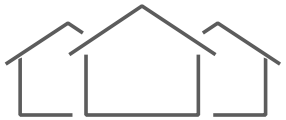
2021 Washington State Energy Strategy

GLENN BLACKMON, PH.D.

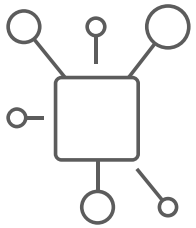
FEB. 24, 2022

Washington State Department of Commerce

We strengthen communities



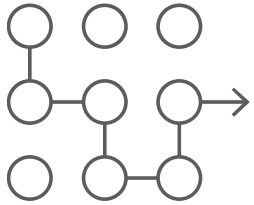
HOUSING HOMELESSNESS



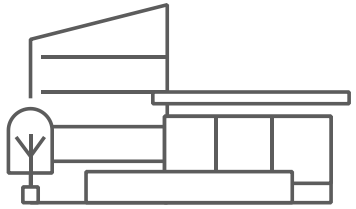
INFRASTRUCTURE

BUSINESS ASSISTANCE

ENERGY



PLANNING



COMMUNITY FACILITIES

CRIME VICTIMS & PUBLIC SAFETY

COMMUNITY SERVICES

2021 Washington State Energy Strategy

Transportation

Buildings

Industry and Workforce

Electricity

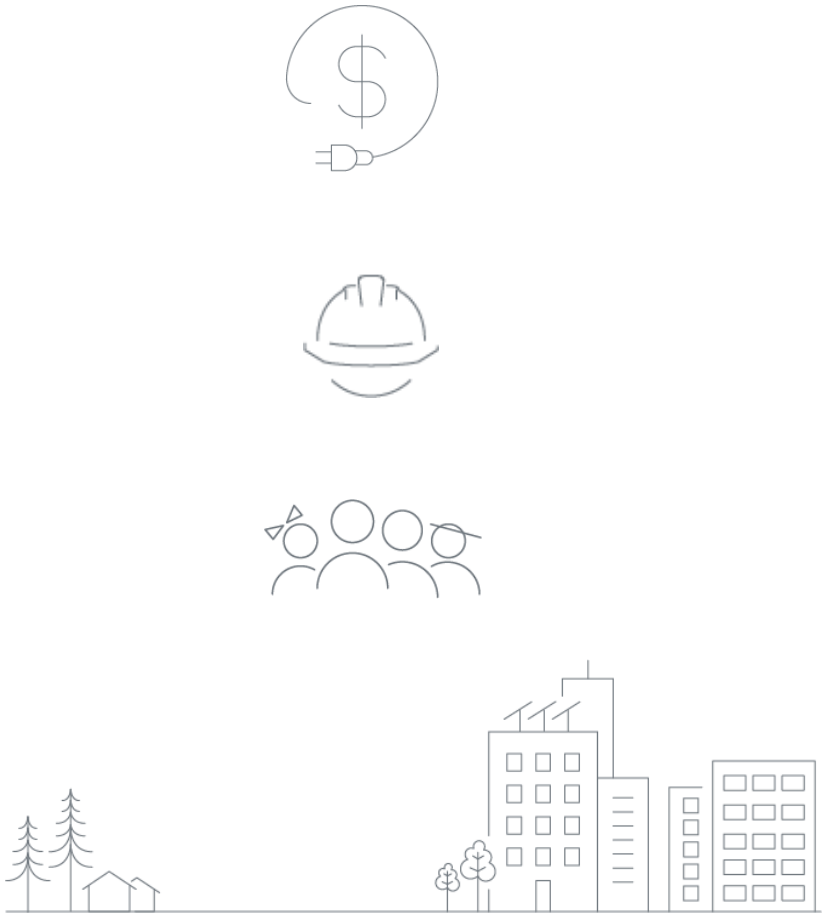
https://www.commerce.wa.gov/energystrategy

Aligning energy and climate policy

- Align strategy with clean electricity laws
  - Energy Independence Act (I-937, 2006)
  - Clean Energy Transformation Act (SB 5611, 2019)
    - After 2025, no coal in resource mix
    - By 2030, greenhouse neutral electricity supply
    - By 2045, 100% renewable or non-emitting sources
- Align strategy with greenhouse gas emissions limits (HB 2311, 2020)
  - By 2030, 45% below 1990 levels
  - By 2040, 75% below 1990 levels
  - By 2050, 95% below 1990 levels and achieve net-zero emissions.

Cross-Sector Considerations

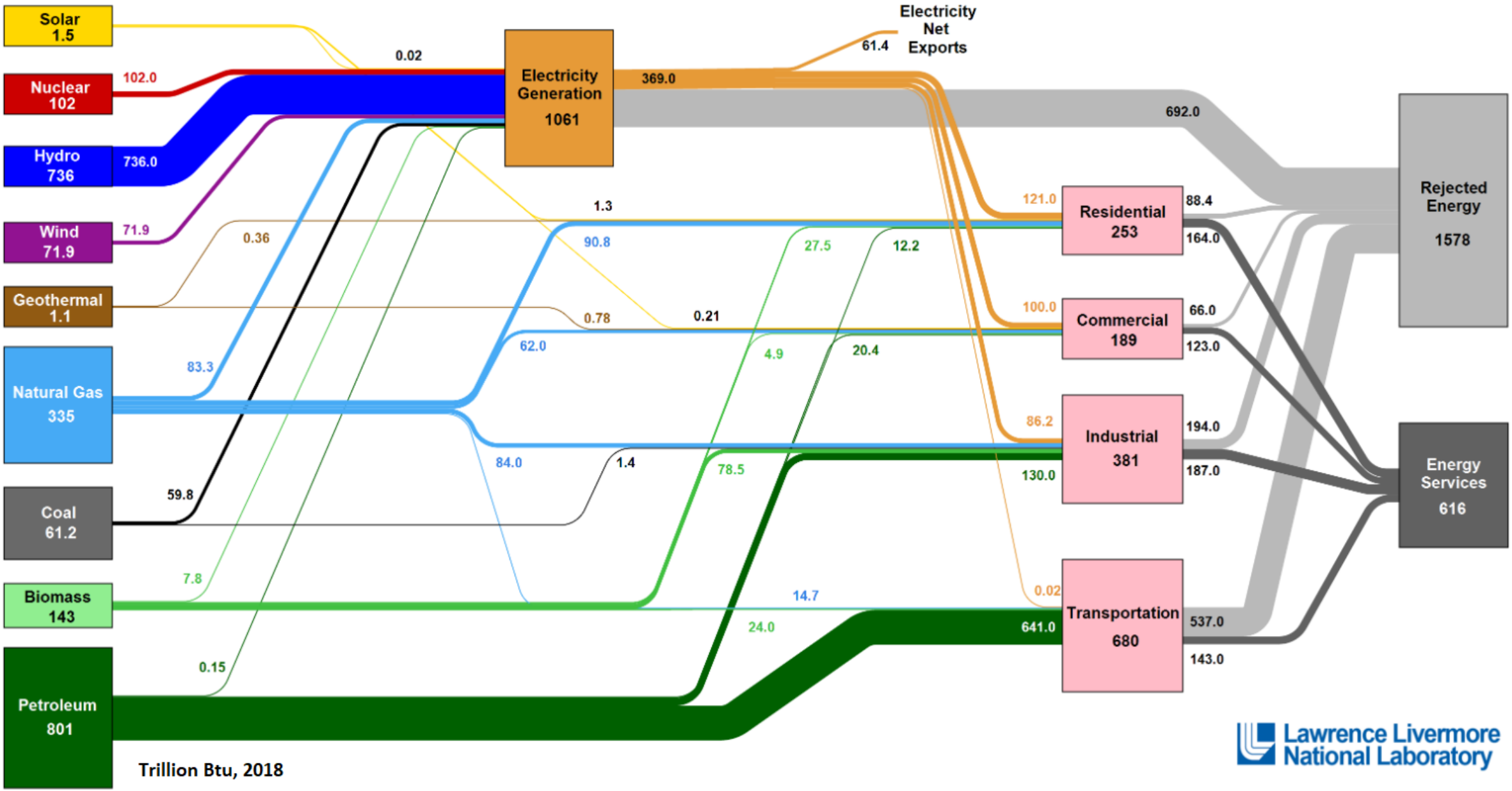
- Maintaining reasonable and fair **prices** and sufficient **supply** of energy
- Promoting a competitive clean energy **economy** and **workforce** development
- Understanding and addressing the needs of **low-income and vulnerable populations**
- Reaching and responding to both **urban and rural communities**



Ensure Equitable Transition for Communities

Source: Washington State Department of Commerce

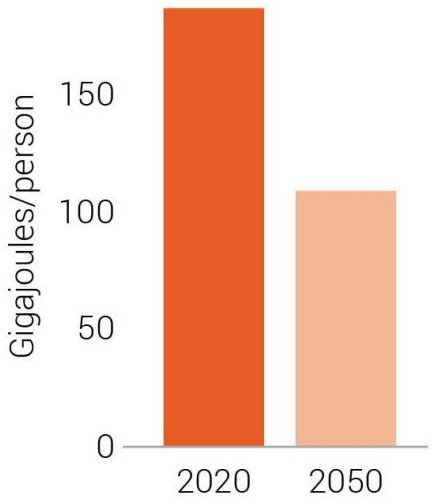
- Apply explicit equity principles
- Ensure impacted communities design solutions
- Invest in equitable and inclusive transition
- Support workers in transition
- Universal broadband access as foundation for transition



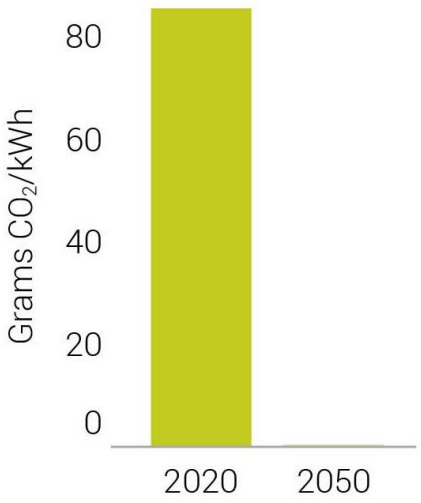
Lawrence Livermore National Laboratory

Five Decarbonization Strategies

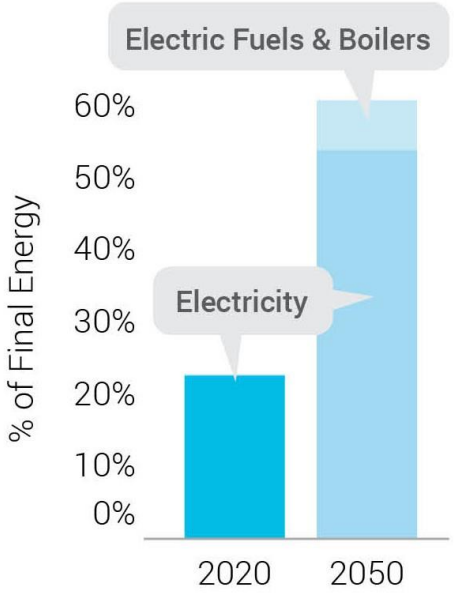
Energy Efficiency
Energy Consumption
(Gigajoules/person)



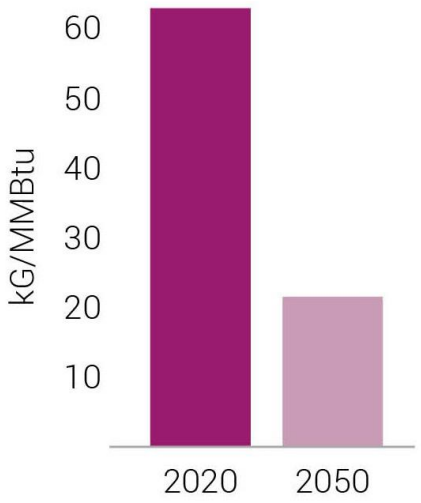
Clean Electricity
Electricity Carbon Intensity
(Grams CO_2 per kWh)



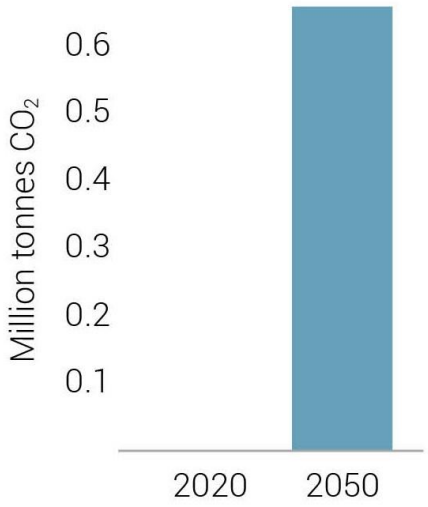
Electrification
Electricity Share of Total Energy
(% of Final Energy)



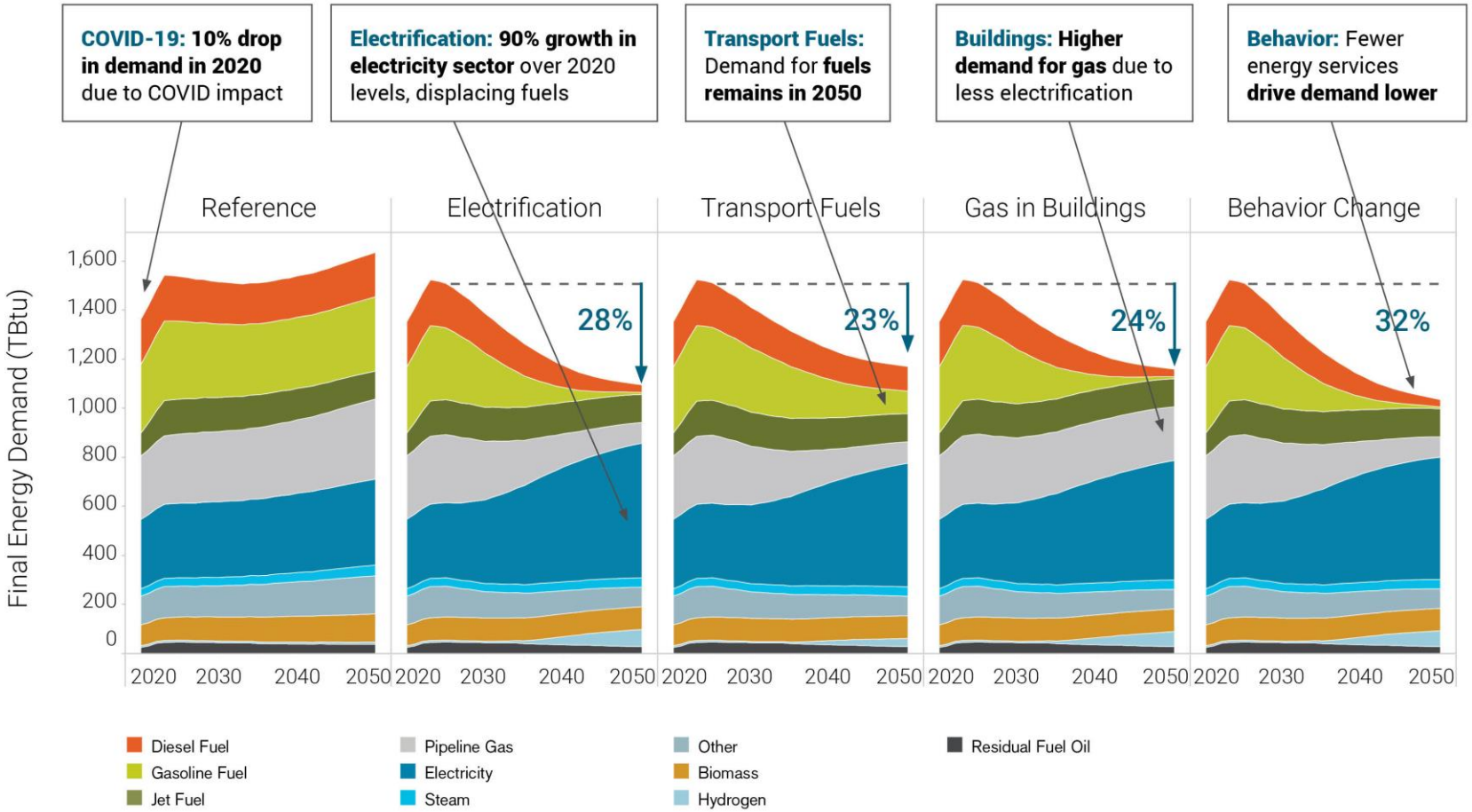
Clean Fuels
Fuels Carbon Intensity
(kG/MMBtu)



Carbon Sequestration
(Million tonnes CO_2)

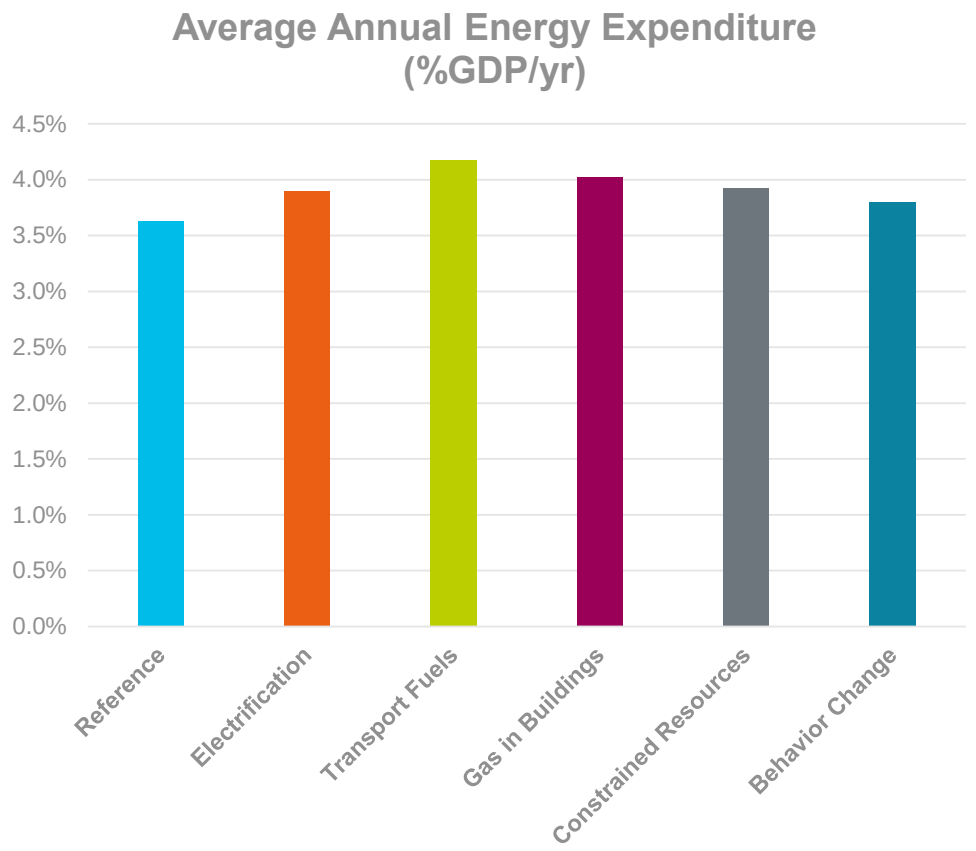


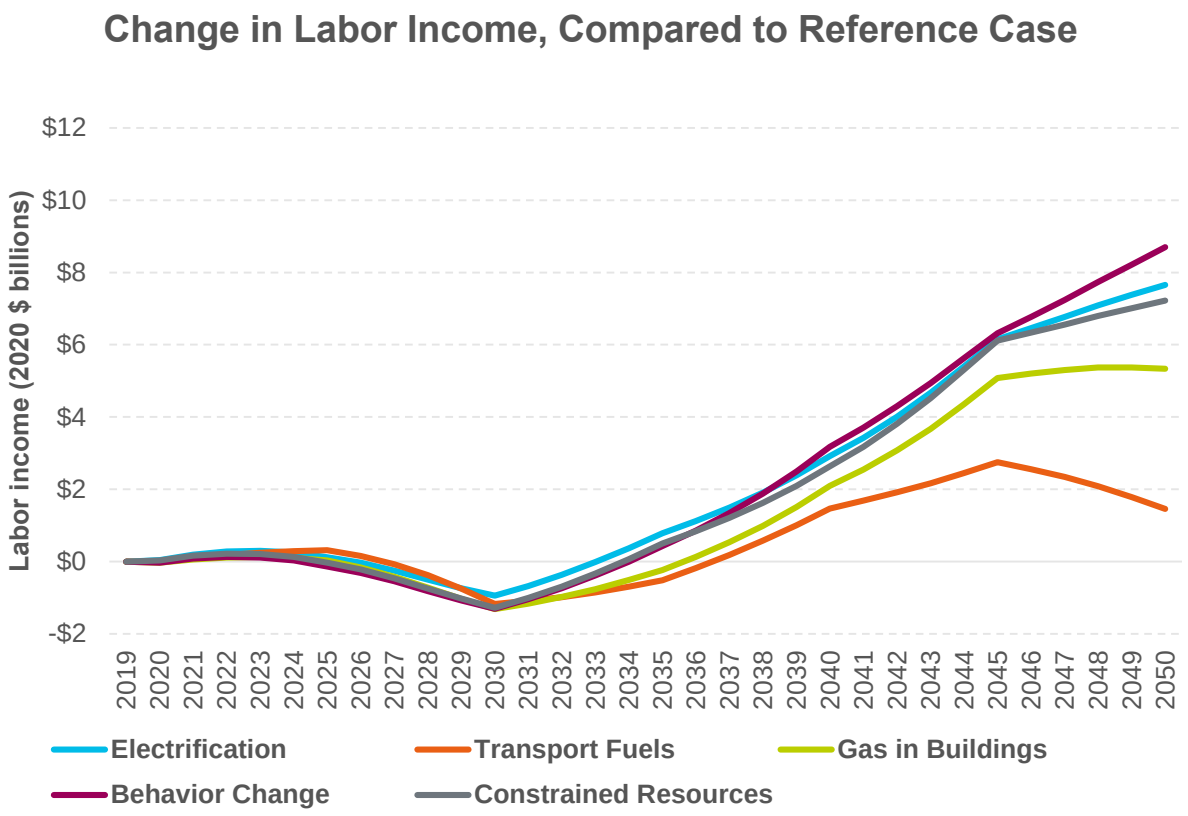
Final Energy Demand 2020-2050



Source: Appendix A – Deep Decarbonization Pathways Modeling Report, December 11, 2020 (p. 28).

Cost Impacts and Economic Effects





Implications for Washington State

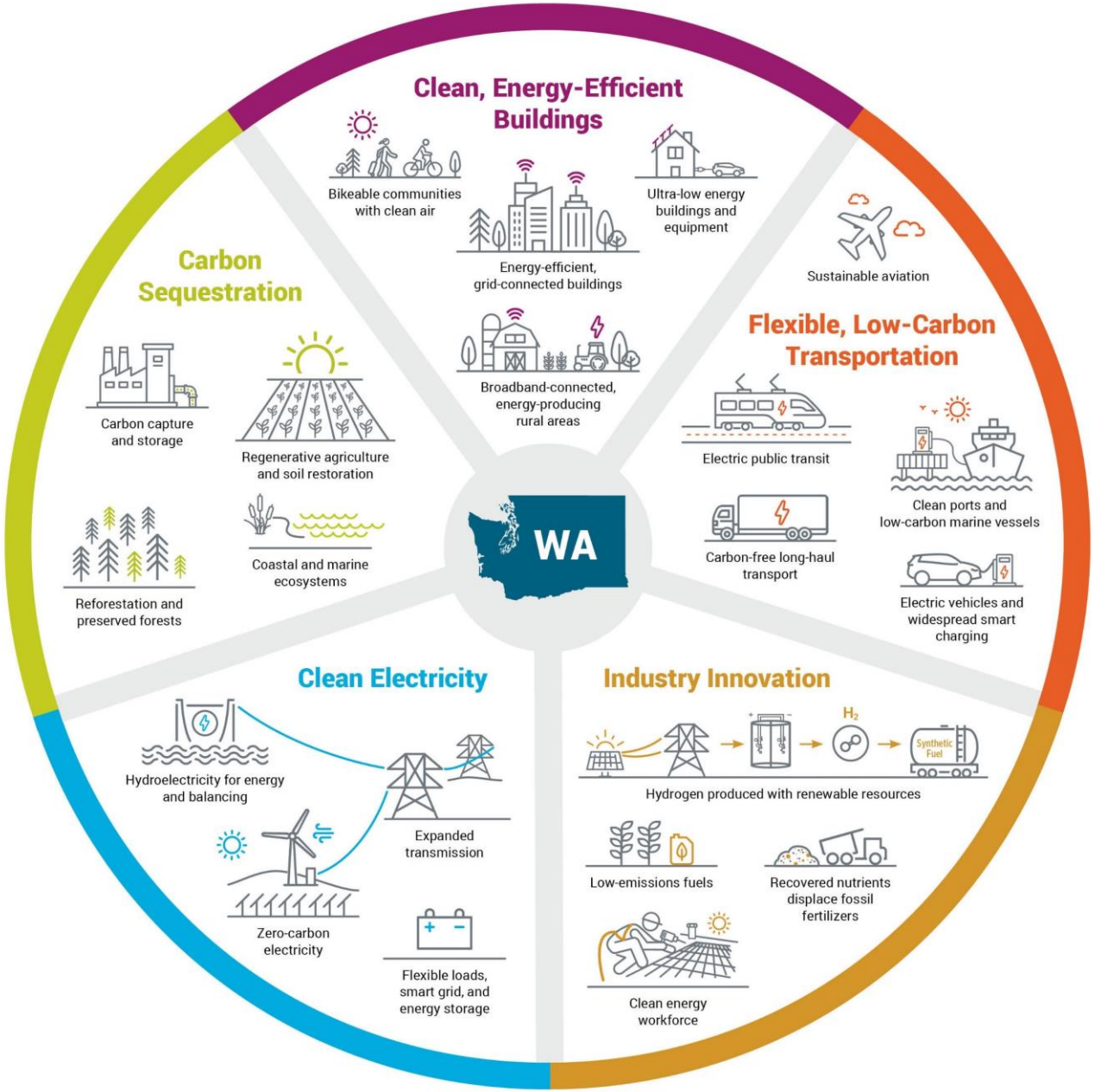
To meet the state's 2030 GHG Targets

- Deep energy efficiency to reduce energy use
- Clean electricity grid by 2030
- Electrifying as many energy end uses as practical
- Accelerating clean fuels industry
- Regional approach required

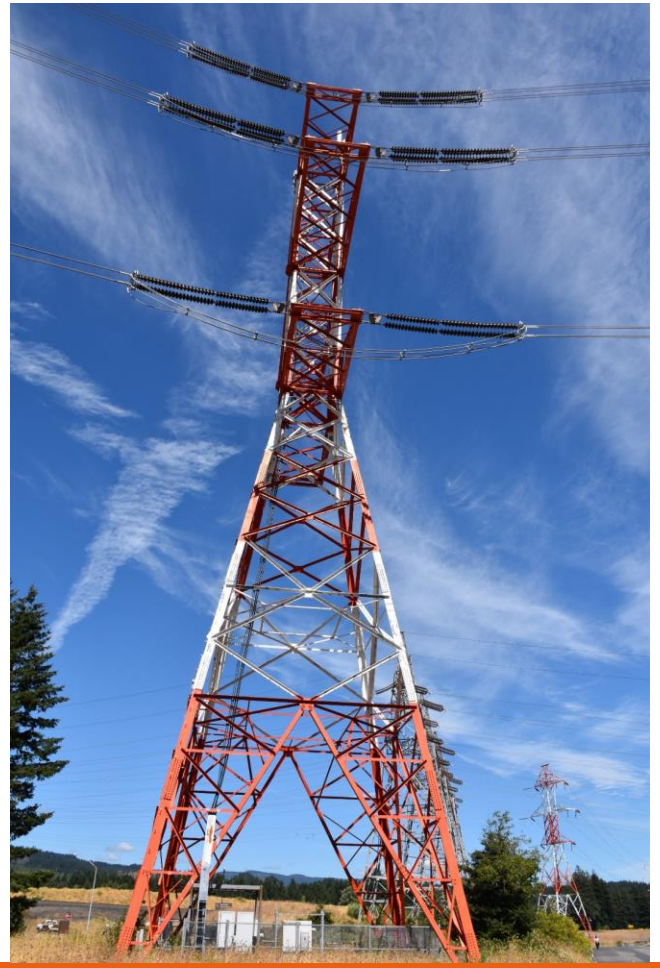
WASHINGTON STATE 2050

Net-Zero Vision

A blueprint for how we can meet our state's climate goals to nearly eliminate the use of climate-threatening fossil fuels by 2050, while growing a prosperous economy and maintaining affordable and reliable energy supplies.

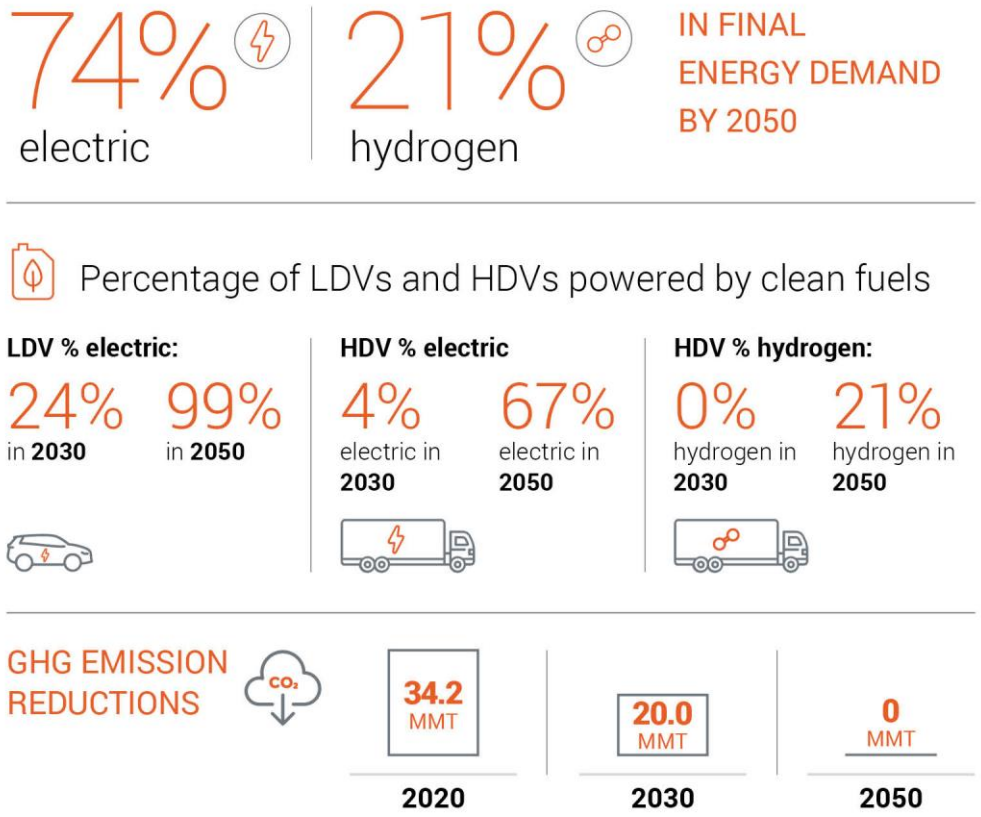


100% Clean Electricity, Smart Grid Power Transition



- Enhance reliability and resource adequacy of the electricity grid
- Accelerate new renewables and transmission expansion
- Deploy flexible solutions and smart grid technology to manage load
- Develop market mechanisms for clean power
- Ensure effective implementation of the Clean Energy Transformation Act

Decarbonizing the Transportation Sector



- Transportation electrification key to cost-effectively decarbonizing Washington economy
  - ✓ Dramatically reduces use of diesel and gasoline
- Gasoline, diesel, jet fuel significantly decarbonized by 2030
  - ✓ Synthetic fuels and biofuels
- Peak in clean fuel demand in 2030 due to large number of ICEs still on the road
- Heavy-duty trucking drives demand for hydrogen fuel cells

Clean Buildings

ENERGY EFFICIENCY reduces building energy load by 26% in 2050

26%

84%

less pipeline gas used for residential heating in 2050

64%

electric water heating in **2030**

100%

electric water heating in **2050**

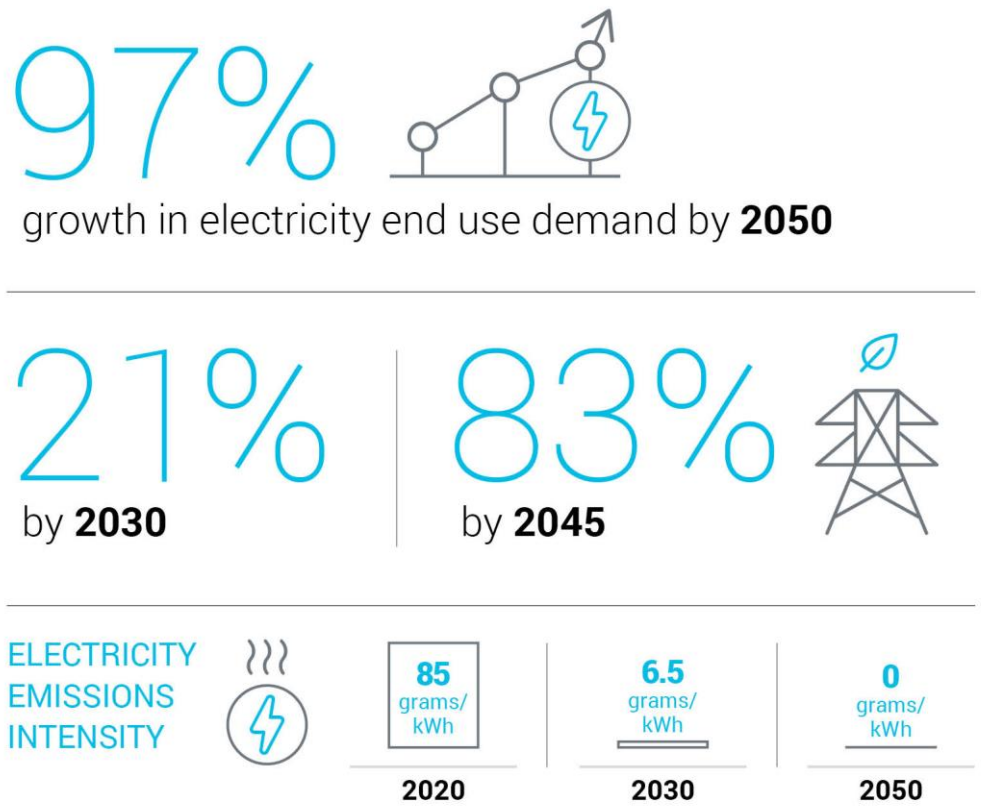
64%

electric space heating in **2030**

82%

electric space heating in **2050**

Decarbonizing the Electricity Sector



- Doubling of 2020 end use electricity load by 2050, plus additional flexible load from electrolysis and boilers
  - ✓ Growth in electricity sector displaces fuels by 2050
- Larger integrated electricity system in West
  - ✓ Regional coordination key to decarbonization
- All coal-fired electricity from state portfolios eliminated by 2025
  - ✓ Carbon-neutral electricity by 2030
- Gas capacity added for reliability
  - ✓ Used only for rate reliability events

Generation and Load in Washington

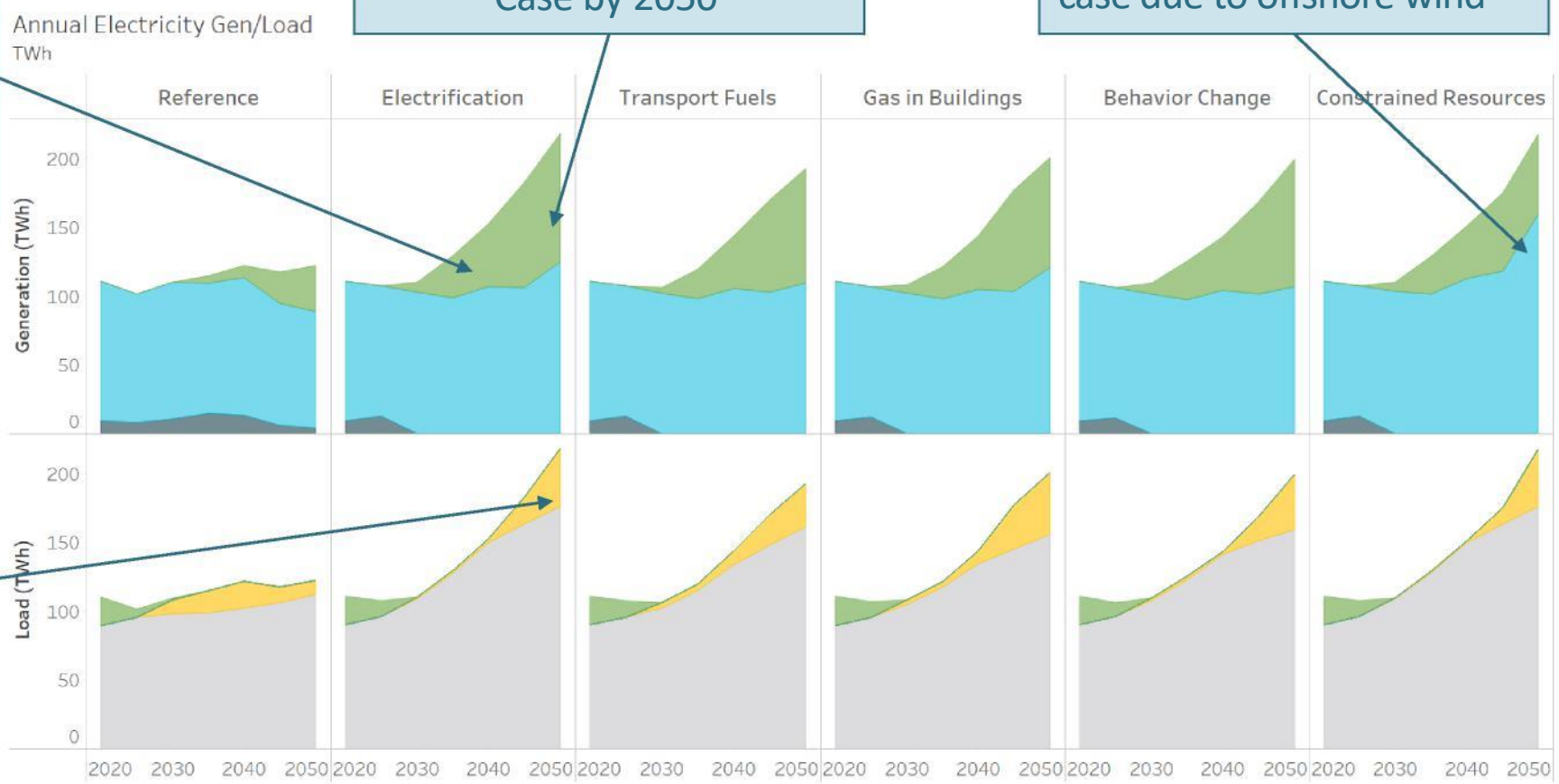
Increases in imports provide clean energy for expanding electricity sector

Growing reliance on clean imports to meet load growth, CETA, and emissions goals

Imports provide 43% of electricity in Electrification Case by 2050

Growth in clean electricity in Constrained Resources case due to offshore wind

Doubling of 2020 load by 2050, including new flexible loads (electrolysis, boilers)



- Net Imports
- Clean Electricity
- Thermal

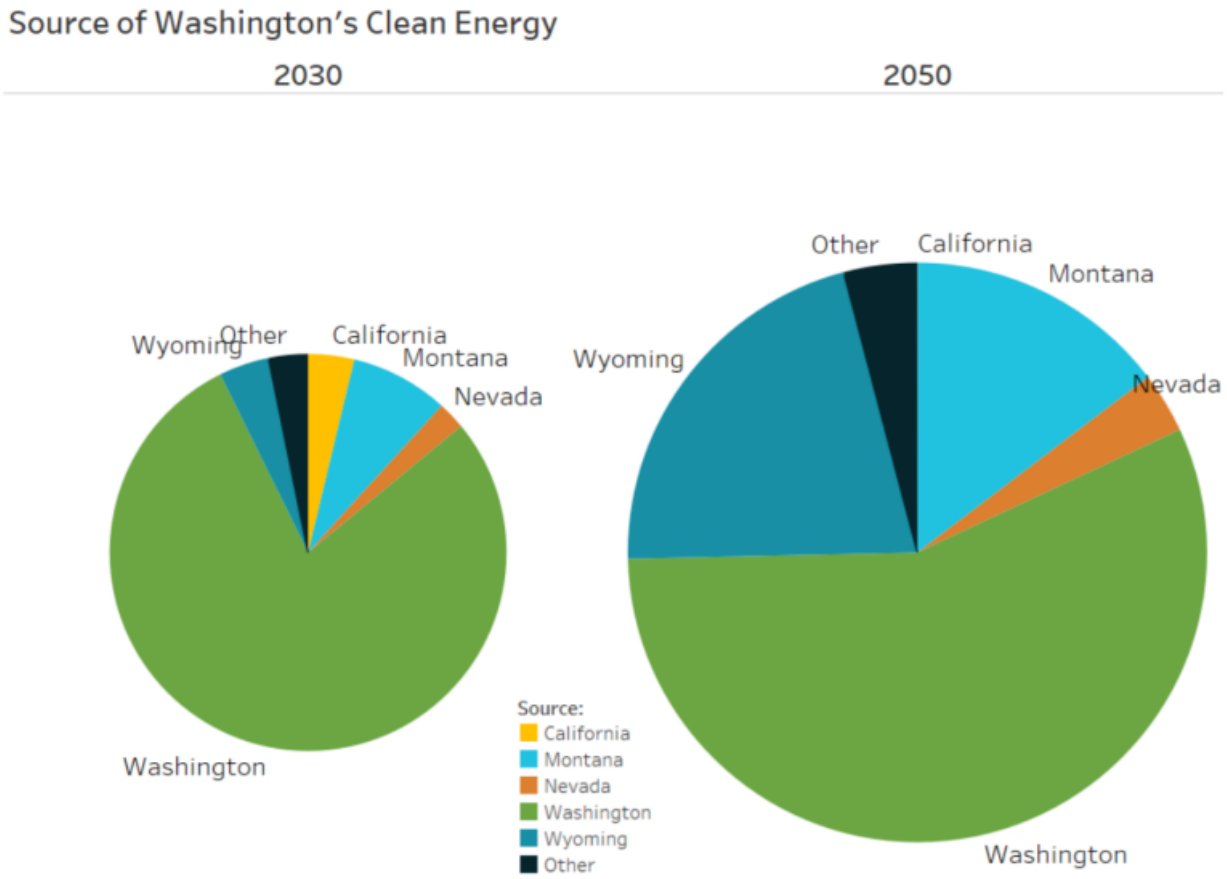
- Flex Industrial Load
- Net Exports
- Bulk Load

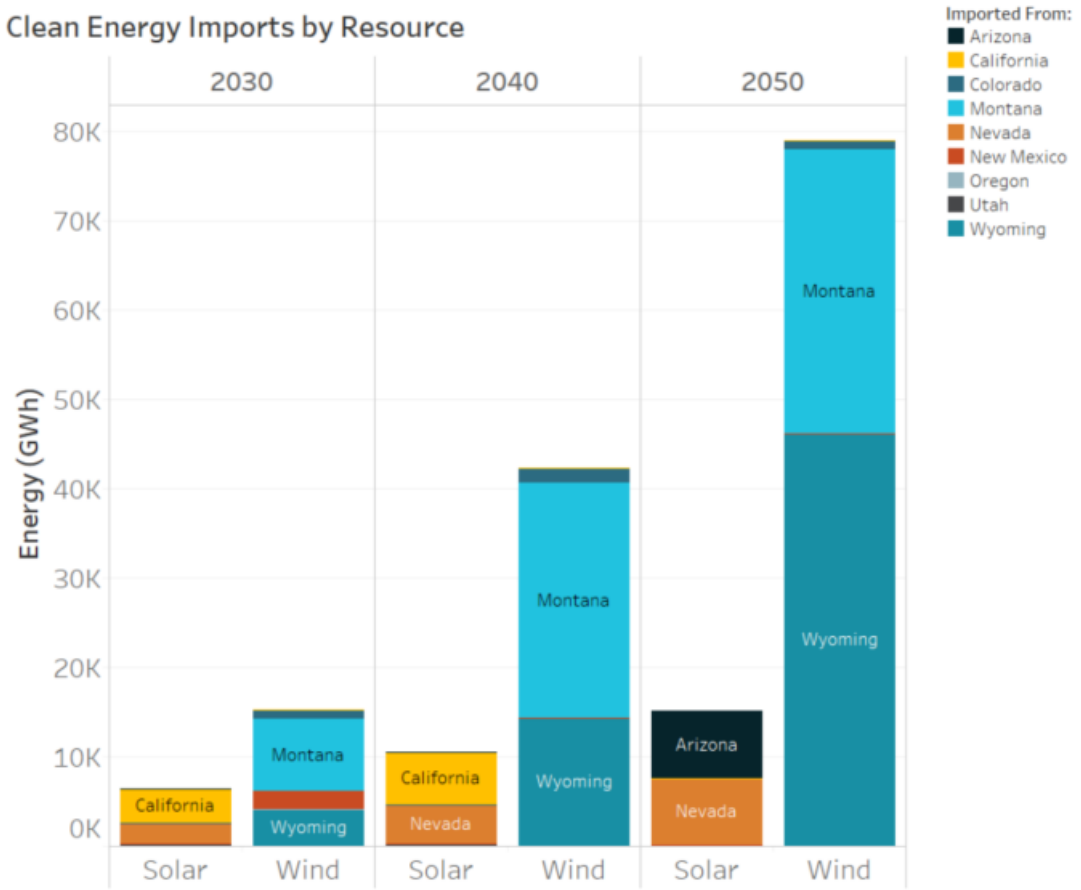
Gas exports not prohibited under CETA but model assumes emissions count towards state inventory in decarbonization cases

Where do Imports Come from?

Clean electricity imports from Electrification Case

High quality wind resources from Wyoming and Montana account for 36% of WA clean electricity in 2050

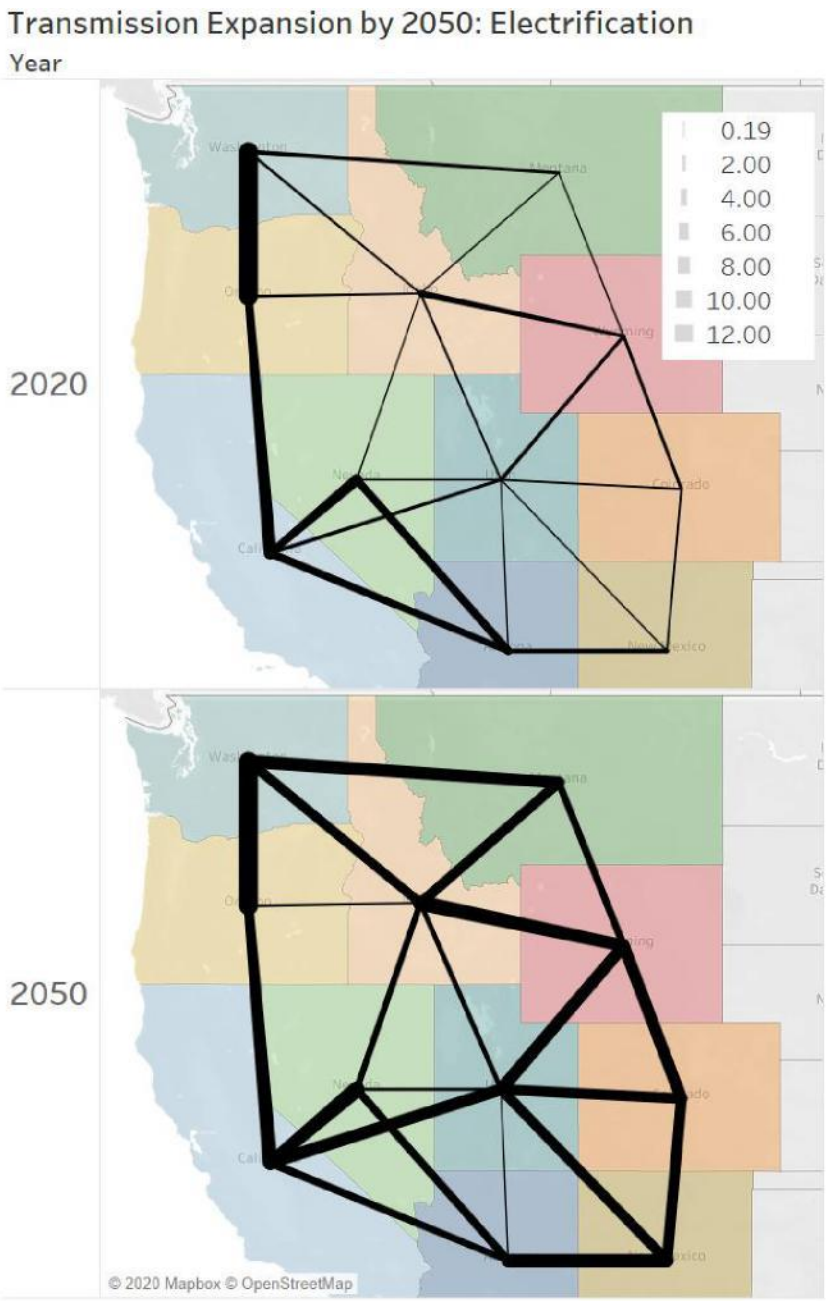




Expanding Transmission Facilitates Imports

Increased transmission capacity required to import so much energy

- Expansion of up to 6 additional GWs of TX between states permitted in the model
  - MT->WA: Maximum 6 GW added by 2050
  - ID->WA: 5 GW added by 2050
- Western states become far more interconnected, taking advantage of least cost clean energy resources
- Additional solar and offshore wind built if unable to expand interties



Implications for siting work

- Substantial increase in supply of clean resources
- Transmission system upgrades are high priority
- Ability to substitute between generation and transmission
- Ability to substitute within generating resource options

Thank you!

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Washington State Department of Commerce

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