Northwest **Power** and **Conservation** Council

January 4, 2023

MEMORANDUM

TO: **Council Members**

FROM: **Leann Bleakney, energy policy analyst, Oregon office**

SUBJECT: **Oregon Dept. of Energy Biennial Energy Report**

BACKGROUND: In 2017, the Oregon Legislative Assembly passed HB 2343, which requires the Oregon Dept. of Energy to develop and to present to the legislature a biennial report regarding local, state, regional, and federal energy policy development and energy planning and investments. Since then, the Oregon Department of Energy has released two reports, in 2018 and 2020. The 2022 report, based on analysis of data and information collected and compiled by the Oregon Department of Energy, provides information on key energy resources, policies, trends, and forecasts, and what they mean for Oregon.

Presenters: Alan Zelenka, assistant director, Energy Planning and Innovation and Adam Schultz, electricity markets and policy group lead

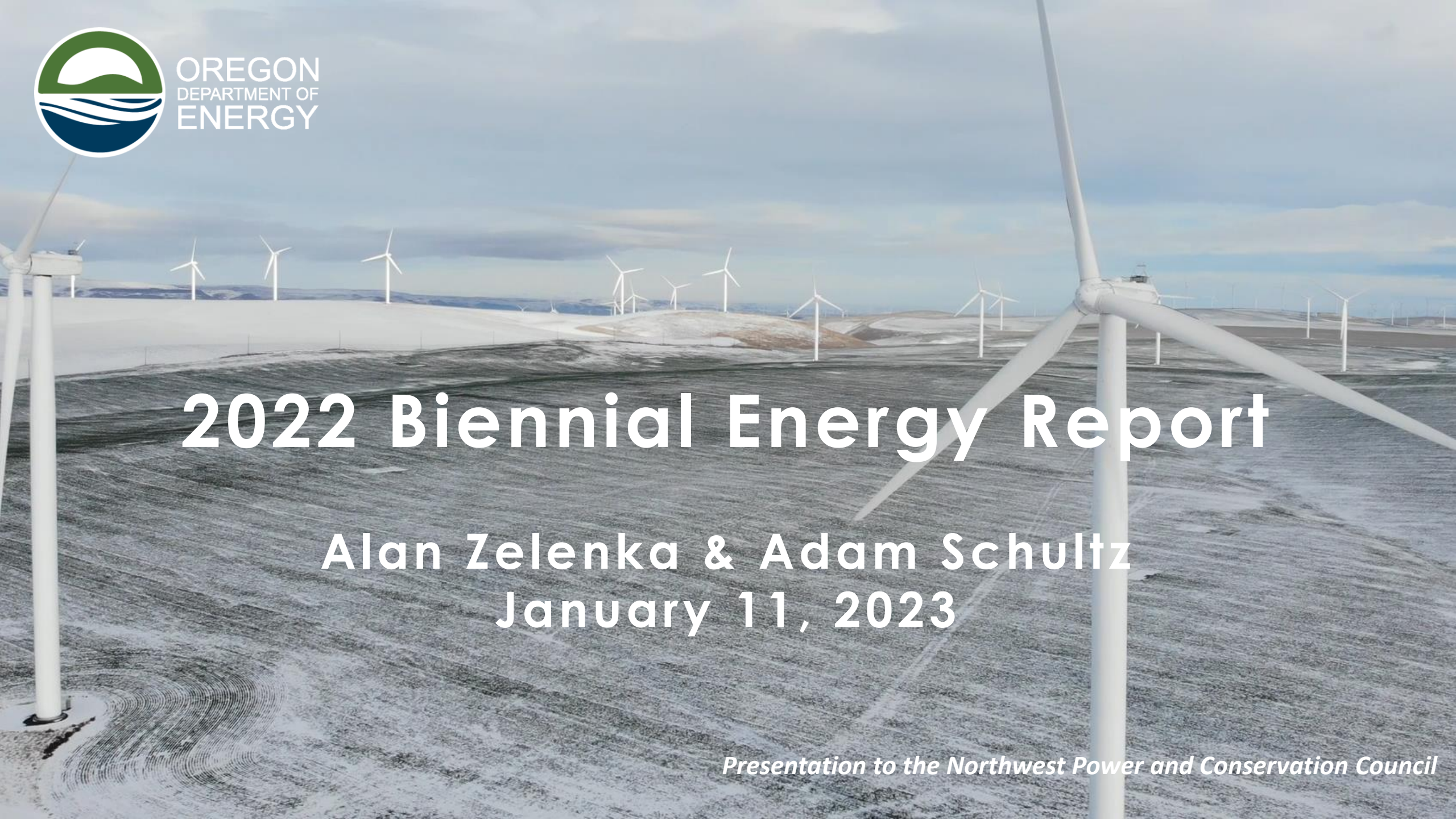
Summary: Alan Zelenka and Adam Schultz will present to the Council the 2022 Biennial Energy Report (BER) and discuss its findings.

Background: The 2022 BER includes several sections and has in each a focus on how Oregon is on a path to a cleaner, low-carbon future, with illustrations on considerations and investments required to meet these climate goals. The report begins by looking at Energy By the Numbers, including detailed information on how energy flows through Oregon, from production and imports to use and exports, as well as how the state uses energy (not just electricity) and strategies the state intends to employ to meet growing energy needs.

The next section of the report is a Timeline of Energy History in Oregon, this year presented in an interactive format that presents photos, videos and audio clips along the timeline and highlighted events. The Resource and Technology Reviews section discusses both traditional and innovative energy resources and technologies. In this section, Energy 101 offers an introduction to help readers understand the basics of how energy systems work and are managed.

. The final section of the BER includes detailed Policy Briefs that focus on how Oregon could accelerate the transition to a clean energy future. This section includes an overarching recommendation that the state would benefit from a strong statewide energy strategy to align policies, regulations, financial investments and technical assistance.

More Info: The full report can be found on the Oregon Department of Energy website or at the BER's website: https://energyinfo.oregon.gov/ber



OREGON DEPARTMENT OF ENERGY

2022 Biennial Energy Report

Alan Zelenka & Adam Schultz

January 11, 2023

Presentation to the Northwest Power and Conservation Council

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

2022 BIENNIAL ENERGY REPORT

Goal of the Report

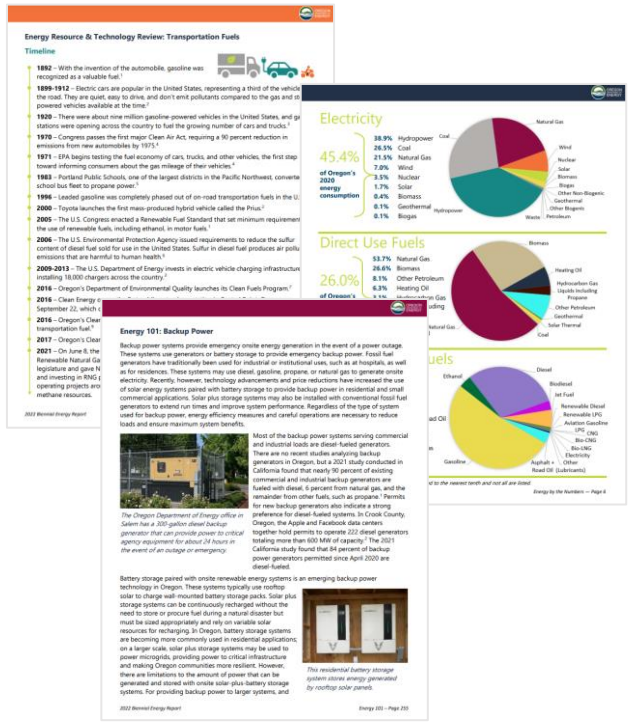
Pursuant to ORS 469.059, provide a comprehensive review of energy resources, policies, trends, and forecasts, and what they mean for Oregon.

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, policy briefs.



https://energyinfo.oregon.gov/ber

BER

- Background and Process
- Energy By the Numbers
- Energy History Timeline
- Energy 101
- Resource and Technology Reviews
- Policy Briefs
- Q&A

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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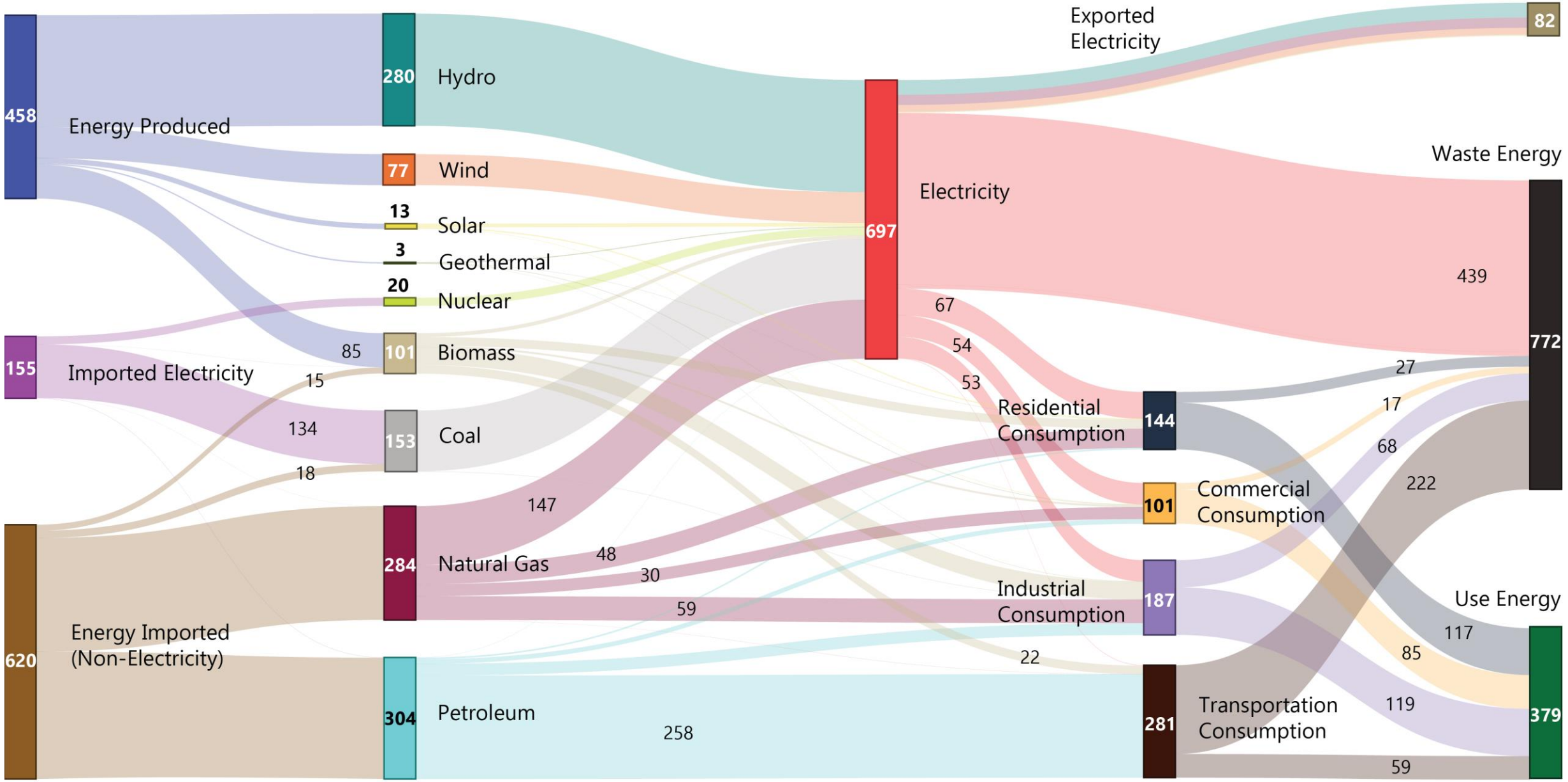
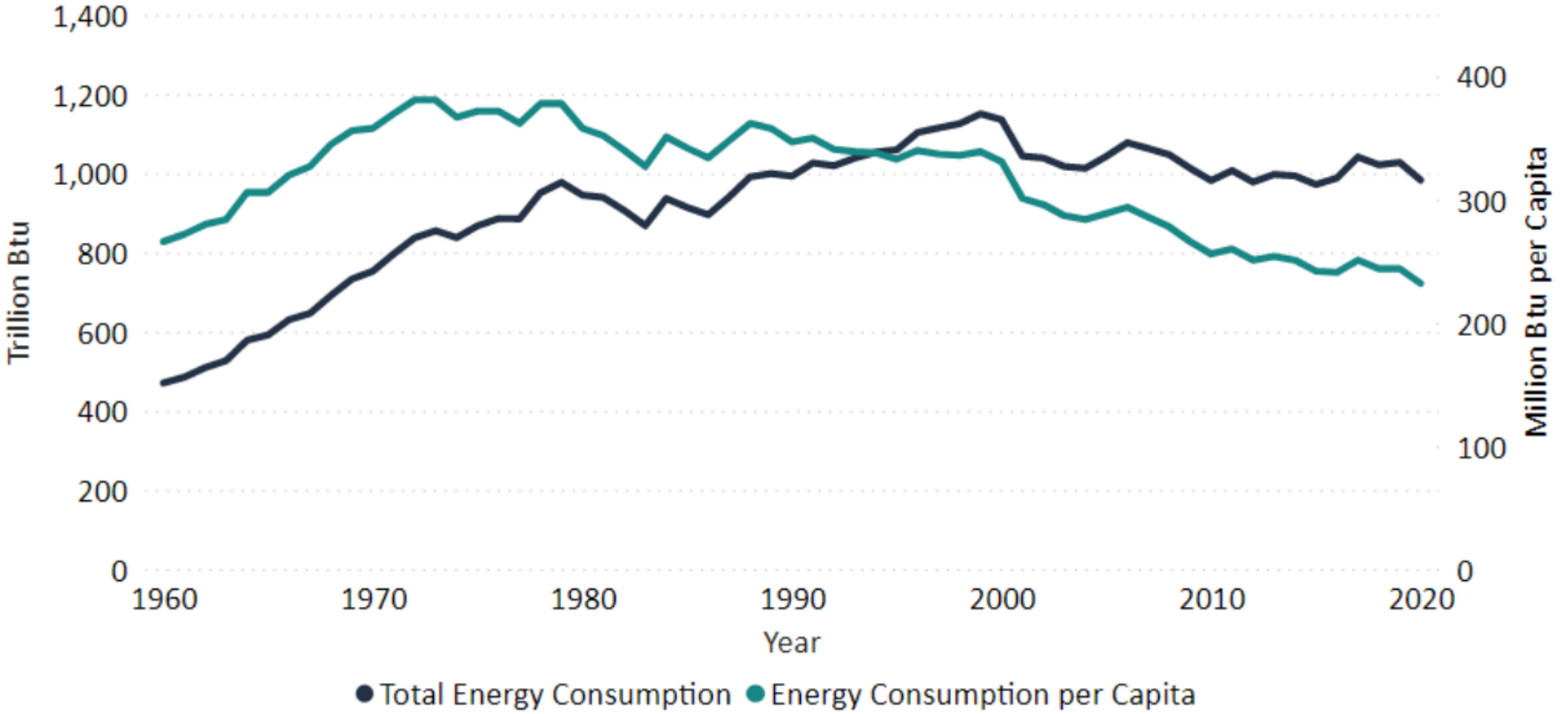
Oregon's Energy Flow

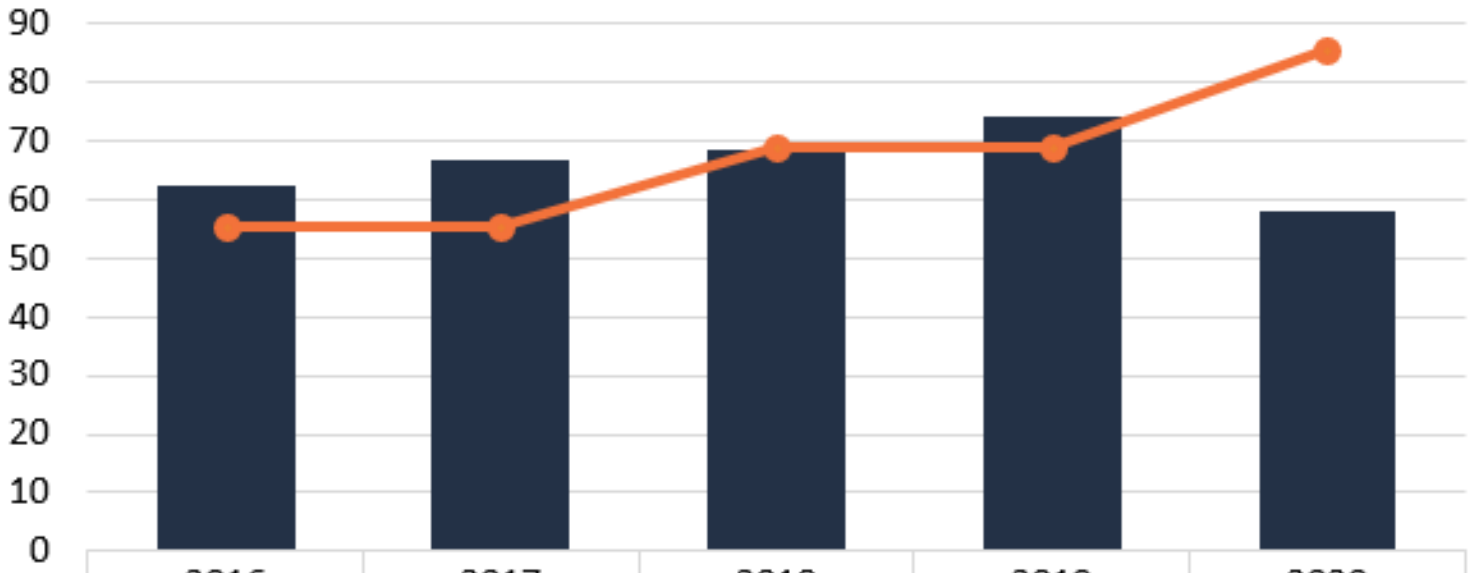


Numbers are in trillions of British thermal units (Btus)

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



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



	2016	2017	2018	2019	2020
Energy Trust of Oregon	58.4	62.2	50.0	51.8	39.9
BPA	9.3	5.7	8.1	8.9	3.9
COU Utility Self-Funded	1.1	0.6	2.6	3.3	0.3
NEEA	9.0	7.9	12.4	16.8	15.0
Codes and Standards	0.0	0.5	1.9	2.4	3.4
Momentum	3.2	8.2	0.0	0.0	0.0
Market Adjustment	-18.7	-18.2	-6.6	-9.0	-4.6
Total Oregon Savings	62.37	66.85	68.38	74.24	57.81
Estimated Oregon Share of Goal	56	56	69	69	86

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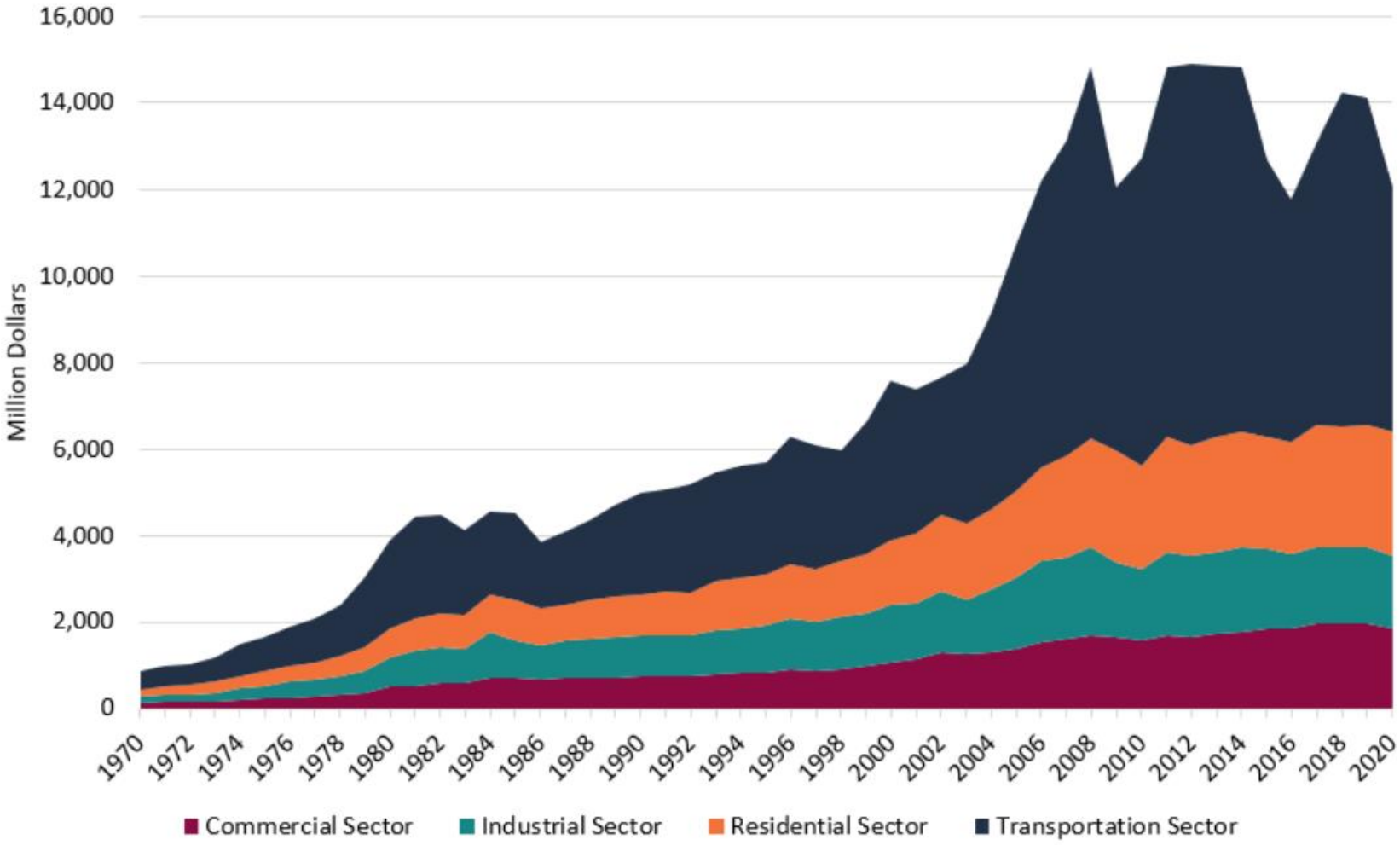
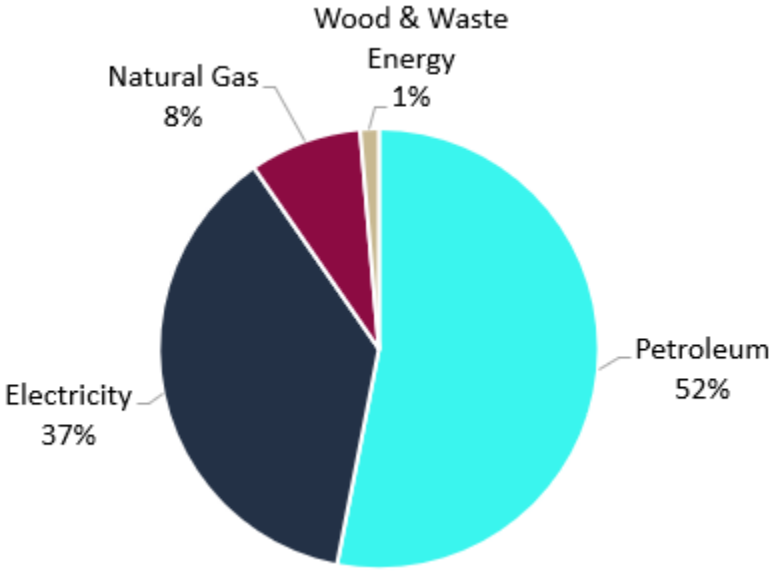
Oregon's Total Energy Expenditures by Sector Over Time



Share of Energy Expenditures by Source in Oregon (2020)



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

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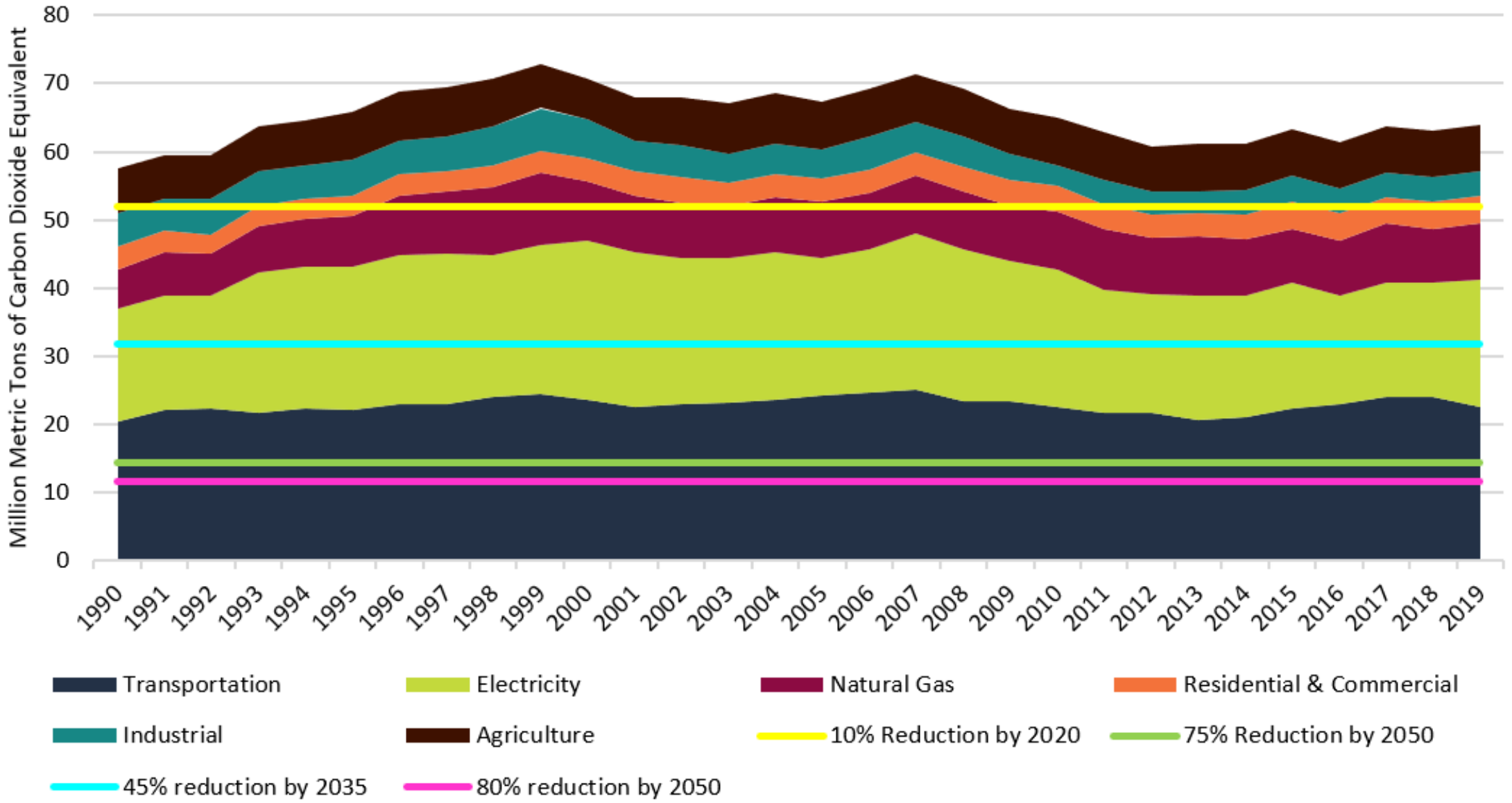
Oregon Greenhouse Gas Emissions Over Time



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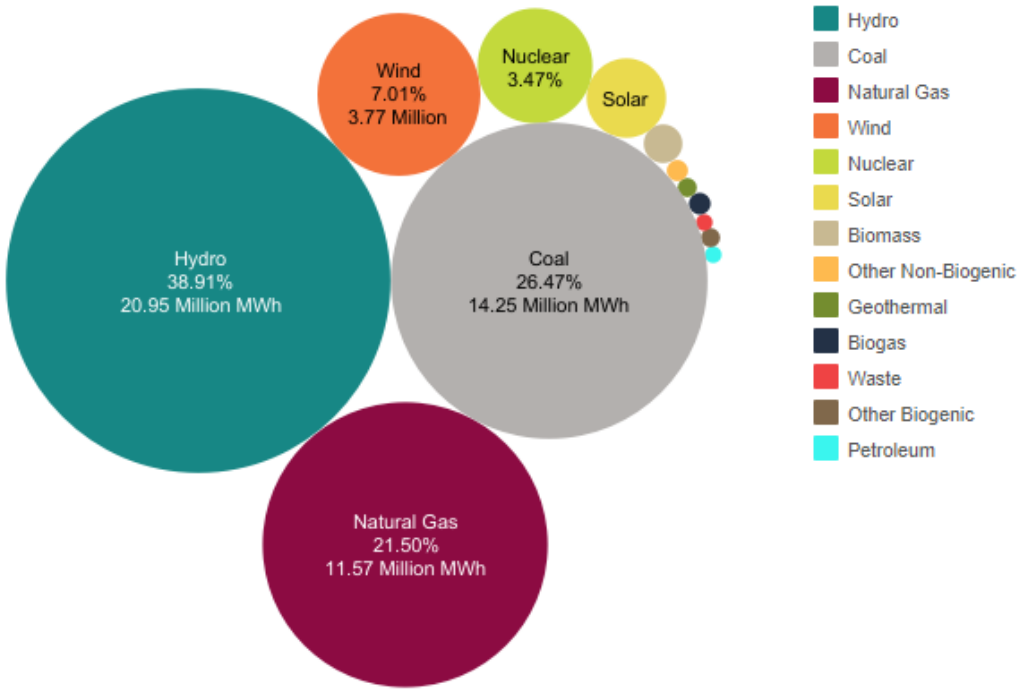
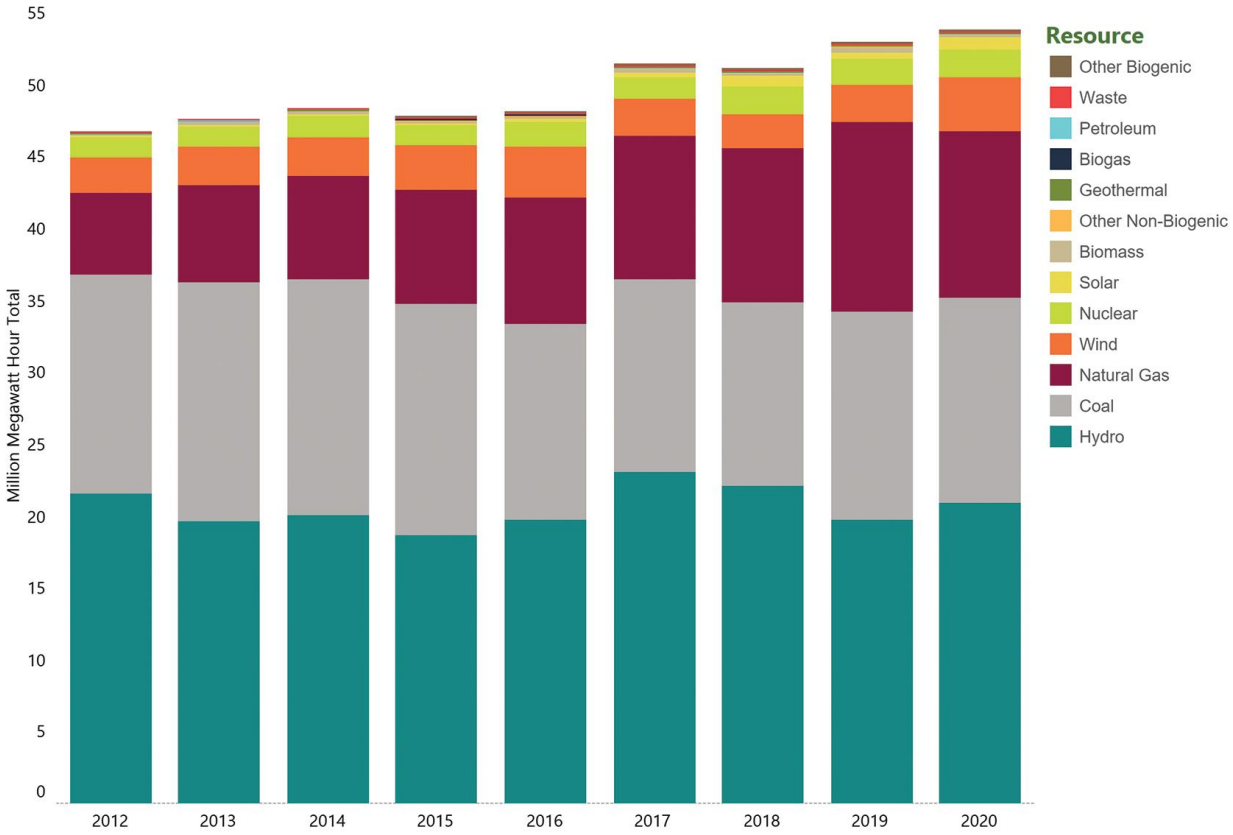
Resources Used to Generate Oregon's Electricity (2020)



Resources Used to Generate Oregon's Electricity Over Time



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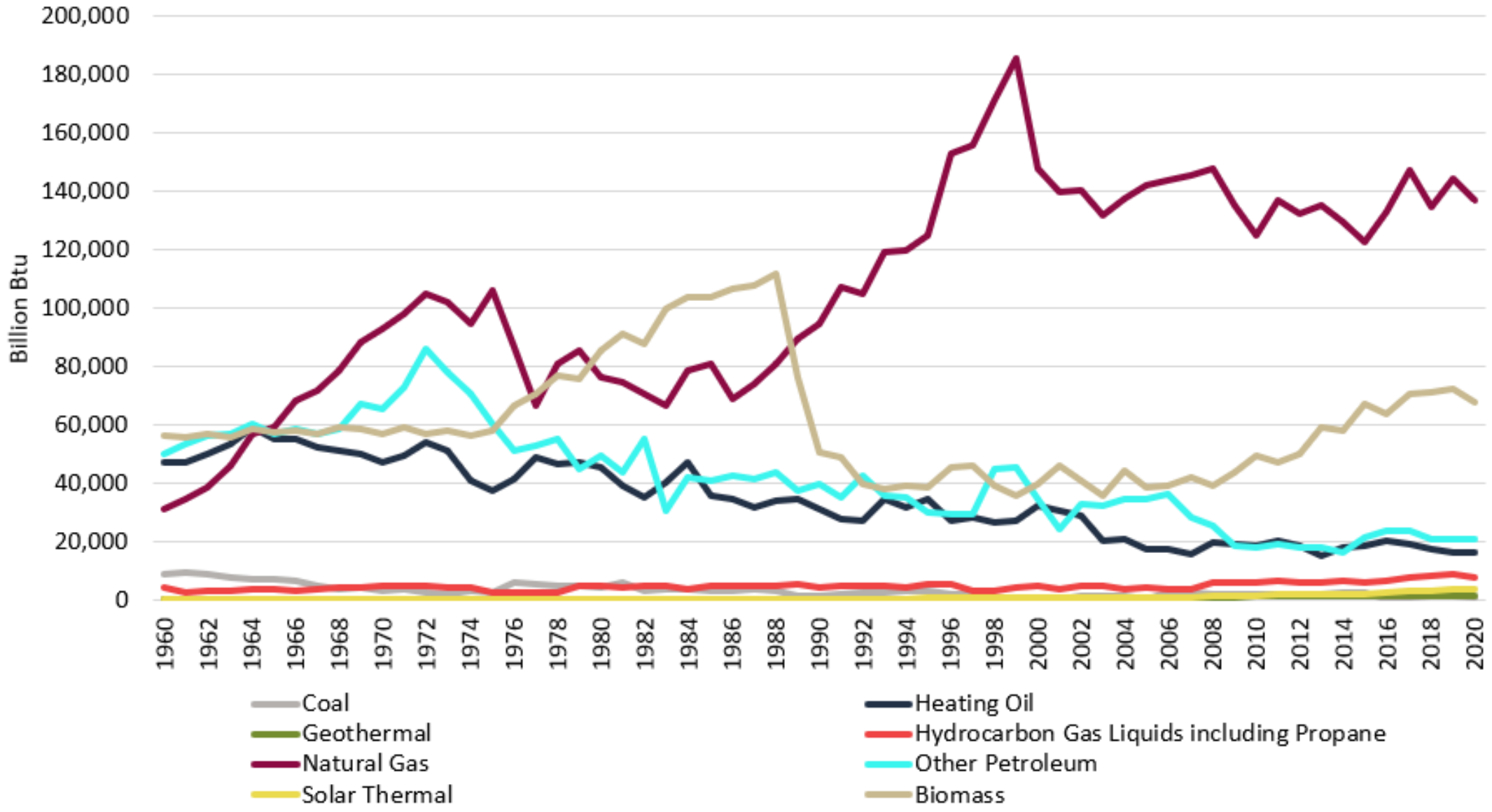
Oregon Direct Use Fuels Consumption Over Time



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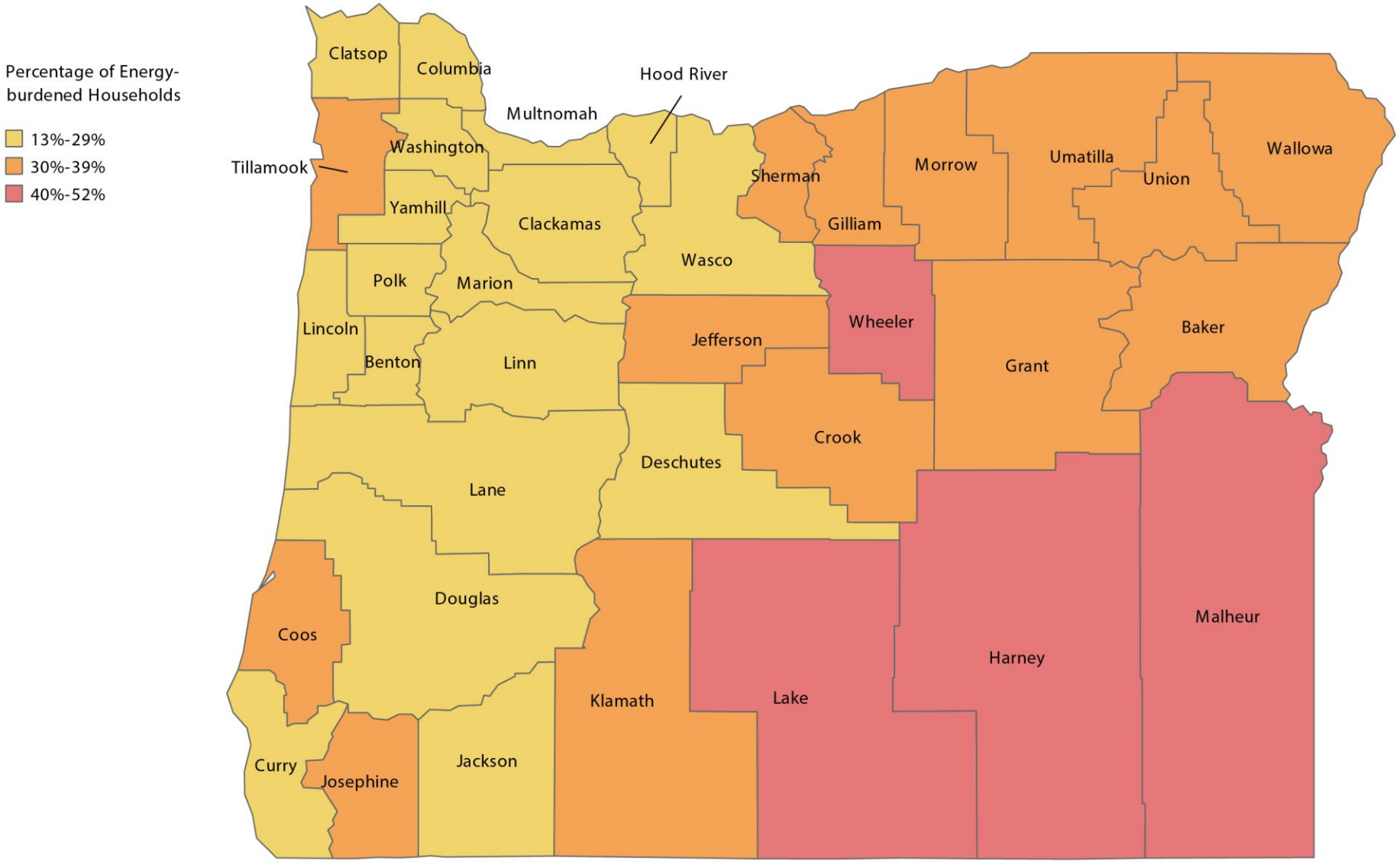
Percentage of Oregon Households Considered Energy Burdened and Earning 200 Percent or Below Federal Poverty Level by County (2020)



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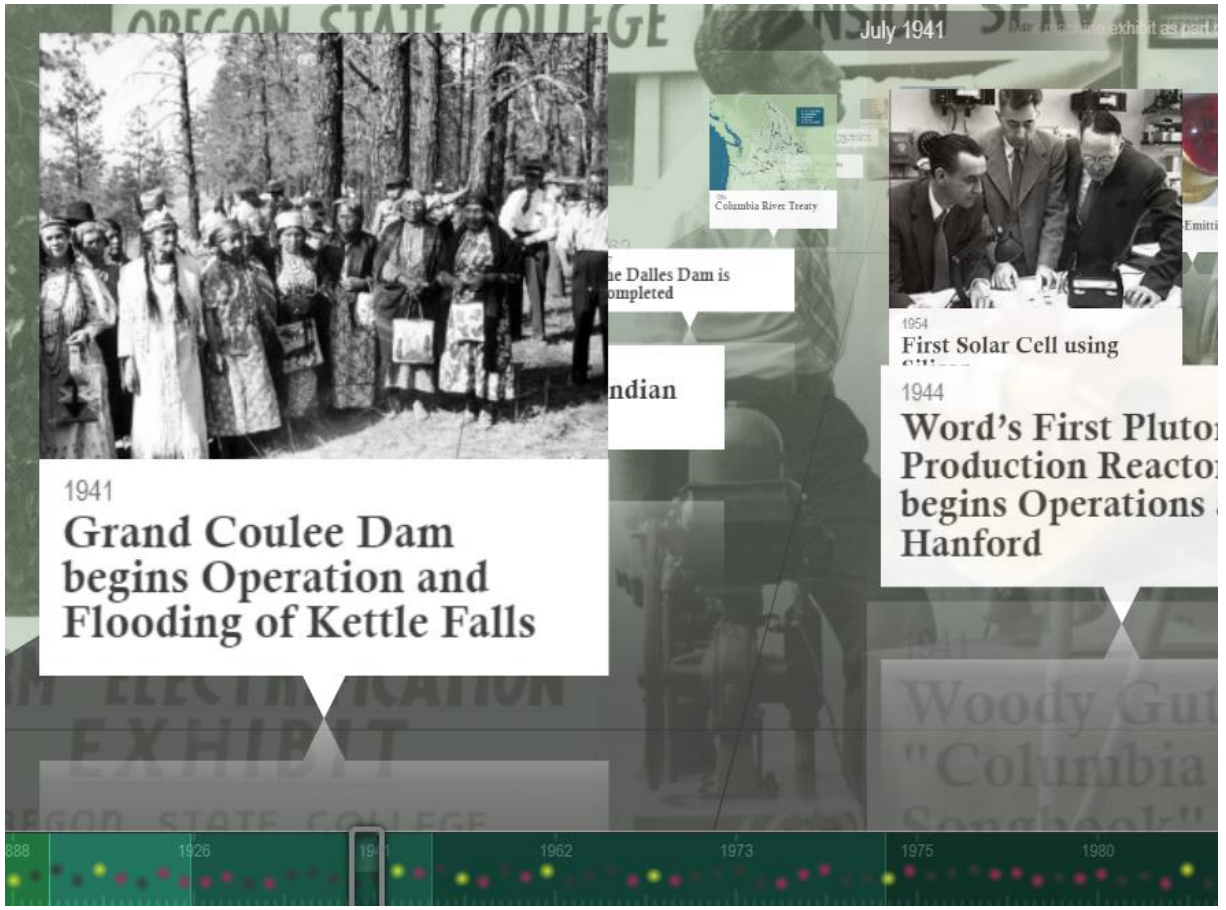
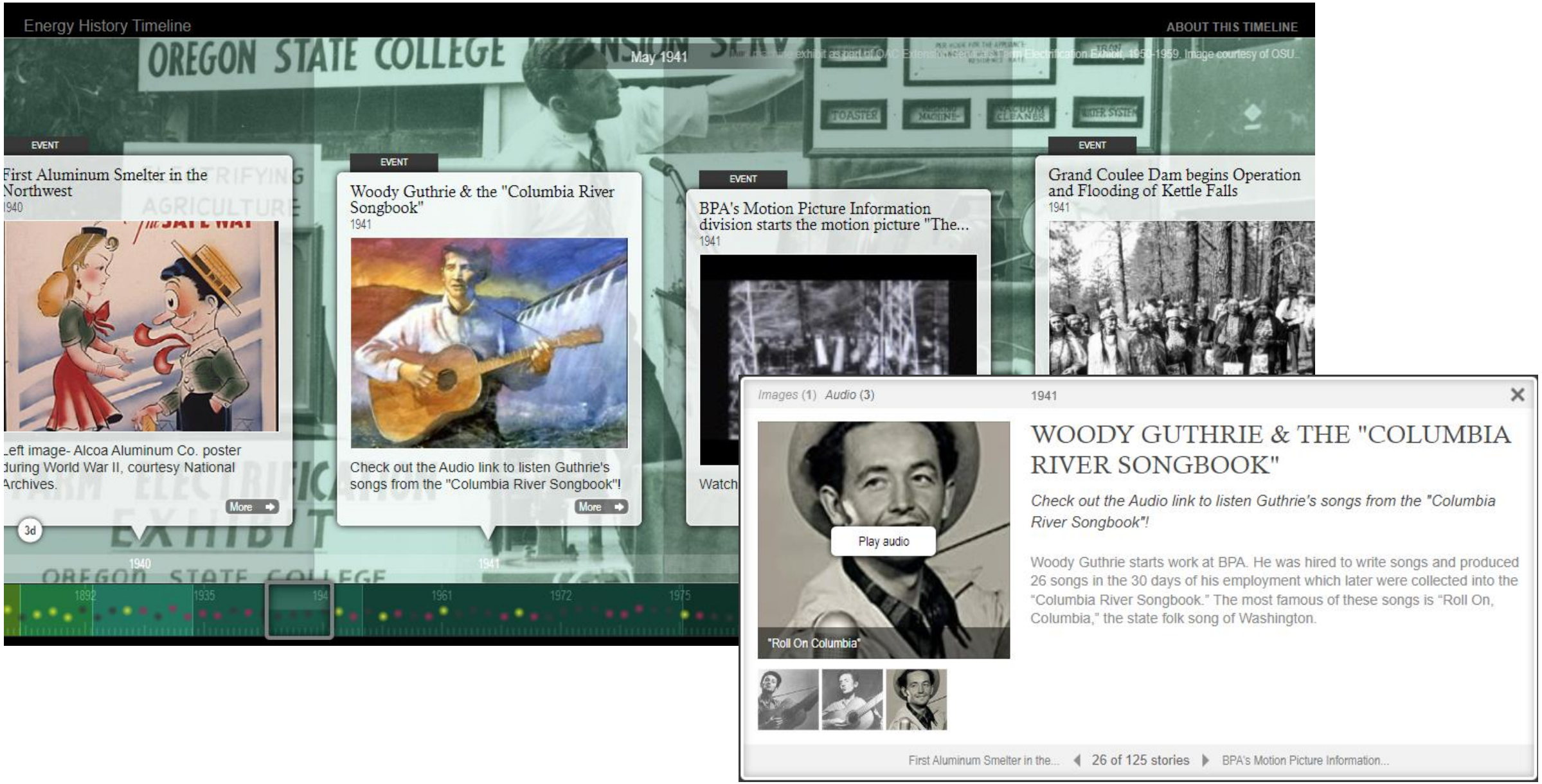
History Timeline

The online, interactive timeline of Oregon's energy history is meant to serve as a useful reference for readers as they review sections of the Energy Report, especially for energy data over time.



https://energyinfo.oregon.gov/timeline

OREGON DEPARTMENT OF ENERGY



https://energyinfo.oregon.gov/timeline

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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Consumer Energy Cost Drivers

Transportation fuel costs influenced by global crude oil prices

- *Global commodity prices subject to volatility and vulnerable to market disruption (e.g., war, pandemic)*

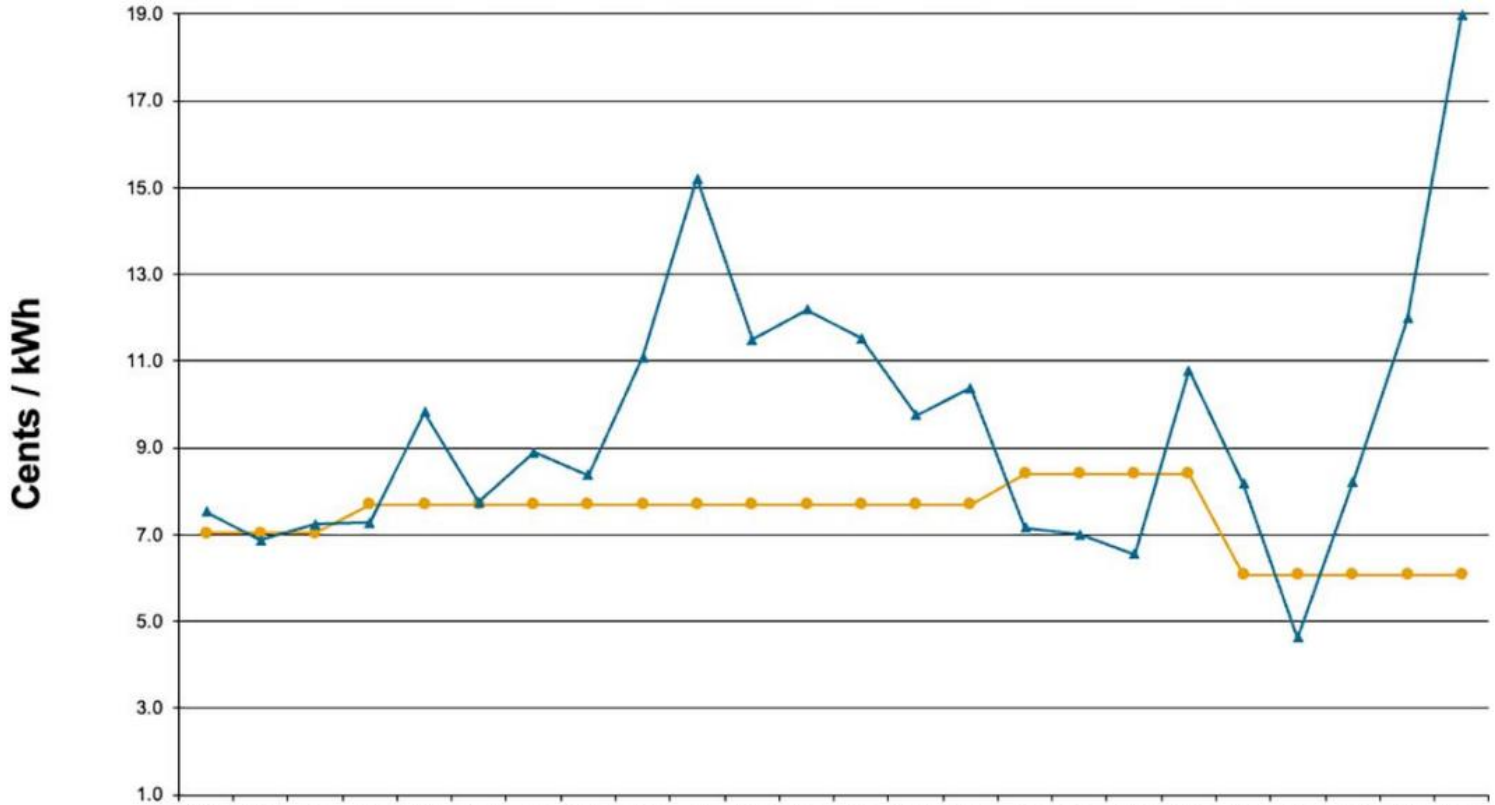
Wholesale electricity and natural gas costs driven by market supply and demand

- *Impacted by fuel price volatility and weather conditions*

Retail electricity and natural gas costs determined through utility cost-of-service ratemaking processes

- *Regulatory oversight provides consumer cost stability and mitigates impacts from wholesale price volatility*

Comparison of Wholesale and Retail Electricity Rates



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Cost of Service	7.0	7.0	7.0	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	8.4	8.4	8.4	8.4	6.1	6.1	6.1	6.1	6.1
Daily Pricing	7.5	6.9	7.2	7.3	9.8	7.7	8.9	8.4	11.1	15.2	11.5	12.2	11.5	9.8	10.4	7.2	7.0	6.6	10.8	8.2	4.6	8.2	12.0	19.0

Electrification Options in the Agricultural Sector

- Oregon is one of the **most promising states for electric tractor** adoption
- Small tractors are increasingly available, but electric and hybrid versions of high-horsepower tractors, combines, and harvesters are **still under development**
- Oregon is home to an innovative electric "**tractor share**" program
- There are several other important on-farm fossil fuel uses that **could be electrified** now and in the near future – 96 percent of irrigation pumps in Oregon are already powered by electricity
- The **strongest candidates for early electrification** will be relatively small equipment that farmers and ranchers use daily, especially equipment used close to the center of the farm
- **Rural utilities** and their customers can incorporate many types of electric farm equipment with existing infrastructure, but large field and processing machinery will likely require electrical service upgrades

Infrastructure Investments & Jobs Act of 2021

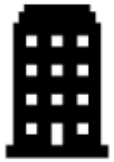
The 2022 Inflation Reduction Act is also expected to bring **federal energy dollars to Oregon**.

STATE ENERGY PROGRAM

$5.6 Million in funding to the Oregon Department of Energy to support investments in clean energy, energy efficiency, and resilience.

ELECTRIC VEHICLES

$52 Million to the Oregon Department of Transportation to construct electric vehicle charging infrastructure.



BUILDING CODES

$TBD. Competitive funding through multiple programs will be available to adopt improved building codes, support training and compliance activities.

ENERGY EFFICIENCY

$3.2 Million for capitalization of an energy efficiency Revolving Loan Fund and Energy Efficiency and Conservation Block Grant program at the Oregon Department of Energy, which will support energy efficiency investments in Oregon communities.

RESILIENCE & RELIABILITY

$50 Million. USDOE will allocate $50 million to Oregon to make investments that enhance the resilience and reliability of the electric grid.

HOMES PROGRAM

$54 Million. Establishes a program to support whole-home energy efficiency upgrade rebates.

WEATHERIZATION

$30 Million for Oregon Housing and Community Services to support weatherization and energy conservation services for low-income households.

ENERGY AUDITOR TRAINING

Up to $2 Million. USDOE will competitively offer $40 million to U.S. states to train energy auditors to help home business owners identify opportunities save energy and money by using less energy.

HEEHR

$54 Million. Establishes a program to provide rebates for high efficiency electric home appliances and associated costs.

https://www.oregon.gov/energy/energy-oregon/Pages/IIJA.aspx

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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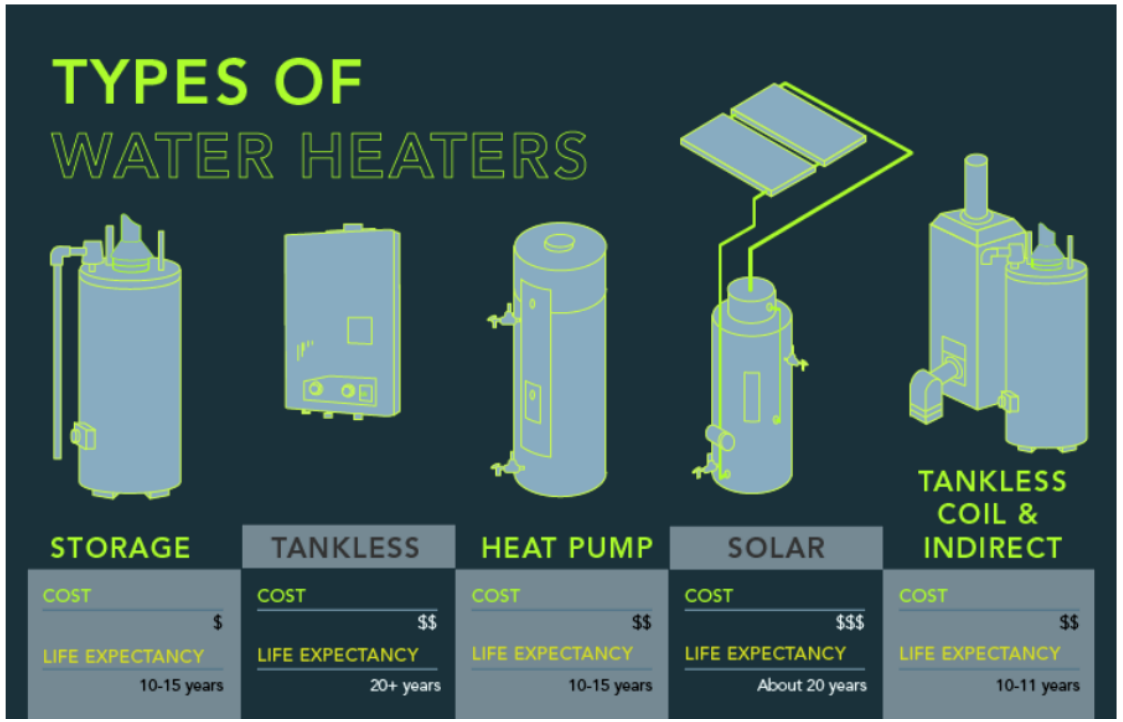
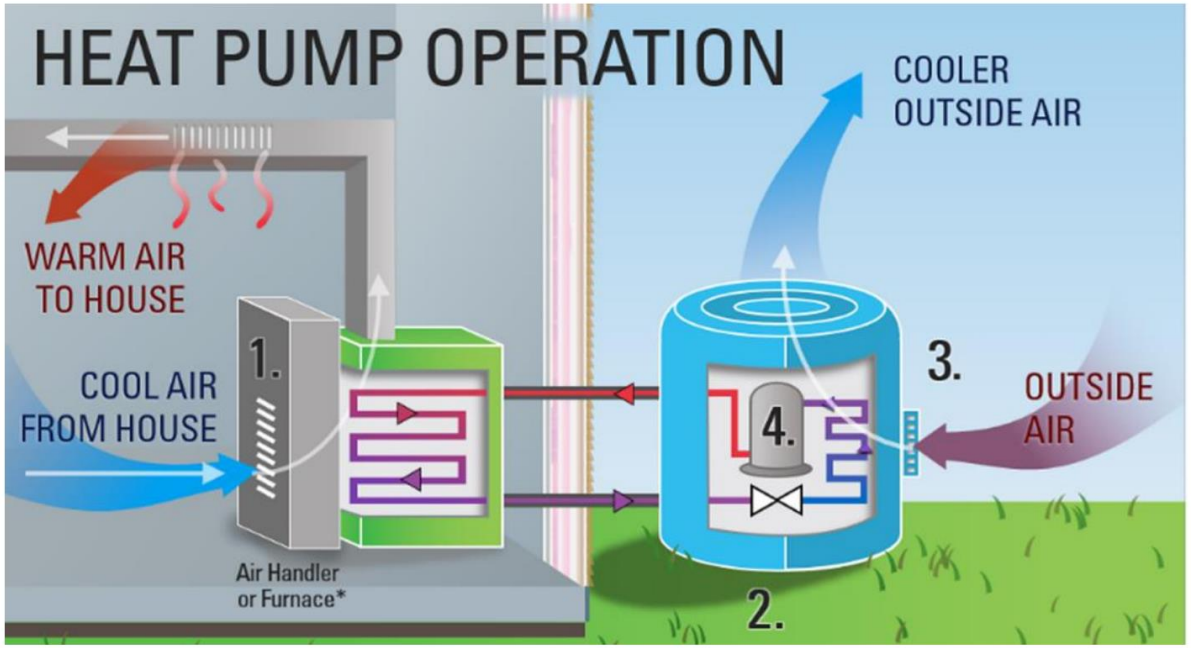
Energy Efficiency Building Tech

Energy efficiency saves Pacific Northwest ratepayers over **$4 billion** and reduces GHG emissions by over 22 million MTCO2 each year.





Advances in energy efficiency have helped utilities manage regional demand and reliability for energy, **reduce energy burden** for many Oregonians, and contribute to progress toward state and local climate goals.

There remains significant energy efficiency potential to continue to provide these benefits.

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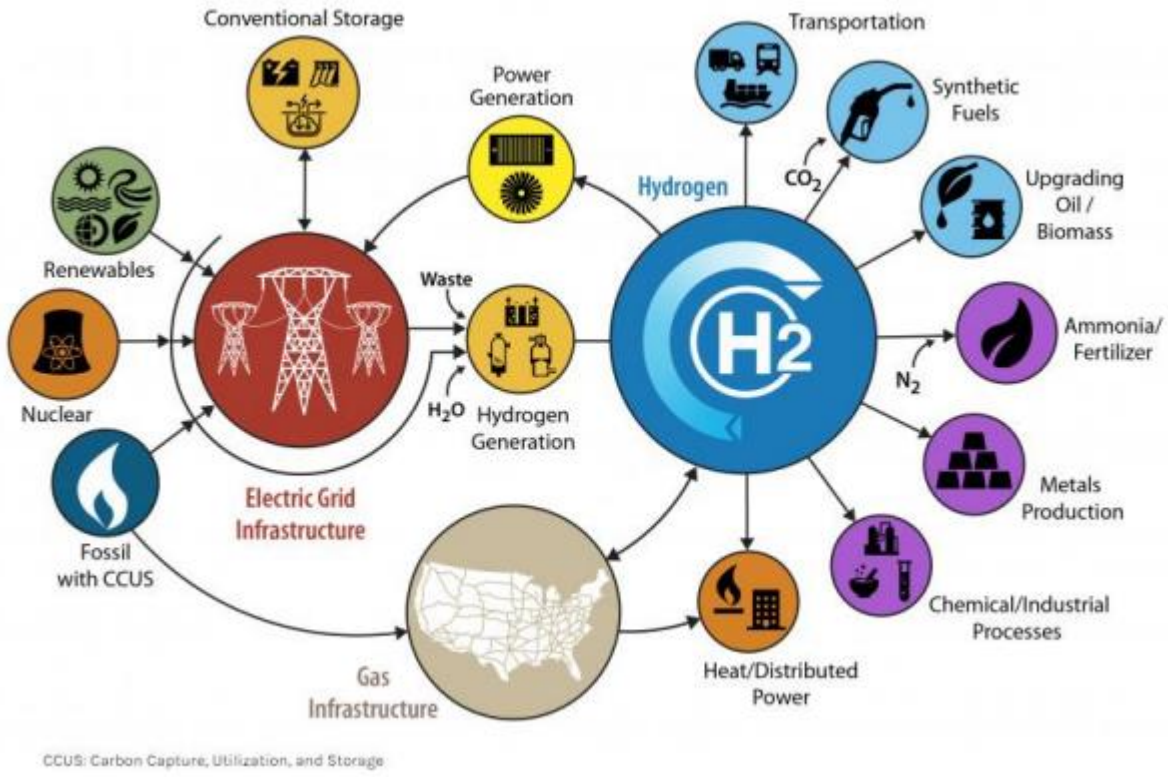
Hydrogen

The most common pathway to produce hydrogen today uses steam to separate the hydrogen from methane in natural gas. Lower-carbon and zero-carbon hydrogen – often referred to as **clean hydrogen** – can be produced through several pathways, including electrolysis of water with renewable electricity or natural gas/renewable natural gas coupled with carbon capture and sequestration technology.

Hydrogen is used predominantly in industrial applications, such as petroleum refining, steel and other metal production, food processing, and chemical production. **Clean hydrogen could reduce greenhouse gas emissions** in sectors where the option to electrify is either too costly or not technologically feasible, such as medium- and heavy-duty transportation, aviation, long-duration storage, or as a substitute for natural gas, among others.



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Policy Briefs

This section provides deeper-dive insights on emerging energy trends, opportunities, and barriers in the energy sector.

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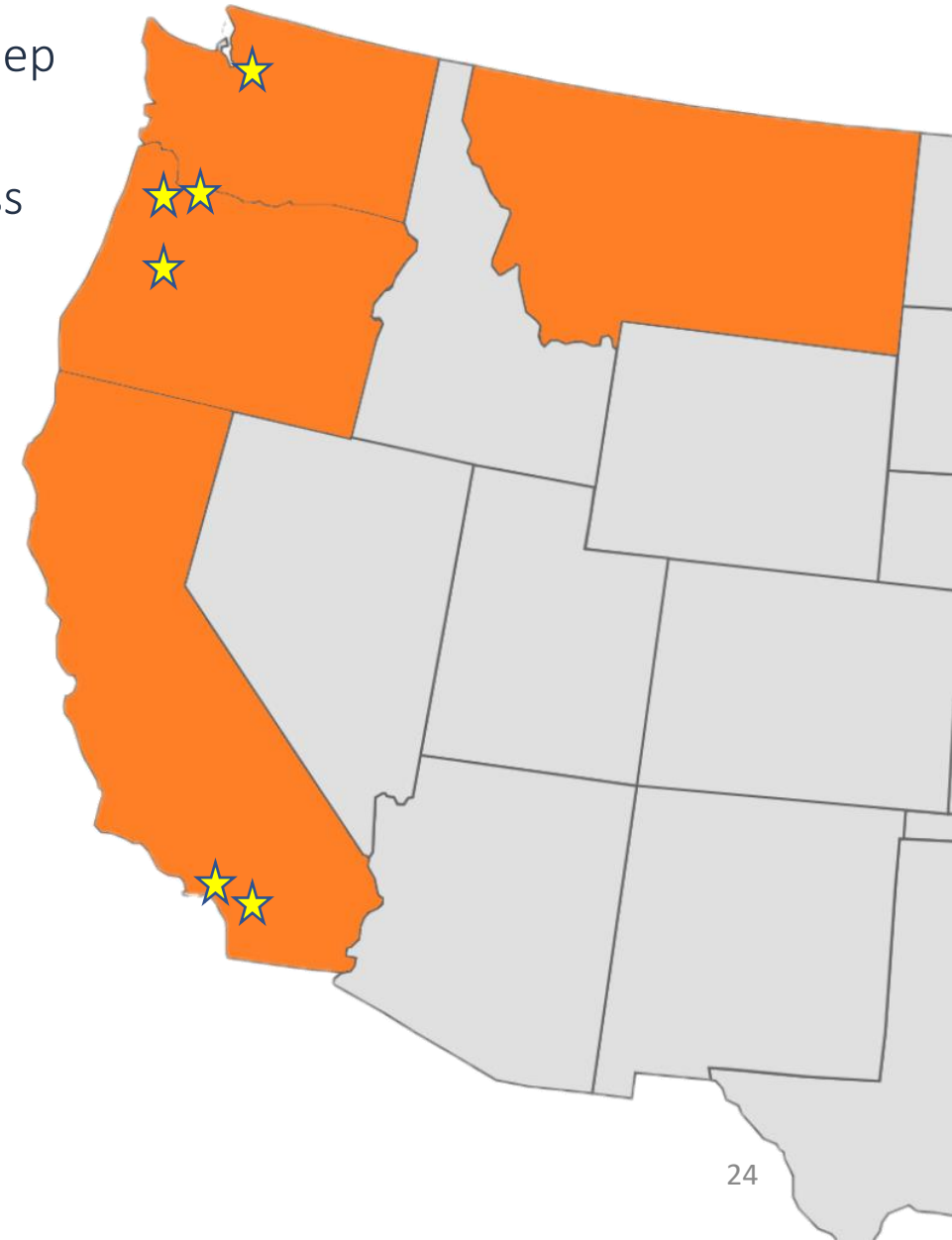
Charting a Course for Oregon's Energy Future

Part I: Introduction

- What will it take to achieve economywide deep decarbonization and 100% clean energy?
- We reviewed 20 technical studies from across the country (mostly the west)



Key Findings:

- Achieving these policies is possible!
- Four pillars of decarbonization identified:
  - energy efficiency,
  - electrification of end uses,
  - cleaner electricity, and
  - develop low-carbon fuels
- There are multiple pathways to achieve policies by mid-century, each with its own tradeoffs

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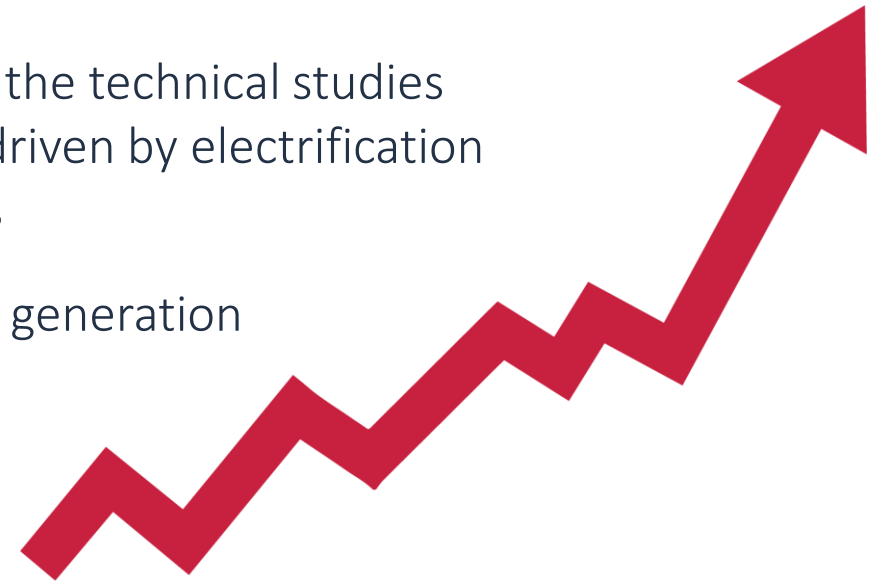
Charting a Course for Oregon's Energy Future

Part II: Electric Sector

- Growing the electric sector: Consensus in the technical studies that demand for electricity will increase, driven by electrification of vehicles and some natural gas end uses
- Cleaning the electric sector: Existing fossil generation will also need to be replaced



Key Findings:

- Energy efficiency continues to play an important role
- Significant amount of new renewable generation required (likely in the tens of gigawatts in Oregon)
- Need to balance tradeoffs involved with clean energy choices—land use impacts, fish and wildlife concerns, total costs, and more

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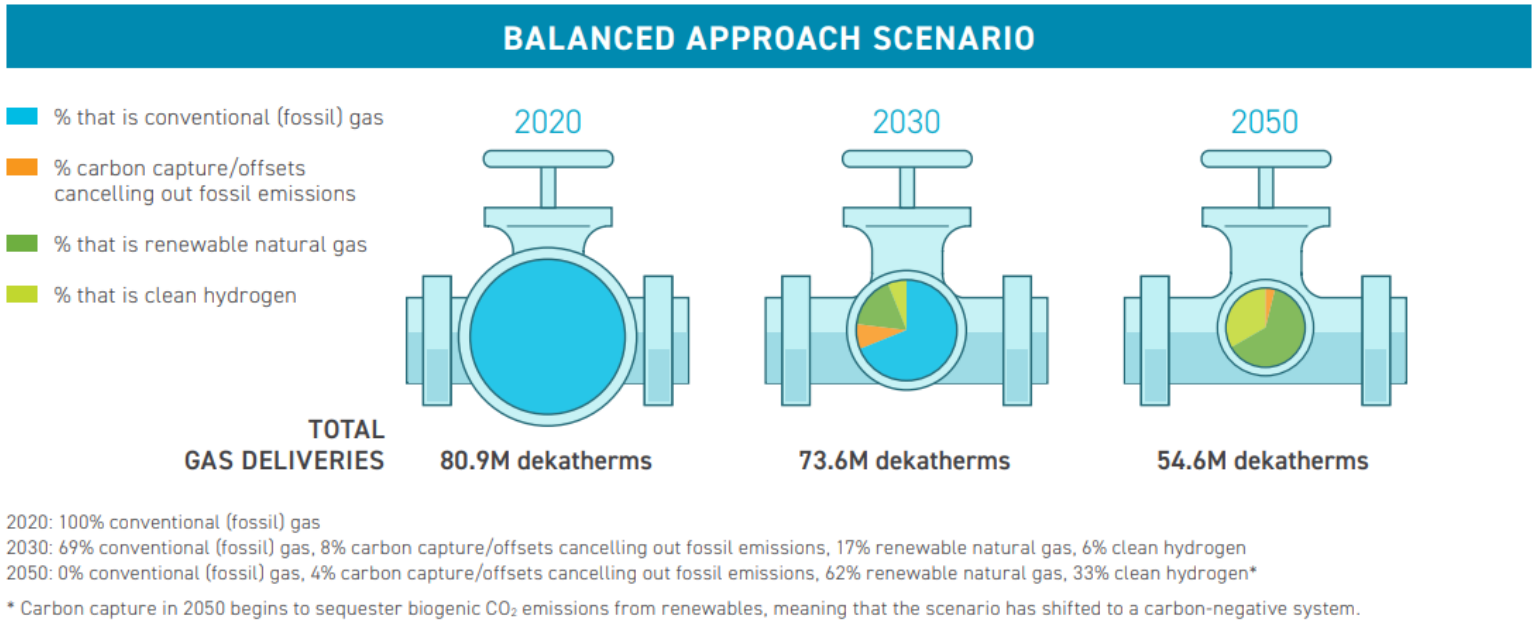
Charting a Course for Oregon's Energy Future

Part III: Natural Gas Sector

- Many studies find that it is most cost-effective to achieve decarbonization policies by reducing or eliminating a lot of current uses of natural gas—such as for electric generation and for many heating applications
- Strategic use of gas: In other instances, the continued use of gas resources may prove the most cost-effective path to achieving clean energy policies

Key Findings:

- Many studies identify a continued need for some dispatchable gas resources
- To achieve policy targets, the gas will need to become cleaner over time by using RNG, carbon capture, or renewable H2



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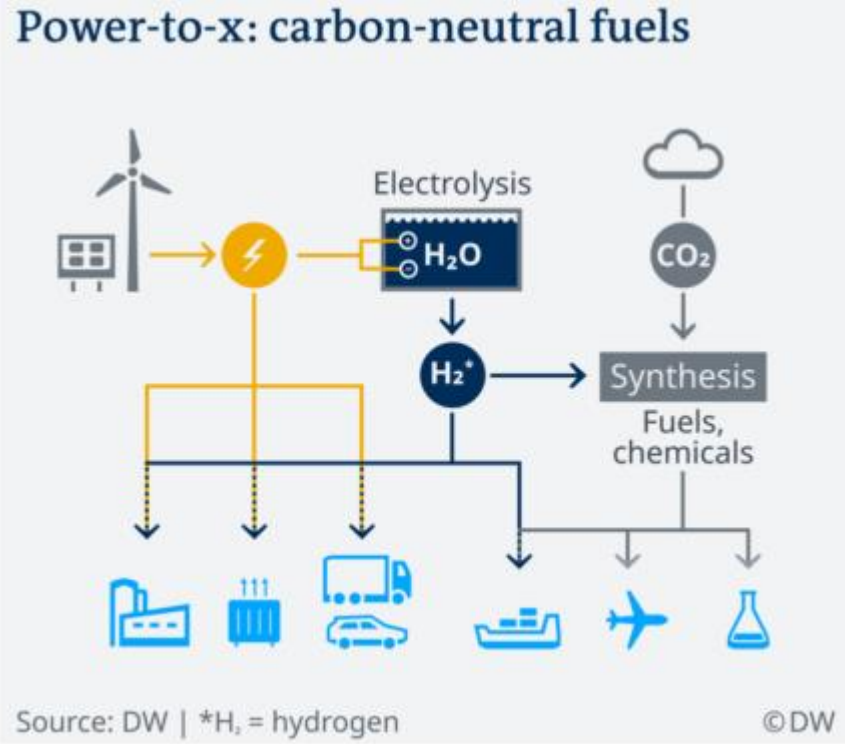
Charting a Course for Oregon's Energy Future

Part IV: Transportation Sector

- Electrification: Electrifying road vehicles – passenger vehicles, trucks, and buses – is a key element of most deep decarbonization studies. Many studies indicate that sales of new passenger vehicles will need to be all electric by 2035 to achieve significant decarbonization by 2050.



- Equity: A transition to clean transportation requires thoughtful deliberation and robust engagement with industry, communities, drivers, and governments. There is an opportunity to build a more equitable transportation system from the ground up.

Key Findings:

- Electrify as many vehicles as possible as soon as possible.
- Use lower-carbon liquid fuel alternatives, such as renewable diesel, for vehicles that cannot be electrified in the near-term.
- Plan for zero-carbon liquid fuel alternatives to decarbonize vehicles that cannot be electrified.

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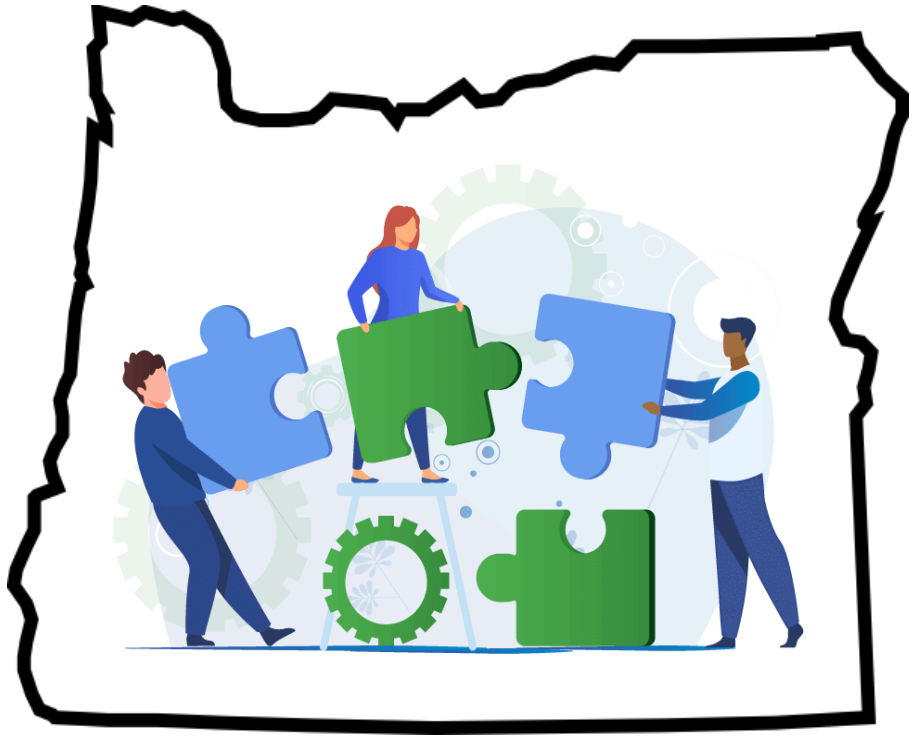
Charting a Course for Oregon's Energy Future

Part V: Pathway Tradeoffs



- The costs of failing to achieve mid-century clean energy and climate policy goals fall inequitably across Oregonians
- Technical analysis shows us that there are multiple technology pathways to achieve mid-century policy goals
- Significant choices remain, and the tradeoffs of those choices must be carefully considered
- Can Oregonians work together to chart an intentional course for the state's energy future that balances these tradeoffs?

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Beyond Savings: Co-benefits of Energy Efficiency

President Jimmy Carter signs the Northwest Electric Power Planning and Conservation Act Dec. 5, 1980.
Photo courtesy of Bonneville Power Administration

- Energy efficiency is facing new challenges, demands, and increased competition from low-cost renewable resources.
- Traditional tests of cost-effectiveness fail to capture the wide range of co-benefits of energy efficiency. Several organizations, including the Oregon Public Utility Commission and California Public Utilities Commission, are working to quantify and incorporate numerous co-benefits into investment decisions.
- If Oregon policymakers are interested in modifying the state's approach to determining the value of energy efficiency, the state could identify, calculate, and incorporate the full value of the co-benefits of energy efficiency (e.g., **J**obs, **E**nhancing **D**ERs, **D**ecarbonization, **I**nvisible, **C**apacity, **R**esilience, **E**nergy **B**urden, **B**eneficial **E**lectrification, **R**eliability)

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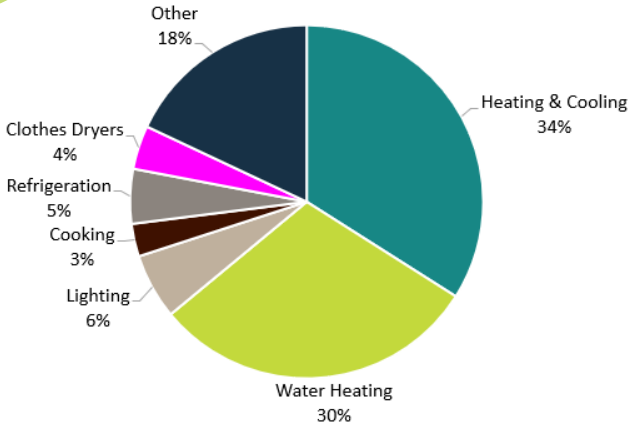
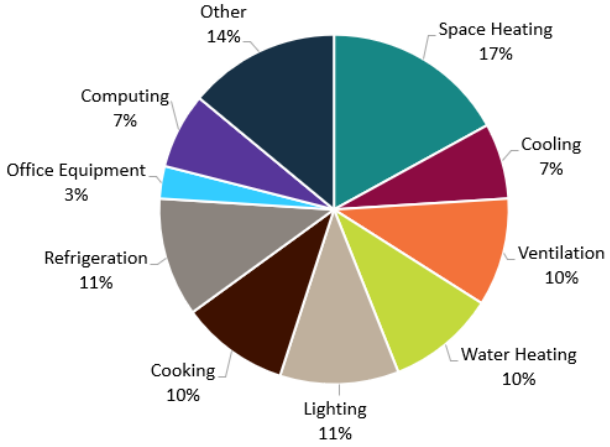
Energy Efficiency Policy Opportunities in Existing Buildings

Residential Energy End-Uses



Commercial Energy End-Uses



- Energy consumption in buildings is responsible for about 22.4 million metric tons, or nearly 35% of annual Oregon greenhouse gas emissions.
- Existing buildings hold the greatest potential for reducing energy consumption and associated greenhouse gas emissions in the building sector.
- Successful existing voluntary energy efficiency programs have made Oregon a leader in energy efficiency and GHG reductions, but more is required to access the large pool of potential energy efficiency and GHG reductions in the existing building stock.
- There are multiple strategies and programs that can support higher adoption of energy efficiency technologies for existing buildings.
- Policy design should be informed by robust data and new programs should establish specific targets and goals to ensure programs are efficient and effective.

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Local Energy Perspectives on Workforce and Supply Chain

Building Energy Controls Apprenticeship Program at Lane Community College

- While labor market disruptions due to the pandemic have largely resolved, long-term workforce issues have re-emerged: generational turnover, shortages of workers with critical skills, and challenges with caretaker needs and affordable housing.
- The clean energy transition presents challenges for training and recruitment of workers with needed skills but also positions the energy industry as an attractive employer at the forefront of meaningful societal change.
- Pandemic-driven supply chain disruptions have pushed energy project developers to plan further ahead to procure materials and equipment and have created pressures to increase domestic manufacturing.

2022 Report Recommendation

The state would benefit from an **energy strategy** to align policy development, regulation, financial investment, and technical assistance in support of an intentional transition to a clean energy economy. This strategy could identify specific pathways to meet the state's policy goals that maintain affordability and reliability, strengthen the economy, and prioritize equity while balancing tradeoffs to maximize benefits and minimize harms. Ultimately, this strategy could be used to **make informed decisions and motivate action**.

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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/