Accelerating Equitable Decarbonization in the Northwest

K & L Gates Environmental Law Practice Group

- Eileen V. Quigley—June 15, 2022

Agenda

- Clean Energy Transition Institute
- Decarbonization Pathways Studies
- Questions and Answers

Clean Energy Transition Institute

- **What We Are:** Independent, nonpartisan Northwest research and analysis nonprofit organization
- **Our Vision:** Accelerate the transition to a clean energy economy in the Northwest
- **Our Role**:
  - Provide unbiased research and analytics
  - Offer an information clearinghouse for policymakers
  - Convene diverse stakeholders

Northwest Deep Decarbonization Pathways Study—June 2019

Why a Northwest Deep Decarbonization Study?

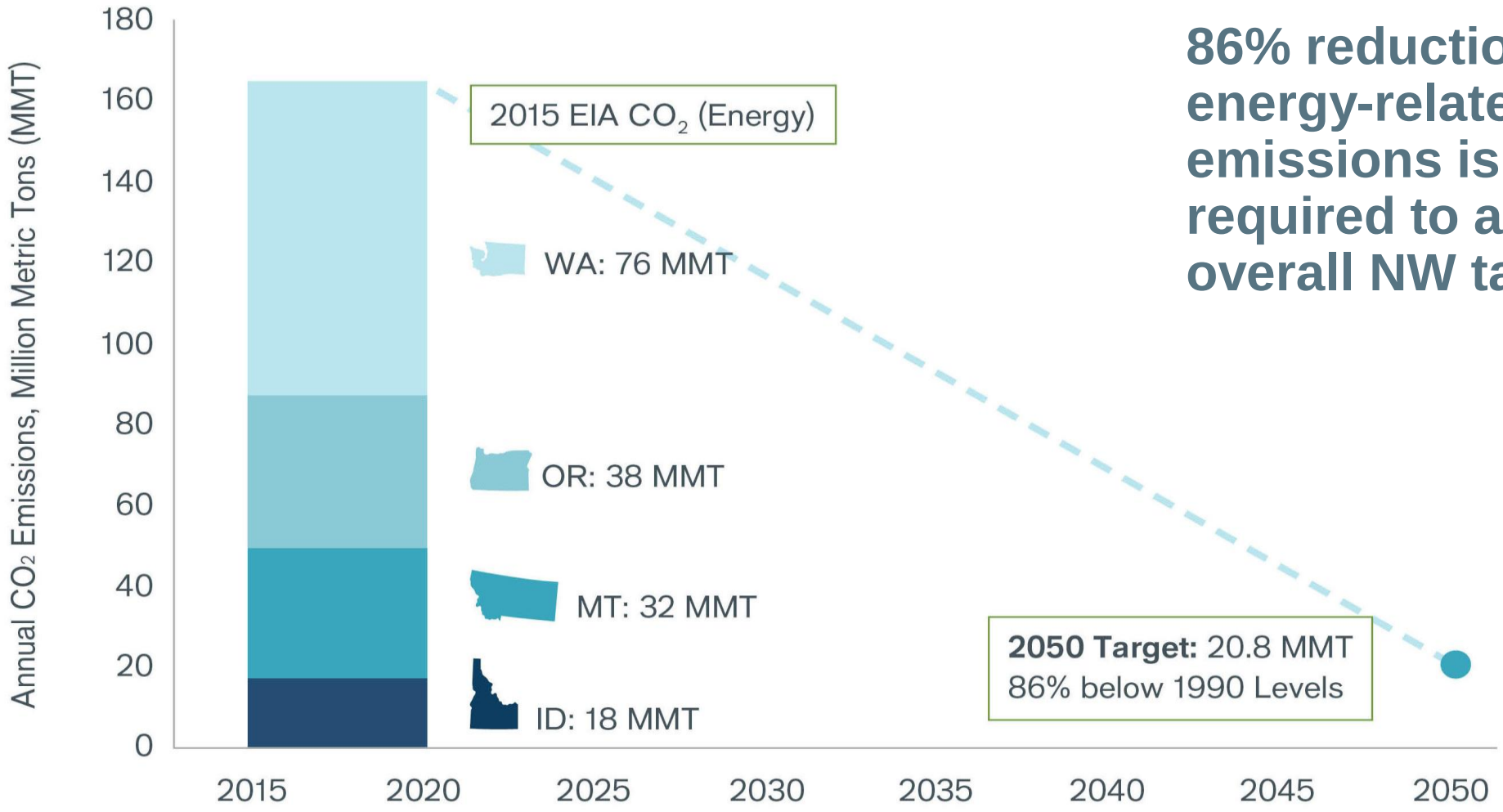
Common set of assumptions to inform decisions about how the clean energy transition could unfold over the coming decades

- Unbiased, analytical baseline for the region
- Variety of pathways to lower carbon emissions
- Surface trade-offs, challenges, and practical implications of achieving mid-century targets
- Broaden conversations about actions needed

Comparison to Prior Decarbonization Studies

			WA	OR	ID	MT
2016	State of Washington Office of the Governor	All sectors	●	○	○	○
2017	Public Generating Pool	Electricity sector only	●	●	◔	◔
2018	Portland General Electric	All sectors	○	◑	○	○
	Climate Solutions	Electricity sector only	●	●	◔	◔
	Northwest Natural Gas Company	All sectors; optimized decisions limited to electricity sector only	●	●	○	○
2019	Public Generating Pool	Electricity sector only; reliability study	●	●	●	●
	Clean Energy Transition Institute	All sectors; optimized decisions across entire energy supply side	●	●	●	●

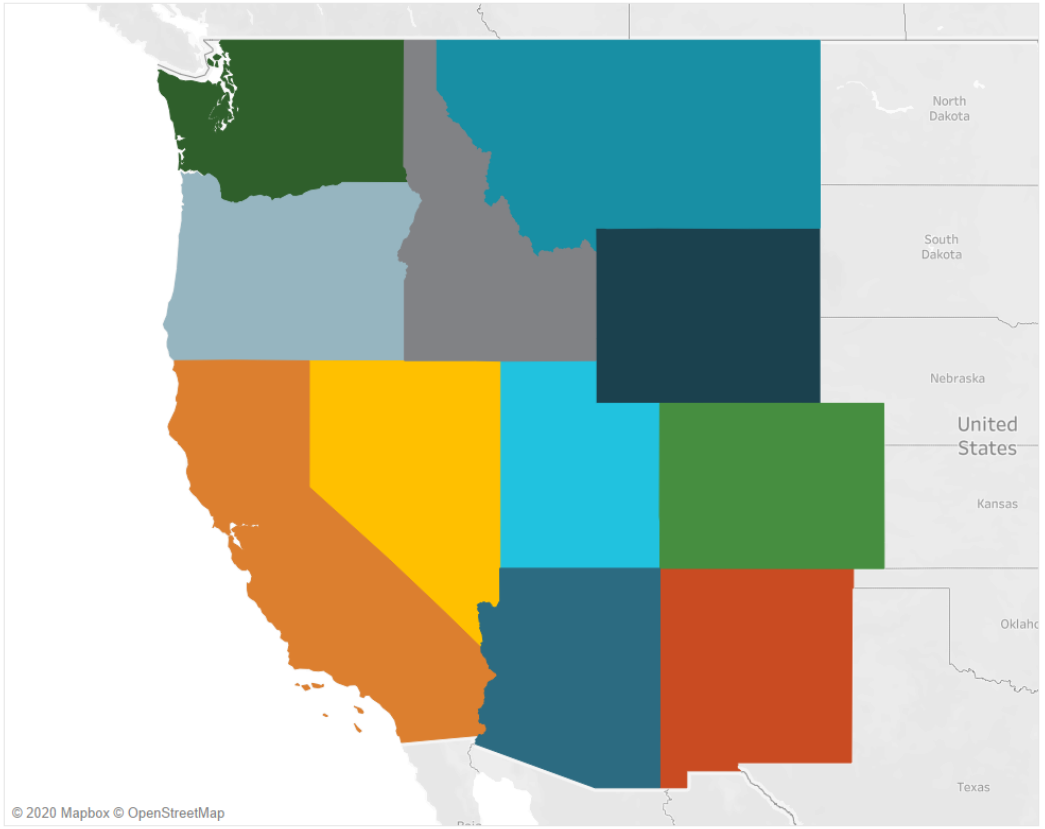
Northwest Deep Decarbonization Target



86% reduction in energy-related CO_2 emissions is required to achieve overall NW target.

Northwest in the Context of a Western Grid

- Holistic Approach
  - Integrated across geographies and economic sectors
- Regional Representation
  - Other state's actions impact the availability and cost of solutions
  - 11 Western states
- Remainder of the U.S. also modeled



What Did We Want to Know?

- How do we get to a 100% Clean Grid quickly?
- How do we avoid outages with intermittent supply and changing demand?
- How much and how fast can we electrify?
- How do we manage the cost impacts, overall and for different customers?
- What business and regulatory models and markets are needed?

What Did We Learn?

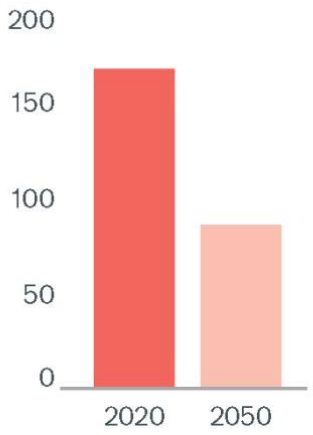
- ~96% clean Electricity
- Clean electricity + highly efficient buildings
- Clean electric vehicles where possible
- Some, but not much, fossil fuel (natural gas) important for reliability and transition
- Improved regional transmission and integration
- Biomass should be used to replace jet & diesel fuel
- Fuels made from electricity will play important role

Pillars of Deep Decarbonization

1 Energy Efficiency

Reducing energy consumed to provide energy services

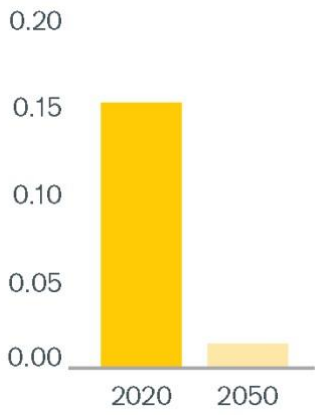
Energy Consumption Per Person (MMBtu)



2 Clean Electricity

Reducing the emissions intensity of electricity generation

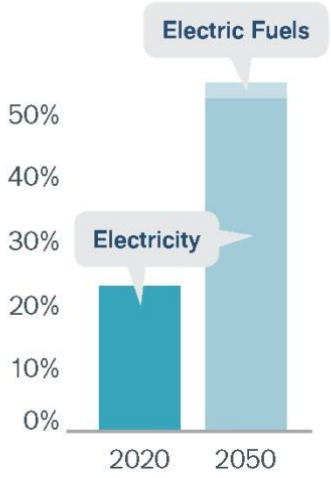
Electricity Carbon Intensity (tonnes CO_2 per MWh)



3 Electrification

Switching end uses from fuel to electricity

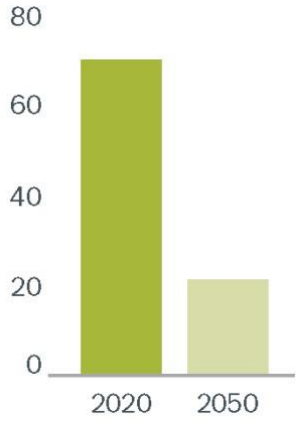
Electricity Share of Total Energy (percentage)



4 Low-Carbon Fuels

Reducing the emissions intensity of liquid and gaseous fuels

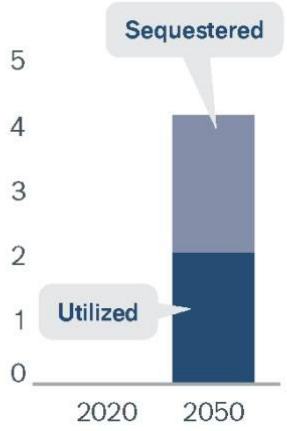
Fuels Carbon Intensity (kg CO_2 per MMBtu)



5 Carbon Capture

Capturing CO_2 from a facility or removing CO_2 from the atmosphere

Carbon Capture (Megatonnes CO_2)



Key Issues and Challenges the NWDDP Highlighted

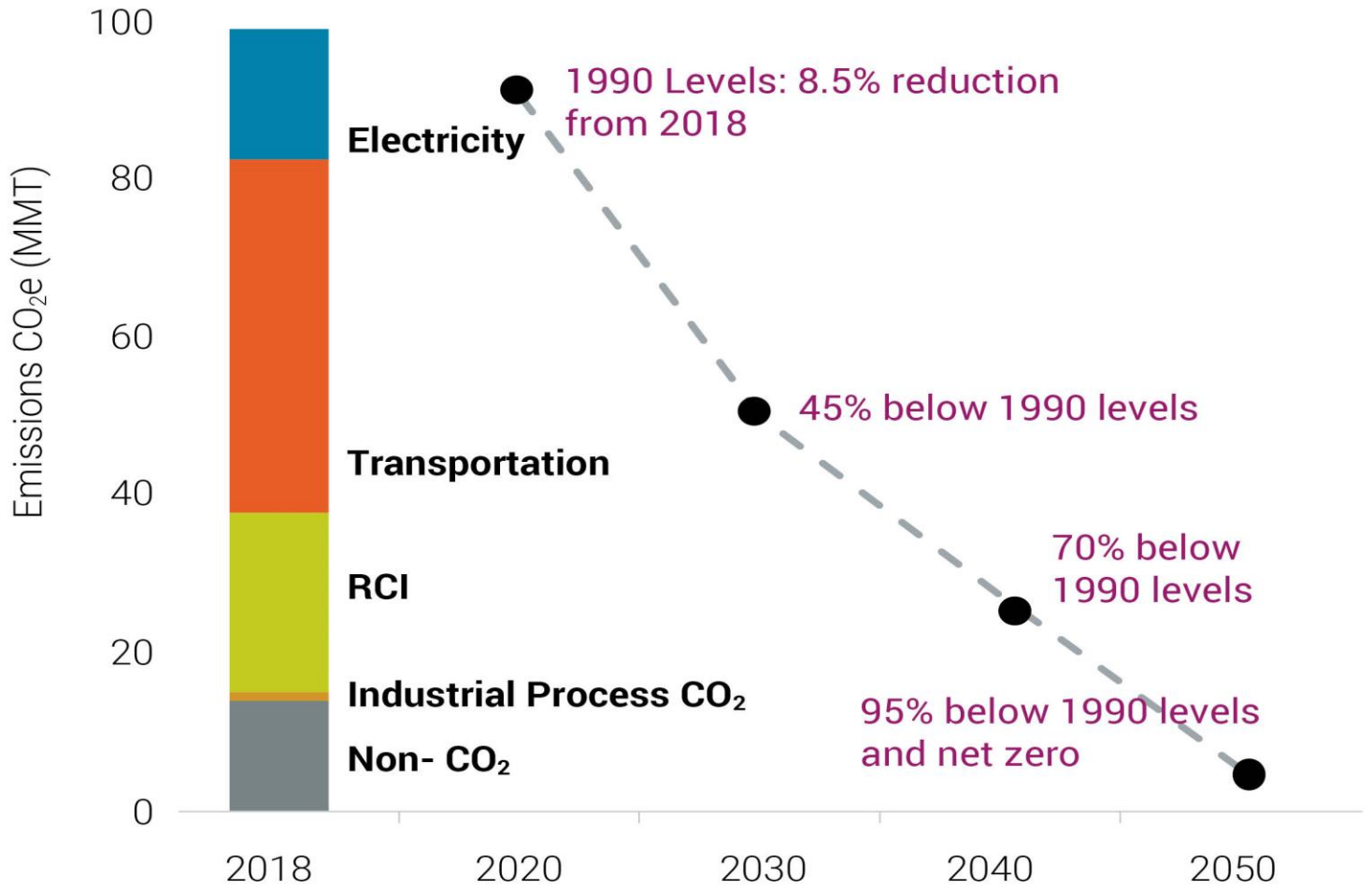
- **100% Clean Grid**: How to deploy required renewables, transmission, storage, gas?
- **Reliability, Capacity & Resource Adequacy**: How to avoid outages with intermittent supply and variable demand?
- **Electrification**: How much, how fast? What happens to demand and how to manage it?
- **Affordability**: How to manage the cost impacts, overall and for different customer groups?
- **Business/Regulatory Models/Markets**: What is needed for the transition?

Equity and Workforce Implications

- Regional equity (rural vs. urban)
- Addressing existing environmental/racial justice inequities
- Who makes the decisions about cost distribution and who benefits?
- What jobs are gained, and which are lost?
- How are people compensated for loss?

Washington State Energy Strategy—December 2020

Transforming Washington's Energy System

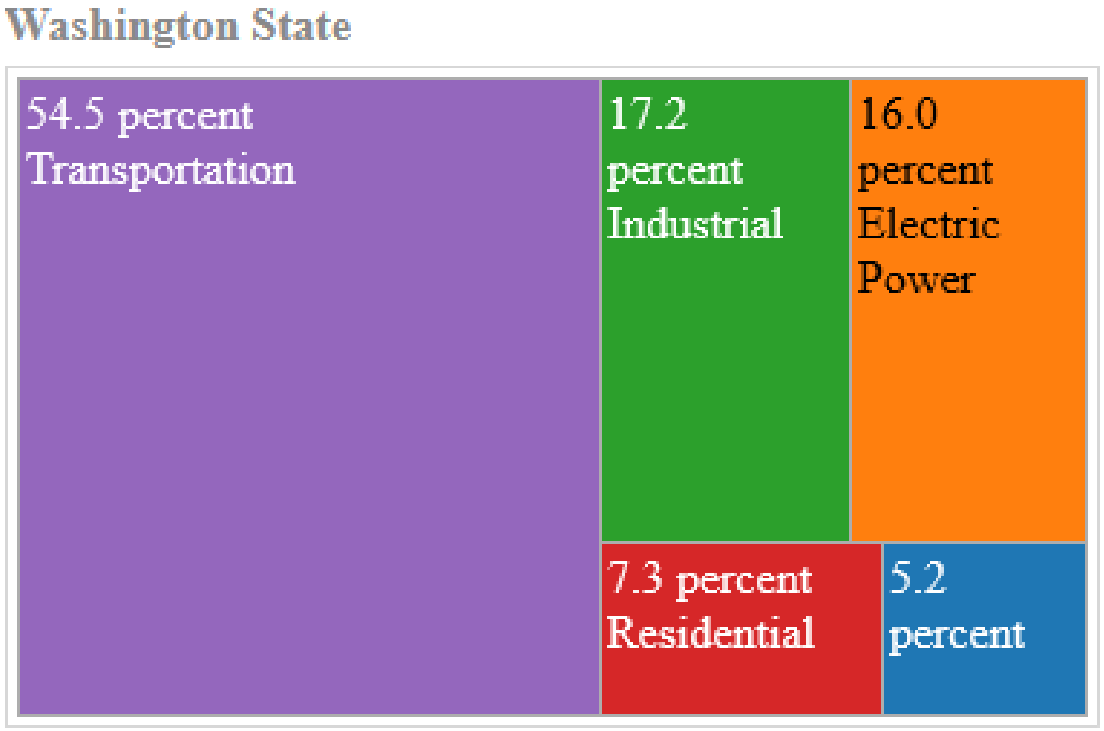


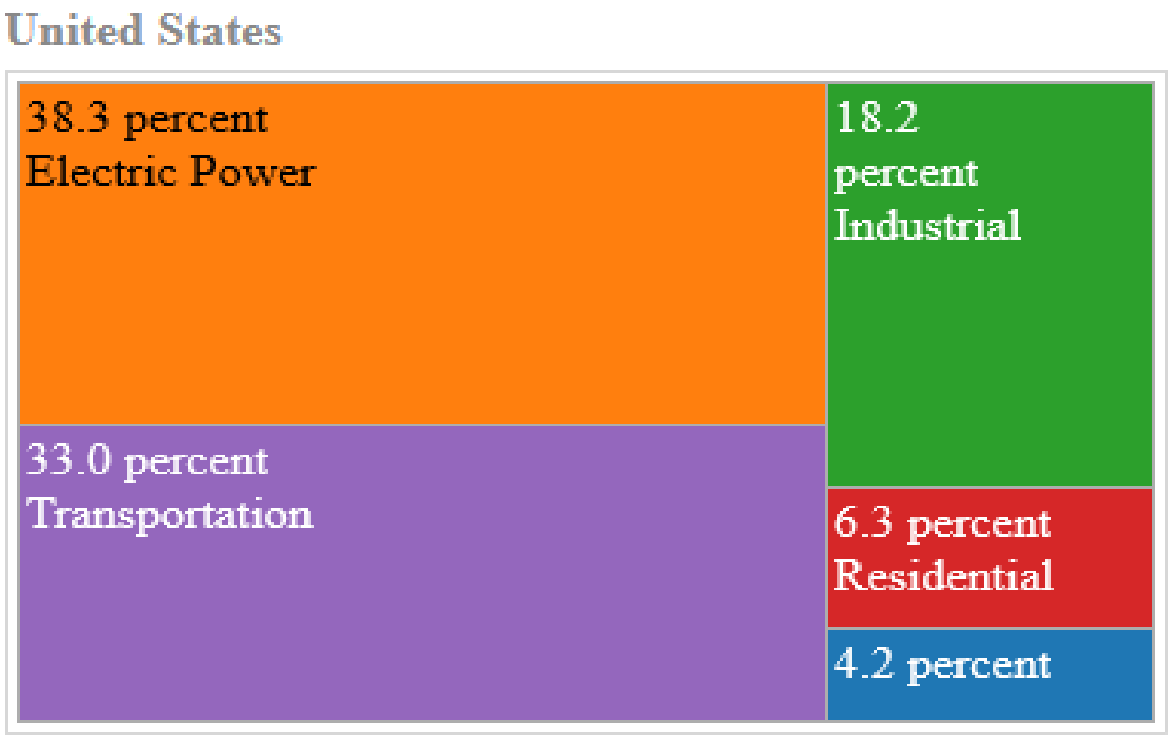
Source: Washington State Department of Ecology and Washington State.
Appendix A –Deep Decarbonization Pathways Modeling Technical Report, December 11, 2020 (p. 15).

Washington State's 2030 Challenge:

- ***53% Reduction in Emissions in less than a decade***

Washington's Very Clean Electric Grid





What Did We Want to Know?

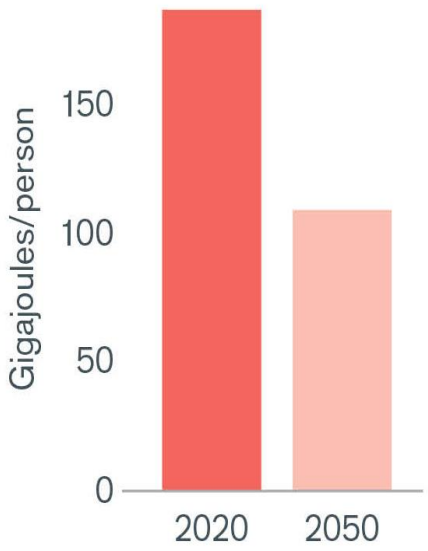
- **What is the impact of rapid and aggressive electrification** of energy systems?
- **What if we don't** electrify transportation as quickly as required?
- **What happens if we retain gas** instead of electrifying buildings?
- **What if transmission expansion is limited** due to siting or permitting?
- **What if policies or behavior change** (i.e., more telecommuting after Covid) lower demand?

What Did We Learn?

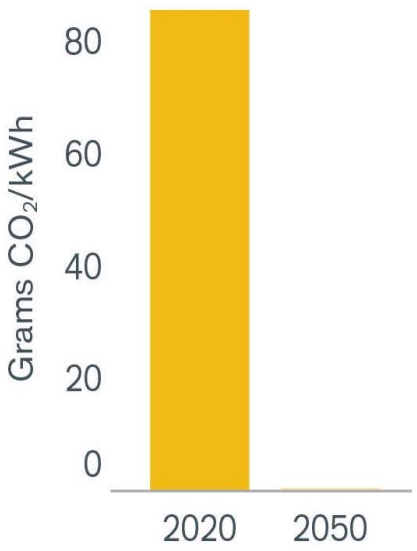
- **To Meet the State's 2030 GHG Targets**
  - Deep energy efficiency to reduce energy use
  - Clean electricity grid by 2030
  - Electrifying as many energy end uses as practical
  - Accelerating clean fuels industry critical
  - Regional approach required

Washington Deep Decarbonization Pathways

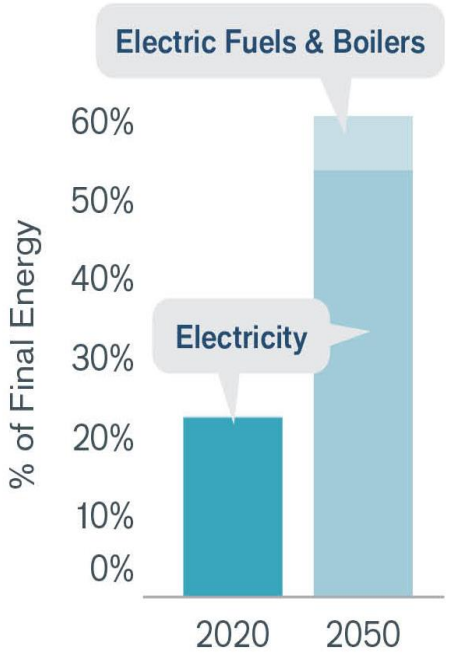
Energy Efficiency
Energy Consumption
(Gigajoules/person)



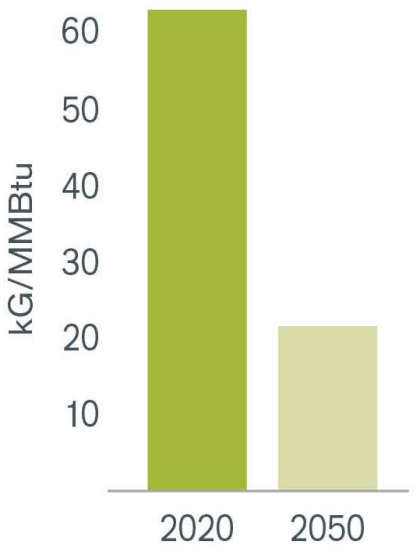
Clean Electricity
Electricity Carbon Intensity
(Grams CO_2 per kWh)



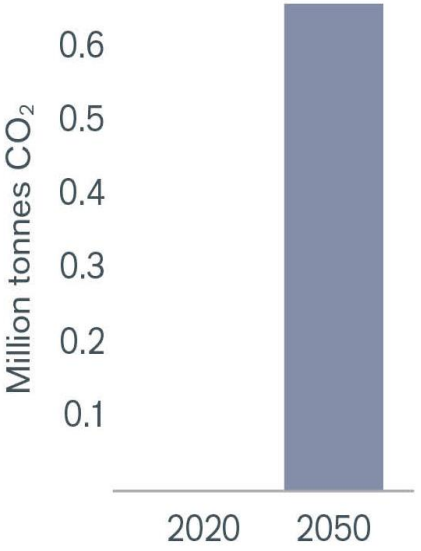
Electrification
Electricity Share of Total Energy
(% of Final Energy)



Clean Fuels
Fuels Carbon Intensity
(kG/MMBtu)



Carbon Sequestration
(Million tonnes CO_2)



Common Findings

Common Findings across Decarbonization Scenarios

- Greater regional coordination required to facilitate clean energy transfers across the West
- Strengthened/expanded Western grid needed to take advantage of resource and geographic diversity
- Large build of solar in the Southwest and wind in the inland states (MT, WY)
- A large clean fuels industry developed based on biofuels and hydrogen from electrolysis
- Electrification of buildings and transportation

Many Issues to Explore—All with Equity Lens

- Distributed energy resources (equity; transmission & renewables siting issues)
- Barriers to electrifying transport
- Removing pipeline gas (grid & buildings)
- Liquid fuels (use of biomass/biofuels)
- Electricity load (resource adequacy & reliability)
- Economic impacts (jobs & cost distribution)
- Clean energy industrial policy

CETI 2022 Programs

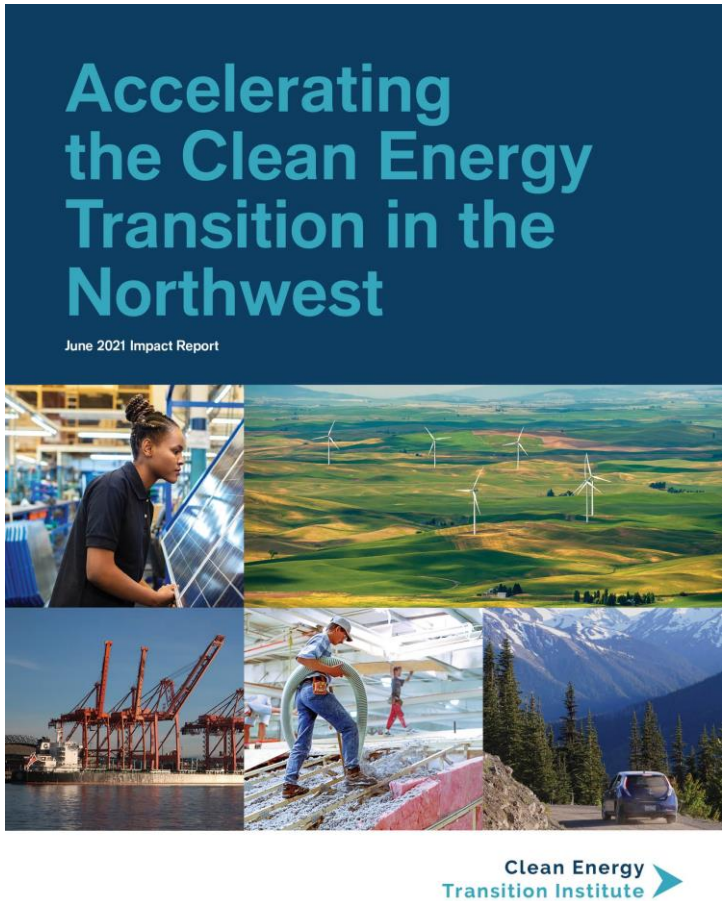
Current Institute Programs

- **Operation 2030**
  - Scaling building decarbonization in Washington state
- **Northwest Clean Energy Atlas**
  - Interactive dashboard of decarbonization visualizations in the Northwest
- **Clean Materials Manufacturing**
  - Analysis (May); Summit (June)
- **Clean Energy and Northwest Rural Communities**
  - Rural community-defined decarbonization
  - Claiming Power: video stories of rural clean energy
- **Net-Zero Northwest**
  - Decarbonization pathways to 2030 + jobs analysis

Clean Energy Transition Impact 2018-2021

- **Download** our Case Statement

- **Download** our Impact Report



Thank you very much

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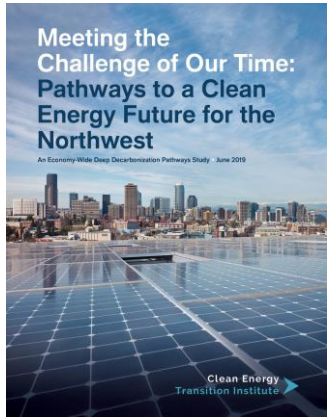
Questions & Answers

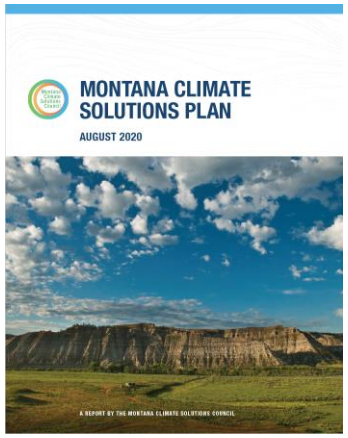
Research and Analytics to Support Policymakers

2019



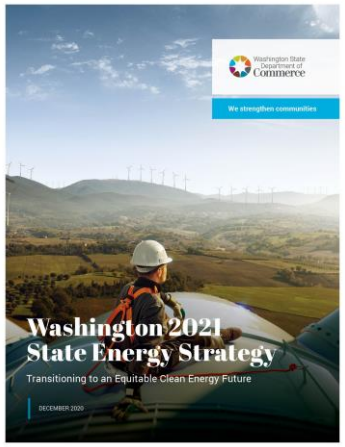
- First economy-wide deep decarbonization study mapped to the Northwest's economic & institutional realities
- First regional de-carbonization study in nation

2020



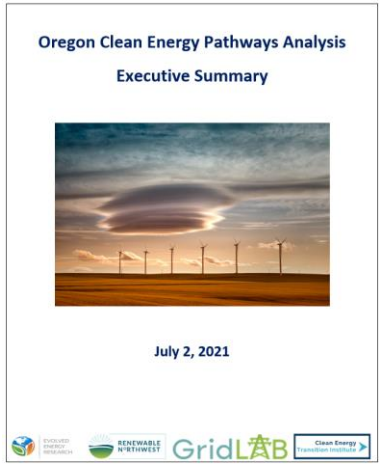
- Provided technical analysis for a chapter in the Montana Climate Solutions Council Plan
- Presented to Montana stakeholders in 2019, 2020, & 2021

2021



- Provided technical and economic analysis for the 2021 Washington State Energy Strategy
- Roadmap to get WA on the path to net zero over next decade

2021



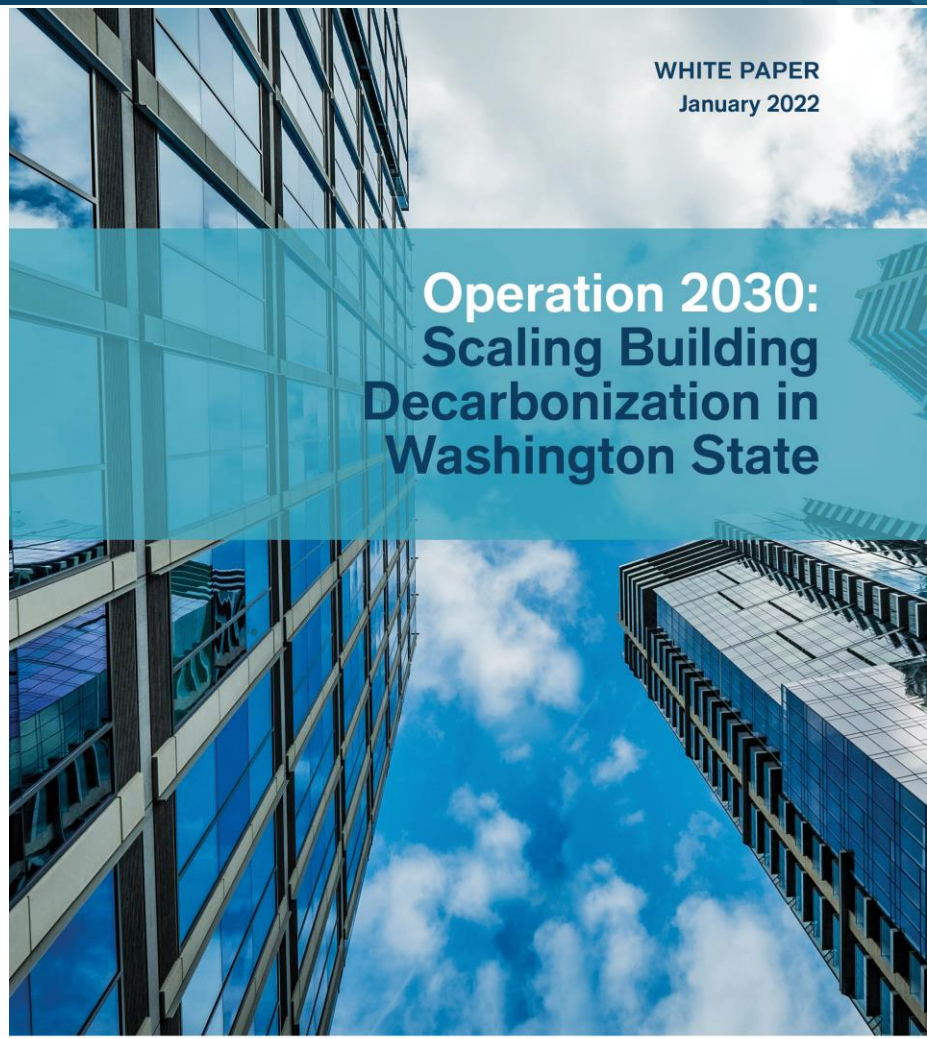
- Examined technical and economic implications of accelerating decarbonization in OR
- Results informed 2021 OR clean energy standard bill

2022

- Charts the targets and requirements for how Washington can scale building decarbonization by 2030
- Released January 5, 2022

Operation 2030 Project

- Independent analysis of data from the Washington 2021 State Energy Strategy deep decarbonization modeling
- Focuses on multi-level ramp up required to take building decarbonization to scale by 2030
- White paper
- Forums



Clean Materials Manufacturing

- Analysis of six key manufacturing sectors in Washington state
  - Emissions profiles
  - Decarbonization pathways
  - Workforce
- In advance of June 23 & June 28 Summit

Pulp and Paper

Wood Products

Concrete and Cement

Glass

Aluminum

Iron and Steel

Northwest Clean Energy Atlas

The Northwest Clean Energy Atlas provides regional stakeholders interactive tools to explore energy data relevant to deep decarbonization in Idaho, Montana, Oregon, and Washington.

Clean Energy Transition Institute References

- Meeting the Challenge of Our Time: Pathways to a Low-Carbon Future for the Northwest (NWDDP Analysis)—June 2019
- Montana Governor's Climate Solutions Council—September 2020
- Washington 2021 State Energy Strategy; Chapter B from the WA SES; Deep Decarbonization Modeling Final Report—January 2021
- Oregon Clean Energy Pathways Analysis—July 2021
- Washington State Industrial Emissions Analysis—July 2021
- Operation 2030: Scaling Building Decarbonization in Washington State—January 2022
- Northwest Clean Energy Atlas—May 2022
- Washington State Clean Industrial Economy Summit—June 2022
- Rural Community-Defined Decarbonization—Launching summer of 2022
- Claiming Power: Stories of Rural Communities and Clean Energy—Launching summer of 2022