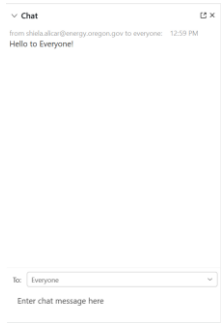
2024 Biennial Energy Report

February 19, 2025

USING WEBEX

Chat



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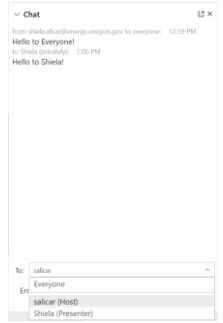

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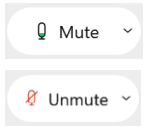
Audio Options



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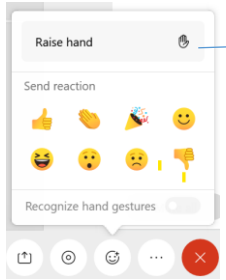

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Agenda

- Background and Process
- Energy By the Numbers
- Energy History Timeline
- Energy 101
- Resource and Technology Reviews
- Updates on State Energy Projects
- Next Steps
- Q&A

Audience Engagement

- Chat
- Polling
- End of Webinar Survey

This webinar is being recorded and will be posted to ODOE's website.

Tell us about yourself!

OREGON DEPARTMENT OF ENERGY

Leading Oregon to a safe, equitable, clean, and sustainable energy future.

Our Mission

The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do

On behalf of Oregonians across the state, the Oregon Department of Energy achieves its mission by providing:

- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

2024 BIENNIAL ENERGY REPORT

Goal of the Report

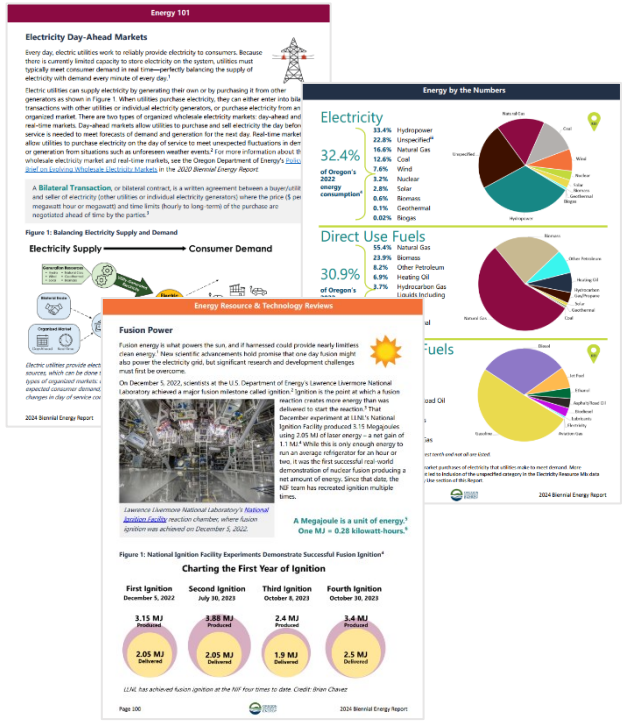
Pursuant to ORS 469.059, provide a comprehensive review of energy resources, policies, trends, and forecasts, and what they mean for Oregon.

Scoping the Report

Shaped by a data-driven process, equity considerations, and input from stakeholders and the public.

Designing the Report

Themes cross sections – energy 101s, resource and technology reviews, updates on state energy projects.



https://energyinfo.oregon.gov/ber

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THE "BER" COLLECTION

Each edition of the Biennial Energy Report builds upon the last, creating a collection of data, energy resource and technology reviews, 101s, and policy briefs that can serve as reference materials for interested Oregonians.

View the whole collection:

https://energyinfo.oregon.gov/ber-collection

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Energy by the Numbers

Oregon's overall and sector-based energy use, energy production and generation, and energy expenditures.

Data and metrics track how Oregon produces, purchases, and uses various types of energy.

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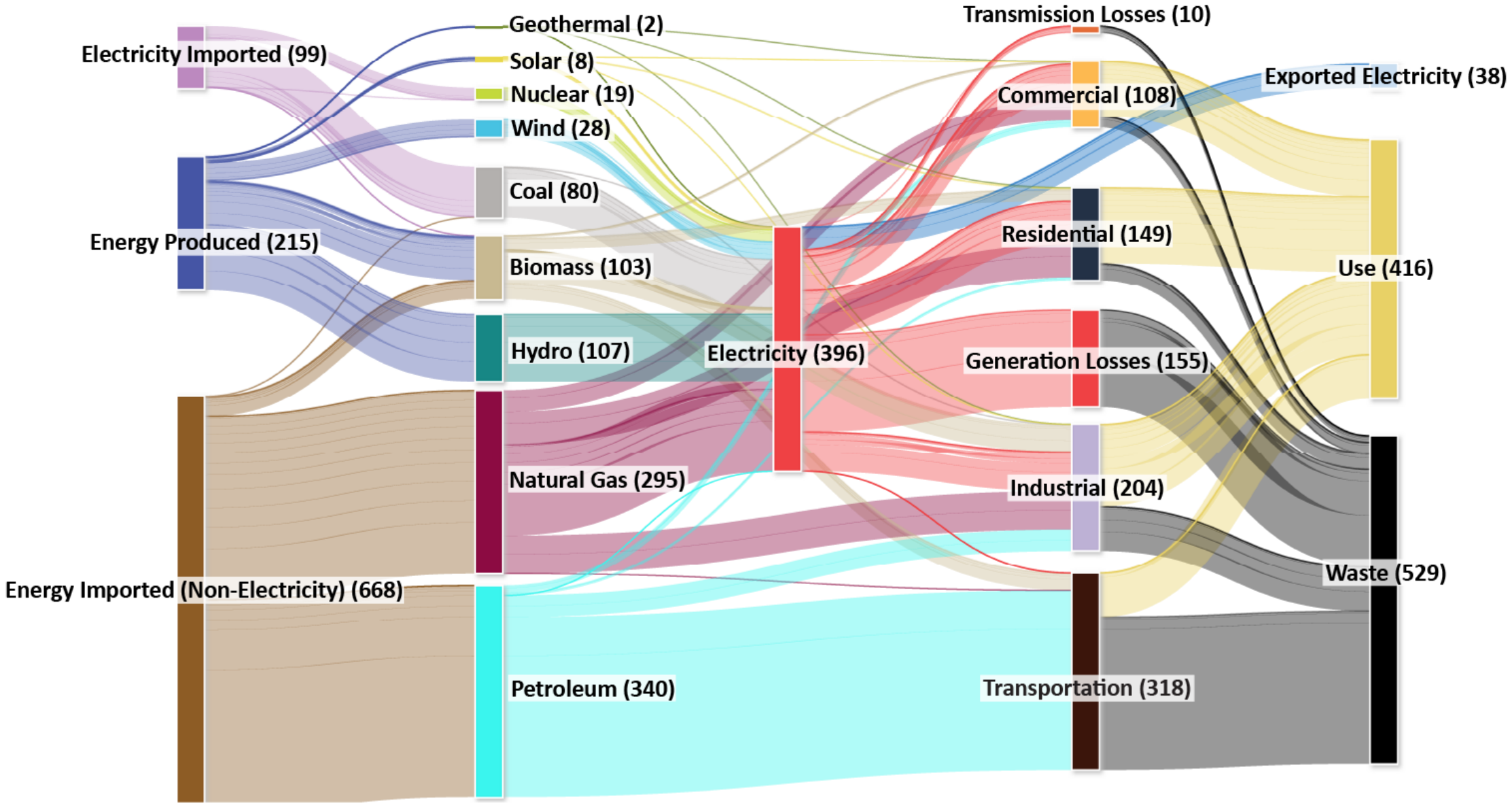
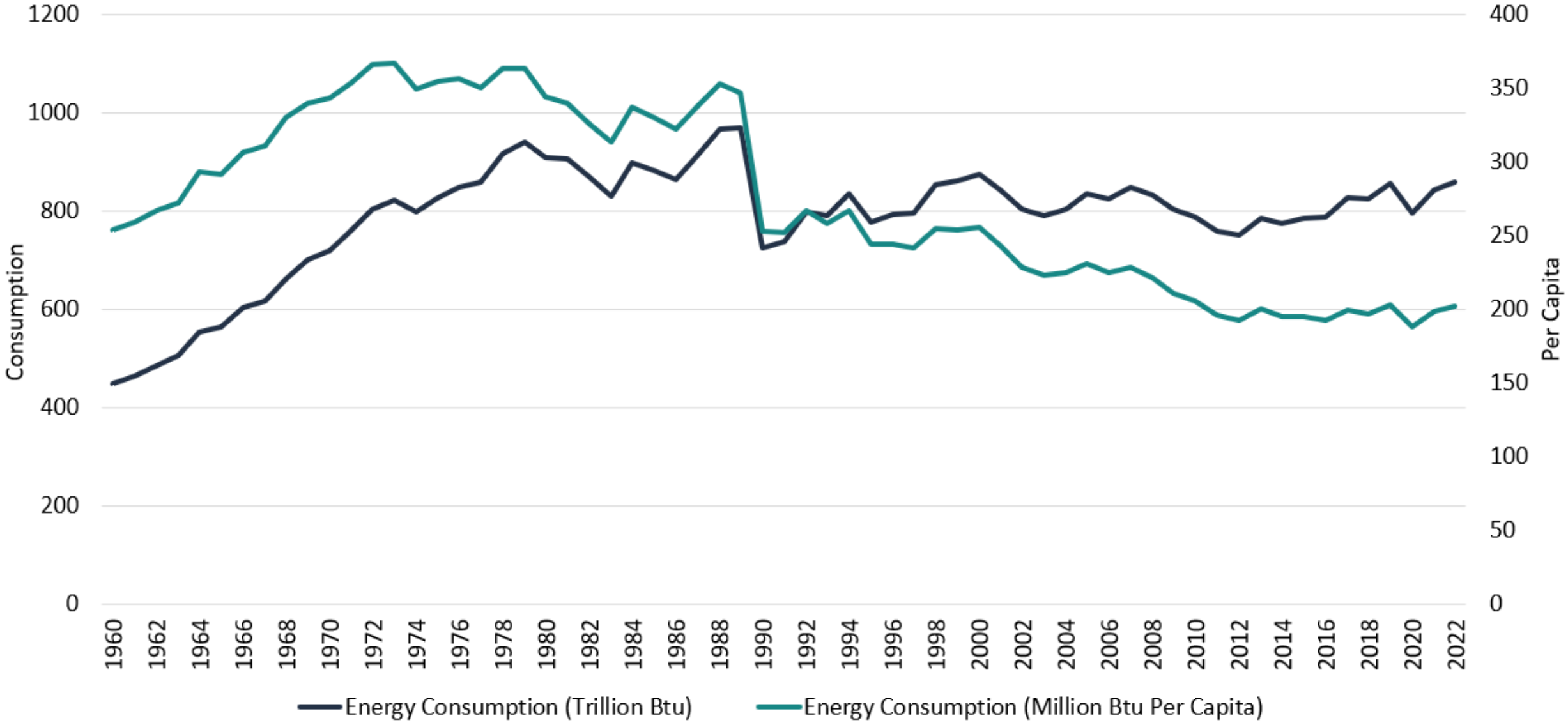
What do you think?

Oregon's Energy Flow

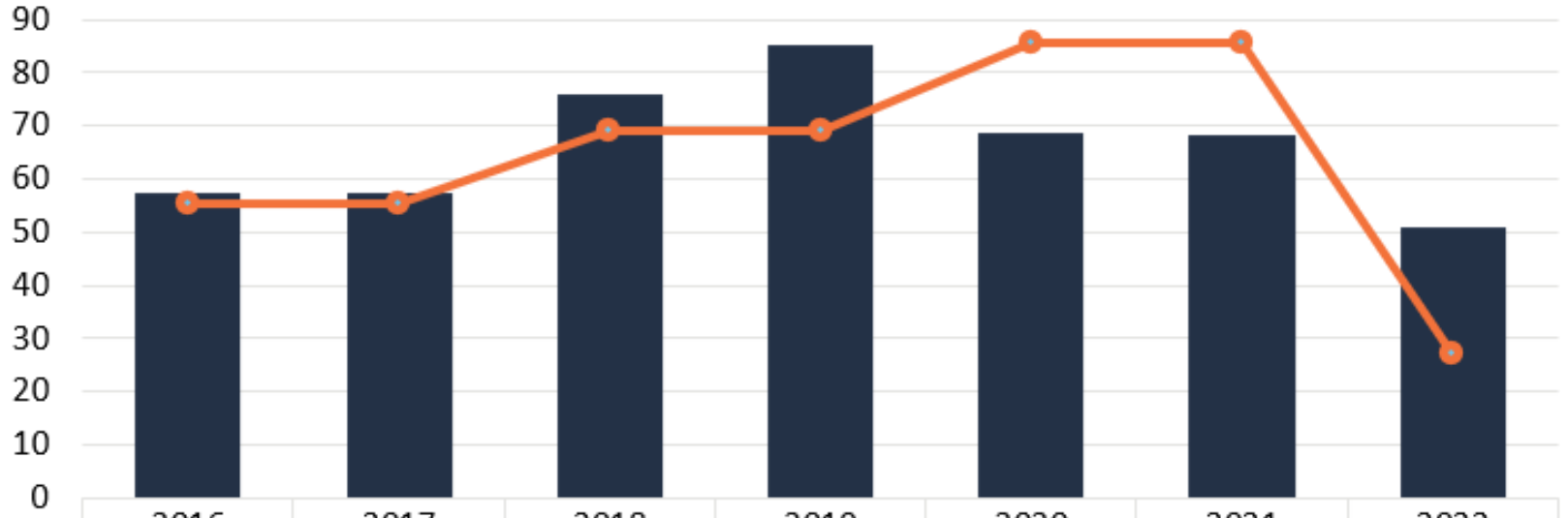


Numbers are in trillions of British thermal units (Btus)

Oregon's Total Energy Consumption and Per Capital Energy Consumption Over Time



Oregon Electricity Savings & Estimated Share of Seventh Power Plan Goal (aMW)



	2016	2017	2018	2019	2020	2021	2022
Energy Trust of Oregon	58.4	62.2	50.0	51.8	39.9	39.9	40.9
BPA	9.3	5.7	8.1	8.9	3.9	4.9	5.8
COU Utility Self-Funded	1.1	0.6	2.6	3.3	0.3	0.3	0.1
NEEA	9.1	8.1	12.9	17.3	14.7	15.5	3.4
Codes and Standards	0.0	0.5	1.9	2.4	3.4	4.1	0.8
Momentum	-1.0	-0.9	12.6	12.9	14.6	10.8	0.0
Market Adjustment	-19.4	-18.7	-12.3	-11.4	-8.0	-7.4	0.0
Total Oregon Savings	57.53	57.50	75.79	85.27	68.62	68.16	50.96
Estimated Oregon Share of Goal	56	56	69	69	86	86	27

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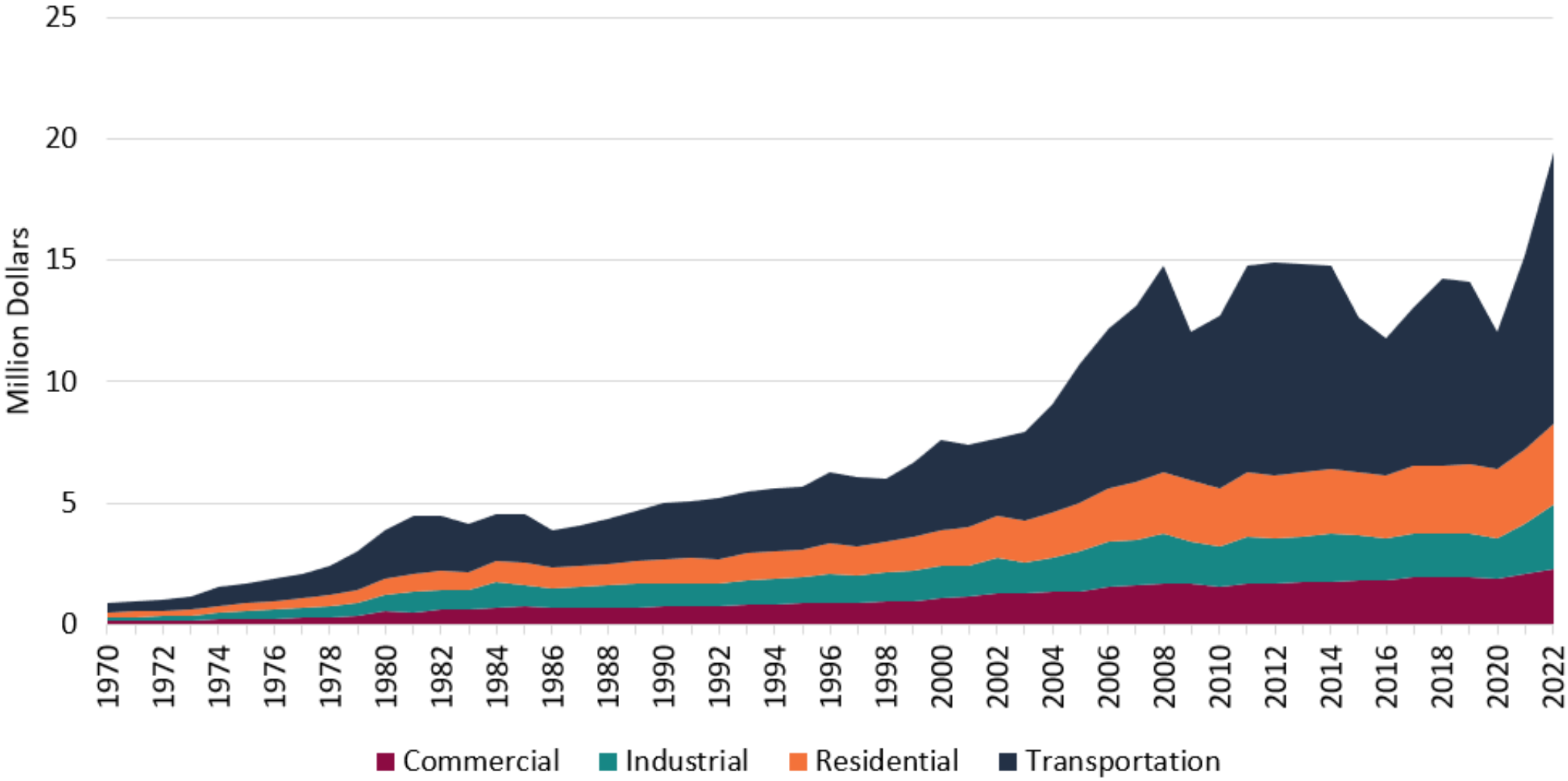
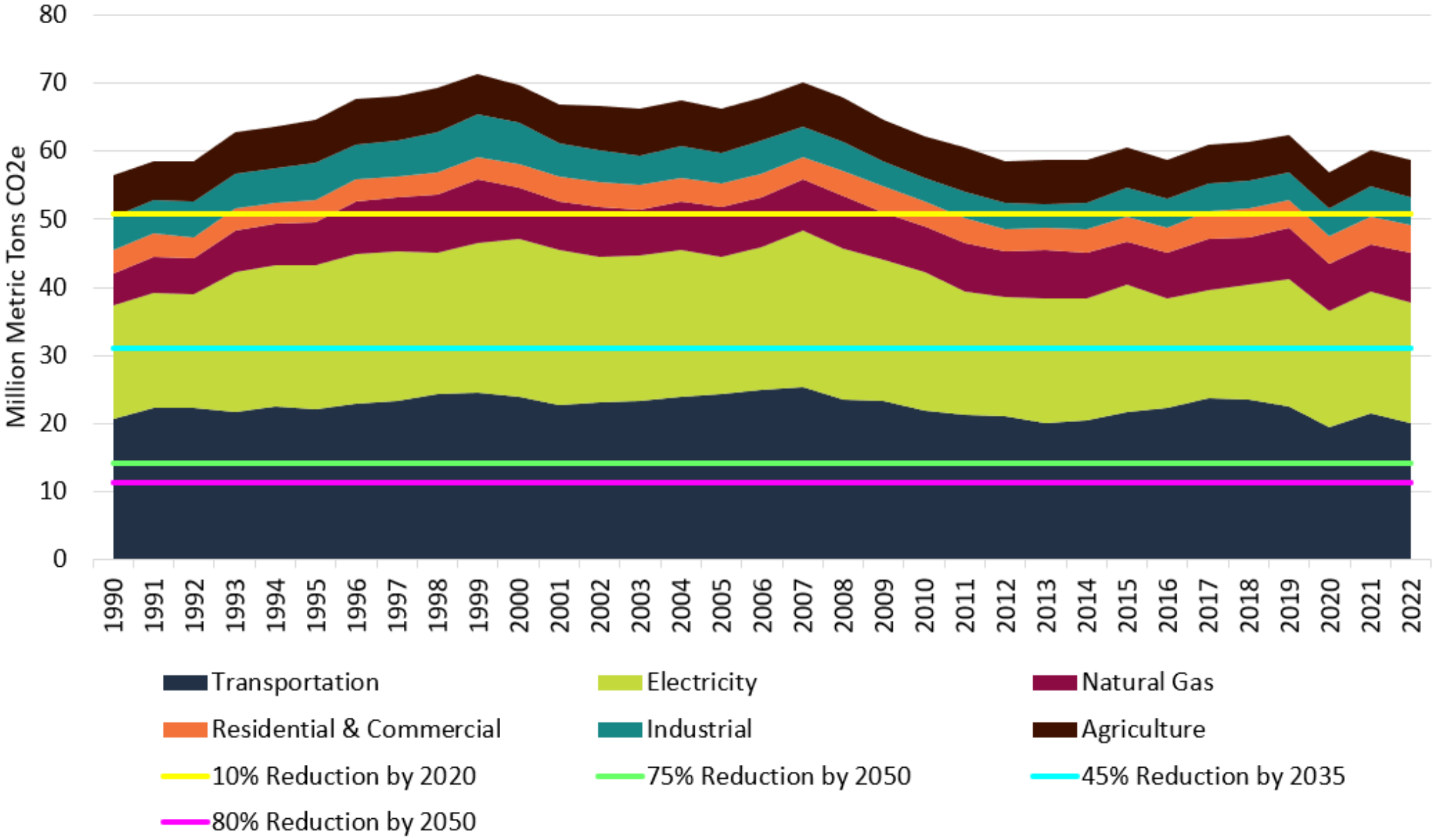
Oregon's Total Energy Expenditures by Sector Over Time



U.S. EIA reports prices in current dollars per million Btu. Chart is not adjusted for inflation.

Oregon Greenhouse Gas Emissions Over Time



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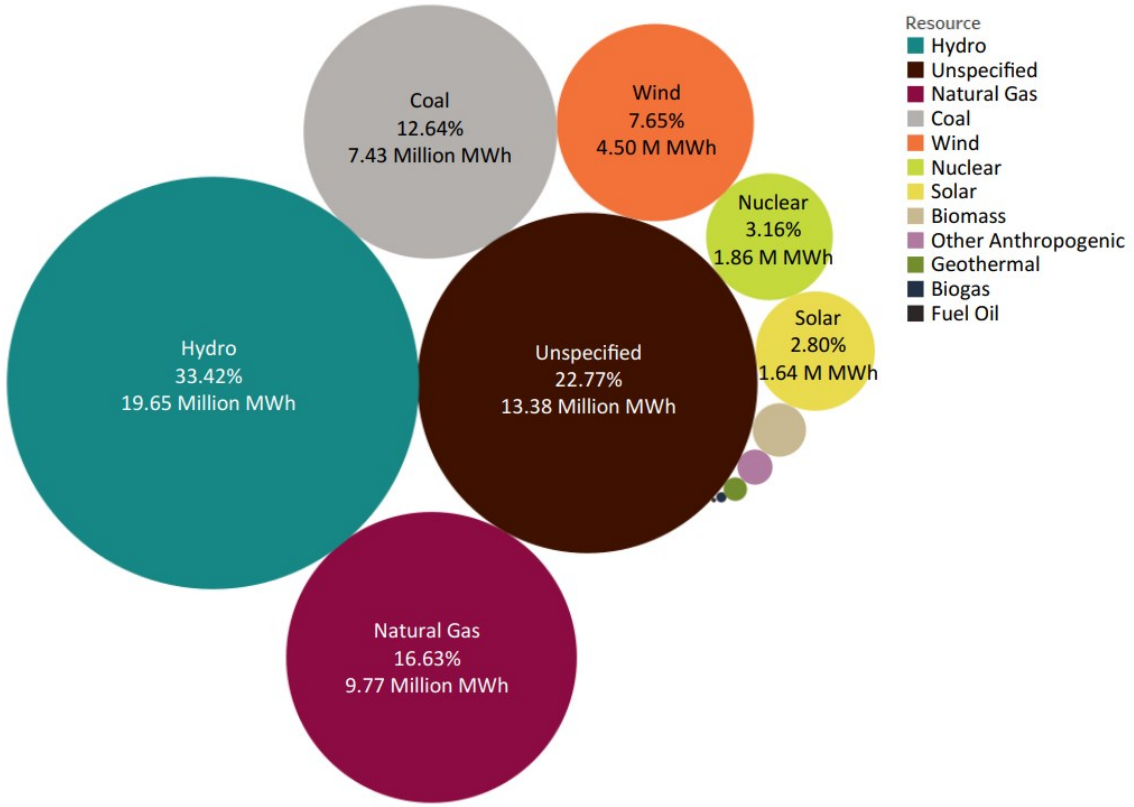
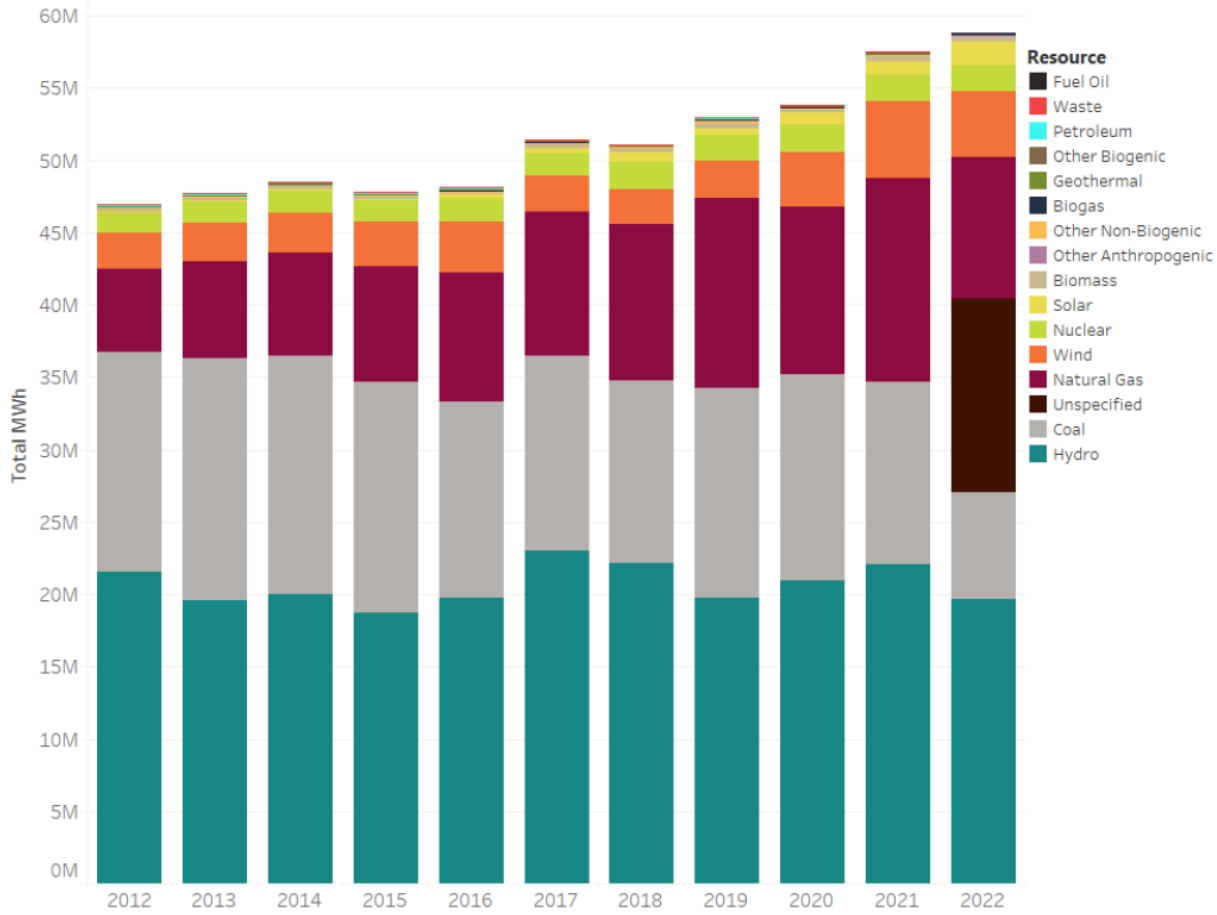
Resources Used to Generate Oregon's Electricity (2022)



Resources Used to Generate Oregon's Electricity Over Time



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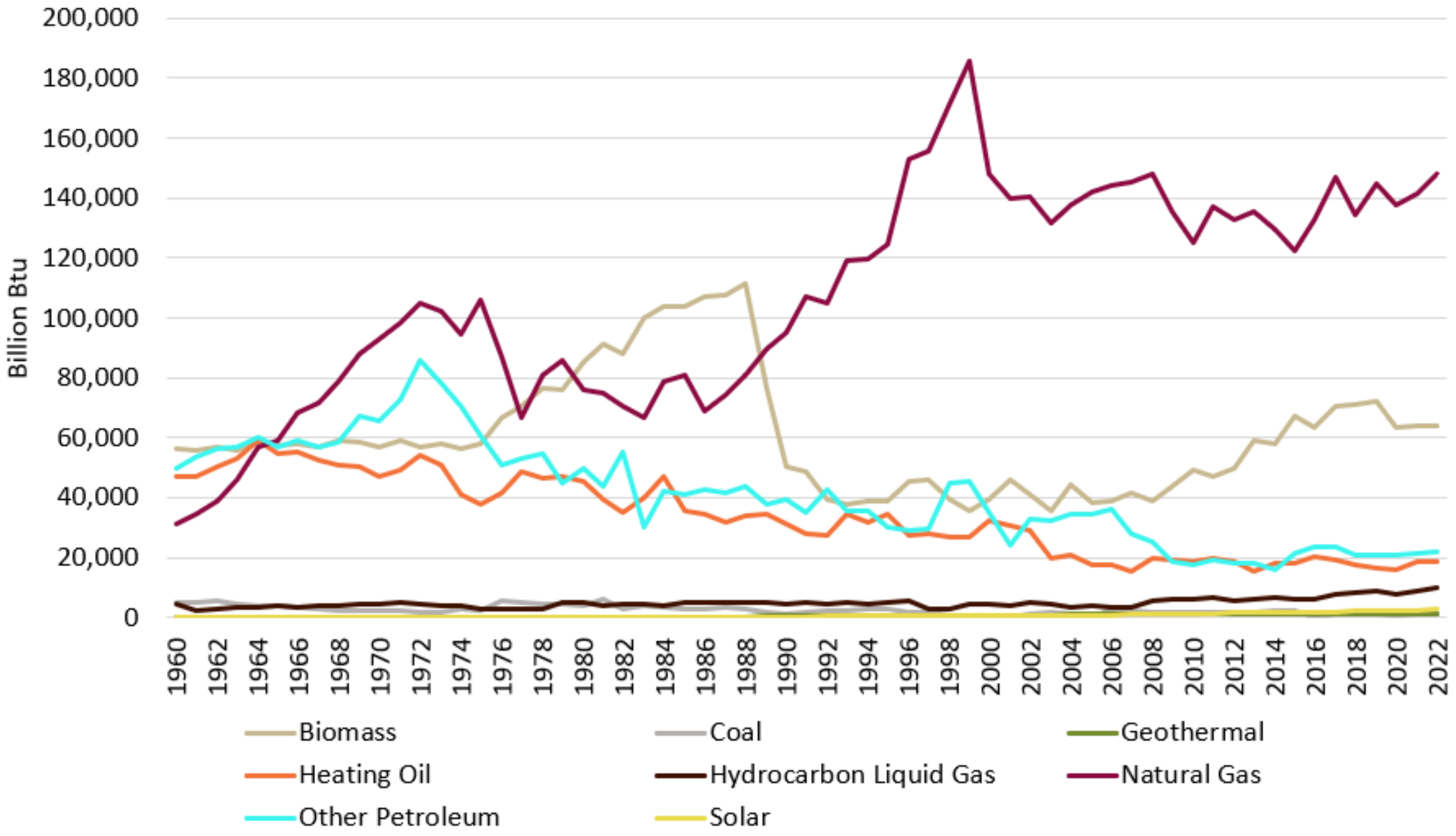
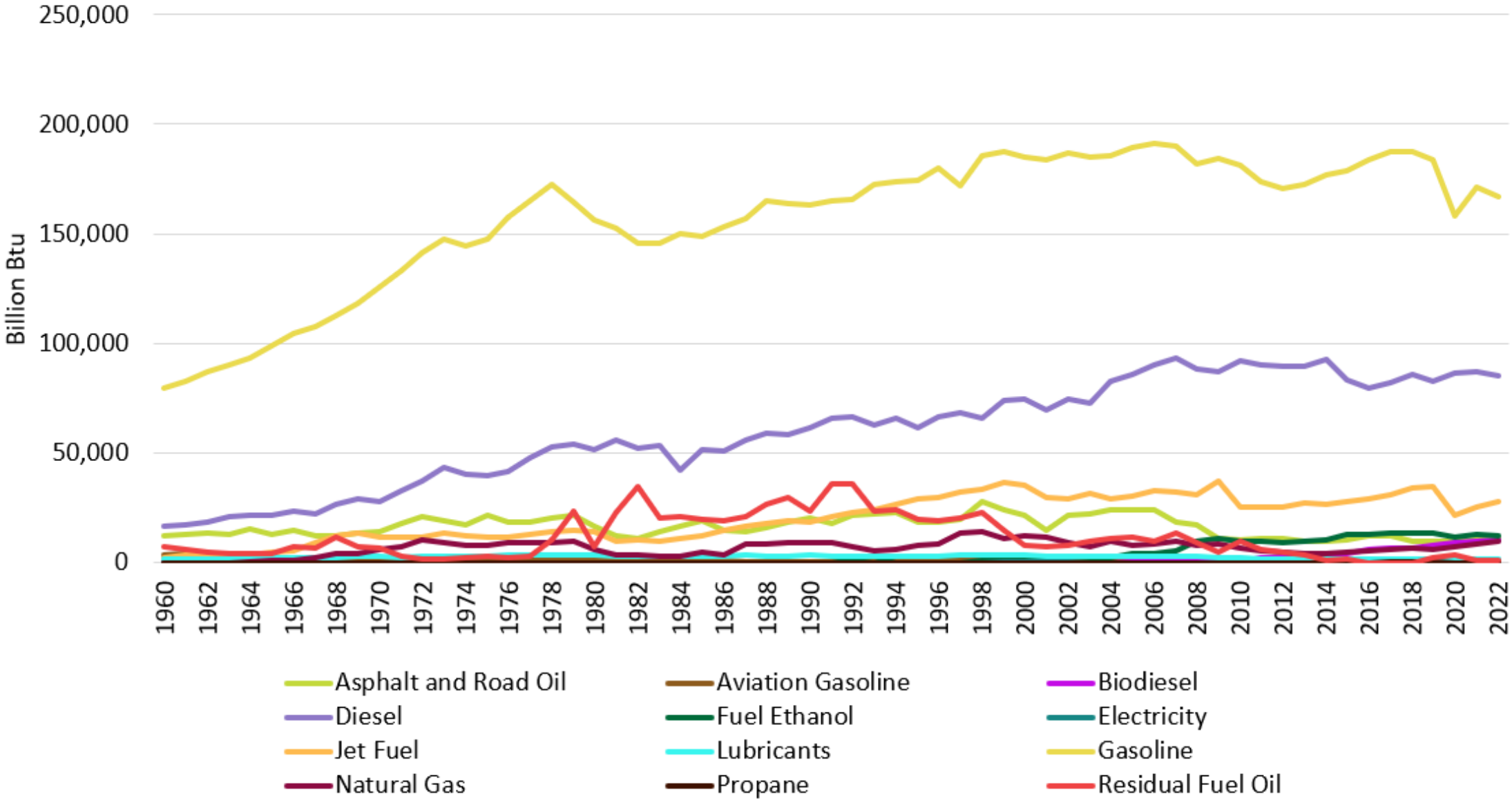
Oregon Direct Use Fuels Consumption Over Time



Oregon Transportation Fuel Consumption Over Time



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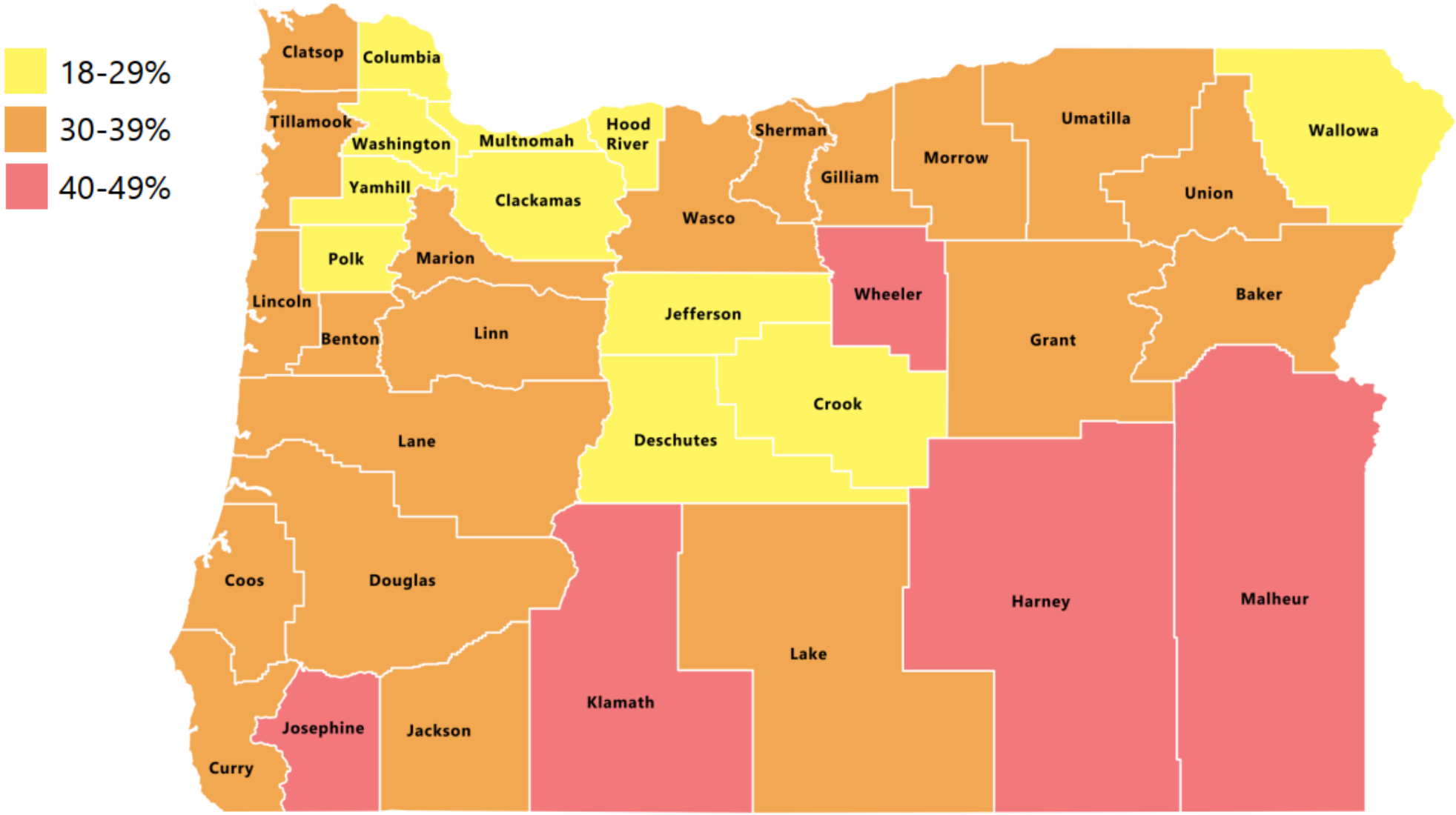
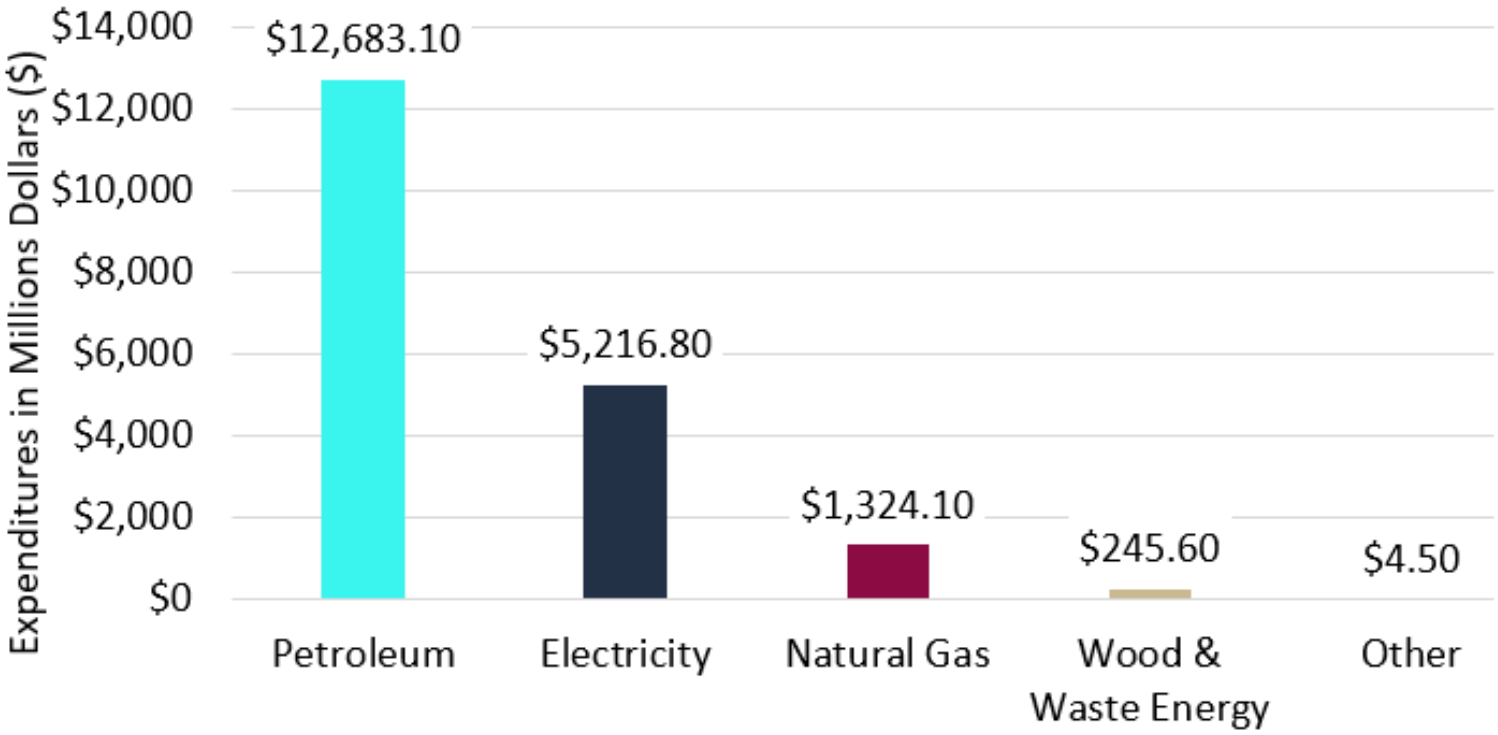
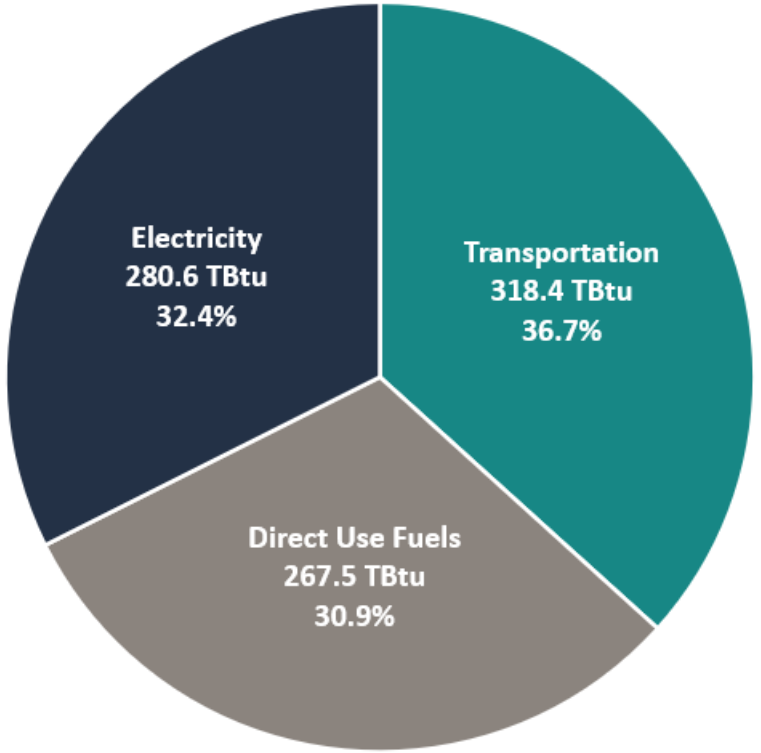
Percentage of Oregon Households Experiencing High or Severe Energy Burden and Earning 200 Percent or Below Federal Poverty Level by County (2022)



2022 Oregon Energy Expenditures by Source



2022 Oregon Consumption by Source



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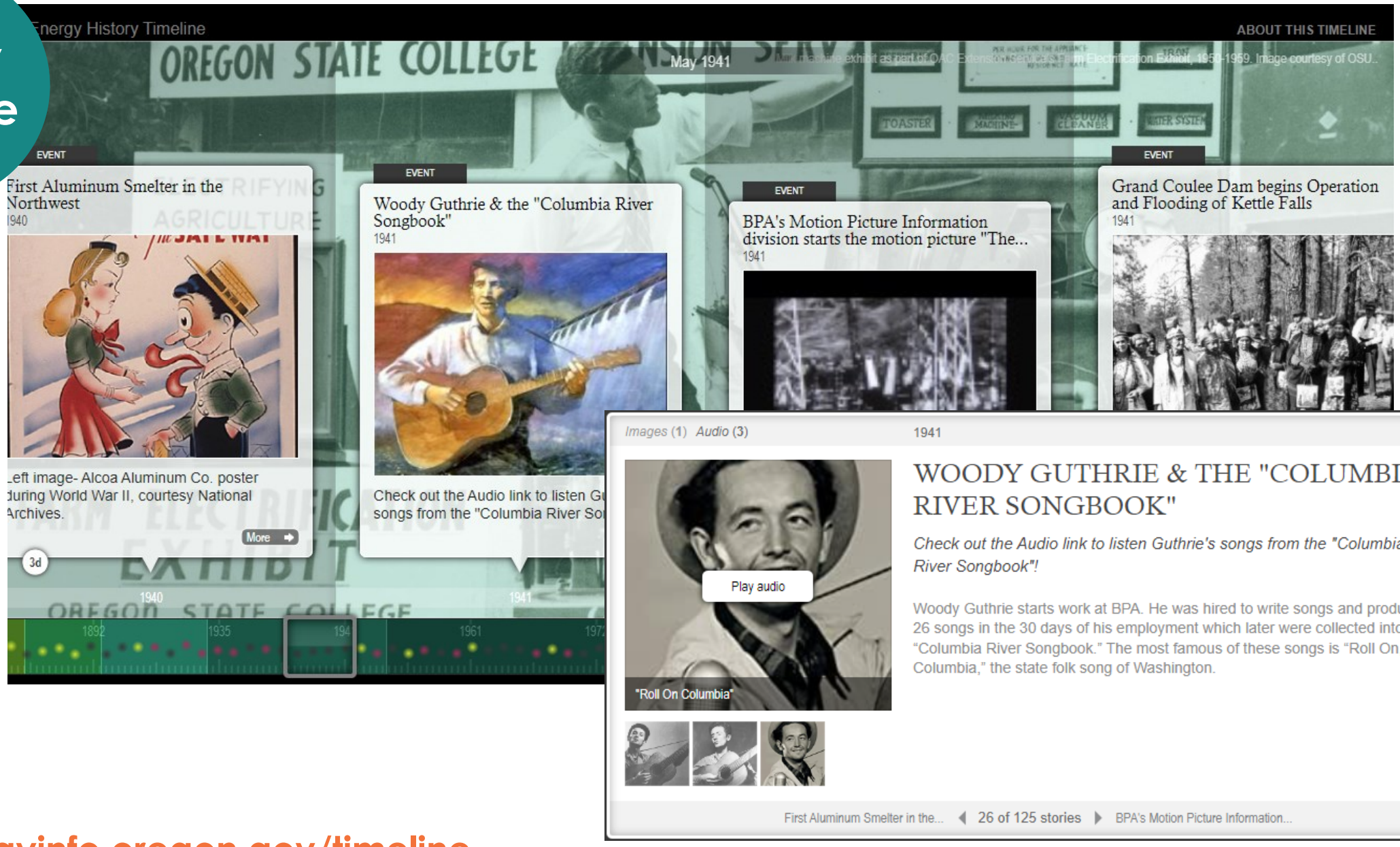
History Timeline



https://energyinfo.oregon.gov/timeline

What do you think?

Energy 101

This section is intended to help the reader understand the first part of the energy story: how energy is produced, used, and transformed.

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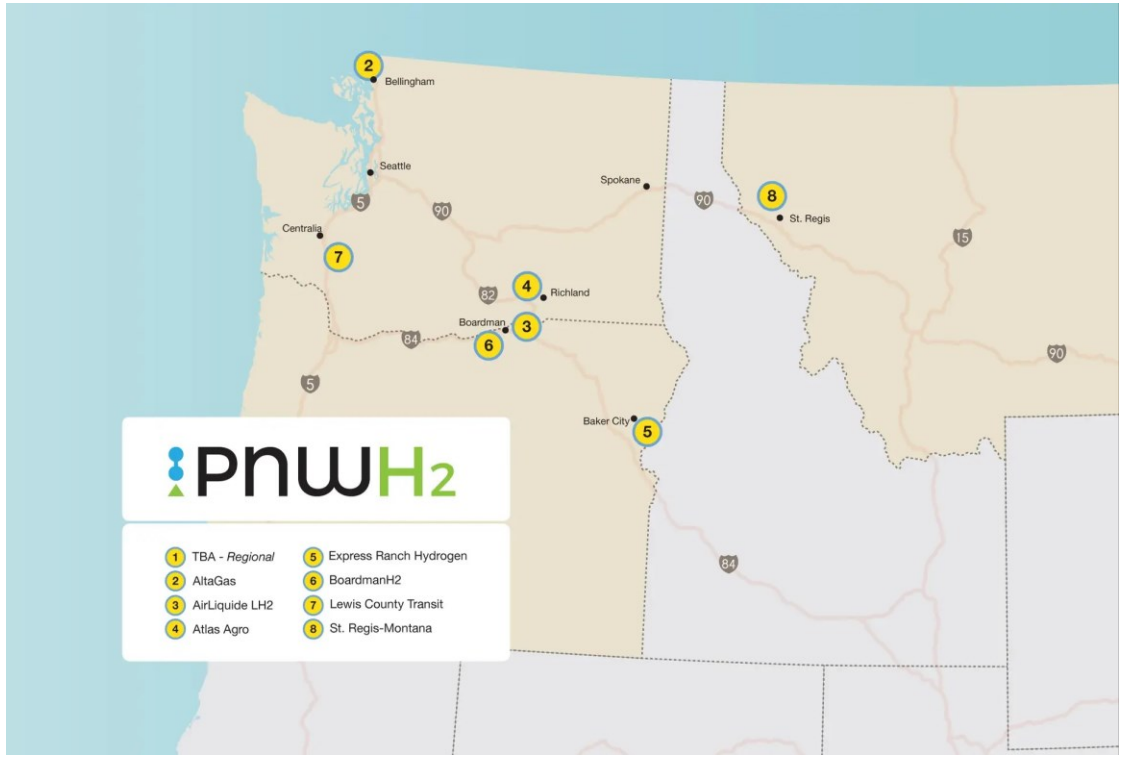
What do you think?

Advancements in a Clean Hydrogen Economy

Clean hydrogen has the potential to play a critical role in helping the world decarbonize over the coming decades, particularly in hard to electrify sectors. With continued policy and financial support, clean hydrogen is poised to scale in the Pacific Northwest, creating job and economic development opportunities for the region.

The PNW H2 Hubs program will jumpstart the hydrogen economy in the PNW:

- **$8 billion program:** $1 billion in federal funding leveraged with $7 billion in private and other investments
- **17 projects** organized into 8 nodes across Oregon, Washington, and Montana
- Projects demonstrate **all aspects of the hydrogen value chain**, from production, storage, transport, and end use.
- Will produce **400 metric tons of clean hydrogen per day**, using 100% renewable energy
- Will create over **10,000 jobs** for the region

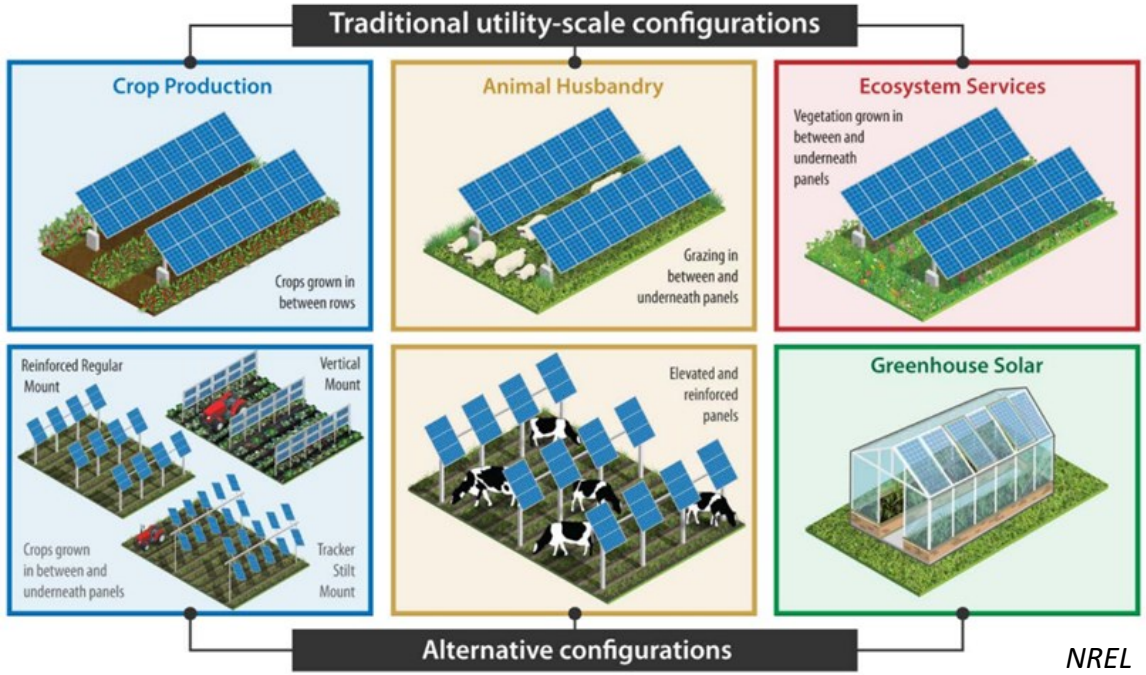


Location of hydrogen projects in the PNW H2 Hub program.

Agrivoltaics in Oregon

Land that is productive for farming is highly likely to be attractive for solar energy generation as well. This Energy 101 highlights the current state of research, development, and incentives regarding agrivoltaics which is the practice of producing both food and electricity from solar panels on the same parcel of land.

- Agrivoltaics allows farmers to **manage sunlight as a resource**, reducing stress on crops
- Most currently operational utility-scale agrivoltaics installations in the U.S. are combinations of **solar generation with sheep grazing**
- Researchers are **exploring combinations** of crops, growing methods, and solar configurations that work best in specific growing conditions
- Several states have invested in state-specific agrivoltaics **research and demonstration projects** and incentive programs
- Oregon **land use law** treats the siting of agrivoltaics projects that generate electricity for sale in the same manner as other solar PV generation

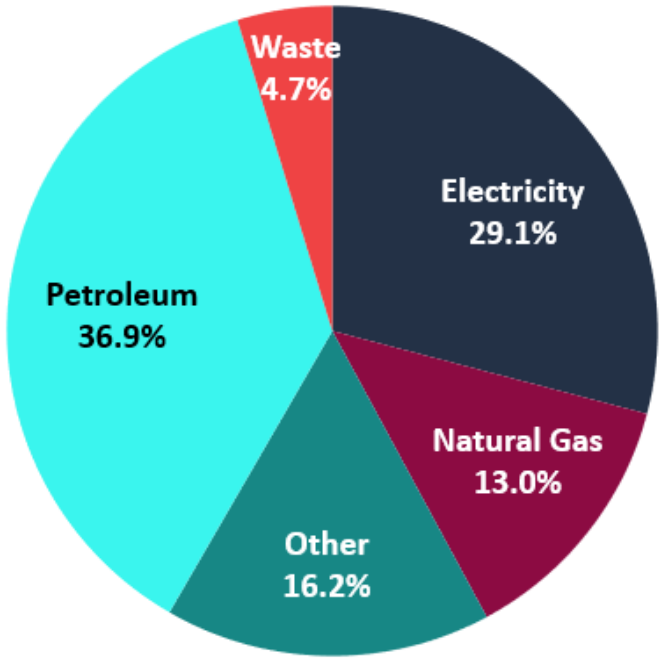


NREL

Climate Change Effects on the Energy System

Most of Oregon's greenhouse gas emissions come from the energy used every day, including electricity, direct use fuels, and transportation fuels. The energy sector plays a unique and important role in climate change – it can be a cause of climate change, can be affected by climate change, and can also be part of the solution.

Greenhouse Gas Emissions Share by Source (2021)



Climate change effects on energy:

- **Energy demand** as hotter and longer heat waves require additional cooling
- **Energy supply** as changes in precipitation type (from snow to rain) shift decades-long patterns that support hydropower
- **Electricity reliability** as extreme weather affects infrastructure

Energy actions to mitigate and adapt to climate change:

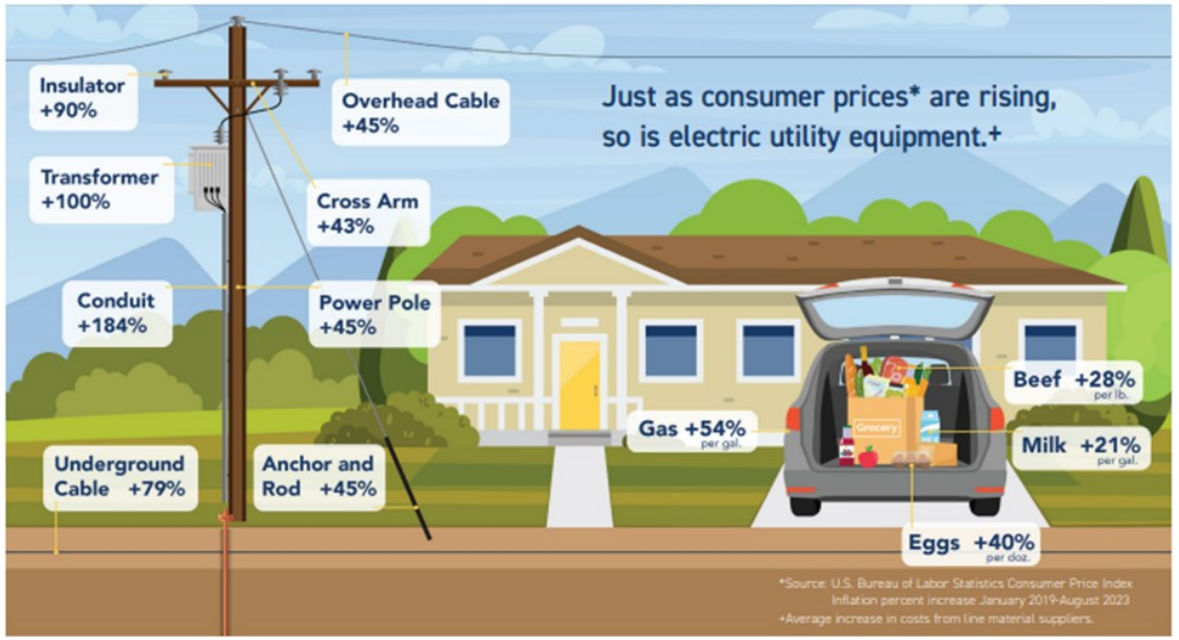
- **Efficiency and conservation measures** can help address increasing demand for energy
- The **transition to locally generated, low-carbon resources** like wind, solar, and alternative fuels reduce greenhouse gas emissions
- Distributed energy generation, renewable energy, microgrids, and energy storage can **improve the reliability** of energy on the grid

Electricity Rate Increase Drivers

For many Oregonians, electricity prices have increased in the past few years. This Energy 101 explains some major cost drivers for electricity in Oregon. While prices for other goods and services have increased in recent years as well, electricity is used by virtually every household and business in Oregon, making electricity prices a topic of statewide interest.

- Not every utility in Oregon has **raised rates** in recent years, but many have
- Three common **cost drivers**:
  - Rising power costs
  - Ongoing infrastructure needs, compounded with inflationary pressures
  - Costs to mitigate the increasing prevalence and risks of wildfires and extreme weather
- HB 2021 is <u>not</u> a direct driver of recent rate increases, but it will likely have **future cost impacts** for Portland General Electric, PacifiCorp, and electricity service suppliers

Inflationary and Supply Chain Cost Pressures (2019-2023)

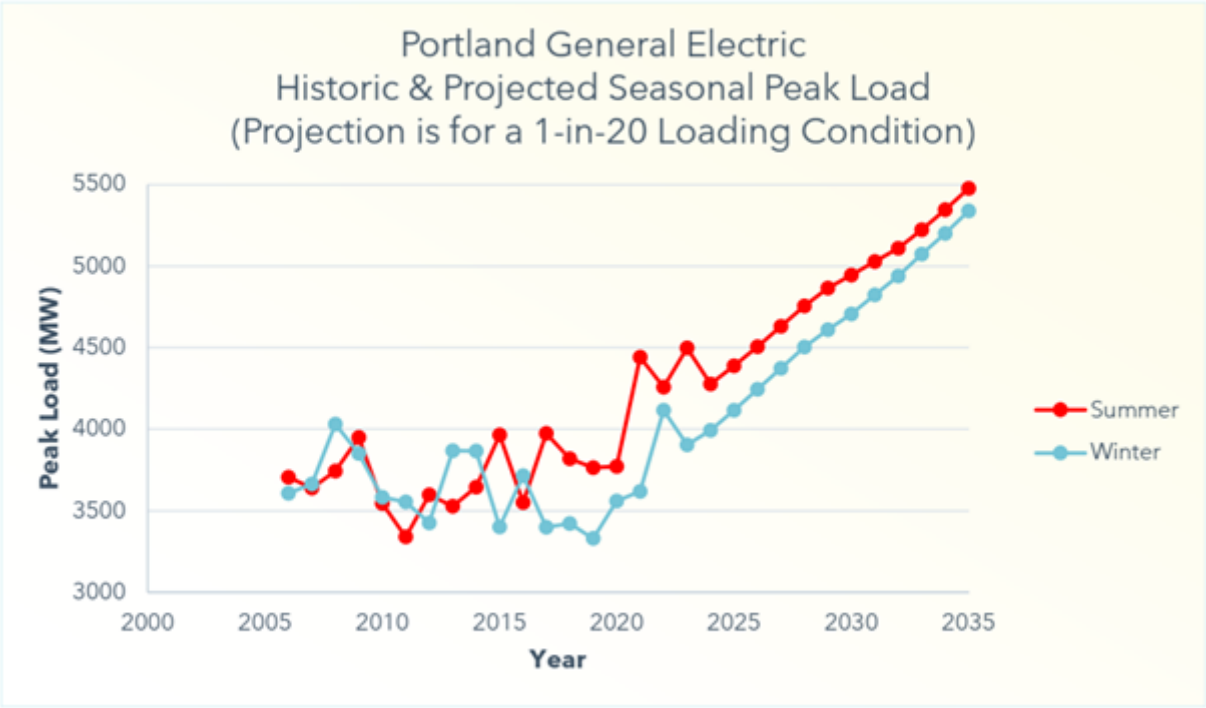


Graphic from Central Electric Cooperative

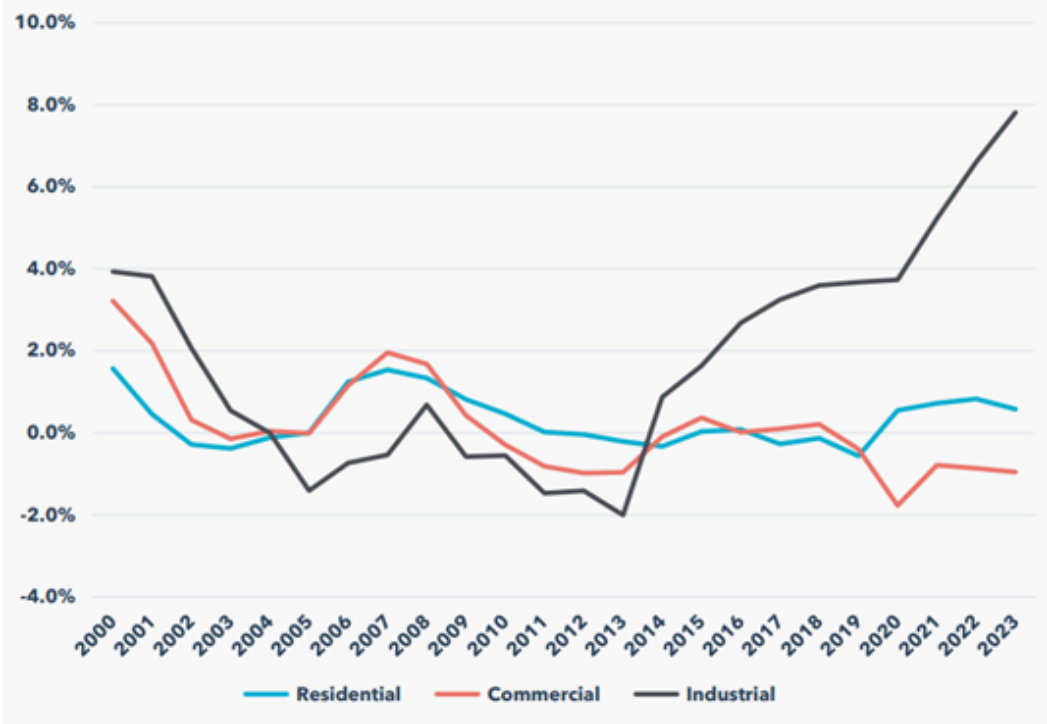
Peak Electricity Demand

Peak electricity demand, or peak load, is the highest demand for electricity from all customers across a specific service area during a specified period of time. Utilities and transmission providers track and forecast peaks in demand to assess future electricity demand — and plan for adequate levels of generating resources needed to keep the lights on.

Portland General Electric Historic and Projected Seasonal Peak Load



Average Five-Year Load Growth Rate by Sector for Portland General Electric



Electricity Day-Ahead Markets

Electricity day-ahead markets are organized markets where utilities can purchase and sell electricity the day before service is needed to meet forecasts of demand and generation for the next day.

- Day-ahead markets function as **auction markets** where entities can bid to buy or sell electricity for a given time period of the next day
- Day-ahead markets can provide **economic, environmental, and reliability benefits**
- Developing an electricity day-ahead market can pose challenges, such as **incorporating state climate and emissions policies** and **ensuring enough transmission to connect valuable resources** across the market

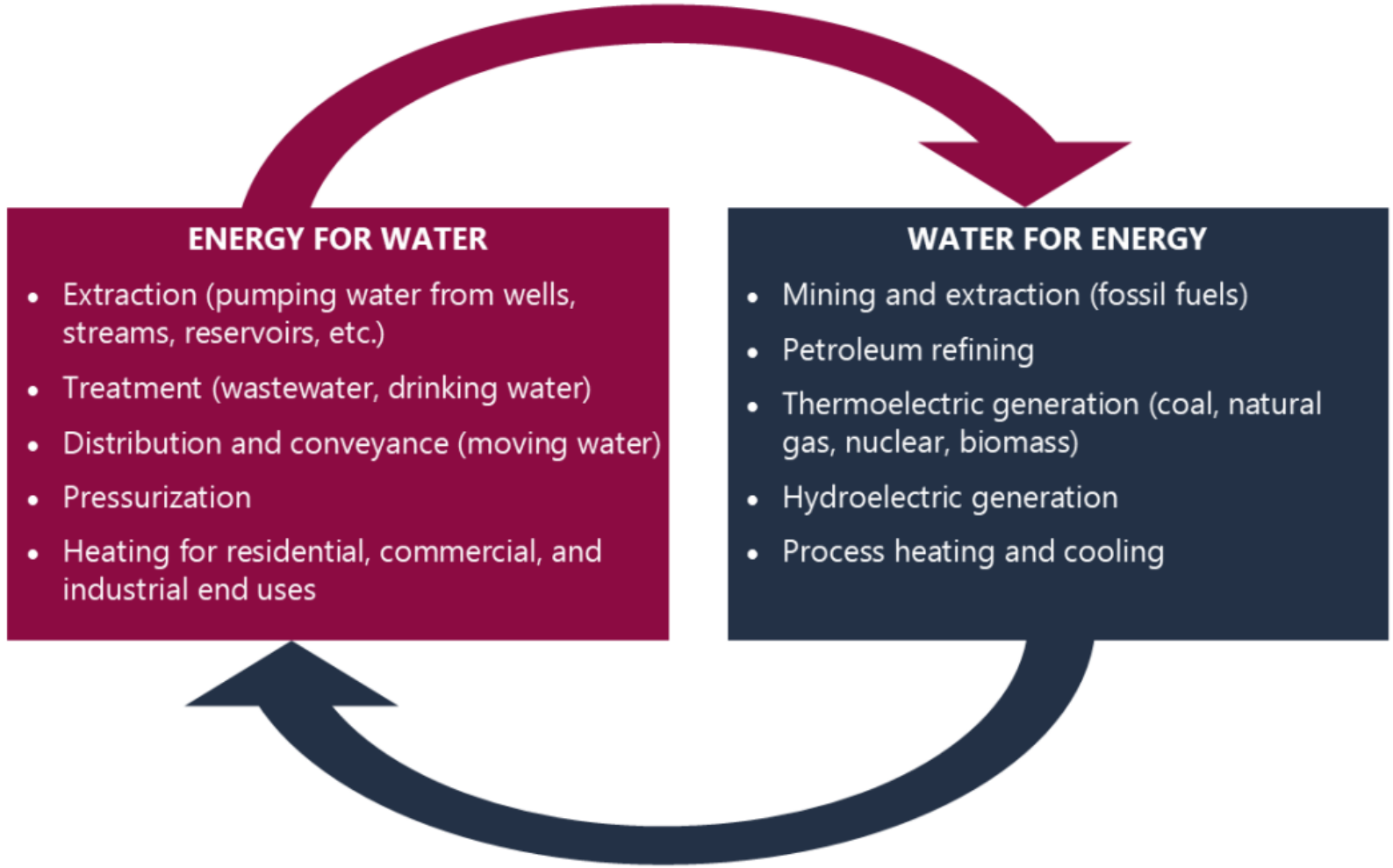
Energy Resilience

Energy resilience refers to the ability to withstand and rapidly restore energy delivery following non-routine disruptions of severe impact or duration. Strengthening energy resilience is critical because energy systems support essential services and there has been an increase in the frequency and severity of disruptions.

- Resilience can focus on bolstering **larger energy systems and** fortifying **communities' resilience**
- Strengthening energy resilience **protects vulnerable groups**
- **Tribal, federal, state, utility, and community** entities are engaged in energy resilience efforts

Water and Energy Nexus

Today's modern life requires energy and water, and the availability and costs of both are highly intertwined. Understanding the interdependencies between water and energy is key to making informed energy and water management choices going forward.



Alternatives to New Transmission

There are many ways to reduce the transmission expansion needed to meet increasing electricity demand and clean energy and climate goals, while improving electricity reliability and resilience.

Leveraging diverse loads & resources to use existing transmission system more efficiently

- Centralized power markets & transmission planning for a West-wide footprint

Repurposing & expanding capacity of existing transmission corridors

- Building wind/solar/storage projects same location as retiring coal plants
- Reconductoring existing lines, adding new lines adjacent to existing lines

Leveraging the use of local energy resources

- Energy efficiency measures, batteries, rooftop & small-scale solar, etc.

Using grid enhancing technologies

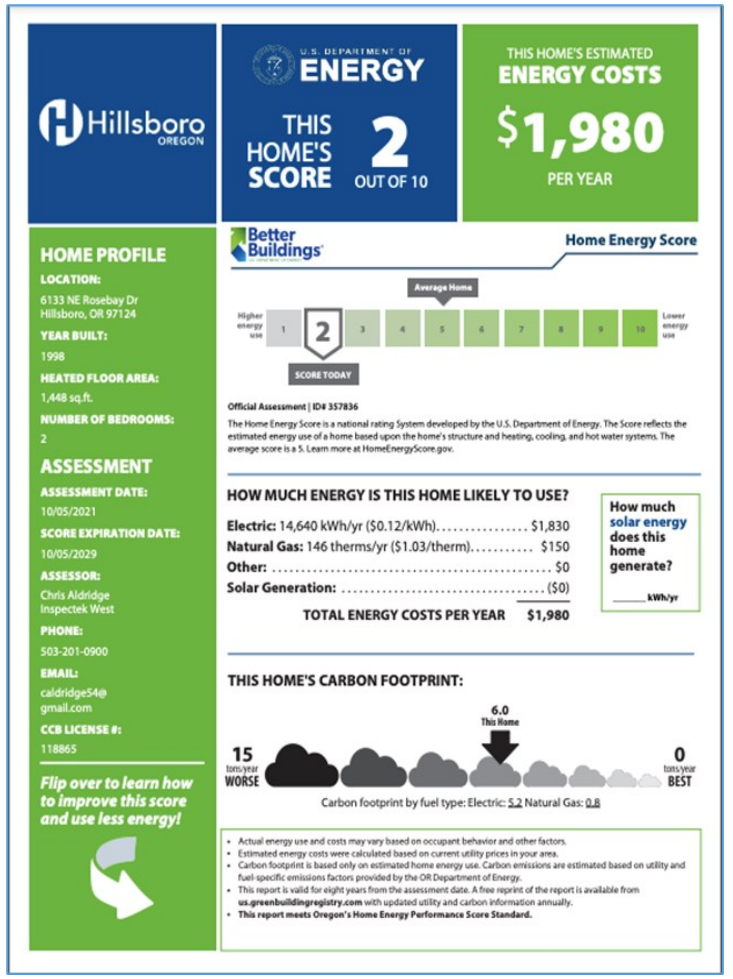
- Modern electronic sensor & control technologies that can boost line capacity during certain times of the year
  - Dynamic ratings for power lines & transformers
  - Power flow controllers

Oregon Home Energy Scoring

The Home Energy Score provides a straightforward and helpful snapshot that empowers homeowners and buyers to make more informed, sustainable, and financially sound decisions.

Home Energy Scores benefit homeowners *and* buyers:

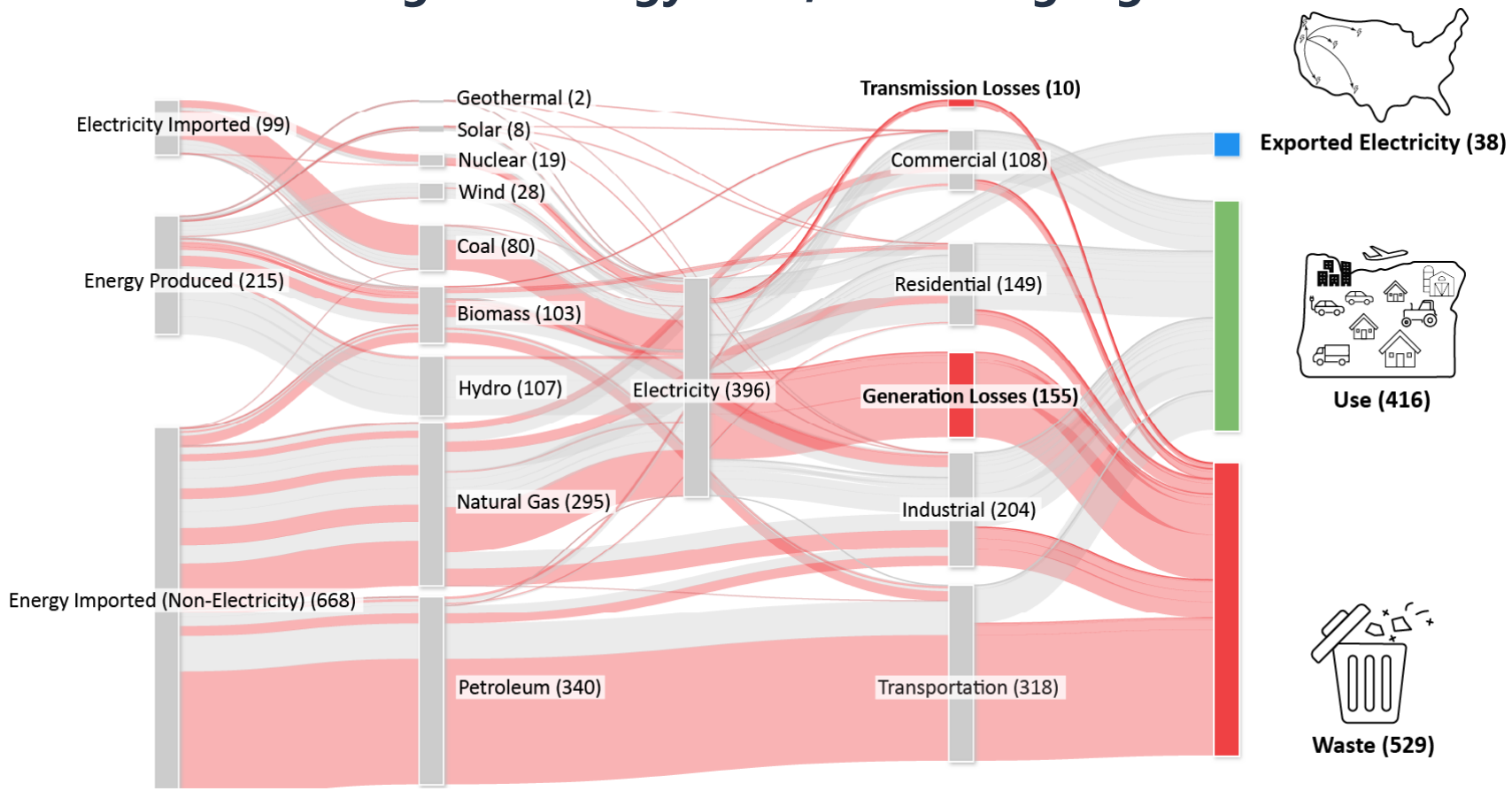
1. Provides an Energy Efficiency Assessment
2. Enables Informed Decision-Making
3. Guides Improvement Priorities
4. Details Environmental Impact
5. Informs Property Value



Waste Energy

Every energy process (production, storage, transport, conversion or use) includes some amount of waste energy; some of this energy loss is inevitable, but there are many opportunities to improve the efficiency of energy processes in Oregon.

Oregon's Energy Flow, Waste Highlighted



Resource & Technology Reviews

The reviews in this section cover the spectrum of traditional to innovative – and demonstrate the breadth of technology that is integral to the production and management of our energy system.

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Note: these reviews build on the 2020 and 2022 Biennial Energy Reports, which also included resource and technology reviews covering a range of technologies.

What do you think?

Enhanced Geothermal Electricity Generation

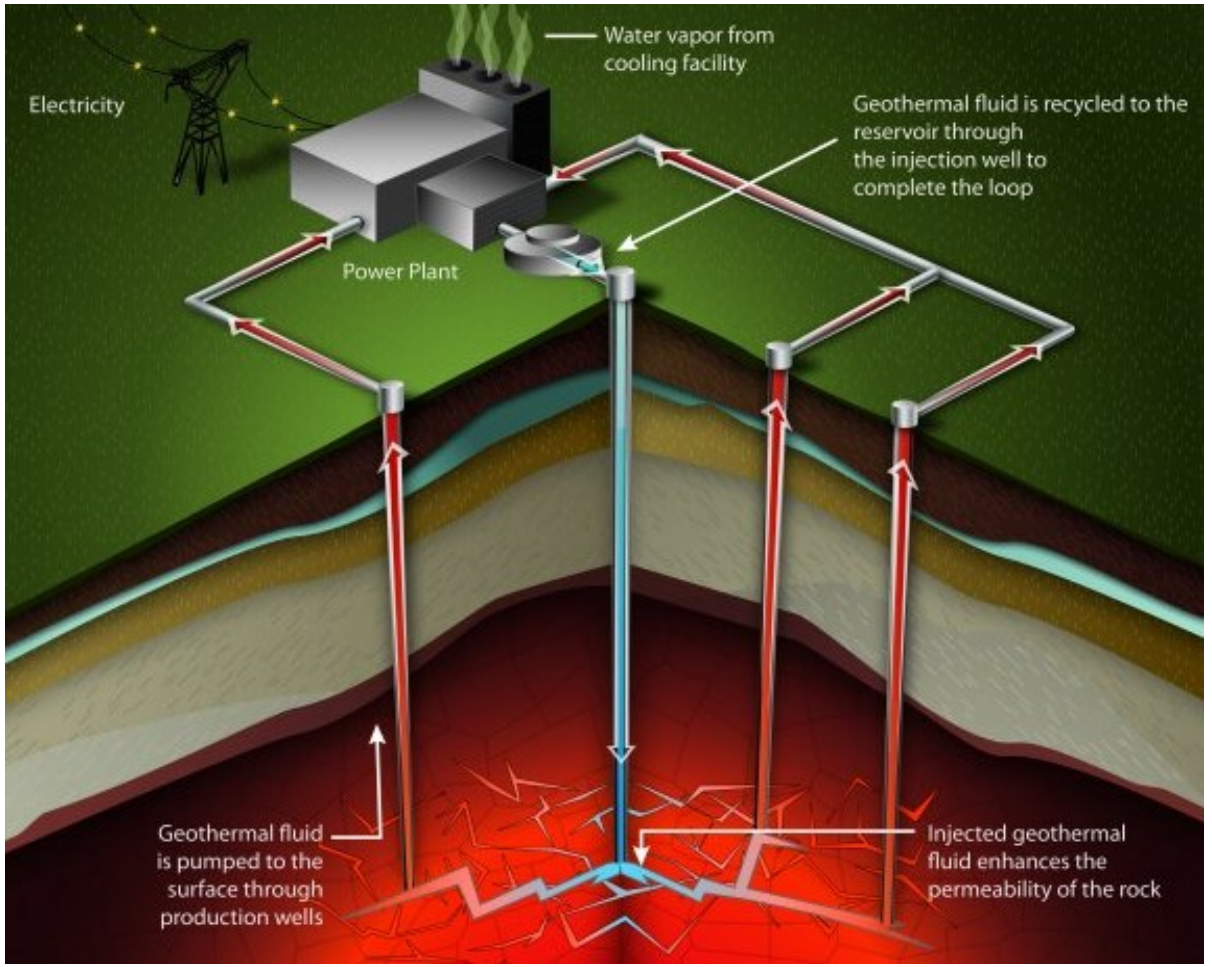
Enhanced geothermal systems expand the potential for geothermal power production in Oregon.

Benefits

- Does not require hot water wells
- Generates renewable energy 24 hours a day
- Much smaller footprint than solar or wind

Opportunities

- Oregon has some of the best geothermal resources in the country
- The Mazama Project at Newberry Volcano will be a nationally recognized demonstration project



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Fusion Power

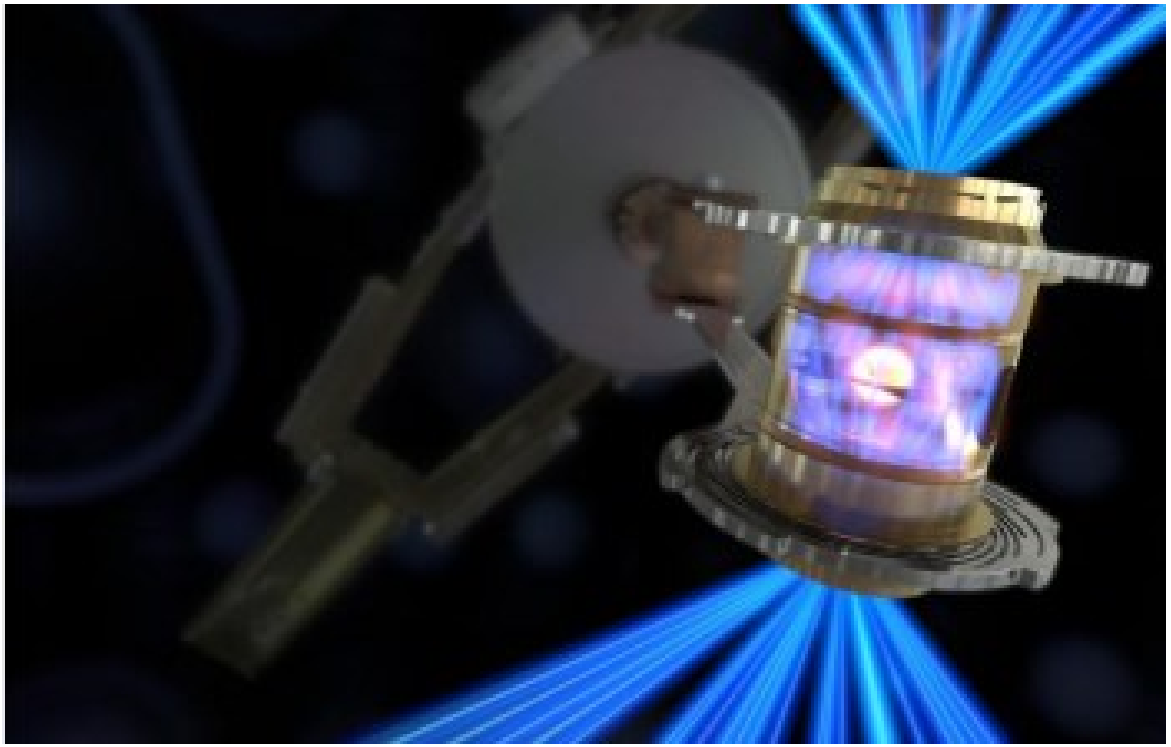
New scientific advancements hold promise that one day fusion might also power the electricity grid, but significant research and development challenges must first be overcome.

Benefits

- Generates huge amounts of energy
- Safer and cleaner than nuclear fusion

Challenges

- Technological viability
- Cost-effectiveness
- Regulatory structure
- Public awareness
- Addressing environmental justice and disadvantaged community concerns



State Energy Project Updates

This section provides updates on energy-related studies recently released or in development at ODOE.

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Oregon Energy Security Plan

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.

Summary

- Required by federal and state legislatures; statewide in scope
- Assessment of natural hazards, physical and cybersecurity risks; organized by geographic regions
- Inclusive of electricity, natural gas, and liquid fuels sectors
- Outreach and data collection effort
- Mitigation analysis to address risks

Take-aways

- Hazard vulnerability varies by region: earthquake, winter storms, wildfire. Cybersecurity risk across state.
- Specific liquid fuel analysis; GIS mapping of fuel storage facilities with hazard analysis

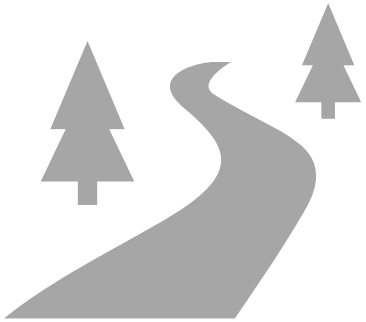
https://www.oregon.gov/energy/safety-resiliency/Pages/Energy-Security-Plan.aspx

Oregon Energy Strategy

The Oregon Department of Energy's 2022 Biennial Energy Report included a Policy Brief about charting a course for Oregon's energy future. That brief led to an overall report recommendation that the state could benefit from an energy strategy that would identify pathways to meet the state's energy and climate goals. ODOE is now leading development of that strategy, due to the Legislature November 1, 2025.

Progress

- Kicked off with a project charter and webinar to inform the public about the project
- Hired technical and facilitation experts to support project development
- Established consultation teams, including an Interagency Steering Group, Advisory Group, and expertise Working Groups
- Ongoing government-to-government communication with the nine federally recognized Tribes in Oregon
- Held multiple meetings over summer and fall 2024
- Developed different energy future scenarios to input into modeling



What's Next

- Present the potential pathways from modeling results in early 2025
- Facilitate policy discussions that will help identify potential recommendations for Oregon's energy strategy

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

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Questions/Comments?

RESOURCES:

Report online: energyinfo.oregon.gov/ber

ODOE's website: www.oregon.gov/energy

Contact us/request a presentation: odoe.powerappsportals.us/ber-comment/