these values by encouraging broad engagement in the plan's development. Between October 2023 and June 2024, ODOE contacted more than 500 interested parties and engaged with over 200 individuals from federal, state, local governments, Tribal governments, non-profits, academic institutions, and utilities, among others. The goals of this engagement were to 1) conduct research and data collection on the electric, natural gas, and liquid fuels energy sub-sectors in Oregon; 2) analyze natural and human-caused threats to Oregon's energy systems; and 3) develop risk mitigation measures. To support these efforts, ODOE retained a facilitation and engagement technical consultant. A summary report of these engagement efforts is included as Appendix D. ODOE has conducted additional engagements with specific partners as part of this 2025 update.

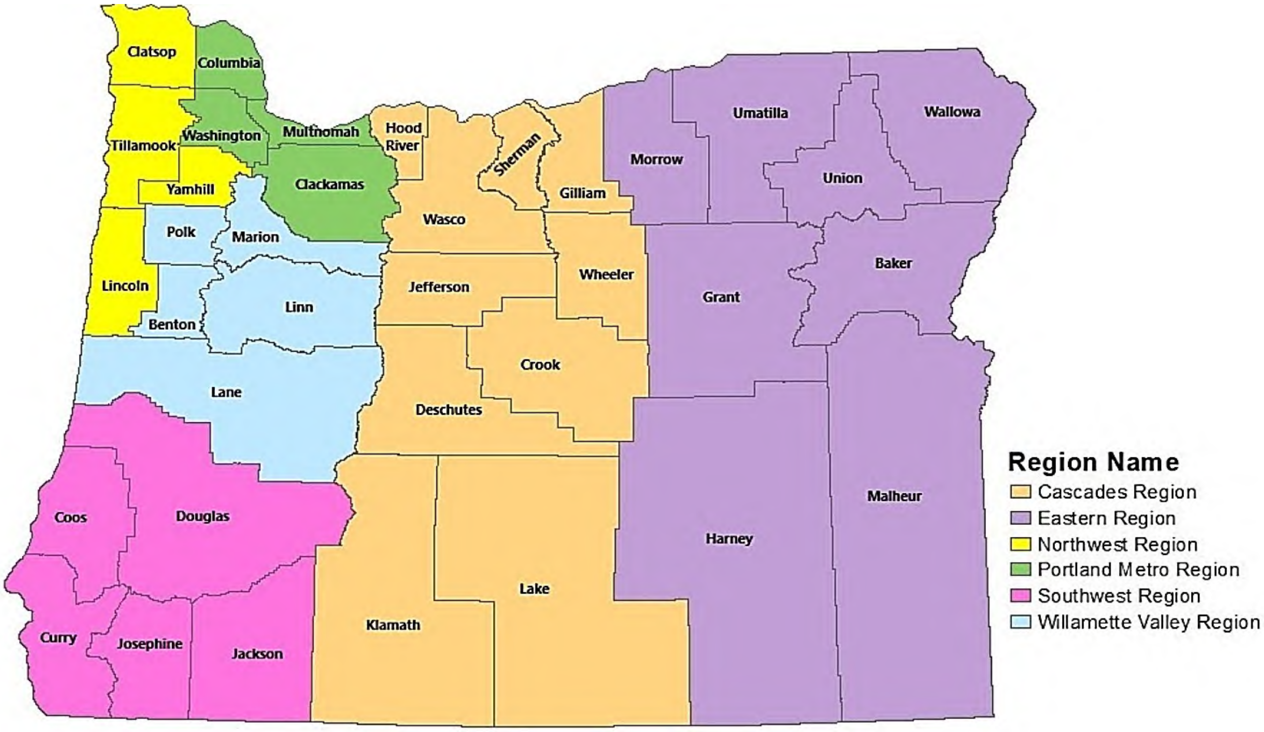
OR ESP engagement began with a statewide kickoff meeting and data-collection survey. To maximize the likelihood that all interested parties could engage with the plan, the survey was sent broadly via ODOE's email distribution list and website. During the kickoff meeting, ODOE provided an overview of the OR ESP project and the engagement strategy. In the meeting and survey, ODOE asked participants for their input on available energy data sources, data they believe should be included in the OR ESP project (e.g., emergency response plans, mitigation strategies, risk assessments of hazards, vulnerability assessments), as well as their personal experiences with energy insecurity.

Following the kickoff, the OR ESP team engaged in a variety of sector-specific surveys to gather further information on threats to Oregon's energy systems and communities: 1) Energy System Threats Public Sector Survey; 2) Electricity Risk Assessment Survey; 3) Natural Gas Risk Assessment Survey; and 4) Liquid Fuels Hazards and Threats Survey. Respectively, these surveys were distributed to: Tribal governments; federal, state, and local government entities; non-profit and other organizations; and Oregon's electric utilities, natural gas utilities, and liquid fuels distributors. Results from these surveys were used to help identify threats and hazards, rank vulnerabilities, and inform the overall risk assessment for Oregon's energy systems and infrastructure.

In May 2024, ODOE conducted regional meetings across the state, including one in each of the six regions in Oregon (utilizing the Oregon Department of Emergency Management regions, as shown in Figure 2), as well as a meeting with Tribal governments. These meetings were held in person with virtual options to maximize accessibility. The meetings provided an opportunity for ODOE to present preliminary findings from the electricity, natural gas, and liquid fuels sector risk assessments, as well as proposed risk mitigation measures; regionally specific information was also presented at each of the regional meetings. Meeting participants had the opportunity to complete assessments during and after the meetings to provide feedback on the regional hazards and potential mitigation measures. In total, more than 90 individuals from utilities; non-profit organizations; academic institutions; the private sector; federal, state, and local government entities; and Tribal governments participated. Recordings and presentations from these meetings are available on the OR ESP page; a summary report of the outreach efforts is available in Appendix D.

Additionally, Appendix G provides a list of the public comments ODOE received via the online comment portal from September 2023 to September 1, 2024, on the OR ESP page, as well as additional written documents received at the regional and Tribal government meetings. These comments were reviewed and considered in the preparation of the OR ESP. ODOE did not receive any substantive comments during September 2024 to July 2025 and closed the comment portal in July 2025. Comments can now be sent to the Energy Security Plan email. ODOE will consider any additional comments during future revisions of the plan.

Figure 2: Map of Regions Established by the Oregon Department of Emergency Management



All the information gathered across these engagement activities has been used to inform the development of the OR ESP and particularly the risk assessment and mitigation measures detailed in Section VIII.

A risk-informed Fuel Site Screening Tool to analyze locations that could host expand geographic distribution of liquid fuels related to emergency-response was developed as part of this plan. Details are available on the OR ESP page.

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II. ENERGY SECURITY PLANNING AUTHORITIES

Many state and federal agencies have critical roles in energy security planning. These roles include:

- Setting standards and regulations related to energy sector safety and security.
- Providing baseline energy information and situational awareness during emergencies.
- Assisting energy system operators in emergency preparedness, response, and recovery activities.
- Coordinating activities with federal, state, local and Tribal officials.

This section identifies the primary state and federal government agencies that lead and support energy security planning. Many of these agencies have roles and responsibilities that extend beyond the energy sector. Also included are agencies that safeguard cybersecurity and physical security of energy infrastructure. The role of local governments and Oregon's nine federally recognized Tribal Nations in energy security planning are discussed in this section. It is recognized that few government agencies own or operate energy systems; in Oregon, that role is primarily the responsibility of electric utilities, natural gas utilities, and private sector fuel companies.[i]

Energy Security Plan Development

As noted in Section I, the Oregon Energy Security Plan is authorized and directed by both the federal government and the state legislature. The 2021 Infrastructure Investment and Jobs Act and Oregon House Bill 1567 (2022) require that the Oregon Department of Energy (ODOE) develop and maintain an Energy Security Plan. Both the IIJA and HB 1567 include specific requirements that must be included in the Energy Security Plan, including requirements for coordination with other state agencies and local and Tribal governments. ODOE has worked closely with the Oregon Public Utility Commission (OPUC) on this plan, and has collaborated with other state agencies, Tribal Government partners, and local governments.

Emergency Support Function 12: Energy

Oregon, like other state and federal governments, organizes our response resources and capabilities under the Emergency Support Functions (ESF) construct as described in the National Response Framework. ESFs provide the structure for state and federal coordination in an incident response. Each ESF has a designated lead federal agency and state agency, with other identified supporting agencies. Federal and state ESF-12 lead agencies are responsible for all aspects of the energy system, including security planning, response, recovery, and long-term mitigation to reduce risks. A more detailed description of agencies included in Oregon's ESF construct is presented in Section III of this plan.

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[i] In Oregon, there are 12 municipal electric utilities, collectively serving approximately 202,000 Oregonians. Many government agencies also own fueling facilities, primarily for fleet vehicle refueling.

The United States Department of Energy (US DOE) is the lead federal agency for ESF-12. In Oregon, the role is divided into two leads, the Oregon Department of Energy and the Oregon Public Utility Commission. ODOE is responsible for statewide energy security planning and emergencies affecting liquid fuels and propane. OPUC is responsible emergencies involving the electricity and natural gas sectors. ODOE and OPUC work closely with US DOE to ensure the federal ESF- 12 plans align with state strategies. This coordination assists in preparation for responding to and recovering from energy disruptions affecting Oregon.

Oregon's leading ESF-12 agencies are the Oregon Department of Energy and Oregon Public Utility Commission.

State Agency Authorities, Roles, and Responsibilities

Governor's Office

As the state's chief executive, the Governor directs the state's response to emergencies affecting the health and welfare of Oregonians. Oregon Revised Statute (ORS) 401 grants the Governor broad authority to protect the public by declaring a State of Emergency when a disaster occurs. During a State of Emergency, if the Governor determines and declares that strict compliance with the provisions of the order or rule would in any way prevent, hinder, or delay mitigation of the effects of the emergency, they have the authority to suspend provisions of any order or rule of any state agency. The Governor may direct any state agency to employ personnel, equipment, and facilities to prevent or alleviate actual or threatened damage from the emergency. The Governor is also authorized to direct state agencies to provide supplemental services and equipment to local governments to restore services to provide for the health and safety of the citizens in the affected area(s).

ORS 401.188 provides additional powers to the Governor to control, restrict, or regulate the use, sale, or distribution of fuel and other commodities to support the state's response and recovery activities.

Oregon Department of Emergency Management

The mission of the Oregon Department of Emergency Management (OEM) is to execute the responsibility of the Governor to establish, maintain, and implement an emergency services system in Oregon during emergencies. ORS 401.052 authorizes OEM as the lead agency for emergency prevention, preparation, response, and recovery.

OEM developed, maintains, and implements the State of Oregon Emergency Operations Plan. During state-declared emergencies with impacts to the energy infrastructure, OEM establishes and maintains a statewide structure for emergency operations. OEM may activate the State Emergency Coordination Center to support multi-jurisdictional emergencies or disasters and serve as a communications hub to ensure the coordination of all participating response agencies. OEM supports 18 state Emergency Support Functions and more than 50 county, city, and Tribal local emergency management offices around the state.

Oregon Department of Energy

As directed by Oregon SB 1567 and the federal Infrastructure Investment and Jobs Act, ODOE is responsible for statewide energy security planning to harden Oregon's energy infrastructure against all hazards. ODOE will maintain the Oregon Energy Security Plan (OR ESP), which brings together all relevant energy information to assess the state's ability to recover quickly from natural disasters and manmade threats, including cyber risks, to Oregon's energy sectors. The OR ESP describes the state's energy profile and supply and delivery systems, quantifies and mitigates risks to the state's energy infrastructure, and highlights energy plans to prepare, respond, and recover from events that disrupt energy supply in Oregon. ODOE collaborates with state, local, and Tribal governments, the private sector, and federal agencies to develop and maintain the OR ESP.

ODOE is also responsible for ensuring fuel resilience. ORS 176.750-820 authorizes ODOE to develop and maintain a statewide contingency plan in response to liquid fuels disruptions or shortages that affect Oregon. The Oregon Fuel Action Plan identifies measures and strategies to ensure adequate fuel supplies are available to maintain emergency services, transportation systems, and other critical lifelines and services to protect public health and safety during and after an emergency. The plan was developed in coordination with state and federal agencies, counties and local jurisdictions, Tribal governments, and the private sector.

Under ORS 176.775, ODOE's Director may recommend the Governor declare an Energy Resource Emergency in the event of a severe or long-term liquid fuels disruption or shortage. An Energy Resource Emergency may be declared if emergency and essential service providers are unable to obtain fuel at any price and/or market forces and fuel conservation measures have failed to provide for adequate and equitable distribution of fuel. An Energy Emergency Declaration allows ODOE to implement strategies in the Oregon Fuel Action Plan and work with fuel providers to resolve the supply disruption or shortage.

Oregon Public Utility Commission

OPUC is the rate regulator for the state's investor-owned electric and natural gas utilities, as outlined by ORS 757. Further, the OPUC is responsible for safety regulation as directed in ORS 757.035(1), which is carried out by the Safety Division of the OPUC. It relates to all operators of electric and telecommunications facilities as outlined in Oregon Administrative Rules (OAR) 860-024, 028 and 300. It is also responsible for service quality regulation of investor-owned utilities as outlined in OAR 860-023.

In addition, the OPUC Safety Division acts as an agent for the Pipeline Hazardous Materials & Safety Administration branch of the Federal Department of Transportation to safely regulate the state's natural gas pipeline systems. OPUC also serves as the liaison to all energy utilities and coordinates efforts for the response and restoration of impacted electric and natural gas infrastructure during an incident or event through ESF-12, while also working with commercial telecommunications operators as ESF-2 on communications. OPUC works with utility partners to evaluate needs and coordinate assets and capabilities to address actions that could relate to resource shortages or system outages.

OPUC communicates and coordinates with interstate partners to address ingress and egress of responders and equipment among neighboring states and works with federal partners to maintain situational awareness when an incident impairs interstate services. OPUC works with utilities to ensure adequate emergency preparedness plans are in place and maintains situational awareness when it becomes aware of potential threat events. OPUC also works with electric and natural gas utilities to facilitate the coordinated recovery of systems and applications from cyber-attacks.

Oregon Department of Environmental Quality

The Oregon Department of Environmental Quality (DEQ) is responsible for developing and implementing a Fuel Tank Seismic Stability Program that evaluates the vulnerability of fuel tank systems to earthquakes and requires facilities to develop and deploy a plan to minimize risk. This applies to 20 facilities that manage over two million gallons of liquid fuels in the state at any given time. The facilities' plans will include actions to protect public health, life safety, and environmental safety within the facility and surrounding communities that may be affected by damage to the facility. The plans must consider the potential consequences and the resources needed to respond to a magnitude 9.0 Cascadia Subduction Zone earthquake. DEQ is developing this program in consultation with the Oregon Department of Geology and Mineral Industries and ODOE.

During state-declared emergencies affecting the liquid fuels sectors, DEQ coordinates with ODOE to temporarily lift environmental waivers to ensure adequate fuel supplies are available to support the state’s emergency and essential services providers. This includes but is not limited to: Vapor Recovery and Fuel Transfer, Loading, and Storage restrictions; Reid Vapor Pressure limits; and Biofuel Blending Waivers. All waivers are listed in Appendix G of the Oregon Fuel Action Plan.

DEQ also manages the state’s Oil Spill Contingency Planning Program. The agency reviews emergency response plans from petroleum facilities, pipelines, commercial ships larger than 300 gross tons and high hazard railways. DEQ also conducts and participates in exercises to ensure federal, state, local, Tribal, and private sector partners are prepared to respond to oil spills. DEQ is the primary state agency serving the ESF-10 role. ODOE shares responsibility for ESF-10 as it relates to radioactive materials.

Oregon Department of Transportation

The mission of the Oregon Department of Transportation (ODOT) is to provide an efficient and safe transportation system to support economic opportunity and livable communities for Oregonians. ODOT provides essential assistance to the state in emergencies where public infrastructure is affected. ODOT developed and maintains an agency Emergency Operations Plan (EOP) that describes ODOT’s preparedness and response to emergencies affecting the state’s transportation system. The ODOT EOP also details what ODOT will do to assist local governments and state agencies during emergencies. This includes, but is not limited to, identifying critical routes and providing escorts to support fuel deliveries and utility crews working in impacted areas, and debris removal to clear roads for fuel trucks and utilities crews.

ODOT also sets safety requirements for intrastate commercial drivers. This includes hours of service requirements limiting how long drivers can be on the road before a mandatory break and weight restrictions on the maximum allowable for trucks that travel on Oregon highways. During energy emergencies, ODOT can waive Driver and Motor Carrier Safety requirements to facilitate the delivery of specific energy products, most often liquid fuels. ODOT can also facilitate the movement of utility crews, trucks, and other resources involved in the restoration of electric power.

Additionally, ODOT oversees Oregon rail operations through the agency’s Rail Safety Programs to ensure structural safety of railroad cars, equipment, track, crossings, and signals. Acting as an agent for the

Federal Railroad Administration, ODOT inspects track, railroad equipment and cars, hazardous materials, and operating practices.

Oregon Department of Administrative Services

The Department of Administrative Services (DAS) is the central administrative agency of Oregon state government. ORS 184.305 authorizes DAS to work with private enterprise, citizens, and other government entities to develop an efficient service delivery system under normal conditions that can be employed during state-declared emergencies through the agency's lead role for ESF-7 resource support. This includes providing centralized contracting and emergency procurement services. DAS also provides network services to state agencies, which includes managing the state data center and coordinating Geographic Information Systems data.

DAS directs and facilitates the Governor's Disaster Cabinet (GDC). When activated, the GDC provides policy direction and advises the Governor on statewide priorities and the allocation of resources to support response and recovery efforts. ODOE's Director and OPUC Commission Chair (or their delegates) are members of the GDC and advise the Governor and state leadership on energy policy and priorities during emergencies.

DAS also works with the Oregon Department of Justice to lead the state's ESF-17 responsibilities over cybersecurity planning efforts.

Oregon Department of Justice: Oregon Titan Fusion Center

The mission of the Oregon TITAN Fusion Center (OTFC) is to protect Oregon citizens from terrorist and criminal activity by providing an all-crimes criminal information clearinghouse. OTFC and DAS co-lead ESF-17 on Cyber and Critical Infrastructure Security. OTFC manages Oregon's Critical Infrastructure and Key Resources Program, which hosts a bi-monthly coordination call with Oregon's Infrastructure Coordination Group (OICG). State and federal partners with vested interests in the security and resilience of Oregon's critical infrastructure, from an all-hazards perspective, make up the OICG.

OICG provides a platform for information sharing and discussions on infrastructure operations and concerns, agency priorities, planning needs, training opportunities, and other topics of mutual interest. OICG promotes cross-talk, coordination, and collaboration between partner agencies. ODOE and OPUC represent ESF-12 on the OICG and report on and collaborate with agencies on potential or existing concerns surrounding the liquid fuels infrastructure, electricity network, and natural gas systems and cross sector interdependencies.

Oregon Military Department

ORS 396.305 authorizes the Oregon Military Department (OMD) to administer, house, equip, and train the Oregon National Guard (ORNG) to support the Governor during natural disasters and times of civil unrest. The ORNG is a reserve force of the United States Air Force and Army. As lead agency for ESF-18 on military support, OMD coordinates, employs, and controls ORNG forces and military resources to assist civil authorities with the protection of life and property, and to maintain peace, order, and public safety. OMD advises the Governor and OEM on ORNG capabilities and resources, ongoing mission status, troop numbers, estimated daily costs, and legal considerations.

OMD also mobilizes and stages personnel and equipment to restore and preserve law and order, and to provide support to other ESFs as directed by the State Emergency Coordination Center. In addition, OMD coordinates with the active federal military to ensure mutual support during federal disaster relief operations.

Oregon Department of Aviation

The Oregon Department of Aviation (ODA) supports airport managers during emergencies to ensure ongoing operations to support state emergency response and recovery activities, ODA serves as a member of a wildfire emergency response Fuel Coordination Group in coordination with ODOE and Oregon Department of Forestry as well as federal partners to monitor airport jet fuel needs to support wildfire response. This group compiles and provides information to response teams during the summer wildfire season to help mitigate risk of jet fuel shortages for fighting major wildfires.

Summary of State Energy Security & Emergency Response Roles

Table 2 below provides an overview of the state agencies that play a role in energy security. Each agency's energy-related activities have been categorized by sector including cyber and physical security.

Agencies' energy security activities may involve:

- **Energy emergency preparedness and response**, including hosting and participating in preparedness planning and exercises, and deploying responders or resources during an emergency event.
- **Information sharing and situational awareness,** including publishing data and threat information, and issuing situation reports during emergency events.
- **Development and enforcement of standards and regulations** for energy industry safety and security. During emergency events some of these standards and regulations may be waived to facilitate faster response and restoration.

Table 2: State Authorities in Energy Security

Department or Agency	Sector	Preparedness & Response	Situational Awareness	Standards & Regulation
Governor's Office *Lead State Emergency Operations*	🔌 ⛽ 🔥 🔒	✓	✓	✓
OEM *Lead State Emergency Operations & support ESF-12*	🔌 ⛽ 🔥 🔒	✓	✓	
ODOE *OR ESP lead and lead on ESF-12 for liquid fuels*	🔌 ⛽ 🔥 🔒	✓	✓	
OPUC *Lead on ESF-12 for electricity and natural gas*	🔌 🔥 🔒	✓	✓	✓
DEQ *Lead ESF-10 HazMat & Support ESF-12*	⛽	✓	✓	✓
ODOT *Lead ESF-1 & support ESF-12*	🔌 ⛽ 🔥	✓	✓	✓
DAS *Co-lead ESF-17 & support ESF-12*	🔒	✓	✓	✓
OTFC *Co-lead ESF-17 & support ESF-12*	🔒	✓	✓	✓
OMD *Lead ESF-18 & support ESF-12*	🔌 ⛽ 🔥	✓	✓	✓

🔌 Electricity ⛽ Liquid Fuels 🔥 Natural Gas 🔒 Cyber & Physical Security

Local Government Authorities

ORS 401.305 to 401.335 requires counties to establish an emergency management agency. City and tribal governments *may* establish emergency management agencies. When city and tribal emergency management agencies exist, county, city, and tribal governments must establish joint policies related to individual emergency management programs, staff, lines of communication, succession, and authorities of elected officials. County, city, and tribal emergency management agency functions must include preparing and maintaining emergency operations plans, managing and maintaining emergency operating facilities, establishing an incident command structure for local emergency response, and coordinating with the Oregon Department of Emergency Management.

ORS 401.309 also gives counties and cities authority to declare that a state of emergency exists within the county or city boundaries and to establish procedures to prepare for and carry out activities needed to prevent, minimize, respond to, or recover from an emergency.

Tribal Nations Authorities

Similar to the process outlined for cities and counties, ORS 401.305 also authorizes the Oregon's nine federally recognized Tribes to establish emergency management programs to prepare their members to respond and recover when disasters strike. This includes developing a Tribal Emergency Operations Plan, maintaining an emergency operations center where Tribal officials coordinate emergency response and recovery activities, establishing an incident command structure for managing emergencies, and coordinating with local, state, and federal agencies consistent with NIMS. Like the local governments, ORS 401.309 also allows the Tribal Governments to issue Tribal emergency declarations when their capabilities to respond to an event are exhausted.

Unique to the Tribes are authorities provided to them from the Sandy Recovery Improvement Act of 2013 (SRIA). SRIA amended the Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) to provide federally recognized Tribes the option to request a Presidential Emergency Declaration through FEMA — independent of actions taken by surrounding counties — and request direct federal assistance as described in the Tribal Declarations Pilot Guidance. When approved, FEMA would process Tribal declaration requests using state declaration regulations.

Federal Agencies Authorities, Roles, and Responsibilities

White House

The President may exercise the authority to issue a national emergency declaration when a crisis or situation exists and threatens the country, requiring an immediate response under the National Emergencies Act of 1976. The President will consult the Governor of an affected state to determine whether such an emergency exists, if practicable.

U.S. Department of Homeland Security

- Federal Emergency Management Agency – FEMA coordinates federal incident response and recovery activities. FEMA's duties during an event include assisting the President in carrying out the Stafford Act, operating the National Response Coordination Center, and supporting all Emergency Support Functions (ESFs) and Recovery Support Functions. FEMA's mission assigns the Defense Logistics Agency to provide fuel support to federal responders and, if requested, State, local, Tribal, and territory governments (SLTT) responders and critical infrastructure. FEMA administers Public Assistance disaster funds, hazard mitigation programs, and others.
- Cybersecurity Infrastructure Security Agency – CISA leads the national effort to understand, manage, and reduce risk to cyber and physical infrastructure. CISA manages the Pipeline Cybersecurity Initiative, and publishes best practices for cybersecurity protection. During a cyber incident, CISA coordinates the national response to significant cyber events and assists in recovery and investigation efforts.

- U.S. Coast Guard – USCG is the principal federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and inland waterways used for the movement of energy products, including petroleum, natural gas, and coal. The Coast Guard reviews and approves vessel and terminal security assessments and security plans, and inspects terminals for compliance with security requirements.
- U.S. Customs & Border Protection – CBP is the primary federal agency tasked with ensuring the security of the nation's borders. CBP is responsible for enforcing and administering laws and regulations to control and oversee vessel movements in and out of U.S. ports. CBP enforces the Merchant Marine Act of 1920, also called the Jones Act, which prohibits the transportation of merchandise between two U.S. ports in any vessel not built and owned by citizens of the United States. Applications may be made to CBP for the Secretary of Homeland Security to grant a Jones Act waiver, which can help facilitate the delivery of fuel and equipment during energy shortages.

U.S. Department of Energy

- Cybersecurity, Energy Security, and Emergency Response – CESER's mission is to enhance the security of U.S. critical energy infrastructure to all hazards, mitigate the impacts of disruptive events and risks to the sector overall through preparedness and innovation, and respond to and facilitate recovery from energy disruptions in collaboration with other federal agencies, the private sector, and State, local, Tribal, and territory governments (SLTT). CESER's preparedness and response activities include SLTT capacity building, energy security and resilience planning, hosting energy emergency exercises, and deploying ESF-12 responders to affected regions during emergencies. CESER facilitates interagency coordination, shares situational awareness products, and provides emergency response support to SLTT governments, and CESER advances research, development, and deployment of technologies, tools, and techniques to reduce risks to the nation's critical energy infrastructure posed by cyber and other emerging threats. CESER administers programs that can be used to mitigate impacts to energy infrastructure and energy supply, and to provide resources during energy emergencies:
    - The Federal Power Act Section 202(c) grants US DOE the power to temporarily order connections of facilities, and generation, delivery, interchange, or transmission of electricity during grid emergencies.
    - The Strategic Petroleum Reserve is a federally owned emergency supply of crude oil. Volumes can be released to mitigate the impact of crude supply disruptions.
- Office of Electricity – This office provides national leadership to ensure that the nation's energy delivery system is secure, resilient, and reliable.
- Office of Enterprise Assessments – OEA oversees four federal Power Marketing Administrations, including the Bonneville Power Administration (BPA), that operate electric systems and sell the electrical output of federally owned and operated hydroelectric dams in the Pacific Northwest.
- Energy Information Administration – EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. EIA publishes state energy profiles, data products related to energy supply, demand, infrastructure, and prices, as well as GIS maps, which can be used in energy security planning and energy emergency response activities.

- Federal Energy Regulatory Commission – FERC is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC's role includes oversight of the transmission and wholesale sale of electricity in interstate commerce, as well as transportation of oil by pipeline in interstate commerce. During energy emergencies, FERC has emergency authority under the Interstate Commerce Act to direct companies to provide preference or priority in transportation, embargoes, or movement of traffic. This authority can be used to direct interstate pipeline operators to prioritize shipments of specific fuels to address shortages.

U.S. Department of Transportation

- Federal Motor Carriers Safety Administration – FMCSA sets safety requirements for interstate commercial drivers, such as hours of service requirements. During energy shortages, FMCSA can waive these requirements for delivery of specific energy products, most often liquid fuels, or to facilitate the movement of utility crews, trucks, and other resources involved in the restoration of electric power.
- U.S. Pipeline and Hazardous Materials Safety Administration – PHMSA regulates pipelines and rail tank cars to advance the safe transportation of petroleum, natural gas, and other hazardous materials. The agency establishes national policy, sets and enforces standards, educates, and conducts research to prevent incidents. The agency also prepares the public and first responders to reduce consequences if an incident does occur. During pipeline incidents (explosions or spills), PHMSA investigates and issues corrective action orders to pipeline operators before pipeline service can resume. During energy shortages, PHMSA can issue emergency special permits and waivers of certain regulations to facilitate the pipeline supply of fuel to the affected region. PHMSA also regulates rail tank cars that carry petroleum, biofuels, or liquefied natural gas.

U.S. Environmental Protection Agency

EPA sets standards for certain fuels, including regulating the vapor pressure of gasoline, requiring reformulated gasoline in certain markets, and specifying the sulfur content in diesel fuel. These fuel specifications can be waived during emergencies to facilitate the supply of fuel into the affected region, or to provide fungibility of available supply within the affected region. EPA also regulates air emissions from energy infrastructure. During events, EPA may choose not to enforce these regulations to facilitate power supply and fuel supply in the affected region.

U.S. Army Corps of Engineers

USACE assists FEMA during disaster response, including installing generators and delivering generator fuels in communities through its Temporary Emergency Power Mission and sending responders to assist in disasters and provide situational awareness.

Federal Bureau of Investigation

FBI leads investigations into cyber attacks and intrusions. The FBI collects and shares intelligence and engages with victims while working to unmask those committing malicious cyber activities.

Bureau of Safety and Environmental Enforcement

BSEE has responsibility for the safety of the environment and conservation of offshore resources. BSEE administers the Oil Spill Preparedness Program and provides support for oil spill response efforts. BSEE leads the development of workplace safety and environmental compliance strategies for offshore renewable energy projects on the Federal Outer Continental Shelf.

Summary of Federal Energy Security & Emergency Response Roles

Table 3 provides an overview of the many federal departments and agencies that play a role in energy security.

Table 3: Federal Authorities in Energy Security

Department or Agency		Sector	Preparedness & Response	Situational Awareness	Standards & Regulation
White House		🔌 ⛽ 🔥 🔒	✓	✓	
DHS	FEMA	🔌 ⛽ 🔥	✓	✓	
DHS	CISA	🔒	✓	✓	
DHS	Coast Guard	⛽ 🔥	✓		✓
DHS	CBP	🔌 ⛽ 🔥			✓
DOE	CESER	🔌 ⛽ 🔥 🔒	✓	✓	
DOE	OE	🔌		✓	✓
DOE	OEA	🔌			✓
DOE	EIA	🔌 ⛽ 🔥		✓	
DOE	FERC	🔌 ⛽ 🔥			✓
DOT	FMCSA	🔌 ⛽			✓
DOT	PHMSA	⛽ 🔥	✓		✓
EPA		🔌 ⛽ 🔥			✓
DOD	USACE	🔌 ⛽ 🔥	✓		✓
DOJ	FBI	🔒	✓		
DOI	BSEE	⛽ 🔥		✓	✓

🔌 Electricity ⛽ Liquid Fuels 🔥 Natural Gas 🔒 Cyber & Physical Security

III. ENERGY EMERGENCY PREPAREDNESS AND RESPONSE

Energy supply disruptions can occur anywhere and at any time. Each year, multiple events cause energy disruptions in Oregon. Most of these disruptions are limited in scope and quickly resolved by energy providers without government support and coordination. More severe outages may affect large segments of communities or last longer. The magnitude and duration of disruption determines whether government resources assist to restore energy supply chains and systems to protect the health and safety of Oregonians.

Instrumental to the process is reliance on the asset owners and system operators to provide necessary response and market forces; however, when those avenues are exhausted and intervention or coordination is needed, support from government fulfills a key role in bridging across federal, state, and local response functions and the various sector partners they may have. More specifically, the state's role in managing any energy emergency is one of coordinator — working with energy providers, state agencies, counties, Tribes, and federal partners to find the least intrusive solution possible to address and resolve energy disruptions.

This section provides an overview of Oregon's emergency management structure for any emergency that may arise. This section also provides a summary of plans and strategies to prepare for, respond to, and recover from energy emergencies that could affect Oregon. The Oregon and Federal emergency response structure is organized by resource and support services, all of which may play a role in any major emergency response. These resources are termed Emergency Support Functions or ESF. Energy is assigned as ESF-12, and in Oregon, energy is divided into the liquid fuels, propane, electricity, and natural gas sectors.

The OR ESP is intended to summarize and reference stand-alone electricity, liquid fuels, natural gas, and cybersecurity emergency response plans. The plans are updated regularly by the lead response agencies for each resource. Where available, links to these plans are available in Appendix C. These links will be updated as part of the annual maintenance of the OR ESP.

Energy Emergency Preparedness Overview

Oregon's energy systems are vulnerable to a variety of hazards, including severe storms, wildfires, flooding, infrastructure failures, deliberate physical and cyberattacks, and other high-impact/low-frequency events such as earthquakes, tsunamis, and pandemics. All energy emergencies — regardless of the cause or magnitude — can lead to a supply or distribution crisis.

Because every event is unique, it would be impossible to plan for every contingency. Managing energy emergencies is a continuous cycle of preparedness, response, recovery, and mitigation. Successful emergency management requires ongoing monitoring, information gathering, assessing actual or potential consequences of an incident, communicating critical information, facilitating system restoration, and mitigating impacts to energy systems to reduce the risk of recurrence. This process is repeated over the course of an emergency with adaptive response actions as the situation evolves.

Energy Event Escalation Levels

Oregon adopted and implemented the Federal Emergency Management Agency's Community Lifelines construct for the state's response framework. The community lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety and economic security. Community lifelines increase effectiveness in disaster operations and better position agencies to respond to a catastrophic event. The Oregon Department of Emergency Management (OEM) serves as the lead emergency management coordination agency for Oregon. Responsibilities for ESF-12 energy emergencies in Oregon are shared by the Oregon Department of Energy (ODOE) for liquid fuels and propane and the Oregon Public Utility Commission (OPUC) for electricity and natural gas. The Community Lifelines construct allows Oregon's ESF-12 agencies to:

- Rapidly determine the scale and complexity of a disaster.
- Identify the severity, root causes, and interdependencies of impacts to critical lifesaving and life-sustaining services within affected areas.
- Develop operational priorities and objectives that focus response efforts on the delivery of these services by the most effective means available.
- Communicate disaster-related information across all levels of public, private, and non-profit sectors using a commonly understood language. Guide response operations to support and facilitate their integration across mission areas.

In coordination with OEM, the ESF-12 agencies established three event escalation levels for the Energy Community Lifeline.

Table 4: Energy Event Escalation Levels

Level 1: Readiness	**Steady State Operations** – Steady State Operations are normal conditions defined by a lack of identified emergency. ESF-12 lead agencies monitor energy markets and systems, and engage in preparedness activities including training, exercises, and plan review to ensure continual program readiness.
Level 1: Readiness	**Credible Threat** – Credible threats are events characterized by impacts to energy supply chains that are largely remediated by energy providers. ESF-12 agencies establish communications with providers to assess each threat for potential service impacts, provide situational awareness, and determine whether additional actions are needed.
Level 2: Response Operations	**Activation and Immediate Response** – When a credible threat is ongoing and is affecting energy infrastructure and systems, ESF-12 agencies will activate and prepare for immediate response. Multi-faceted events may result in a State Emergency Declaration and the activation of the State Emergency Coordination Center (ECC) to facilitate the overall response. ESF-12 coordinates with federal, state, local, and Tribal partners to assess impacts, provide situational awareness, and determine the appropriate actions to take. *Note: Major disasters may also result in a Federal Emergency Declaration.*

Level 2: Response Operations	**Community Stabilization** – Following the Immediate Response phase, ESF-12 continues to coordinate with federal, state, local, and Tribal partners to assess impacts and address mission requests. The Governor's Disaster Cabinet (GDC) may be convened. ESF-12 agencies on the GDC provide policy guidance, establish statewide response priorities, and recommend resource allocations. Stabilization is achieved when temporary measures effectively prevent further degradation of energy systems.
Level 2: Response Operations	**Sustained Operations** – As the event continues, ESF-12 agencies work with energy providers to identify and resolve barriers to restoring service to affected areas.
Level 3: Recovery Operations	**Recovery Operations** – When Community Lifelines are stabilized, the threat response is terminated. ESF-12 transitions to longer term recovery activities as needed, which could include returning energy infrastructure to pre-disaster or more resilient operational conditions.

The three phases allow Oregon's ESF-12 agencies to determine energy event conditions and effects, identify objectives and strategies to resolve energy disruptions, and implement actions to restore service and return energy systems to steady state conditions.

Level 1 *Readiness*

When no emergency is ongoing, also known as "blue sky days," ODOE and OPUC routinely monitor energy markets and systems to stay informed on the region's baseline supply and distribution system. Knowing the region's typical energy needs helps ODOE and OPUC better anticipate problems that might disrupt the Pacific Northwest energy infrastructure and affect Oregonians. Additional information on Oregon's energy systems can be found in Section V of this plan.

US DOE and the U.S. Energy Information Administration (EIA) support state ESF-12 lead agencies like ODOE and OPUC by providing information-gathering and situational awareness tools for monitoring and/or responding to electricity, liquid fuels, and natural gas emergencies.

Table 5: Information Gathering and Situational Awareness Tools

Tool	Power	Liquid Fuels	Natural Gas
US DOE Emergency Situation Reports	Customer outages and summaries of electric system damage and estimate restoration timelines. Level of resources committed for restoration.	Refinery status, capacity, and output, petroleum terminal status, regional product inventories, offshore crude oil production impacts.	Natural gas pipeline status, gas utility customer outages, onshore and offshore natural gas production impacts.
US DOE EAGLE-I	Power outages by utility and by county in near real time.	Refinery process unit status alerts.	Natural gas pipelines critical notices.

US DOE Estimated Customer Power Outages (sent by DOE via email to affected states)	Predicted customer outages based on strength and track of hurricane or major storms.	Can be used to identify the critical petroleum infrastructure that may be impacted by the storm or by power outages.	Predict the degree that electrically powered compressors, if used, may be affected.
EIA Energy Atlas	Electricity infrastructure: power plants, substations, transmission lines, electric rail service territories.	Liquid fuels infrastructure: oil wells, platforms, pipelines, biofuel plants, terminals, refineries (locations and capacities).	Natural gas infrastructure: gas wells and platforms, pipelines, natural gas processing plants, underground storage.
EIA Hourly Grid Monitor	Hourly electricity generation by fuel type, interchange, and day-ahead demand forecasts.	Hourly oil-fired generation.	Hourly natural gas-fired generation.
EIA Weekly Petroleum Status Report	-	Weekly supply, demand, inventory, and import data.	-
EIA Winter Heating Fuels	Electric generation and prices.	Propane and heating oil inventories and prices.	Natural gas inventories and gas prices.
EIA SHOPP	-	State weekly residential heating oil and propane prices.	-
EIA Natural Gas Storage Dashboard	-	-	Evaluate natural gas storage activity, consumption by sector, exports, and prices.
EIA Daily Prices	Daily electricity prices.	Daily crude, gasoline, diesel, and propane prices.	Daily natural gas spot prices.

Level 2

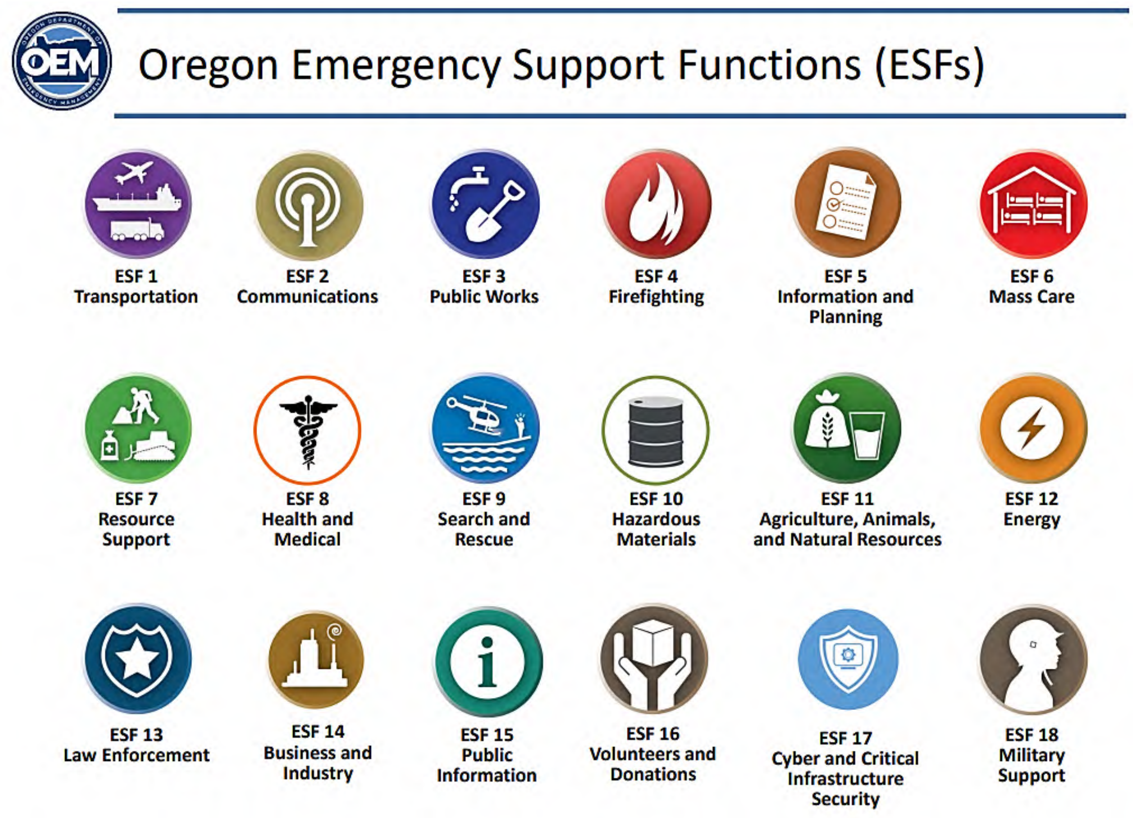
Response Operations

When natural or man-made emergencies occur in the state that threaten the health and safety of Oregonians, the Governor may issue a State Emergency Declaration. OEM is responsible for coordinating response and recovery activities with state agencies, local emergency management, and Tribal governments when an event involves multiple Emergency Support Functions.

Emergency Support Functions

Oregon uses a coordinated response structure identifying 18 ESFs that ensure if critical lifelines and services are disrupted, vital capabilities and resources can be provided by emergency response agencies.

Figure 3: 18 Oregon ESFs



Oregon's structure is based on but not identical to the federal ESF framework. At the federal level, FEMA designated US DOE to lead ESF-12. At the state level, OEM designated ODOE and OPUC to co-lead ESF-12. In addition to leading the development of the Oregon Energy Security Plan, ODOE is responsible for planning and preparing for, responding to, and recovering from emergency events related to supply or distribution of liquid fuels and propane. OPUC has the lead for electricity and natural gas preparedness, response, and recovery actions. If an emergency affecting liquid fuels results in a release, spill response and environmental cleanup is the responsibility of the Department of Environmental Quality.

Oregon's ESF-12 agencies work closely with US DOE, the federal lead for ESF-12, and other federal partners to ensure state energy policy, plans, procedures, and tactics complement federal strategies. By enhancing federal-state coordination and collaboration, the state can gain situational awareness, minimize impacts, and recover rapidly when energy emergencies occur in Oregon, neighboring states in the region, or during events affecting nationwide energy infrastructure.

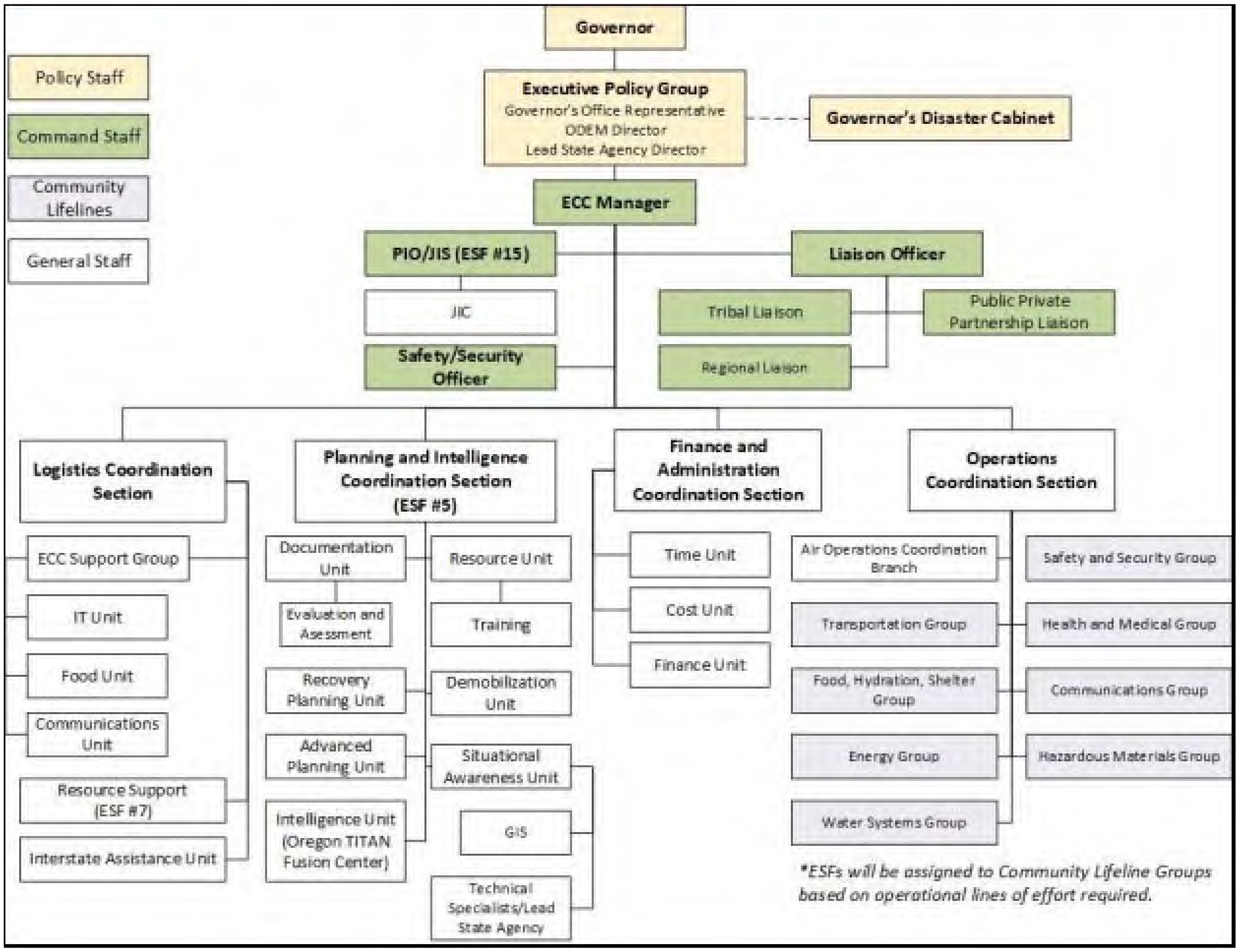
State-declared Emergencies

During state-declared emergencies, OEM may activate the State Emergency Coordination Center (ECC) and necessary emergency support functions to direct and coordinate the state's overall response to an event. During State ECC activations, Oregon Emergency Response System Council agencies, including

ODOE and OPUC, report to the State ECC virtually or in person to support Oregon's overall response and recovery effort in the following ways:

- ODOE's Director and OPUC Commission Chair or their delegates report to the Governor's Disaster Cabinet (GDC) to guide and advise state leadership on policy issues, energy response priorities, and energy resource allocations.
- ODOE and OPUC emergency preparedness staff report to the ECC to:
    - Coordinate with federal, state, local, and Tribal governments to identify and address interdependencies among all critical lifeline services and mission requests.
    - Work with energy providers to assess the severity of supply disruptions, determine risks to public health and safety, and identify solutions to support supply and distribution.
    - Respond to mission and resource requests from state, local, and Tribal governments and energy providers.
- ODOE and OPUC Public Information Officers develop and disseminate energy emergency information, issue protective action instructions, and provide support to the state's Joint Information Center.

Figure 4: Oregon State Emergency Response Structure



**ESFs will be assigned to Community Lifeline Groups based on operational lines of effort required.*

Level 3

Recovery Operations

In the days and weeks after a disaster, the state transitions to recovery operations to rebuild stronger, smarter, and safer. Consistent with the National Disaster Recovery Framework, Oregon moves from operating under 18 ESFs to operating under seven State Recovery Functions (SRF). ESF-12 Energy shifts to SRF 6 under Infrastructure Systems under the Oregon Disaster Recovery Plan.

Table 6: State Recovery Functions

Section/Annex	Coordinating Agency or Team
Basic Plan	**Office of Emergency Management**

State Recovery Function (SRF) Annexes	Agency/Department
SRF 1 Community Planning and Capacity Building	Oregon Department of Land Conservation and Development
SRF 2 Economic Recovery	Business Oregon
SRF 3 Health Services	Oregon Health Authority
SRF 4 Social Services	Oregon Department of Human Services
SRF 5 Disaster Housing	Oregon Housing and Community Services
SRF 6 Infrastructure Systems	Oregon Department of Administrative Services Oregon Department of Energy Oregon Department of Transportation Oregon Public Utility Commission
SRF 7 Natural and Cultural Resources	Oregon Department of Environmental Quality

Under SRF 6, ODOE and OPUC focus on working with energy providers to restore and sustain the electricity, liquid fuels, and natural gas services to pre-emergency or more resilient conditions for maintaining community functionality. Primary responsibilities include:

- Coordinating state resources in support of the recovery of affected energy infrastructure systems.
- Participating in the state-level coordination of damage and community needs assessments to ensure that energy infrastructure considerations are integrated into the post-disaster community planning process.
- Working with local, Tribal, federal, and private sector partners to leverage available financial and technical assistance from governmental and nongovernmental sources to execute the community's Infrastructure Systems Recovery Action Plan.
- Promoting rebuilding infrastructure in a manner that will reduce vulnerability to future disaster impacts.
- Reviewing and identifying codes, building permits, and waivers to support energy sector recovery efforts.

Overview of Energy Emergency Response Plans

While Energy Emergency Response Plans can be used anytime, they are primarily implemented during Phase 2 Emergency Operations. ODOE and OPUC developed and maintain stand-alone emergency response plans for the electricity, liquid fuels, and natural gas sectors. This section provides a general overview of the emergency response plans for each sector, which includes key responsibilities, actions, and priorities for plan activations. Also included is an overview of the state's cybersecurity plan.

Oregon Fuel Action Plan

As the designated state lead for ESF-12 overseeing petroleum emergency preparedness, planning, response, and recovery, ODOE developed the Oregon Fuel Action Plan in 2017. The plan identifies priority actions the agency would take to direct the state's overall response to petroleum disruptions. This includes establishing scalable procedures for:

- Plan activation and notifications within ODOE and to external partners and key stakeholders.
- Monitoring and assessing the severity, scope, and other consequences of supply shortages and distribution problems.
- Federal, state, and local governments, Tribes, and petroleum industry collaboration and coordination in emergencies.
- Issuing voluntary and mandatory fuel conservation measures.
- Securing applicable waivers to ensure timely and safe fuel deliveries.
- Developing and disseminating fuel information and protective actions to the public and news media.
- Fuel allocation to emergency and essential services providers when supplies are limited.
- Designating distribution sites for receiving emergency fuel supplies.
- Coordinating and implementing regional response measures with western states if event conditions warrant joint state actions.


Oregon Department of Energy
@ODOEnergy

Summer 2021 presented a transportation fuel challenge: jet fuel delivery. ODOE's Emergency Preparedness Manager responded to requests for additional jet fuel deliveries to small airports in Oregon to support crucial firefighting missions. Learn more 👇

energyinfo.oregon.gov
Fueling Up Oregon in Emergencies — Energy Info
Summer 2021 presented a new transportation fuel challenge: jet fuel delivery. Deanna Henry, ODOE's ...

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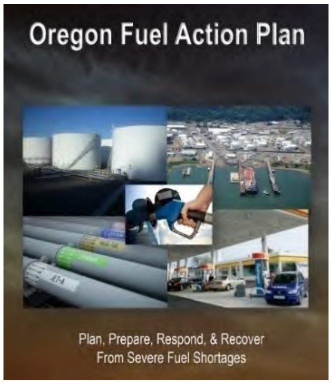


In catastrophic disasters, ODOE actions can include working with federal agencies and the petroleum industry to create new temporary fuel supply chains and delivery systems into Oregon until the region's petroleum infrastructure is restored. This could include bringing fuel into staging areas in central Oregon, likely at the Redmond and Klamath Falls airports, before moving the product into communities along the I-5 corridor when possible. Small amounts of fuel could also be transported by air, but these missions would be limited. To support coastal communities, fuel supplies could be delivered by tanker ships if roads and bridges are severely damaged and coastal communities are inaccessible for overland delivery.

The Oregon Fuel Action Plan was developed in coordination with federal, state, local, Tribes, and petroleum industry partners. Each strategy and procedure identified by the plan can be scaled up or down as needed to address different levels of supply disruption severity.

Oregon Electricity and Natural Gas Emergency Response Plans

As the designated state lead for ESF-12 overseeing electric and natural gas sector emergency preparedness, planning, response, and recovery, OPUC is responsible for working with energy asset owners and operators in addressing electric and natural gas disruptions regardless of the cause. Prior to electric and natural gas emergencies, OPUC plays a key role in a variety of resource and sector planning activities intended to avert shortages or insufficiency. Upon activation, OPUC actions include:

Winter storms can result in area wide outages due to damage to electrical equipment.

- Coordinating, tracking, and providing status updates on electricity and natural gas sector restoration efforts. This includes state leadership briefings, operational briefings, and situation reports.
- Assisting energy asset owners and operators in identifying resources needed to stabilize and resolve limiting factors in restoration of energy systems.
- Coordinating with energy asset owners and operators to advise local, state, Tribes, territorial, and federal authorities on priorities for energy system restoration, assistance, and supply during response and recovery operations.
- Assisting energy asset owners and operators, and local, state, Tribal, and territorial authorities with requests for emergency response actions, as required, to meet Oregon's energy demands.
- Serving as Oregon's point of contact with the electric and natural gas industry for information sharing and requests for assistance from private and public sector owners and operators.
- Evaluating and ensuring continuous ESF-12 OPUC staffing throughout the duration of an event.

A natural gas explosion in NW Portland in 2016 damaged a city block.

Oregon Cybersecurity Emergency Response Network

Information security affects the state's enterprise information assets and its ability to provide services to Oregonians. Enterprise Information Services (EIS) has responsibility for statewide information and cybersecurity standards, as well as policies on information security, under the authority of Oregon Revised Statute 276A.300.

As part of EIS, Cyber Security Services (CSS) is responsible for creation and maintenance of statewide information and cyber security standards. CSS sets the statewide direction for cybersecurity and follows guidance from National Institute of Standards and Technology and the Center for Internet Security as well as other cybersecurity organizations such as the Cloud Security Alliance where appropriate. State regulation guidance includes:

- Statewide Information Security Plan
- Statewide Information and Cyber Security Standards V1.0
- System Security Plan Template

Security Incident Response

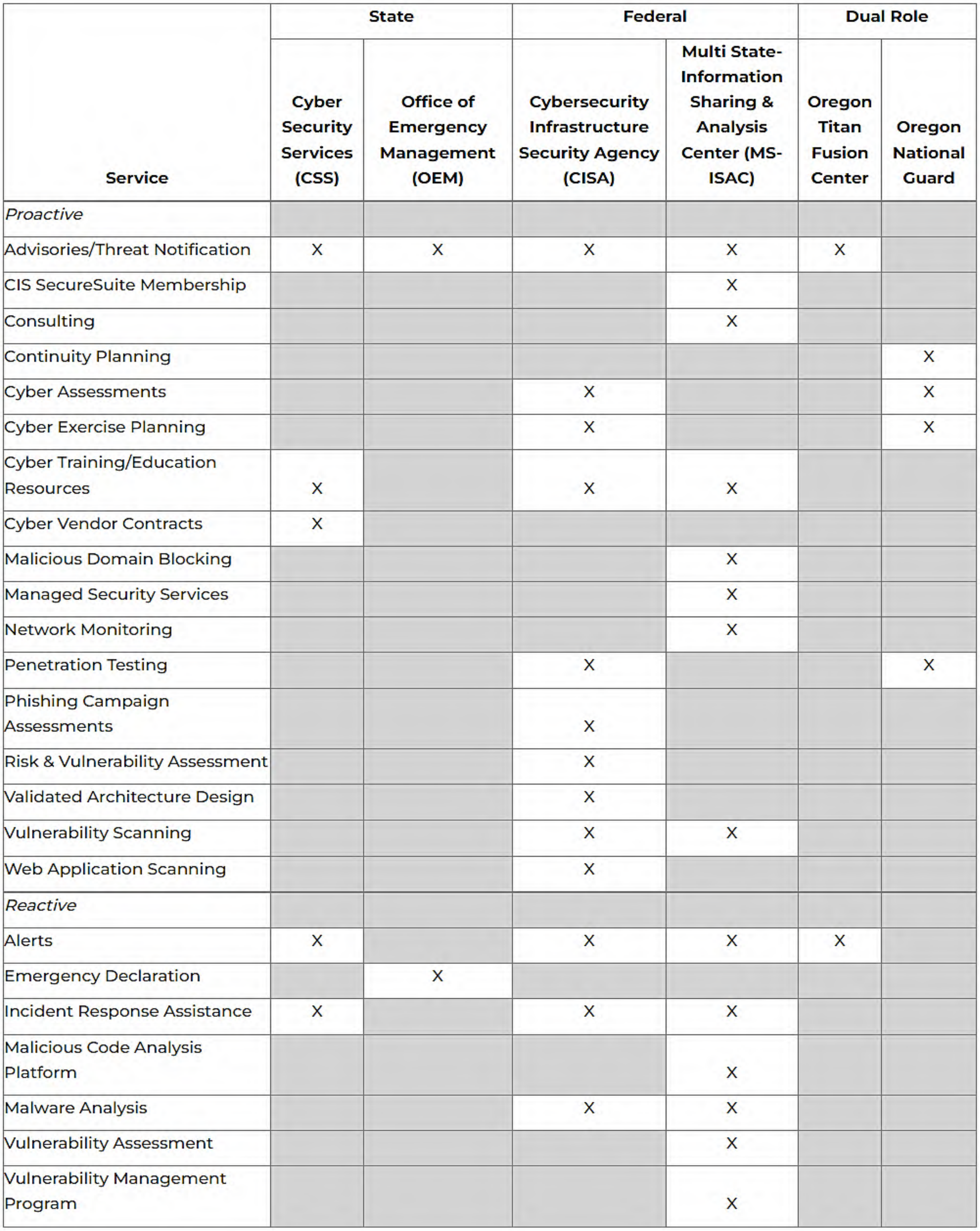
In the event of an information or cyber event, the CSS Security Operation Center (SOC) responds to incidents that may affect multiple agencies or pose a significant threat to the state. The SOC is responsible for coordinating interagency security incident response resources and communications during an information security incident that affects multiple agencies.

Agencies responding to the SOC collect, classify, and catalog all reported information-security incidents. When an information-security incident occurs that does not require SOC activation, CSS may assist agencies in responding to an information-security incident upon request. The CSS maintains confidentiality in accordance with agency policy, rules, and legal requirements on all information-security incidents reported to it.

The Oregon Department of Administrative Services (DAS), through CSS, has authority and responsibility for the statewide incident response program. The program establishes enterprise-wide procedures, standards, and guidelines for statewide and agency-level information-security incident response. The CSS maintains a forensics program capable of assisting agencies. The CSS maintains the State of Oregon Information Security Incident Response Plan.

An Oregon “Whole of Government Community" Cyber Disruption Response and Recovery (OCDR) Voluntary Resource Guide has also been developed. This plan brings the governing entities in Oregon together for an inclusive cybersecurity network. Below is a matrix highlighting cybersecurity resources available to Oregon agencies.

Table 7: Cybersecurity Resources for Oregon Agencies [1]



Service	State		Federal		Dual Role	
	Cyber Security Services (CSS)	Office of Emergency Management (OEM)	Cybersecurity Infrastructure Security Agency (CISA)	Multi State-Information Sharing & Analysis Center (MS-ISAC)	Oregon Titan Fusion Center	Oregon National Guard
Proactive						
Advisories/Threat Notification	X	X	X	X	X	
CIS SecureSuite Membership				X		
Consulting				X		
Continuity Planning						X
Cyber Assessments			X			X
Cyber Exercise Planning			X			X
Cyber Training/Education Resources	X		X	X		
Cyber Vendor Contracts	X					
Malicious Domain Blocking				X		
Managed Security Services				X		
Network Monitoring				X		
Penetration Testing			X			X
Phishing Campaign Assessments			X			
Risk & Vulnerability Assessment			X			
Validated Architecture Design			X			
Vulnerability Scanning			X	X		
Web Application Scanning			X			
Reactive						
Alerts	X		X	X	X	
Emergency Declaration		X				
Incident Response Assistance	X		X	X		
Malicious Code Analysis Platform				X		
Malware Analysis			X	X		
Vulnerability Assessment				X		
Vulnerability Management Program				X		

REFERENCES

[1] Enterprise Information Services. "Cyber Security Services." (2023). https://www.oregon.gov/eis/cyber-security-services/pages/cyber-disruption-plan.aspx

IV. REGIONAL COORDINATION WITH PARTNERS

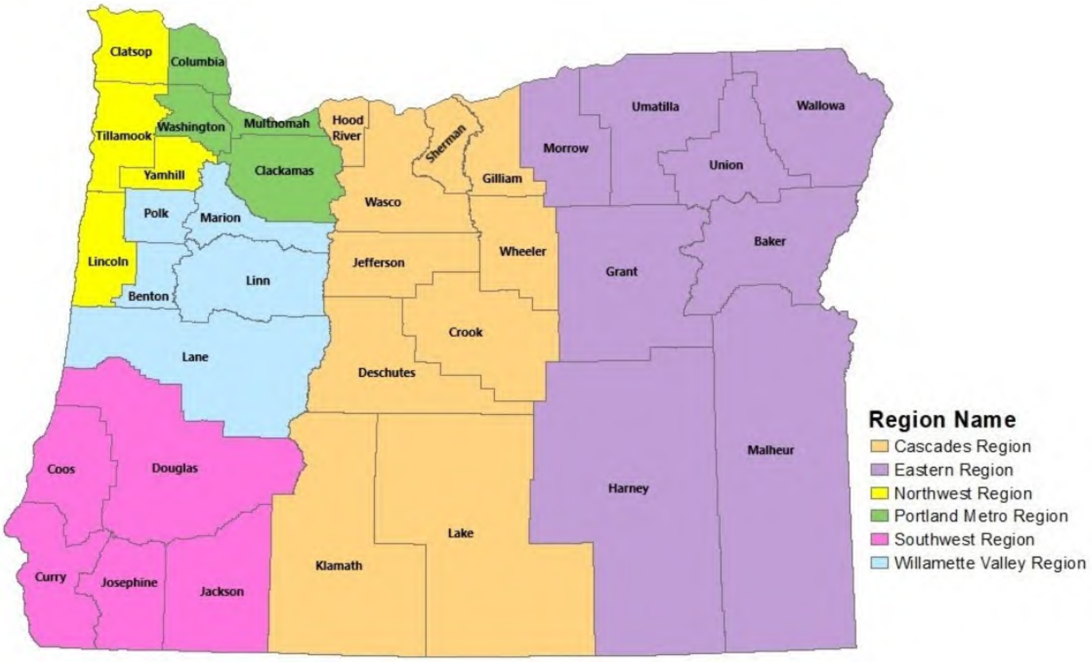
Ensuring Oregon's energy security requires collaboration with many partners as we face a changing energy landscape and threats to the critical energy infrastructure. This section describes ESF-12 programs that promote regional coordination within the state, in the region, and with federal partners; it also describes the regional coordination process that was undertaken in development of this Energy Security Plan.

Energy Security Plan and ESF-12 Coordination within Oregon

As the energy security planning lead agency, and ESF-12 co-lead agency, the Oregon Department of Energy (ODOE) works closely with the Oregon Public Utility Commission (OPUC) and the Oregon Department of Emergency Management's (OEM) Regional Coordinator Teams to engage Oregon's 36 counties and 241 incorporated cities.[1] OEM has two regionally focused teams serving as dedicated points of contact for state ESF agencies across six Oregon regions to support local and Tribal emergency managers. This includes the Regional Preparedness & Response (P&R) Coordination Team and the Regional Mitigation and Recovery (MARS) Coordination Team.

Both teams serve as liaisons between state ESF agencies and counties, city governments, and the Tribes. The teams also represent OEM at local meetings and support regional programs at the local level. ODOE engaged with this same structure in development of the energy security plan.

Figure 5: OEM Map of Oregon's Six Regions



ODOE and OPUC may engage P&R Regional Coordinators to coordinate training, seminars, and workshops for the six regions on ESF-12 planning, preparedness, and response plans and strategies. P&R Regional Coordinators help ensure local operations plans align with state ESF-12 priorities.

ODOE and OPUC may also coordinate with MARS Regional Coordinators when working with local government agencies in planning and preparing for and implementing energy recovery missions to ensure alignment with federal, state, and local priorities.

ODOE used the same Oregon regional structure when developing this energy security plan. Data collection, risk assessment, and mitigation strategies were all coordinated around regionalization. ODOE used the regional relationships and organizational structures created by OEM to help facilitate development of the ESP, including conducting in-person stakeholder engagement meetings in each of the state's six regions. Additional information regarding the stakeholder engagement process used for developing the ESP can be found in Appendix D.

In addition to government agencies and tribal governments, the OPUC closely partners with utility providers to ensure that as various risks are identified, those companies and OPUC mitigate the consequences across the wide range of scenarios.

Coordination with Local Governments

ODOE and OPUC engage local jurisdictions to promote collaboration and information sharing of state and local ESF-12 energy priorities, concerns, planning strategies, resources, and capabilities. ODOE and OPUC provide technical assistance to counties and cities to develop procedures for responding to energy issues in local emergency operations plans, and to coordinate with local governments to conduct workshops, training, and exercises to ensure state and local officials can effectively address energy disruptions. This ensures ongoing program readiness.

When responding to energy disruptions, ODOE and OPUC work with county and city partners to assess energy impacts in local communities, provide situational awareness and recommend protective actions, and address mission requests as appropriate. In addition, local governments are critical contributors to statewide energy security planning efforts. ODOE also supports local energy resilience planning efforts by providing resources and funding to help advance energy resilience at the local level.

Coordination with Energy Providers

Energy security is provisioned for Oregon through both public and private channels, so coordination involves working with energy providers to ensure that credible contingencies are part of their planning regime. ODOE works with petroleum distributors and suppliers to ensure resiliency across a wide range of situations, while OPUC supports a wide variety of utility planning functions, including resource adequacy through Integrated Resource Plans, as well as reliability and resilience functions with investor-owned utilities. In certain cases, particular planning efforts — including wildfire mitigation and clean energy planning — are facilitated through workshops or other dockets; some of these include both consumer-owned and investor-owned utilities, depending upon the authorities bestowed for the specific planning function. Coordination between government and energy providers is necessary and vital, both to identify and reduce risks and threats to our energy systems as they currently exist, but also to identify and mitigate future risks beyond natural hazards or cybersecurity threats, including resource adequacy, transmission expansion, lowering energy costs, and maintaining sufficient supply of energy, and meeting state environmental goals.

Coordination with the Tribes

Energy infrastructure serving the nine federally recognized Tribal Nations is intertwined with energy systems from Oregon and the broader region. Energy security planning and energy emergency response planning in Oregon must consider and coordinate with Tribal governments.

One of the primary venues for coordination between Oregon state government and Tribal government emergency planners and managers is the Tribal Preparedness Coalition of Oregon. Eleven years after the first Annual Tribal Public Health Preparedness Conference hosted by the Northwest Portland Area Indian Health Board, the Tribal Preparedness Coalition of Oregon (Tribal Coalition) was convened in August 2016. All nine federally recognized Tribes are represented on the Tribal Coalition, which is staffed by the Oregon Health Authority. ODOE regularly meets with and presents to the Tribal Coalition at its meetings and workshops. During development of the energy security plan, ODOE staff met with the Tribal Coalition at offices of the Coquille Tribe in North Bend in September 2023, as well as at offices of the Confederated Tribe of the Umatilla Indian Reservation near Pendleton, Oregon in May 2024.

Figure 6: Oregon's Nine Federally Recognized Tribes

Source: Oregon Department of Education

The Tribal Coalition promotes activities concerning disaster preparedness, planning, response and recovery, and continuity of operations. The Tribal Coalition coordinates with and among its member Tribes, federal agencies, state agencies, and local jurisdictions to enhance preparedness and resilience of Tribal communities in preparation for disasters and to support response activities during incidents.

The Tribal Coalition conducts monthly coordination meetings virtually and meets in person quarterly. State and federal agencies are invited guests to Tribal Coalition meetings. ODOE and OPUC engage the Tribes monthly and quarterly in person to continue learning the priorities, concerns, and emergency preparedness needs of Oregon's nine federally recognized Tribes.

ODOE and the PUC work with Tribal Governments in many additional ways, such as:

- Collaboration on information-sharing, trainings, and workshops on ESF-12 plans, and strategies for preparing for, responding to, and recovering from energy emergencies.
- Coordination, including technical assistance, on Tribal plans and strategies in response to energy emergencies.

- Information sharing on energy security risks and threats, as well as potential mitigation measures to address those risks and threats.

When responding to emergencies, state partners work closely with the Tribes, including:

- Information sharing and situational awareness on the energy outlook.
- Assessing potential energy impacts to the Tribes.
- Recommend protective actions as appropriate.
- Work with energy providers to address mission and resources requests from the Tribes.

Oregon state government recognizes Tribal nation sovereignty and respects the Tribal laws, authorities, and policies that govern the actions necessary to provide safety for all Tribal members and other residents on Tribal lands, property, and natural and cultural resources.

Federal and Multi-State Coordination

Because energy systems cross jurisdictional boundaries, events such as power outages, fuel shortages, and natural gas disruptions in one state can affect communities in neighboring states. With the increase in extreme weather events and recognition of emerging cyber and physical risks within the energy sector, coordination and collaboration with neighboring states prior to an emergency is critical to ensuring rapid response and recovery from disruptions threatening the region. Additionally, coordination with US DOE has been critical in developing the energy security plan. The US DOE office of Cybersecurity, Energy Security, and Emergency Response (CESER) has led a nation-wide program to support states in developing energy security plans, including providing technical support, plan development guidance and requirements, and template examples for plans. Additional discussion of the interdependency of Oregon’s energy systems with neighboring states is included in Section V.

Energy Emergency Assurance Coordinators Program

The Energy Emergency Assurance Coordinators (EEAC) Program is a cooperative effort between the U.S. Department of Energy (US DOE), National Association of State Energy Officials (NASEO), the National Association of Regulatory Utility Commissioners (NARUC), the National Governors Association (NGA), and the National Emergency Management Association (NEMA).

The EEAC Program provides states with a means of sharing and receiving credible, accurate, and timely information with other states and US DOE leading up to and during energy emergencies. Structured communications are essential for understanding the severity, magnitude, and consequences of energy disruptions regardless of the causes. EEACs serve as points of contact for US DOE in the event of an emergency. Membership is made up of representatives from state energy offices, public utility commissions, state ESF-12 responders, emergency management agencies, homeland security agencies, local governments, and governors’ offices.

ODOE and OPUC are the state’s designated EEACs and lead planning and response roles during energy emergencies. ODOE and OPUC staff are registered on a website called ISERNet, which US DOE hosts. ODOE and OPUC review and update their contacts annually.

Examples of Products US DOE has Shared with Oregon

US DOE leverages the EEAC network to communicate important notices, such as situation reports and outage estimate reports. US DOE distributes limited-release and official use information including situational awareness, energy sector analysis, and alerts to EEACs leading up to and during energy emergencies. For example, during the COVID-19 pandemic, US DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) disseminated weekly COVID-19 situation reports to all states in addition to situation reports for emergency events like the June 2023 physical attacks on critical electric infrastructure in the Pacific Northwest.[2]

Examples of Products Oregon has Shared with US DOE

ODOE has leveraged the EEAC network to communicate important notices, such as situation reports, waivers, state emergency declarations, and state energy reports to US DOE as well as state energy offices across the West and adjoining states. Due to the regional nature of most energy emergencies, ODOE collaborates with neighboring states to ensure better situational awareness and monitoring, and to improve the overall operating picture during emergencies and disasters.

Energy Security Committee

The National Association of State Energy Officials' (NASEO) Energy Security Committee provides a forum for state energy officials to discuss, learn, and collaborate on energy emergency preparedness and response. The committee seeks to address all natural and manmade hazards as part of its energy security efforts. It supports state efforts in the areas of energy data and analysis, intra-state and inter-state communications and training, and public-private sector coordination.

The committee collaborates with relevant federal partners and industry stakeholders to promote comprehensive energy sector security. The committee leverages its network to assist states in carrying out their responsibilities as state energy data repositories, providing technical assistance to other state government agencies, and conducting energy assurance planning and preparedness activities. The committee structure is designed as a conduit to solicit diverse state perspectives on a variety of subjects in order to inform future activities and resource requests, and to guide NASEO advocacy.

ODOE participates in NASEO's monthly Energy Security Committee virtual meetings to discuss, learn, and collaborate in the areas of energy data and analysis, intra-state and inter-state communications and training, and public-private sector coordination. The committee collaborates with relevant federal partners and industry stakeholders to promote the roles, responsibilities, and capabilities of state energy offices' comprehensive energy sector security.

ODOE also participates in the committee's monthly State Hazards and Operations Rundown Call. During regional or national emergencies, these meetings allow states to share information pertaining to potential, anticipated, and ongoing hazards; response actions and updates; outstanding needs; and ongoing tactics and strategies concerning the event. During "blue sky days," states discuss ongoing preparedness efforts, best practices, and lessons learned from responding to energy events advancing regional coordination and collaboration.

Western States Petroleum Collaborative

In March 2020, the Western States Petroleum Collaborative (WSPC) was created to facilitate the coordination and development of a regional fuel response framework with 11 state energy offices and emergency management agencies. The western states recognized the need to work together and share resources to address regional petroleum shortage preparedness and response needs. This effort was built off the existing EEAC Program originally established in 1996 to encourage information sharing in energy disruptions. The WSPC expands the coordination beyond information sharing to include coordinated response actions. This effort was sponsored by US DOE-CESER, NASEO, and NEMA.

Staff from ODOE and Oregon Department of Emergency Management (OEM) co-chaired the 18-month effort sponsored by the US DOE, NASEO, and NEMA to establish the framework for the WSPC. As co-chairs, ODOE and OEM provided guidance and worked to ensure project goals and objectives reflected the need for regional coordination to manage fuel disruptions affecting multiple states.

The WSPC Framework was finalized in September 2021 and establishes a multi-state coordinated response structure for the western states in response to liquid fuel emergencies affecting multiple states. The purpose of the WSPC Regional Framework is to codify guidance for coordinated response, prioritize response actions and measures, standardize information flows, and pre-identify tools and templates that are necessary to respond to a liquid fuels shortage.

Multi-State Coordinated Response

The multi-state coordinated response structure developed by the WSPC:

- Identifies a set of petroleum shortage response actions, decision-making protocols, and priorities for regional coordination when triggers and thresholds are met;
- Identifies data sources and essential information required for states to establish a common operating picture during petroleum disruptions to determine whether coordinated response actions are warranted;
- Identifies triggers and thresholds to allow states to determine the level of response and collaboration required to reflect the severity of the disruption; and
- Creates consistency and streamlines the response process for fuel providers operating in multiple states.

ODOE's implementation of coordinated regional response actions is voluntary, and coordinated actions typically occur when two or more states in the region face a petroleum shortage and those states agree that a coordinated regional approach is mutually beneficial. When regional coordination is warranted, ODOE uses existing pre-established decision-making authorities and processes described in the Oregon Fuel Action Plan.

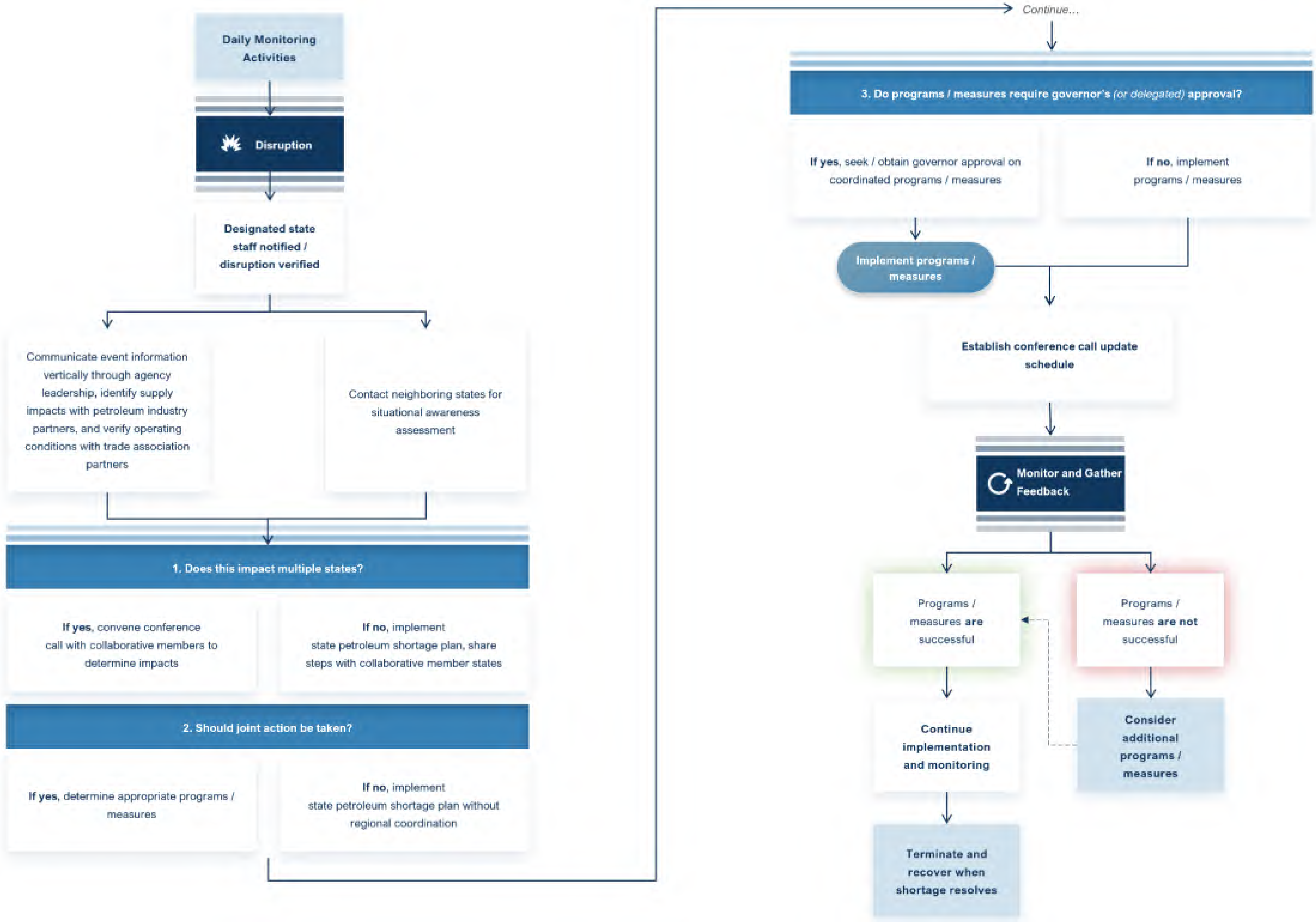
When there is a disruption of liquid fuels supply, ODOE and other states in the region consider the following questions when assessing the situation and determining whether to conduct a coordinated response.

Table 8: Considerations for Coordinated Response

Does this event affect multiple states?	If the answer is **YES**, affected states should convene the WSPC member states in a coordination call to indentify the scope of impacts and consider aligning response actions. Additional support from NASEO will be available, if requested.	If the answer is **NO**, the affected state should carry out its individual state liquid fuels plan (or energy security plan) and share updates with WSPC member states for information purposes.
Should joint action be taken?	If the answer is **YES**, affected states should align needs and capabilities to determine which programs/measures to enact and the process required to do so.	If the answer is **NO**, the affected state or states should implement their individual state liquid fuels plan (or energy security plan) without regional coordination, but maintain communication with WSPC member states regarding the situation and actions taken.
Do the identified programs and measures require the Governor's (or delegated) approval for implementation?	If the answer is **YES**, affected states should follow their respoective procedures for obtaining gubernatorial (or other) approval on the selected programs and measures.	If the answer is **NO**, affected states should carry out implementation of the selected programs and measures to address the disruption.

The multi-state coordinated response structure flow chart (below) describes the process for implementing a multi-state response.

Figure 7: Regional Coordinated Response Structure Flowchart



Case Study: Oregon Implements Multi-State Coordinated Response to 2021 Wildfires

ODOE used the WSPC Multi-State Coordinated Response Structure during the 2021 wildfire season. Oregon experienced jet fuel supply shortages when COVID restrictions lifted and the state had a sudden increase in commercial travel coupled with an early wildfire season in late spring.

With the exception of the Portland International Airport, all jet fuel deliveries are transported by truck from the Portland fuel hub to airports around the state. Fuel carriers already working at capacity were unable to add unscheduled jet fuel deliveries to airports in eastern and southern Oregon to support wildfire response.

With NASEO's assistance, ODOE coordinated with WSPC states to provide situational awareness and to find out if other states in the region were experiencing the same problems. It was evident from our discussions that Oregon's jet fuel problems in response to wildfires did not affect neighboring states, and no joint actions were needed.

ODOE worked with jet fuel providers, state fire officials, and the airports to ensure adequate supply was available at air bases that were supporting wildfire response in Oregon. ODOE and the Oregon Department of Forestry established the new state-federal Fuel Coordination Group and procedures for responding to jet fuel shortages during wildfire season. ODOE provided situation reports, new Fuel Coordination Group procedures, and lessons learned from the 2021 wildfires to WSPC states.

WSPC Role During Steady-State Conditions

To foster collaboration and facilitate collective maintenance of response capabilities, WSPC states conduct quarterly virtual coordination meetings. States discuss common issues, concerns, and goals for preparedness, as well as raise potential solutions to strengthen resilience in the region. WSPC states also share information on relevant training and exercises that other member states may support or participate in. This allows states to integrate regional coordination elements into liquid fuels exercises. US DOE and NASEO participate in the WSPC coordination meetings to provide federal reports on training opportunities, regional exercises, and upcoming webinars and workshops that may interest the WSPC member states.

States rotate hosting the quarterly WSPC meetings on an annual schedule. Oregon, Washington, and California hosted and facilitated meetings in 2021, 2022, and 2023, respectively.

National Association of Regulatory Utility Commissioners

OPUC participates within the overall structure of the National Association of Regulatory Utility Commissioners (NARUC), which organizes collaborative efforts relating to energy security, risk identification, and mitigation. Key to the work of energy security are the following subcommittees:

- Staff Subcommittee on Critical Infrastructure
- Staff Subcommittee on Electric Reliability and Resilience
- Staff Subcommittee on Pipeline Safety

Committee on Critical Infrastructure

Established on a temporary basis after the September 11, 2001 terrorist attacks, the now-permanent Critical Infrastructure Committee provides state regulators with a forum to analyze solutions to utility infrastructure security and delivery concerns. As demonstrated on September 11 and later during Hurricane Katrina, protection of the nation's energy and telecommunications infrastructure is critical to national security, and this committee provides OPUC opportunities to share best practices and collaborate with other states and federal counterparts.

NARUC also houses the Critical Infrastructure Resource Repository, which provides “one-stop” access to topical information across a spectrum of activities undertaken by public utility commissions to address critical infrastructure security. These activities focus on approaches and strategies related to energy infrastructure reliability and resilience, cybersecurity, and emergency response.

Information on this site is proprietary. It is voluntarily shared by public utility commissions to facilitate peer engagement and information exchange. It is intended to help drive innovation and encourage consistency and alignment across states' activities in the critical infrastructure security domain.

Committee on Electricity

OPUC participates in the Electricity Committee to develop and advance policies that promote reliable, adequate, and affordable supply of electricity. Through strong collaboration with the Federal Energy Regulatory Commission (FERC) and other federal agencies, the committee also seeks ways to improve the quality and effectiveness of regulation through education, cooperation, and exchange of information.

Gas Committee

OPUC works closely with FERC, US DOE, and the U.S. Department of Transportation (USDOT) on the Gas Committee. Through panel discussions and educational sessions, the committee fosters awareness and understanding of issues affecting the transportation, distribution, and sale of natural gas safely, efficiently, and economically.

Cybersecurity Manual

NARUC has developed the Cybersecurity Manual, a comprehensive suite of cybersecurity tools, to help public utility commissions gather and evaluate information from utilities about their cybersecurity risk management and preparedness.

Components of the Cybersecurity Manual can be used individually but are designed to work together. NARUC’s intent is to provide a comprehensive set of assessment tools that, when applied, provide a consistent, complete view of utilities’ cybersecurity preparedness.

Western Regional Mutual Assistance Group (WRMAG)

Over decades of emergency response functions, the electric and natural gas industries have established strong industry ties that enable them to rapidly access response support for a variety of emergencies. Over the past decades these have been exercised in response to earthquakes (i.e. Loma Prieta in 1989, Northridge in 1996 and others), storms and hurricanes (November 2007, February 2021) and wildfires (October 2017, January 2018, and September 2020). This regional structure (which is facilitated through the Western Energy Institute) is backfilled with access to additional regions should the response activity be requiring additional support, and is hosted through industry organizations such as EEI (Edison Electric Institute). Support could include logistics, materials (including long-lead items), equipment, or — as in the case of Hurricane Maria in Puerto Rico —engineering standards, operating procedures, and other fundamental building blocks for re-creating utility infrastructure and systems.

Mutual Aid Assistance

Mutual aid is an essential resource for receiving assistance through prearranged agreements with and from other states to provide support under specified terms and conditions. Oregon is working to establish three ESF-12 mission-ready packages (MRP) for mutual aid during steady state. The packages include detailed information about the type of resource that can be offered, the amount of the resource, timing considerations, and any associated costs. By establishing these details in advance, states identify needs and key resources they can offer or request from other states within the region. Oregon’s ESF-12 agencies will work to establish the following MRPs:

- Electric Utility ESF-12 Technical Assistance Support
- Liquid Fuels ESF-12 Technical Assistance Support
- Natural Gas ESF-12 Technical Assistance Support

Oregon’s MRPs define explicit terms, including considerations for how the agreement is activated, how the requesting and supporting entities communicate and coordinate with one another, and funds available to support the terms of the agreement. The MRPs will meet standards established for the Emergency Management Assistance Compact led by the National Emergency Management Association. Mission-ready packages not only speed up the mutual aid process but also provide an opportunity for continued coordination with regional partners as part of preparedness. Oregon anticipates establishing the ESF-12 MRPs in 2026.

REFERENCES

[1] Oregon Department of Emergency Management. “OEM Regional Coordinators Program Overview.” (August 2023).

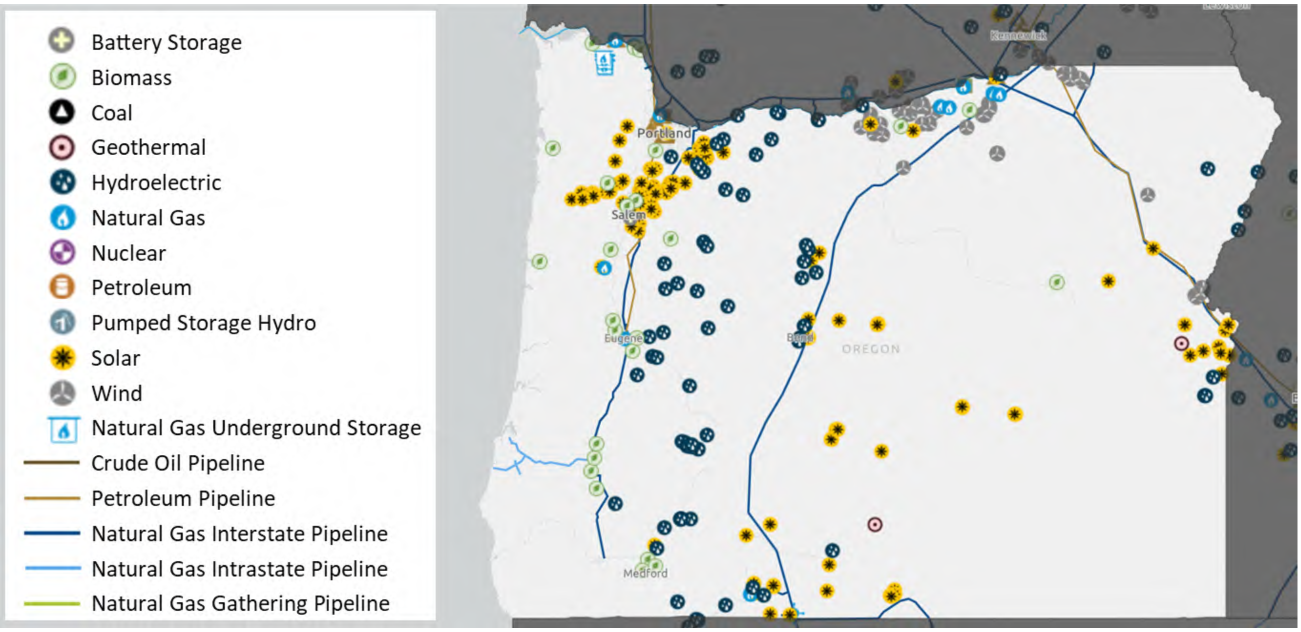
[2] U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response. “Monthly Energy Events Analysis Brief” for Energy Emergency Assurance Coordinators. (June 2023).

V. OREGON ENERGY SYSTEMS

Oregon's energy systems are geographically diverse, relying upon systems and facilities throughout the state, the region, and even international. The state's electricity systems rely on in-state electricity generation as well as electricity generated elsewhere that is imported into Oregon via the regional electric grid. Oregon imports fuel for multiple natural gas-fired power plants, primarily clustered in Columbia, Klamath, Morrow, and Umatilla counties. Oregon also has a wealth of renewable energy sources for electricity generation. The Columbia River, along with other rivers in the state, provides abundant hydroelectric power. Wind and solar energy have also become significant contributors to Oregon's energy production over the last 20 years. A complex transmission system is required to move this generated electricity across the state to end users, to export into other states, and to import out-of-state electricity into Oregon. In contrast, Oregon has few fossil energy reserves, so nearly all natural gas and all refined petroleum liquid fuels used in the state are imported. This results in a strong reliance on pipelines, shipping, and transit corridors from other states and countries to supply the fuels that Oregon consumes.[1] The electricity, liquid fuel, and natural gas fuel infrastructure that powers Oregon's residential, commercial, industrial, and transportation sectors are presented in this chapter. Additional information regarding Oregon's energy systems is found in the Oregon Department of Energy's *Biennial Energy Report*, produced every two years, and available here.

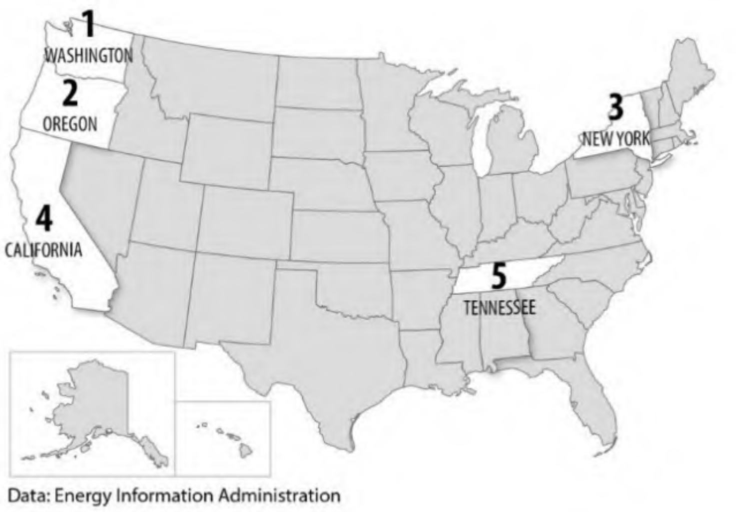
As described in Section I, expansion of Oregon electricity generation and transmission facilities is widely expected to be necessary in the coming years based on rising energy demand forecasts for our state and region.[2] Rising demand is primarily due to data center load growth and advanced manufacturing and other large industrial users of electricity. Oregon will need more power generation facilities and more electric transmission lines to move electricity to from where it is generated to where it is needed, and to be done in a cost-effective manner. This section of the Energy Security Plan describes existing energy infrastructure in Oregon, and future versions of this plan will include additional information about necessary energy infrastructure expansion and build-out. We also direct readers to the forthcoming Oregon Energy Strategy, to be released in November 2025, for additional information.

Figure 8: Energy Facilities in Oregon



View an interactive version of this facility map on the U.S. Energy Information Administration's website.

Figure 9: Top Hydropower Producing States (2021)[3]

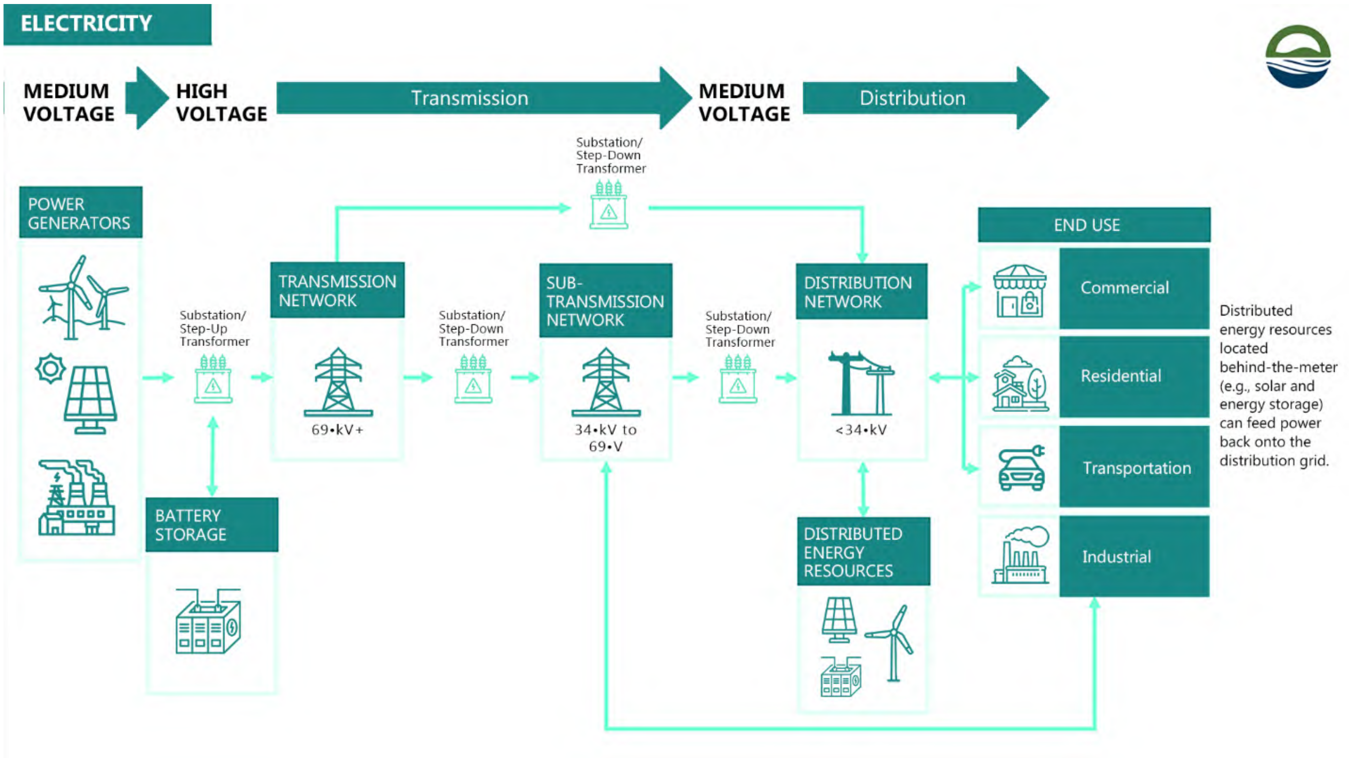


Data: Energy Information Administration

Electricity

When most people think about energy, they begin with electricity – turning on lights, charging phones, perhaps fueling an electric vehicle, and otherwise powering our day-to-day lives. Throughout the year, Oregon imports and exports electricity. In the state, electricity comes from hydropower, natural gas power plants, wind power, and a growing share from solar and other sources (see Figure 8). The electricity generated by these sources is delivered to customers through a complex electricity transmission and distribution system referred to as the grid, which also connects Oregon to larger regional and continental networks.

Figure 10: Electricity Supply Chain



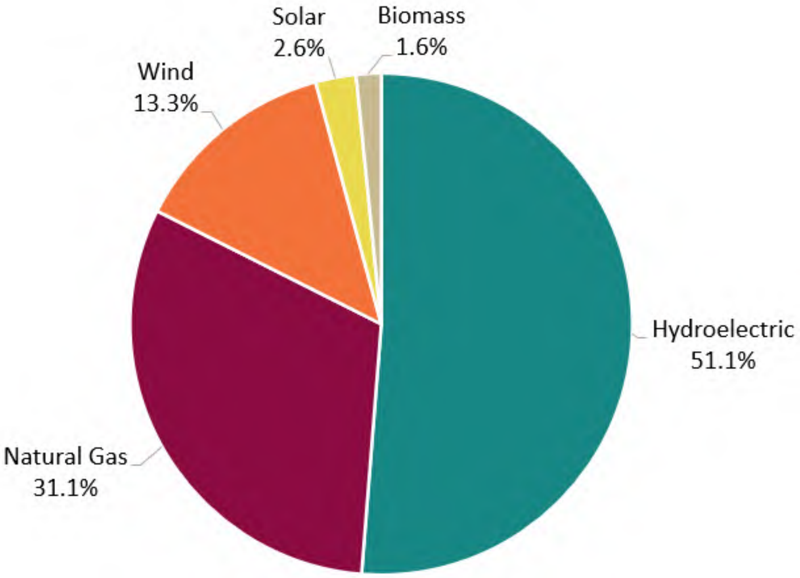
Electricity Generation

In 2022, 69 percent of electricity generated in Oregon came from renewable resources. Fifty percent of Oregon's electricity generation came from Oregon's 105 hydroelectric facilities. The state's four largest electricity generating facilities are federally owned and operated dams on the Columbia River, and their combined generation capacity is double that of the remaining six largest power plants in the state. Wind is the second largest producer of renewable energy in the state (13.3 percent), followed by solar (2.6 percent).[4,5]

Oregon's abundance of renewable electricity is used in the state or exported. Energy production from most types of renewable resources is variable from year to year and from season to season. For example, hydropower output can vary widely based on annual precipitation patterns, resulting in significant changes in how much is available to serve Oregon's demand from one year to the next. Similarly, wind and solar output is also dependent on weather conditions and therefore variable. When this variability results in more generation than Oregon's demand, this energy can be exported to neighboring states, stored, or the generating facility can be configured to produce less electricity. In 2022, 37 percent of Oregon's hydropower and 45 percent of its wind generation were exported.[4,6] Utility scale energy storage may allow Oregon to capture more of its own power production, as well as address some other electricity challenges such as meeting peak demand, but it has yet to be developed in Oregon in a significant fashion.

Natural gas represented about 31 percent of Oregon's 2022 electric generation. Natural gas consumption for electricity generation has grown over time in Oregon replacing coal as the preferred on-demand firm resource that supplements what is produced by variable renewable resources. In energy markets, electricity providers typically prioritize using the lowest cost generating resources, allowing them to meet customer demand at least cost. This often results in prioritization of hydropower, wind, and solar, which have low or zero marginal costs. These types of resources are used first, and then, if there is unmet customer demand, energy providers will look to other types of resources, such as natural gas power plants, to meet additional demand. Oregon natural gas facilities import more than 99 percent of the natural gas they use.[7] Oregon has a single site in the northwestern region of the state (Columbia County) that is used primarily for gas storage, although it also produces a small amount of natural gas. Oregon has no commercial coal or petroleum resource extraction facilities.

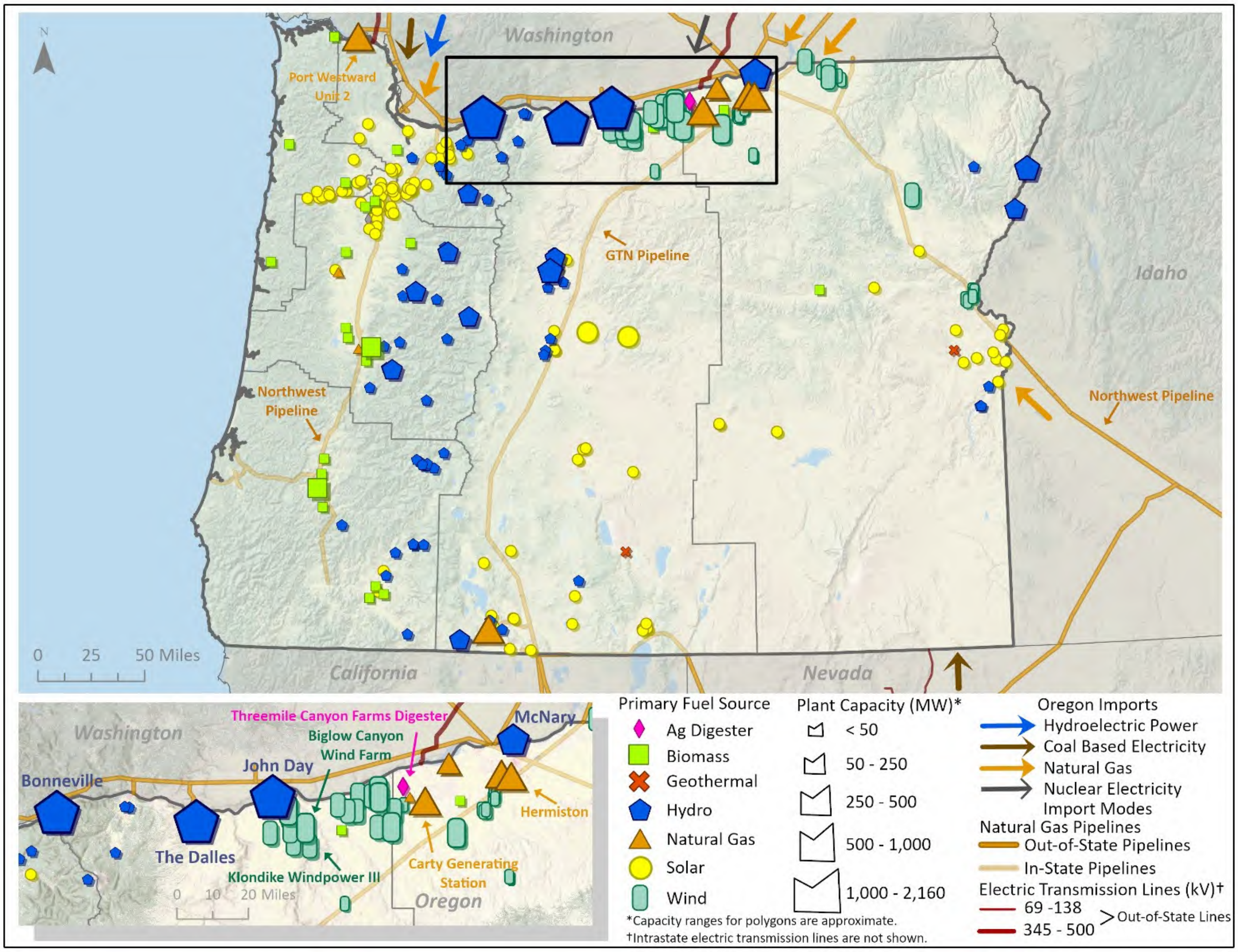
Figure 11: Electricity Generated in Oregon (2022)[4]



Oregon's sole coal-power plant ceased operation in 2020 and was demolished in 2022. When the coal power plant was operating, all of the coal the plant used was imported.[7]

The owners of electricity generation facilities in Oregon include utilities and Electricity Service Suppliers, also known as Independent Power Producers. Utilities either sell their power directly to consumers or to the larger regional market. Service suppliers and power producers sell their power to large industrial customers, utilities, or the regional market. A detailed table of all commercial electricity generating facilities in the state is provided in Appendix H.

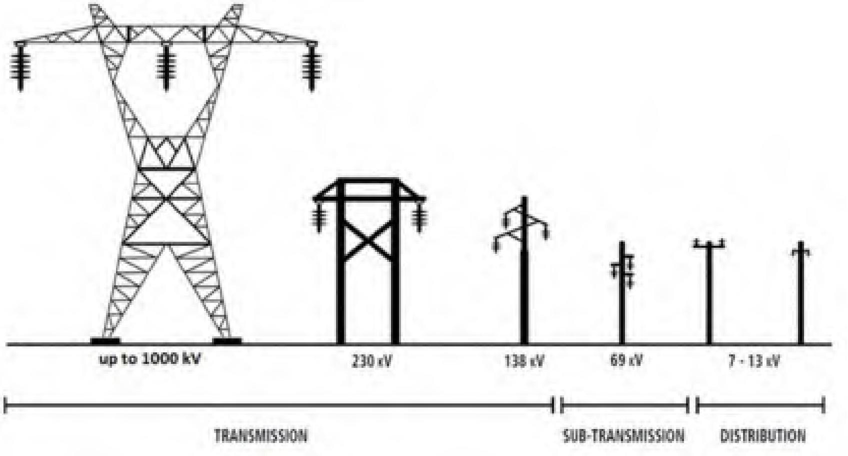
Figure 12: Electricity Generation Facilities [8–10]



*Capacity ranges for polygons are approximate.
†Intrastate electric transmission lines are not shown.

Electricity Transmission

Figure 13: Typical Sizes of Transmission and Distribution Systems



The transmission network is a complex system of interconnected transmission lines that link energy sources to customers. Most generators are located long distances from the cities, towns, and rural areas they serve – for example, customers along Oregon's coast often receive their power from generation east of the Cascades. Transmission lines are critical to the delivery of large amounts of power from regional electricity generating resources to customers. Electricity travels long distances most effectively and efficiently at high voltages. Therefore, high-voltage transmission lines, such as those that hang between tall metal towers, are used to carry electricity over long distances to connect large generating resources to electricity customers (also known as load centers). "Step-up" transformers are used to increase the voltage of electricity from the generating sources to enable travel along high-voltage transmission lines. Then, to decrease the voltage back down to the levels required to serve customers, the electricity passes through "step-down" transformers, first at substations and then at customers' service transformers before being consumed by end users.[11] The transmission network provides access to diverse energy resources, helps to ensure reliable electricity, and allows generating resources to be centrally located and while meeting demand across a region.

Figure 14: Map of Electric Power Plants and Transmission Lines in Oregon[12]

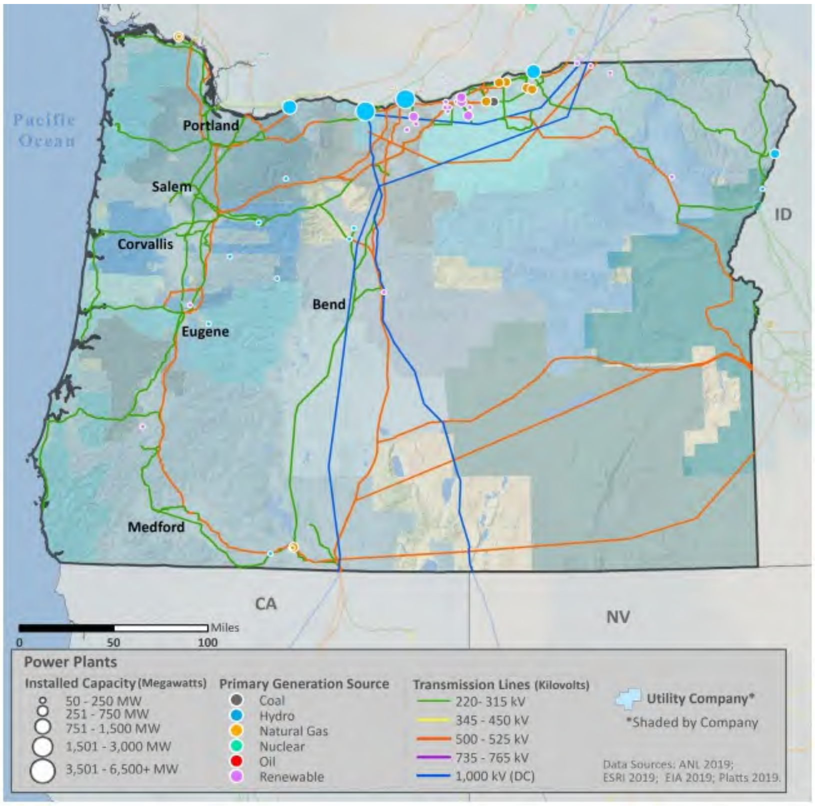
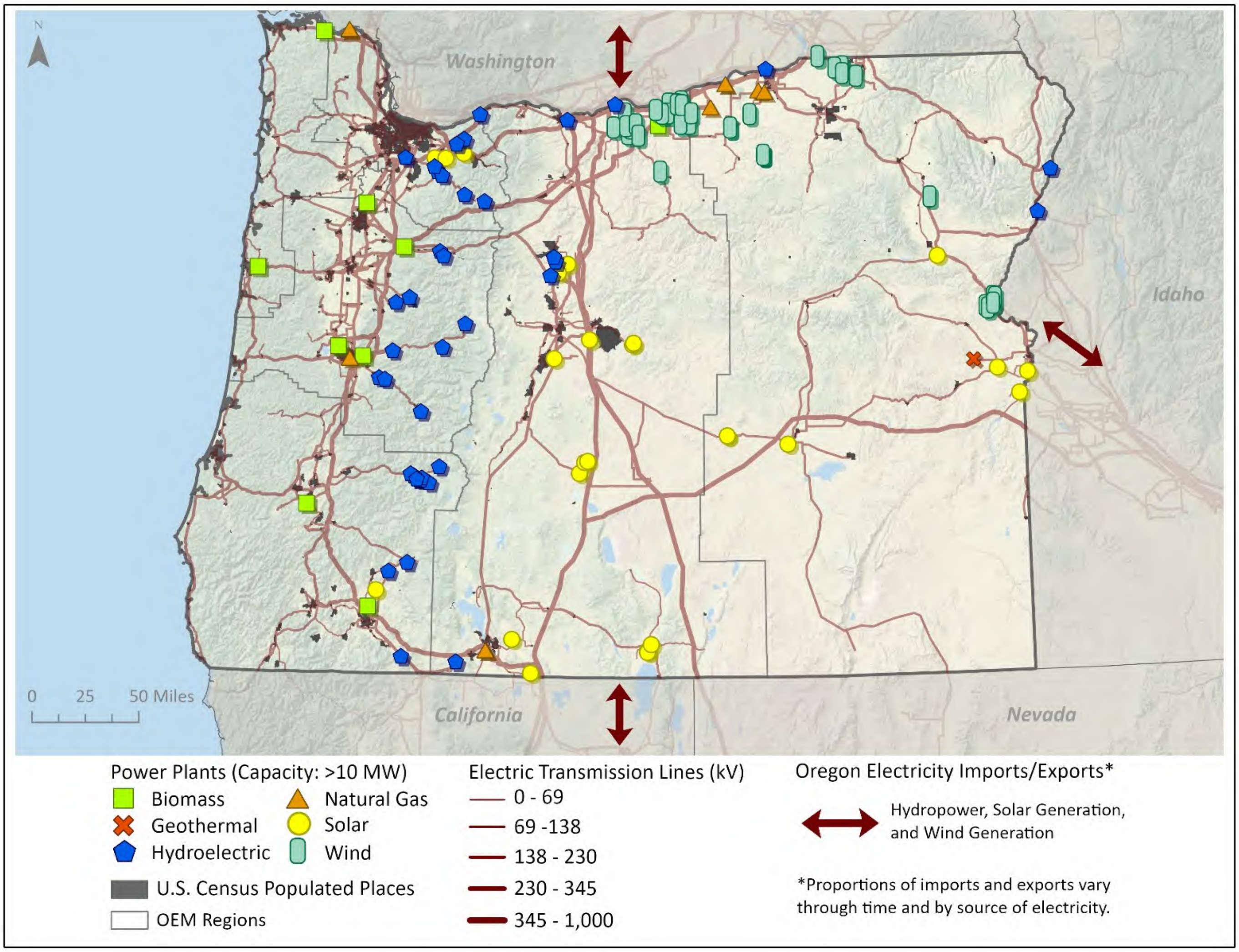


Figure 15 illustrates the major electricity transmission lines in Oregon. Transmission line owners and operators are often affiliated with the same utilities that own and operate power generation to provide customers with electricity.[13]

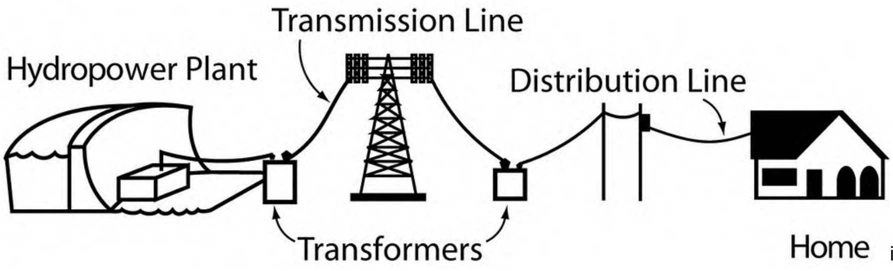
Figure 15: Electricity Transmission [8,10,14]



Electricity Distribution

The electricity distribution system — or distribution grid — is responsible for delivering power to retail customers. Homes and businesses receive electric service by physically connecting to the poles and wires of the distribution system running up and down the streets of their neighborhoods. The distribution system receives power at substations from the bulk transmission system. Electricity delivered to the transmission system comes from a variety of resources, including hydropower, fossil fuel-generated power plants, wind, solar, and others.

Figure 16: Distributing Electricity[3]



[i]

While it was much more common in the past for electricity to always flow in one direction in the transmission network, i.e. from large power generation sources to consumers, with the increased development of distributed generation this has changed. Electricity still only flows in one direction, but that direction may change depending on availability of resources and demand. Distributed or local generation are the terms used when electricity is generated from sources near the point of use instead of a central generation source like a power plant. For instance, a building with solar panels on its roof may generate some or all the electricity it consumes. Distributed generation sources are often renewable. Additional examples of distributed energy resources include wind generating units, small hydro, and battery storage. Some commercial and industrial facilities in Oregon also produce their own renewable natural gas (frequently from landfills or sewage treatment plants) and biofuels that are used to generate electricity onsite as part of combined heat and power systems. Distributed energy resources can supply power to the building or facility they are connected to, store some of this energy, and/or distribute electricity back onto the grid — reducing the cost of the electricity to the consumer and potentially offering resilience if there is a temporary disruption of service.[15] Distributed generation resources add another layer of complexity to the already complicated grid, but if built out in sufficient quantity, it is possible that distributed generation could help address some current challenges in energy supply management such as meeting peak demand.

The reliable delivery of power to customers requires effective planning for investments to expand and maintain the grid, and the processes and activities for distribution system planning are evolving. Emerging technologies can provide customers and utilities with new opportunities to optimize how electricity is supplied and managed across the distribution grid. These technologies include advanced digital communication and control infrastructure as well as distributed energy resources. There is also an opportunity to utilize these new tools to increase resilience for Oregon communities interested in mitigating potential impacts during an emergency event or offer them greater energy independence.[11]

Bulk Electric System Reliability

The bulk electric grid in Oregon is managed by the Western Electricity Coordinating Council, and the aggregated assets also are known as the Western Interconnection. The Western Interconnection ensures a reliable bulk electric system in the region by creating, monitoring, and enforcing reliability standards.[16] The Western Interconnection serves a population of more than 90 million people across all

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[i] This image is an example of an electricity distribution pathway from a hydropower source to a single-family dwelling and is not representative of all the generation sources or end use customers possible in Oregon.

or part of 14 states, the Canadian provinces of British Columbia and Alberta, and the northern part of Baja California in Mexico.[16,17]

Figure 17: Map of Western Interconnection[18]

The Western Interconnection is made up of about 136,000 miles of transmission lines. Two features distinguish the flow of electricity in the West from that in the East:

- Long, high-voltage lines were built to connect remote generating resources with distant population centers, primarily along the West Coast.
- Other lines carry power from hydroelectric resources in the Pacific Northwest to California and other states. These resources have the greatest capacity during the spring, when demand in the Northwest is relatively low. This allows distribution of hydroelectric power that would otherwise be considered excess.
- The Western Interconnection has also evolved to accommodate heavy south to north flows when solar generation in California is overproducing, reversing the flow of transmission paths.

Because of these unique supply and demand patterns, utilities in the West rely more heavily on electricity transported over long distances than utilities in the East. Electricity generally flows south and west in a “doughnut” pattern, rather than the typical spiderweb pattern of the East.

Real-time Management of Energy Flow within the Western Interconnection

Balancing authorities play a key role in ensuring that the Western Interconnection functions properly. A balancing authority ensures, in real time, that power supply is matched to system demand. This balance is needed to maintain the safe and reliable operation of the power system. If demand and supply fall out of balance, local or even area-wide blackouts can result. In the WECC region, there are 37 balancing authorities.[17] BPA and Oregon utilities, as well as many other power providers and utilities across other western states, participate in the Western Energy Imbalance Market[19]; in total, 22 balancing authorities participate in WEIM, including the California ISO.[17,20] In this organized regional market, a centralized operator automatically balances supply and demand over 5- and 15-minute intervals by dispatching the lowest cost energy from power plants in the region to meet regional loads most efficiently. Participation in the WEIM is attributed with better utilizing the energy and delivered cost benefits to customers of those utilities that participated. BPA and many western utilities, including Oregon’s two largest utilities, have also signaled interest in participating in a similar form of market for electricity balancing for the next day, called a day-ahead market.[19] The Extended Day-Ahead Market, which will be open to entities participating in WEIM, is scheduled to open in 2026.[20]

Oregon's utilities and electricity service providers sell power to the regional market. Due to the complex system through which Oregon utilities and customers receive electricity, at times utilities in Oregon import and export electricity (see Figure 15). How much electricity Oregon imports and which type of energy it comes from is affected by the regional nature of energy markets, resource availability, market dynamics and utility contracts, and public policy.[11,21] Imported electricity is generated from multiple sources including by fossil fuels, nuclear power, or renewable sources. This in turn affects the overall resource makeup for Oregon electricity, which is described in detail in Section VI.

Bonneville Power Administration

Unlike most other regions of the country, the federal government plays a unique and critical role in the Pacific Northwest energy ecosystem. BPA is a federal government agency that markets wholesale electric power from 31 federal hydroelectric facilities and provides about 29 percent of the electricity used in the Northwest.[6] BPA in turn gets its electricity primarily from hydroelectric power facilities or the region's sole nuclear power plant (Columbia Generating Station, located near Richland Washington). The dams generating the hydroelectric power are operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation. These energy resources are sold directly to utilities in Oregon via BPA's transmission system.

Figure 18: 2022 Bonneville Power Administration Resource Mix[6]

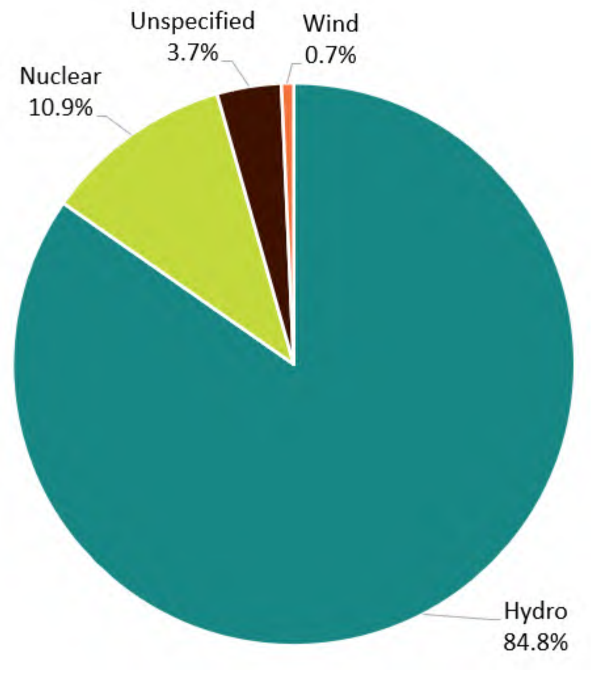
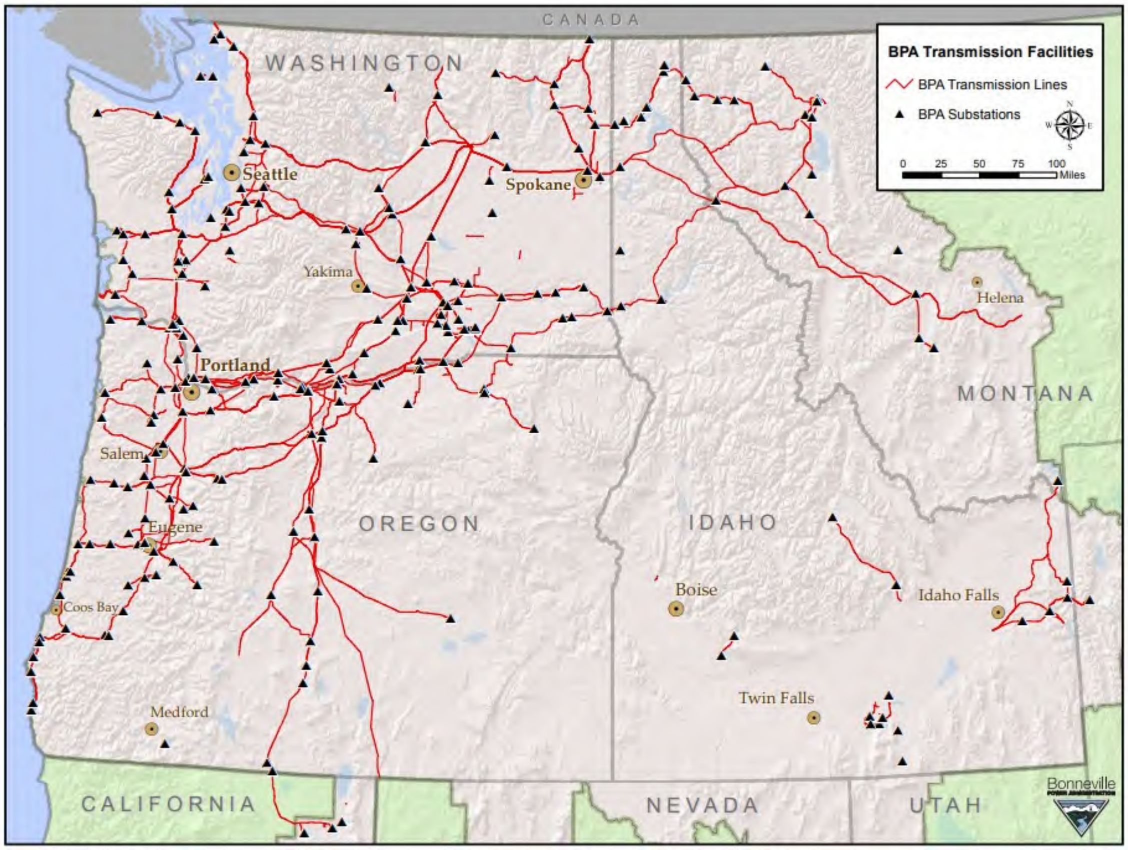


Figure 19: BPA Transmission Facilities[22]



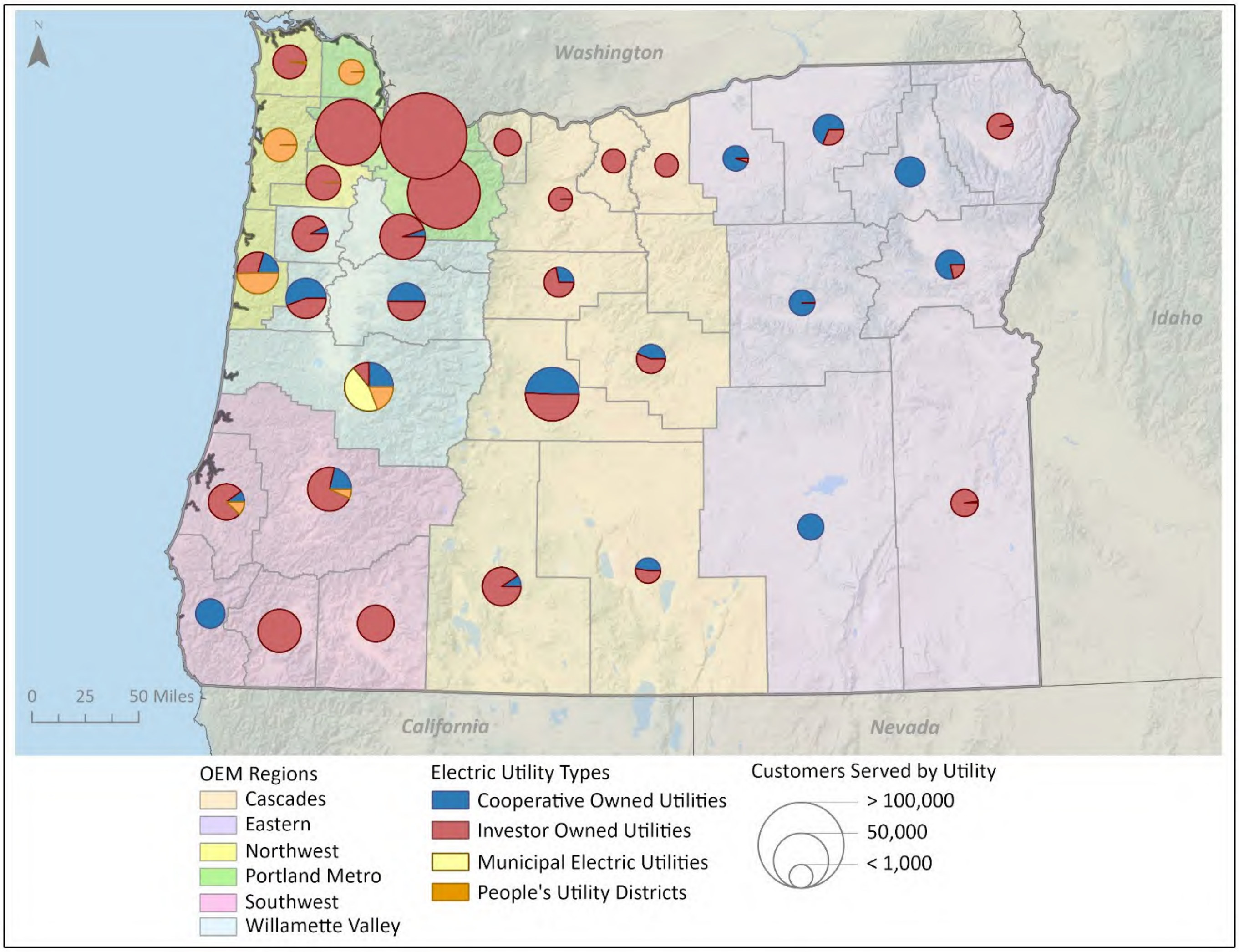
Electric Utilities

Electric utilities' primary purpose is to distribute electricity to retail electricity consumers. In Oregon, these utilities are organized using a number of ownership and business models, including invester owned, cooperative, municipal, or public owned. They are responsible for the delivery of electricity to homes and businesses, including metering, billing, and customer service. Oregon utilities generate their own electricity, purchase power from wholesale providers like BPA, and/or enter into contracts to buy electricity from third-party owned power plants and the market. Figure 20 shows the distribution of utility type by county and the number of consumers served by each.

OREGON HAS 41 ELECTRIC UTILITIES

3 investor-owned
20 cooperatives
12 municipals
6 people's utility districts

Figure 20: Electric Utilities by Type[23]



Three investor-owned electric utilities operate in Oregon, providing service to approximately 74 percent of the customers in the state.[24] The two largest investor-owned utilities in Oregon are Portland General Electric and Pacific Power. The third investor-owned utility operating in Oregon is Idaho Power, which serves a small number of customers in far eastern Oregon. The average annual kilowatt hour (kWh) consumption of residential customers of Oregon investor-owned electric utilities is outlined in the tables below.

Table 9: Investor-Owned Electric Utilities[24]

Year	2017	2018	2019	2020	2021	2022
Average annual residential consumption (kWh)	10,848	10,151	10,205	10,304	10,554	10,606

The remainder of Oregon’s electric users are served by 38 consumer- or publicly owned electric utilities.

Table 10: Electric Suppliers Serving Customers in Oregon in 2022[24]

Type of Electricity Supplier	Number	MWh Sales in Oregon (%)	Customers in Oregon (%)
Investor-Owned	3	59.5	74.2
Electricity Service Suppliers (ESS)	5	4.9	<0.1
Cooperative	19	18.1	10.4
Municipal-Owned	12	8.7	9.6
People's Utility District	6	8.8	5.8

A description of the utilities included in this table is listed below. The number of customers served and the amount of electricity consumed varies widely by provider.

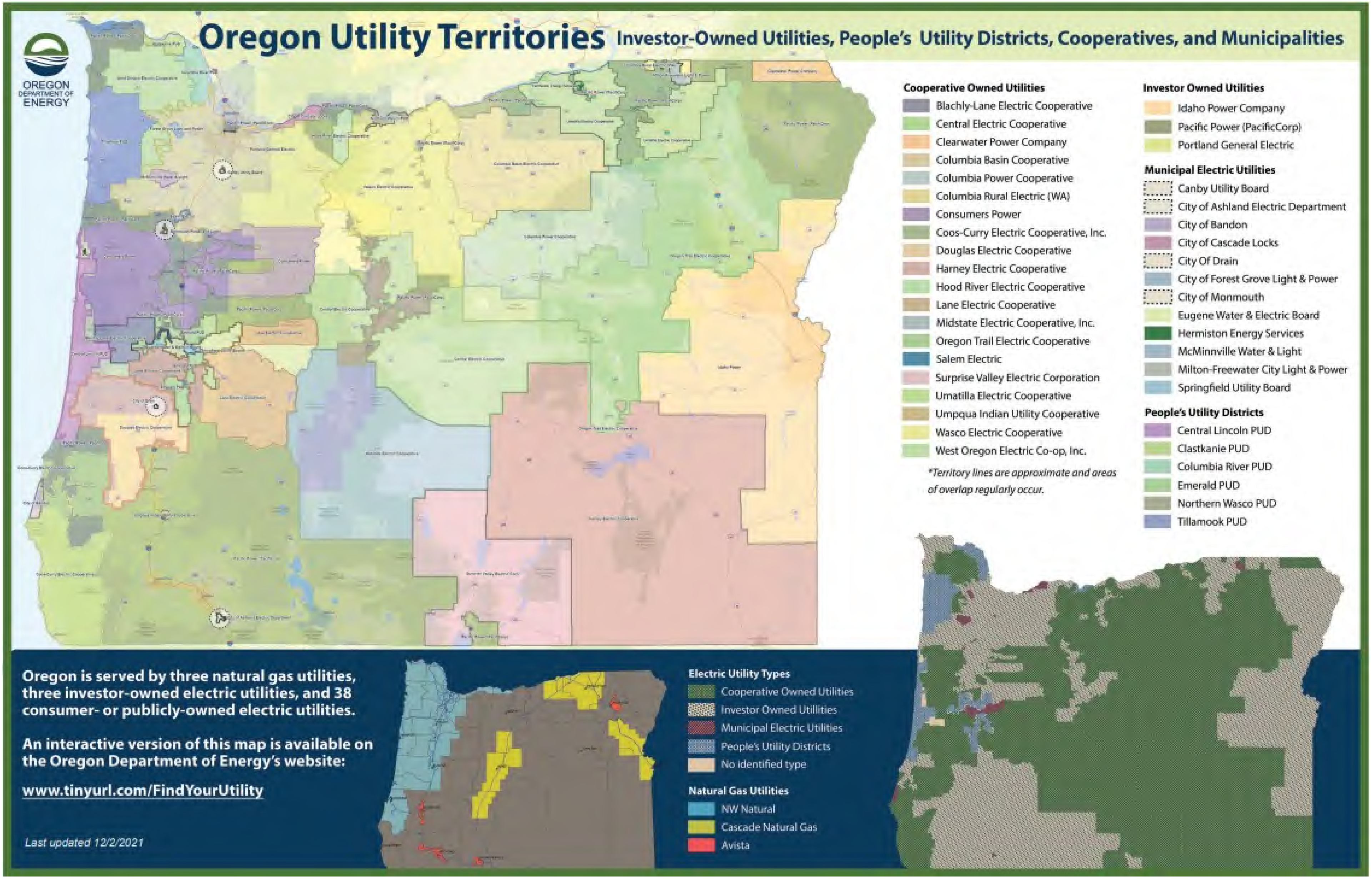
Table 11: Major Electric Utilities Serving Oregon[24]

Utility Name	Ownership Type	Total Sales (MWh)	% of State's Sales	Average # Customers	% State's Customers
Portland General Electric	Investor-owned	18,905,061	33.8%	922,444	44.1%
PacifiCorp	Investor-owned	13,700,592	24.5%	606,834	29.0%
Eugene	Municipal	2,350,341	4.2%	97,096	4.6%
Central Lincoln	People's Utility District	1,260,698	2.3%	40,827	2.0%
Central Electric	Cooperative	805,786	1.4%	37,217	1.8%
Springfield	Municipal	775,713	1.4%	32,981	1.6%
Oregon Trail Electric	Cooperative	687,693	1.2%	31,606	1.5%
Consumers Power, Inc.	Cooperative	420,900	0.8%	23,172	1.1%
Emerald	People's Utility District	506,412	0.9%	22,576	1.1%
Tillamook	People's Utility District	501,183	0.9%	22,036	1.1%
Midstate Electric	Cooperative	450,199	0.8%	20,871	1.0%
Salem Electric	Cooperative	330,923	0.6%	20,674	1.0%
Columbia River	People's Utility District	499,766	0.9%	20,386	1.0%
Idaho Power	Investor-owned	695,393	1.2%	19,831	0.9%
Coos-Curry Electric	Cooperative	338,166	0.6%	18,370	0.9%
McMinnville	Municipal	712,700	1.3%	18,075	0.9%
Umatilla Electric	Cooperative	5,880,299	10.5%	16,183	0.8%
Lane Electric	Cooperative	250,873	0.4%	13,437	0.6%
Ashland	Municipal	165,478	0.3%	12,224	0.6%
Northern Wasco Co.	People's Utility District	1,190,079	2.1%	11,496	0.5%
Forest Grove	Municipal	266,825	0.5%	11,106	0.5%
Douglas Electric	Cooperative	156,798	0.3%	10,470	0.5%
Canby	Municipal	186,441	0.3%	8,159	0.4%
Hermiston	Municipal	108,964	0.2%	5,493	0.3%
Milton-Freewater	Municipal	105,497	0.2%	5,030	0.2%
Monmouth	Municipal	77,601	0.1%	4,890	0.2%
Bandon	Municipal	71,021	0.1%	4,811	0.2%
Wasco Electric	Cooperative	106,264	0.2%	4,718	0.2%

West Oregon	Cooperative	70,763	0.1%	4,559	0.2%
Clatskanie	People’s Utility District	968,759	1.7%	4,311	0.2%
Columbia Basin Electric	Cooperative	125,970	0.2%	3,983	0.2%
Hood River Electric	Cooperative	129,955	0.2%	3,953	0.2%
Blachly-Lane County	Cooperative	184,845	0.3%	3,675	0.2%
Harney Electric	Cooperative	111,679	0.2%	2,487	0.1%
Columbia Power	Cooperative	25,280	0.0%	1,985	0.1%
Surprise Valley Electrification	Cooperative	40,895	0.1%	1,957	0.1%
Cascade Locks	Municipal	36,798	0.1%	993	0.0%
Drain	Municipal	24,828	0.0%	751	0.0%
Clear Water Power	Cooperative	1,908	0.0%	180	0.0%
Columbia Rural Electric	Cooperative	6,288	0.0%	129	0.0%
Electricity Service Suppliers	n/a	2,732,314	4.9%	77	0.0%
Total		**55,967,948**		**2,092,053**	

Figure 21 illustrates the geographic territories of Oregon's electric utilities.

Figure 21: Oregon Utility Territories[25]



Oregon is served by three natural gas utilities, three investor-owned electric utilities, and 38 consumer- or publicly-owned electric utilities.

An interactive version of this map is available on the Oregon Department of Energy's website:

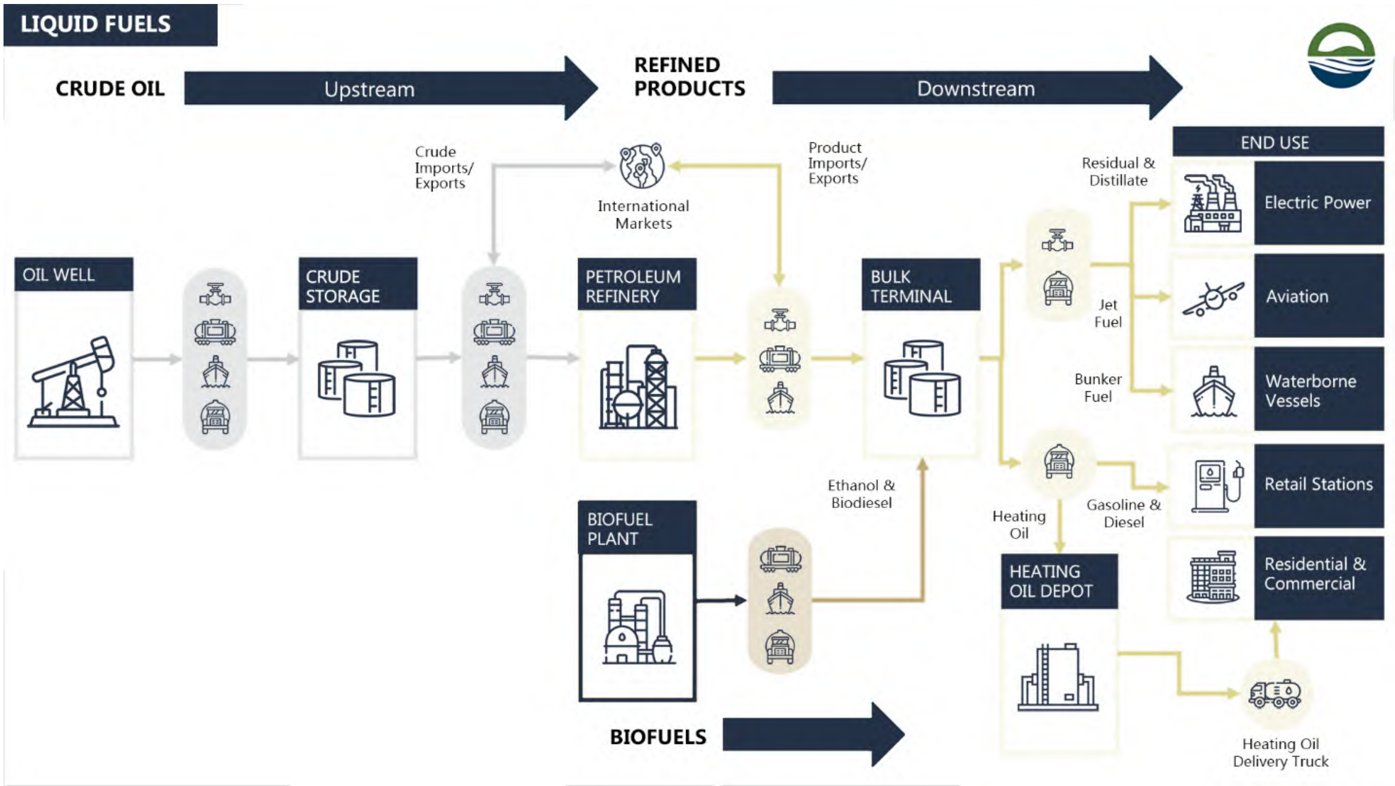
www.tinyurl.com/FindYourUtility

Liquid Fuels

Liquid fuels include fossil fuels such as gasoline, diesel, and jet fuel (petroleum-based fuels) as well as alternative fuels like ethanol, biodiesel, or renewable fuels. While liquid fuels have a variety of uses including heat or electricity generation, transportation is the most prominent use in Oregon. Transportation of people and goods made up about 27 percent of total U.S. energy consumption in 2022 – in Oregon, it was almost 37 percent.[26,27] Petroleum-based products account for all aviation fuels and 91 percent of the total transportation fuels used to power the 3.2 million registered passenger vehicles and 8,930 trucking companies located in Oregon.[28,29] Liquid fuels reporting focuses primarily on petroleum-based fuels and how they are distributed to Oregon consumers.

Crude oil is a global commodity, and Oregon's petroleum fuel prices are affected by worldwide events. In 2021, Egypt's Suez Canal – a critical route for crude oil transport between the Middle East and Europe – was temporarily blocked by a container ship, slowing global trade. Crude oil prices rose by 4 percent in international markets, leading to increased transportation fuel prices around the world.[30] In 2022, Russia invaded Ukraine, leading to dramatic increases in the cost of oil around the globe. Russia is the third-largest producer of oil in the world and the international community, including the United States, prohibited the import of Russian oil, natural gas, and coal as part of economic sanctions in response to the invasion of Ukraine, which violated international law. This conflict and other petroleum supply factors led to Oregon fuel prices rising from an average price of $3.431/gallon for gasoline in June 2021 to $5.266/gallon in June 2022. Prices have since subsided, with average gasoline prices in Oregon in August 2024 at $3.871/gallon.[31]

Figure 22: Liquid Fuels Supply Chain

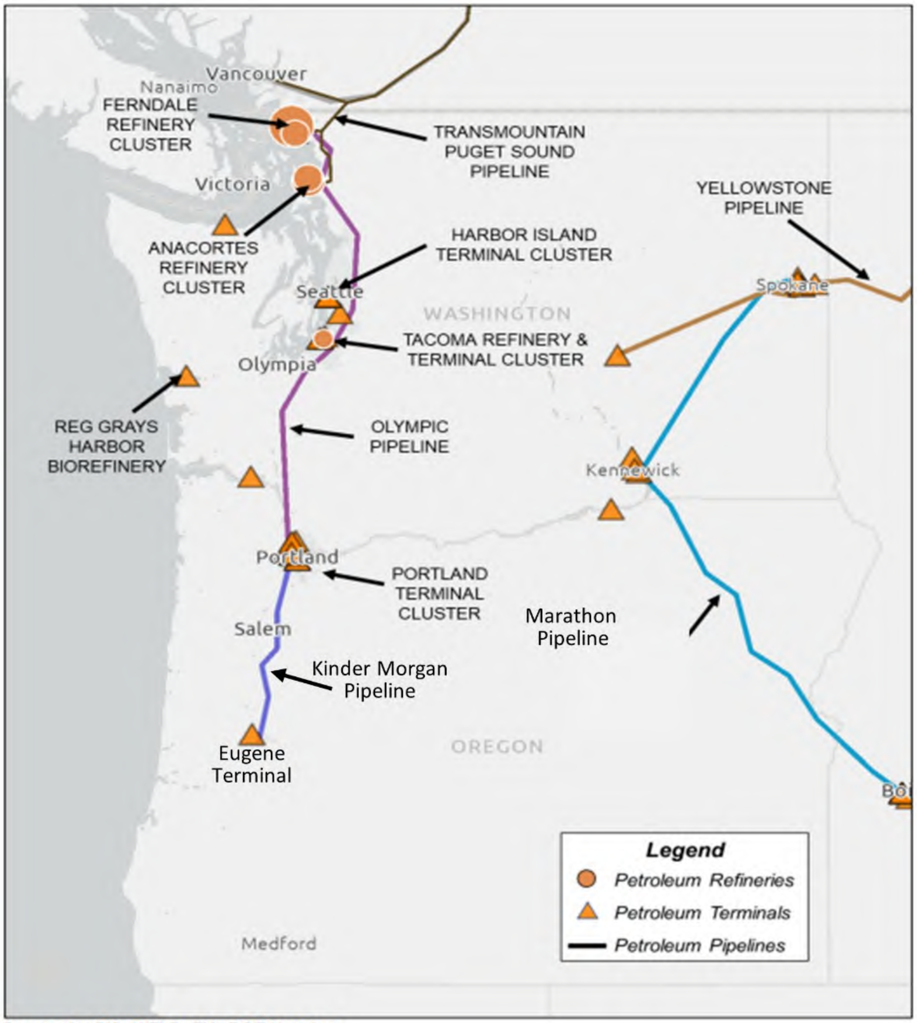


Liquid Fuels Production

Liquid fuels are either sourced from renewable stock or from refined oil. Oil is drilled from wells in the field and transported by pipeline, rail, or barge for processing at refineries. At the refineries, crude oil is processed into gasoline, diesel, jet fuel, propane, and other petroleum products. From refineries, gasoline, diesel, and other refined products are again transported by pipeline, rail, or barge to distribution terminals where ethanol is blended into gasoline so it meets federal and Oregon state guidelines. The finished product is loaded into trucks for delivery or transported by pipeline to the end user or retail station. For the purposes of this section, liquid volumes will be discussed in the unit of barrels (bbl), which is equal to 42 gallons or approximately 159 liters.

Oregon has neither crude oil resources nor refineries. Oregon imports 100 percent of the refined liquid fuels used in the state. Oregon, along with Alaska, Arizona, California, Hawaii, Nevada, Washington, and Western Canada form a somewhat-closed system of petroleum production and consumption. The American states are referred to by the federal government as Petroleum Administration for Defense District Five (PADD 5). Although the system is stable, it is near capacity. This means a major disruption in any part of the supply and distribution chain could create a severe and prolonged petroleum shortage. The map below illustrates the Pacific Northwest Critical Petroleum Infrastructure.

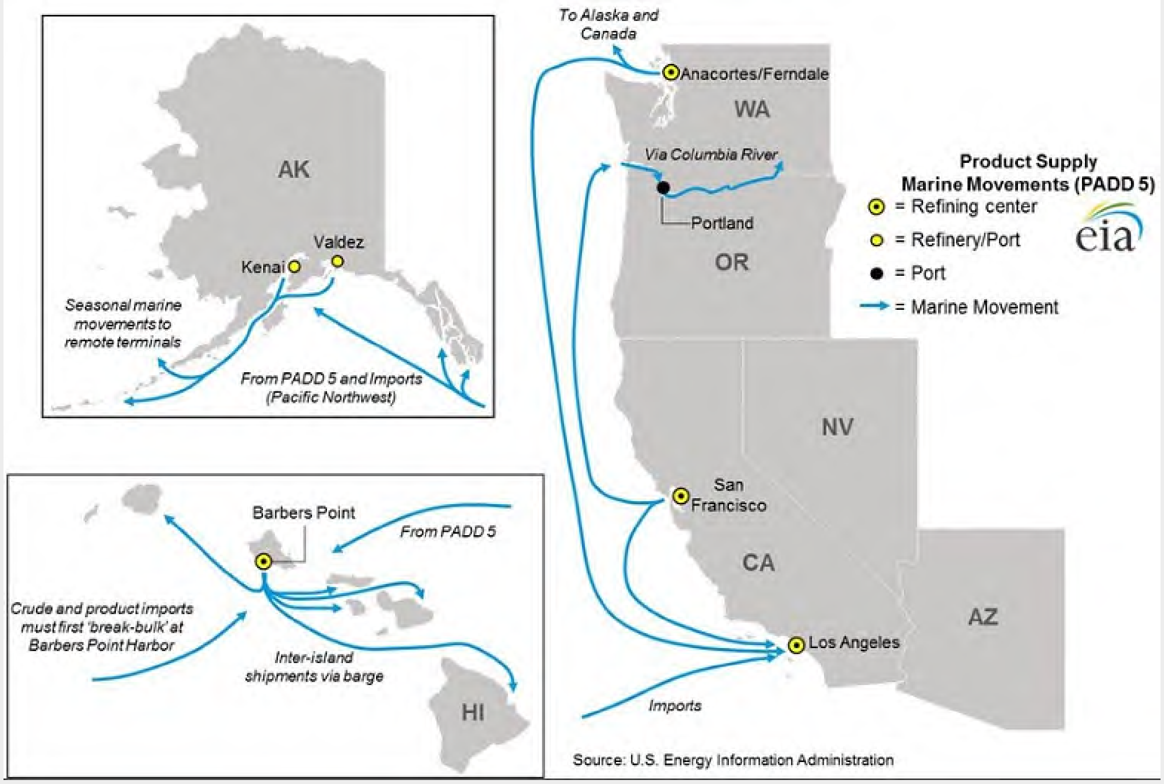
Figure 23: Map of Pacific Northwest Critical Petroleum Infrastructure[32]



Source: ArcGIS, HIFLD, EIA, DOE Notations

PADD 5 is not one market for liquid fuels, but rather six distinct regional markets. Because there is limited pipeline infrastructure connecting the six regional markets, marine movements within PADD 5 play a key role in moving liquid fuels from regions with excess supply to regions with supply shortfalls. As a result, marine vessels are generally highly utilized, and there is minimal capacity to increase intraregional shipments to manage supply disruptions.

Figure 24: PADD 5 Marine Movements[33]



Source: U.S. Energy Information Administration

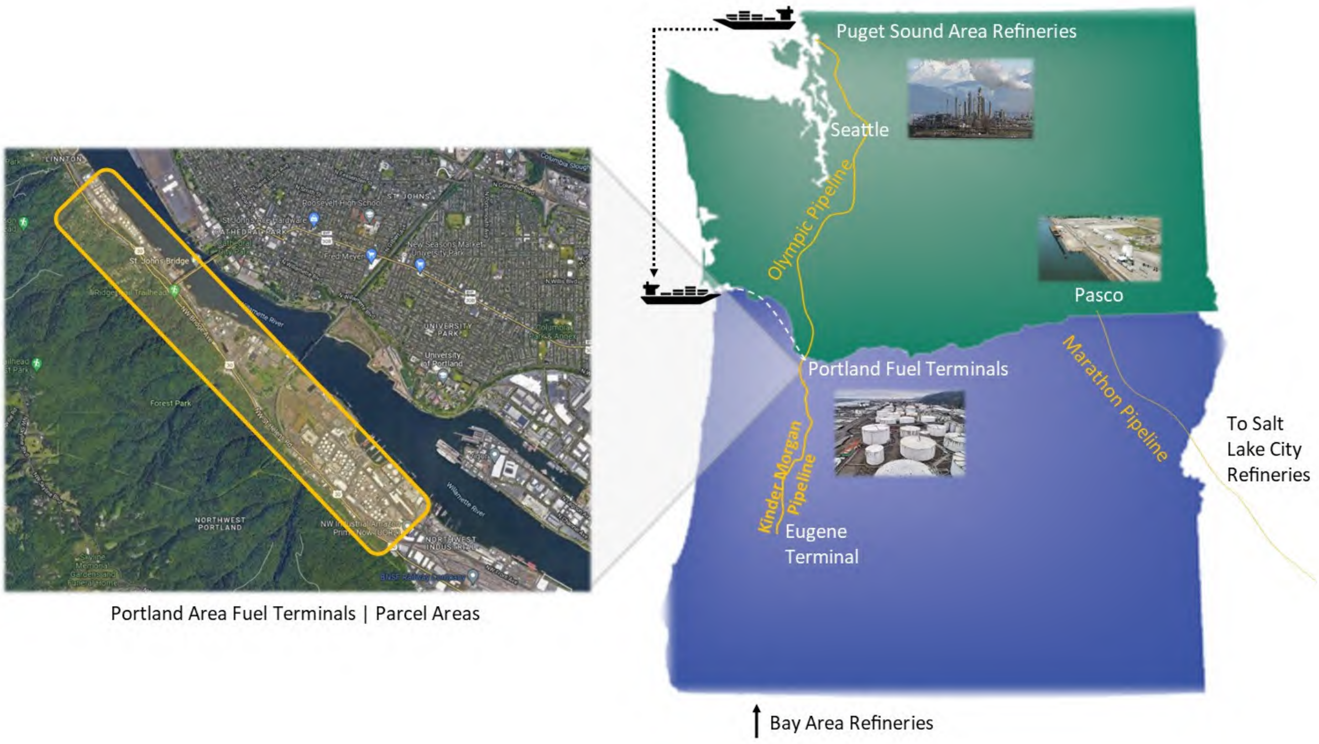
Crude Supply and Refineries

Oregon relies heavily on refined liquid fuels from refineries in Washington State. Washington is a major oil refining center with the fifth-largest crude oil refining capacity in the nation. Washington's refineries receive crude oil supplies by pipeline, marine vessel, and rail. The state's five refineries process domestic and foreign crude oils, primarily from Canada, North Dakota, and Alaska. Overall, the refinery cluster receives 49 percent of its crude supply from foreign imports (mostly from Canada), 30 percent from Alaska, and the balance from the Bakken oil field in North Dakota.[34] More than 90 percent of petroleum liquid fuels used in Oregon are produced in refineries in Washington and delivered via the Olympic Pipeline and barge to eight Portland-area terminals. From these terminals, some of the product flows via the Kinder Morgan pipelines south to Eugene or to the Portland International Airport. The Eugene distribution terminal serves southern, central, and eastern Oregon. Tank barges also carry some refined petroleum up the Columbia River to Pasco, Washington to service eastern Oregon communities. Additionally, an estimated 1,500 tanker trucks deliver fuel from the Portland-area terminals to about 2,400 fueling locations throughout the state.[34]

Less than 10 percent of the refined petroleum products used in Oregon originate from refineries in Salt Lake City and the San Francisco Bay Area.[34] From Salt Lake City, the Marathon Pipeline transports product to a distribution terminal in Pasco, Washington. From the Pasco facility, trucks deliver fuel to eastern Oregon communities.

San Francisco Bay Area refineries supply small quantities of fuel to a Chico, California terminal from which trucks deliver supply to southern Oregon communities.

Figure 25: Map of Oregon and Washington Fuel Supply and Distribution System[35]



The table below gives a high-level overview of the five Washington State refineries where Oregon's liquid fuel comes from. The refineries are divided into clusters based on location:

- Ferndale Cluster – BP Cherry Point and Phillips 66 refineries
- Anacortes Cluster – HF-Sinclair Puget Sound and Marathon Petroleum refineries

A fifth Washington State refinery is in Tacoma (Par Pacific Refinery), but this refinery is not connected to the Olympic Pipeline and does not contribute significantly to Oregon's fuel supply.

A more in-depth discussion of the Ferndale and Anacortes refinery clusters follows the table.

Table 12: Washington Refining Capacity and Markets Served[32]

Inbound Crude
• Canadian Crude via Trans Mountain Puget Sound Pipeline • Alaskan and Foreign Crude by Barge • North Dakota Bakken Crude by rail

Refineries	Refining Capacity (bbl/day)	Refined Product Distribution	Markets Served
Ferndale Cluster: BP Cherry Point, Ferndale	238,500	Olympic Pipeline Tanker Trucks Barges	Pacific Northwest
Ferndale Cluster: Phillips 66, Ferndale	105,000	Olympic Pipeline Tanker Trucks Barges	Pacific Northwest
Anacortes Cluster: HF-Sinclair Puget Sound, Anacortes *(formerly Shell)*	145,000	Olympic Pipeline Tanker Trucks Barges	Pacific Northwest
Anacortes Cluster: Marathon Petroleum, Anacortes	119,000	Olympic Pipeline Tanker Trucks Barges	Pacific Northwest
Tacoma Refinery: Par Pacific, Tacoma (U.S. Oil)	40,700	Pipeline Tanker Trucks Barges	McChord Air Force Base Local Retail Stations Domestic - Foreign

Ferndale Refinery Cluster – The BP Cherry Point Refinery and the Phillips 66 Ferndale Refinery are located near the Ferndale Refinery Cluster in Whatcom County, approximately 100 miles north of Seattle. Most of Ferndale's refined products are distributed by the Olympic Pipeline, tanker truck, and barge to markets in the Pacific Northwest. BP Cherry Point Refinery is the largest supplier of jet fuel to the Seattle, Portland, and Vancouver airports. The source and capacity of crude supplies for this cluster is presented below.

Table 13: Ferndale Refinery Cluster – 2021 Crude Supply by Refinery (bbl/day)[32]

Ferndale Refinery Cluster	BP Cherry Point	Phillips 66	Total
Estimated Crude Runs *	215,000	95,000	310,000
Waterborne Alaska Receipts	85,000		85,000
Waterborne Foreign Imports	27,000	9,000	36,000
Trans Mountain Pipeline	49,000	48,000	97,000***
Rail from North Dakota**	83,000		83,000
Rail from Canada	13,000		13,000

* Estimated runs based on 90% operating capacity
** Balance of crude runs minus imports and Alaska receipts
***Total may include up to 5,000 bbl/day of Canadian oil shipped by marine vessel from western Canadian ports

The Ferndale Refinery Cluster has a combined crude oil refining capacity of around 332,000 bbl/day, or approximately 52 percent of the Pacific Northwest refining capacity, and nearly 13 percent of the total refining capacity in the West Coast PADD 5 region.[32]

Anacortes Refinery Cluster[32] – The HF-Sinclair Puget Sound Refinery and Marathon Petroleum Refinery from the Anacortes Refinery Cluster in Skagit County, WA, approximately 70 miles north of Seattle. Anacortes refineries have access to deepwater docks and the Trans Mountain Puget Sound Pipeline. Marathon Petroleum also has a rail crude oil unloading facility. Most of Anacortes' refined products are distributed by Olympic Pipeline, tanker truck, and barge to markets in the Pacific Northwest. The source and capacity of crude supplies for this cluster is presented below.

Table 14: Anacortes Refinery Cluster – 2021 Crude Supply by Refinery (bbl/day)[32]

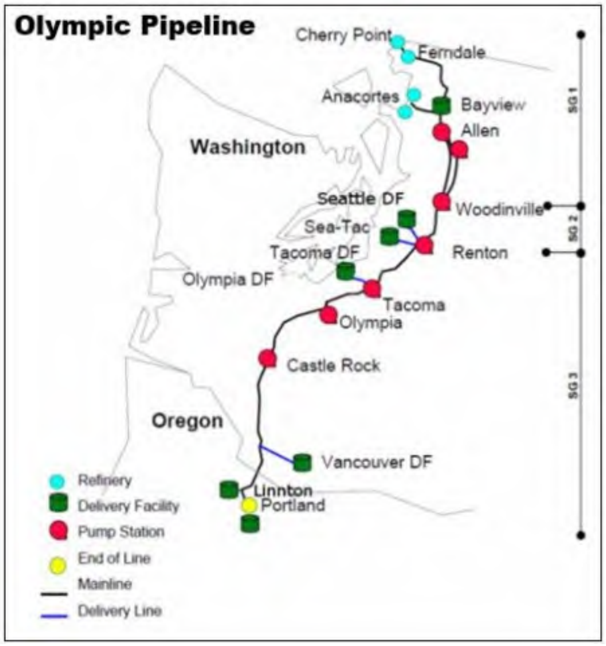
Anacortes Refinery Cluster	HF Sinclair	Marathon	Total
Estimated Crude Runs*	130,000	107,000	237,000
Waterborne Alaska Receipts	72,000		72,000
Waterborne Foreign Imports	30,000		30,000
Trans Mountain Pipeline	49,000	48,000	97,000
Rail from North Dakota**			38,000

Source: EIA, 2021 Company Level Imports; 2021 U.S. Army Corps of Engineers
* Estimated runs based on 90% operating capacity
** Balance of crude runs minus imports and Alaska receipts

The Anacortes refinery cluster has a combined crude capacity of around 265,000 bbl/day, or approximately 41 percent of the Pacific Northwest refining capacity.[32]

Tacoma Refinery - The fifth refinery, Par Pacific Refinery in Tacoma, Washington (U. S. Oil) has a crude distillation capacity of 40,700 bbl/day and a total storage capacity of 3,000,000 bbl. U.S. Oil produces petroleum products such as gasoline and diesel for local markets in Washington.[32] This refinery is not connected to the Olympic Pipeline and does not supply significant quantities of fuel to Oregon markets.

Figure 26: Olympic Pipeline Map [32]



Pipeline and Marine Distribution

Most liquid fuels in the Pacific Northwest are transported via major pipelines. Transporting liquid fuels by pipeline allows for high-volume continuous deliveries to markets in Washington and Oregon. The Olympic Pipeline is the backbone of the region's liquid fuels supply chain.

The Olympic Pipeline, owned by a consortium of companies and investment firms including BP America, is the primary transportation system delivering petroleum fuels to distribution terminals in the Pacific Northwest west of the Cascades. Olympic is a 400-mile interstate pipeline system that transports gasoline, diesel, and jet fuel from the Cherry Point and Anacortes refinery clusters in northwest Washington State to delivery points in western Washington and Oregon, including the Seattle and Portland metropolitan areas.

The total capacity of Olympic Pipeline is approximately 325,000 bbl/day, and in 2022, the system transported approximately 280,000 bbl/day of petroleum products. Approximately 159,000 bbl/day of those products were delivered to terminals in Washington State and 120,000 bbl/d delivered to terminals in Oregon.[32] It is estimated that Olympic transports two-thirds of the petroleum fuels consumed in Washington State and Oregon. The Olympic Pipeline's supply of petroleum liquid fuels is critical to the Pacific Northwest and even a short-duration outage would likely cause supply shortages.

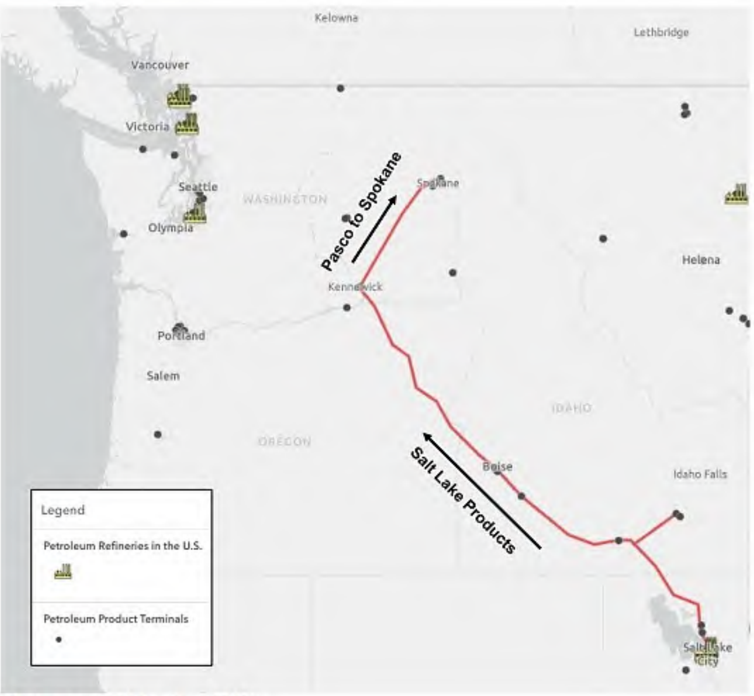
Kinder Morgan Pipeline, owned and operated by Kinder Morgan Inc, starts where the Olympic Pipeline ends at the Port of Portland. The Kinder Morgan Pipeline connects eight liquid fuels terminals that form the Portland petroleum terminal cluster supplying most of Oregon's liquid fuels needs. More information about the Portland petroleum terminal cluster is provided below.

From the Kinder Morgan Terminal in Portland, the pipeline travels 115 miles delivering 2,000 bbl/hour of diesel and gasoline continuously to the Kinder Morgan Terminal in Eugene, Oregon. The Kinder Morgan Pipeline also travels 8.5 miles delivering 17,000 bbl of jet fuel to PDX as needed by the airport.

Marathon Northwest Products Pipeline System (MNPPS), owned and operated by MNPPS, is a 760-mile refined products system that extends from refineries and connected pipelines in Salt Lake City, Utah to distribution terminals in Utah, Idaho, and eastern Washington, including Pasco, Spokane, and Fairchild Air Force Base.

MNPPS receives products from five refineries in Salt Lake City. The pipeline can also receive shipments from interconnecting carriers in Salt Lake City. In 2022, the pipeline system received 77,000 bbl/day from Salt Lake City refineries and an additional 6,500 bbl/day from the interconnected pipeline systems in the Salt Lake area, for a total system throughput of 83,500 bbl/day of gasoline, jet fuel, and distillate.[32] MNPPS' Salt Lake Products System extends from Salt Lake City to delivery points in Utah and Idaho. The system passes through Oregon from Idaho as two 6-inch lines terminating at the Tesoro Logistics terminal in Pasco, Washington, which is approximately 30 miles north of the Oregon border. In 2021, the pipeline system received 12,000 bbl/day of petroleum products via barge at the terminal in Pasco, but no such shipments were registered in 2022.[32] From Pasco, fuels are transported south to eastern Oregon via trucks.

Figure 27: Marathon Pipeline Map[32]



Source: EIA, ArcGIS

In summary, Oregon receives liquid fuels either directly or indirectly distributed through three main pipelines.

Table 15: 2022 Refined Product Pipelines Servicing Oregon[32]

Operator	Line Name	Origin-Destination	Throughput (bbl/day)
BP	Olympic Pipeline 400 Miles	Ferndale/Anacortes, WA to: • Western, WA • Oregon	280,000 total • 159,000 WA • 120,000 OR
Kinder Morgan	Line Section 14 114 Miles	Portland to Eugene Terminal	• 48,000*
Kinder Morgan	Line Section 1880 8.5 Miles	Portland to Portland International Airport (PDX)	Upon PDX request: • 17,000 bbl*
MNPPS	Marathon Pipeline 760 Miles	Salt Lake City, UT to: • Idaho • Eastern WA - *Supply trucked to Eastern OR* • Fairchild Air Force Base	• 83,500

*Throughput provided by Kinder Morgan.

Portland Terminals

The Portland area fuel terminals, located in the Port of Portland, Oregon, is the primary source of petroleum product supply storage for Oregon. The cluster is comprised of eight bulk terminals with a combined storage capacity of 7.4 million bbl of liquid fuels, including gasoline, distillate, jet fuel, natural gas liquids, and ethanol. Product is primarily supplied into the cluster by the Olympic Pipeline from refineries in Washington State. From the fuel terminals, refined product is distributed primarily by truck throughout the state. However, product is also distributed by pipeline to the Eugene distribution terminal and then to central, southern, and eastern Oregon markets, and the PDX Airport (jet fuel), and by barge to Pasco, Washington for trucked distribution to Washington and eastern Oregon markets.

In 2021 the Portland fuel terminals also received just over 6,700 bbl/day of marine shipments, including 5,500 bbl/d of domestic movements, and nearly 1,200 bbl/day of international imports. Ethanol is also delivered to the terminals via tanker railcar, at a rate of approximately 5,400 bbl/day.

Table 16: Portland Terminal Cluster Storage Capacity[32]

Company	Products	Storage Capacity (bbl)
Shell Terminal	Gasoline, Diesel, Ethanol, Biodiesel	400,000
Zenith Energy Terminals	Asphalt, Crude	1,466,000
Kinder Morgan: Linnton	Gasoline, Diesel, Jet Fuel, Additives	420,000
Kinder Morgan: Willbridge	Gasoline, Diesel, Jet Fuel, Additives	1,478,000
Chevron Terminal	Gasoline, Diesel, Ethanol, Biodiesel	1,600,000
NuStar Terminal	Gasoline, Diesel, Jet Fuel, Ethanol, Biodiesel, Fuel Oils	1,191,000
Seaport Terminal	Gasoline, Diesel, Lube Oil, Additives	601,500
Phillips 66 Terminal	Gasoline, Diesel, Ethanol, Biodiesel, Lube Oil	760,000
McCall Oil Terminal	Gasoline, Diesel, Biodiesel, Asphalt, Additives	930,000
Port of Portland Total	**Service Territory:** Statewide by pipeline, truck, and barge	**8,846,500**

Table 17: Eugene Terminal Storage Capacity[32]

Company	Products	Storage Capacity (bbl)
Kinder Morgan Terminal	Gasoline, Diesel, Additives	620,093
Eugene Total	**Service Territory:** Central, Southern, and Eastern Oregon by truck	**620,093**

Liquid Fuels Imports

Since Oregon does not possess crude oil resources or refineries, 100 percent of the refined liquid fuels products used in the state are imported. These include biodiesel, diesel, ethanol, gasoline, renewable diesel, propane, and aviation fuel as shown in the series of figures below.

Liquid fuels are transported into the state via barge or tanker, pipeline, rail, and truck, with more than 90 percent of liquid fuels originating from refineries in the state of Washington – the other 10 percent comes from refineries in Salt Lake City and the San Francisco Bay Area. Most liquid fuels – specifically jet fuel, diesel, and gasoline (and some renewable diesel) – are transported into Oregon via the Olympic pipeline, which originates in northern Washington State near the Canadian border, travels roughly along I-5, passes under the Columbia River and terminates at the Portland area fuel terminals. The Portland area fuel terminals play a key role in the fuel system – these terminals receive unfinished fuel products and blend in other fuels (e.g., ethanol into gasoline or biodiesel into diesels), detergents, and other additives to make finished fuel. Terminals in Washington, Idaho, and Nevada also distribute finished fuel into Oregon by truck.

In Oregon, the Kinder Morgan pipeline transports diesel, gasoline, and renewable diesel from the Portland fuel terminals to the Eugene terminal, which serves as the main fuel terminal for most of central and southwest Oregon. The Kinder Morgan pipeline carries finished diesel fuel that is already blended with biodiesel. As a result, the pipeline is not able to carry jet fuel, so nearly all jet fuel used in the state is delivered via truck from the Portland area fuel terminals or one of the terminals in Washington or Idaho.

Maritime vessels also play an important role in transporting aviation fuel, diesel, and gasoline into Oregon; even though most liquid fuels move by pipeline, capacity is not sufficient in the pipeline at all times of year, so other modes of transport are necessary to supplement flows of fuel to the Portland area fuel terminals. The Portland area fuel terminals receive deliveries by marine barges from California and Washington, as well as occasionally tankers from overseas. Ethanol and biodiesel cannot move on the Olympic Pipeline, and are instead imported by barge, rail, or truck. Ethanol is primarily imported by barge. Ethanol, propane, and renewable diesel are also brought into the state via rail from California, Idaho, and Washington. Biodiesel is primarily imported by truck from California and Washington.

The Columbia River also plays a key role in fuel movements. Most of the *inbound* maps below show an inset panel that displays movements along the river on barges and adjacent to the river on rail lines and highways. The Portland area fuel terminals transport a significant quantity of fuel by barge up the river to terminals in Umatilla, Oregon and Pasco, Washington. All fuel types are moved up the river, including jet fuel. At some times of year, jet fuel received in Portland is barged to Pasco, and then enters pipeline to supply Spokane.

Figure 28: Inbound Flow of Biodiesel Fuel to Oregon[36–44]

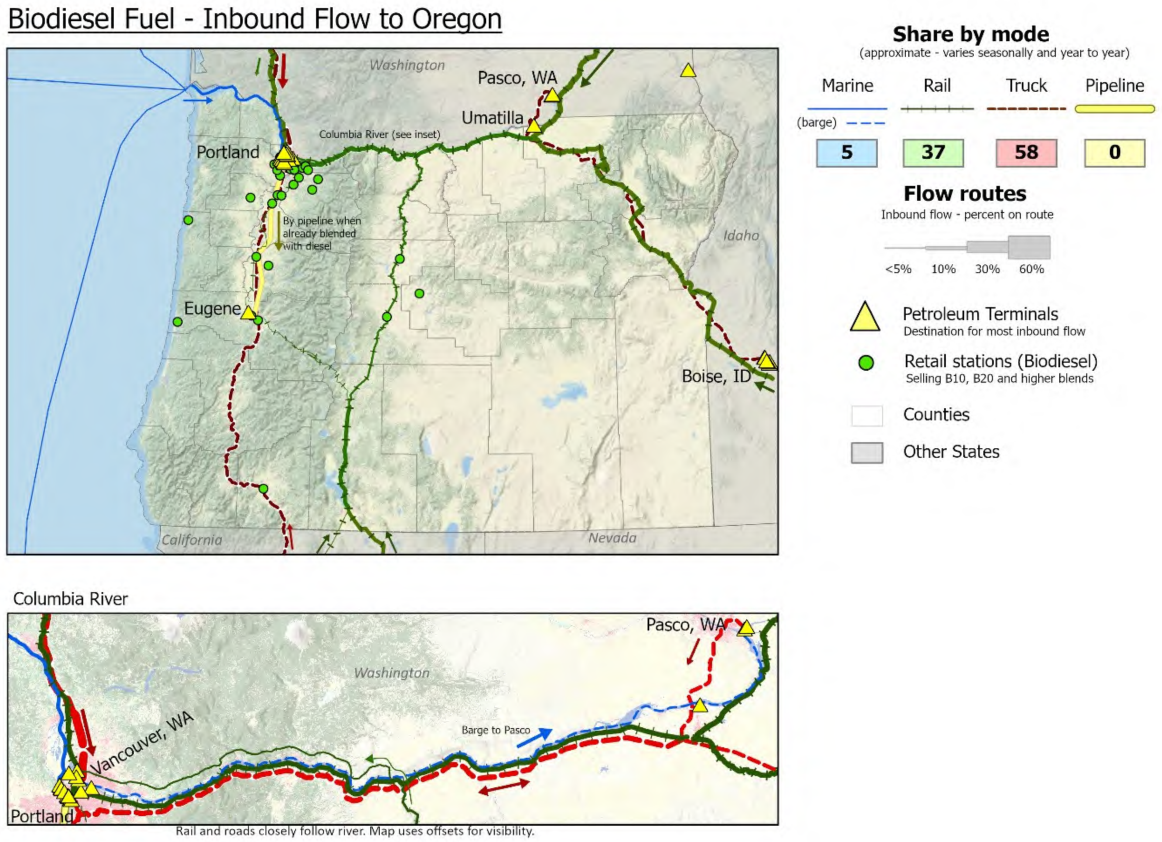


Figure 29: Inbound Flow of Diesel Fuel to Oregon[36,37,39–43]

Figure 30: Inbound Flow of Ethanol to Oregon[36–44]

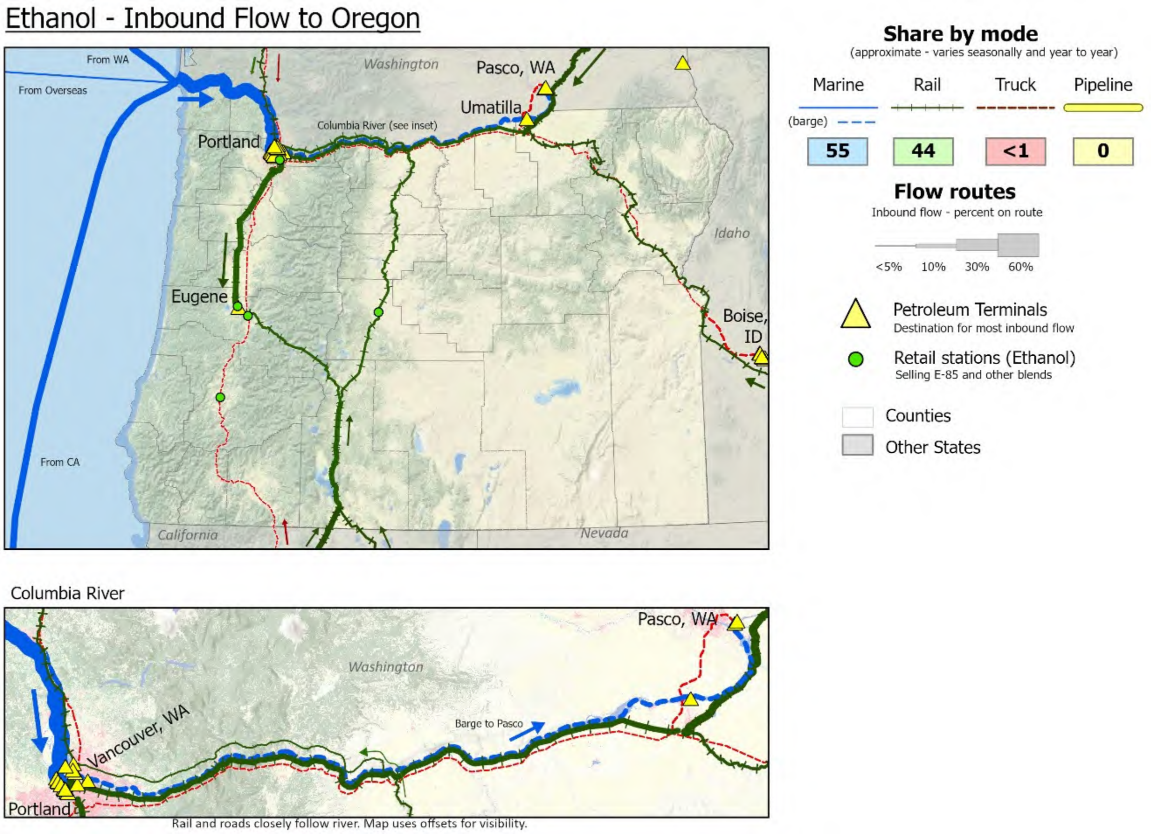


Figure 31: Inbound Flow of Gasoline Fuel to Oregon[36,37,39–44]

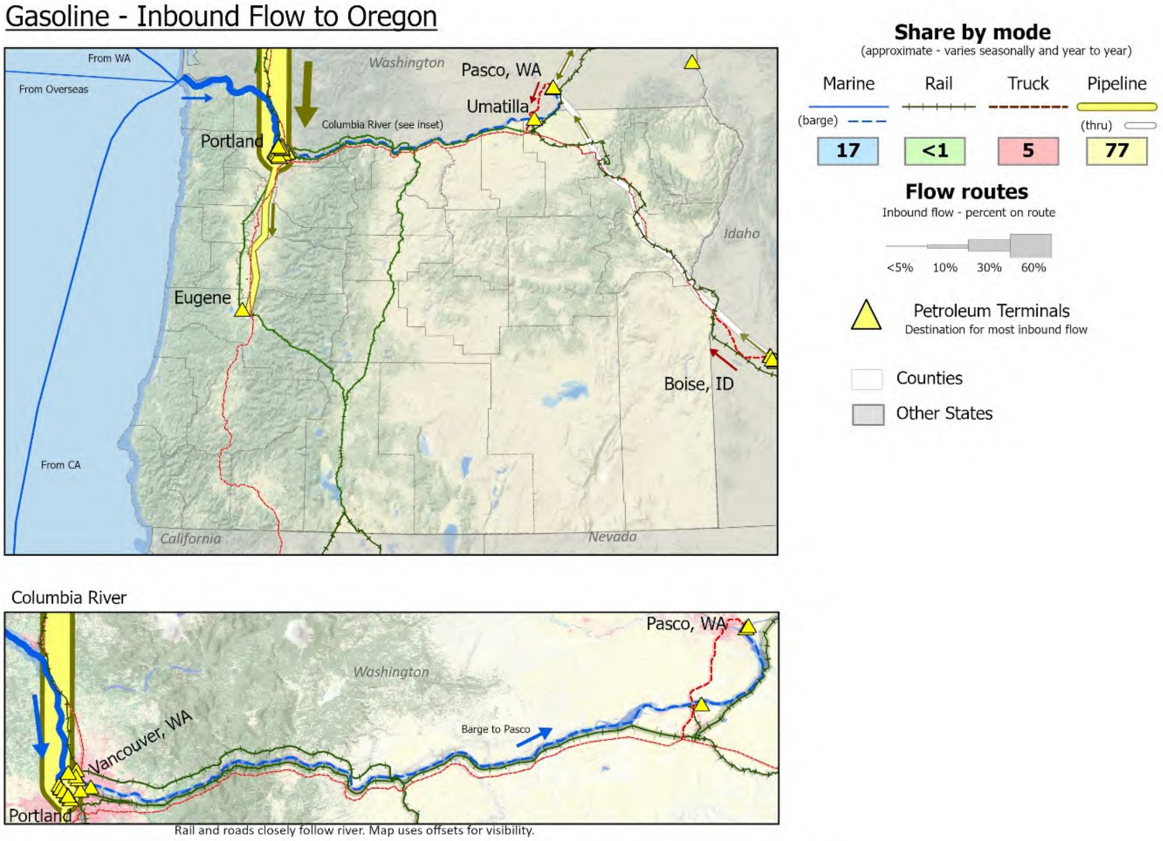
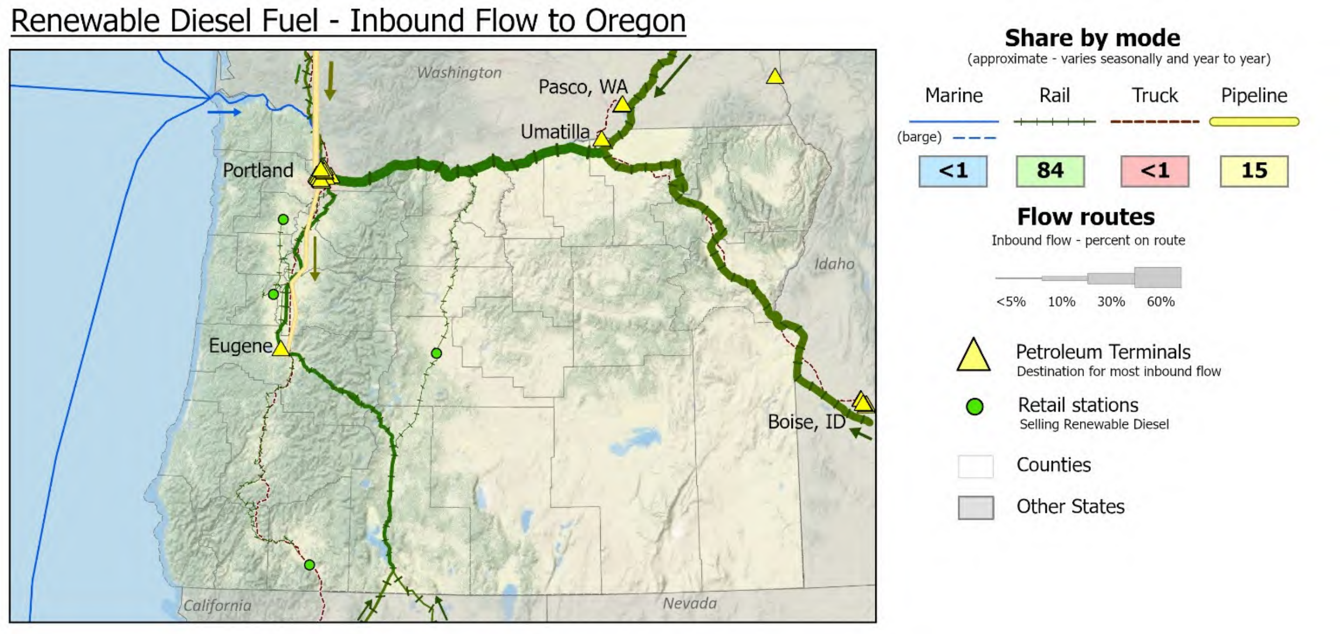


Figure 32: Inbound Flow of Renewable Diesel Fuel to Oregon[36–45]



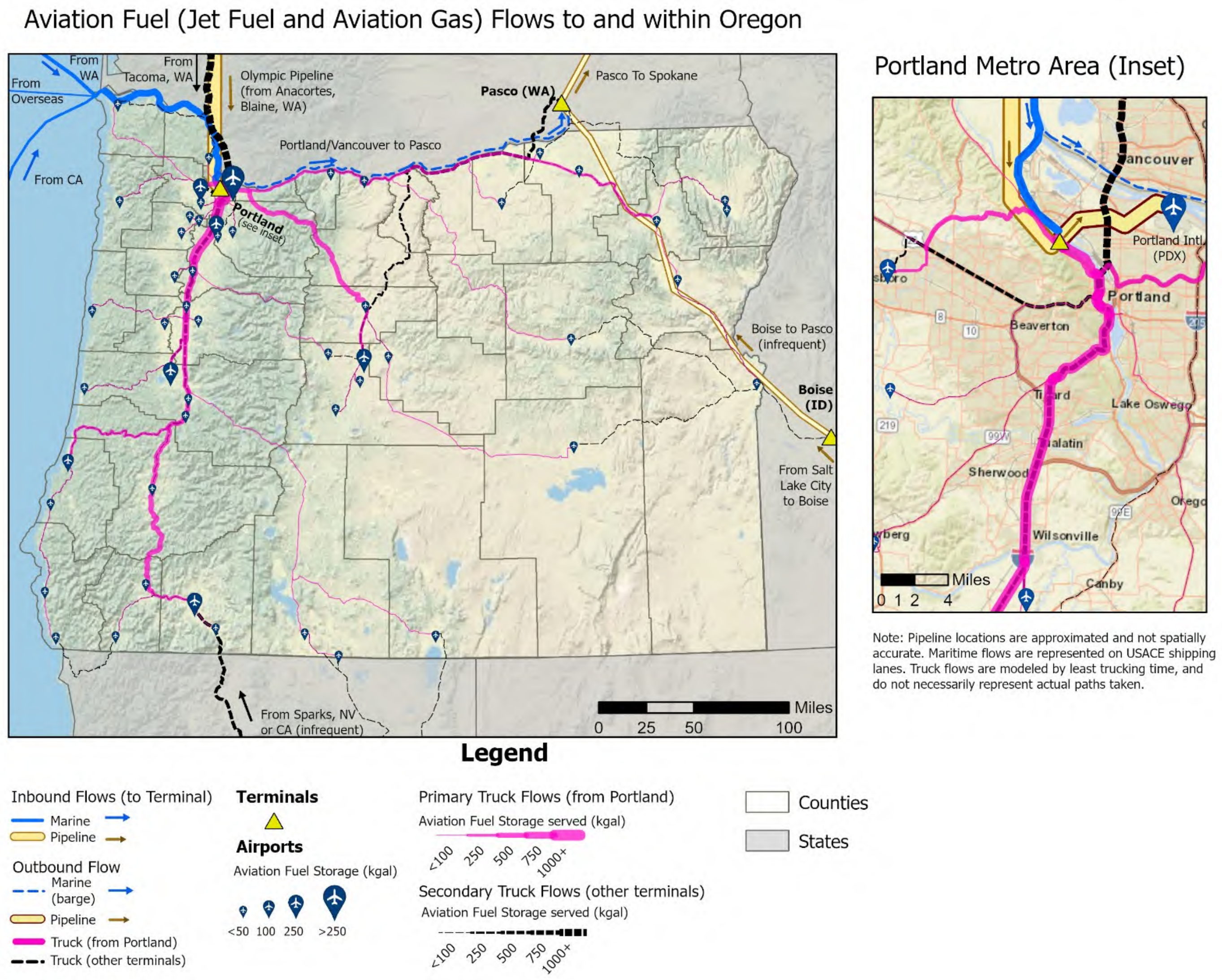
Liquid Fuels Transmission, Distribution, and End Users

Once liquid fuels are imported into Oregon, truck drivers pick up fuel from terminals and deliver it to major fuel distributors' bulk storage sites, who then deliver to fuel retailers (i.e., gas stations) and other end users (e.g., private logistics, manufacturing, emergency back-up generator fuel storage).

Once fuel leaves the terminal by road, it is harder to estimate the transportation routes in a general sense. The maps that follow showing the transport from distributors to retail stations were created using a series of assumptions and GIS-based analysis. While they may not be a perfect representation of reality, they show the complex network of roadways required to keep fuel flowing to the end users.

The maps below show flows of aviation fuel as well as finished diesel/biodiesel and gasoline/ethanol blends, where line width represents the total storage capacity served along roadway segments, aggregated from all modeled routes that pass that segment. From the results, it is evident that major interstates such as I-5 and I-84 are the primary transportion links most important for moving aviation fuel and finished diesel and gasoline products to fuel distributors, and then to end users. State highways and other routes (e.g., U.S. Highway 26, Oregon Route 58, Oregon Route 126) are also important conduits for fuel movement to serve cities across the state.

Figure 33: Inbound Flow of Aviation Fuel (Jet Fuel and Aviation Gas) to and Within Oregon[36,37,42,46–49]



Note: Pipeline locations are approximated and not spatially accurate. Maritime flows are represented on USACE shipping lanes. Truck flows are modeled by least trucking time, and do not necessarily represent actual paths taken.

Figure 34: Flow of Finished Diesel and Biodiesel Blends from Terminals to Fuel Distributors and Retailers/End Users Within Oregon[14,36–38,48–50]

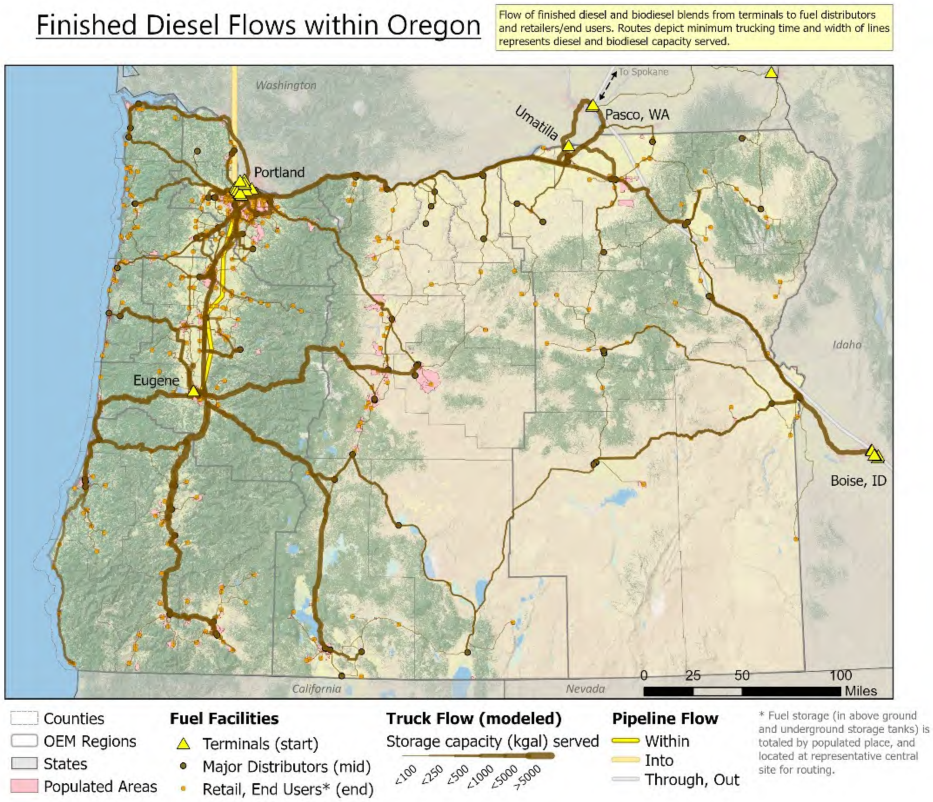


Figure 35: Flow of Finished Gasoline from Terminals to Fuel Distributors and Retailers/End Users Within Oregon[36–38,48–51]

Natural Gas

Natural gas is a fossil fuel trapped in underground beds of porous rock and gathered from drilled wells through a series of collection pipes. When extracted, it is typically a mixture of hydrocarbon gases, primarily methane. It is refined and processed from wellhead collection points to separate valuable components like oil and natural gas liquids from impurities like water, carbon dioxide, and sulfur that could cause pipeline corrosion. The result is pipeline quality gas that can be distributed and consumed or stored underground until it is needed during peak periods of high space heating demand, such as winter.[52]

Figure 36: Where Natural Gas is Found[52]

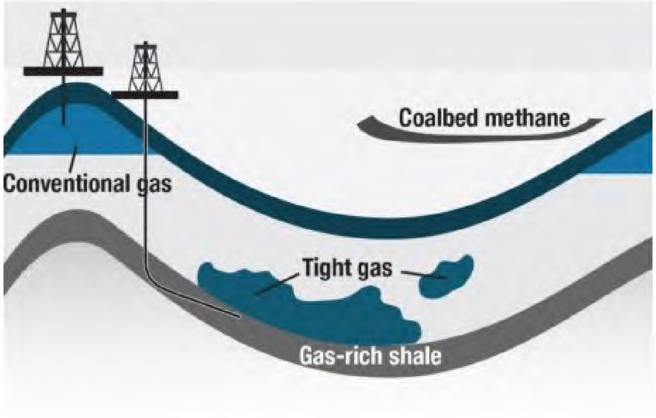
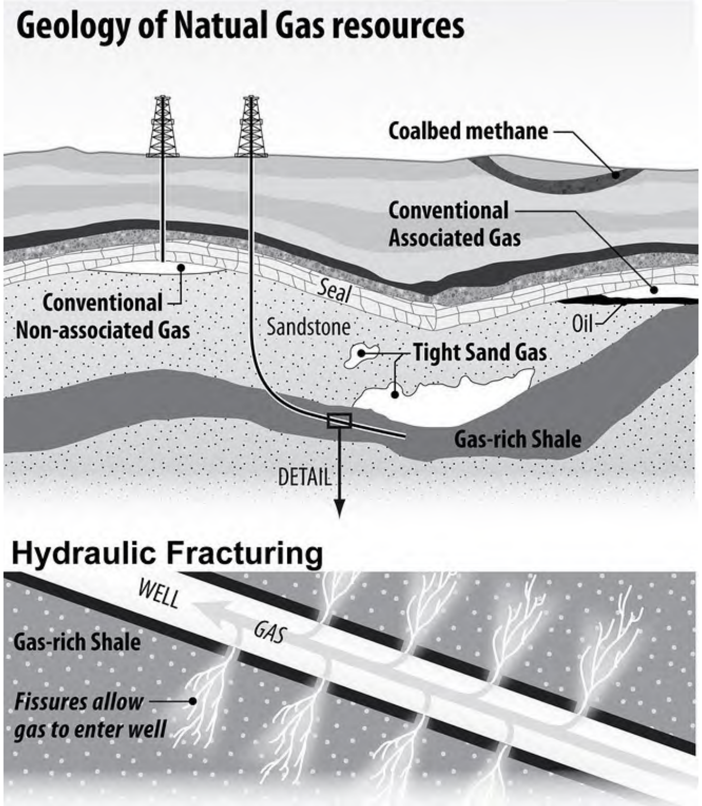


Figure 37: Source of Natural Gas[53]

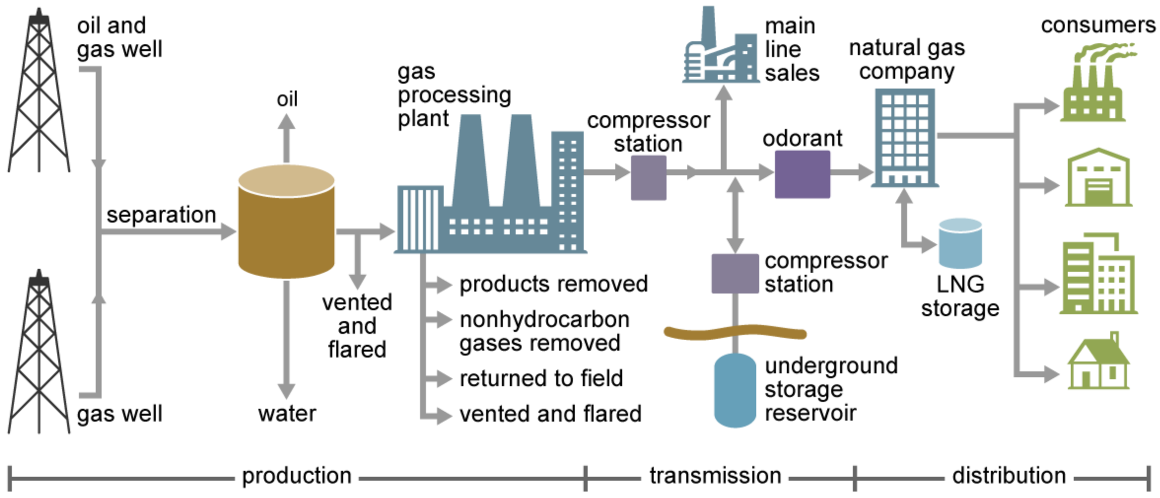


Natural gas is used in Oregon for "direct use" or electricity production. About half of the natural gas consumed in Oregon is used to generate electricity, and half is used as a direct use fuel in the residential, commercial, and industrial sectors.[54] Natural gas is delivered to consumers across Oregon for "direct use" in buildings and industrial processes. Many homes and businesses rely on natural gas for space and water heating, cooking, and to fuel other gas appliances and systems. Industrial facilities often use natural gas to generate heat and/or power for manufacturing processes.

Natural gas also supports electricity generation as a firm and on-demand resource that supplements Oregon's growing renewable resources. Natural gas-fired power plants are dispatchable, meaning that they can reliably be called on to meet power demand when needed by utilities. Renewable resources such hydropower, solar, and wind are variable in when they produce power during the day or season. Firm resources such as natural gas can complement variable resources by ramping up or down their production based on demand and variable production.[55] In 2022, Oregon consumed an estimated 16.6 percent of its total electricity from natural gas. There are 13 natural gas electricity generation facilities with a combined capacity of 4,354 MW in Oregon.[56] Natural gas has completely replaced coal as the preferred firm resource for electricity generation in Oregon.

Natural gas is the largest energy resource used to generate electricity in the United States. The Northwest Power and Conservation Council published that natural gas-fired generation makes up 18 percent of the U.S. Northwest's generating capability, and in 2020 it fueled 16 percent of the electricity produced in the region.[57]

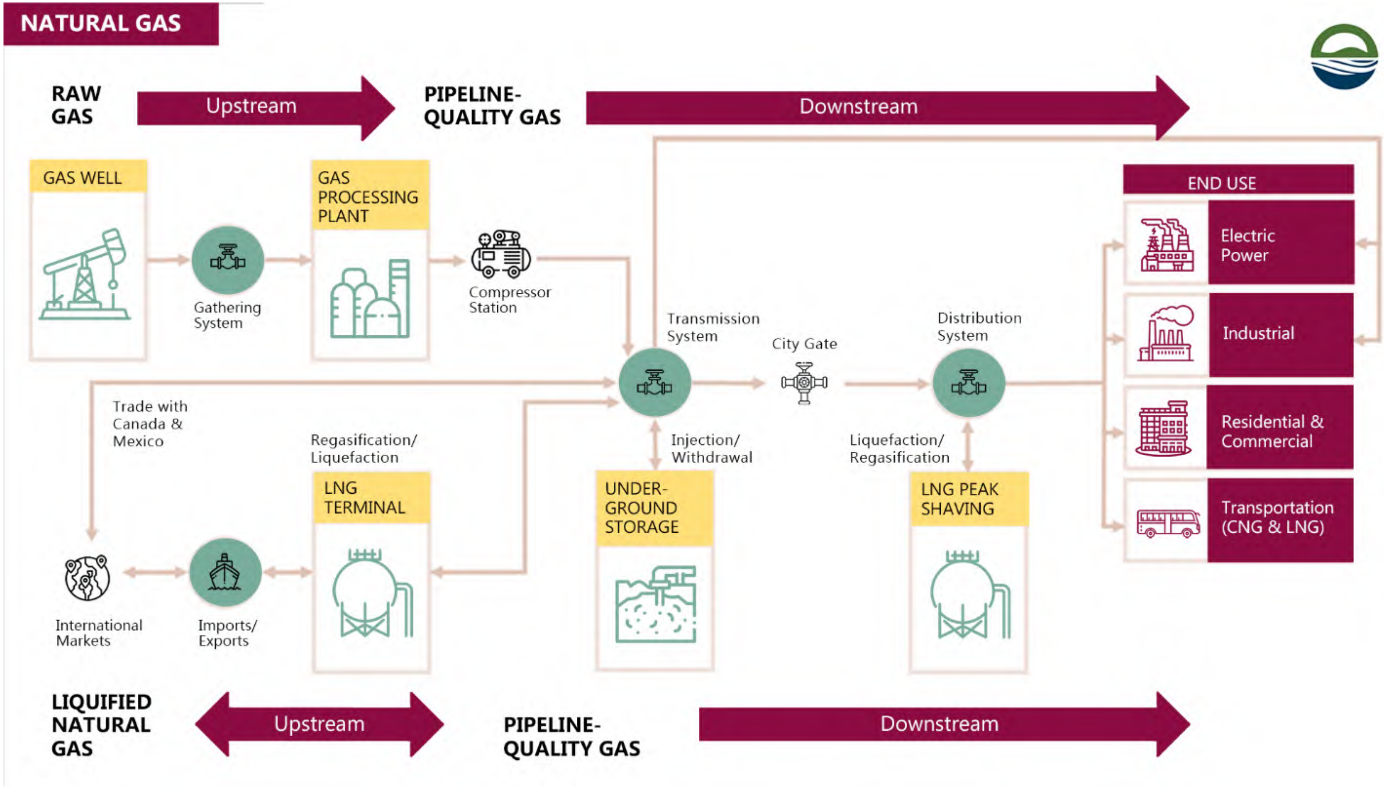
Figure 38: Natural Gas Production and Delivery[52]



Source: U.S. Energy Information Administration

Natural gas data is typically discussed in either volume as in cubic feet or in units of energy like British Thermal Units (Btu). One cubic foot (cf) of natural gas is equivalent to 1,036 Btu. At the volumes appropriate for Oregon, the data is typically in Billion Cubic Feet (Bcf) or million Cubic Feet (MMcf). When discussing flow rates, the units are typically per day (/d). As an example, 1 MMcf/d is 1 million cubic feet of natural gas per day, and that volume would equate to 1.036 billion BTU.

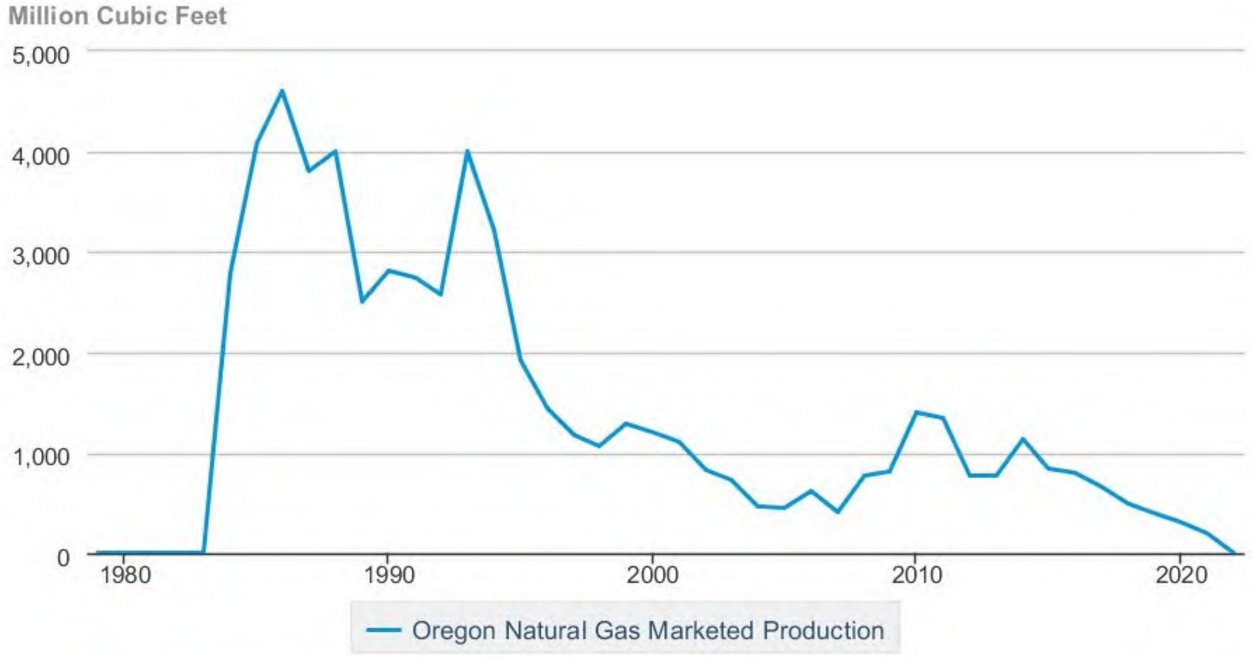
Figure 39: Natural Gas Supply Chain



Production

There are no identified major natural gas resources in Oregon – more than 99 percent of the natural gas consumed in the state is imported. In the past, Oregon produced some of the natural gas it consumed at the Mist facility in northwest Oregon but the available gas has dwindled, as presented in Figure 40. The Mist facility is now used primarily for natural gas storage. In 2022, the Mist field only produced 13 million cubic feet with 14 wells accounting for 0.005 percent of Oregon's total consumption of natural gas.[11,58]

Figure 40: Oregon Natural Gas Production[58]



Data source: U.S. Energy Information Administration

Since 2005, U.S. natural gas production has nearly doubled due to the new accessibility of the nation's shale and tight gas formations brought on by the adoption of horizontal drilling and hydraulic fracturing techniques. Oregon has benefited from the lower prices of natural gas because of increased regional supply of natural gas but remains dependent on production and delivery from outside of the state.[1]

Figure 41: US Oil and Gas Basins[53]

Renewable Natural Gas

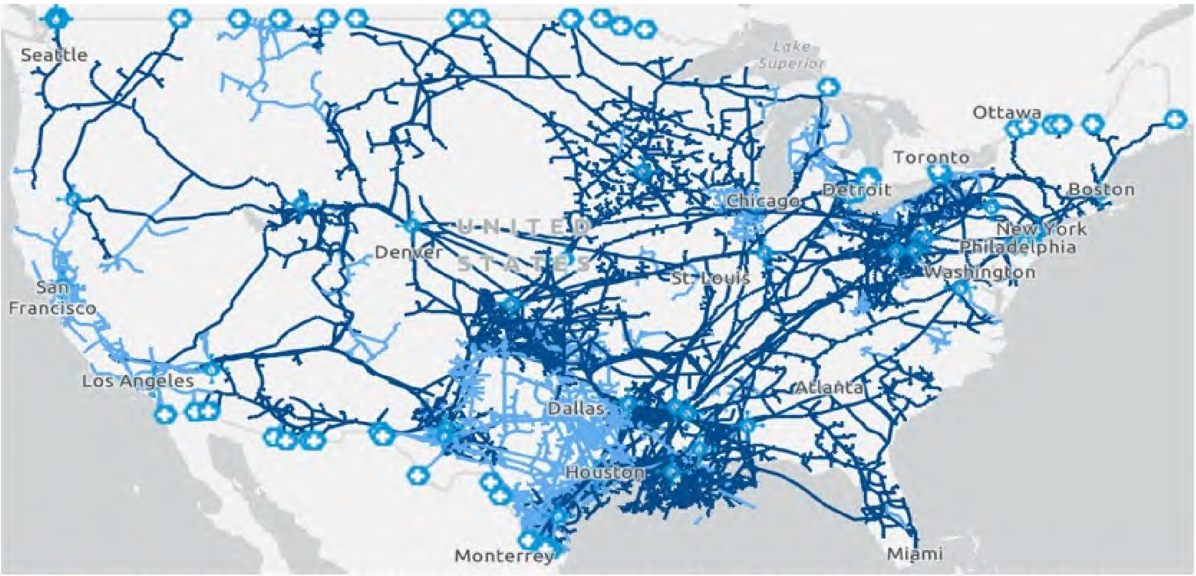
Renewable natural gas, a low carbon intensity alternative to fossil natural gas, is made by capturing methane biogas emitted from decomposing food waste, agricultural manure, landfills, and wastewater treatment plants. Captured biogas is processed to remove non-methane elements and can then be added to a pipeline or used onsite as natural gas. In 2019, Oregon passed Senate Bill 98, which set voluntary goals for adding as much as 30 percent renewable natural gas into the state's pipeline system by 2050. The law allows up to 5 percent of a utility's revenue requirement to be used to cover the incremental cost of investments in renewable gas infrastructure. Oregon natural gas utilities are investing in RNG projects throughout the state. There are six renewable natural gas facilities operating or soon to begin operating in Oregon. These include two at dairy farms (Boardman, Tillamook), a third facility in Junction City that uses methane from both locally sourced cow manure and agricultural residues, two wastewater treatment plants (Eugene, Portland), and a planned facility in Lakeview that will process wood waste.[57,59]

The Oregon Department of Energy inventoried current and potential renewable natural gas production quantities and estimated that 4.5 percent of Oregon's annual natural gas use (including power generation) could be replaced with renewable natural gas produced in the state — with the potential of reaching 17.5 percent of annual use with future technological advancements in collection and processing. That additional 17.5 percent could meet almost 31 percent of all direct gas use (not including power generation) in Oregon.[60]

Pipelines

Due to Canada's proximity, natural gas resources, and mature infrastructure, most natural gas consumed in Oregon – up to two-thirds, depending on demand and market conditions – is imported from Canada. Three transmission pipelines provide gas transport to and through Oregon from major supply basins in the Rockies, Northern Alberta, and Northern British Columbia.[32]

Figure 42: U.S. Natural Gas Pipelines[61]



Source: U.S. Energy Information Administration, U.S. Energy Atlas, January 29, 2024
Note: Light-blue lines are intrastate pipelines, dark-blue lines are intrastate pipelines, and + are border crossings.

Enbridge BC Pipeline - The 1,776-mile Enbridge BC Pipeline, shown in red on Figure 43 below, serves as the main natural gas transmission line for natural gas development in British Columbia, Canada. It goes south from Fort Nelson to the U.S.-Canada border at Huntingdon-Sumas, a major natural gas trading hub. The pipeline transports about 60 percent of the natural gas produced in British Columbia and has been the backbone of B.C.'s natural gas industry since 1957. The pipeline also supplies about 50 percent of the natural gas demand in Idaho, Oregon, and Washington.[32]

Williams Northwest Pipeline – Initially built more than 60 years ago as a 1,500-mile pipeline, in dark blue on Figure 43, the Williams Northwest Pipeline has grown to a 4,000-mile bi-directional transmission system crossing the states of Washington, Oregon, Idaho, Wyoming, Utah, and Colorado. This system provides access to British Columbia-sourced natural gas (where it connects to the Enbridge BC Pipeline at the U.S.- Canada border), Alberta sourced gas (via the connection shown in purple), U.S. Rocky Mountain gas, and San Juan Basin gas supplies.[32]

Gas Transmission Northwest (GTN) System Pipeline – The 1,377-mile pipeline shown in purple on Figure 43 begins at the U.S.-Canadian border in Idaho. From the Kingsgate hub, the pipeline travels south through the southeast corner of Washington and then through central Oregon to the California border. The pipeline delivers gas to the Pacific Northwest and California and has been in operation since 1961.[32] This border crossing provides access to the AECO-C/Nova Inventory Transfer market center located in Alberta, and is a major long-distance transportation system that transports natural gas to points throughout Canada and to the United States. Alberta is the major Canadian exporter of natural gas to the U.S. and historically produces 90 percent of Canada's natural gas.[32]

Figure 43: Natural Gas Infrastructure Map[57]

Source: Northwest Gas Association

Table 18: 2022 Pacific Northwest Natural Gas Pipeline Deliveries[32]

Pipeline Company	Line Miles	Capacity 2022	Markets
Enbridge BC	1,776 miles	1.09 Bcf/d 1.36 Bcf/d Peak Flow *(1.56 Bcf/d Capacity)*	Pacific Northwest
Williams Northwest	4,000-miles bi-directional	1.23 Bcf/d *(~3.8 Bcf/d Capacity)*	WA - Est. 0.92 Bcf/d *(96% of state deliveries)* OR – Est. 0.31 Bcf/d *(38% of state deliveries*)
GTN	1,377-miles	2.46 Bcf/d Imports from Other Countries *(2.74 Bcf/d Capacity)*	1.39 Bcf/d to Pacific Northwest *(55% of Pacific Northwest deliveries)*

Delivery and Storage

There are three major investor-owned natural gas operators in Oregon — Northwest Natural Gas, Avista Utilities, and Cascade Natural Gas. Oregon's natural gas distribution system consists of a pipeline network of nearly 16,000 miles of distribution main lines and just over 730 miles of high-pressure transmission pipeline and related storage facilities illustrated below. There are 13 operators of intrastate pipelines. Each pipeline typically serves a single commercial entity in the state.[32]

Figure 44: Map of Natural Gas Distribution Company Territories[57]

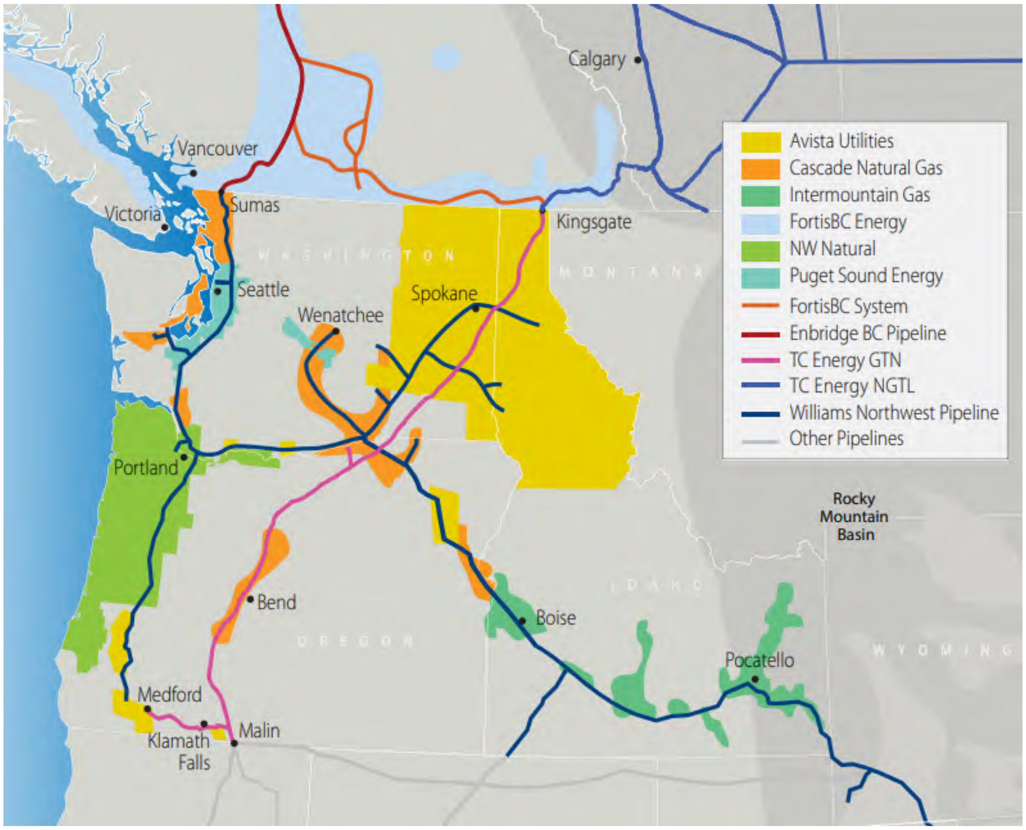
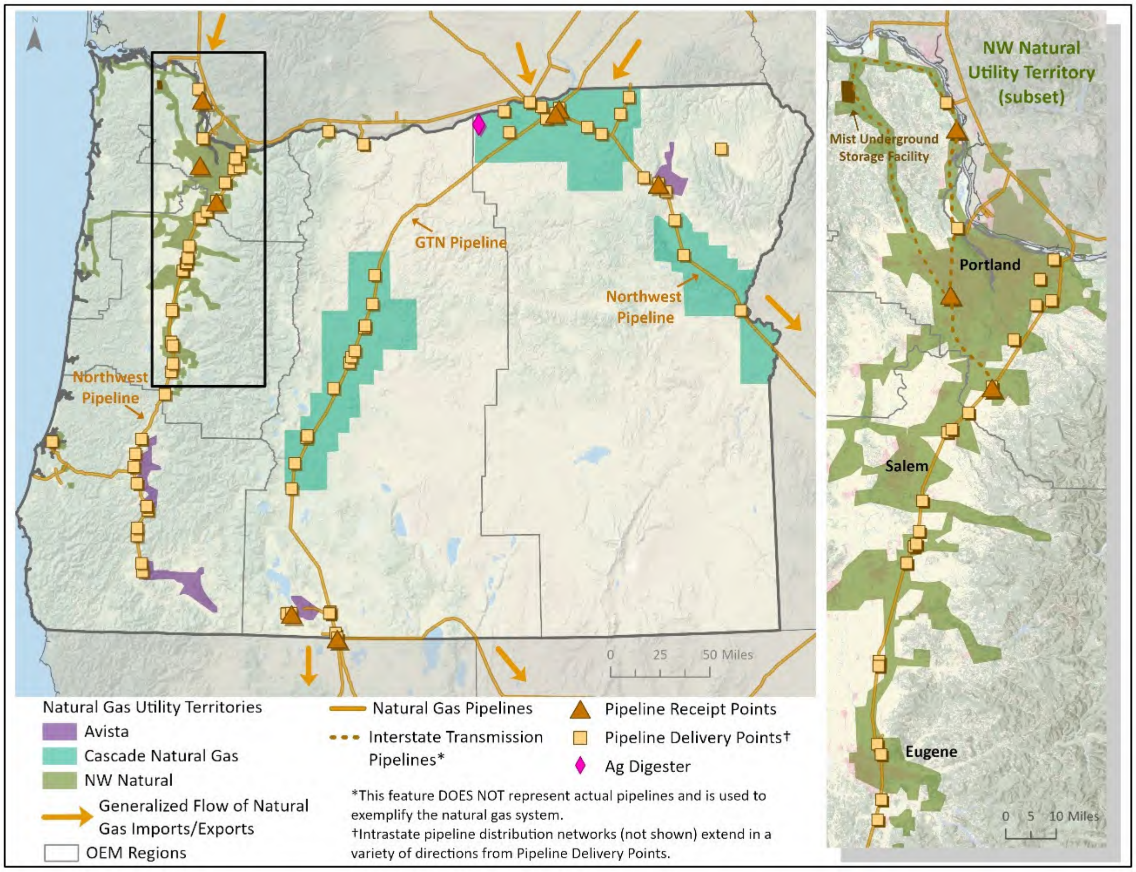


Figure 45: Natural Gas Flow[9,62,63]



Storage in Oregon

Gas utilities use underground natural gas storage to balance supply and demand on their systems when transmission pipelines supplying gas from outside the region are at capacity—typically during the winter heating season and on hot summer days when demand from electric generators is high.

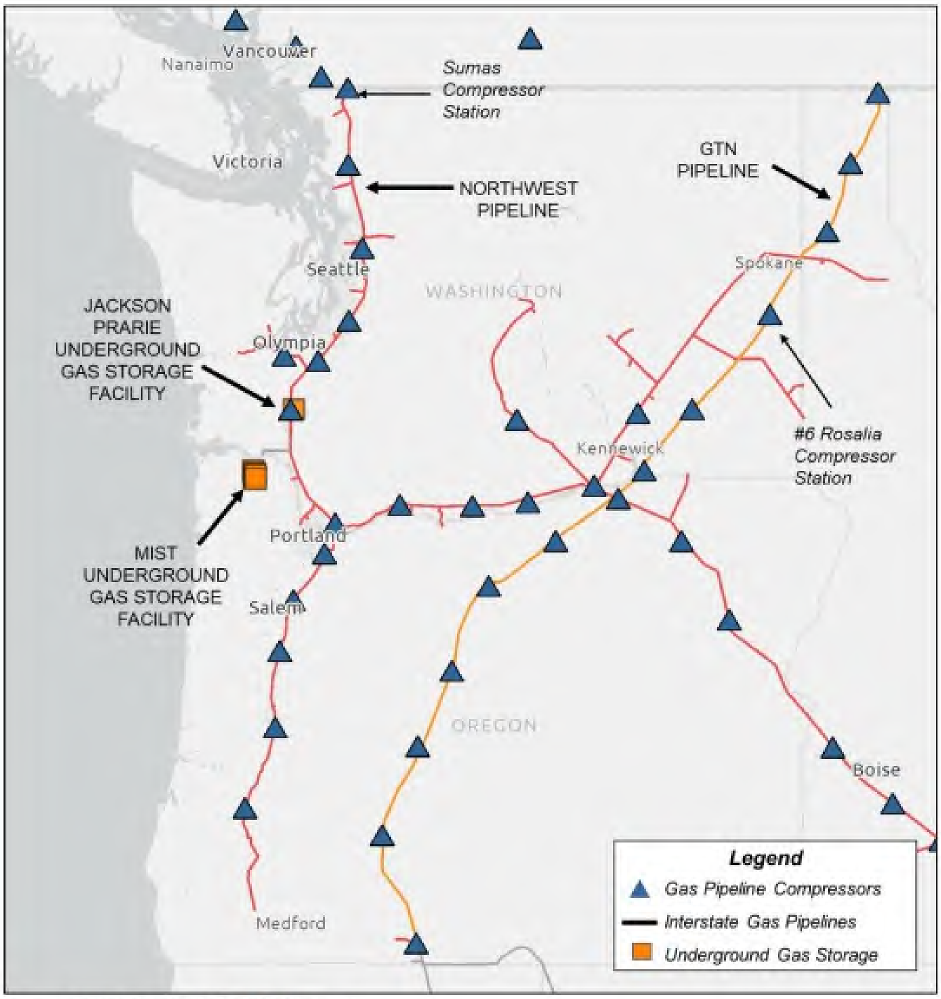
Mist Facility

NW Natural's Mist Underground Storage is the only natural gas storage facility in Oregon, and is the second largest storage facility in the Pacific Northwest (the largest such facility is the Jackson Prairie facility in Washington State, near Chehalis, managed by Puget Sound Energy). Located in Columbia County, approximately 50 miles northwest of Portland, the facility consists of eight depleted field reservoirs with a working capacity of 21.1 Bcf and maximum deliverability of 635 MMcf/d.[32]

According to NW Natural, the withdrawals from the Mist facility were projected to meet approximately 30 percent of design day[ii] sales for the company's natural gas distribution segment serving Northwest Oregon during the 2022-23 winter heating season. The 4.1 Bcf North Mist facility, which was completed in 2019 and is part of the Mist complex, is contracted for the exclusive use of Portland General Electric (PGE), which uses gas to fuel its gas-fired electric generation facilities. Gas from the North Mist facility can be withdrawn rapidly at a rate of up to 120 MMcf/d to supply PGE's Port Westward Power Station in Clatskanie, Oregon via a 13-mile pipeline.[32]

[ii] The design day is an estimate of the temperature conditions which are expected to be colder than all but one day annually. Natural gas utilities use this forecast to make sure they can meet the demands of all their customers even during extreme temperature conditions.

Figure 46: Map of Pacific Northwest Natural Gas Storage and Critical Infrastructure[32]

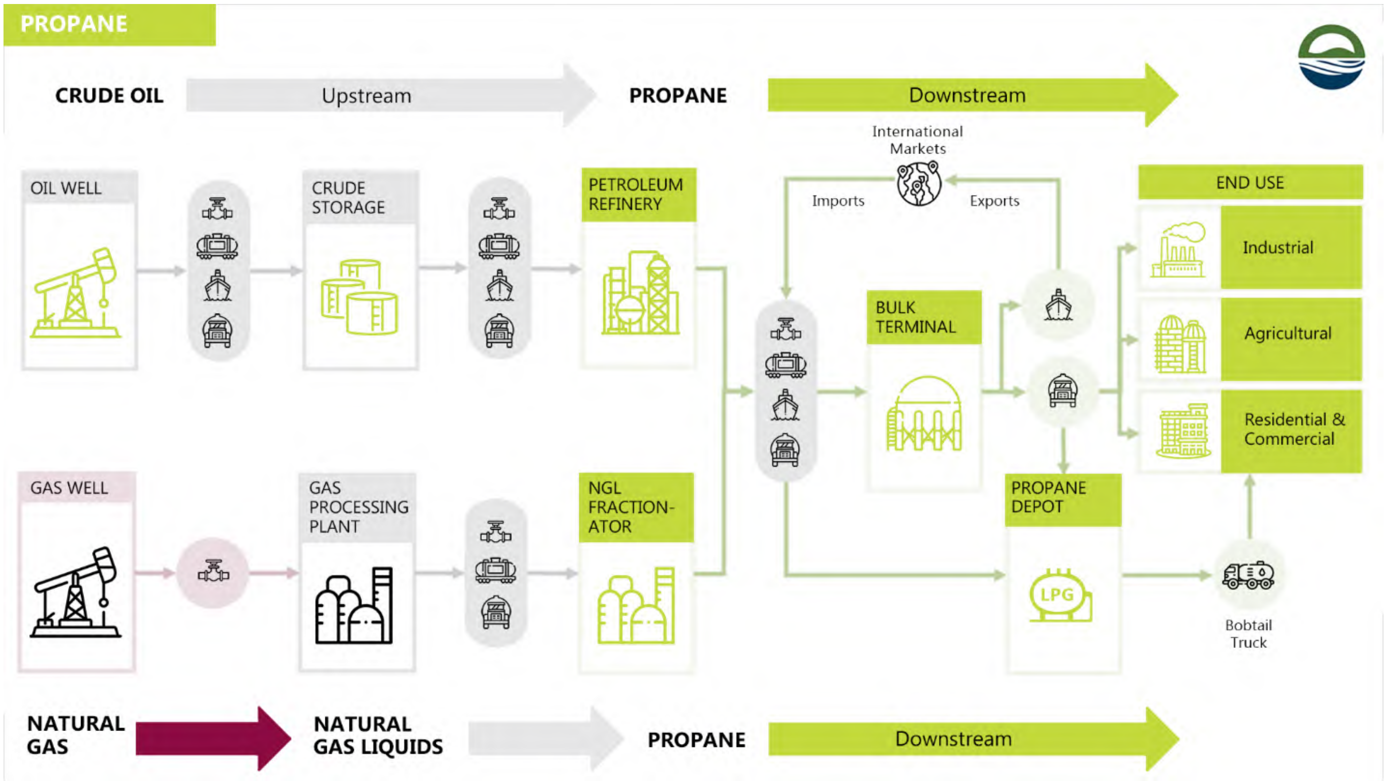


Source: ArcGIS, HIFLD, EIA, DOE Notations

Propane

Propane is a gas at atmospheric pressure and a liquid – called liquefied petroleum gas or LPG – under higher pressures or cold temperatures. Its versatility and high energy density in liquid form make it useful for many purposes, including as a feedstock for petrochemical plants, as a heating or cooking fuel, a transportation fuel, energy storage, and a fuel that can be quickly sited and used during an emergency event. As U.S. natural gas production increased, the supply of propane as a byproduct of natural gas processing has followed, making it increasingly more available in the market as an affordable fuel.[64]

Figure 47: Propane Supply Chain



Production

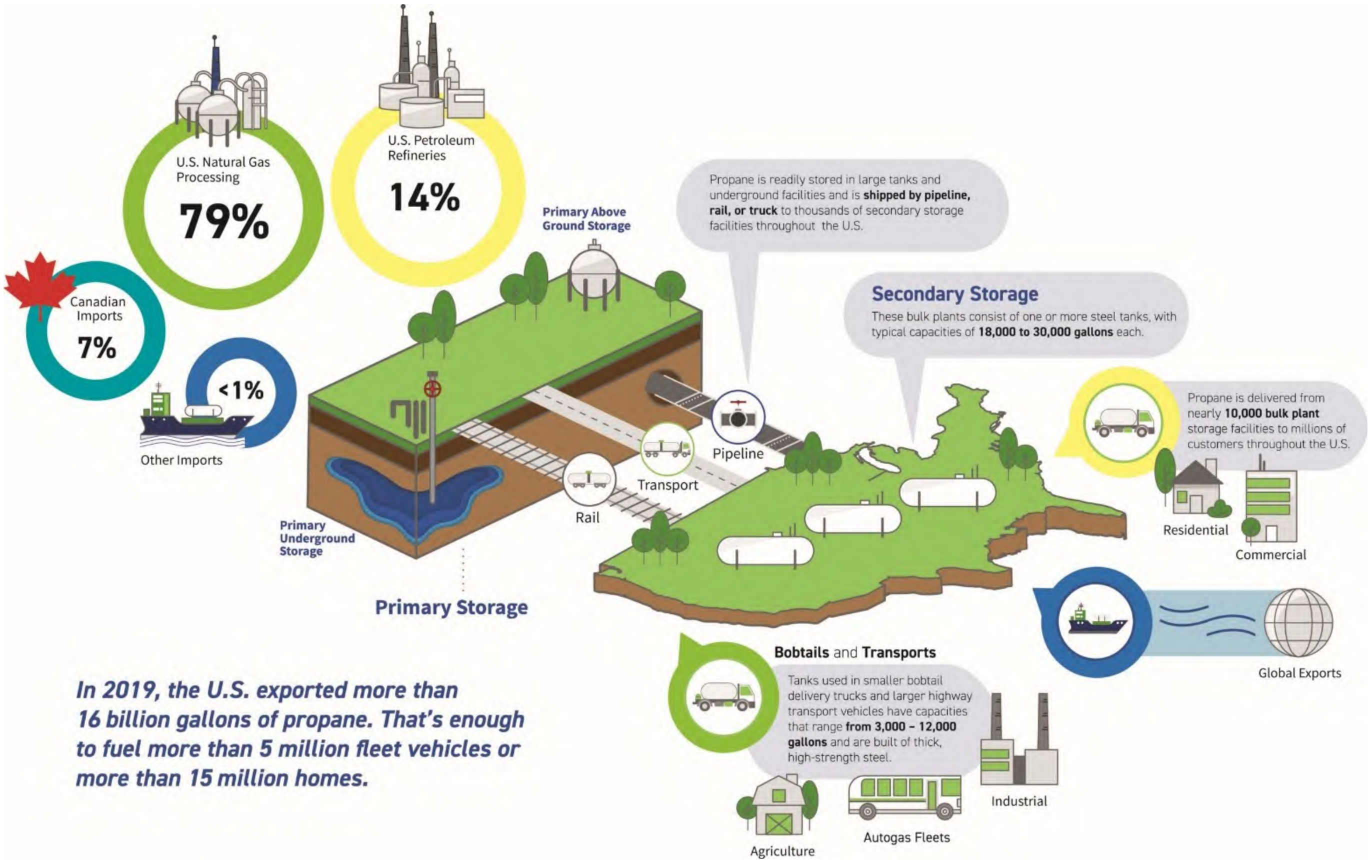
Propane is a usable by-product of conventional fossil fuel production, primarily natural gas processing. The United States is currently the world's leading supplier of propane and has been a net exporter since 2010. The Pacific Propane Gas Association estimates that more than 95 percent of the propane consumed in Oregon is sourced from natural gas processing plants in Alberta and British Columbia, Canada.[65]

Renewable Propane

Renewable propane is a lower carbon form of propane made from a mix of waste residues and sustainably sourced materials, including agricultural waste products, cooking oil, and animal fats. Renewable propane production is in its early stages, with the first commercial production in the United States beginning in 2018. It is most often created as a byproduct of renewable diesel or sustainable aviation fuel production. Other methods for producing renewable propane are being studied and tested.[66] Renewable propane is imported into Oregon from production facilities in Los Angeles, California. It is currently available only in limited quantities and is typically mixed into existing propane supplies for distribution to propane vehicle fleets.

Renewable propane supply will likely increase concurrently with renewable diesel production since it is a byproduct of that process. Currently, only a fraction of the renewable propane is being delivered to the market because most of it is used on site to fuel production plant operations.[67] Commercial availability is increasing, however, as low carbon fuel standards in Oregon and other states have created incentives for the fuel. All renewable propane is imported into Oregon, but in-state production could occur if renewable diesel or sustainable aviation fuel production facilities are built.

Figure 48: Propane Production[68]



Propane is readily stored in large tanks and underground facilities and is **shipped by pipeline, rail, or truck** to thousands of secondary storage facilities throughout the U.S.

Secondary Storage

These bulk plants consist of one or more steel tanks, with typical capacities of **18,000 to 30,000 gallons** each.

Propane is delivered from nearly **10,000 bulk plant** storage facilities to millions of customers throughout the U.S.

Bobtails and **Transports**

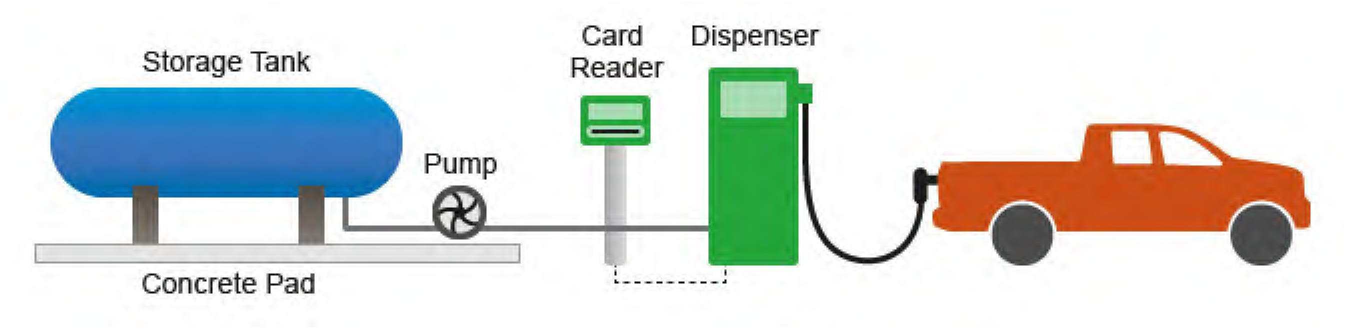
Tanks used in smaller bobtail delivery trucks and larger highway transport vehicles have capacities that range **from 3,000 – 12,000 gallons** and are built of thick, high-strength steel.

In 2019, the U.S. exported more than 16 billion gallons of propane. That's enough to fuel more than 5 million fleet vehicles or more than 15 million homes.

Delivery and Storage

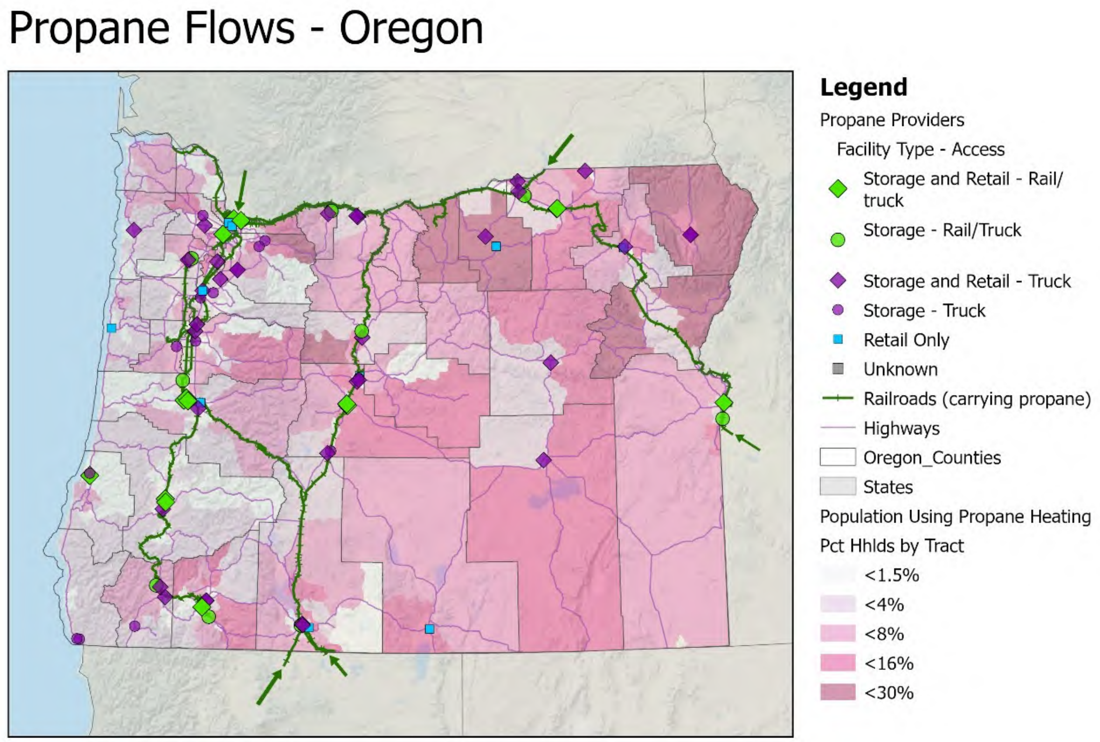
Propane is used in Oregon to power buses, locomotives, forklifts, taxis, and farm tractors. Propane is also a key fuel for backup electricity generation and heating, as well as for other uses. The infrastructure needed for propane is very similar to that of other gas fossil fuels, although propane is delivered under pressure so that it will remain a liquid. Propane is typically transported to a site via a delivery truck instead of a pipeline and put into on-site storage tanks, traditionally above ground. Propane does not degrade as quickly as gasoline and diesel when being stored, making it a good transportation fuel for vehicles that are not in regular use[35] and a more robust power source for backup generation.

Figure 49: Propane Distribution[69]



New vehicles and conversion kits to retrofit existing vehicles are becoming increasingly available, and vehicles can be built as dedicated propane vehicles or bi-fuel vehicles that can run on propane or gasoline.[70,71] Propane fueling infrastructure currently exists with 44 fueling stations in Oregon, largely supporting private and public fleets.[72] Propane is used by public and private local commercial fleets with light- or medium-duty trucks or delivery vans. Many Oregon school districts use propane as a fuel for bus fleets. In 1983, in response to rising fuel prices and air quality regulations, Portland Public Schools turned to propane as a fuel source for its fleet of buses.[73] There were an estimated 8,257 school buses in Oregon in 2019, and 1,159 — about 14 percent — were fueled by propane (the national average is 4 percent).[65] Using propane requires buying a new vehicle or retrofitting an existing one, but unlike many other fuels that require new fueling infrastructure, often the rental of a fueling pallet from a propane distributor is included in the price of the fuel. This reduces the initial investment burden on Oregon customers interested in adopting the fuel. Return on investment is reasonably fast without incentives and the fuel is available throughout Oregon.[33]

Figure 50: Oregon Propane Flows[40,41,74–76]



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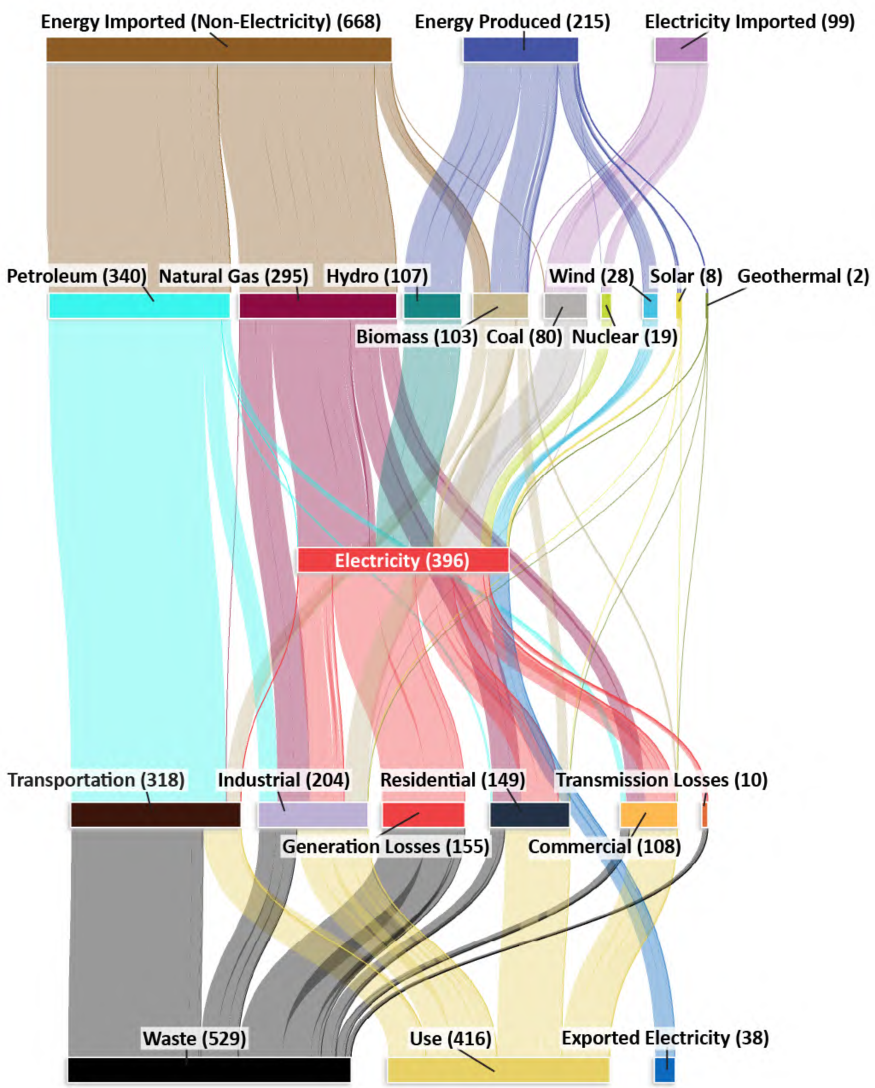
VI. OREGON ENERGY CONSUMPTION

This overview of Oregon's energy profile provides baseline data, maps, charts, and other information on how energy is used in Oregon in the residential, commercial, industrial, and transportation sectors. The information here provides the baseline of Oregon's energy systems, against which identified risks and threats are assessed. This 2025 updated Energy Security Plan does not include significant updates to Oregon's energy consumption data, and the information presented here is the same as was in the 2024 plan. This is due to data-collection limitations and time-lags for reporting. The 2026 Energy Security Plan update will include updated consumption data, as available.

Figure 51: Oregon's Energy Flow[1,2]



A **British Thermal Unit (Btu)** is a measurement of the heat content of fuels or energy sources. Btu offers a common unit of measurement that can be used to count and compare different energy sources or fuels. Fuels are converted from physical units of measurement, such as weight or volume, into Btu to more easily evaluate data and show changes over time.

Oregon's energy story has evolved over time to adapt to new technologies, changes in the availability of resources and generation infrastructure, state energy goals, and a growing population and economy. Energy sources classified as renewable are not a new concept to Oregon. The Pacific Northwest has a long history of using hydropower resources, but as recently as 20 years ago, solar and wind-generated energy was scarce.

Today, Oregon's energy resources are more diverse. Figure 51 demonstrates how energy flows through Oregon. Start at the top to see imported energy and energy produced in Oregon. The numbers represent trillions of Btu of energy. The energy lines flow through to show the different types of resources we use – including the energy produced in Oregon and what is imported as direct fuels or electricity – and where they end up in Oregon's energy ecosystem. The energy produced and imported helps meet various needs, whether for in-state electricity generation, transportation fuels, or the natural gas and electricity that supply homes and businesses. Some energy is exported to other states, and the remainder goes unused or is not captured due to system inefficiencies.

The chart provides a macro level look at the energy Oregonians produce, import, consume, and export. *Energy Produced* includes forms of energy that Oregon generates in-state, such as hydroelectric, wind, solar, and biomass energy. *Electricity Imported* includes electricity that is generated in other states and used in Oregon. *Energy Imported (Non-Electricity)* includes the other forms of energy brought into the state for various uses, such as petroleum fuels like gasoline and diesel that power transportation and natural gas, propane, or distillate fuel oil that heat Oregon homes.

The flow to *Waste* includes all the energy that is not harnessed, from the point of extraction to the point of use. This includes energy lost as heat during combustion or transformation into electricity, transmission losses, and many other factors.[1,2]

While this section provides a snapshot in time of Oregon's energy consumption, as is shown in Figure 56 below, electricity consumption in Oregon is rising steadily – and, based on multiple energy-demand forecasts, electricity demand in Oregon is set to rise dramatically in the coming years.[3] This is primarily due to expected load growth from data centers, advanced manufacturing, and other industrial users, as well as a general push to increase use of electricity in buildings, industry, and transportation. Future versions of the Energy Security Plan will provide additional assessment of the steps necessary to meet rising power demands, and how state government can play a vital role in supporting these efforts. Additionally, we encourage readers to review the Oregon Energy Strategy, to be released in November 2025, a report intended to provide multiple pathways that Oregon can meet its future energy needs and ambitious greenhouse gas reduction goals.

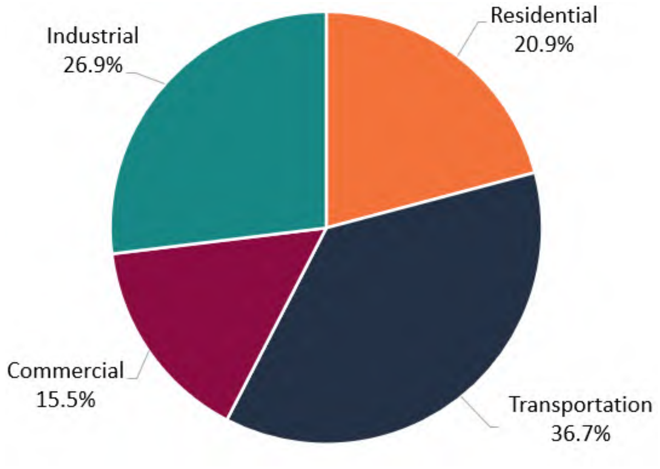
Energy Consumption

By Sector

Energy consumption is tracked by how it is used among four main end-use sectors: Residential, Commercial, Transportation, and Industrial. Agricultural energy uses are included in the Industrial sector for this analysis.

In Oregon in 2022, those four sectors combined consumed almost 866.5 trillion Btu of energy with the transportation sector consuming the most energy at almost 36 percent.[1,2]

Figure 52: Energy Consumption by Sector[1,2]



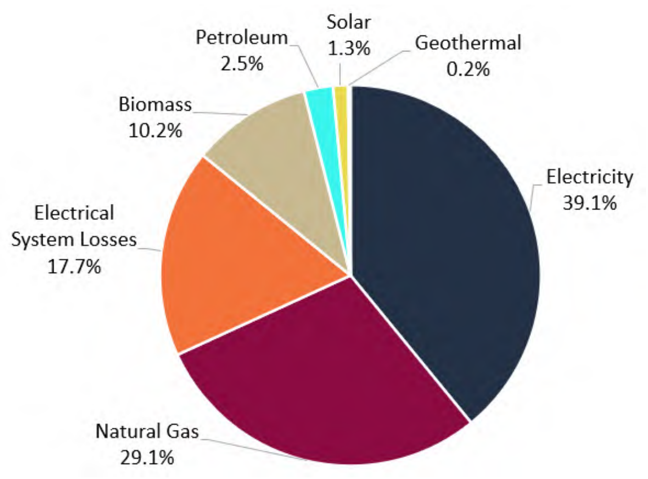
20.9% of Oregon's 2022 energy consumption[1]

Residential: this category includes single family, multi-family, and manufactured homes for Oregonians. Energy is used for lighting, to heat and cool living space, cooking, and appliances. Electricity is the most used energy resource in homes – with heat pumps, electric furnaces, and electric resistance heaters as examples of primary electric heat options.

15.5% of Oregon's 2022 energy consumption[1]	**Commercial:** this category includes businesses that provide goods and services, government and office buildings, grocery stores, and shopping malls. Energy is used to heat and cool spaces, power equipment, and illuminate facilities. It is Oregon's smallest energy-consuming sector, supported by the adoption of advanced energy codes, energy efficiency programs, and advancements in equipment and processes.
26.9% of Oregon's 2022 energy consumption[1]	**Industrial:** this category includes facilities used to produce, process, and manufacture products – including agriculture, fishing, forestry, manufacturing equipment, mining, and energy production. Energy powers industrial equipment and machinery to manufacture products. This sector has seen contractions in aluminum, forestry, and manufacturing – with improvements in efficiency of industrial facilities and equipment.
36.7% of Oregon's 2022 energy consumption[1]	**Transportation**: Personal cars, fleets, shipments, airline travel, and more make up Oregon's transportation energy use. Petroleum is the most used resource and the largest contributor of greenhouse gas emissions in Oregon. Alternative fuels like electricity and biofuels are a growing part of this sector.

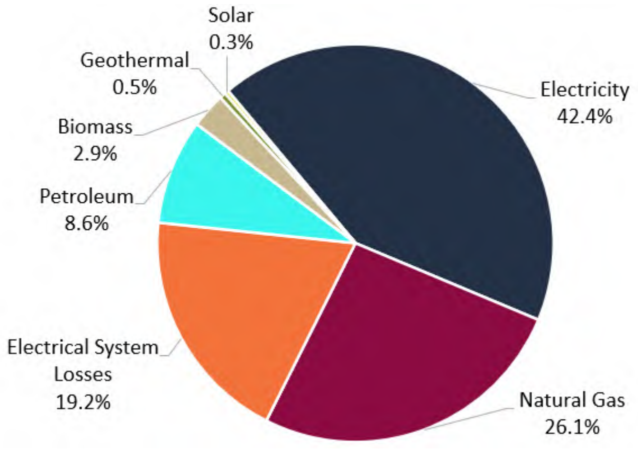
Residential Sector | 20.9% of Oregon's 2022 energy consumption

17.7%	Electrical System Losses
39.1%	Electricity
29.1%	Natural Gas
10.2%	Biomass
2.5%	Petroleum
1.3%	Solar
0.2%	Geothermal



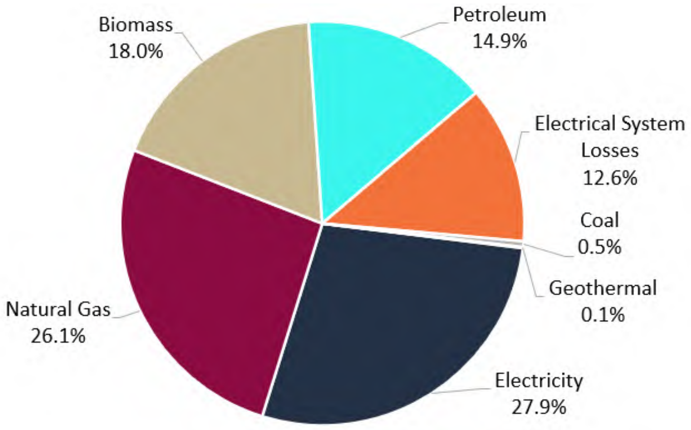
Commercial Sector | 15.5% of Oregon's 2022 energy consumption

19.2%	Electrical System Losses
42.4%	Electricity
26.1%	Natural Gas
8.6%	Petroleum
2.9%	Biomass
0.5%	Geothermal
0.3%	Solar



Industrial Sector | 26.9% of Oregon's 2022 energy consumption

12.6%	Electrical System Losses
26.1%	Natural Gas
27.9%	Electricity
18.0%	Biomass
14.9%	Petroleum
0.5%	Coal
0.1%	Geothermal
0.03%	Solar



Transportation Sector | 36.7% of Oregon's 2022 energy consumption

50.6%	Gasoline
30.9%	Diesel
7.4%	Jet Fuel
3.7%	Ethanol
3.4%	Asphalt + Road Oil
3.1%	Biodiesel
1.8%	Renewable Diesel

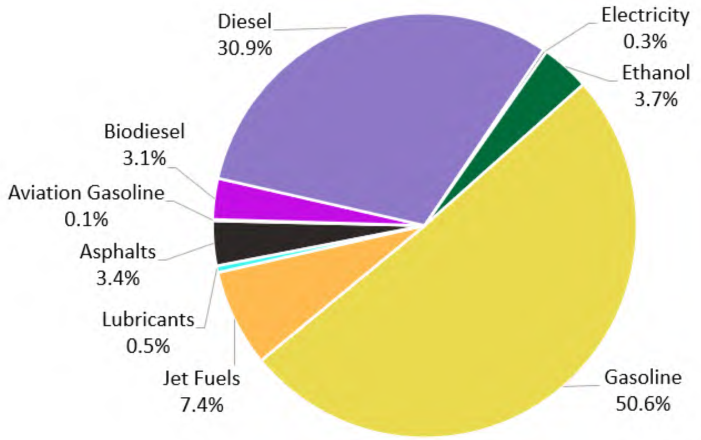
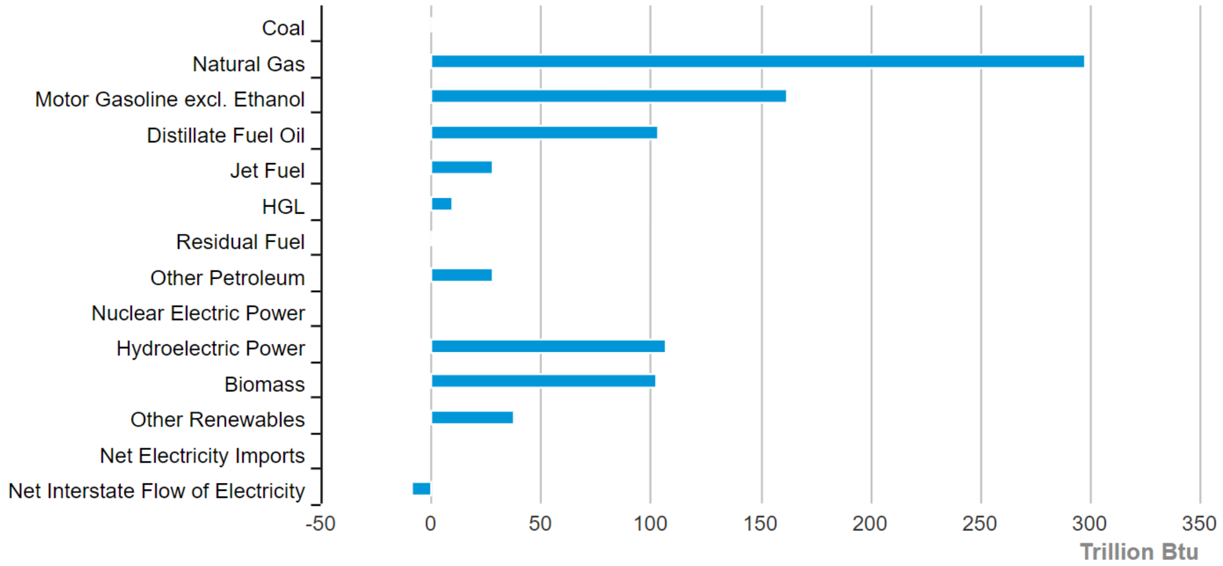


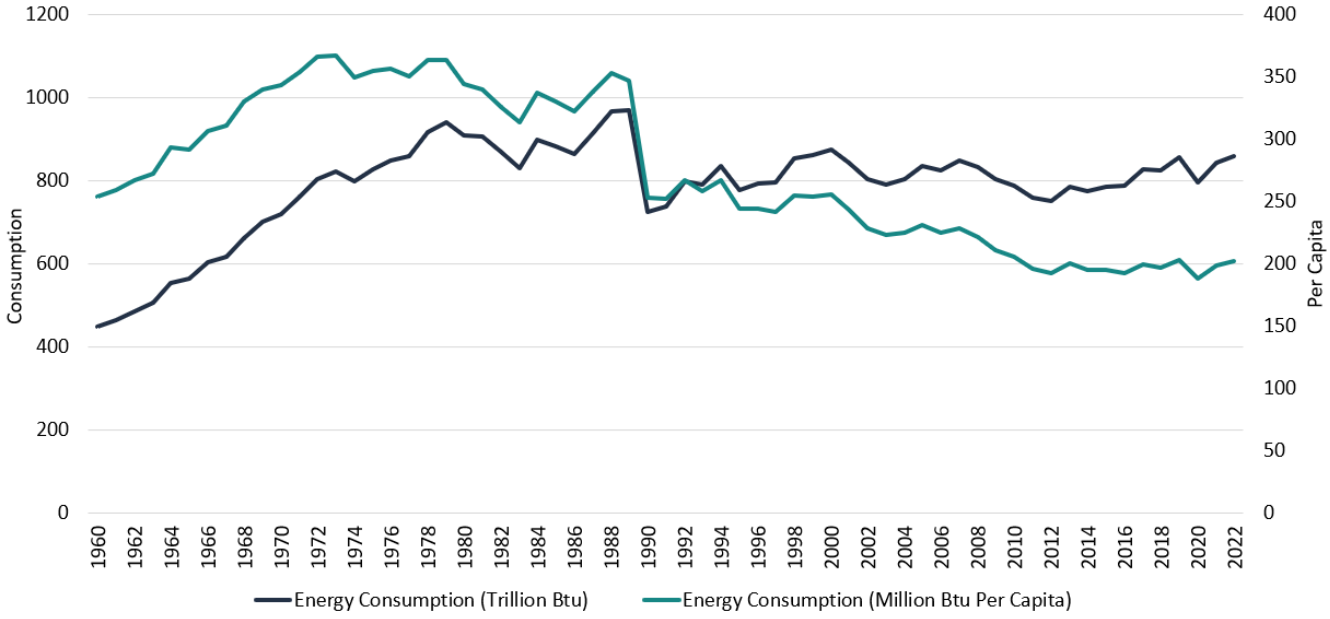
Figure 53: Energy Consumption Estimates in Oregon (2022)[1]



Oregon's Energy Consumption Over Time

Oregon saw an overall trend of increased energy use for almost four decades—an average of 3.6 percent growth per year from 1960 to 1999.[1] During that time, the state shifted from a reliance on fuel oil and wood to an increased use of natural gas and electricity in homes and businesses. Oregon reached its highest consumption of energy in 1999 in both stationary and transportation uses. Between 2000 and 2020, total energy use declined by 13.4 percent. Energy use has leveled off recently with alternating increases and decreases, which may indicate the beginning of a plateau. Energy consumption per capita does not directly correlate with overall energy use. In the last 20 years, Oregon has had steady population increase during a period of slight decline in overall energy consumption. This translates to a steady decrease in energy consumption per capita.[1]

Figure 54: Energy Use Over Time – Oregon's Total Energy Consumption and Per Capita Energy Consumption Over Time[1]

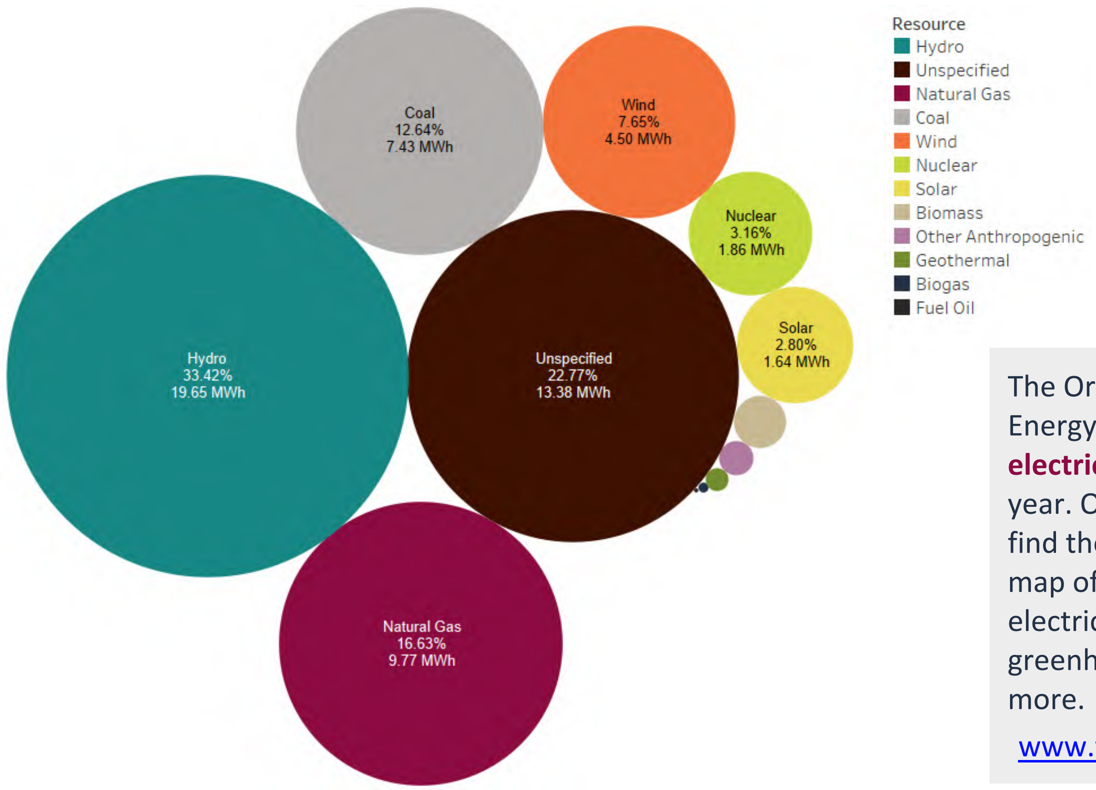


Electricity

In 2022, Oregon used 58.7 million megawatt hours (MWh) of electricity from both in-state and out-of-state sources. Hydropower, coal plants in other states, and natural gas power plants in Oregon and elsewhere generate the bulk of the electricity Oregonians use. This is commonly called the "resource mix." The share of each resource is constantly changing and evolving.

Renewable energy sources are increasing in the mix each year. In 2021, the Oregon Legislature passed House Bill 2021, requiring Oregon's largest electric utilities, Portland General Electric and Pacific Power, to reduce greenhouse gas emissions to 80 percent below baseline emissions levels by 2030, 90 percent below by 2035, and 100 percent by 2040.[4] Figure 55 demonstrates the energy resources used to generate the electricity that is sold to Oregon's utility customers. The five largest sources of electricity consumed in Oregon are labeled below; the other resources not listed in the bubble chart are each under 2 percent.[2] Electric utilities provide customers with power generated from facilities they own or with whom they have long-term power purchasing agreements ("PPAs"). Utilities may also meet demand with on-the-spot purchases from the regional market pool of power or electricity markets. If the generating resource (coal, natural gas, hydropower) associated with these purchases is not known, the power is referred to as "unspecified."[5]

Figure 55: Resources Used to Generate Oregon's Electricity (2022)[2]

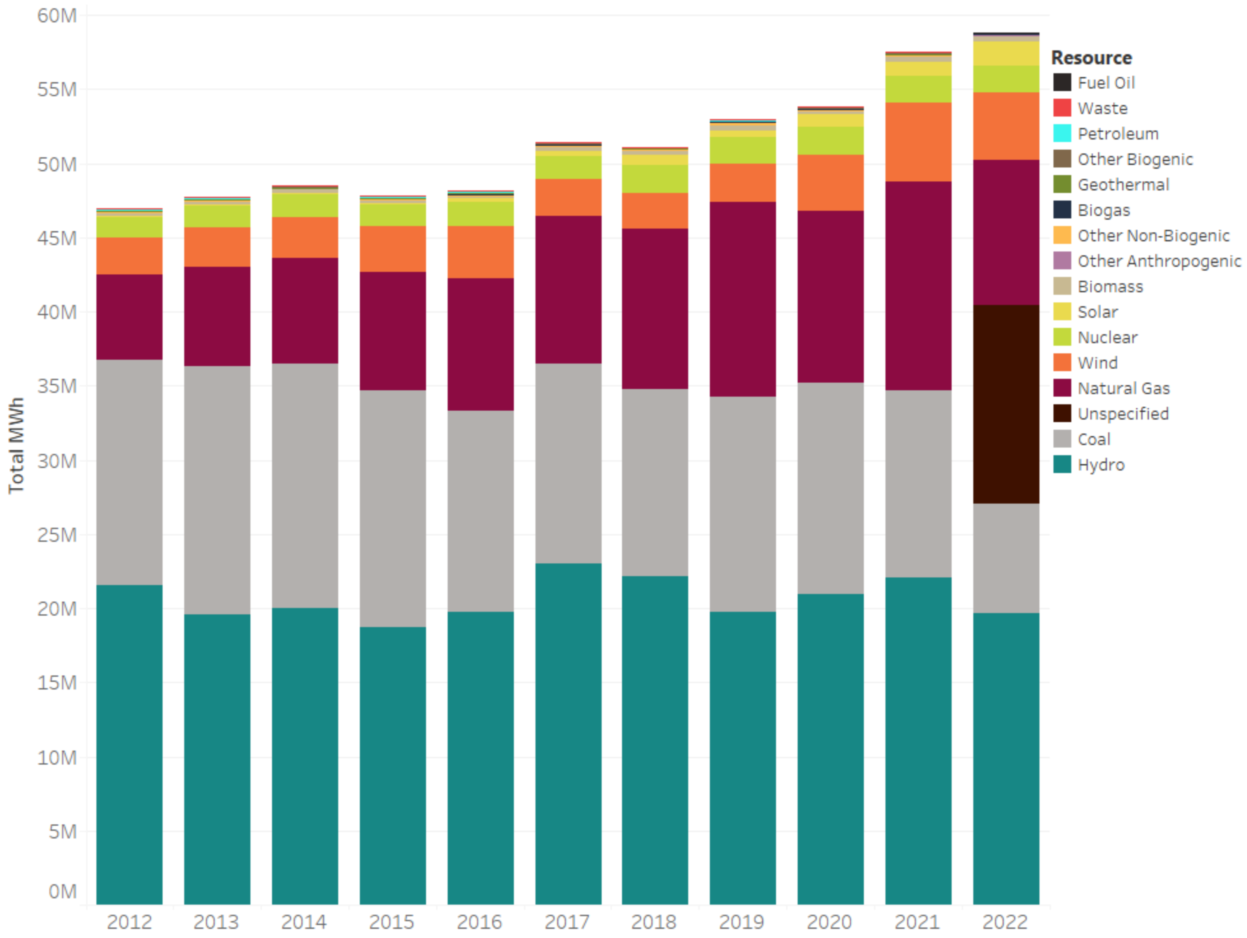


The Oregon Department of Energy updates the state's **electricity resource mix** each year. On the agency's website, find the state's overall mix, a map of generation facilities, electricity mixes by utility, greenhouse gas emissions, and more.

www.tinyurl.com/OregonERM

Oregon's electricity resource mix displays the proportion that each resource (solar, wind, hydropower, etc.) contributes to the total amount of electricity that Oregonians consume each year. The chart below presents Oregon's mix from 2012 to 2022. Total annual electricity consumption has increased from 47 to 59 million MWh between 2012 to 2022, driven by factors like economic and population growth and increased customer demand.[2]

Figure 56: Oregon's Electricity Mix Over Time[2]



Unspecified Electricity in Oregon's Resource Mix

In 2024, the Oregon Department of Energy changed the methodology used to calculate Oregon's Electricity Resource Mix, the data source for this section on electricity consumption. Instead of relying on a mix of data directly reported to ODOE and the Oregon Department of Environmental Quality, and verifying the data with reports from the U.S. Department of Energy's Energy Information Administration and Oregon Public Utility Commission, ODOE now relies on verified data from the DEQ's Greenhouse Gas Emission Reporting program. The largest difference in the output is that the unspecified purchases in the resource mix are no longer estimated; instead, DEQ attributes a flat emission rate to consumption from unspecified purchases. This change means that the most common resources in the region (Hydro, Coal, and Natural Gas) will appear lower than in previous years. Unspecified is also now a resource starting in 2022 in Figures 55 and 56 above. See more on the Unspecified resources below.

Fluctuations in the sources of electricity consumed in Oregon are the result of several factors, including the regional nature of energy markets, resource availability, market dynamics and utility contracts, public policy, and other factors. Hydropower availability drives much of the year-to-year fluctuation in Oregon's electricity resource mix. Oregon and the Pacific Northwest are rich in hydropower, which is consistently a low-cost resource. In energy markets, utilities typically prioritize using the lowest cost generating resources, allowing them to meet customer demand at least cost. This often results in prioritization of hydropower, wind, and solar, which have low or zero marginal costs. These types of resources are used first when they are available, and then, if unmet customer demand remains, utilities will look to other types of units, such as natural gas power plants, to meet additional residual demand.

It is worth noting that the availability of renewable resources—such as wind, solar, and hydropower—vary over the course of a day, from season-to-season, and year-to-year based on natural cycles, weather patterns, and changing climate conditions. Utility electricity mixes include real-time supplemental market purchases of electricity that utilities make to meet demand; these purchases are called "unspecified" because the specific resources used to generate the electricity are not tracked nor accounted for in real-time.

Electricity Imports and Exports

Oregon has an abundance of renewable energy resources and is one of the leading producers of renewable energy in the country. This abundance is one of the reasons Oregon can export significant amounts of the renewable electricity it generates — particularly from hydropower. Oregon also relies on in-state natural gas generation facilities and out of state electricity sources. Oregon imports almost all —more than 99 percent — of the natural gas used to generate electricity at in-state facilities. Oregon also imports electricity from all over the western U.S.; this imported electricity comes from various resources.[1,2]

Oregon 2022 Exports

45% of wind generation

37% of hydropower

Oregon 2022 Imports

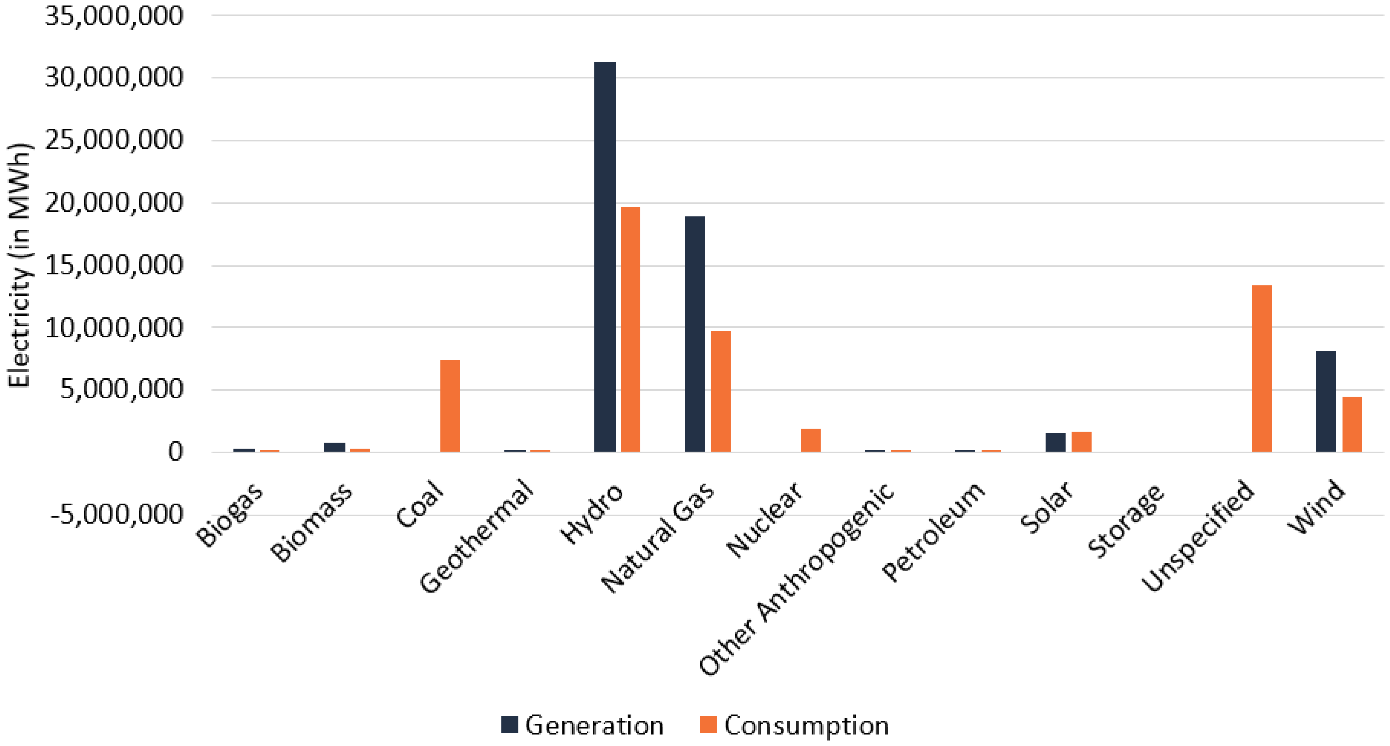
100% of coal electricity

100% of nuclear electricity

100% of the unspecified electricity

8% of solar electricity

Figure 57: Oregon's Electricity Generation and Consumption (2022)[1,2]



Liquid Fuels

Consumption

As noted previously, Oregon imports all petroleum fuels it consumes, primarily from five major refineries in Washington State. As shown on the charts above, transportation uses the most liquid fuels, with some use in the commercial, industrial, and residential sectors.

Direct Use Liquid Fuels

Direct Use Fuels include fuels used to heat homes and commercial spaces, as well as other fuels used directly in manufacturing and industrial processes. They do not include fuels used to generate electricity or support the transportation sector.

Heating Oil

Heating oil is a petroleum distillate fuel that is used primarily to heat buildings; some buildings also use it to heat water. Because space heating is the primary use for heating oil, demand is highly seasonal and affected by the weather. Most Oregon heating oil use occurs during the heating season: October through March.

In 2022, Oregon used 18.5 trillion Btu of heating oil for direct uses, and 3 percent of Oregon homes use fuel oil for heating.[1,6] It is also used to heat commercial buildings and for industrial applications. As with most liquid fuels, the majority of Oregon's heating oil comes from refineries in Washington.[7]

Biodiesel heating oil is becoming more readily available in Oregon. Biodiesel is a renewable fuel made from vegetable oils - like soy and canola- that are grown domestically. Biofuels are mixed with petroleum heating oil to create blends of 5 to 20 percent to create a cleaner burning alternative fuel. The mixes can be used by typical oil furnaces in homes, but increasing the portion of vegetable oils beyond this level in the blends does require adjustments to home oil furnaces.

Heating Oil Consumption by Sector

Commercial Sector | 2.4 trillion Btu

Residential Sector | 1.9 trillion Btu

Industrial Sector | 14.3 trillion Btu[1]

Other Petroleum

This category refers to petroleum fuels like kerosene or lubricants that are not propane or heating oil, and are used, for the most part, in Oregon's commercial and industrial sectors to fuel machinery and manufacturing processes. In 2022, Oregon consumed almost 22 trillion Btu of Other Petroleum fuels.

Other Petroleum Consumption by Sector

Commercial Sector 5.0 trillion Btu

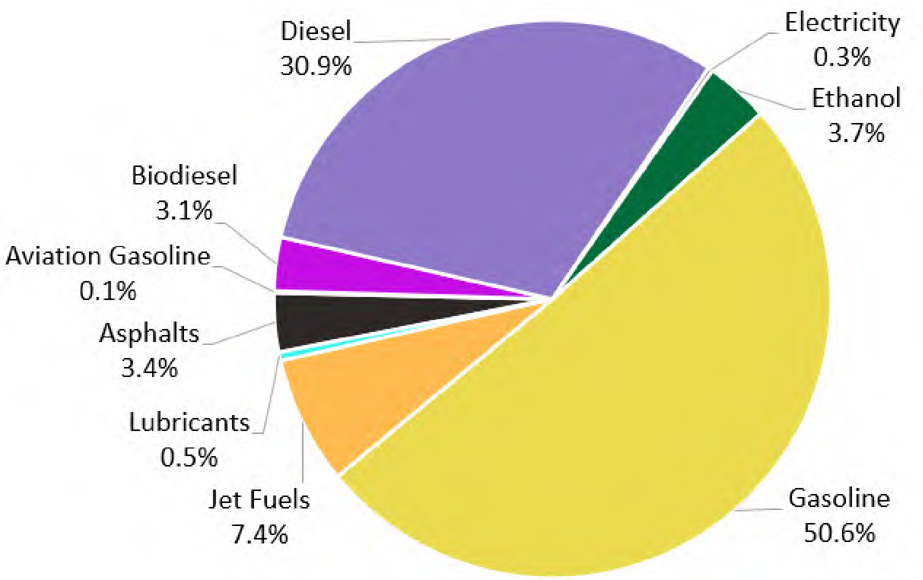
Residential Sector 0.1 trillion Btu

Industrial Sector 16.9 trillion Btu[1]

Transportation Fuels

In 2022, Oregon's transportation sector used 36.7 percent — or 318.4 trillion Btu — of the energy consumed in Oregon, the most of any sector.[1] The Oregon Department of Energy analyzes data from the Oregon Department of Environmental Quality's Clean Fuels Program and the Department of Transportation's fuel tax program to determine an estimate of the mix of transportation fuels consumed in Oregon, as illustrated in Figure 58 below. In 2022, petroleum-based products accounted for 91 percent of fuel consumed in the transportation sector.

Figure 58: 2022 Transportation Fuel Consumption

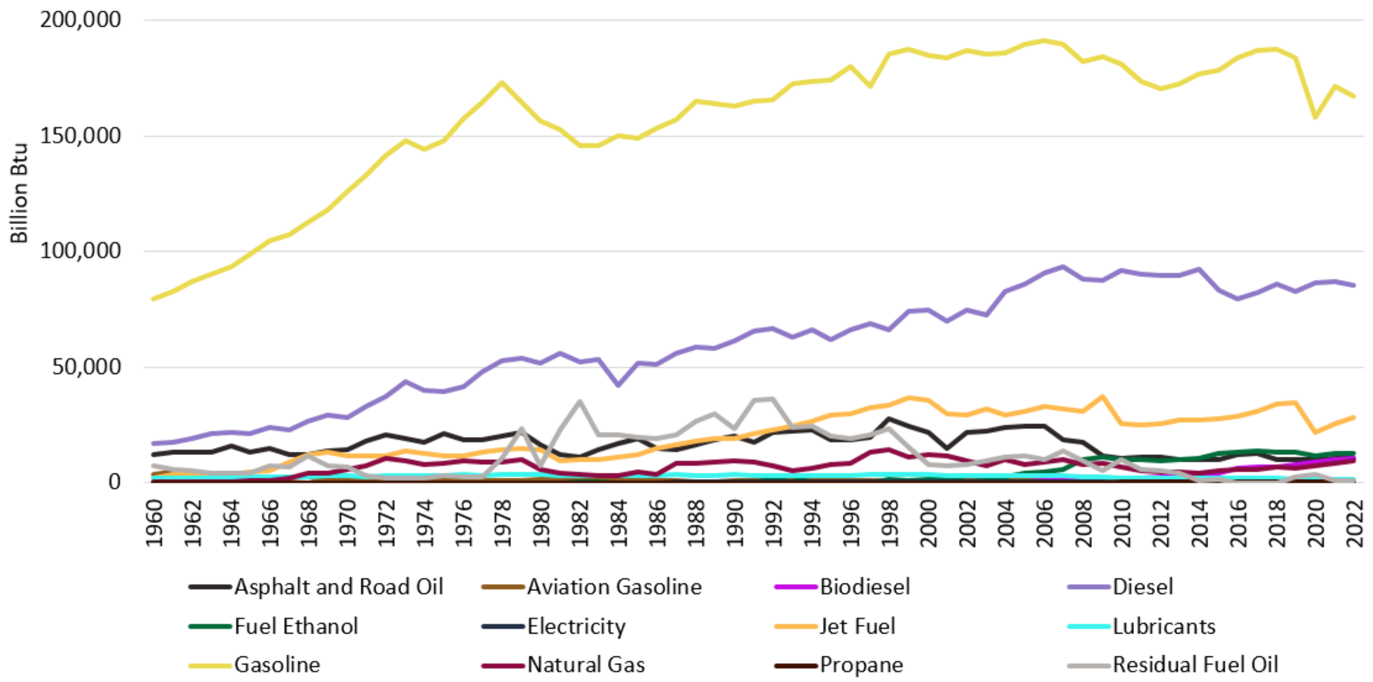


Transportation Fuel Use Over Time

The U.S. Energy Information Administration has tracked national energy consumption and individual state consumption since 1960. In Oregon and nationally, overall transportation fuel consumption increased between 1960 to 2018. In 2019 and 2020 there was a 16 percent reduction in the use of gasoline and a 37 percent reduction in jet fuel, but a 3 percent uptick in the use of diesel. Analysis attributes this to less personal travel and increased delivered goods related to the COVID pandemic. Since 2020, Oregon's transportation sector returned to its upward trajectory, consuming 318.4trillion Btu of energy in 2022, exceeding the peak year of transportation energy consumption in Oregon — 314.4 trillion Btu in 2019.[1]

Except for 2019 and 2020, petroleum product consumption has steadily increased over time and still dominates transportation fuel use in Oregon. Nearly all transportation fuels are imported into Oregon. In 2022, just 1.6 percent of transportation fuel used in Oregon was produced in the state, including the 22 percent of biofuels used in Oregon. Oregon electric utilities provided 0.54 trillion Btu of electricity to fuel electric vehicles in 2022.[1,8] Oregon does not have crude oil reserves or refineries to process petroleum, so over 90 percent of the petroleum products delivered to and consumed in Oregon come from five refineries in Washington state. Crude oil used at Washington refineries comes from Alaska, western Canada, and North Dakota.[9] The rest of the fuel used in Oregon comes mostly from California or Utah refineries.

Figure 59: Oregon Transportation Sector Consumption: 1960-2022 (billion Btu)



Transportation Fuels in Oregon

Gasoline

- **1,359,234,970 gallons (32,362,737 bbl)** — Total gasoline consumed in Oregon in 2022
- **0** — total gasoline produced in Oregon in 2022
- **1,850** — public and private fuel stations in Oregon

Gasoline is the most widely used transportation fuel in the United States and Oregon, powering cars, motorcycles, light trucks, airplanes, and boats. Gasoline accounts for 51 percent of Oregon's total transportation fuel consumption.[8] Oregon's renewable fuel standard requires that nearly all commercially available gasoline for light-duty vehicles has a 10 percent ethanol blend, called E10. Petroleum refineries and blending facilities in Washington State produce 90 percent of motor gasoline for sale at retail gasoline fueling stations in Oregon, and the rest come from Utah or California refineries. In 2022, over 1.36 billion gallons of gasoline powered vehicles on Oregon roads, or about 318 gallons per Oregonian.[10]

Diesel

- **829,785,611 gallons (19,756,800 bbl)** — Total Diesel consumed in Oregon in 2022
- **0** — Total Diesel produced in Oregon in 2022
- **1,350** — public and private fuel stations in Oregon

Diesel fuel is second only to gasoline in fuel consumption in Oregon.[10] It is commonly used by trucks, buses, automobiles, and locomotives, as well as farm and construction equipment. While both gasoline and diesel start as crude oil, they are separated into their component parts and blended with other fuels at a refinery. Diesel is typically blended with biodiesel at 5, 20, and 99 percent amounts. In Oregon, all diesel fuel that is sold or distributed must contain at least a 5 percent blend of biodiesel or renewable diesel called B5. A 20 percent blend, called B20, is also widely available in Oregon. Additional blends of petroleum diesel, biodiesel, and renewable diesel are used to cut lifecycle greenhouse gas emissions of diesel fuel consumption and are available in some parts of the state.[11] Over 90 percent of diesel used in Oregon comes from refineries in Washington State, and the rest from refineries in Utah or California. Diesel contains more energy per gallon than gasoline, so a diesel engine requires less energy to accomplish the same amount of work.

Jet Fuel

- **199,207,130 gallons (4,743,027 bbl)** — Total Jet Fuel consumed in Oregon in 2022
- **0** — Total Jet Fuel produced in Oregon in 2022
- **98** — public airports in Oregon

Jet fuel is an aviation fuel for a variety of aircraft powered by gas-turbine engines and is used in commercial and military applications in Oregon. There are many types of jet fuels. They are derived from crude oil and blended or refined with products such as naphtha, gasoline, or kerosene to meet specific military or commercial specifications. Jet fuel is delivered to and consumed at Oregon's airports. As discussed above, Washington State refineries supply the vast majority of jet fuel used by Oregon airports.

Alternative Transportation Fuels

The use of alternative fuels – including electricity, renewable diesel, propane, and biofuels – is 9 percent of all transportation fuel use in Oregon. These fuels provide Oregonians with a variety of options and an increasingly more diverse landscape of transportation fuels. Alternative fuels can be — and in some cases are — produced in Oregon, reducing dependence on imported fuels. Alternative fuels generally have the benefit of lower greenhouse gas emissions and lower tailpipe emissions of other air pollutants. Fuels such as ethanol and biodiesel are blended into most petroleum gasoline and diesel respectively, and are widely used in all vehicles and sectors. "Drop-in fuels" are renewable fuels that can use existing fueling infrastructure and can be added to the tank of an existing fossil fuel vehicle without needing to modify it. Renewable diesel is an example of a drop-in fuel; it can be used in existing diesel engines and transportation infrastructure but can be challenging to find enough supply to meet current demand. Some fuels, such as electricity and natural gas, require buying a new vehicle capable of using the fuel and may require new fueling infrastructure. Oregon policymakers are increasingly assessing policy options that support the production and adoption of cleaner transportation fuels to meet state greenhouse gas reduction goals, and Oregonians are seeing more fuel and vehicle options available. Neither renewable diesel nor sustainable aviation fuel are produced at scale in the Pacific Northwest at this time, but there are multiple proposed facilities that if built, would provide refining capacity for the region.

Ethanol

- **99,562,471 gallons (2,370,535 bbl)** – Total Ethanol consumed in Oregon in 2022
- **25,704,000 gallons (612,000 bbl)** – Total Ethanol produced in Oregon in 2022
- **25.6%** – Percentage of total Ethanol used in Oregon in 2022 which was also produced in state
- **4** – Public and private E85 fuel stations in Oregon

Ethanol is the most common gasoline substitute, with more than 98 percent of U.S. gasoline containing some amount of ethanol. It is a renewable alcohol-based fuel made by fermenting and distilling crops, such as corn, sugar cane, sorghum, and wheat. Ethanol oxygenates the gasoline, causing it to burn hotter and cleaner, and reducing air pollution and greenhouse gas emissions.

Biodiesel

- **83,640,269 gallons (1,991,434 bbl)** – Total biodiesel consumed in Oregon in 2022
- **9,156,000 gallons (218,000 bbl)** – Total biodiesel produced in Oregon in 2022
- **10.9%** – Percentage of total biodiesel used in Oregon in 2022 which was also produced in state
- **33** – Public and Private fuel stations in Oregon

Biodiesel is a fuel created from fats, oils, and greases and is currently the dominant form of biomass-based diesel. When blended with diesel fuel it can be used by standard diesel trucks, buses, trains, and boats. Oregon’s Renewable Fuels Standard requires all diesel fuel sold in the state to include a 5 percent biomass-based diesel blend, known as B5.

Electricity

- **7,023,085 gasoline gallons equivalent** – Total electricity consumed for transportaion in Oregon in 2022
- **234,102,833 kWh** – Total electricity generated in Oregon for transportation consumption in 2022
- **3,193** – public chargers in Oregon

Electricity can be used as a transportation fuel and is a growing component of Oregon’s passenger vehicle sector and is starting to be used for medium and heavy-duty trucks, port equipment, construction equipment, and other non-road vehicles.

Renewable Diesel

- **49,792,035 gallons (1,185,525 bbl)** – Total renewable diesel consumed in Oregon in 2022
- **0** – Total renewable diesel produced in Oregon in 2022
- **40** – estimated public and private fuel stations in Oregon

Renewable diesel fuel, sometimes called green diesel, is a low carbon intensity biofuel made from waste or renewable materials, including rendered tallow, fish waste, used cooking oil, inedible corn oil, soybean oil, canola oil, and other biomass resources. It is chemically identical to petroleum diesel fuel and can be used in existing petroleum pipelines, storage tanks, and engines without modification or blending.[12]

Renewable diesel consumption is growing rapidly in Oregon as fleets that incorporate the fuel in their operations have positive performance results.[12] From 2018 to 2022, Oregon consumption increased from 1.2 million gallons to almost 50 million gallons, or about 6 percent of all annual diesel fuel consumed in Oregon. This increase may be attributed in large part to DEQ’s Clean Fuels Program. The Clean Fuels Program incentivizes delivery and use of renewable diesel in the state. In CFP’s 2022 program review to the Oregon Legislature, DEQ identified renewable diesel as the “primary drop-in fuel to generate credits and reduce deficits with the existing diesel vehicle fleet." Apart from ethanol and biodiesel, renewable diesel is the most widely adopted alternative transportation fuel in Oregon.

Table 19: 2022 Oregon Production & Consumption of Transportation Fuels (GGE)

Resource	Consumption in Oregon	Oregon Production	Imported	% of Consumption Produced in Oregon
Biodiesel	83,640,269	9,156,000	74,484,269	11%
Fuel Ethanol	99,562,471	25,704,000	73,858,471	28%
Gasoline	1,359,234,970	0	1,359,234,970	0%
Diesel	829,785,611	0	829,785,611	0%
Jet Fuel	199,207,130	0	199,207,130	0%
Asphalt & Road Oil	91,707,323	0	91,707,323	0%
Lubricants	13,260,578	0	13,260,578	0%
Aviation Gasoline	2,730,496	0	2,730,496	0%
Electricity*	7,023,085	4,791,436	2,231,649	68%
LPG/Propane	1,877,200	0	1,877,200	0%
Compressed Natural Gas	261,890	0	261,890	0%
Bio-CNG	4,084,226	0	4,084,226	0%
Renewable Diesel	49,792,035	0	49,792,035	0%
LNG (Fossil)	0.00	0	0	0%
Renewable Propane	490,478	0	490,478	0%
Hydrogen	13,048	0	13,048	0%
Totals	**2,742,670,810**	**40,197,545**	**2,702,473,265**	**1.5%**

**The exact amount of electricity generated in Oregon and consumed in Oregon for transportation is unknown. ODOE uses best available estimates based on Oregon Department of Environmental Quality's Clean Fuels Program and utility data. The percentage used here is based on the estimated ratio of electricity produced to electricity imported for 2022.*

Gaseous Fuels

Natural Gas

A gaseous mixture of hydrocarbon compounds, primarily methane, natural gas is a fossil energy source from beneath the earth's surface that is produced abundantly in the United States. Natural gas is used directly for space and water heating, electricity production, cooking, and many agricultural, commercial, and industrial processes.

Oregon consumed 295 trillion Btu of natural gas in 2022 — nearly all of it imported from Canada and the Rocky Mountain states.[1] Oregon's electric power sector uses about half of the natural gas delivered to Oregon, as you can see below in Figure 60. The rest is consumed in direct uses. The industrial sector accounts for about 20 percent of state consumption. The residential sector, where almost three in five Oregon households use natural gas as their primary energy source for home heating, accounts for 18 percent of natural gas deliveries, and the commercial sector uses 12 percent.

Natural Gas Consumption by Sector

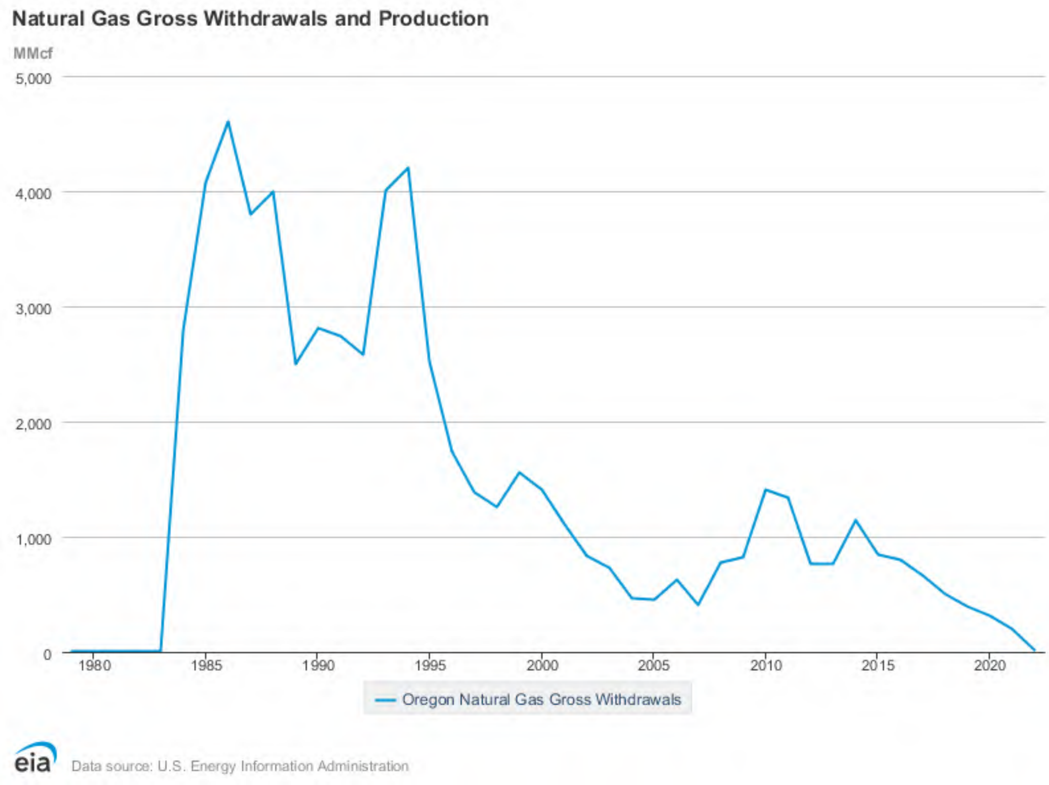
Commercial Sector | 35 trillion Btu

Residential Sector | 52.6 trillion Btu

Industrial Sector | 60.5 trillion Btu[1]

The Pacific Northwest's only natural gas extraction facility is located outside Mist, Oregon and its resources go to NW Natural, one of three investor-owned gas companies serving the state.[13] The Mist field is primarily used for natural gas storage and produced only 0.005% of Oregon's annual use in 2022.[1]

Figure 60: Oregon Natural Gas Production[14]



Hydrocarbon Gas Liquids and Propane

Hydrocarbon gas liquids are extracted from natural gas at natural gas processing plants and from crude oil when it is refined into petroleum products. HGLs are heavier than air while natural gas is lighter. Propane is the most commonly used HGL in Oregon. Both natural gas and propane are gases at atmospheric pressure and liquids under higher pressures, which can also be liquefied by cooling. The versatility and high energy density of these fuels in liquid form make them useful for many purposes, including as feedstock in petrochemical plants, as fuel for home space and water heating – see Figure 22 in Section V – or cooking, and as transportation fuels, additives, or as a diluent. Propane is used to power farm and industrial equipment and backyard barbeques. Propane remains a viable fuel over long periods of storage, making it a common backup fuel for essential facilities like hospitals and cell towers, and is a potential resource in response to an emergency. Propane is a byproduct of natural gas production.[15] As U.S. natural gas production has increased, the supply of propane has followed, making it an affordable and attractive option for many Oregonians.[16]

All propane consumed in Oregon is imported. Based on the available data on propane production, imports, exports, and transportation, the Pacific Propane Gas Association estimates that more than 95 percent of the propane consumed in Oregon is sourced from natural gas processing plants in Alberta and British Columbia, Canada.[16]

Oregon consumed 9.8 trillion Btu of propane in 2022 as a direct use fuel.[1] About 1 percent of Oregon residents use propane boilers or furnaces to heat their homes; even more use it for cooking.[6] While propane use on-road as a transportation fuel is a small segment of the total fuel usage in Oregon, school districts have embraced propane as a fuel for bus fleets.

Hydrocarbon Gas Liquids and Propane Consumption by Sector

Commercial Sector | 4.0 trillion Btu

Residential Sector | 2.5 trillion Btu

Industrial Sector | 3.3 trillion Btu[1]

Natural Gas Consumption Over Time

Consumption of natural gas in Oregon has increased significantly in recent decades. Figure 61 shows Oregon's aggregate consumption of natural gas from the electricity, residential, commercial, industrial, and transportation sectors between 1960 and 2020. Oregon's consumption of 298 trillion Btu of natural gas in 2022 is an increase of 8 percent from the 275 trillion Btu Oregon consumed in 2008.[1]

Natural gas has replaced distillate fuel oil and coal use in most Oregon buildings and industrial processes as a cleaner-burning alternative. As Oregon reduces greenhouse gas emissions to meet state targets, the application and use of natural gas and other fossil-based direct use fuels may change as the state seeks lower carbon intensity alternatives.

Figure 61: Total Natural Gas and Propane Consumption 1960 – 2022 (Billion Btu)[1]

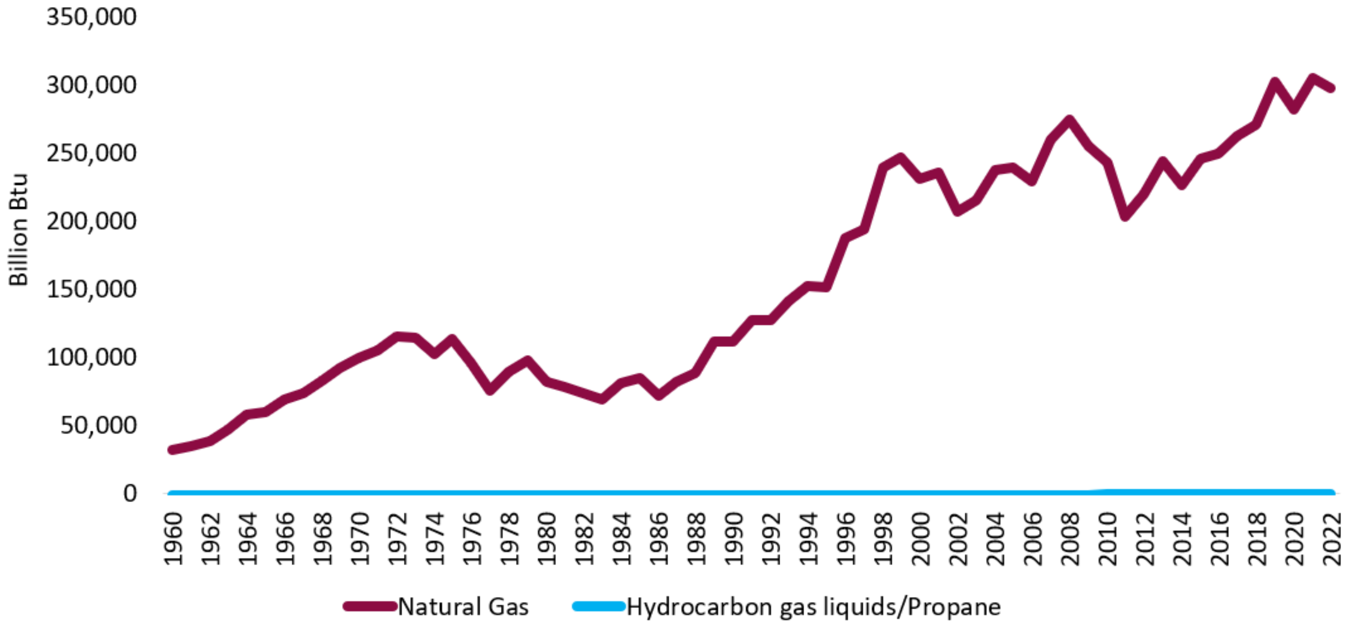
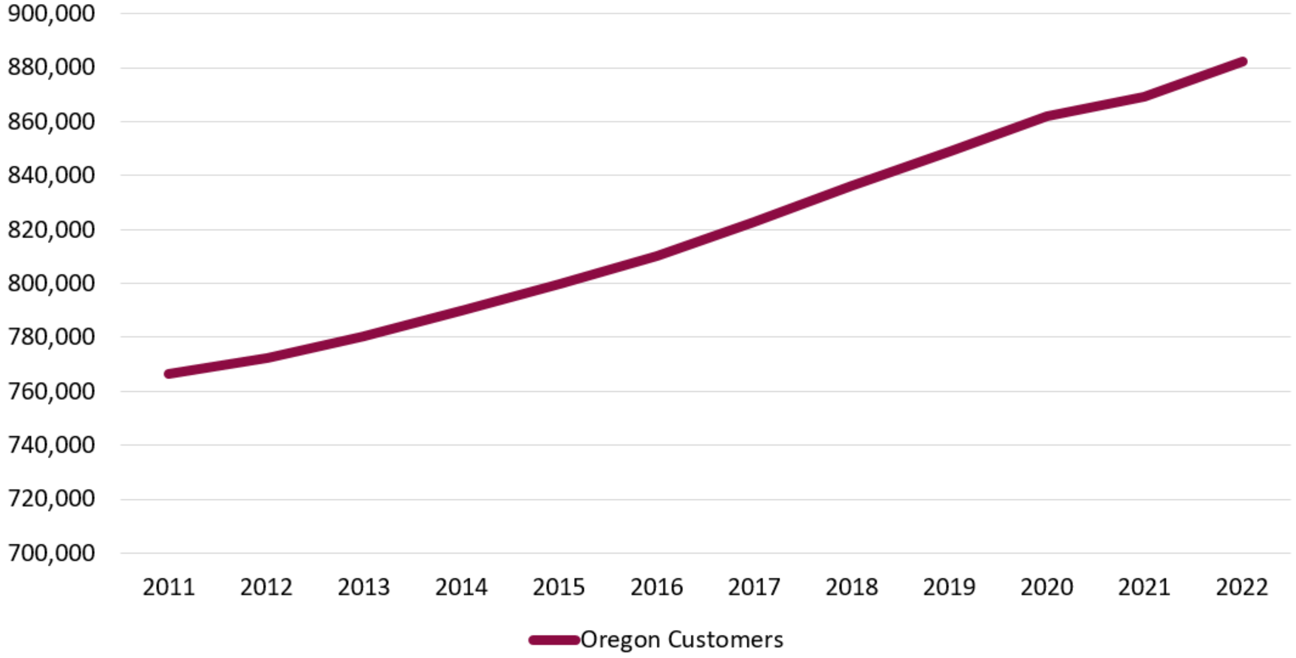


Figure 62 demonstrates that the total number of natural gas retail customers in Oregon has also steadily increased over the last decade. In 2022, there were approximately 882,000 retail gas customers in the state.

Figure 62: Total Natural Gas Retail Customers in Oregon 2011-2022[17]



Natural Gas Consumption for Electricity

There are 13 natural gas electricity generation facilities in Oregon with a combined capacity of 4,354 MW. Demand for electricity produced by natural gas in Oregon has increased over time.[1] Total consumption by Oregon's electric power sector increased from 119 trillion Btu in 2008 to 140 trillion Btu in 2022, an increase of 18 percent.[1] Natural gas plants are also able to play different roles in grid management, including serving as steady dispatchable power generators and acting as highly flexible generators that can ramp up and down quickly to meet constantly changing electricity demand.

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VII. ENERGY SECTOR THREATS

Natural disasters and man-made threats have the potential to cause damage to the state's energy infrastructure, which could result in loss of life, harm to the environment, destruction to property, impacts to our economy, or cause cascading consequences to other critical lifelines such as transportation, communications, health care.

This section provides an overview of the energy infrastructure risk assessment that ODOE commissioned to support development of the energy security plan. The consultant's final report can be viewed in its entirety in Appendix E. The energy sector threat information in this section describes what is currently known about the threats to Oregon's energy systems, based on the ODOE team and its consultant's work, including working with the PUC and energy providers. Note that the scope of work for the threat assessment is specific to natural hazards, intentional physical attacks, and cyber-attacks. Other threats to Oregon's energy systems are not currently incorporated into this plan but could be as threats emerge or come into better focus in coming years. Specifically, as will be further assessed in the Oregon Energy Strategy (released in November 2025), Oregon and the region are facing a potentially significant shortfall of power generation and transmission line facilities to meet rapidly rising electricity demand. Alongside that rising demand, Oregon also has important greenhouse gas reduction goals. Data centers, advanced manufacturing, other industrial applications, and a push to increase electricity use in buildings and transportation are expected to cause substantial power demands, as well as an associated need to build the infrastructure necessary to deliver such power in a cost-effective manner. Future versions of the Energy Security Plan will provide additional analysis, building off the Oregon Energy Strategy and other reports from energy companies, trade associations, and regional bodies, of this important emerging risk to our state.

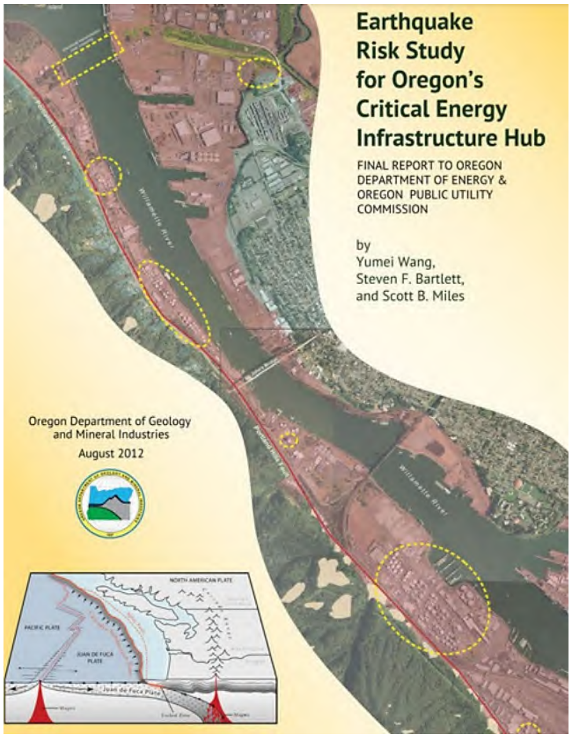
Natural Hazards

When natural hazards or threats to the energy systems are discussed in the Pacific Northwest, many instantly think of the regional risk for a high magnitude earthquake.

Cascadia Subduction Zone Earthquake

The area of impact for a Cascadia Subduction Zone (CSZ) earthquake and tsunami stretches from northern California to British Columbia, where the Juan de Fuca tectonic plate converges with the North American plate.[1] This convergence of the two plates has built pressure over time. One probable scenario for releasing the pressure is a mega-earthquake that causes a tsunami.[1] Depending on the epicenter of the quake, the tsunami could have severe impacts on the Oregon coast.[2] The earthquake also could cause widespread landslides and liquefaction from the coast to inland areas.[2]

Figure 63: Oregon Earthquake Risk Study



Earthquake Risk Study for Oregon's Critical Energy Infrastructure Hub

FINAL REPORT TO OREGON DEPARTMENT OF ENERGY & OREGON PUBLIC UTILITY COMMISSION

by
Yumei Wang,
Steven F. Bartlett,
and Scott B. Miles

Oregon Department of Geology and Mineral Industries
August 2012

State leaders and scientists have conducted extensive planning for and studies of the potential effects of a CSZ event on Oregon's critical infrastructure, including the energy sector. The Oregon Resilience Plan and an Earthquake Risk Study showed that a CSZ event likely would have severe impacts on many components of the Pacific Northwest's critical energy infrastructure associated with electricity, natural gas, and liquid fuels. While major impacts are expected from the CSZ event in western Oregon and particularly on the coast, central and eastern Oregon also will be affected. For example, most liquid fuel is trucked from Portland or Eugene fuel hubs to communities across the state. After a CSZ event, these fuel terminals may not be operable for an extended period of time. While the Eugene terminal may be less susceptible to damage from earthquake shaking, it relies upon fuel delivered via pipeline from the Portland-area terminals, which, in turn, rely on fuel delivered primarily from Washington State refineries. Risks and vulnerabilities from an earthquake exist throughout the fuel production and delivery system.

These plans and studies investigated the seismic risks of Oregon's energy storage and transmission infrastructure, with a special emphasis on the vulnerability of the cluster of liquid fuel terminals and tank farms in the Portland harbor. This area comprises a 6-mile stretch of the lower Willamette River in North Portland where energy storage, including liquid fuel tanks and pipelines and natural gas storage and distribution, as well as electric transmission facilities, are concentrated. ODOE's consultant team further analyzed risks and vulnerabilities to regional energy systems from earthquakes, including additional assessment of risks at Portland harbor fuels terminals and tank farms. See the Risk Assessment report (Appendix E) for more details.

Critical Energy Infrastructure

The phrase "critical energy infrastructure, or CEI, is used by different people to mean different things. "CEI Hub" often refers to a specific cluster of fuel terminals and tank farms in the Portland harbor area. Nationally, and elsewhere in Oregon, CEI tends to be used in a broader sense to refer to energy infrastructure that is of vital significance for a state or region, including power plants, major electrical substations and power lines, natural gas storage facilities and stations, and fuel infrastructure such as pipelines, terminals, and tank farms. In this report, "CEI" is used in the broader sense, and the Portland-area fuels terminals are described accordingly.

Extreme Weather Events

There are other more frequent threats that regularly affect Oregon's energy assets and delivery systems. In the past five years, Oregon governors have issued 150 emergency declarations and executive orders requiring statewide response to wildfires, severe winter storms, flooding, droughts, cyber-security threats, and a pandemic.

Table 20: Oregon Emergency Declarations Issued by Type and Year

Year	Floods	Wildfires	Conflagrations[i]	Severe Weather (extreme heat and winter storms)	Landslides	Droughts	Pandemic Other	Total
2019	1	-	-	1	-	-	-	**2**
2020	1	3	16	-	-	7	32	**59**
2021	-	1	9	6	-	10	11	**37**
2022	-	1	5	1	1	7	4	**19**
2023	-	1	5	3	-	9	4	**22**
2024	-	1	14	4	-	4	3	**26**
2025*	3	2	6	-	-	2	2	**15**
Total	**5**	**9**	**55**	**15**	**1**	**39**	**56**	**180**

* Includes emergency declarations and executive orders issued for January through June 2025.

Examples of recent implementation of ESF-12 emergency response systems include ODOE activating the Oregon Fuel Action Plan in response to extreme weather events like major wildfires and ice storms to ensure timely fuel deliveries to airports supporting wildfire response efforts, and to hospitals, utility crews, and first responders supporting storm response. As a result of wildfires, ODOE and the Oregon Department of Forestry established a state and federal Fuel Coordination Group and procedures for meeting jet fuel needs at airports supporting wildfire response efforts in the state.[3]

OPUC, which serves as ESF-12 co-lead for natural gas and electricity, works with electric utilities and natural gas during adverse conditions. These can include weather events, cyber and physical security attacks, and various other events affecting large amounts of customers. In addition, the agency has worked with electric companies to facilitate power restoration to affected communities and supports the preparation for public safety power shutoffs during wildfire seasons. In March 2020, the Governor issued Executive Order 20-04 directing OPUC to evaluate risk-based wildfire program plans for investor-owned utilities and to conduct workshops to share best practices for mitigating risks with stakeholders. Subsequent to the executive order, legislation regarding statewide wildfire mitigation plans for electric operators was adopted. Details related to those wildfire mitigation plans are presented in Section X of this document.

Figure 64 shows some of the potential impacts that can occur under extreme weather events in relation to the state's energy system.

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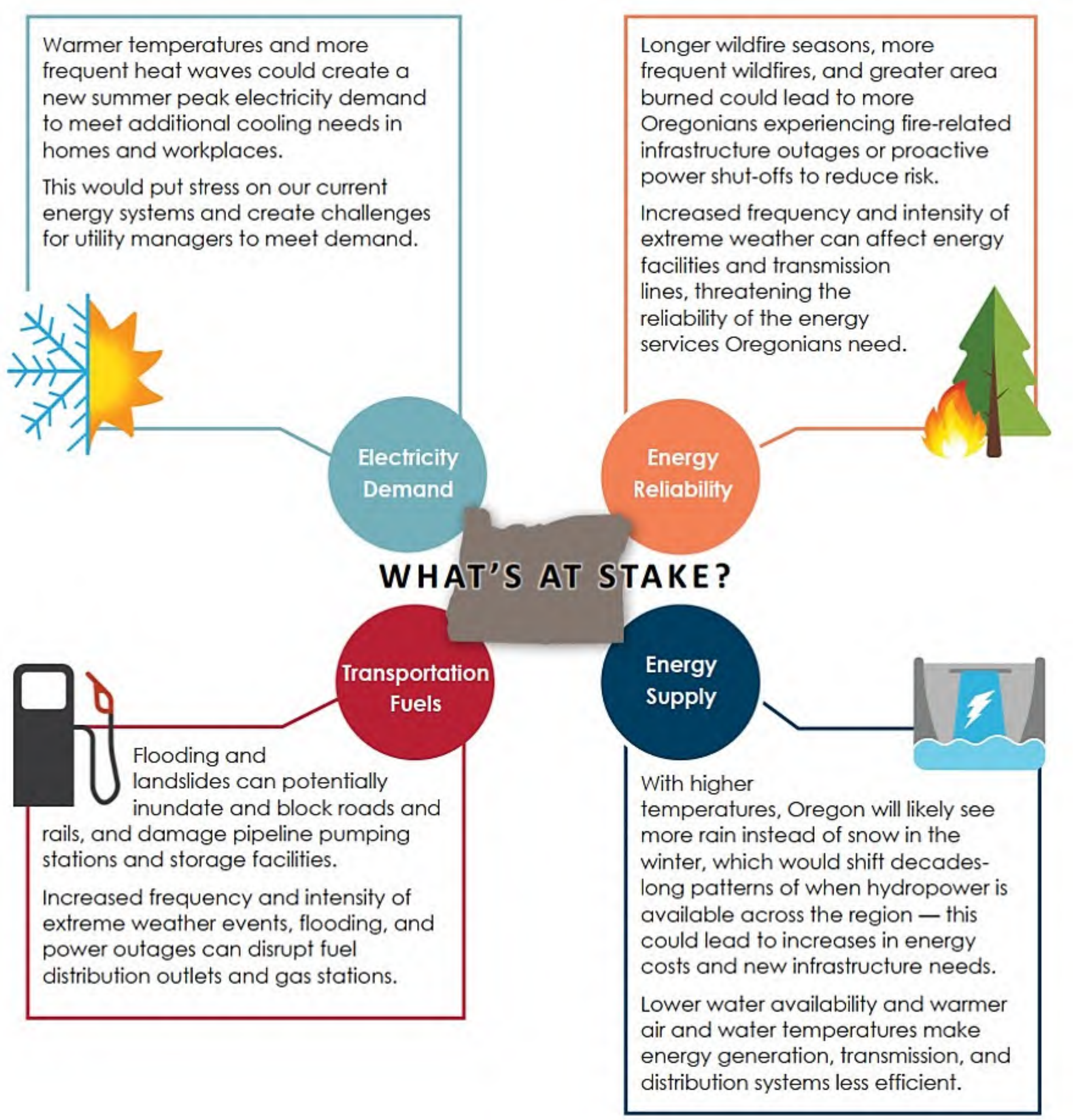
[i] Conflagrations are defined as fires posing threats to life, safety, and property, and those threats exceed the capabilities of local firefighting personnel and equipment.

Figure 64: Extreme Weather Events Affect Energy Systems



Warmer temperatures and more frequent heat waves could create a new summer peak electricity demand to meet additional cooling needs in homes and workplaces.

This would put stress on our current energy systems and create challenges for utility managers to meet demand.

Longer wildfire seasons, more frequent wildfires, and greater area burned could lead to more Oregonians experiencing fire-related infrastructure outages or proactive power shut-offs to reduce risk.

Increased frequency and intensity of extreme weather can affect energy facilities and transmission lines, threatening the reliability of the energy services Oregonians need.

Flooding and landslides can potentially inundate and block roads and rails, and damage pipeline pumping stations and storage facilities.

Increased frequency and intensity of extreme weather events, flooding, and power outages can disrupt fuel distribution outlets and gas stations.

With higher temperatures, Oregon will likely see more rain instead of snow in the winter, which would shift decades-long patterns of when hydropower is available across the region — this could lead to increases in energy costs and new infrastructure needs.

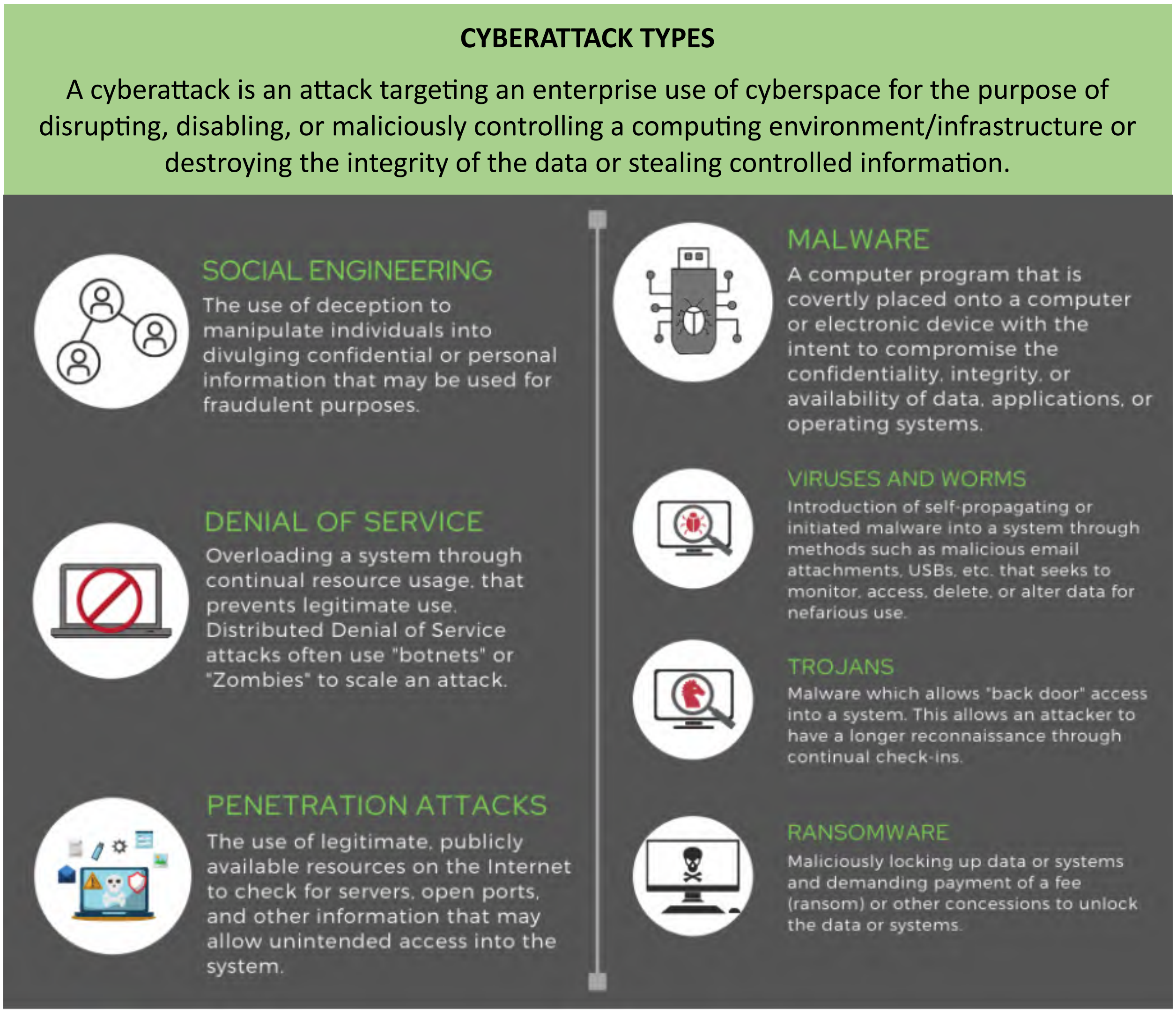
Lower water availability and warmer air and water temperatures make energy generation, transmission, and distribution systems less efficient.

Human-Made Threats

Cybersecurity Attacks

Today's energy sector is technology driven resulting in many benefits, including improvements to efficiency, resiliency, and flexibility. However, because the energy sector is uniquely critical – all other critical infrastructure sectors depend on power and fuel to operate – this makes the energy assets attractive targets for cyberattacks. In support of the development of state Energy Security Plans, USDOE provided an overview of possible cyber threats energy providers face.

Figure 65: Cyberattack Types[4]



CYBERATTACK TYPES

A cyberattack is an attack targeting an enterprise use of cyberspace for the purpose of disrupting, disabling, or maliciously controlling a computing environment/infrastructure or destroying the integrity of the data or stealing controlled information.

SOCIAL ENGINEERING

The use of deception to manipulate individuals into divulging confidential or personal information that may be used for fraudulent purposes.

DENIAL OF SERVICE

Overloading a system through continual resource usage, that prevents legitimate use. Distributed Denial of Service attacks often use "botnets" or "Zombies" to scale an attack.

PENETRATION ATTACKS

The use of legitimate, publicly available resources on the Internet to check for servers, open ports, and other information that may allow unintended access into the system.

MALWARE

A computer program that is covertly placed onto a computer or electronic device with the intent to compromise the confidentiality, integrity, or availability of data, applications, or operating systems.

VIRUSES AND WORMS

Introduction of self-propagating or initiated malware into a system through methods such as malicious email attachments, USBs, etc. that seeks to monitor, access, delete, or alter data for nefarious use.

TROJANS

Malware which allows "back door" access into a system. This allows an attacker to have a longer reconnaissance through continual check-ins.

RANSOMWARE

Maliciously locking up data or systems and demanding payment of a fee (ransom) or other concessions to unlock the data or systems.

Energy infrastructure owners and operators use technology to monitor or control physical devices, processes, and events. Examples include:

- Energy Management Systems and Supervisory Control and Data Acquisition (SCADA)
- Oil refinery, gas processing, and electricity generation distributed control systems.
- Pipeline pump/compressor stations and electrical substations
- General industrial control systems used in energy processes

A cyber incident within energy operational systems can result in a physical consequence in addition to potential losses of data or damage to an organization's reputation. A cyber event can cause loss of power or access to fuel, initiate prolonged cascading impacts, create potential risks to health and safety, and result in economic impacts to not only the company, but also to the people and businesses that rely on energy. Understanding the current and evolving threat landscape as well as possible consequences of a cyber-physical event can help state officials and energy owners and operators understand risks.

Table 21: Information Technology vs. Operational Technology Impacts[4]

Information Technology Impacts	Operational Technology Impacts
• Brand damage — loss of confidence in company • Loss of personally identifiable information • Loss of business data • Customer - supplier payment issues	• Operator loses visibility into operations • Operator forced to switch to manual operations mode • Supply fails to meet demand • Disruption to basic daily activities – loss of power or access to fuel • Health, safety, and economic impacts • Impacts from prolonged disruptions can cascade into larger consequences

Physical Attacks

In recent years, there is a recognition that physical attacks on energy infrastructure are a serious risk to energy security across the nation. Transmission lines may be affected by individuals intentionally hitting power poles or lines with vehicles or downed trees. Attacks on pipelines or other fuel infrastructure could cause a major disruption of services. Terrorist or malicious strikes on electric substations can disrupt service, as has occurred in Oregon, Washington, and elsewhere nationally in recent years.

According to the U.S. Department of Energy, incidents related to physical security of electricity infrastructure increased 70 percent in 2022, compared to the prior three years. In Oregon on Thanksgiving Day 2022, two intruders cut through the fencing around a substation in Clackamas County, shooting and disabling numerous pieces of equipment and causing significant damage. Washington State saw four substations near Tacoma attacked on Christmas Day 2022 in an apparent effort to cut power so the assailants could commit a burglary.

From simple trespassing and acts of vandalism to more serious attacks on energy infrastructure with destructive devices, states need to be aware of and prepared for physical threats. The risk assessment conducted by ODOE and its consultants includes intentional physical attacks on energy infrastructure.

OOPS

Accidental impacts to energy infrastructure are not included in the OR ESP or associated Risk Assessment report, as they are not malicious — and can best be managed by utilities or law enforcement. For example, a driver could accidentally hit a car into a power pole, knocking out electricity to a neighborhood. Or, a farmer may unintentionally dig into an underground pipeline while working their field. While both of these examples have occurred recently in the Pacific Northwest, these types of accidents are typically minor and are readily responded to by utilities. As they are random and unintentional, they are not included as hazards in the baseline risk assessment for the OR ESP.

Summary of Energy Sector Threats

The table below provides a high-level summary of common hazards, vulnerabilities, and impacts to the energy sector. This list of general threats provided by the US DOE was used to inform ODOE's Baseline Energy Infrastructure Risk Assessment. Not all threats in the table below were selected for inclusion in the assessment, though there may be reason to include them in future updates. This input and an assessment of historically underserved and environmental justice communities will be considered before any final recommendations from ODOE are made. National hazards that were included in the Oregon risk assessment are bolded and shaded.

Table 22: Energy Sector Hazards and Vulnerabilities

HAZARD	ELECTRICITY	LIQUID FUELS	NATURAL GAS
Cyber Incident	• Informational technology and operation technology systems can be affected. This includes company data, payment and scheduling systems, sensors, and control systems.	• Informational technology and operation technology systems can be affected. This includes company data, payment and scheduling systems, sensors, and control systems.	• Informational technology and operation technology systems can be affected. This includes company data, payment and scheduling systems, sensors, and control systems.
Drought	• Reduced hydroelectric generation due to low water levels. • Reduced efficiency at thermoelectric generation facilities if there are constraints on steam or cooling. • Increased wildfire risks, impacting reliability and resilience.	• Impacts to biofuel feedstocks from low moisture in soil. • Low water levels can prevent barge traffic on inland waterways. • May limit drilling and refinery operations if alternate water supply is not available.	• May limit drilling and refinery operations if alternate water supply is not available.
Dam Failure	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to flooding and debris. • Hydroelectric power generation may be disrupted, which may also reduce black start capabilities.	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to flooding and debris • Unearthing and rupturing pipelines.	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to flooding and debris • Unearthing and rupturing pipelines.
Earthquake	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to shaking and liquefaction.	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to shaking and liquefaction.	• Damage to downstream electric, liquid fuels, and natural gas infrastructure due to shaking and liquefaction.

HAZARD	ELECTRICITY	LIQUID FUELS	NATURAL GAS
Earthquake (cont)	• Power generation facilities, substations, transmission poles, etc.	• Pipeline rupture, refineries, well sites, pumping stations, etc.	• Pipeline rupture, processing plants, well sites, compressor stations, etc.
Equipment Malfunction	• Line arcing, power surges, corrosion, or moisture on equipment can cause system malfunction or go offline.	• Corrosion, material failure, excess pressure buildup, or controls malfunction can cause supply disruptions.	• Corrosion, material failure, excess pressure buildup, or controls malfunction can cause supply disruptions.
Extreme Heat	• Increased demand for cooling causing power plants to operate below reserve margins pending available capacity. • Can cause rolling brownouts and blackouts.	• Can reduce operating efficiency at refineries and terminals. • Can reduce product delivery capabilities.	• Can reduce operating efficiency at refineries and terminals. • Can reduce product delivery capabilities.
Flood	• Damage to equipment exposed to water and debris. • Underground equipment damage, such as flooding of electric cabinets and buoyancy of pipelines or storage tanks. • Power generation equipment, control center buildings, transmission lines, etc.	• Damage to equipment exposed to water and debris. • Underground equipment damage, such as flooding of electric cabinets and buoyancy of pipelines or storage tanks. • Refinery process units, tanks, underground pipelines, etc.	• Damage to equipment exposed to water and debris. • Underground equipment damage, such as flooding of electric cabinets and buoyancy of pipelines or storage tanks. • Processing plant units, underground pipelines, etc.
Landslide	• Damage to nearby electric, liquid fuels, and natural gas infrastructure. – Landslides included in the Oregon Risk Assessment are limited to those associated with the Cascadia Subduction Zone Earthquake.	• Damage to nearby electric, liquid fuels, and natural gas infrastructure. – Landslides included in the Oregon Risk Assessment are limited to those associated with the Cascadia Subduction Zone Earthquake.	• Damage to nearby electric, liquid fuels, and natural gas infrastructure. – Landslides included in the Oregon Risk Assessment are limited to those associated with the Cascadia Subduction Zone Earthquake.
Human-Made Damage	• Deliberate physical attacks on or takeovers of infrastructure. Human error can cause facilities to run outside of design parameters.	• Deliberate physical attacks on or takeovers of infrastructure. Human error can cause facilities to run outside of design parameters.	• Deliberate physical attacks on or takeovers of infrastructure. Human error can cause facilities to run outside of design parameters.

HAZARD	ELECTRICITY	LIQUID FUELS	NATURAL GAS
	- Excavation damage, such as dig-ins.	- Excavation damage, such as dig-ins.	- Excavation damage, such as dig-ins.
Human-Made Damage (cont)	- Transmission lines may be affected by individuals hitting power poles, cutting trees down, or striking underground wires. Third-party strikes on substations can disrupt service. - Car hit poles	- Third-party strikes of pipelines can rupture lines and disrupt service.	- Third-party strikes of pipelines can rupture lines and disrupt service.
Pandemic	- Shifts in demand of energy supplies and reduced worker availability.	- Shifts in demand of energy supplies and reduced worker availability.	- Shifts in demand of energy supplies and reduced worker availability.
Tropical Cyclone	- Damage to electric, liquid fuels, and natural gas infrastructure from high winds, debris, and flooding. - Power generation facilities, substations, transmission poles, etc.	- Damage to electric, liquid fuels, and natural gas infrastructure from high winds, debris, and flooding. - Pipeline pumps and tank damage — production facilities and refineries may shut down ahead of storm for personnel safety. - Shoaling in ports can prevent ship and barge traffic to terminals.	- Damage to electric, liquid fuels, and natural gas infrastructure from high winds, debris, and flooding. - Pipeline pumps and tank damage — production facilities and refineries may shut down ahead of storm for personnel safety. - Shoaling in ports can prevent ship and barge traffic to terminals.
Thunderstorm and Lightning	- Blown transformers and downed trees may affect power lines.	- Power outages may affect refinery, terminal, or pumping operations.	- Power outages may affect select electric compressor operations.
Tornado	- High winds can cause damage to power lines and power generation facilities.	- High winds can cause damage to refineries, terminals, and other aboveground facilities.	- High winds can cause damage to processing plants, compressor stations, metering and regulating stations, and other aboveground facilities.
Wildfire	- Damage to power lines and generation facilities. - Utilities may shut off power to prevent wildfires *(high temperatures and winds)*.	- Combustible material if exposed, primarily affecting above-ground infrastructure. - Curtailment of services to support fire suppression or encroaching fire.	- Combustible material if exposed, primarily affecting above-ground infrastructure. - Curtailment of services to support fire suppression or encroaching fire.

HAZARD	ELECTRICITY	LIQUID FUELS	NATURAL GAS
Winter Storm and Extreme Cold	• Freezing in cooling towers prevents electric generation. • Rail freezing affects delivering feedstock to power generation (Coal). • Can cause rolling brownouts and blackouts.	• Freezing for non-weatherized equipment including frozen product in piping system, malfunctioning flow control equipment, flaring, and production shut-ins. • Increased backup generator demand. • Rolling brownouts and blackouts can reduce product delivery capabilities.	• Freezing for non-weatherized equipment, which can cause production shut-ins. • Increased demand for heating can strain capacity. • Rolling brownouts and blackouts can reduce product delivery capabilities.

Source: U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response

Baseline Energy Infrastructure Risk Assessment

The state has completed several assessments to identify hazards, vulnerabilities, and risks facing Oregonians. This includes the Natural Hazards Mitigation Plan and the Threat and Hazard Identification and Risk Assessment. The Oregon Department of Emergency Management also provides a Hazard Vulnerability Analysis that provides a simple numerical calculation that allows local governments and Tribes to complete comparative ranking of hazards in their jurisdictions. These hazard analyses are broad in scope and do not focus on threats to the energy sectors.

In 2021, the U.S. Department of Energy produced the State of Oregon's Energy Risk Profile. This profile examines the relative magnitude of the risks that the state's energy infrastructure routinely encounters in comparison with the probable impacts. The profile identified both natural and physical hazards with the potential to cause disruption of the energy infrastructure.

Missing from state and federal risk assessments to date are thorough evaluations of energy sector threats from a pandemic, cyber or physical attacks, and extreme wildfire events of recent years.

To arrive at the clearest picture of the risk associated with Oregon's energy systems and infrastructure, ODOE retained a consultant to develop a baseline Energy Security Risk Assessment. An overview follows, and the full report is included as Appendix E.

The intent of ODOE's Baseline Energy Infrastructure Risk Assessment is to bring together all relevant existing threat information and collect new data to fill gaps to complete a quantified risk assessment of all threats to Oregon's energy systems. This product will increase awareness of risk to Oregon's energy systems so that the state, local governments, and Tribes — in collaboration with energy providers — can better prepare for supply disruptions and make more informed decisions related to energy systems and infrastructure investments, resilience and hardening strategies, and asset management.

Risk Assessment Hazards

As further described in the Risk Assessment Report, Appendix E, for each of the major energy systems (liquid fuels, electricity, and natural gas), four categories of infrastructure assets were analyzed: generation/production, transmission, storage, and distribution to end users. For the baseline assessment, nine of the top-anticipated hazards were assessed. These hazards — Cascadia Subduction Zone (CSZ) earthquake, drought, flood, lightning, wildfire, windstorms, winter storms, cyber or physical attack — were selected based on stakeholder input, frequency, potential impact, alignment with national risk assessments, and data availability.

Maps for natural hazards were generated statewide and overlain with OEM regions, using published information. Larger versions of the maps are available in the Risk Assessment Report.

Figure 66: CSZ Hazard Zones: Landslide Susceptibility

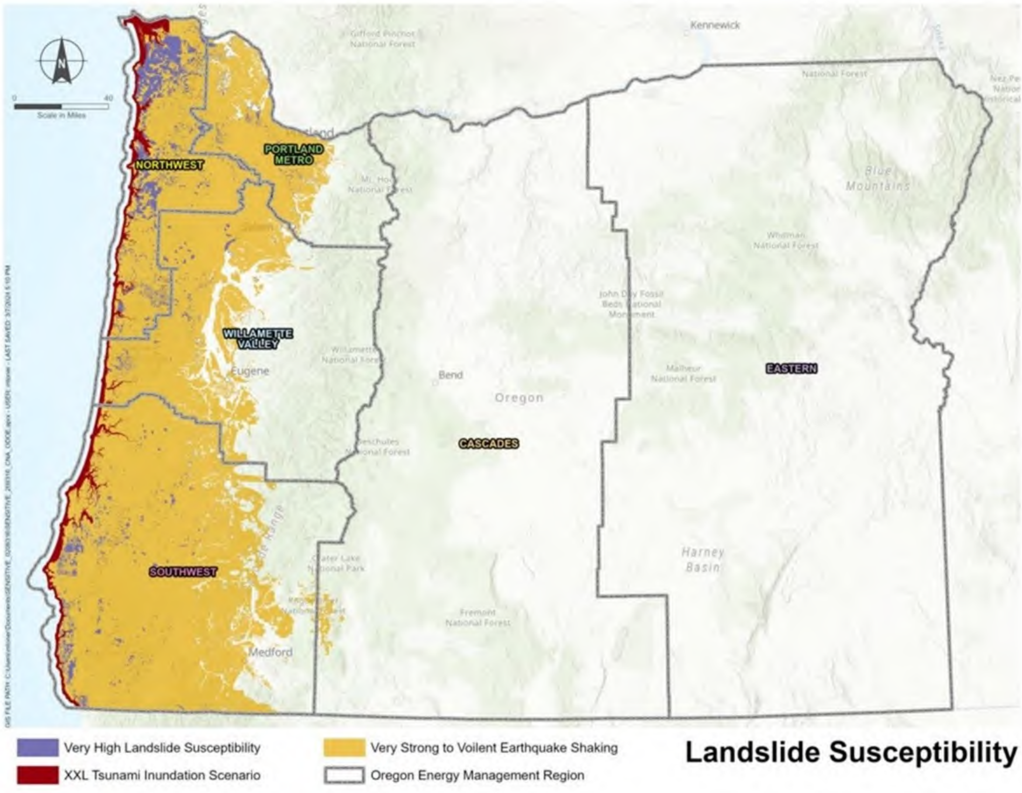


Figure 67: CSZ Hazard Zones: Liquefaction Susceptibility

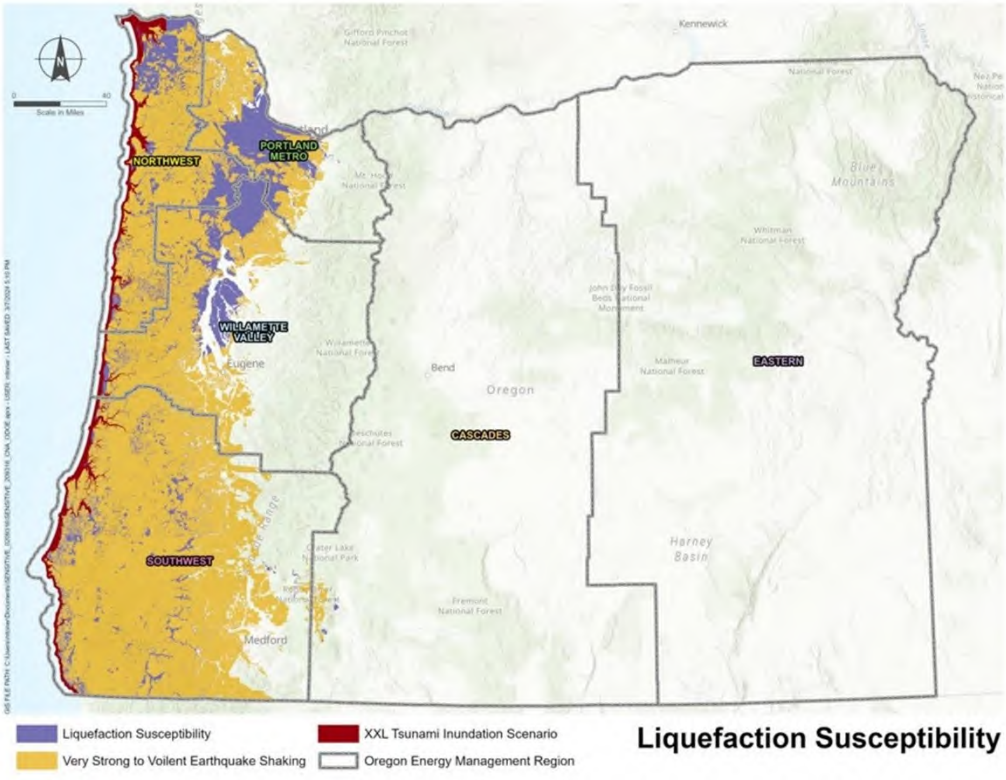


Figure 68: Annualized Drought Hazard Zone

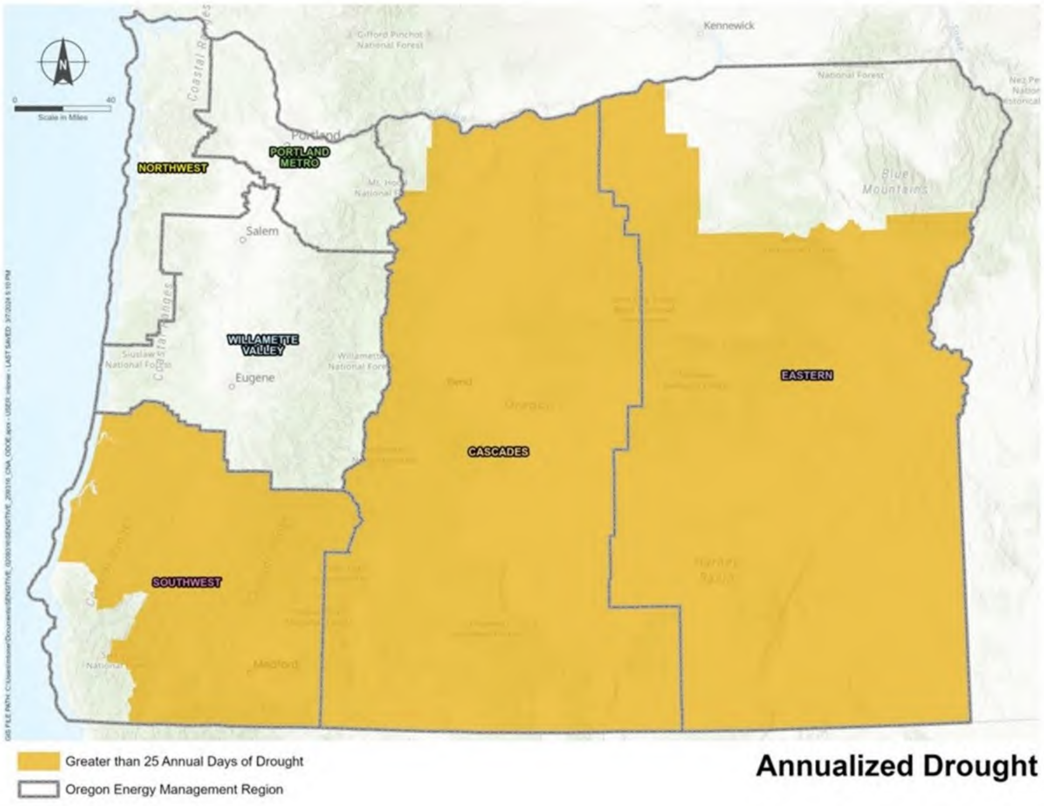


Figure 69: Flood Hazard Zone

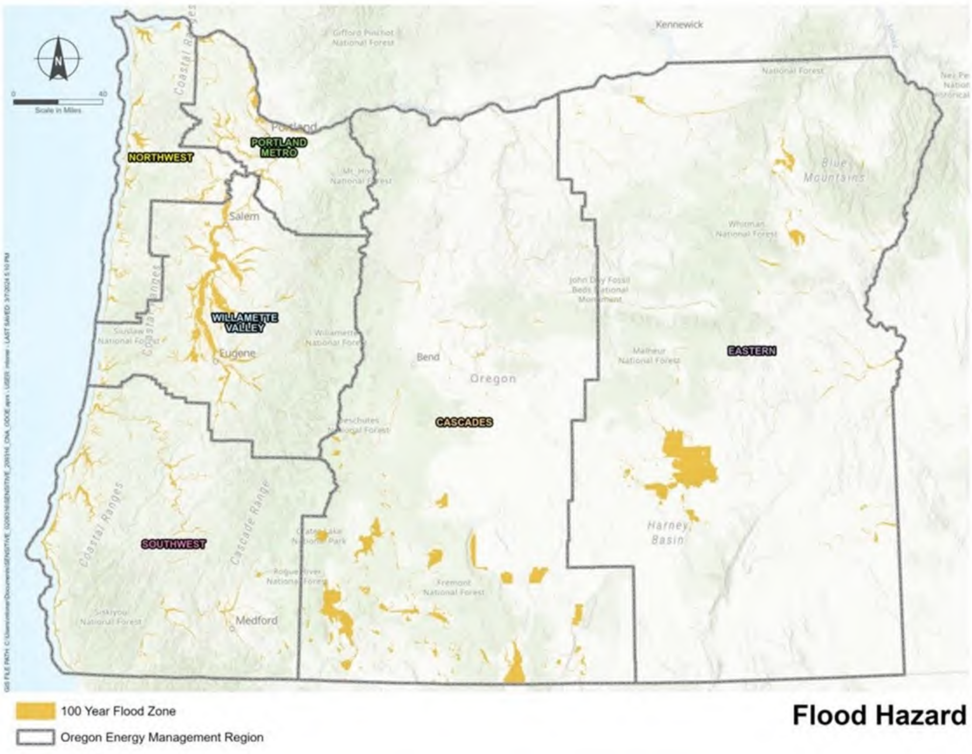


Figure 70: Damaging Lightning Hazard Zone

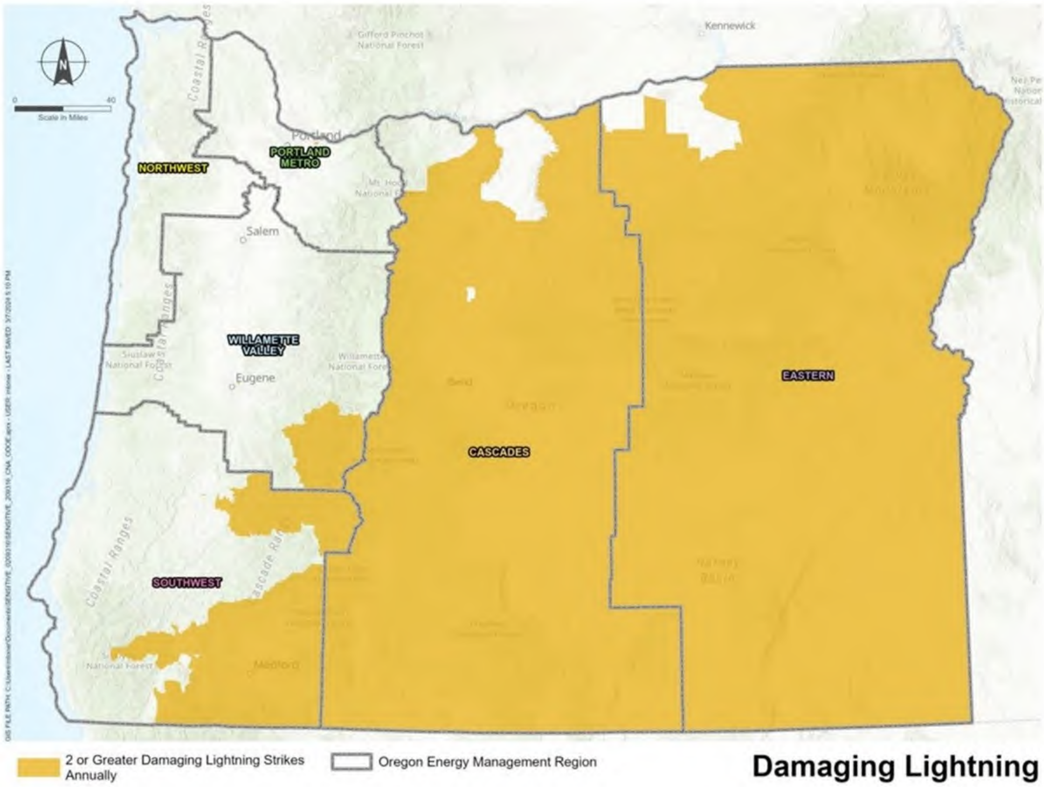


Figure 71: Wildfire Hazard Zone

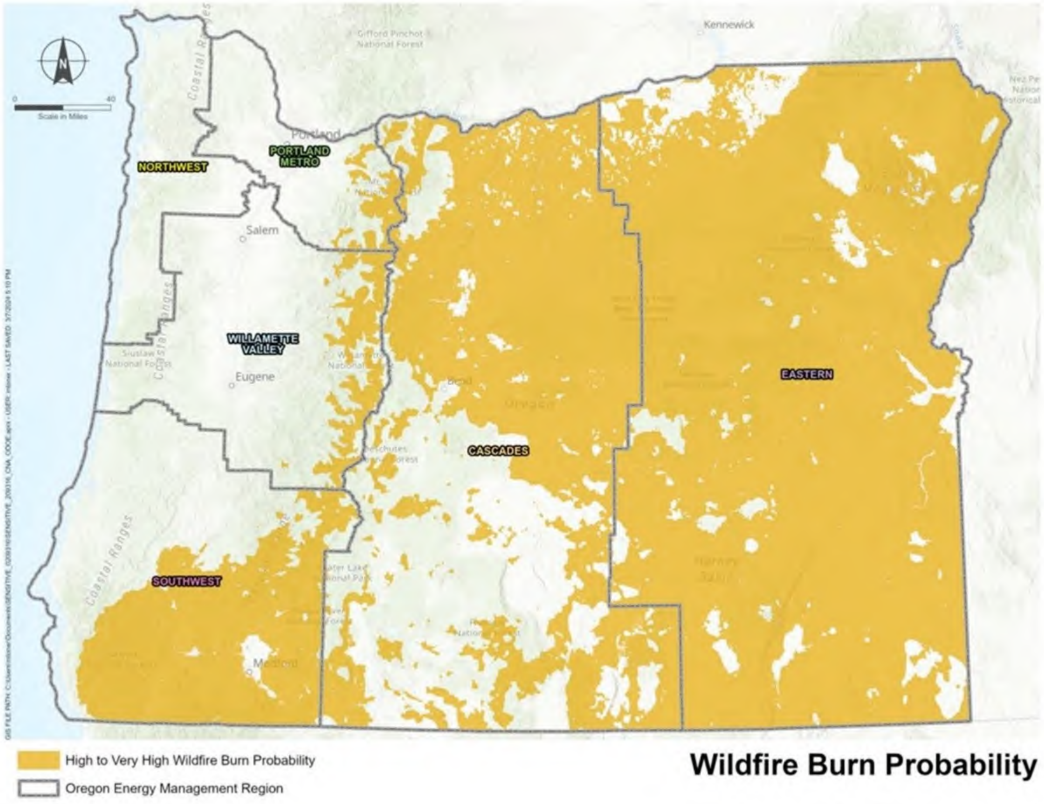


Figure 72: Windstorm Hazard Zone

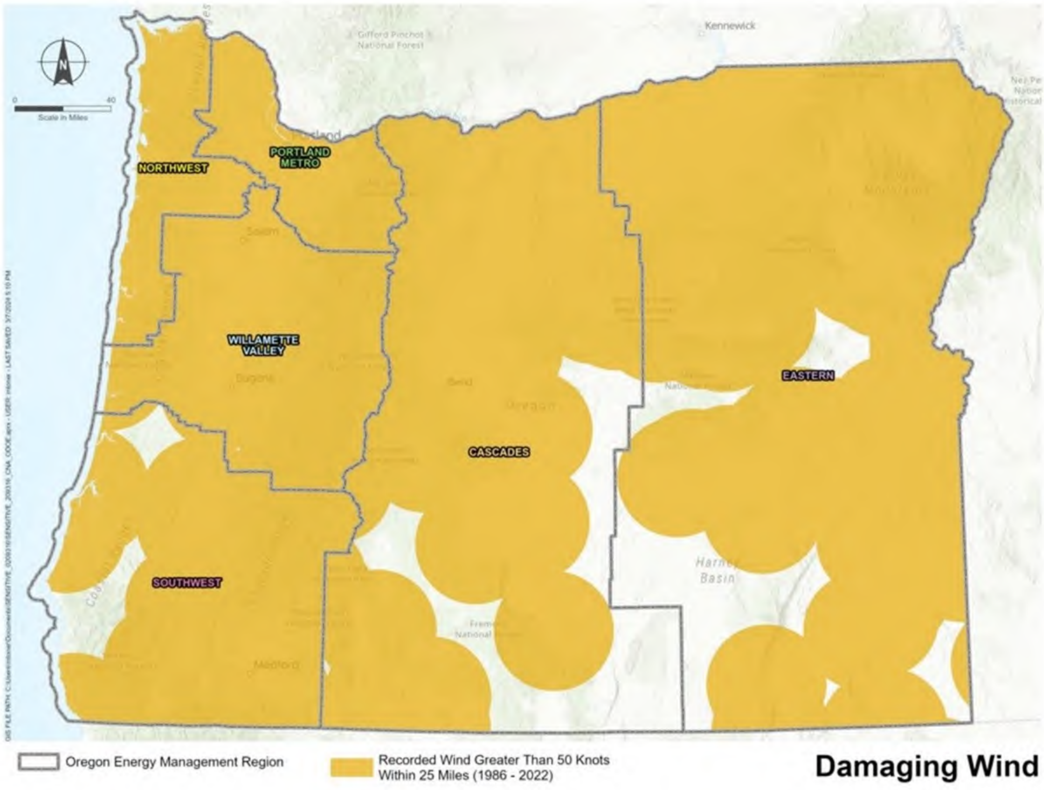
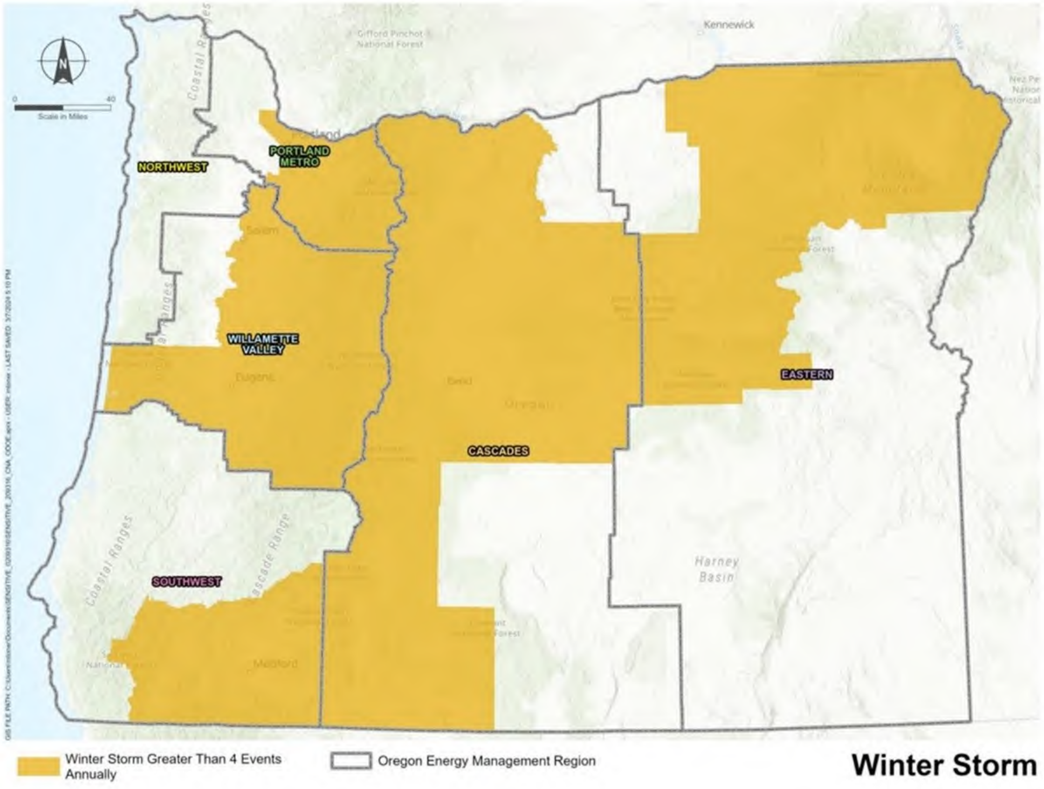


Figure 73: Winter Storm Hazard Zone

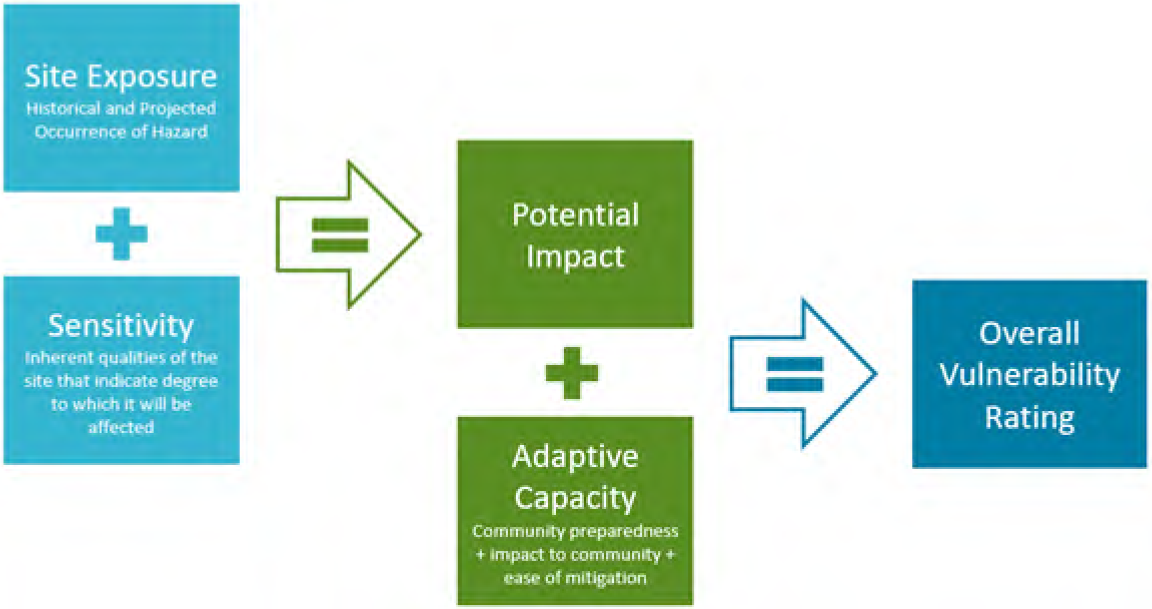


Risk Assessment Methodology

The risk assessment conducted by ODOE's contractor uses a methodology premised on best practice in hazard vulnerability assessments established by the Intergovernmental Panel on Climate Change (IPCC) for Impacts, Adaptation and Vulnerability. The framework is comprised of four dimensions of vulnerability evaluated for each system and threat, which are combined to calculate an overall vulnerability rating that denotes risk for each energy system to each hazard in each region. The four dimensions are exposure, sensitivity, impact, and adaptive capacity:

1. **Exposure** – examines the overlap of the geographic footprint of the energy system elements and hazard zones and the frequency of those hazard events.
2. **Sensitivity** – considers the conditions of the energy systems infrastructure, their physical characteristics, and interdependencies with other systems.
3. **Impact** – indicates the potential adverse consequences of the hazard, based upon system exposure to the hazard and sensitivity of system elements to the hazard.
4. **Adaptive Capacity** – considers the level of preparedness and ability to manage adverse events from the threats and hazards, such as physical mitigation measures, operational measures (including planning, training, and exercise), and policies.

Figure 74: Risk Assessment Methodology



Availability of data pertaining to each energy subsector varied. The liquid fuels system had robust data available. As such, geospatial analysis of the four dimensions was feasible. In contrast, data relating to the electric and natural gas systems was limited. For these subsectors, a survey was designed around the framework of exposure, sensitivity, impact, and adaptive capacity. Service providers (i.e., utilities) were encouraged to provide feedback specific to their system and regions in which they provide service or have assets. All three natural gas service providers in Oregon participated in the survey. In the electric subsector, 17 of 41 service providers participated, including the three investor-owned utilities that operate in Oregon and serve the majority of end-users in the state. The Bonneville Power Administration (BPA) also provided feedback to the electric subsector survey. Because the BPA serves a distinct role relative to utilities, this feedback did not affect the overall vulnerability ratings but provides additional insight into the electric subsector.

Risk Assessment Results

The vulnerability rating for each sector and region are tabulated below. The overall score is on a 1-10 scale, with 1 being the lowest and 10 being the highest vulnerability rating. For a detailed analysis, please see Appendix E. In general, vulnerability to hazards associated with wildfire, windstorms, and winter storms were consistently high across all sectors and all regions. CSZ vulnerabilities were highest in those regions where exposure is highest: in the Northwest, Southwest, Portland Metro, and Willamette Valley regions.

Fuel Sector

Based on the results of the analysis, Oregon's liquid fuels energy system is most vulnerable to the CSZ earthquake, lightning, wildfire, windstorms, and winter storms. Interviews with owner/operators indicated sensitivity of the liquid fuel system to the loss of power — a critical interdependency with the electric system. Whether is it from an extreme winter storm or other hazard, the loss of power was the single-most important factor that could affect continuity of fuel distribution, including truck racks, pumping systems, and communication systems.

Table 23: Liquid Fuels Sector Vulnerability Scores

	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	5	6	7	7	7	7
Cyberattack	5	4	5	5	5	5
Drought	6	6	4	4	6	4
Flood	4	5	4	4	4	4
Lightning	7	8	6	6	7	6
Physical Attack	**3**	**3**	**3**	5	3	3
Wildfire	7	7	6	6	6	6
Windstorm	7	8	7	7	7	7
Winter Storm	8	8	6	8	7	8

The liquid fuels methodology calculated exposure and sensitivity on a statewide scale for natural hazards, rather than regionally. Therefore, the hazard exposure and sensitivity are the same for every region. Liquid fuels vulnerability ratings presented by region and hazard. Underlined and bolded values indicate that at least one response was unknown. Colors in the table correspond to rating categories. Green represents low overall vulnerability (≤5), yellow and orange represent moderate overall vulnerability (6–8), and red represents high overall vulnerability (≥9).

Electric Sector

Based on the results of the analysis Oregon's electricity energy system is most vulnerable to the CSZ earthquake, wildfire, windstorms, and winter storms. These vulnerabilities were relatively consistent across the state, and no region is considered highly vulnerable to all hazards.

Table 24: Electricity Sector Vulnerability Scores

	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	4	5	5	5	6	4
Cyberattack	3	**2**	3	**2**	3	4
Drought	3	4	2	6	3	3
Flood	3	3	3	4	3	4
Lightning	5	4	2	4	3	3
Physical Attack	4	**2**	3	**2**	4	4
Wildfire	6	5	4	6	4	6
Windstorm	6	6	5	6	6	6
Winter Storm	7	6	5	5	5	7

Data for the electricity vulnerability analysis was collected via survey. The survey was distributed to all 41 electric utilities in Oregon as well as BPA. Responses were received from BPA and 17 service providers, including the three investor-owned utilities, which serve the majority of end users in the state. Electricity vulnerability ratings presented by region and hazard. Underlined and bolded values indicate that at least one response was unknown. Colors in the table correspond to rating categories. Green represents low overall vulnerability (≤5), yellow and orange represent moderate overall vulnerability (6–8), and red represents high overall vulnerability (≥9).

Natural Gas Sector

Based on the results of the analysis Oregon's natural gas energy system is most vulnerable to the CSZ earthquake, lightning, wildfire, and windstorms. Vulnerability to each natural hazard was consistent across all regions. For example, vulnerability ratings for each hazard varied only by +/- 1 across all regions. This is likely a result of a limited number of suppliers, each providing service to multiple regions. There were no responses for any questions pertaining to drought; thus, it received an N/A rating for each region.

Table 25: Natural Gas Sector Vulnerability Scores

	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	6	6	6	6	6	6
Cyberattack	2	3	2	2	3	2
Drought	N/A	N/A	N/A	N/A	N/A	N/A
Flood	4	4	4	4	4	4
Lightning	5	5	4	4	5	4
Physical Attack	4	4	7	7	4	6
Wildfire	5	5	5	5	6	5
Windstorm	6	5	6	6	6	6
Winter Storm	4	4	4	4	4	4

Data for the natural gas vulnerability analysis was collected via survey. The survey was distributed to the three natural gas utilities in Oregon, and all three provided feedback. Natural gas vulnerability ratings presented by region and hazard. Colors in the table correspond to rating categories. Green represents low overall vulnerability (≤5), yellow and orange represent moderate overall vulnerability (6–8), and red represents high overall vulnerability (≥9). N/A indicates no response. Note the anomalous results for physical impact are an artifact of survey response, and not an accurate representation of vulnerability.

Risk Assessment Limitations and Next Steps

This assessment provides valuable information using available data and industry self-reporting through surveys. However, any assessment is limited by the quality and quantity of inputs, assumptions, and metrics. In this case, there is a potential inherent bias in the data – that is, responses were not independently validated using third party analysis. The interpretation may also be influenced by the incomplete sample size. Additional time and resources may provide those who were not able to complete the survey a chance to do so.

Future studies should either provide repeat surveys to track change from the industry's perspective or complement the survey with additional data collection and analysis. Additionally, the hazards reviewed as part of the assessment are not all-inclusive. Future studies could rely on research yet to be conducted and evaluate emerging hazards that were not included in this study. Additionally, more specific risk assessments related to climate change impacts, extreme heat, landslides not associated with earthquakes, or even volcanic activity may be incorporated as specific hazards in future updates to the risk assessment.

Cross Sector Interdependencies

Identifying and understanding interdependencies (two-way) or dependencies (one-way) between infrastructure assets and sectors is important both for assessing risks and vulnerabilities and for energy security and resilience planning. Connections and interdependencies between infrastructure elements and sectors means that damage, disruption, or destruction to one infrastructure element can cause cascading effects, affecting continued operation of another.

The U.S. Department of Homeland Security (DHS) has identified 16 critical infrastructure sectors. DHS defines critical infrastructure as the assets, systems, facilities, networks, and other elements that society relies upon to maintain national security, economic vitality, and public health and safety. This includes energy, as all of the other critical infrastructure sectors depend on power and/or fuel to operate. A disruption or loss of the services provided by the energy sector can directly affect the security and resilience within and across numerous sectors.

For example, energy stakeholders provide essential power and fuels to key portions of the communication, transportation, and water sectors — and, in return, the energy sector relies on them for fuel delivery (transportation), electricity generation (water for production and cooling), and control and operation of infrastructure (communication). These connections and interdependencies between infrastructure elements and sectors mean that the loss of one or more function typically has an immediate impact on the operations of multiple sectors. As a result, additional functions in additional sectors may be lost as time passes.

Further, identifying and officially recognizing cross-sector interdependencies prompts collaboration and information exchange, allowing each sector to mitigate potential vulnerabilities that promote continuity of operations and services during emergencies.

The figures below show key dependencies and interdependencies between the energy sector and other critical infrastructure sectors. Following the figures, is additional information describing specific Oregon interdependencies and context.

Figure 75: Electricity Cross Sector Interdependencies

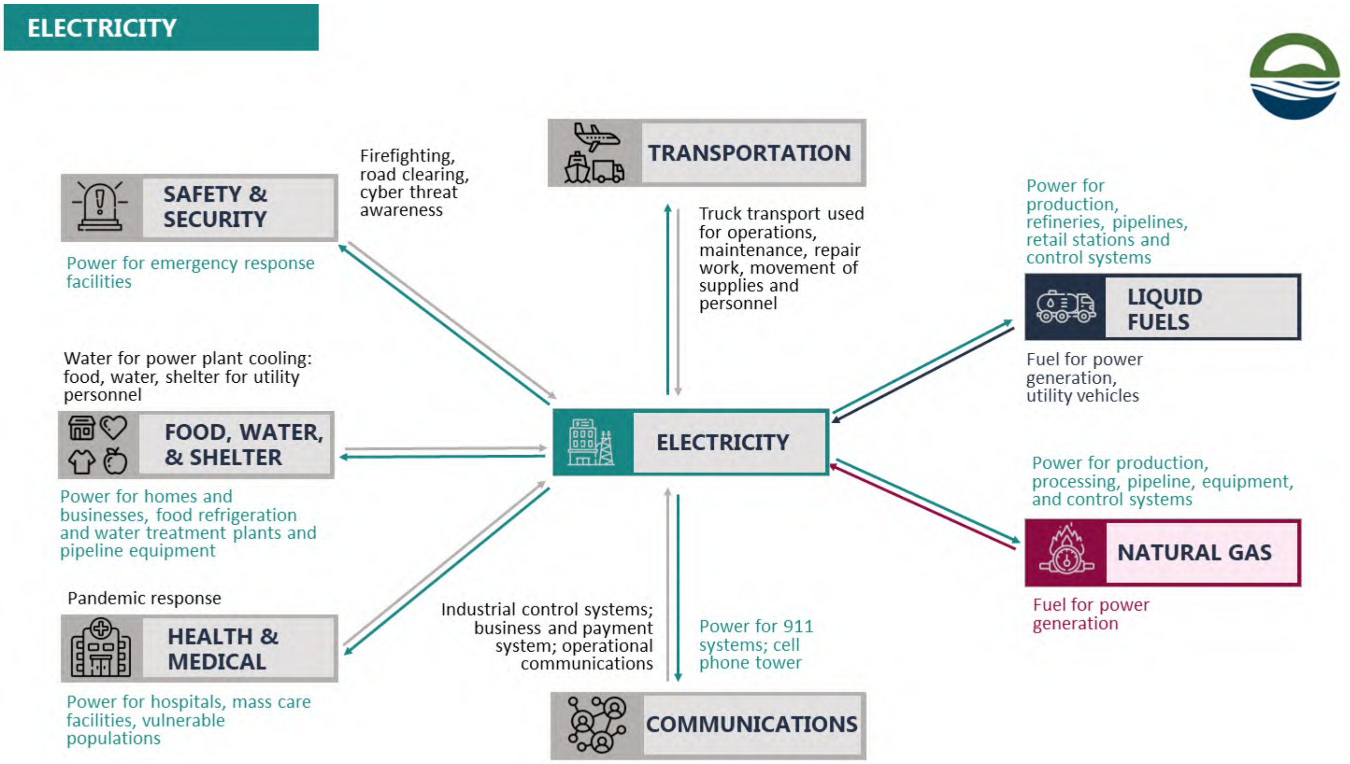


Figure 76: Liquid Fuels Cross Sector Interdependencies

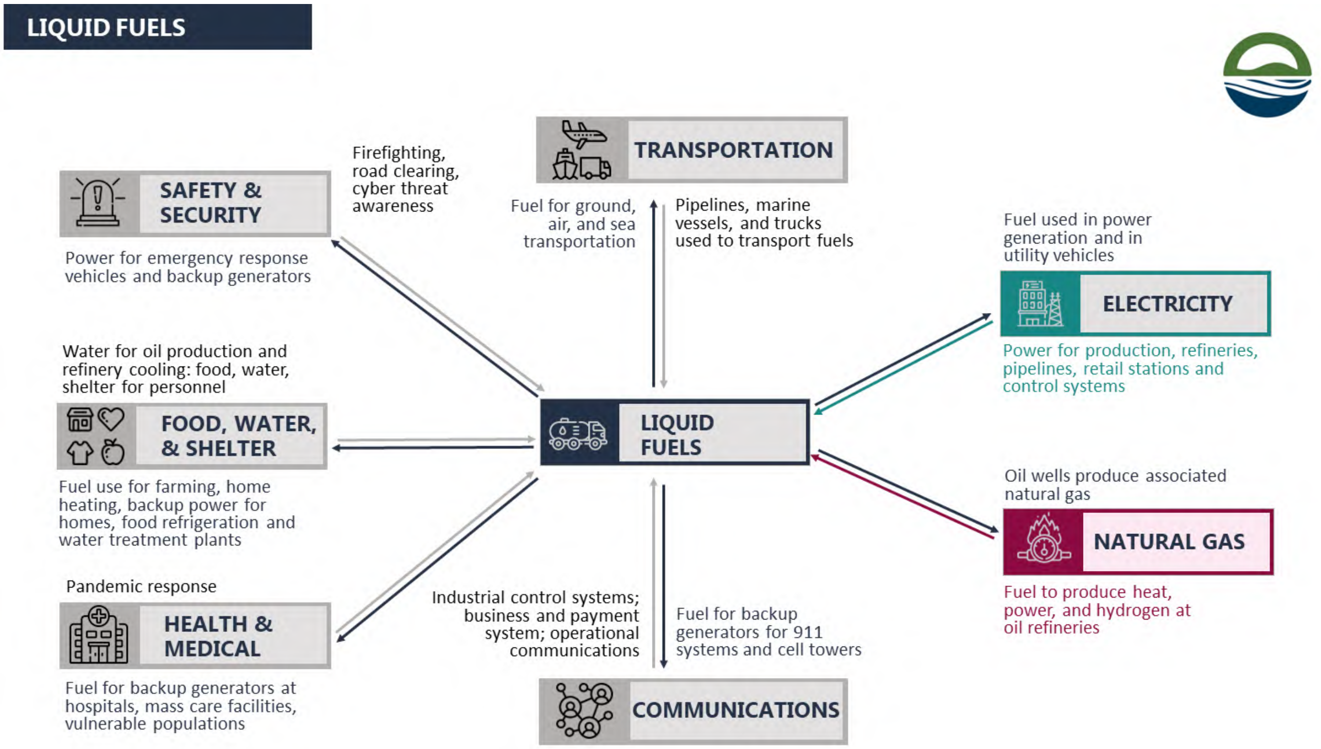
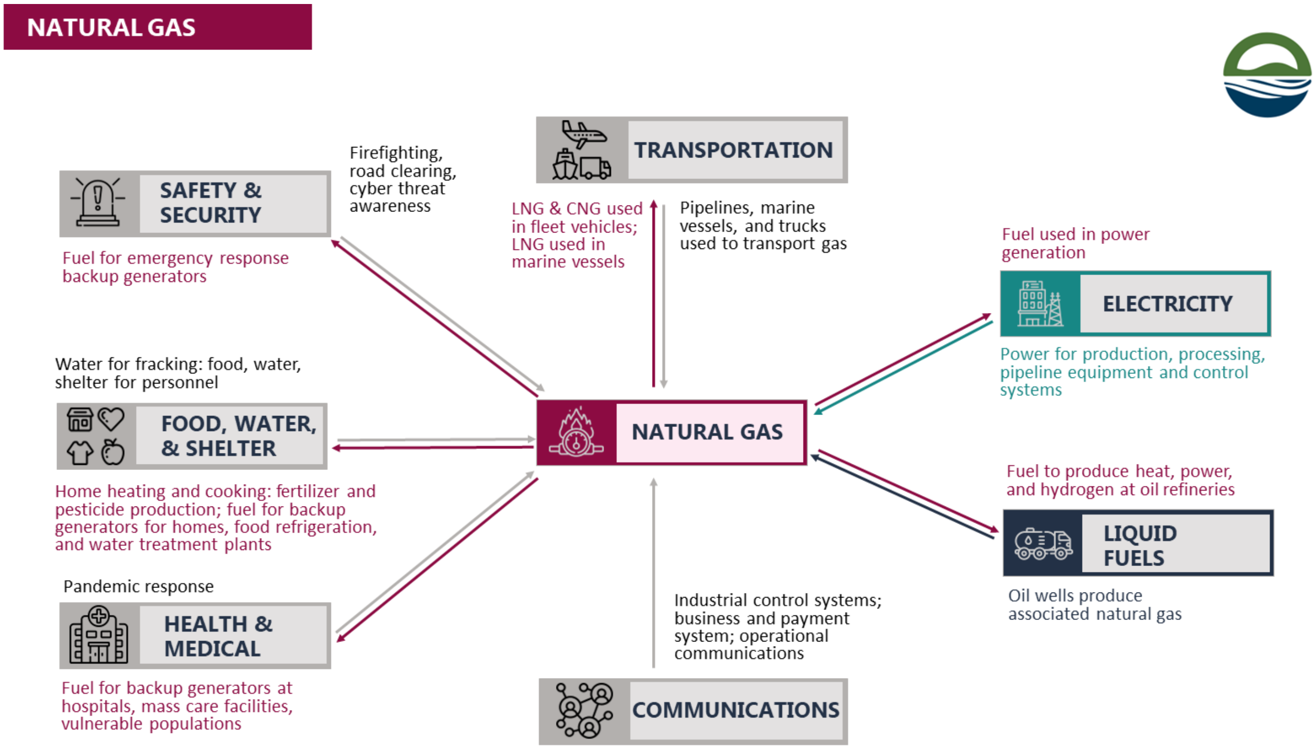


Figure 77: Natural Gas Cross Sector Interdependencies



Energy Sector Interdependencies: Oregon Context

Evaluation of Oregon's energy sectors is complicated by the large-scale interdependencies between energy types. For example, 31 percent of Oregon's electric generation is from natural gas. Natural gas plants play different roles in electricity grid management, including serving as steady dispatchable power generators and acting as highly flexible generators that can ramp up and down quickly to meet constantly changing electricity demand. Oregon's largest electric utility, Portland General Electric (PGE), and its largest natural gas utility, NW Natural, rely on each other's services to provide energy to Oregonians. The NW Natural gas pipeline transmission system is used to provide gas for some of PGE's natural gas-powered generation facilities, and the NW Natural Mist Natural Gas Underground Storage Facility, located in Columbia County, has a dedicated storage reservoir and pipeline system exclusively used for storage and supply to the nearby PGE natural gas power generation facilities. Additionally, Oregon also has a fleet of natural gas-fueled electricity generation facilities in Morrow, Umatilla, and Klamath counties. These power plants rely upon natural gas primarily from the GTN ("Gas Transmission Northwest") pipeline, owned by TC Energy, which sources natural gas for this system from Canada. TC Energy recently completed a significant project on the pipeline system, specifically upgrading gas compressor stations.

Inversely, the natural gas industry in Oregon also relies upon electricity for its operations, such as pumps and equipment operations (see Part V and VI for further information). In light of the significant and growing interdependence and importance of these systems, in 2025, the Northwest Gas Association and Pacific Northwest Utilities Conference Committee published a literature review highlighting recommendations to increase coordination among natural gas and electric systems to enhance reliability and resilience (See Section VIII).

Similarly, the liquid fuel and electricity sectors are also intrinsically connected in Oregon. Electric power is required for pipeline operation, terminal maintenance, and transfer from storage tanks into delivery trucks. In terms of emergency response, electricity is needed at designated fuel distribution points and emergency fueling locations for responders to fuel up their response vehicles, which in turn are necessary to assess and repair damages to the electric and natural gas distribution network. Operators at the petroleum terminals also need electricity to conduct damage assessments to the facilities, tanks, equipment, and systems. Liquid fuels are also vital for use by electric and natural gas utilities for many purposes, including vehicle operations, pumping, pipeline operation, and emergency response. For instance, in winter 2023, part of Oregon Highway 101 on the south coast in Curry County experienced a significant landslide, limiting vehicle traffic to the region – including fuel trucks. ODOE worked with the local electric co-operative (Coos-Curry Electric Co-op) to ensure it had fuel for its utility trucks to respond to power outages in the region (see part X) When electric utilities are unable to provide services for critical sites, the interdependencies are at the forefront of emergency planning - ensuring that fuel is available for generators to support life safety and communications. An important planning and mitigation consideration across Oregon is that emergency responders should consider how, and if, they can operate without electricity for extended periods of time. Backup power generation for critical facilities and operations is vital.

Another specific example of the significance and impact of energy sector interdependencies in Oregon and the Pacific Northwest is described in the Oregon ESP executive summary on page i. In January 2024, a major winter storm struck the region, leading to very high demand for electricity and natural gas (both for power generation and residential home heating). Furthermore, a major regional natural gas storage facility located in southwest Washington state – but used by Oregon utilities – suffered an issue related to the cold temperatures affecting equipment. Oregon gas utilities had to request reduced use by customers as a result. While the worst impact was avoided thanks to quick repairs at the natural gas storage facility, if natural gas were further limited, it could have severely affected power generation capacity in Oregon and also increased demand for electricity for home heating if natural gas was not available. These coupling impacts could have crippled Oregon's power grid at the most critical time for life-safety of Oregonians.

Finally, as described throughout the Oregon ESP, Oregon's energy sectors are very dependent on each other: natural gas is a significant source of electricity production in Oregon; the natural gas industry in Oregon relies upon electricity for its operations; liquid fuels are used by the electric and natural gas utilities for vehicle operations; and liquid fuels rely on electricity for multiple purposes, including pumping of fuels for transmission and distribution.

Community Lifeline Interdependencies

Beyond interdependencies within the energy sectors, the state's co-leads at ESF-12 – ODOE and OPUC – support actions across community lifelines in Oregon on energy emergency preparedness and response. At both the micro and macro levels, energy is critical and interdependent with all lifelines and infrastructure sectors. For example, without electricity or liquid fuel, food may spoil or not be distributed. Without electricity or fuels for generators, hospitals cannot function, vulnerable populations will suffer, and water/wastewater systems may not be operable. Without energy, police and firefighters cannot travel to respond to emergencies, and 911 centers or cell phone networks will not operate.

ODOE and OPUC work closely with tribal nations; state, local, and federal agencies; non-government organizations, and, and the private sector, to better understand and prepare for potential impacts to energy systems that could disrupt lifelines or infrastructure systems for Oregonians. ODOE works closely with ESF-1 transportation (Oregon Department of Transportation) on planning and exercises to ensure that emergency response vehicles and heavy equipment have necessary fuel to carry out their mission when energy supplies are disrupted. ODOE also routinely works with state, federal, and local partners on wildfire fighting operations to ensure that both ground and aerial operations have the fuel needed to fight wildfire (ESF-4, firefighting). ODOE in its role as ESF-12 fuels supports delivery of liquid fuels to small water/wastewater utilities in rural Oregon during winter storms to support generator backup power when electricity is disrupted. OPUC and ODOE coordinate with electric utilities on public safety power shutoffs to ensure that gas stations providing fuel to emergency responders are not shut off from electricity if there is no other way to pump fuel to vehicles.

As part of the Oregon ESP development process, ODOE and OPUC met with many state agencies, such as with the Oregon Department of Transportation, and the Oregon Department of Corrections, to discuss critical needs for fuel as part of emergency planning. Additionally, ODOE met with the nine federally-recognized Tribal Governments' emergency management staff to discuss energy security for tribal nations, including tribally-operated critical facilities – in fact, this meeting occurred at the Tribal Health Clinic at the Confederated Tribes of the Umatilla Indian Reservation in Northeast Oregon, highlighting the importance of cross-sector interdependencies between energy and medical/health systems (ESF 8, health and medical). The Oregon Heath Authority provides a dedicated full-time staff member to coordinate the Tribal Emergency Coalition, which supports Tribal Governments in emergency planning and response, including the energy sector. In 2026, ODOE is planning to further advance our state agency fuel emergency planning and response capabilities by conducting a significant emergency exercise focused on fuel needs (Section X contains additional information regarding planned future exercises).

Risk Assessment Updates

The hazard landscape and associated vulnerabilities across energy systems in the state are not expected to change rapidly. However, as updates or additions are made to the Baseline Energy Infrastructure Risk Assessment, they will be described in this section.

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VIII. RISK MITIGATION AND IMPROVING ENERGY SECURITY

Oregon is geographically diverse. The state consists of mountainous regions, large valleys, high-elevation desert plateau, dense evergreen forests, large cities, and more than 360 miles of coastline.

Risks to one region of the state differ from another due to the varied climate and topography. Hazards facing Oregon's coastal communities like tsunamis, erosion, and landslides differ from wildfire threats along the Cascade Mountains or the high desert in the central and eastern part of the state. An earthquake along the Portland Hills Fault would endanger the Portland-Metro region, while the Cascadia Subduction Zone earthquake event has the potential to threaten the entire western part of the state, as well as parts of Washington, British Columbia, and northern California. There is also significant variation in population density across the state. Mitigation in a dense urban center may look very different from strategies focused on low-density rural communities. Cybersecurity incidents are a risk to all Oregonians no matter where they live.

This section describes the work completed to identify, evaluate, and prioritize mitigation measures to reduce risks to the energy systems in Oregon, with a focused look at each region. The section also highlights state programs and activities underway to improve Oregon's energy security and resilience; ongoing resilience efforts are discussed in further detail in Section X. This work is guided by two definitions: from the federal government, a definition of "resilience," and a definition of "energy security" used by Oregon for this project. Resilience is a significant component of energy security. Presidential Policy Directive 21 from 2013 provides a fitting definition of resilience, and the definition of energy security used for this report and presented in Section I is repeated below. This section is adopted from a comprehensive report and analysis of Mitigation Measures included as Appendix F to this report, and includes much more detail on the process, specific measures, and regional prioritization. The Mitigation Measure report was completed by CNA and Haley & Alrich, as ODOE's consultants.

The Oregon Energy Strategy (coming November 2025) will include additional analysis and information related to Oregon's evolving energy risks, as well as ongoing efforts and proposed recommendations to reduce those risks and improve energy resilience. The Energy Strategy aligns with the Energy Security Plan in many ways, perhaps most in the focus on resilience and readiness to meet tomorrow's energy needs. As described in both reports, Oregon needs to be ready to provide the energy generation and transmission assets necessary to meet rising electricity demand, increase resilience, and meet greenhouse gas reduction goals. Additionally, as described through this plan, Oregon's fuel infrastructure is at risk from multiple hazards, and the region's petroleum refineries are outside Oregon and thus subject to policy decisions of other state governments. To this end, Oregon should work to reduce the risks to our fuel infrastructure and improve our fuel storage diversification across the state, primarily to improve emergency preparedness and response capabilities. As is further discussed in the Energy Strategy, Oregon should consider incentivizing in-state production of low-carbon liquid fuels, both to meet our state's greenhouse gas reduction goals and to reduce our dependency on out-of-state fuel refining. Finally, it is important to reiterate the interdependencies between energy systems – fuel refining and other important large-scale fuel-energy projects (for example, renewable natural gas or hydrogen) must have sufficient electricity and associated infrastructure to meet facility demands. It is particularly important that all regions of our state have the energy needed to power our future. As is noted in the Energy Strategy, rural regions of Oregon, in particular, lack electricity capacity to attract major industrial facilities, such as low-carbon fuel projects or other energy risk-reduction measures.

Presidential Policy Directive - 21

"Resilience is the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."

Oregon's Energy Security Definition

"To ensure a reliable and resilient supply of energy at an affordable price – through efforts to identify, assess, and mitigate risks to energy infrastructure and to plan for, respond to, and recover from events that disrupt energy supply."

Inventory of Energy Infrastructure Mitigation Strategies

The OR ESP project team started with US DOE's inventory of potential risk mitigation measures for energy infrastructure to inform the mitigation measures evaluated as part of this assessment for Oregon.

Mitigation measures are generally divided into categories that align with three of the "infrastructural qualities" outlined in the Department of Homeland Security's Resilience Framework. For the OR ESP, additional qualities were also considered: **Research, Planning, and Training;** and **Equity**:

- **Rapid Detection/Recovery** – measures that accelerate the time it takes to overcome a disruption and restore energy services.
- **Redundancy** – measures that allow for alternate options, choices, and substitutions when a system is under stress.
- **Robustness** – measures that strengthen a system to withstand external hazards without degradation or loss of functionality.
- **Research, Planning, and Training** – measures that ensure up-to-date information is incorporated into planning and that responders know how to best implement the plan.
- **Equity** – measures that remove institutional barriers or undue environmental burden to historically underserved communities. Resilience and mitigation must be beneficial to all, not only those who can afford the price tag.

Prioritized Mitigation Measures by Region

The Baseline Energy Infrastructure Risk Assessment described in Section VII provided the base for evaluation of mitigation measures. The OR ESP project team considered both statewide and region-specific risk mitigation strategies for critical energy assets and systems, and traveled around the state to engage stakeholders and the nine federally recognized Tribes in Oregon in person to collaborate on mitigation strategies specific to the six regions. The full summation of this effort, the Mitigation Measures report, is included as Appendix F.

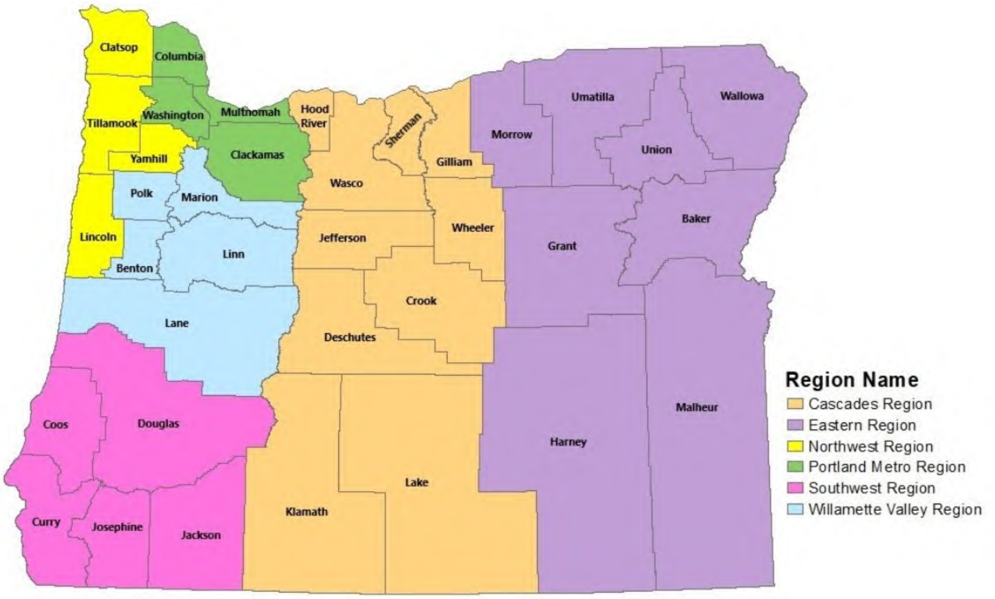


Table 26: Energy Security Plan Outreach in Six Regions

Region	Counties
Eastern	Baker, Grant, Harney, Malheur, Morrow, Umatilla, Union, and Wallowa
Cascades	Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, and Wheeler
Portland Metro	Clackamas, Columbia, Multnomah, and Washington
Northwest	Clatsop, Lincoln, Tillamook, and Yamhill
Willamette Valley	Benton, Lane, Linn, Marion, and Polk
Southwest	Coos, Curry, Douglas, Jackson, and Josephine

Engaging a wide range of people and organizations — including policymakers, planners, community groups, organizations representing historically underserved communities, system operators, and Tribes — by region aids in in-depth and comprehensive analyses to identify and quantify energy sector threats and measures to mitigate risks. It also creates greater buy-in to support implementation of both regional and statewide risk mitigation approaches. This engagement approach also aligns with DOE guidance for risk mitigation development provided in the August 2024 *Risk Mitigation Approach Guidebook for State Energy Security Plans*.

Risk Mitigation Measures

To evaluate mitigation measures for evolving threats to the energy sectors, ODOE retained a project consulting team to support technical analysis and evaluation. The team was tasked with conducting a baseline risk assessment for energy systems (Section VII), evaluating Risk Mitigation Measures (this Section), and producing an evaluation toolset to recommend sites to diversify fuel storage around the state (Section IX). While each product is distinct, there are interconnectivities between the three reports – the risk assessment was used to inform mitigation measures and fuel site selection tools.

Early in the mitigation assessment, partners in the liquid fuel and electric and natural gas utility sectors were asked to conduct a self-assessment as to the maturity of their response and preparedness to hazards and vulnerabilities. At a series of meetings around the state, regionally interested parties were presented with the hazards and vulnerabilities on a statewide level as well as those specific to their regions. The self-reported maturity information for providers in the appropriate region were also presented. The meeting participants were then asked to prioritize mitigation measures for their region for all identified hazards. For natural hazards, mitigation measures that were considered included the physical measures outlined in the table below

Table 27: Risk Mitigation Physical Measures

Risk Mitigation Measure	Descriptions
Use of Drones	Develop drone inspection capabilities (and procedures) to identify deficiencies, decrease response time, and increase situational awareness.
Hardening	Harden and upgrade components.
Monitoring	Establish automated and remote monitoring systems.
Protect	Improve maturity of measures related to the Protect category for human-caused threats.
Redundancy	Identify alternate facility sites (i.e., backup operations centers).
Redundancy	Increase fixed and/or portable backup generator capacity to provide backup power to critical facilities when grid-supplied power is interrupted.
Redundancy	Reduce isolation of critical facilities (i.e., backup access routes, backup communication systems).
Removal	Remove assets out of hazard zone.
System Segmentation	Subdivide energy systems to more efficiently isolate damaged areas, allowing undamaged segments to continue serving customers.
Undergrounding	Replace overhead with underground cables.
Vegetation Management	Manage vegetation to minimize impacts of natural hazards.
Weatherization	Weatherize energy system assets.

Operational measures were also considered and assessed, outlined in the table below.

Table 28: Risk Mitigation Operational Measures

Risk Mitigation Measure	Descriptions
After-Action Reports	Generate incident After Action Reviews and incorporate lessons learned into plans or other mitigation actions with the goal to reduce incidents, and improve efficiency and effectiveness of future response.
AI	Integrate artificial intelligence into operational plans/monitoring (AI analysis can augment the abilities of subject matter experts to prioritize transmission line operations, identify defects, and update asset management systems).
Audits	Audit resilience strategies and recommend improvement plans.
Inventories	Maintain inventories of equipment and inter-operability/mutual aid.
Maturity	Improve maturity of measures across all categories for human-caused threats.
MOUs	Develop Memorandums of Understanding with government. Having the paperwork in place before the event will reduce confusion and minimize delays, as well as establish reliable partnerships and set clear expectations.
Planning	Develop scenario-driven emergency response plans including back-up communications and employee preparedness.
Projections	Improve forecasting and situational awareness abilities.
Reduce Demand	Develop peak Demand Reduction Programs.
Redundancy	Have secondary key suppliers in place.
Risk Maps	Maintain baseline risk maps to inform long term investments and programs.
Studies	Comprehensive, site-specific risks to inform Capital Improvement Plans (CIPs) and Asset Management Plans (AMPs).
Studies	Lifeline service delivery systems and disaster resilience.
Studies	Assess current supply chain resilience for continuity planning.
Training	Conduct regular training and exercises.

For physical threats and cyber-attacks, mitigation measures fell into the following categories:

- Identify
- Protect
- Detect
- Respond
- Recover

The mitigation measures provided for physical and cyber-attacks were distinct for each category, as well as from those for natural hazards.

Resilience Ranking Results

Across the state — and in all energy sectors — there are clear areas where mitigation measures could be moved forward and matured, as identified by the energy providers' self-assessment surveys. In addition to those opportunities for additional benefit, the results of the analysis and statewide engagement indicates several priorities to mitigate vulnerabilities. Responses from all energy sectors acknowledged that continued resilience and mitigation measures are necessary for the evolving cyber and human physical threats. Industry reported that mitigation measures related to cyber-attacks were fairly well embedded in their operations, although as hazards evolve so must countermeasures.

At the statewide level, measures related to **Redundancy**, **Hardening**, **Upgrading**, and **Weatherizing** were among the most frequent physical measures recommended while numerous operational measures related to studies, plans, and procedures were the most frequent. Stakeholders ranked developing **drone inspection capabilities and procedures**, **removing assets out of hazard zones**, and **improving maturity of measures related to the Protect category of mitigation measures for human-caused threats** as the top three physical measures. The top three operational statewide measures included **integrating artificial intelligence into operational plans/monitoring, generating incident after-action reviews**, and **conducting studies on lifeline service delivery systems and disaster resilience**.

At the regional scale, the threats that recommended measures were most frequently associated with included the Cascadia subduction zone earthquake, human-caused threats, and windstorms. This was observed for all three energy subsectors: electricity, natural gas, and liquid fuels. In addition, wildfire was a dominant threat for which measures were recommended in the electric and natural gas subsectors, while winter storm was included in the top threats for liquid fuels. Prioritization of recommended measures and associated threats for each energy subsector varied by region, and are presented in detail in Appendix F.

A Note on Equity

Of all the metrics in this Energy Security Plan, equity is the hardest to quantify. However, we know that the most effective mitigation measures are often the ones with the highest up-front cost. Since historically underserved and under-resourced communities may also be located in areas most vulnerable to hazards, the information in this document can be leveraged to assist these communities to enact high-impact mitigation measures. Security and resilience equity is not only good for historically underserved populations — the fastest recovery to a disaster is one that is averted.

Recent and Planned Mitigation Actions

A detailed overview of recent significant mitigation actions is presented in Section X of this document, and planned activities related to mitigation are described in Section XI. However, key activities accomplished or planned are listed below. Note that the measures here rely upon government-led activities in partnership with communities or energy companies; energy companies also regularly implement impact mitigation actions across their service territories:

- Electric Sector Wildfire Mitigation Plans (Electric Utilities/PUC)
- Large fuel tank seismic mitigation assessment and plans (Fuel terminals/ODEQ)
- County Energy Resilience planning (Counties/ODOE)

- Grid Resilience (Electric Utilities/ODOE)
- Community Resilience hubs (Oregon Department of Human Services/community partners)

Resilience Resources

Mitigating impacts from hazards to the energy system is a topic that is constantly being reevaluated, and the guidance for best practices is ever-changing. Below are resources focusing on ways to increase the resilience of energy systems. Note: this is not a comprehensive list of resources.

Northwest Gas Association and Pacific Northwest Utilities Conference Committee. 2025. *NWGA/PNUCC Literature Review Findings Brief*.

This literature review presents key findings, gaps, and recommendations for increasing coordination among natural gas and electric systems to enhance reliability and resilience in light of rising energy demand and increased extreme weather events in the Pacific Northwest. The findings brief is intended to inform regulators, policymakers, and utilities.

Oregon Department of Energy. 2019. *Oregon Guidebook for Local Energy Resilience*.

The guidebook is intended to help Consumer Owned Utilities' staff identify incremental actions they can take to: 1) Improve business continuity planning; 2) Develop a framework to prioritize investments in distributed energy resources; and 3) Better understand the role of local utilities within the context of federal, state, and local emergency management planning. The Guidebook includes a Resilience Resource List and Resilience Guidance Deep Dives addressing a number of resilience topics, including distributed energy resources, State of Oregon emergency planning resources, the Federal Emergency Management Agency's role, and others.

Institute of Electrical and Electronics Engineers. 2020. *Resilience Framework, Methods, and Metrics for the Electricity Sector*.

This report provides an overview of resilience definitions (including its relationship with reliability), the existing frameworks for holistically defining resilience planning and implementation processes, and the metrics to evaluate and benchmark resilience. It also evaluates technologies, tools, and methods to improve electrical system resilience.

National Renewable Energy Laboratory. 2019. *Energy Resilience Assessment Methodology*.

This report presents a replicable energy resilience assessment methodology for sites, military bases, and campuses to assess energy risks and develop prioritized solutions to increase site resilience.

National Renewable Energy Laboratory. 2019. *Power Sector Resilience Planning Guidebook: A Self-Guided Reference for Practitioners*.

This guidebook introduces policymakers, power sector investors, planners, system operators, and other energy-sector stakeholders to the key concepts and steps involved in power sector resilience planning.

U.S. Climate Resilience Toolkit. 2019. *Building Resilience in the Energy Sector*

Examines climate change challenges for the energy sector, possible actions to mitigate risk and links to resources.

U.S. Dept. of Energy. 2016. *Climate Change and the Electricity Sector: Guide for Climate Change Resilience Planning*.

This report provides basic assistance to electric utilities and other stakeholders in assessing vulnerabilities to climate change and extreme weather, and in identifying an appropriate portfolio of resilience solutions.

Electric Power Research Institute (EPRI). 2016. *Electric Power System Resiliency*.

This report describes innovative technologies, strategies, tools, and systems that the electricity sector is developing and applying to address resiliency. The report explores three elements of resiliency: damage prevention, system recovery, and survivability.

U.S. Dept. of Energy. 2014. *United States Fuels Resiliency Volume III: U.S. Fuels Supply Infrastructure Vulnerabilities and Resilience*.

This study evaluates the ability of the nation’s oil and natural gas transportation, storage, and distribution infrastructure to respond to and recover from natural disasters and intentional acts, system chokepoints and interdependencies, and other supply interruptions.

U.S. Dept. of Energy. 2010. *Hardening and Resiliency: U.S. Energy Industry Response to Recent Hurricane Seasons*.

This report examines the storm hardening and resilience measures that refiners, petroleum product pipeline operators, and electric utilities in the Gulf Coast area took in response to the 2005 and 2008 hurricane seasons. It focuses on the segments of the energy industry that contribute most to the delivery of gasoline and diesel to the Southeast U.S.

IX. FUEL RESOURCE EVALUATION

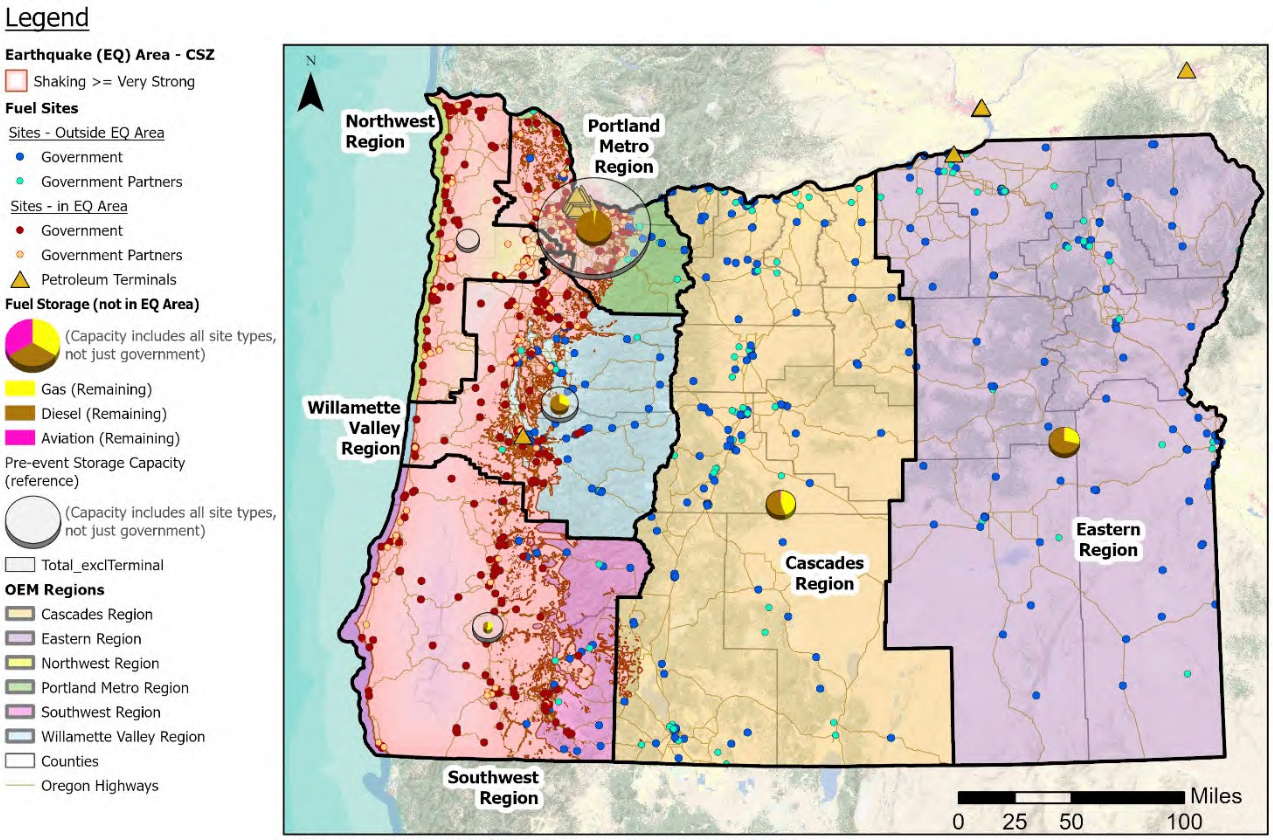
In 2022, the Oregon Legislature passed Senate Bill 1567. This legislation resulted from recommendations identified in an Oregon Seismic Safety Policy Advisory Committee fuel report, published in 2019. The bill has two major components: 1) directs the Oregon Department of Energy to prepare this Energy Security Plan in accordance with federal requirements, and to also evaluate additional fuel resilience strategies; and 2) directs the Oregon Department of Environmental Quality to regulate seismic resilience of certain large fuel tanks. DEQ has largely completed its requirements, and the adopted rules are available online.

This section of the OR ESP focuses on providing the fuel resilience evaluation, as directed under Section 12 of SB 1567. A narrative fact sheet with the applicable clauses and ODOE actions is presented as Appendix I.

Oregon Department of Energy's Role

Fuel storage capacity across the state, whether owned by the private or public sector, is adequate to meet regular operational needs. However, during emergencies, if fuel resupply is affected, fuel shortages can arise and hamper emergency response functions (see Section X). Furthermore, the fuel storage capacity that currently exists – specifically fuels available for emergency response and recovery operations – is expected to be severely affected in the case of a Cascadia Subduction Zone earthquake. ODOE's ESP contractor has evaluated the specific hazards facing fuel storage facilities in Oregon; Figure 78 illustrates these realities. The risk is most acute in western Oregon, but Central and Eastern Oregon will also be affected by a major earthquake due to impacts to fuel distribution systems and supply lines, as most fuel in Oregon is delivered from the Portland or Eugene fuel terminals.

Figure 78: Post-CSZ Event Fuel Sites and Storage Capacity by Fuel Type and Region



(Note: Excludes terminal storage capacity)

By understanding the hazards and recommending a process to increase geographic distribution of fuel supply (primarily publicly owned storage), the state and its partners can increase the effectiveness of short-term life safety missions and potentially reduce the time elapsed before recovery can begin. We note that any recommendation for fuel storage expansion would follow conversations with potentially impacted or interested communities surrounding the candidate site(s).

Expanded Fuel Site Screening Tool

ODOE and the contractor team collaborated to develop a geospatial Fuel Site Screening Tool to assess the viability of existing fuel storage sites as potential candidates for fuel diversification and increased storage. Every regulated fuel storage tank in Oregon was mapped in a GIS database using permit data from DEQ and the Oregon State Fire Marshal's office. Underground fuel storage tanks are permitted and regulated by DEQ, while aboveground fuel storage tanks are permitted and regulated by OSFM. In 2025, the GIS database is being updated to include more comprehensive data available through the Oregon State Fire Marshal's Community Right to Know program and DEQ.

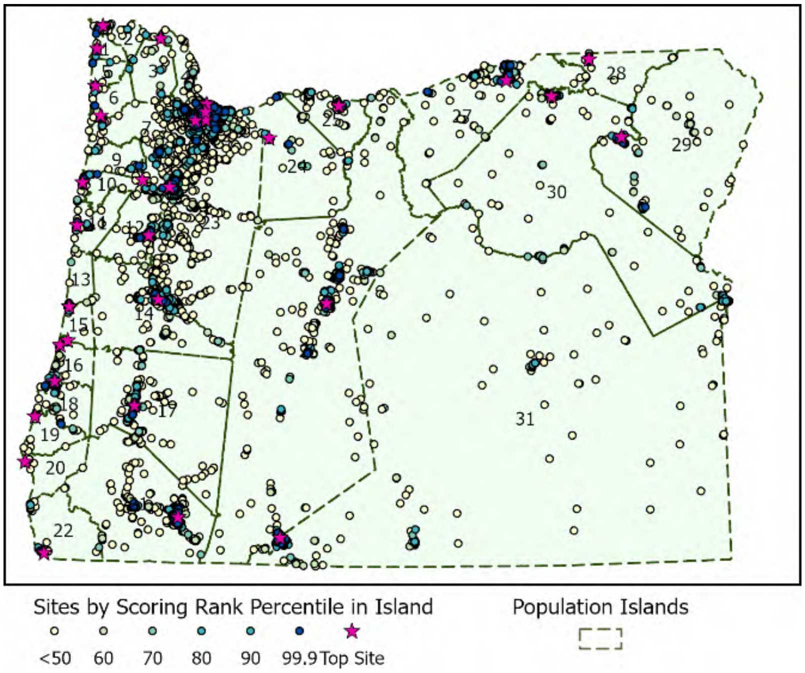
The GIS screening tool includes mapped hazard areas (severe shaking, landslide, liquefaction, tsunami, etc.), proximity to prioritized lifeline route or rail system, site ownership type, and current storage capacity and fuel type (diesel, unleaded, jet fuel). As is expected and understood, nearly all existing storage tanks in western Oregon are in areas with high potential for ground shaking. Any recommended fuel storage expansion project will include a site-specific seismic mitigation assessment to increase the resilience of the emergency fuel storage area.

Lifeline Routes

The Oregon Department of Transportation has designated priority lifeline routes. These are the most critical highways to be restored following a major earthquake to support emergency response and recovery activities in the state.

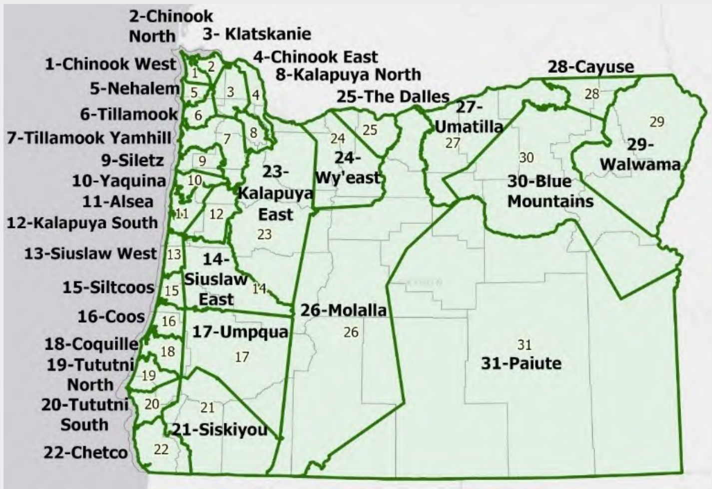
See the lifeline routes in Appendix C of the Oregon Fuel Action Plan.

Figure 79: Ranked Storage Sites in Post-CSZ Islands



Identifying Isolated Islands

The Fuel Site Screening Tool relies on analysis completed in a study commissioned by ODHS OREM, which identifies 31 likely seismic population islands. Seismic islands are geographic areas that have been identified as very likely to be cut off from one another due to a magnitude 9.0 Cascadia Subduction Zone earthquake and tsunami event. ODOT's state seismic lifeline routes will experience damage to routes and bridges; these identified "breaks" in connectivity may be caused by shaking intensity, liquefaction, landslides, and tsunami inundation. The "seismic islands" give us a geographic approach to address resilience in areas likely to be cut-off for a period of weeks or more.



As a next step in this work, ODOE will conduct evaluations of government-owned sites interested in potential expansion. If there is interest, a site visit may be scheduled to assess:

- Ability of the site to handle truck traffic;
- Whether hazards block key transportation routes connecting the site to priority demand locations within the island (even if the site itself is not at risk);
- Ability of the site to store enough additional fuel, and fuel types, to meet projected life-safety and recovery demands in the island;
- Centrality of the site within the island or proximity to known cities or population centers;
- Incompatible land uses or facilities (e.g., certain industrial uses, Level 1 trauma hospitals, sensitive environmental resources) near the site;
- Willingness of the site owner to sign an agreement to store fuel;
- Adequacy of current fuel usage to ensure proper storage turnover rates;
- Features already present on the site that would otherwise need to be added (fuel dispensing pumps, emergency back-up generators, fencing, etc.);
- Potential impacts to communities adjacent to sites under consideration, particularly historically underserved or over-burdened communities; and
- Community members' thoughts and concerns about fuel storage expansion at the site. This could be accomplished via a public meeting(s).

Following the data collection above and conversations with surrounding communities, ODOE will recommend fuel expansion at well-suited sites, along with any suggested accompanying mitigation measures to increase usability and reduce impacts.

The GIS tool also allows ODOE to adjust criteria to prioritize specific storage sites where partner agencies are interested in increasing storage capacity. Another evaluation with the adjusted criteria is underway for sites owned and operated by ODOT, Oregon Department of Corrections, Oregon Department of Administrative Services, and municipal airports with recommendations to follow.

Evaluation of Sites Without Fuel Storage

During the assessment process, a number of government agencies voiced interest in developing additional fuel storage sites where there is not currently fuel storage. The screening tool will be used to provide a high-level evaluation of potential sites to assist in identifying which of the sites may be most suitable for development. Under current DEQ and OSFM regulations, any new fuel storage sites will be required to implement seismic mitigation measures if they are located in a hazard zone.

Fuel Points of Distribution

The Oregon Fuel Action Plan recommends that state agencies, Tribal governments, and counties identify fuel points of distribution where bulk emergency fuel supplies can be delivered, list these in their emergency response plans, and communicate the locations to ODOE. Agencies, Tribes, and counties should consider the location of current and potential expanded fuel storage locations in designating fuel points of distribution, as well as anticipated islanding effects as identified in the fuel storage analysis above. Partners should reach out to ODOE for more information on specific sites from the fuel storage analysis within their jurisdictions. As additional fuel points of distribution locations are proposed and shared with ODOE, ODOE will work with partners to use the screening tool to evaluate relative vulnerability and whether mitigation measures for fuel points of distribution may be appropriate.

Community Engagement and Private Sector Partnerships

The expanded fuel storage assessment, as directed by the legislature, included public partner organizations such as utilities, higher education institutions, and telecom providers. As implementation matures, partnerships with private entities in critical locations where there is no viable government or public partner site may be pursued, if needed. Additionally, as directed by SB 1567, coordination and relationships with private sector energy companies is vital – fuel delivered to Oregon's public storage facilities comes from the private sector, and future coordination with private sector energy companies will be important to best site, analyze, and construct expanded fuel storage facilities.

Additionally, as part of future site-specific assessments, ODOE will work with site owners and local governments to gather community members' thoughts and concerns about fuel storage expansion at the site. This input and an assessment of historically underserved and environmental justice communities will be considered before any final recommendations from ODOE are made.

Oregon Fuel Action Plan

The information in this section, as well as the other liquid fuel mitigation strategies and response planning in the Oregon Energy Security Plan, incorporates elements of the Oregon Fuel Action Plan. This action plan remains the primary response document for liquid fuels during significant statewide or regional emergencies (See Section III).

Decarbonization and Resilience

Currently, all renewable fuels – renewable diesel, biodiesel, ethanol – are imported from other states or countries. The Figures below show the flow of renewable fuels into Oregon. Since Oregon does not have significant production capacity for these petroleum fuel replacements or supplements, their use does not readily lend itself to improving disaster resilience in and of themselves. However, the potential reportedly exists for renewable diesel to have a longer shelf life (10 years) than traditional diesel (6-12 months) or biodiesel (6 months). There may be opportunities to develop isolated storage of renewable diesel in areas that do not have a high turnover rate in tanks – more assessment of this option should occur. Additionally, there are multiple project proposals currently in process to develop renewable fuels production facilities in Oregon; if these facilities proceed to development, Oregon would have an in-state supply of such fuels. This would strengthen resilience and security by increasing the fuel supply available in the state. Finally, as propane also has an extended storage viability, it may also be a useful resource for backup power generation or emergency response. See Section V for a description of the propane distribution system in Oregon.

The figures below show inbound flows of fuels into Oregon by mode, where the percentage of each mode is shown in the box; for example, 84 percent of renewable diesel imported into Oregon comes via rail.

Figure 80: Renewable Diesel Fuel Inbound Flow to Oregon

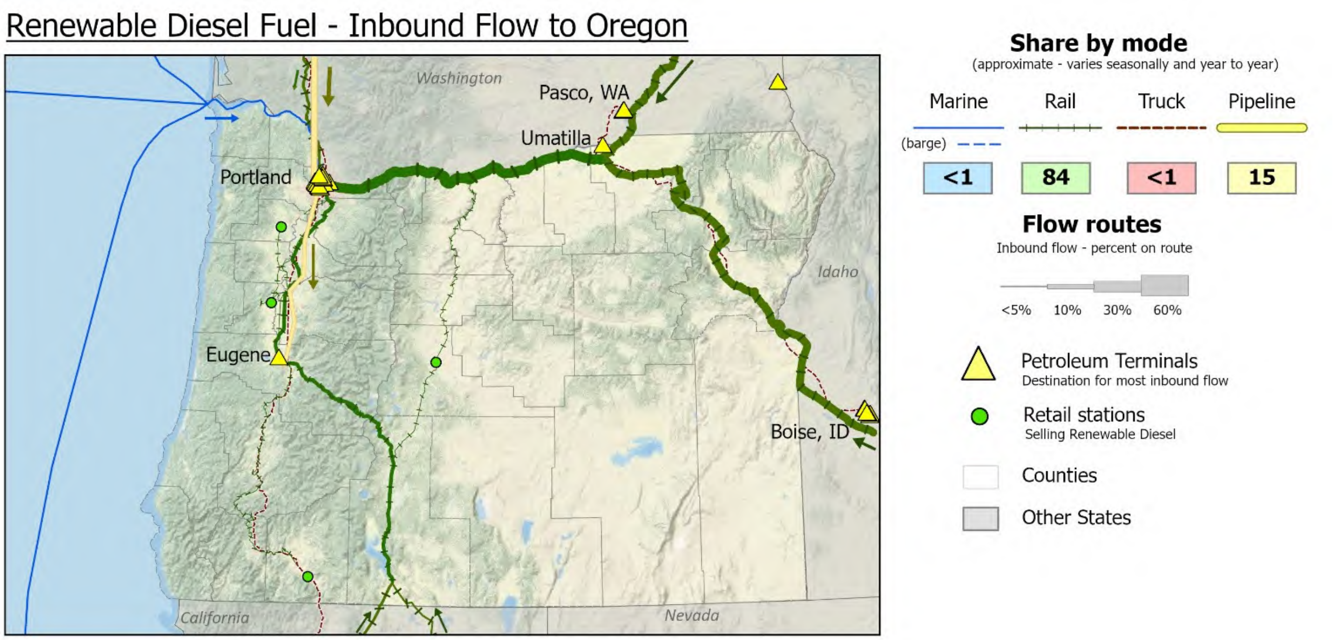


Figure 81: Biodiesel Fuel Inbound Flow to Oregon

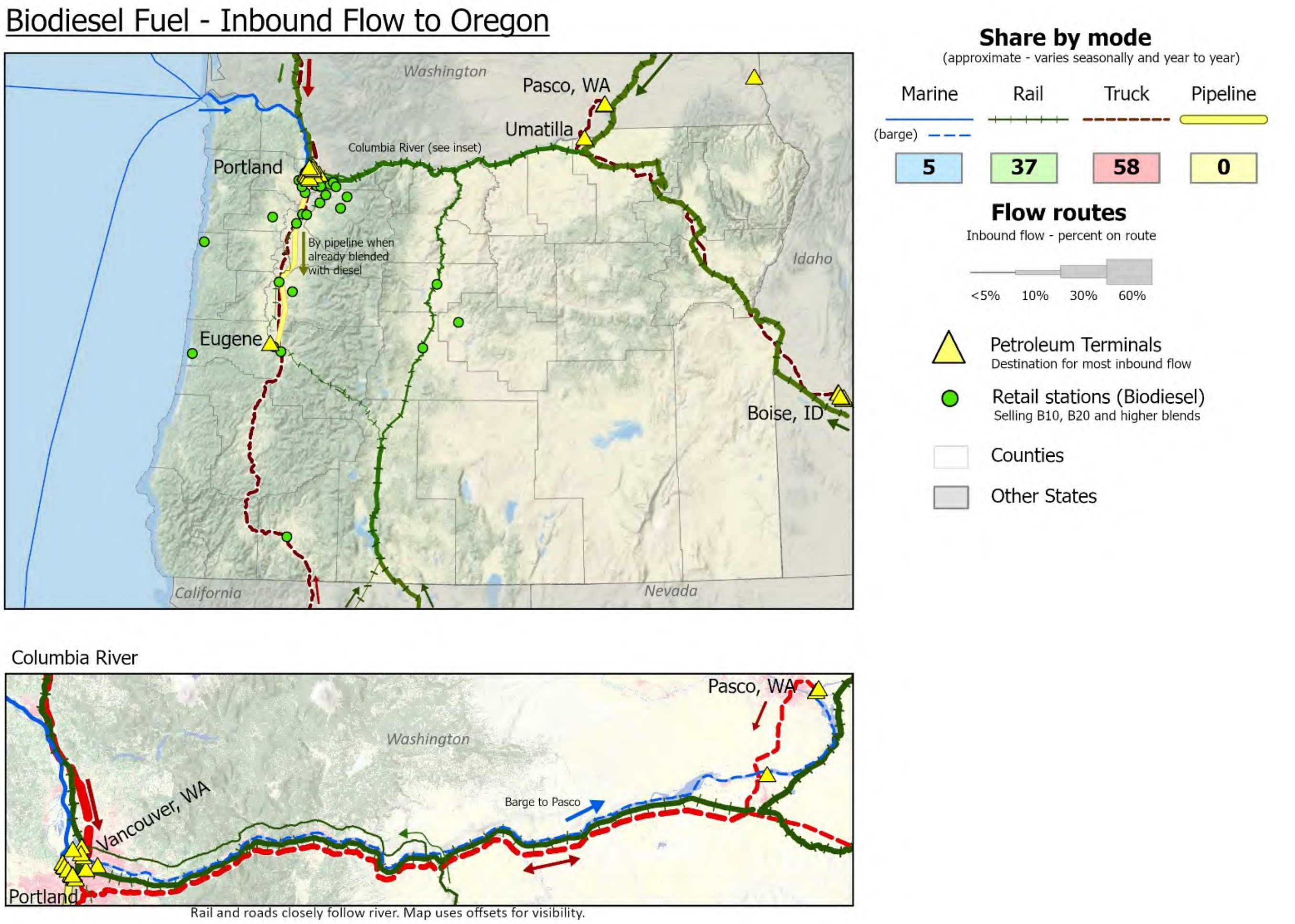
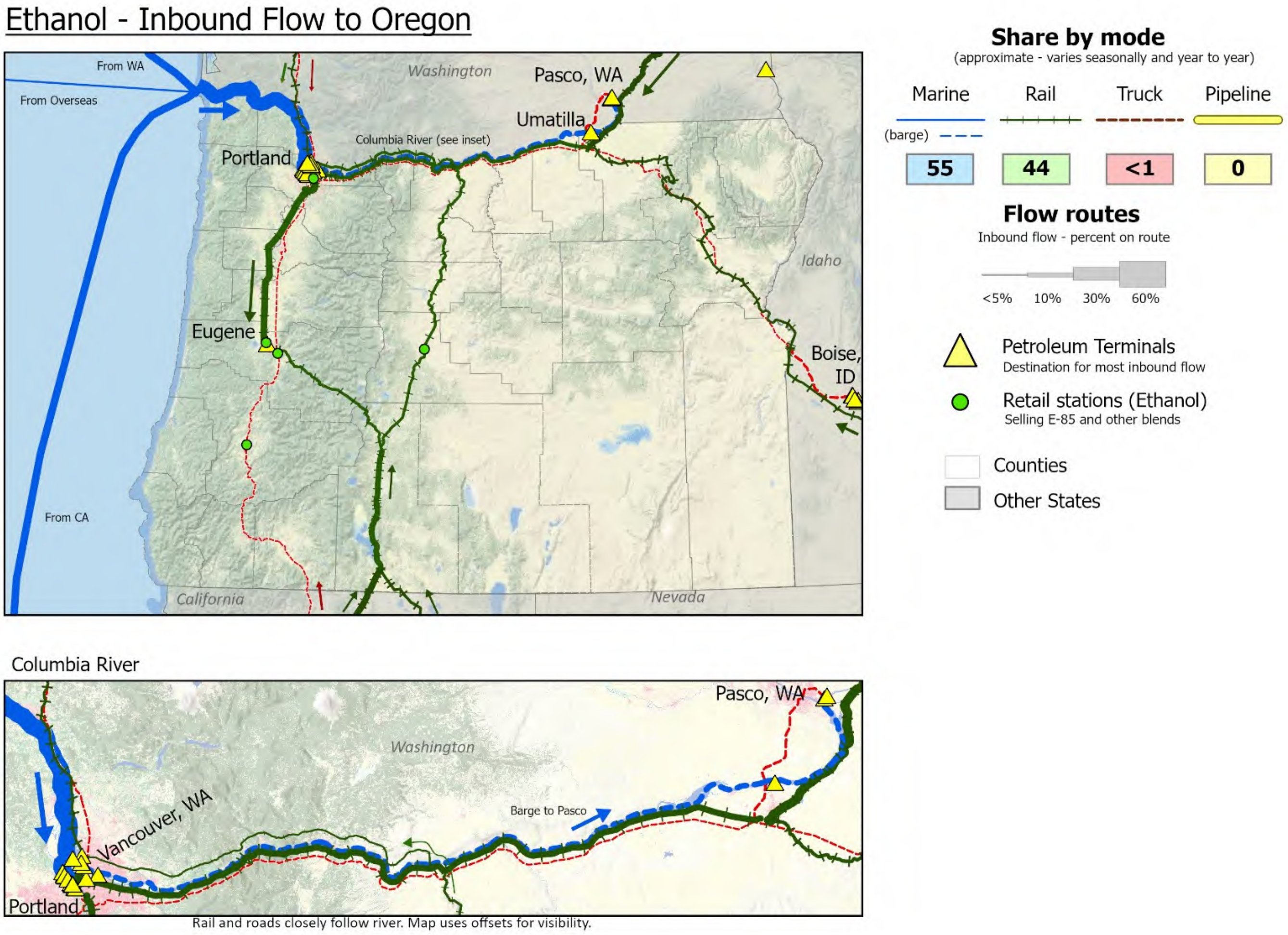


Figure 82: Ethanol Inbound Flow to Oregon



As Oregon purses decarbonization goals, electric vehicles, battery backup, and microgrids may prove to be an effective resilience method to help supplement — or in some cases, replace — liquid-fueled emergency vehicles or backup power generators. Programs to enhance and improve the electric grid can have a substantial benefit to decarbonization and reduced reliance on liquid fuels. The Oregon Department of Energy's Grid Resilience Grant Program, which was funded under the Inflation Reduction Act, has the potential to benefit the state in many ways. By improving grid security and resilience, and reducing the frequency and duration of power outages, there may be a reduced need for liquid-fueled back-up power generation. Additional discussion of current and planned resilience actions is presented in Sections X and XI of this report, respectively.

Even as sectors of the Oregon economy decarbonize in general (transportation, power generation, etc.), emergency response and recovery actions and backup power generation are expected to remain heavily reliant on liquid fuels for years to come. The process outlined in this section establishes a deliberate hazard-informed assessment to support additional liquid fuel resilience in a changing landscape. The Fuel Site Screening Tool provides an opportunity to collaborate with partner agencies and other government organizations to optimize investment in resilient and necessary fuel storage infrastructure. The evaluation must also consider benefits that can be provided for historically underserved communities without creating an undue risk to human health or the environment.

Summary of Implemented Recommendations

In subsequent Energy Security Plan revisions, this section will describe sites at which fuel storage capacity was increased or improved, along with the community outreach activities associated with the project.

Future Work and Opportunities for Expansion

The Energy Security Plan is an opportunity to consolidate and compile the planning resources developed for the state. As mentioned above, this section and the rest of the ESP utilizes the Oregon Fuel Action Plan as the primary source of information for Oregon's liquid fuel emergency response. The analysis presented in this section enhances recommendations in the fuel action plan by establishing a baseline fuel resource map and providing guidance for selecting increased fuel storage in areas most likely to be beneficial for state resilience and disaster recovery. ODOE envisions that future iterations of this section will track the implementation of those expanded fuel resources and document the dialog with surrounding communities. ODOE anticipates working closely with state partners at DEQ and OSFM, as well as private sector partners, to track the change in storage over time. Currently, funding priorities and supply chain/labor shortages are reported to be the primary obstacles to implementation of additional fuel storage across the state. A framework for additional studies to this effect is summarized in Section XI. In the near term, ODOE anticipates the following activities will occur:

- Continue conversations with state agencies that have an interest in increasing fuel storage.
- Coordinate with counties as they prioritize fuel points of distribution location, looking for opportunities to co-locate fuel storage that could also serve emergency response.
- Inspect sites where increased storage has been requested and that score highly on the screening tool.
- Hold public meetings around potentially recommended storage expansion sites.
- Following public meetings, formally recommend expansion at the site where determined appropriate.
- Develop best practices for increased fuel storage, potentially including propane storage and backup generation.
- Update the inventory of storage sites as tanks are decommissioned or new tanks are licensed.
- A comprehensive, state-wide analysis of fuel storage priority needs should be conducted, and specific locations for future expanded fuel storage should be identified. A development strategy, including funding and other barriers, should be included as part of such an analysis.

X. ENERGY SECURITY READINESS

The Oregon Department of Energy and the Public Utility Commission jointly are responsible for energy-related emergency planning and response at the state-level. ODOE and the PUC routinely participate in training and activities at the local, state, regional, and national levels to ensure Oregon is prepared to respond to and rapidly recover from energy supply disruptions. This includes creating and practicing programs and measures that strengthen energy systems, reduce risk, and minimize impacts to communities.

This section describes the programs and activities to increase statewide energy program readiness. These activities change every year depending on available resources, opportunities, and program needs. This section examines the prior year's events and describes best practices, lessons learned, corrective actions, progress, and achievements toward improving the state's resilience posture to ensure energy security.

Training and Exercises

Through training and exercises, the state is able to test capabilities, practice procedures, and improve performance in a "no-fault" learning environment, so decision-makers and responders are ready to tackle energy supply disruptions. This includes the Oregon Department of Energy's ESF-12 role of activating the Oregon Fuel Action Plan to respond to liquid fuels and distribution problems affecting the state. ESF-12 plans for electricity and natural gas are managed by the Oregon Public Utility Commission. Training and exercises also allow ESF-12 agencies the chance to identify strengths, planning and response gaps, and other areas for improvement in coordination and collaboration with emergency response partners.

ESF-12 agencies participate in virtual and hybrid workshops, tabletop drills, and functional exercises to review, validate, and assess the effectiveness of energy response plans and procedures. This allows the agencies to ensure a coordinated response and rapid recovery of energy systems from various designed scenarios. The most recent events and exercises are presented below:

Simulated Fuel Issue During Regional Nuclear Response Drill

The Nuclear Safety and Energy Security division at ODOE participates in regular response exercises related to potential impacts to Oregon from an event at the US DOE-managed Hanford Nuclear Site in southwest Washington state. ODOE staff participate in the annual exercises with state partners at Oregon Health Authority and Oregon Department of Agriculture, and coordinate external needs with Oregon Department of Emergency Management. The exercise also includes Morrow and Umatilla County emergency managers and experts from Oregon State University. During the 2024 exercise, an ODOE "inject" — or unexpected twist to the exercise — related to evacuations presented the opportunity for counties to practice making requests for fuel supply and reception centers through the state response system. All lessons learned from responding to actual emergencies, exercises, and training will be incorporated as appropriate in forthcoming revisions to the state's energy emergency response plans.

OPUC Exercises with Investor-Owned Utilities and Coordination with all Natural Gas and Electric Utilities

Staff from the Oregon Public Utility Commission participate in exercises regularly with investor-owned electric and natural gas utilities. In addition to "all-hazard" exercises, during recent activations, OPUC participated in scenarios including impacts associated with winter weather, wildfire, and cyberattacks. Regulator and responder inclusion in these industry-specific exercises reinforces the lines of communication and coordination needed to efficiently and effectively respond to real world events.

GridEx VII

In November 2023, OPUC staff and electric utilities participated in the GridEx national exercise. Hosted every two years by the NERC Situation Awareness (SA) and the Electricity Sector Information Sharing and Analysis Center (ES-ISAC) E-ISAC, GridEx gives E-ISAC member and partner organizations a forum in which to practice how they would respond to and recover from security events. The 2023 exercise focused on a combination of coordinated cyber and physical security threats and incidents. It is the largest grid security exercise in North America.

This exercise reinforces regional response strategies and ensures that lines of communication are established with regional and national partners.

2023 Olympic Pipeline Worst Case Disaster Exercise

ODOE participated in its first Olympic Pipeline exercise in August 2023. ODOE collaborated with the company, state agencies, local government, and federal partners in response to a simulated pipeline breach that caused a jet fuel spill into the Columbia River. Even though Olympic Pipeline's primary focus was oil spill response, the company took this opportunity to integrate ODOE into the company's emergency response plan and structure.

During oil spill events or exercises, ODOE will serve as a liaison/agency representative to work with Olympic Pipeline officials to address potential supply and distribution concerns resulting from the oil spill and damaged pipeline. As a part of exercise play, ODOE monitored potential supply concerns resulting from the oil spill and its impacts to meeting local, regional, and statewide jet fuel needs, provided situational awareness, and discussed the need for issuing temporary waivers.

IronOR 24

ODOE and PUC participated in a state-wide functional disaster exercise focused on interagency and statewide coordination following a 9.0 magnitude Cascadia Subduction Zone (CSZ) earthquake and tsunami. This exercise involved state, local, and Tribal partners, and was led by the Oregon Department of Emergency Management. IronOR 24 exercise play began at "Day Four" post-CSZ and spanned a multi-day period in October 2024. ESF 12 agencies coordinated with energy providers and federal, state, local, and Tribal partners to respond to potential energy supply and distribution concerns resulting from the exercise scenario.

Pacific Northwest Fuel-Rail Summit

Representatives from Oregon, Washington, Montana, Utah, and Idaho collaborated with railroad companies, the fuel sector, and local and federal partners to identify opportunities and challenges related to transportation of bulk fuel by rail following catastrophic disasters. The summit was held in March 2025.

Aviation Response Summit

The ODOE energy security manager participated in a statewide summit about aviation response planning in April 2025. The summit brought together representatives from state agencies, airports, and emergency management to discuss development of a state aviation response plan. Planning efforts will include identifying fuel needs and how to meet those needs through storage, supply, and distribution systems.

DOE Cybersecurity Summit

The ODOE energy security manager attended the Cybersecurity for Energy Resilience Summit in May 2025. The summit provided training and awareness about roles of government officials in protecting energy infrastructure and advancing national security. Information from the summit will be incorporated into future versions of the Oregon Energy Security Plan.

Oregon Disaster Airlift Response Team 2025 Whale Run Exercise

In June 2025, the ODOE energy security manager participated in an annual exercise held by the Oregon Disaster Airlift Response Team, a nonprofit disaster relief organization that serves Oregon and coordinates with similar organizations in neighboring states. The exercise included an objective that targeted fuel needs for conducting ODART operations. During the exercise, players identified the types and amounts of fuel needed. The energy security manager also reviewed fuel supply and distribution limitations and fuel supply request procedures with the exercise simulation cell.

Planning Documents

The following planning documents are currently being updated or have recently been published. The information provided below is not an exhaustive list and there are other documents being developed by state agencies, tribal governments, the private sector, and local and nonprofit groups.

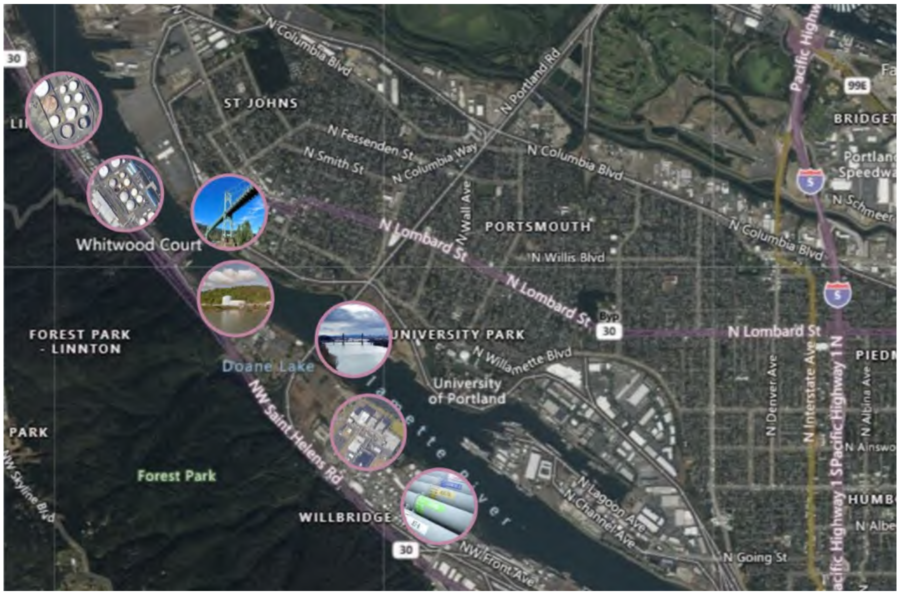
Electric Utilities Wildfire Mitigation Plans

In 2021, the Oregon legislature passed SB 762, which requires electric utilities to file with OPUC a risk-based plan designed to protect public safety, reduce the risk of utility facilities causing wildfires, reduce risk to utility customers, and promote electric system resilience to wildfire damage. OPUC staff conducted workshops in late spring/early summer 2024 to assist utilities in developing their plans. The OPUC ruleset relating to Wildfire Mitigation plans is OAR 860-300-0001 through 0090.

https://www.oregon.gov/puc/safety/pages/wildfire-mitigation.aspx

Oregon Department of Environmental Quality Seismic Stability Program

DEQ's Land Quality Division includes a Fuel Tank Seismic Stability Program, which was created by the Oregon Legislature in 2022 (SB 1567). The program evaluates and improves the earthquake resilience of large-capacity oil and fuel storage facilities to safeguard public health, life safety, and the environment from potential fires or fuel releases linked to earthquakes.



Fuel tank storage and transportation routes along the Willamette River in North Portland.

Through the program, DEQ developed the process and criteria for seismic vulnerability assessments and risk minimization implementation at the largest fuel storage and distribution facilities in Columbia, Multnomah, and Lane counties.

As of June 1, 2024, the statutory deadline from SB 1567, 16 facilities have submitted their Seismic Vulnerability Assessments to DEQ. The assessments include the geotechnical, structural, and safety assessments prescribed by Administrative Rule.

https://www.oregon.gov/deq/ss/Documents/ftssReport0724.pdf

State Integrated Preparedness Plan 2023-2026 v1.2

The Oregon Department of Emergency Management published a plan that describes anticipated emergency management exercises and training for state, Tribal, and county governments. The document is available using the following link, and select activities presented in the plan are also summarized in section 11 of this Energy Security Plan.

https://www.oregon.gov/oem/Documents/OEM-IPP-2023-2026-v1.2.pdf

Oregon State Emergency Operations Plan

The State of Oregon Emergency Operations Plan (EOP) is one volume of the state Comprehensive Emergency Management Plan. The State EOP describes the organization used by the state to respond to emergencies and disasters, including common incident management and response functions applicable in an all-hazards response. The EOP also describes responsibilities of state emergency support functions. The ESF-12 Annex last was updated in 2016.

https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/CEMP.aspx

State Homeland Security Strategy

The 2025-2028 Oregon Homeland Security Strategy supports the state's ability to prevent, protect against, respond to, and recover from various threats and hazards. The strategy includes seven key goals aligned with FEMA's National Preparedness System: strengthening intelligence and information sharing, enhancing critical infrastructure resilience, advancing cybersecurity measures, strengthening counterterrorism capabilities, improving public health and medical emergency preparedness, expanding interoperable emergency communications, and enhancing all-hazards preparedness at every level of government.

https://www.oregon.gov/oem/Documents/2025-Homeland-Security-Strategy.pdf

State Capability Assessment

The State Capability Assessment is conducted annually by the Oregon Department of Emergency Management to evaluate the capabilities and resources emergency management partners have available to respond to threats and hazards in Oregon. The results of the assessment help inform the State Homeland Security Grant Program as well as identify training and exercise gaps. Capabilities assessed are determined by FEMA's Core Capabilities List.

https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/State-Capability-Assessment.aspx

Regional ESF-12 planning group

In March 2025, a preliminary conversation was held between Idaho, Washington, Montana, and Oregon to discuss regional coordination of fuel resources when supplies are disrupted. The states committed to sharing plans and making efforts to ensure that the state specific plans are compatible and collaborative.

ESF-12 Activation Case Studies

The most effective way to test and validate the state's energy plans and procedures is in response to real world events. ESF-12 agencies in Oregon have had several opportunities in recent years to demonstrate the state's resources and capabilities to effectively address and resolve potential and actual energy supply issues. Below are some highlights of recent ESF-12 agency actions and lessons learned.

2024 Winter Storm

In January 2024, the Governor declared a state of emergency after freezing rain blanketed twelve counties — causing treacherous conditions, downed trees blocking roadways, and widespread power outages. OPUC facilitated coordination among utility operators as they recovered and restored power to more than 650,000 customers. OPUC support helped operators get access to communication assets, transportation corridors, local and external crews, and necessary materials as they restored power and rebuilt systems. OPUC and other ESF partners helped prioritize when critical locations (warming shelters, communication assets) were particularly affected by the event. ODOE worked with industry partners to deliver propane to warming centers, at-risk families, and essential service providers, as well as delivering diesel fuel to first responders, warming centers, and correctional institutions. ODOE also closely monitored road conditions to assess safety of delivery truck travel and the fuel supply of high-volume commercial stations along the freeway.

Oregon Highway 101 Landslide

Ongoing rainstorms in early January 2023 drenched southwest Oregon, cutting off power, flooding communities, prompting evacuations, and causing a major landslide on Highway 101 along the coast near Port Orford. The Oregon Department of Transportation (ODOT) closed all lanes of the highway for nearly a week. Hwy 101 is the only major road connecting communities on the southern Oregon coast with Oregon's major cities and distribution networks to the north.

The closure of Hwy 101 presented problems for fuel companies delivering product to communities along the southern Oregon coast. Typically, fuel delivered to the southern Oregon coast originates at a distribution terminal in Eugene, travels west, and then south on Hwy 101, never leaving Oregon. However, with the closure of Hwy 101, the safest and most efficient alternate route to these communities from Eugene would be to pass through California using Hwy 199 to Hwy 197, and then north back onto Hwy 101 at Smith River (see map).

Oregon and California state regulations for trucking differ for both truck weight limits and axle limits. The Oregon Department of Energy (ODOE) and ODOT collaborated with the California Energy Commission (CEC) and California Department of Transportation (Caltrans) on the appropriate protocols if Oregon were to request a temporary waiver to allow fuel trucks originating from Oregon to exceed the California 80,000-pound weight limit and 6-axle restriction when passing through California to deliver fuel to southern Oregon coast communities during the closure of Hwy 101. This would allow fuel trucks to carry their normal 105,500-pound fuel loads with 8-axle truck and trailer combinations, which is consistent with Oregon regulations and the typical size of a delivery vehicle in Oregon. The alternative would be to have more, smaller fuel vehicles traveling on California highways, which is less efficient, requires more trips, and produces more greenhouse gas emissions. It is also during a time of limited truck and truck driver availability, which presents logistical challenges for fuel delivery companies.

However, ODOT was able to make the necessary repairs to reopen one lane of Hwy 101 within five days of the closure, so no temporary waiver request was necessary from California. A major lesson learned from this event was that CEC and Caltrans do not have the authority to issue permits for divisible loads without a Presidential declaration, approval from the Federal Highway Administration, and accompanying executive orders from the Governors of Oregon and California — and even then, the process to allow Oregon-sized trucks to use California roads would be time-consuming and would likely require action and direction from the top levels of federal government.

2021 Wildland Fires

Starting in June 2021, a sudden increase in commercial air travel as the COVID pandemic waned, coupled with an early wildfire season in late spring, resulted in jet fuel supply and distribution problems for smaller airports in southern and northeast Oregon to support wildland firefighting missions. While there was no shortage of jet fuel in Oregon, there were logistical challenges connecting available supplies with fuel haul trucks and drivers to get the much-needed fuel to those local airports where the demand for jet fuel exceeded local supplies. ODOE worked with state, local, and federal partners, as well as with the private sector, to ensure firefighters had the fuel they needed to continue to fight wildfires. This included establishing procedures in coordination with the Oregon Department of Forestry and the Oregon Department of Aviation for requesting and meeting fuel needs in future wildfire seasons.

In August 2021, OPUC coordinated with Pacific Power, Portland General Electric, and Bonneville Power Administration to ensure that transmissions line outages due to smoke from the Bootleg Fire in southern Oregon did not result in impacts to the transmission capacity of the west. These transmissions lines are called the California Oregon Intertie. This intertie supplies northwest hydro power to a significant portion of southern California, and supplies solar during periods of high production in California north into Oregon.

All lessons learned from responding to real world emergencies will be incorporated as appropriate in forthcoming revisions of the state's energy emergency response plans.

XI. NEXT STEPS

Improving energy security and resilience is not a process that can be accomplished at the flip of a switch. Ensuring that all relevant interested parties, Tribal Nations, government agencies at all levels, and private energy companies have the information and resources they need to develop projects that reduce risk and strengthen energy security takes time.

This section describes the planned activities to increase statewide energy system readiness. The planned exercises, documents under development, and recommended areas for future study are not an exhaustive list, but rather a snapshot of the important work that continues to improve readiness, resilience, and security for Oregon. The Oregon Department of Energy will continue statewide coordination efforts via its energy security program staff and regular reviews, revisions, and updates to the Energy Security Plan. Additionally, ODOE Energy Security staff work closely with the ODOE Energy Strategy team to ensure alignment between both important plans. The Energy Security Plan and the Energy Strategy (coming November 2025) contain analysis, information, and recommendations about how Oregon can meet its future energy needs, reduce risks, and strive to meet its greenhouse gas reduction goals while maintaining energy resilience and security – all the while working hard to lower costs to Oregonians and boost our economic competitiveness with an economy that works for all Oregonians. While this work will not be easy, it is necessary.

Future Studies and Identified Data Gaps

ODOE anticipates incorporating additional infrastructure data as it can be collected, including specific information such as additional baseline infrastructure data, sector-specific vulnerability analysis, and utility or private fuel company risk and mitigation analyses. This additional data and analysis can be used to add to the current risk assessment and geographic fuel distribution assessment in future iterations of the Energy Security Plan. Additionally, more specific risk assessments related to climate change impacts, extreme heat, landslides not associated with earthquakes, or even volcanic activity may be incorporated as specific hazards in updates to the risk assessment section of future versions of the plan.

ODOE is collaborating with the Pacific Northwest National Laboratory and DOE-CESER Office on a pilot project leveraging modeling and frameworks from a 2024 Sector Coupling analysis that was supported by the U.S. Department of Energy's Office of Electricity. The current project looks to understand vehicle transportation fuel system dynamics and analyze transportation system-level vulnerabilities related to EV adoption goals that are specific to Oregon (of note, the project is not analyzing electricity grid vulnerabilities related to EV adoption goals). The project also analyses risks to petroleum refining business so that Oregon can better prepare for potential scenarios in the future that may involve less refining capacity in the region. This will help to identify opportunities to strengthen the system and reduce risk associated with changing future demand for, and supply of, gasoline. The pilot investigation, sponsored by the U.S. Department of Energy's Office of Cybersecurity, Energy Security, and Emergency Response, is intended to be replicable and available to all states, and is expected to be completed in 2025.

Additionally, we look forward to working with our partners to better understand, incorporate, and support their ongoing energy security ventures, such as the recent report from the Northwest Gas Association and Pacific Northwest Utilities Conference Committee on gas-electric coordination (Guidehouse analysis of regional energy reports 2025). We are also excited about supporting regional efforts throughout our state to meet specific local energy needs, such as the ongoing work in northeast Oregon related to energy infrastructure, power demand and supply, and exploring options related to nuclear power, as well as efforts in central Oregon to support the "CORE3 Center," a new joint effort building a regional emergency response and training center (CORE3 Center Home » Central Oregon Ready Responsive Resilient).

Exercise Opportunities (9/2025 - 8/2026)

ODOE and its partners will participate and facilitate in upcoming emergency exercises that contain energy security components. A selection of the upcoming significant exercises is listed here.

GridEx VIII

In November 2025, OPUC and ODOE plan on participating in the GridEx national exercise.

Hosted every two years by the NERC Situation Awareness (SA) and the Electricity Sector Information Sharing and Analysis Center (ES-ISAC), GridEx gives E-ISAC member and partner organizations a forum in which to practice how they would respond to and recover from security events. The 2023 exercise focused on a combination of coordinated cyber and physical security threats and incidents. It is the largest grid security exercise in North America.

This exercise reinforces regional response strategies and ensures that lines of communication are established with regional and national partners.

Operation Vital Flow Exercise Series (2026)

ODOE is planning two fuel allocation exercises for 2026 to test planning, operational coordination, situational assessment, and logistics and supply chain management capabilities. In early 2026, state executive branch agencies will participate in a continuity-based functional exercise to identify energy considerations for implementing essential functions and then apply a fuel allocation to implement their plans. Counties and tribes will be invited to participate in a statewide drill in late 2026 to apply a fuel allocation in implementing their continuity, emergency operations, and/or energy resilience plans. To prepare state agencies, counties, and tribes for the exercises, ODOE also will offer a workshop and discussion-based tabletop exercise template for identifying energy considerations for emergency planning.

Fueling the West Exercise (2026)

As part of the Western States Petroleum Collaborative, ODOE is leading planning for a functional exercise to test the Western Petroleum Shortage Response Collaborative Regional Framework. The exercise will be held in late 2026 or early 2027. Exercise planning support is being provided by FEMA through the National Exercise Program.

Anticipated State Resources and Products

Many Oregon state government agencies, including ODOE, are establishing programs related to energy security and resilience. The list below is a summary of the programs both at ODOE and other state agencies that are either focused on energy resilience and security specifically, or have an important connection or component related to energy security. This list may not be comprehensive, as many agencies operate in this space. It is acknowledged that in addition to state government agencies, there are also federal, local, and Tribal governments working on energy security and resilience issues. In the coming years, the ODOE Energy Security Program will work to be a comprehensive resource for government programs in this space. Utilities and energy providers are constantly working to address risk and increase their security and resilience, and ODOE looks forward to continuing our working relationships with these companies to improve security across our state.


2025 Legislative Session Report

OREGON DEPARTMENT OF ENERGY

Check out ODOE's 2025 Legislative Session Report to learn more about energy policy and program changes from the 2025 Legislative Session. This report summarizes energy and energy security bills that were passed or proposed during the session.

Community Renewable Energy Grant Program — This Oregon Department of Energy competitive grant program awards funds to Tribes, public entities, and consumer-owned utilities for planning or construction a renewable energy or energy resilience project. Half of the available funding for the program is allocated for projects that support community energy resilience. The maximum award for a planning project is $100,000 and the maximum award for a construction grant is $1,000,000.

Community Resilience Hubs — The Oregon Department of Human Services has implemented a Resilience Hubs and Networks Grant program. The Oregon State Legislature granted $10 million for this program through House Bill 3409 Section 86 (2023 Regular Session). The intent of this program was to combat environmental justice issues affecting people in Oregon and to provide resources to communities disproportionately impacted by climate change. "Resilience Hubs and Networks" refers to:

- **Resilience hubs** - Locations in the community that are a part of the community's daily life, serving community members each day as well as during emergency response and recovery efforts.
- **Resilience networks** - The groups of people, facilities, organizations, resource providers, or service providers who support the purposes of a resilience hub location.

The Resilience Hubs and Networks Grant is intended to support these community efforts and the people and organizations that come together to make their community stronger. Eighty-seven organizations across the state received awards under this program to support disaster resilience and help prepare and protect Oregonians and their communities.

County Energy Resilience Grant Program — This ODOE program awards counties a noncompetitive state grant of $50,000 to develop an energy resilience plan. County plans are intended 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. Nineteen counties received awards under the program. The initial deadline for counties to submit plans to ODOE is August 1, 2025.

Oregon Energy Strategy — The Oregon Department of Energy is developing a state energy strategy that will identify pathways for the state to achieve its energy policy objectives, evaluate the trade-offs of different pathways, and develop policy recommendations. The project began with technical analysis, which then informed the identification of policy gaps, needs, and opportunities. ODOE has conducted robust engagement throughout this process, including a series of Working Groups, Listening Sessions, and an Advisory Group to inform the development of policy recommendations. The energy strategy will be available November 1, 2025.

Grid Resilience Grant Program — The Grid Resilience Grant Program is supported through a federal award authorized by the IIJA. The grants are intended to enhance grid flexibility and improve the resilience of the power system against growing threats of extreme weather and climate change. ODOE administers the program for Oregon and received applications for 13 projects. As of May 2025, six projects been approved by the U.S. DOE and have entered into signed performance agreements with ODOE.

State Natural Hazard Mitigation Plan and Risk Assessment update — Beginning in March 2023, DLCD and the Oregon Department of Emergency Management (OEM) are working on upgrading the Oregon Natural Hazards Risk Assessment. The risk assessment provides the factual foundation for establishing mitigation goals and identifying and making strategic investments to reduce risks to people, property, and the natural environment from natural hazard events throughout the state. The current Natural Hazards Mitigation Plan (NHMP) was completed in 2020, and will expire in September 2025. An updated state NHMP has been approved by FEMA and is in the process for promulgation by the state.

Oregon Disaster Recovery Plan — A revision to the Oregon Disaster Recovery Plan is expected in late 2025 from the Oregon Department of Emergency Management, with additional Recovery Support Function annexes to be published in 2026. Energy infrastructure is included in SRF-6 (Infrastructure). The current ODRP was published in 2018.

OSSPAC 10-Year Update of the OR Resilience Plan — The Oregon Seismic Safety Policy Advisory Commission (OSSPAC) was formed as a result of Senate Bill 96 in 1991. Since this time, OSSPAC has continued to increase Oregon's awareness to earthquake hazards by supporting earthquake education, research and legislation. OSSPAC is currently updating the Oregon Resilience Plan, which was last published in 2013.

APPENDIX A: CHANGE LOG

This change log will record updates to future versions of the Energy Security Plan.

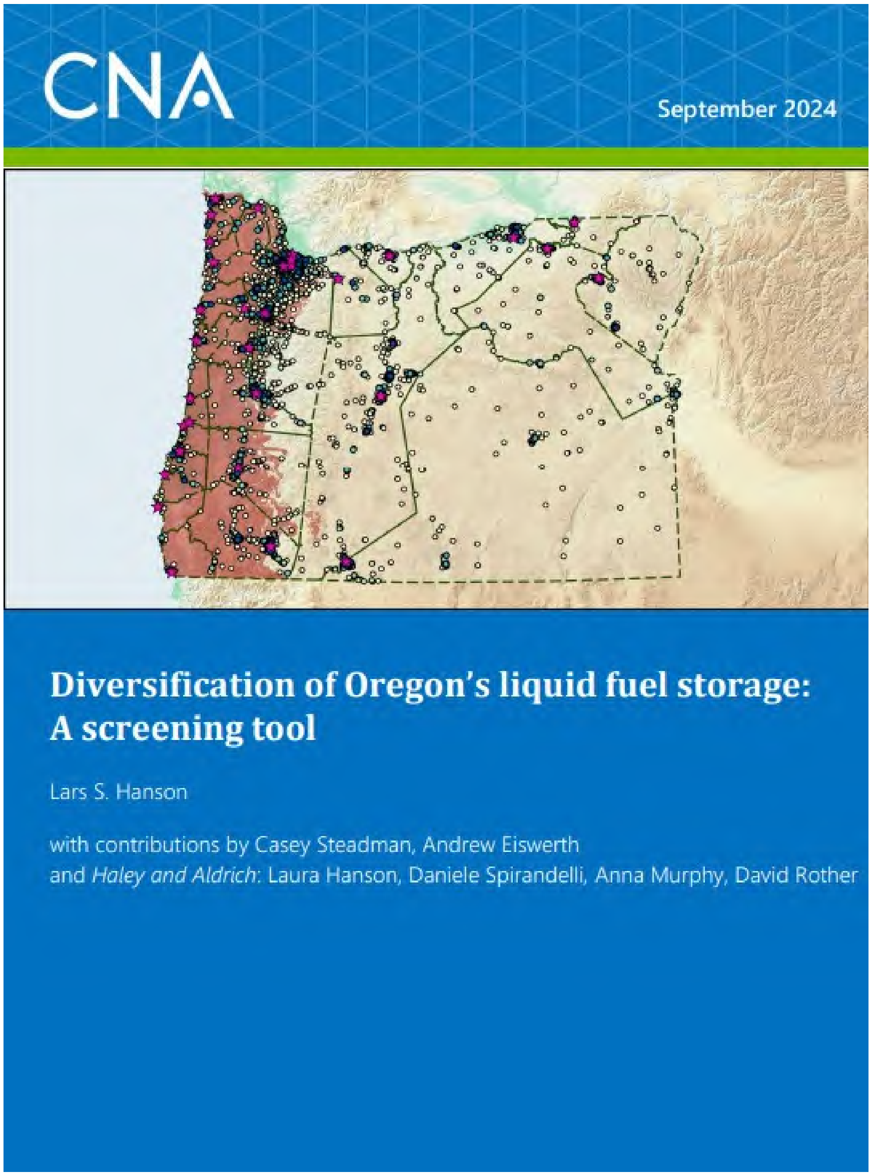
Version	Part/Section	Page	Date	Description
1.0	Exec Summ.	i, ii	7/21/25	Minor edits
1.0	01	1, 2	8/11/25	Update to introductory text
1.0	01	1, 3, 7	7/21/25	Minor edits for 2025 updates
1.0	01	5, 6	7/21/25	Update to Table 1 and associated text
1.0	01	7	3/19/25	Addition of SRF 6
1.0	01	8	7/24/25	Comment portal update
1.0	02	16, 17	3/19/25	Update to Local Government Authorities
1.0	02	17	7/21/25	Update to FEMA funding information
1.0	02	20	7/21/25	Formatting update Table 3
1.0	03	24-26	6/5/25	Minor edits to Response Operations
1.0	03	27	7/21/25	Formatting update Table 6
1.0	04	33	8/11/25	Update to Coordination with Energy Providers
1.0	04	38	7/23/25	Formatting update Table 8
1.0	04	42	7/22/25	Minor edits to Mutual Aid Assistance
1.0	05	43	8/11/25	Update to introductory information
1.0	05	45, 48	7/24/25	Minor edits to Electricity
1.0	05	50-52	5/28/25	Updates to Bulk Electric System Reliability and Real-time Management of Energy Flow
1.0	05	62	7/23/25	Formatting update Table 12
1.0	05	77	7/23/25	Formatting update Table 18
1.0	06	87, 88	8/11/25	Update to introductory information
1.0	07	106	8/11/25	Update to introductory information
1.0	07	106, 107	6/5/25	Edits to CSZ Earthquake information
1.0	07	108	7/21/25	Update to Table 20
1.0	07	111	6/5/25	Minor edits Physical Attacks
1.0	07	112-115	7/21/25	Formatting update Table 22
1.0	07	127-129	5/12/25	Addition of Oregon Context to Interdependencies
1.0	08	130, 131	8/11/25	Update to introductory information
1.0	08	131	7/15/25	Update to Inventory of Energy Infrastructure Mitigation Strategies
1.0	08	136	5/14/25	Addition of NWGA and PNUCC study
1.0	09	139, 140	7/14/25	Updates to Expanded Fuel Site Screening Tool
1.0	09	145	7/15/25	Update to Future Work
1.0	10	146-148	6/11/25	Updates to Training and Exercises
1.0	10	148-150	7/22/25	Updates to Planning Documents
1.0	11	153	8/11/25	Update to introductory information
1.0	11	153, 154	7/18/25	Updates to Future Studies and Identified Data Gaps
1.0	11	154	6/11/25	Updates to Exercise Opportunities
1.0	11	155	7/23/25	2025 Legislation Callout Box

Version	Part/Section	Page	Date	Description
1.0	11	155-156	7/22/25	Updates to Anticipated State Resources and Products
1.0	1-11	i-156	7/24/25	Updates to dead links

APPENDIX B: REPORT ON DIVERSIFICATION OF OREGON'S LIQUID FUEL STORAGE – A SCREENING TOOL

View this report in its entirety online:

https://www.oregon.gov/energy/safety-resiliency/Documents/2024-ORESP-Appendix-B.pdf



CNA

September 2024

Diversification of Oregon's liquid fuel storage:
A screening tool

Lars S. Hanson

with contributions by Casey Steadman, Andrew Eiswerth
and *Haley and Aldrich*: Laura Hanson, Daniele Spirandelli, Anna Murphy, David Rother

APPENDIX C: ENERGY SECURITY AND EMERGENCY RESPONSE PLANS AND INFORMATION

OEM Emergency Operations Plan ESF-12
https://www.oregon.gov/oem/Documents/2015_OR_EOP_ESF_12_energy.pdf

Oregon Fuel Action Plan
https://www.oregon.gov/energy/safety-resiliency/Pages/Petroleum.aspx

Oregon Public Utility Commission Information:

- ESF-12 Information https://www.oregon.gov/puc/safety/Pages/Emergency-Management.aspx
- Utility cybersecurity and emergency preparedness https://www.oregon.gov/puc/safety/Pages/SafetyHome.aspx
- Utility Wildfire Mitigation Plans https://www.oregon.gov/puc/safety/Pages/Wildfire-Mitigation.aspx
- Reliability and resilience https://www.oregon.gov/puc/safety/Pages/Reliability-Resilience.aspx

OEM Emergency Operations Plan ESF-17
https://www.oregon.gov/oem/Documents/OR_EOP_ESF_17_Critical_Infrastructure_Cybersecurity.pdf

Oregon Comprehensive Emergency Management Plan: links to Oregon's preparedness, response, recovery, and mitigation plans
https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/CEMP.aspx

FEMA ESF-12 Annex
https://www.fema.gov/sites/default/files/2020-07/fema_ESF_12_Energy-Annex.pdf

Oregon Seismic Safety Policy Advisory Commission (OSSPAC): links to OSSPAC reports, letters, policy recommendations
https://www.oregon.gov/oem/Councils-and-Committees/Pages/OSSPAC.aspx

Tribal Government Pages:

- Burns Paiute Tribe: https://burnspaiute-nsn.gov/departments/emergency-management-services/
- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians: https://ctclusi.org/tribal-police/
- Confederated Tribes of Grande Ronde: https://www.grandronde.org/services/emergency-services/
- Confederated Tribes of Siletz Indians: https://ctsi.nsn.us/planning/
- Confederated Tribes of Umatilla Indian Reservation: https://ctuir.org/departments/public-safety/emergency-management/
- Confederated Tribes of Warm Springs: https://warmsprings-nsn.gov/program/emergency-management/
- Cow Creek Band of Umpqua Tribe of Indians: https://www.cowcreek-nsn.gov/government/emergency-management/
- Coquille Indian Tribe: https://www.coquilletribe.org/coquille-indian-housing-authority/1131-2/
- The Klamath Tribes: https://klamathtribes.org/community-services/ | https://klamathtribes.org/public-safety/

County Resource Pages (by region)

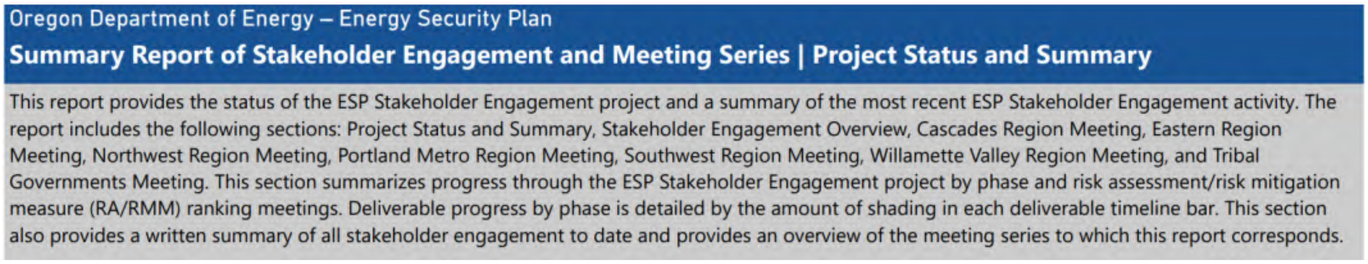
Visit the pages below to find county emergency management plans and resources such as emergency operations plans, emergency fuel storage plans, and natural hazard mitigation plans.

Cascades	
Crook	https://co.crook.or.us/sheriff/page/emergency-management
Deschutes	https://sheriff.deschutes.org/divisions/special-services/emergency-management/
Hood River	https://hoodriversheriff.com/what-we-do/emergency-management
Jefferson	https://www.jeffco.net/ps/page/emergency-management
Klamath	https://www.klamathcounty.org/300/Emergency-Management
Lake	https://www.lakecountyor.org/government/emergency_management.php
Gilliam	https://www.co.gilliam.or.us/government/sheriff_s_office/emergency_management.php
Sherman	https://www.co.sherman.or.us/departments/emergency-services/
Wasco	https://www.co.wasco.or.us/departments/emergency_management/index.php
Wheeler	https://www.wheelercountyoregon.com/emergency-management
Eastern	
Baker	https://www.bakercountyor.gov/emergency/emergency-management.html
Grant	https://grantcountyoregon.net/182/Emergency-Management
Harney	https://harneycountyor.gov/emergency-management/
Malheur	https://www.malheurco.org/emergency-management/
Morrow	https://www.co.morrow.or.us/emergency
Umatilla	https://umatillacounty.net/sheriff/departments/sheriff/emergency-management
Union	https://unioncountyor.gov/emergency-services/
Wallowa	https://www.co.wallowa.or.us/emergency-services
Northwest	
Clatsop	https://www.clatsopcounty.gov/em/page/emergency-management
Lincoln	https://www.co.lincoln.or.us/708/Emergency-Management
Tillamook	https://www.tillamookcounty.gov/emergency-management
Yamhill	https://www.co.yamhill.or.us/160/Emergency-Management
Portland Metro	
Clackamas	https://www.clackamas.us/dm/
Columbia	https://www.columbiacountyor.gov/departments/EmergencyManagement
Multnomah	https://www.multco.us/em
Washington	https://www.washingtoncountyor.gov/emergency
Southwest	
Coos	https://www.co.coos.or.us/sheriff/page/emergency-management
Curry	https://www.co.curry.or.us/departments/emergency_management/index.php
Douglas	https://douglascountyor.gov/856/Emergency-Management
Jackson	https://www.jacksoncountyor.gov/departments/emergency_management/index.php
Josephine	https://www.josephinecounty.gov/departments/emergency_management/index.php
Willamette Valley	
Benton	https://sheriff.bentoncountyor.gov/emergency-management/
Lane	https://www.lanecounty.org/government/county_departments/lane_county_emergency_management
Linn	https://www.linnsheriff.org/community-resources/emergency-preparedness/
Marion	https://www.co.marion.or.us/PW/EmergencyManagement
Polk	https://www.co.polk.or.us/em

APPENDIX D: STAKEHOLDER ENGAGEMENT REPORT

View this report in its entirety online:

https://www.oregon.gov/energy/safety-resiliency/Documents/2024-ORESP-Appendix-D.pdf



Oregon Department of Energy – Energy Security Plan

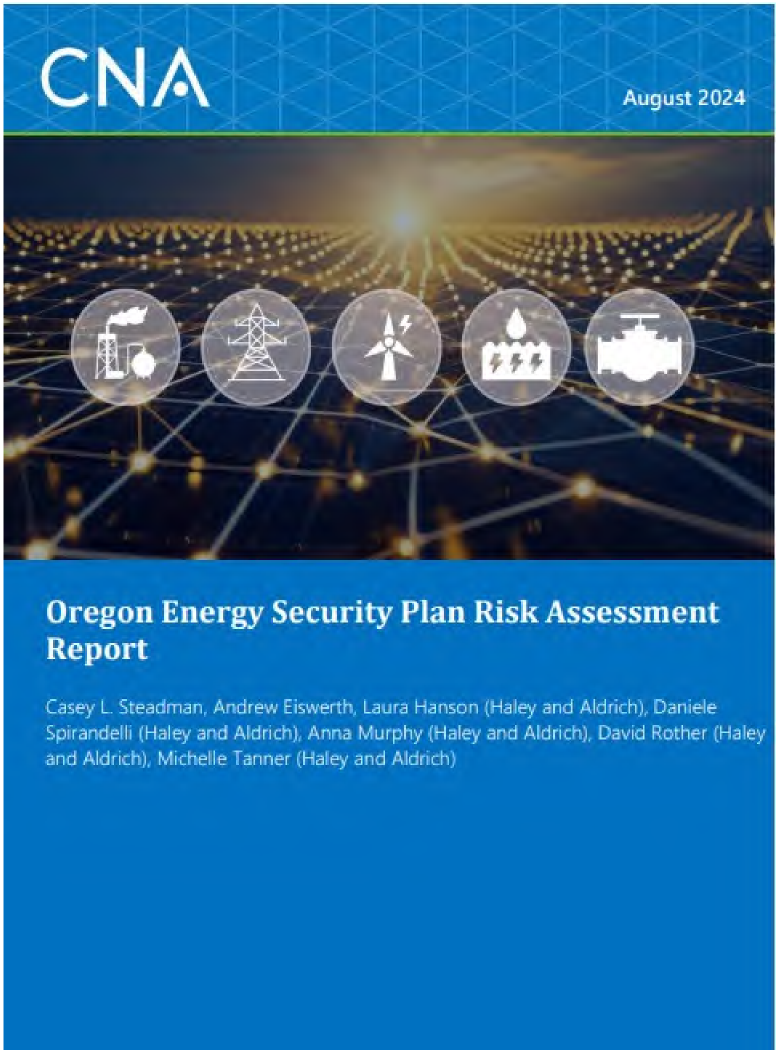
Summary Report of Stakeholder Engagement and Meeting Series | Project Status and Summary

This report provides the status of the ESP Stakeholder Engagement project and a summary of the most recent ESP Stakeholder Engagement activity. The report includes the following sections: Project Status and Summary, Stakeholder Engagement Overview, Cascades Region Meeting, Eastern Region Meeting, Northwest Region Meeting, Portland Metro Region Meeting, Southwest Region Meeting, Willamette Valley Region Meeting, and Tribal Governments Meeting. This section summarizes progress through the ESP Stakeholder Engagement project by phase and risk assessment/risk mitigation measure (RA/RMM) ranking meetings. Deliverable progress by phase is detailed by the amount of shading in each deliverable timeline bar. This section also provides a written summary of all stakeholder engagement to date and provides an overview of the meeting series to which this report corresponds.

APPENDIX E: OREGON ENERGY SECURITY PLAN RISK ASSESSMENT REPORT

View this report in its entirety online:

https://www.oregon.gov/energy/safety-resiliency/Documents/2024-ORESP-Appendix-E.pdf



CNA

August 2024

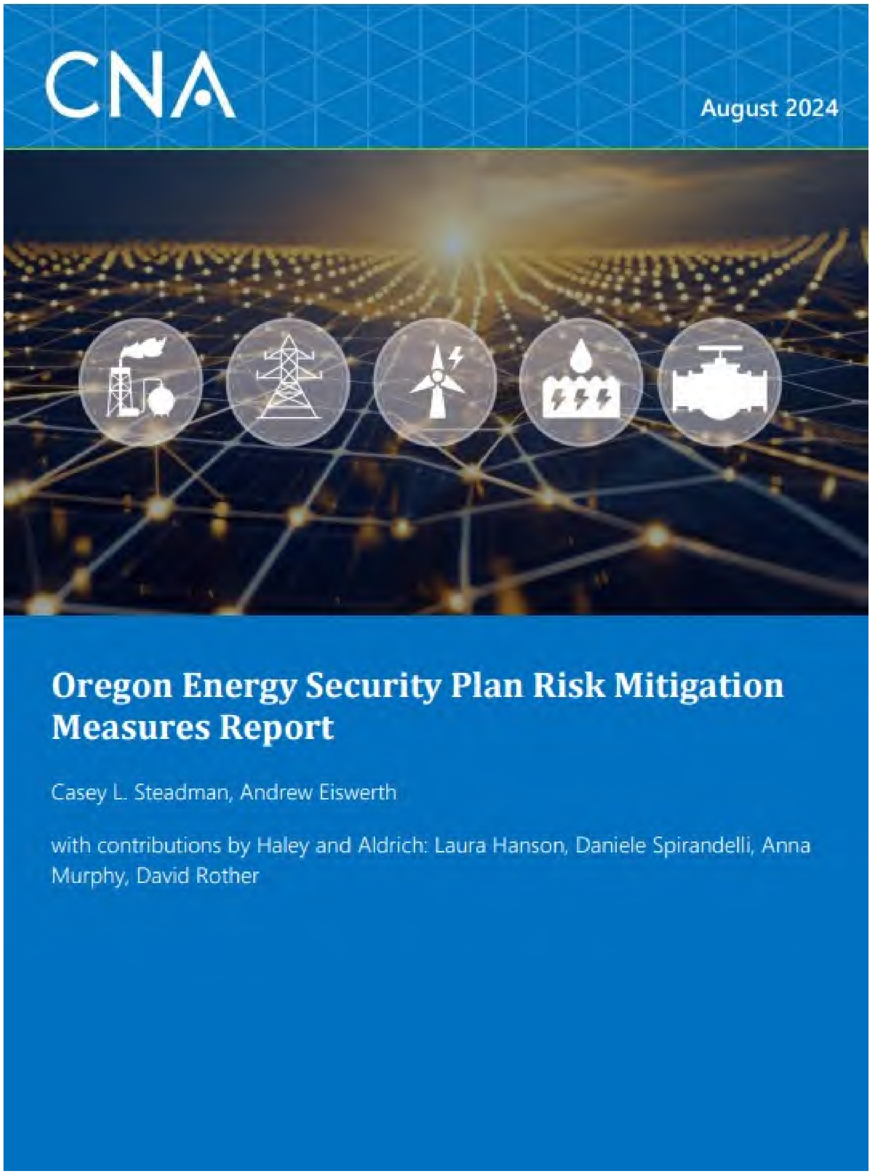
Oregon Energy Security Plan Risk Assessment Report

Casey L. Steadman, Andrew Eiswerth, Laura Hanson (Haley and Aldrich), Daniele Spirandelli (Haley and Aldrich), Anna Murphy (Haley and Aldrich), David Rother (Haley and Aldrich), Michelle Tanner (Haley and Aldrich)

APPENDIX F: OREGON ENERGY SECURITY PLAN RISK MITIGATION MEASURES REPORT

View this report in its entirety online:

https://www.oregon.gov/energy/safety-resiliency/Documents/2024-ORESP-Appendix-F.pdf



CNA

August 2024

Oregon Energy Security Plan Risk Mitigation Measures Report

Casey L. Steadman, Andrew Eiswerth

with contributions by Haley and Aldrich: Laura Hanson, Daniele Spirandelli, Anna Murphy, David Rother

APPENDIX G: PUBLIC COMMENT

The Oregon Department of Energy is grateful to all the individuals who provided public comment on the development of the 2024 Oregon Energy Security Plan. This Appendix includes comments ODOE received from the online comment portal that was available on the Oregon Energy Security Plan page from September 2023 through September 1, 2024, as well as written documents received at the May 2024 engagement meetings. All comments were reviewed and considered in the preparation of the OR ESP.

Public Comments: Online Submission

**Marketing spam comments were not included in this list*

In recent years, leading scientists from the US, Russia, China, India and https://facebook.com have warned of an energy crisis in the 21st century. Analyzing the causes of this crisis, scientists believe that it is mainly due to the depletion of oil, gas and coal resources; the increasing demand for energy as many countries are promoting industrialization while there is no new main source of energy to replace oil; security instability in strategic energy regions of the world (mainly due to the US's authoritarian political policies) and the world still disagreeing on solutions to the crisis. So how can we minimize these risks?

Linda Rose

7/26/2024

SB 1567 charges ODOE with developing an energy security plan for the state. The 2023 draft made available to the public talks about sources of energy, but does not offer even a hint as to how the state's energy security may be achieved. SB 1567 requires a report to a legislative Assembly committee by Sept. 15.

Nikki Mandell, CEI Hub Task Force

7/5/2024

Numerous state, county, and city reports document the potentially catastrophic consequences of a CSZ earthquake on the CEI Hub. The CEI Hub, which stores 90% of the liquid fuel used throughout the state and 100% of the jet fuel used at PDX, is critical infrastructure for the entire state. I am not aware of any published report that expects the CEI Hub to be operational in the aftermath of the predicted CSZ earthquake. At a PSU-Institute for Sustainable Solutions all-day workshop in Aug. 2023 participants from ODOE, the State Fire Marshal's Office and Portland F&R all indicated that they fully expected the CEI Hub to be non-operational, not to mention the source of massive toxic pollution, after the CSZ earthquake. As of a few years ago, DEQ could verify that only 1% of the storage tanks were seismically retrofitted.

Nikki Mandell, CEI Hub Task Force

6/23/2024

I attended the May 15 comment session and was disappointed that the SB 1567-related discussion items for the CEI Hub liquid fuels was scheduled at the very end of the session and we ran into a time crunch for good discussion. In fact all of the virtual attendees were cut off promptly at the 2-hour mark and missed much of what we did cover since we ran over time. For the Metro Region-these we very critical comment opportunities that were unnecessarily truncated.

Jay Wilson, Clackamas County Disaster Management

3/25/2024

General Questions/Comments

1) It wasn't clear how (or if) the stakeholder process informs the risk quantification and mitigation analysis when we are assessing some systems that are more regional in their existence (natural gas and electricity). In contrast those which are more local and rely upon an understanding of the local inventories available through a risk event, for which the stakeholder process makes a lot of sense to capture capacity and needs.

2) How will parties (directly or indirectly involved) be updated on process, timing, deliverables and status as the plan evolves?

3) Will ODOE share the DOE/PNNL results regarding the feedback received on the interim deliverable filed at the end of September?

4) Hopefully survey comments and questions/answers are going to be shared to ODOE's ESP webpage!

Heide Caswell, OPUC

11/1/2023

We recommend that ODOE develop near-term, mid-term, and long-term goals for Oregon's energy security alongside feasible implementation plans. Mid-term and long-term goals should guide the reduction of petroleum fuel usage stemming from decarbonization efforts in a way that maintains statewide energy resilience.

Luke Hanst, Institute for Sustainable Solutions

10/23/2023

Resiliency through diversity of energy sources

Tracy Pierce, NW Natural

10/16/2023

Energy security is vital for our industry!

CJ Baxter, Clean Water Services

9/28/2023

Unlimited, never-ending source of clean energy is Wave Energy. To find-out a easy way to use wave energy, it is a time demand responsibility to emphasize Wave Energy in the Energy Security Plan,

Dear Sir,

Greetings, I am Moniruzzaman, have been working since the last five years to find out the easy way to use Wave Energy. My vision is, I would like to see the world is using 100% renewable energy. I believe ocean Wave Energy will be the prime source of clean energy in the world's future energy system. As my mission, for the last few years I have been working to find-out the easy way to use wave energy.

I want to share my works on "Wave Energy Conversion", if you may like to implement or promote my clean energy ideas (linked).

1. https://www.scitechnol.com/peer-review/tidal-wave-energy-large-scale-conversion-technology-hr26.php?article_id=9649

-[https://premc.org/doc/ICREN2019/ICREN2019_Book_Of_Abstracts.pdf

[page-98]]

2. https://www.scitechnol.com/peer-review/wave-energy-efficient-conversion-of-the-big-waves-vQFe.php?article_id=20138

- [Third prize Winner in the Best Projects Category of the Adult Competition

https://entrepreneurship.de/en/magazin/winners-of-the-2022-citizen-entrepreneurship-competition-announced]

3. https://doi.org/10.14738/aivp.113.14613

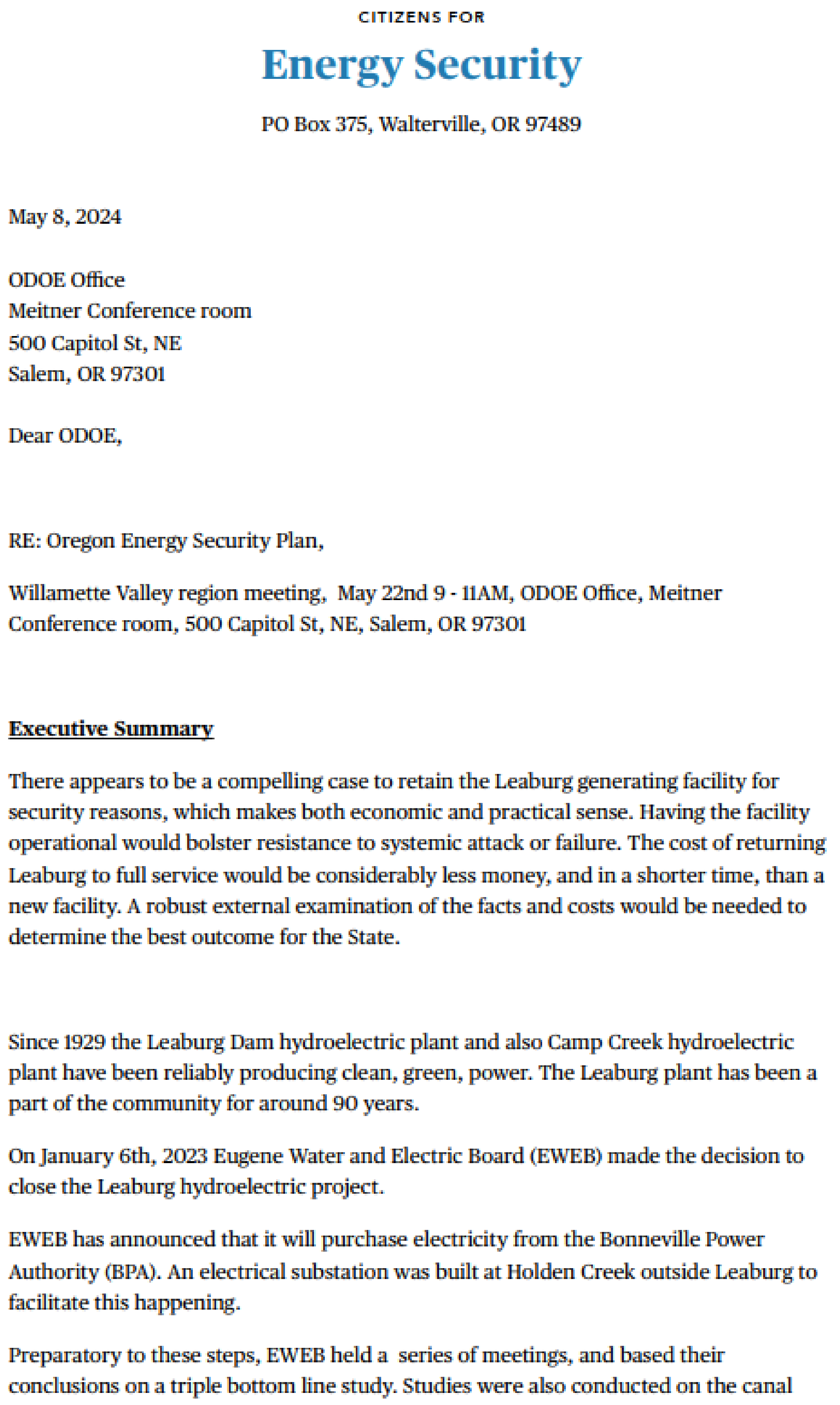
Hope you will suggest me about the implementation and or to improve it.

Thanks

Md. Moniruzzaman

9/7/2023

May 2024 Engagement Meetings Written Documents



CITIZENS FOR
Energy Security
PO Box 375, Walterville, OR 97489

May 8, 2024

ODOE Office
Meitner Conference room
500 Capitol St, NE
Salem, OR 97301

Dear ODOE,

RE: Oregon Energy Security Plan,

Willamette Valley region meeting, May 22nd 9 - 11AM, ODOE Office, Meitner Conference room, 500 Capitol St, NE, Salem, OR 97301

Executive Summary

There appears to be a compelling case to retain the Leaburg generating facility for security reasons, which makes both economic and practical sense. Having the facility operational would bolster resistance to systemic attack or failure. The cost of returning Leaburg to full service would be considerably less money, and in a shorter time, than a new facility. A robust external examination of the facts and costs would be needed to determine the best outcome for the State.

Since 1929 the Leaburg Dam hydroelectric plant and also Camp Creek hydroelectric plant have been reliably producing clean, green, power. The Leaburg plant has been a part of the community for around 90 years.

On January 6th, 2023 Eugene Water and Electric Board (EWEB) made the decision to close the Leaburg hydroelectric project.

EWEB has announced that it will purchase electricity from the Bonneville Power Authority (BPA). An electrical substation was built at Holden Creek outside Leaburg to facilitate this happening.

Preparatory to these steps, EWEB held a series of meetings, and based their conclusions on a triple bottom line study. Studies were also conducted on the canal system. Necessary repairs to the canal system were deemed too costly, when weighed against the remaining approximately 17 year (then) license time.

EWEB has made a commercial decision acting on its interests, which may not align with strategic needs for the state. It is unusual for a valuable asset to be closed due to relatively short term considerations of a licensee. Power projects are long term, and their implications far reaching. The economics of full facility restoration alter completely once the consideration of the licensing period is removed. The demolition of Leaburg Dam, and the associated power plants would however endure, and be irreversible. The impacts of closure would have major community consequences.

EWEB was founded on the back of a 1908 Typhoid outbreak. It was founded to protect the interests of the citizens of Eugene, then numbering just over 3000 people. Today the McKenzie valley alone is over 5000.

EWEB built the Leaburg generating plant to obtain a cost effective and long term solution, and get away from a 1923 standby power agreement. That agreement was with the Mountain States Power Company. EWEB now seeks to return to such an arrangement.

Today most utilities in Oregon purchase their power from BPA. From a security perspective, this represents an elevated risk, placing all eggs in one basket. Hostile actors who might seek to do ill to Oregon have to be considered in today's world.

On January 13th, 2024 an unexpected ice storm greatly impacted the Springfield area. Power lines and poles were downed over large areas. The damage was extensive, and revealed conclusively how fragile and exposed power lines can be in some conditions. On resumption of service some locales started later than others, depending upon the extent of pole damage. Bonneville Power Authority was also impacted, and power was locally lost for a while.

Most large scale industrial decisions in big companies today use a disciplined and formal approach. Under such methodology once decisions have been made there is usually a monitoring process to verify that matters are unchanged, and the decisions remain valid. Security risks have altered since early 2023, and must be given greater focus.

Background

The world political landscape has changed greatly over the past years. Global tensions have escalated, but at the same time new types of warfare and hostility have arisen as part of asymmetric warfare. This puts almost anything in scope for deliberate disruption. To some extent, computers and the internet have facilitated that, allowing actions to be conducted from thousands of miles away. Long standing bad actors have escalated their actions - often in consequence to sanctions or other actions. Newer threats have also emerged at the same time from formerly regional conflicts. The combination of both of these elements pose an increased threat to energy supply. Active and passive defense mechanisms are now very necessary.

Hacking in to electrical companies is one form of hostility, but there are many possibilities. In Ukraine one can see how energy supply is a key issue. Power stations are a key objective and threat. Modern thinking on large power stations providing power over large areas extends the radius of damage that can be caused by targeting one facility. This is very visible in Ukraine, were the Zaporizhzia power plant to be lost seven nations and millions of people would be without power. However, it is not just threats from bad actors which are present. Today and increasingly, climate change is producing more extreme weather events.

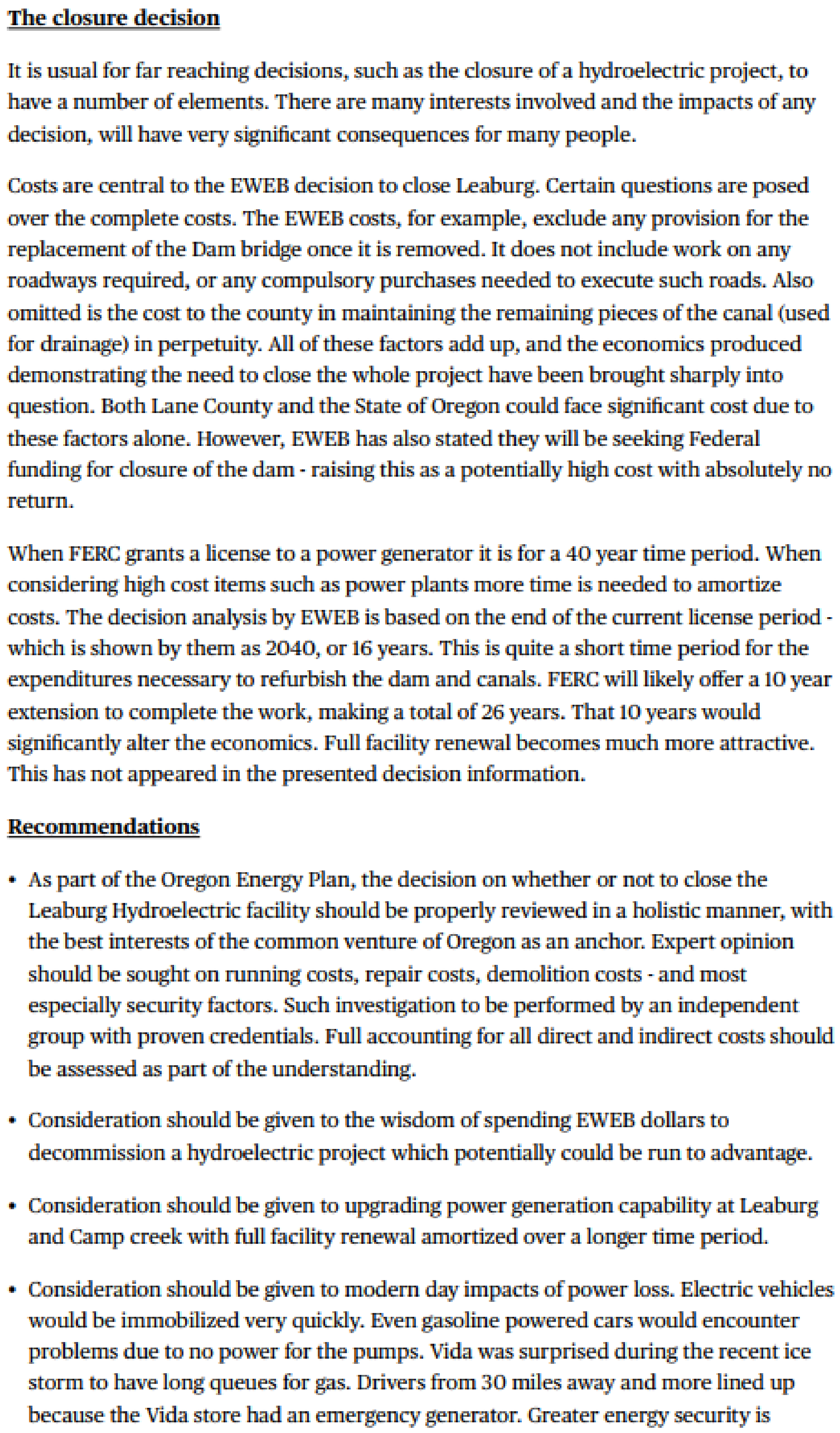
Security and the role of Leaburg/Camp Creek hydroelectric plants

Closing the Leaburg Power Plant would be detrimental to the interests of the state of Oregon.

The decision to close the Leaburg Hydroelectric Plant was made on commercial grounds. The scope of the decision was limited solely to the interests of EWEB and not for those of the greater good.

In reviewing written submittals from EWEB, no discussion was seen on the lower reliability of power lines stretched over many miles from the generating point. We were unable to find an assessment on reliability, subsequent to reducing the number of generating points in a system. There was no discussion about the sudden loss of power over a wide area which could happen if Bonneville Power Authority (BPA) lines were downed. Such events on a large scale can have serious impacts as seen by the power failure aboard MV Dali at Baltimore, and the subsequent loss of Francis Scott Key Bridge. In that case they did not have another generator available which could be brought on line.

Oregon has been diversifying its energy generators, but it would take many millions of dollars to replicate the generating ability, reliability and availability of the Leaburg Hydroelectric Project. Keeping more generating centers removes some of the fragility of lines on poles. It does this by reducing the length of wire runs from source to consumer. The impacts of damage to one generating facility or BPA lines can be mitigated to some degree, provided there are alternatives, and alternative routes.



The closure decision

It is usual for far reaching decisions, such as the closure of a hydroelectric project, to have a number of elements. There are many interests involved and the impacts of any decision, will have very significant consequences for many people.

Costs are central to the EWEB decision to close Leaburg. Certain questions are posed over the complete costs. The EWEB costs, for example, exclude any provision for the replacement of the Dam bridge once it is removed. It does not include work on any roadways required, or any compulsory purchases needed to execute such roads. Also omitted is the cost to the county in maintaining the remaining pieces of the canal (used for drainage) in perpetuity. All of these factors add up, and the economics produced demonstrating the need to close the whole project have been brought sharply into question. Both Lane County and the State of Oregon could face significant cost due to these factors alone. However, EWEB has also stated they will be seeking Federal funding for closure of the dam - raising this as a potentially high cost with absolutely no return.

When FERC grants a license to a power generator it is for a 40 year time period. When considering high cost items such as power plants more time is needed to amortize costs. The decision analysis by EWEB is based on the end of the current license period - which is shown by them as 2040, or 16 years. This is quite a short time period for the expenditures necessary to refurbish the dam and canals. FERC will likely offer a 10 year extension to complete the work, making a total of 26 years. That 10 years would significantly alter the economics. Full facility renewal becomes much more attractive. This has not appeared in the presented decision information.

Recommendations

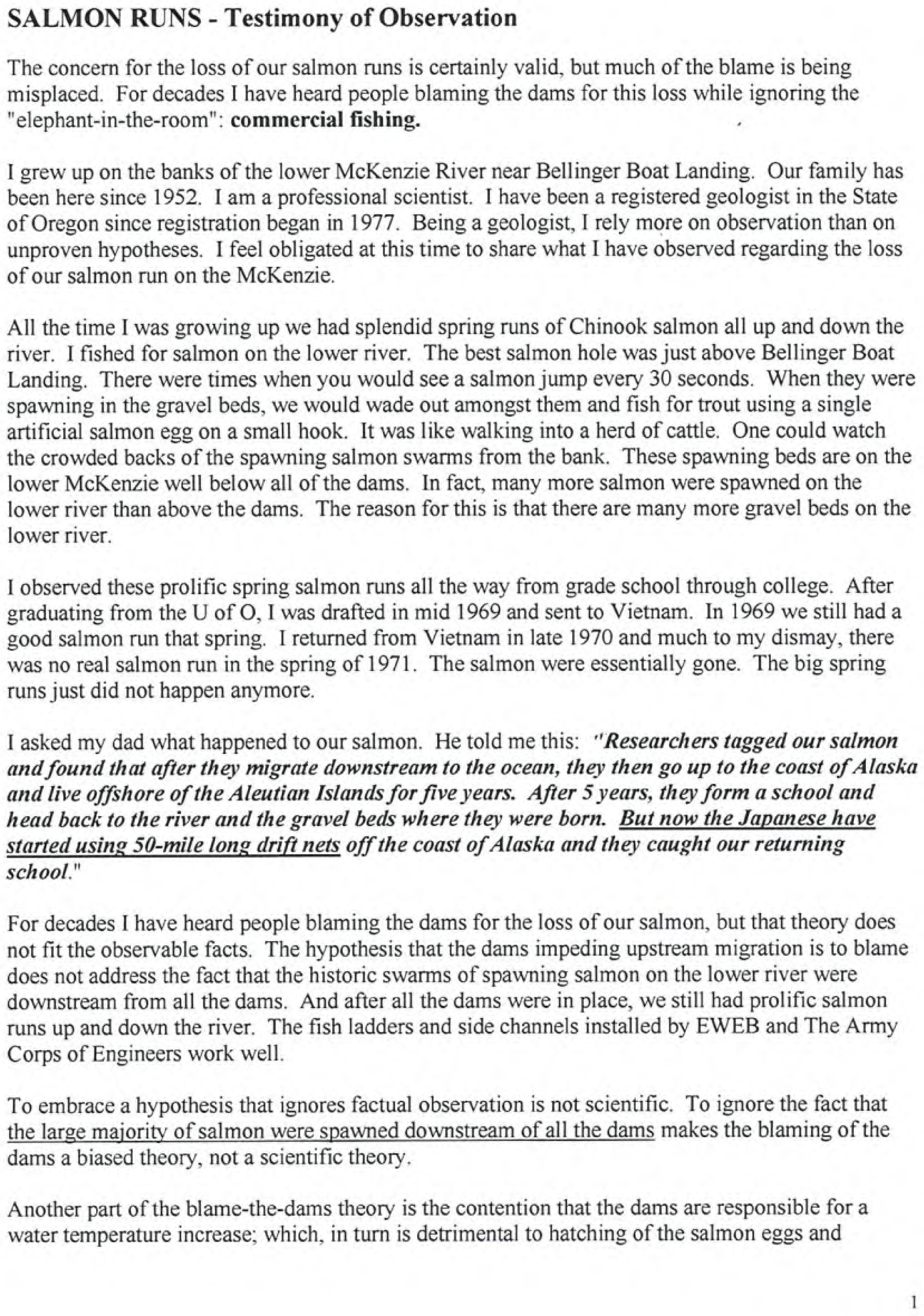
- As part of the Oregon Energy Plan, the decision on whether or not to close the Leaburg Hydroelectric facility should be properly reviewed in a holistic manner, with the best interests of the common venture of Oregon as an anchor. Expert opinion should be sought on running costs, repair costs, demolition costs - and most especially security factors. Such investigation to be performed by an independent group with proven credentials. Full accounting for all direct and indirect costs should be assessed as part of the understanding.
- Consideration should be given to the wisdom of spending EWEB dollars to decommission a hydroelectric project which potentially could be run to advantage.
- Consideration should be given to upgrading power generation capability at Leaburg and Camp creek with full facility renewal amortized over a longer time period.
- Consideration should be given to modern day impacts of power loss. Electric vehicles would be immobilized very quickly. Even gasoline powered cars would encounter problems due to no power for the pumps. Vida was surprised during the recent ice storm to have long queues for gas. Drivers from 30 miles away and more lined up because the Vida store had an emergency generator. Greater energy security is

becoming a more critical function. Taking down BPA power lines by bad actors cannot be ruled out.

- Opinions of relevant State and County bodies should inform the decision. particularly concerning the huge impacts of demolition and on peoples lives.
- The strong advantages of hydro power should be weighed in the discussion, high reliability, not subject to diurnal variation, not dependent on any fuel and the energy source abundant.

Citizens for Energy Security

PO BOX 375, WALTERVILLE, OR 97488



SALMON RUNS - Testimony of Observation

The concern for the loss of our salmon runs is certainly valid, but much of the blame is being misplaced. For decades I have heard people blaming the dams for this loss while ignoring the "elephant-in-the-room": **commercial fishing.**

I grew up on the banks of the lower McKenzie River near Bellinger Boat Landing. Our family has been here since 1952. I am a professional scientist. I have been a registered geologist in the State of Oregon since registration began in 1977. Being a geologist, I rely more on observation than on unproven hypotheses. I feel obligated at this time to share what I have observed regarding the loss of our salmon run on the McKenzie.

All the time I was growing up we had splendid spring runs of Chinook salmon all up and down the river. I fished for salmon on the lower river. The best salmon hole was just above Bellinger Boat Landing. There were times when you would see a salmon jump every 30 seconds. When they were spawning in the gravel beds, we would wade out amongst them and fish for trout using a single artificial salmon egg on a small hook. It was like walking into a herd of cattle. One could watch the crowded backs of the spawning salmon swarms from the bank. These spawning beds are on the lower McKenzie well below all of the dams. In fact, many more salmon were spawned on the lower river than above the dams. The reason for this is that there are many more gravel beds on the lower river.

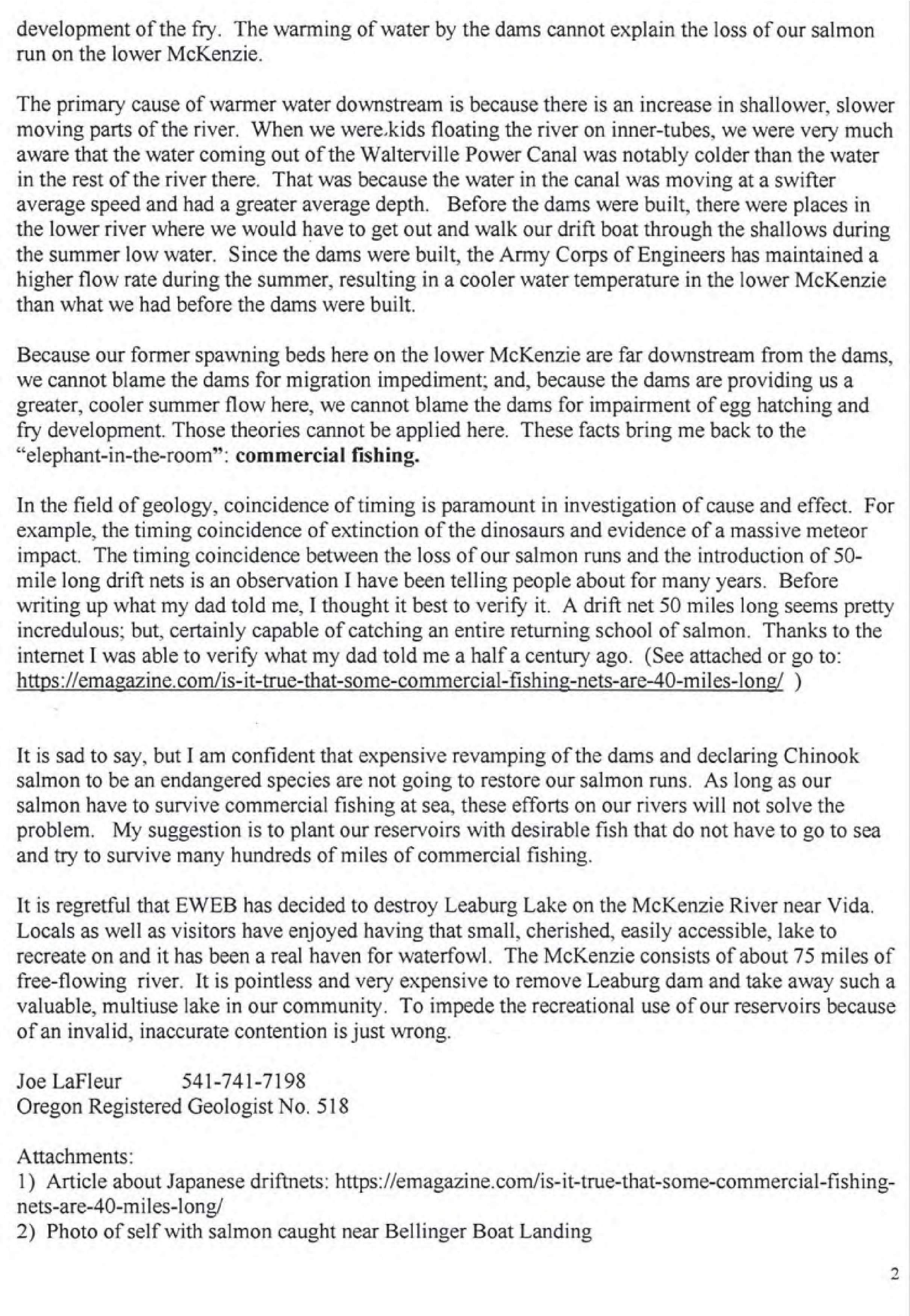
I observed these prolific spring salmon runs all the way from grade school through college. After graduating from the U of O, I was drafted in mid 1969 and sent to Vietnam. In 1969 we still had a good salmon run that spring. I returned from Vietnam in late 1970 and much to my dismay, there was no real salmon run in the spring of 1971. The salmon were essentially gone. The big spring runs just did not happen anymore.

I asked my dad what happened to our salmon. He told me this: ***"Researchers tagged our salmon and found that after they migrate downstream to the ocean, they then go up to the coast of Alaska and live offshore of the Aleutian Islands for five years. After 5 years, they form a school and head back to the river and the gravel beds where they were born. But now the Japanese have started using 50-mile long drift nets off the coast of Alaska and they caught our returning school."***

For decades I have heard people blaming the dams for the loss of our salmon, but that theory does not fit the observable facts. The hypothesis that the dams impeding upstream migration is to blame does not address the fact that the historic swarms of spawning salmon on the lower river were downstream from all the dams. And after all the dams were in place, we still had prolific salmon runs up and down the river. The fish ladders and side channels installed by EWEB and The Army Corps of Engineers work well.

To embrace a hypothesis that ignores factual observation is not scientific. To ignore the fact that the large majority of salmon were spawned downstream of all the dams makes the blaming of the dams a biased theory, not a scientific theory.

Another part of the blame-the-dams theory is the contention that the dams are responsible for a water temperature increase; which, in turn is detrimental to hatching of the salmon eggs and



development of the fry. The warming of water by the dams cannot explain the loss of our salmon run on the lower McKenzie.

The primary cause of warmer water downstream is because there is an increase in shallower, slower moving parts of the river. When we were kids floating the river on inner-tubes, we were very much aware that the water coming out of the Walterville Power Canal was notably colder than the water in the rest of the river there. That was because the water in the canal was moving at a swifter average speed and had a greater average depth. Before the dams were built, there were places in the lower river where we would have to get out and walk our drift boat through the shallows during the summer low water. Since the dams were built, the Army Corps of Engineers has maintained a higher flow rate during the summer, resulting in a cooler water temperature in the lower McKenzie than what we had before the dams were built.

Because our former spawning beds here on the lower McKenzie are far downstream from the dams, we cannot blame the dams for migration impediment; and, because the dams are providing us a greater, cooler summer flow here, we cannot blame the dams for impairment of egg hatching and fry development. Those theories cannot be applied here. These facts bring me back to the "elephant-in-the-room": **commercial fishing.**

In the field of geology, coincidence of timing is paramount in investigation of cause and effect. For example, the timing coincidence of extinction of the dinosaurs and evidence of a massive meteor impact. The timing coincidence between the loss of our salmon runs and the introduction of 50-mile long drift nets is an observation I have been telling people about for many years. Before writing up what my dad told me, I thought it best to verify it. A drift net 50 miles long seems pretty incredulous; but, certainly capable of catching an entire returning school of salmon. Thanks to the internet I was able to verify what my dad told me a half a century ago. (See attached or go to: https://emagazine.com/is-it-true-that-some-commercial-fishing-nets-are-40-miles-long/)

It is sad to say, but I am confident that expensive revamping of the dams and declaring Chinook salmon to be an endangered species are not going to restore our salmon runs. As long as our salmon have to survive commercial fishing at sea, these efforts on our rivers will not solve the problem. My suggestion is to plant our reservoirs with desirable fish that do not have to go to sea and try to survive many hundreds of miles of commercial fishing.

It is regretful that EWEB has decided to destroy Leaburg Lake on the McKenzie River near Vida. Locals as well as visitors have enjoyed having that small, cherished, easily accessible, lake to recreate on and it has been a real haven for waterfowl. The McKenzie consists of about 75 miles of free-flowing river. It is pointless and very expensive to remove Leaburg dam and take away such a valuable, multiuse lake in our community. To impede the recreational use of our reservoirs because of an invalid, inaccurate contention is just wrong.

Joe LaFleur 541-741-7198
Oregon Registered Geologist No. 518

Attachments:
1) Article about Japanese driftnets: https://emagazine.com/is-it-true-that-some-commercial-fishing-nets-are-40-miles-long/
2) Photo of self with salmon caught near Bellinger Boat Landing

APPENDIX H: COMMERCIAL ELECTRICITY GENERATING FACILITIES

Plant Name	Entity Name	County	Net Summer Capacity (MW)	Net Winter Capacity (MW)	Technology	2021 Generation	% of Total Generation
John Day	USACE Northwestern Division	Sherman	118	118	Conventional Hydroelectric	6,048,748	9.9%
The Dalles	USACE Northwestern Division	Wasco	14	14	Conventional Hydroelectric	4,734,282	7.8%
Bonneville	USACE Northwestern Division	Multnomah	13.1	13.1	Conventional Hydroelectric	3,726,676	6.1%
McNary	USACE Northwestern Division	Umatilla	58	58	Conventional Hydroelectric	2,907,291	4.8%
Hells Canyon	Idaho Power Co	Wallowa	131.8	131.2	Conventional Hydroelectric	944,339	1.5%
Biglow Canyon Wind Farm	Portland General Electric Co	Sherman	125.4	125.4	Onshore Wind Turbine	863,705	1.4%
Port Westward Unit 2	Portland General Electric Co	Columbia	18.7	18.7	Natural Gas Internal Combustion Engine	624,545	1.0%
Klondike Windpower III	Avangrid Renewables LLC	Sherman	76.5	76.5	Onshore Wind Turbine	610,767	1.0%
Wheatridge Hybrid	Wheatridge Wind Holdings, LLC	Morrow	30	30	Batteries	516,047	0.8%
Round Butte	Portland General Electric Co	Jefferson	110	110	Conventional Hydroelectric	501,583	0.8%
South Hurlburt Wind LLC	Caithness Shepherds Flat LLC	Gilliam	290	290	Onshore Wind Turbine	499,774	0.8%
Horseshoe Bend Wind LLC	Caithness Shepherds Flat LLC	Gilliam	290	290	Onshore Wind Turbine	494,388	0.8%
North Hurlburt Wind LLC	Caithness Shepherds Flat LLC	Gilliam	265	265	Onshore Wind Turbine	467,149	0.8%
Oxbow (OR)	Idaho Power Co	Baker	52	53	Conventional Hydroelectric	459,893	0.8%
Montague Wind Power Facility LLC	Avangrid Renewables LLC	Gilliam	200	200	Onshore Wind Turbine	427,793	0.7%
Biomass One LP	Biomass One LP	Jackson	8.5	8.5	Wood/Wood Waste Biomass	380,524	0.6%
Leaning Juniper Wind Power II	Avangrid Renewables LLC	Gilliam	199.2	199.2	Onshore Wind Turbine	340,893	0.6%
Hermiston Power Partnership	Hermiston Power Partnership	Umatilla	184	195	Natural Gas Fired Combined Cycle	305,059	0.5%
Elkhorn Valley Wind Farm	Telocaset Wind Power Partners	Union	100.7	100.7	Onshore Wind Turbine	265,008	0.4%
Wheatridge 1	Portland General Electric Co	Morrow	100	100	Onshore Wind Turbine	243,493	0.4%
Vansycle II Wind Energy Center	FPL Energy Stateline II Inc	Umatilla	98.9	98.9	Onshore Wind Turbine	233,567	0.4%
Leaning Juniper	PacifiCorp	Gilliam	100.5	100.5	Onshore Wind Turbine	225,861	0.4%
Carty Generating Station	Portland General Electric Co	Morrow	168.2	189.9	Natural Gas Fired Combined Cycle	221,629	0.4%
Klondike Windpower II	Avangrid Renewables LLC	Sherman	81	81	Onshore Wind Turbine	204,421	0.3%
Pelton	Portland General Electric Co	Jefferson	36	36	Conventional Hydroelectric	197,915	0.3%
Star Point Wind Project LLC	Avangrid Renewables LLC	Sherman	98.7	98.7	Onshore Wind Turbine	181,963	0.3%
Arlington Wind Power Project	Arlington Wind Power Project LLC	Gilliam	102.9	102.9	Onshore Wind Turbine	174,228	0.3%
Pebble Springs Wind LLC	Avangrid Renewables LLC	Gilliam	98.7	98.7	Onshore Wind Turbine	173,187	0.3%
Hay Canyon Wind Power LLC	Avangrid Renewables LLC	Sherman	100.8	100.8	Onshore Wind Turbine	171,647	0.3%
Wheat Field Wind Power Project	Wheat Field Wind Power Project	Gilliam	102.9	102.9	Onshore Wind Turbine	168,773	0.3%
Willow Creek Energy Center	Invenergy Services LLC	Morrow	72	72	Onshore Wind Turbine	136,429	0.2%
Green Peter	USACE Northwestern Division	Linn	40	40	Conventional Hydroelectric	134,098	0.2%
Lookout Point	USACE Northwestern Division	Lane	40	40	Conventional Hydroelectric	132,146	0.2%
Lost Creek	USACE Northwestern Division	Jackson	24.5	24.5	Conventional Hydroelectric	129,983	0.2%
Neal Hot Springs Geothermal Project	US Geothermal Inc.	Malheur	5.9	9.5	Geothermal	129,975	0.2%
Detroit	USACE Northwestern Division	Marion	50	50	Conventional Hydroelectric	129,209	0.2%
Eurus Combine Hills Turbine Ranch 2	Eurus Combine Hills II LLC	Umatilla	66.1	66.1	Onshore Wind Turbine	112,326	0.2%
North Fork	Portland General Electric Co	Clackamas	27	27	Conventional Hydroelectric	112,068	0.2%
Millican Solar Energy LLC	Invenergy Services LLC	Crook	71.4	71.4	Solar Photovoltaic	104,961	0.2%
John C Boyle	PacifiCorp	Klamath	47.6	47.6	Conventional Hydroelectric	103,508	0.2%
Prospect 2	PacifiCorp	Jackson	18	18	Conventional Hydroelectric	102,668	0.2%
Seneca Sustainable Energy LLC	Seneca Sustainable Energy LLC	Lane	19.8	19.8	Wood/Wood Waste Biomass	101,871	0.2%
Carmen Smith	Eugene Water & Electric Board	Linn	3.8	6.5	Conventional Hydroelectric	100,869	0.2%
Waste Management Columbia Ridge	WM Renewable Energy LLC	Gilliam	0.8	0.8	Landfill Gas	99,743	0.2%
Solar Star Oregon II	Avangrid Renewables LLC	Crook	56	56	Solar Photovoltaic	98,381	0.2%
Toketee Falls	PacifiCorp	Douglas	15	15	Conventional Hydroelectric	96,677	0.2%
FPL Energy Vansycle LLC (OR)	FPL Energy Vansycle LLC	Umatilla	122.8	122.8	Onshore Wind Turbine	95,702	0.2%

APPENDIX I: SB 1567 FACT SHEET

In 2022, the Oregon Legislature passed Senate Bill 1567, which directed the Oregon Department of Energy to prepare this Energy Security Plan in accordance with federal statute, and to also evaluate additional fuel resilience strategies. This fact sheet describes the process used to complete requirements established in SB 1567, Section 12.

> 9.2 *align with strategies in the Oregon Fuel Action Plan*

The liquid fuel mitigation strategies and response planning associated with the Oregon Energy Security Plan incorporate elements of the Oregon Fuel Action Plan, which remains the primary response document for liquid fuels in emergencies.

> 9.2a *evaluate the state's ability to recover quickly from physical threats including CSZ 9.0 and cybersecurity*

A statewide and regional risk assessment of physical and cybersecurity threats is included in Section 7 of the Energy Security Plan. Mitigation strategies to manage those risks and reduce recovery time are presented in Section 8.

> 9.2b *make recommendations for increasing the geographic fuel storage capacity throughout the state*

A framework that establishes a screening tool for recommendations is included as Appendix B.

> 9.2c *assess the seismic resilience of existing fuel storage facilities throughout the state*

Analysis conducted as part of the Energy Security Plan included geographic evaluation of reported fuel storage locations relative to anticipated seismic impacts. Current ODEQ and OSFM regulations include resilience requirements for new construction.

> 9.2d *assess the use of renewable fuels and other innovative alternatives to improve disaster resilience*

Currently, all renewable fuels – renewable diesel, biodiesel, ethanol – are imported from other states or countries. Since Oregon does not have significant production capacity for these petroleum fuel replacements or supplements, their use does not readily lend itself to improving disaster resilience in and of themselves. However, the potential reportedly exists for renewable diesel to have a longer shelf life (10 years) than traditional diesel (6-12 months) or biodiesel (6 months). There may be opportunities to develop isolated storage of renewable diesel in areas that do not have a high turnover rate in tanks – more assessment of this option should occur. Additionally, there are multiple project proposals currently in process to develop renewable fuels production facilities in Oregon; if these facilities proceed to development, Oregon would have an in-state supply of such fuels. This would strengthen resilience and security by increasing the fuel supply available in the state. Finally, as propane also has an extended storage viability, it may also be a useful resource for backup power generation or emergency response. See Section V for a description of the propane distribution system in Oregon.

As Oregon pursues decarbonization goals, electric vehicles, battery backup, and microgrids may prove to be an effective resilience method to help supplement — or in some cases, replace — liquid-fueled emergency vehicles or backup power generators. Programs to enhance and improve the electric grid can have a substantial benefit to decarbonization and reduced reliance on liquid fuels. The Oregon Department of Energy's Grid Resilience Grant Program, which was funded under the Inflation Reduction Act, has the potential to benefit the state in many ways. By improving grid security and resilience, and reducing the frequency and duration of power outages, there may be a reduced need for liquid-fueled back-up power generation. Additional discussion of current and planned resilience actions is presented in Sections X and XI of this report, respectively.

> 9.2e *evaluate strategies for mitigating barriers to implementing a geographically distributed fuel network across the state including:*
>
> > *(A) Adoption of Oregon Fuel Action Plan criteria for predesignated fuel points of distribution for receiving emergency fuel supplies at selected fuel diversification sites*

State agencies, Tribal governments, and county governments were asked to provide preferred fuel point of distribution (FPOD) locations. As these locations are proposed, the hazard evaluation tool will be used to evaluate relative vulnerability and whether mitigation measures may be appropriate. ODOE will continue to work with its partners at county and Tribal governments, using the analysis tool, to identify and designed FPOD locations across the state.

> > *(B) Strategies for expanding storage capacities at public facilities with existing capability to store and dispense unleaded, diesel or aviation fuel, including an evaluation of whether fuel storage sites contain properly installed seismically certified generators and adequate on-site fuel storage capacity to power backup generators so that independent operations can be maintained for three or more weeks after a Cascadia Subduction Zone earthquake*

A methodology for screening sites for viability is included as Appendix B. Following initial screening, the process would recommend a site visit to assess additional criteria. These criteria may include backup power/manual fuel retrieval options, security, paved surfaces in support of logistics, and/or vulnerability of access routes. ODOE will continue to work with state, local, and Tribal government partners, as well as the private sector energy companies, to conduct additional analysis with both the GIS tool and site-specific assessments.

> > *(C) Partnerships with private-sector companies to build fuel storage capacity at identified, prioritized locations, especially private-sector companies that provide an emergency or essential service mission to save or sustain life or support the restoration of critical lifelines and services in support of the state's overall response and recovery effort.*

The preliminary assessment of storage capacity for potential expansion included public partner organizations such as utilities, higher education institutions, and telecom providers. As implementation matures, partnerships in critical locations where there is no viable government or public partner site will be pursued as needed. ODOE will also continue to work with private sector energy companies, as possible, during site-specific assessments and future development activities of energy storage facilities.

> > *(D) Strategies for increasing geographically distributed fuel storage that prioritize areas of this state that are expected to be most vulnerable to a Cascadia Subduction Zone earthquake, including local or regional islanding effects that would isolate a region from the rest of this state as a result of road or bridge damage.*

The islanding and expansion evaluation tool developed as part of this plan is available to ensure that the proposed storage expansions and FPODs are situated in a manner that allows adequate refueling access and serves the most likely islanded communities. As described in Section 9, the Oregon post-Cascadia earthquake 'island mapping' is a key component of the GIS tool.

> > *(E) An evaluation of potential impacts to communities adjacent to potential locations for emergency fuel storage or expanded fuel storage, including consultation and outreach with those communities*

Prior to implementation of any fuel storage expansion recommendations, ODOE and partners will conduct consultation and outreach to the local and potentially affected communities. This work will be on-going.