# Building the Fossil Free Grid: Sustainable Fuels

***Moderator:*** *Erin Childs, Executive Director, Renewable Hydrogen Alliance*

***Speakers:***
*Christopher Efird, Chief Executive Officer, NXTClean Fuels*
*Mary Moerlins, Director of Environmental Policy & Corporate Responsibility, Northwest Natural*
*Steve Schueneman, Manager of Emerging Technology and Sustainability, Puget Sound Energy*

RHA
RENEWABLE HYDROGEN ALLIANCE

Dec 2025

# About Renewable Hydrogen Alliance (RHA)

- Non-profit trade association enabling access to renewable hydrogen across the Pacific Northwest.
- Over 80 members representing full hydrogen value chain & impacted communities
- Advocate for laws, regulations, and funding to accelerate hydrogen use & production
- Educate community & partners on issues related to hydrogen and specific to the NW region
- Enabling commercial development activities with members and industry partners

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# What is hydrogen?

Odorless, colorless, tasteless, non-toxic, non-poisonous gas with applications across the economy

- Used as a clean fuel or industrial input
- Commercially traded for decades
- Made with renewables or fossil fuels

Renewable hydrogen is produced from renewable energy and feedstocks

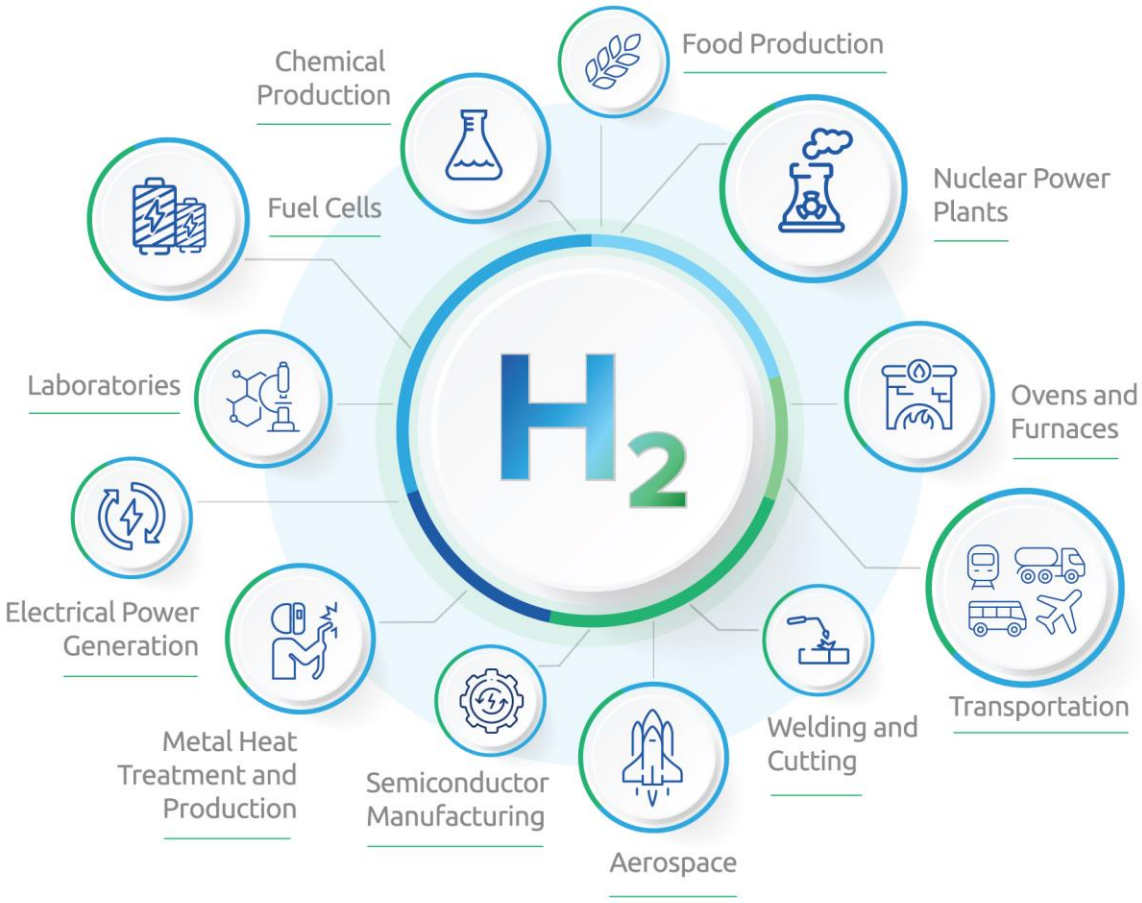


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*Image courtesy of the Safe Hydrogen Project*

# Broad use cases support infrastructure scaling

- Medium & heavy-duty trucks
- Long-route buses
- Light and medium-duty vehicles
- Forklifts, tractors, and other off-road vehicles
- Planes, trains, watercraft

## Transportation

- High-heat processes (glass, steel, concrete)
- Chemical processes (refining, fertilizer, semiconductors)
- Derivative fuels (SAF, methanol, ammonia)

## Industrial

- Seasonal storage of renewable energy
- Peak demand management through generation and flexible load
- Microgrids & backup power
- Local energy production

## Energy Resilience

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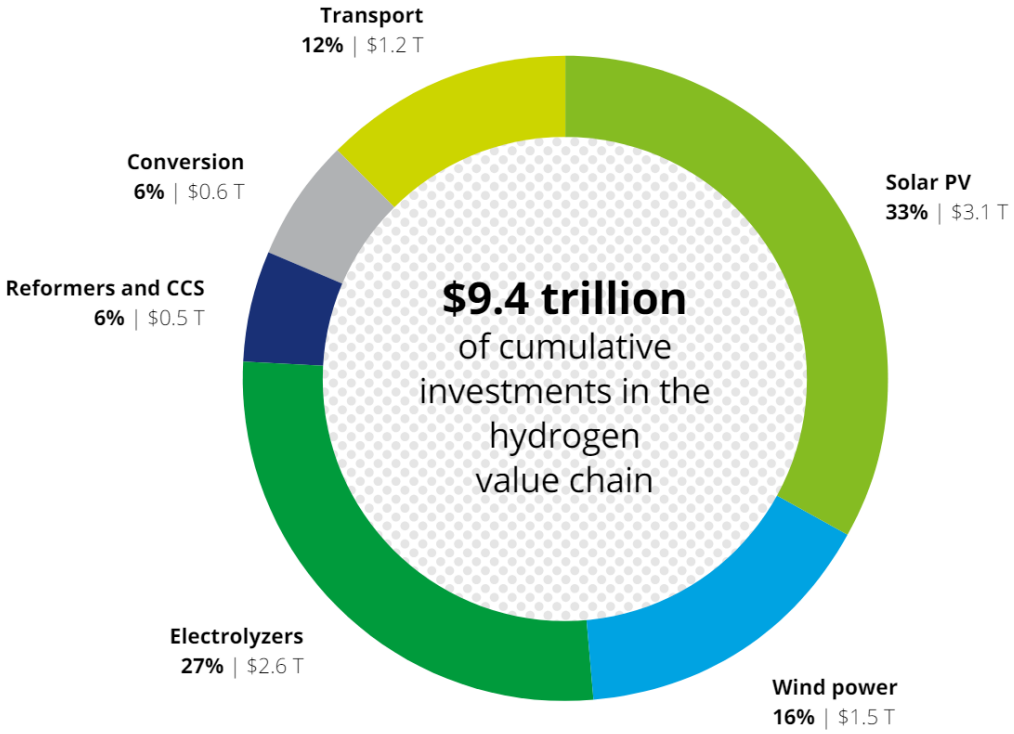
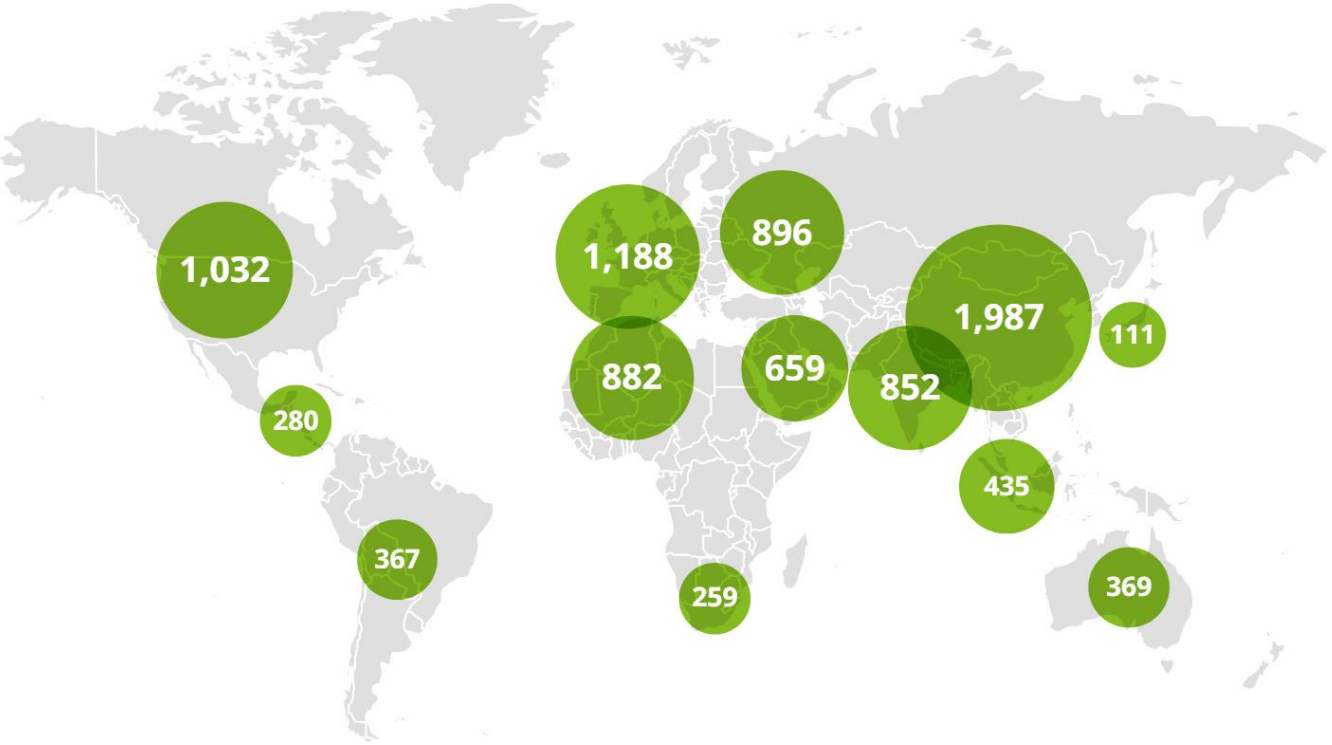
# Hydrogen is a rapidly growing global industry

## Global Investments (2050)




## Investments by Region (2050, $US billion)

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Deloitte Green Hydrogen Report

# Industry adapting to 2025 opportunities

## Federal Turbulence

- Shifting positions on climate priorities and community engagement impacting project development
- Alternative fuels remain compelling opportunity for energy abundance
- Hydrogen industry vulnerable to tariffs due to global supply chain

## Infrastructure Limits

- Electric sector bottlenecks encouraging distributed and behind-the-meter electrolytic projects
- Pathways for organic, waste and other non-electrolytic H2 will add to local supply

## H2 Regulation

- Updates to Oregon climate and clean fuels policy can support clean hydrogen
- Implementation of H2 fueling regulation needed for vehicle adoption
- West coast policy consistency will help scale H2 market

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# Industry Priorities in 2026

**Hydrogen Fueling (HyFI):** Accelerate H2 transportation sector via fueling access

**Fuel Supply:** Increase local production of H2 and associated clean fuels

**Project Development: S**upport timely permitting and construction for tax credits

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NXT Clean Fuels is developing a large-scale Renewable Diesel and SAF Production facility focused on the Cascadia region. This facility is permitted to produce up to 600 MM gallons of ultra-low carbon intensity transportation fuel annually.

- Regional Population: **21 million**
- Regional GDP: **$ 1.7 trillion**
- Annual Diesel Usage: **3.5 billion gal**
- Annual JetA Usage: **1.7 billion gal**
- Major Metro Areas: **10**
- Major Producer of Renewable Power
- Large Producer of Clean Fuel Feedstocks
- Aggressive Decarbonization Policy Environment

**NXTClean Fuels Columbia River Hub**

- Port Westward, Oregon
- 625 Acres @ Columbia River Mile 53
- 360 MM gallons SAF / 180 MM gallons RD Annually
- 315K Kg of 0.0 CI $H_2$ per Day
- Approx. $ 3 billion CapEx
- Economic Impact: $ 3.5 billion / yr
- Employment: > 300

## *Port Westward Clean Fuels Complex*

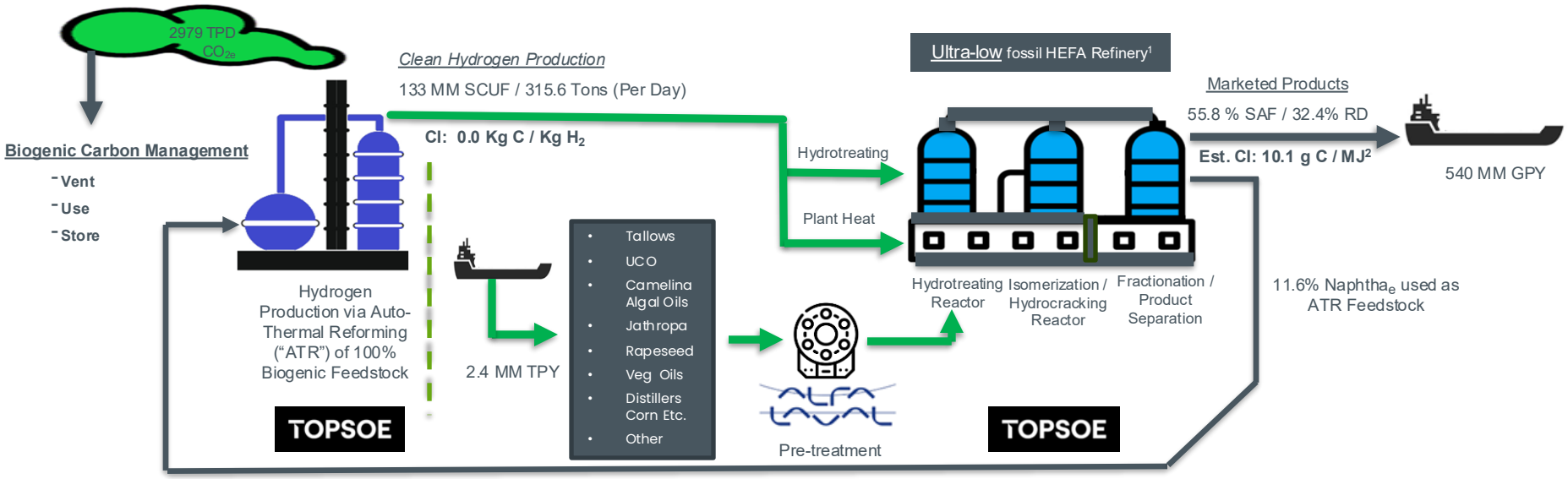
NXTCLEAN FUELS

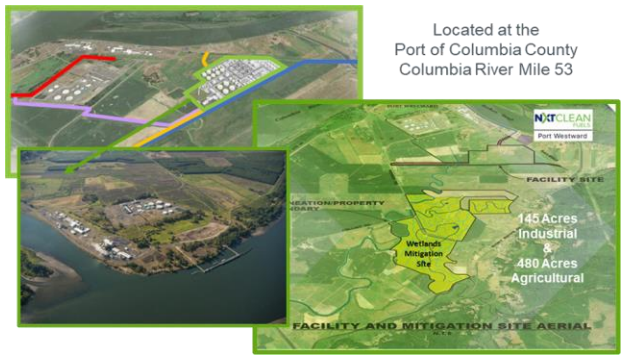
# FACILITY LAYOUT & RECYCLE DESIGN

NXTCLEAN FUELS

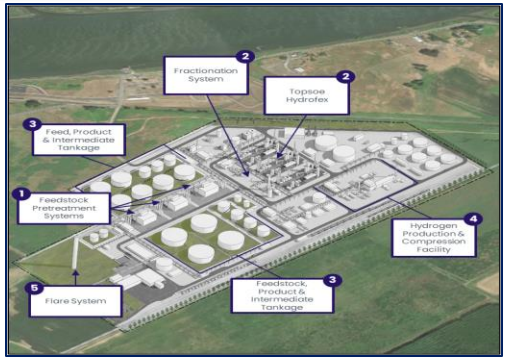
Port Westward, OR
Clean Fuels Complex

Columbia River Mile 53

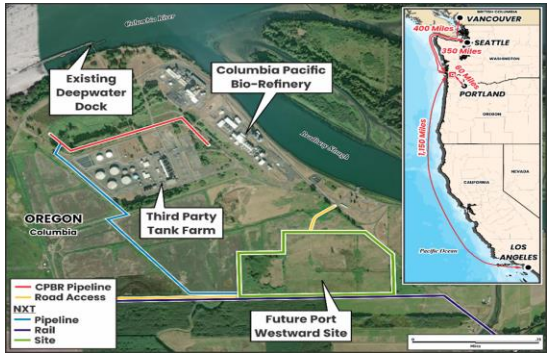



HIGH LEVEL PORT WESTWARD OVERVIEW




FACILLITY LAYOUT




PORT WESTWARD AREA PLAN

[1] Methane used for startup, then pilot lights only during normal operations

[2] Based on SAF Feedstock Mix and CORSIA Scoring Methodology

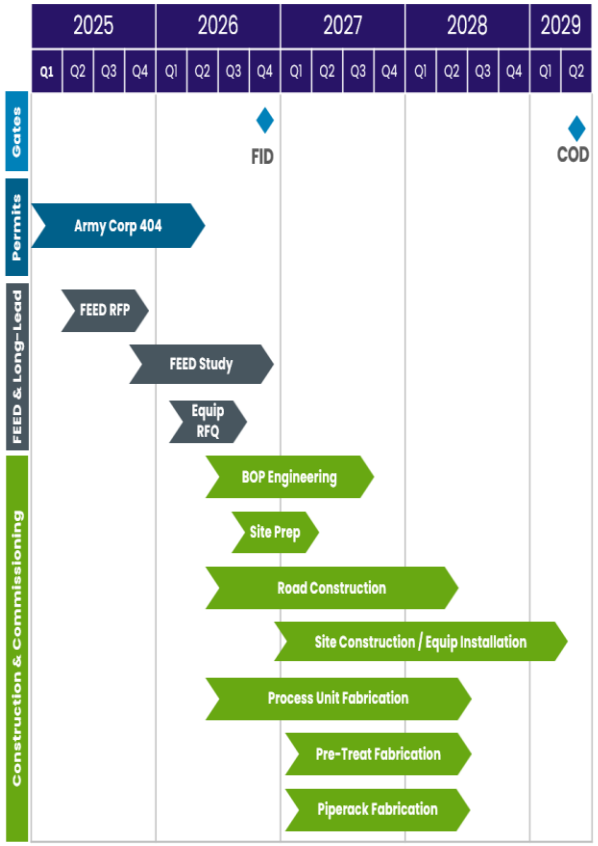
# Permits and Timeline

NXTCLEAN FUELS | Port Westward, OR
Clean Fuels Complex

All "at-risk" binary permits have been received, with remaining permits expected in 2026

| | | |
|---|---|---|
| Columbia County Oregon | ✓ Land Use Approval | GRANTED |
| | ✓ Conditional Use Permit | GRANTED |
| Oregon Department of Energy | ✓ Energy Facility Siting Council Exemption | GRANTED |
| DEQ State of Oregon Department of Environmental Quality | ✓ Air Contaminant Discharge Permit – Impacts to Air Quality | GRANTED |
| | ✓ 401 Water Quality Certification – Impact to Water Quality | GRANTED |
| US Army Corps of Engineers | ❑ 404 Clean Water Act Permit – Impact to Water Quality | Q2 2026 |

## Project Timeline




## NXT Path to FID

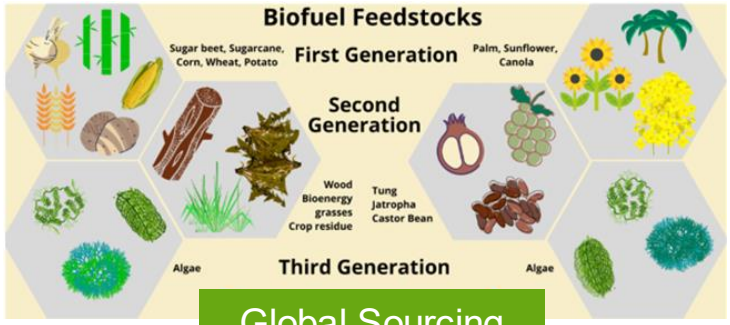
- ✓ Secured leased and owned land position for site
- ✓ Secured community engagement and advanced state and federal permitting
- ✓ Executed agreements with Port of Columbia County for use of infrastructure to support refinery operations
- ✓ Engaged subject matter experts and technology providers
- ✓ Project company subsidiary book value of >$35mm
- ✓ Completed process flow with Topsoe

**Pending:**

- Complete Federal EIS / 404 Clean Water Act permit
- Complete FEED study
- Secure project financing and off-take / supply agreements

# FEEDSTOCK & HUB PLAN

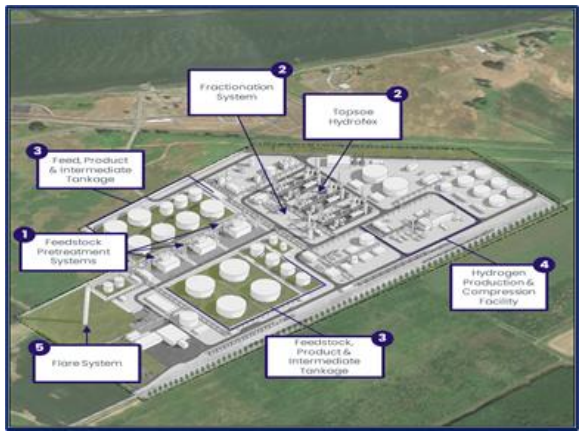
NXTCLEAN FUELS | Port Westward, OR Clean Fuels Complex




Global Sourcing

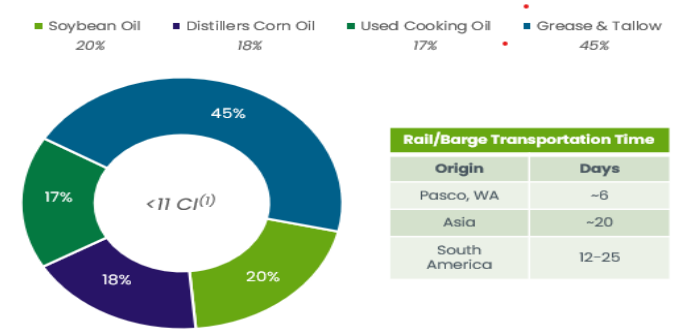
Direct NXT Use

NXTClean Fuels Production

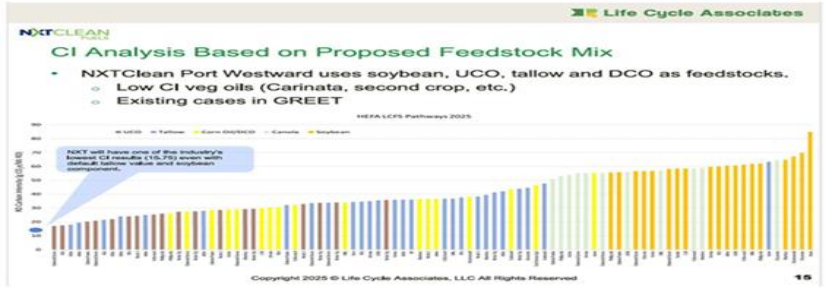



Regional Distribution

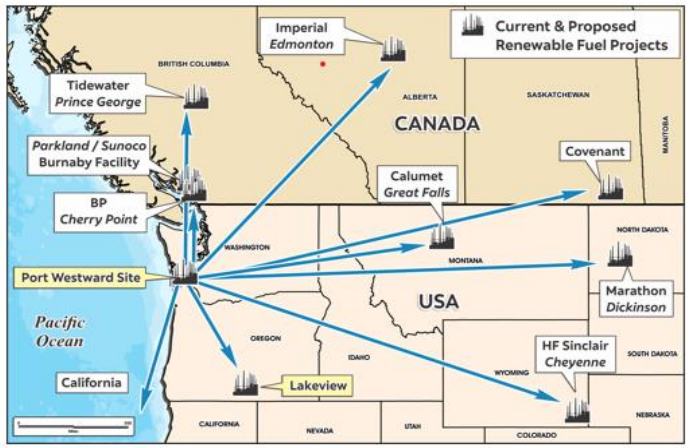
Feedstock Supply Mix & Transport Times




| Rail/Barge Transportation Time | |
|---|---|
| Origin | Days |
| Pasco, WA | ~6 |
| Asia | ~20 |
| South America | 12–25 |




Low Carbon Feedstock Hub



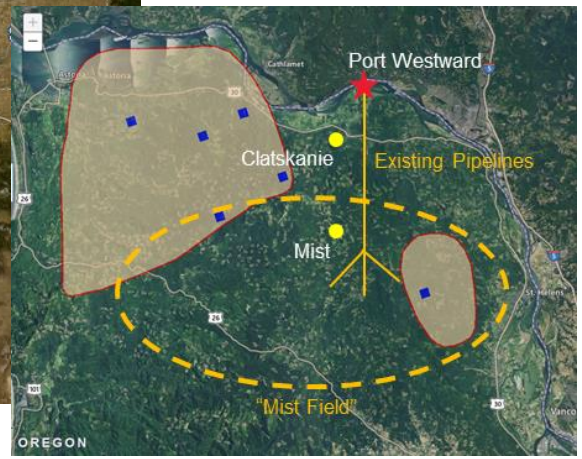
# Derivative Development – REGIONAL CCS HUB

## Regional $CO_2$ Sequestration Potential

http://energy.usgs.gov/co2public/

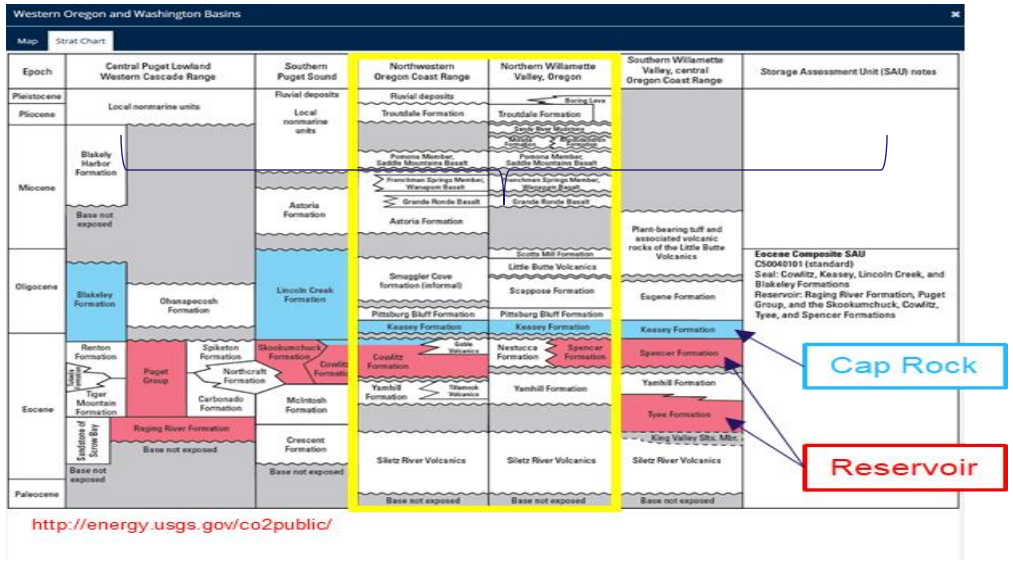
Western Oregon and Washington Basins

| Mean $CO_2$ storage resource | |
|---|---|
| Known recovery replacement | 0 megatons |
| Buoyant trapping | 8.2 megatons |
| Residual trapping class 1 | 1,700 megatons |
| Residual trapping class 2 | 12,000 megatons |
| Residual trapping class 3 | 14 megatons |
| Technically accessible | 14,000 megatons |



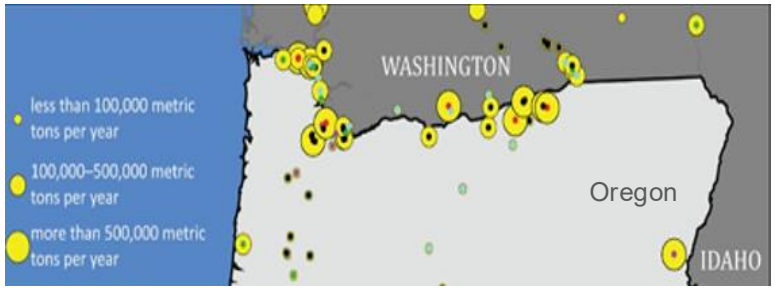

http://www.Oregon.gov/dogamu/geology/pages/carbon_seq.aspx

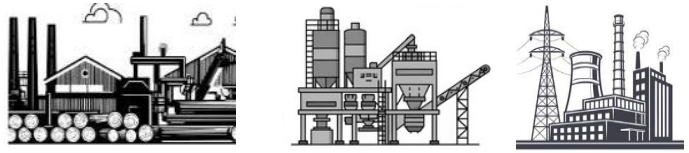
## Regional Stratigraphic Overview




http://energy.usgs.gov/co2public/

## $CO_2$ Sources – Columbia / Snake River Corridor > 12 MM tons / Year



Capture & Consolidation

Compression & Transport

Injection → Storage

45Q = $ 85 / Ton

CDR = $ 100-300 / Ton

# NW Natural & Clean Fuels

NW Natural®

# We Must Evolve Energy Sources

Instead of wires, NW Natural delivers energy through pipes.
What goes through them is the opportunity for de-carbonization.

# Delivering Lower Carbon Resources

## Summary of supply mix in our "Balanced Approach" scenario

**Balanced Approach Scenario**

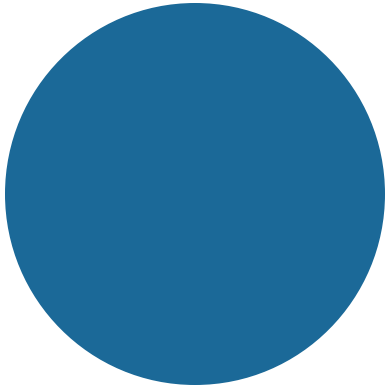
- % Conventional (fossil) gas
- % Carbon capture/offsets cancelling out fossil emissions
- % Renewable natural gas
- % Clean hydrogen

**Total Gas Deliveries**

### 2020

100% Conventional (fossil) gas

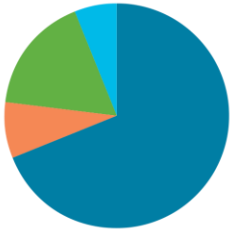
**80.9M Dekatherms**



### 2030

69% Conventional (fossil) gas
8% Carbon capture/offsets cancelling out fossil emissions
17% Renewable natural gas
6% Clean hydrogen

**73.6M Dekatherms**



### 2050

0% Conventional (fossil) gas
4% Carbon capture/offsets cancelling out fossil emissions
62% Renewable natural gas
33% Clean hydrogen

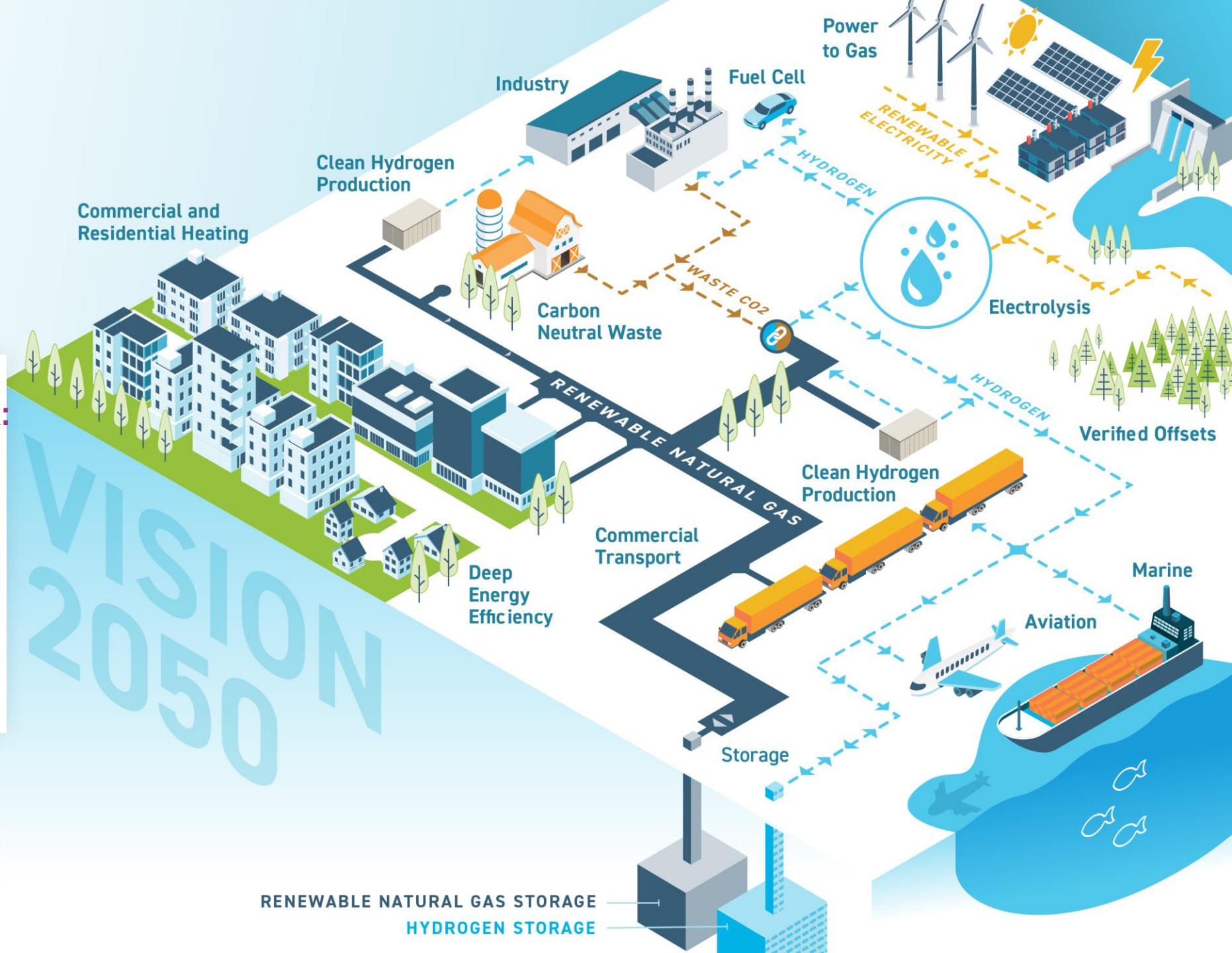
**54.6M Dekatherms**

* Carbon capture in 2050 begins to sequester biogenic $CO_2$ emissions from renewables, meaning that the scenario has shifted to a carbon-negative system.

IRP - Strategically planning for use and development of energy resources - NW Natura Vision2050BRONOV2021FINAL (1).pdf

## A decarbonized network:

- Deep energy efficiency
- Renewable natural gas
- Renewable hydrogen
- Blended and dedicated hydrogen systems




Renewable Natural Gas
Dedicated Hydrogen
Waste $CO_2$
Renewable Electricity

# Energy for Clean Fuels and Regional Energy Supply

Steve Schueneman

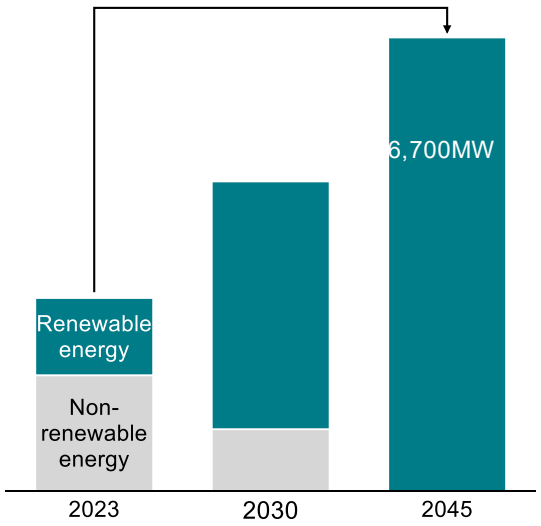
Manager, Emerging Technology and Sustainability

December, 2025

# To meet clean energy targets, PSE and PNW must procure vast quantities of clean energy and capacity

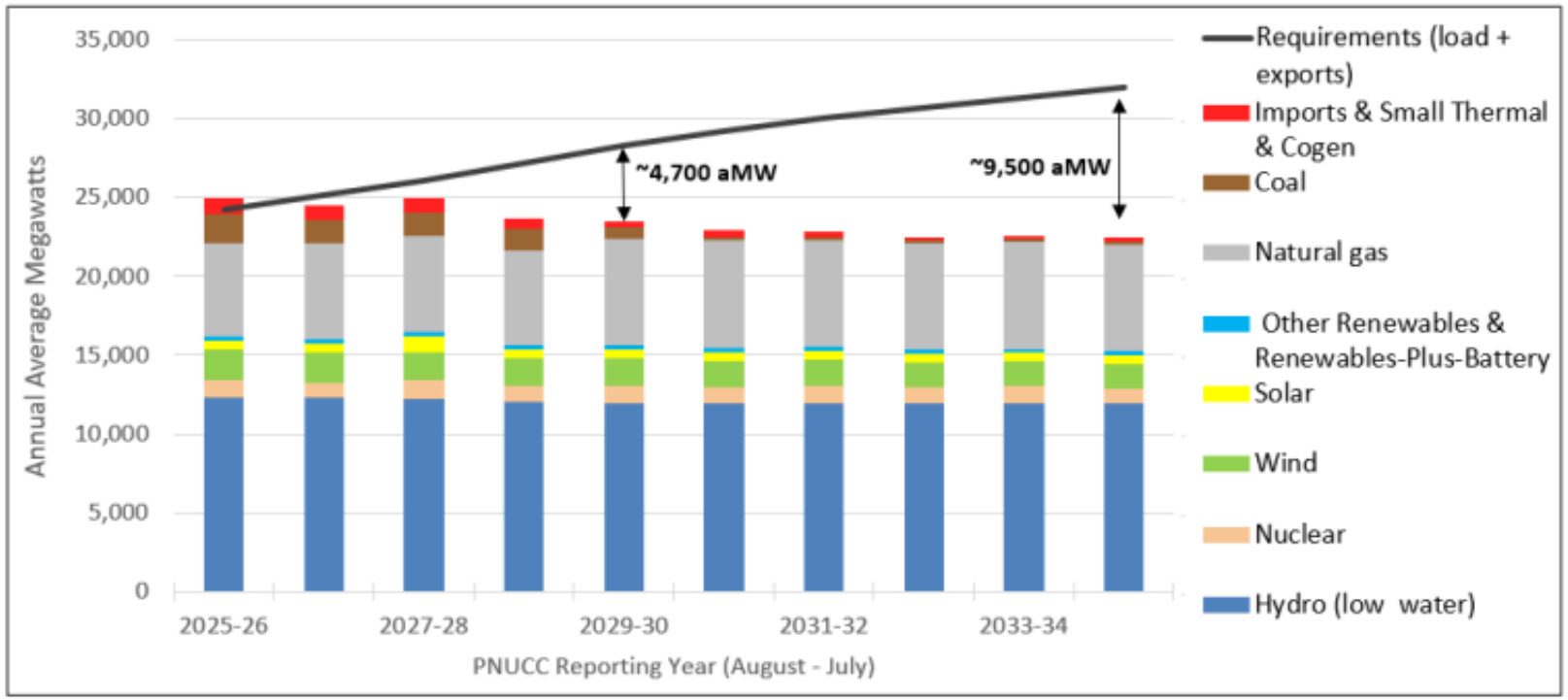
***PSE's need due to CETA, electrification, and native load growth***

**~15,000MW**
of renewable energy




Nameplate capacity required in Resource Plan (in MW)

***PNUCC's projection of energy shortfall beginning this year and running through 2035***

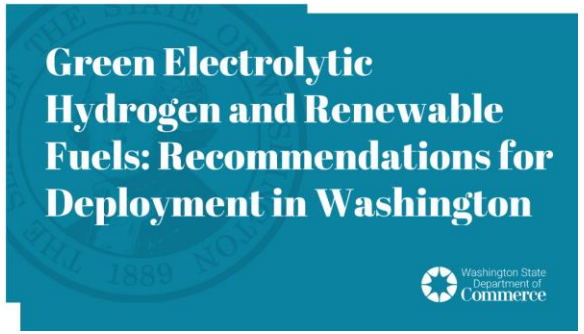



Source: PNUCC 2025 Northwest Regional Forecast



PUGET SOUND ENERGY

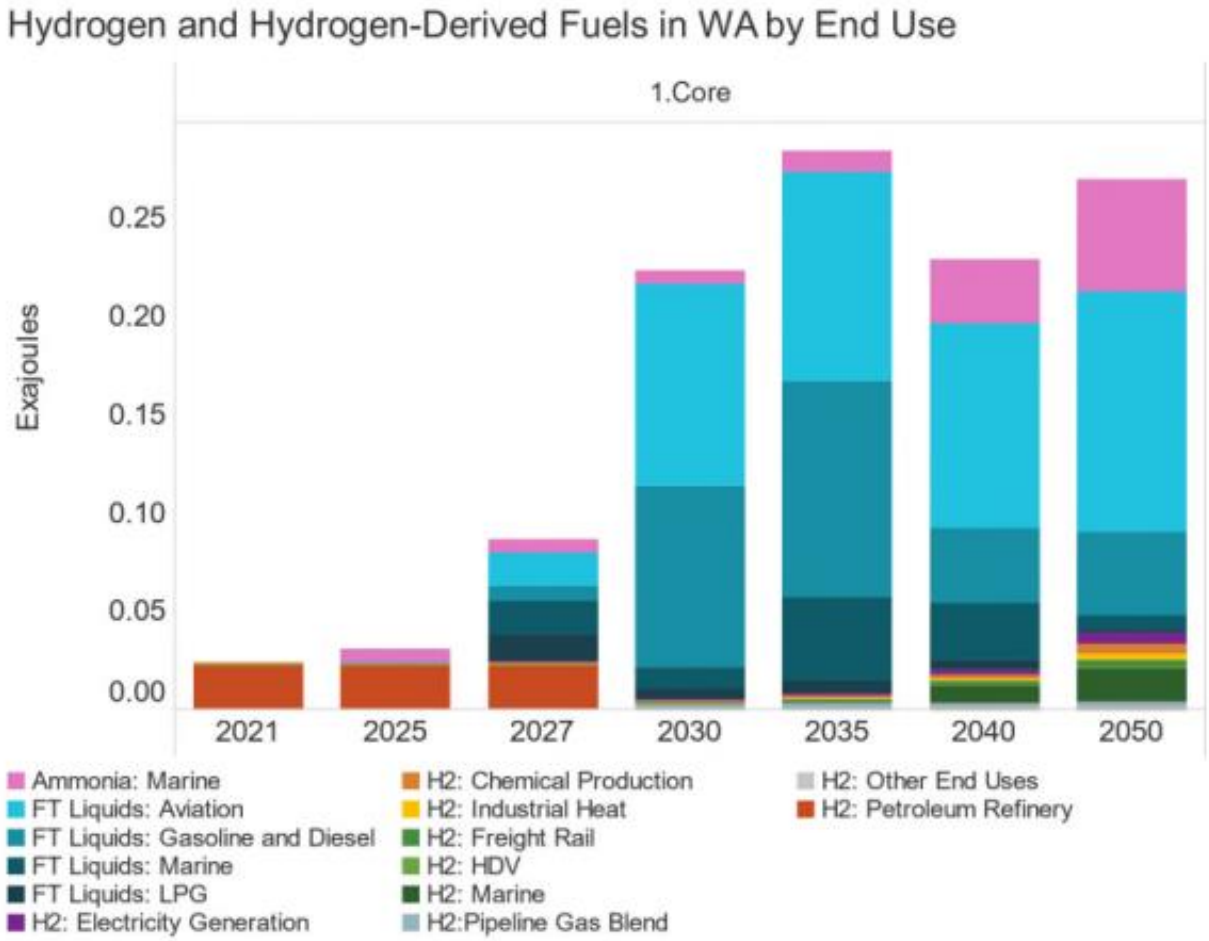
# Based on projections from the WA Hydrogen report, the energy required clean fuels is approximately the same size as BPA




***Key takeaways from the report:***

- Production of F-T fuels will require 500MW in 2030 and 2.5 GW by 2035
- Renewable electricity capacity need to grow by 3.4GW by 2030 and 36.8 GW by 2050

***The energy requirements for clean fuels are not reflected in PNUCC's projections***

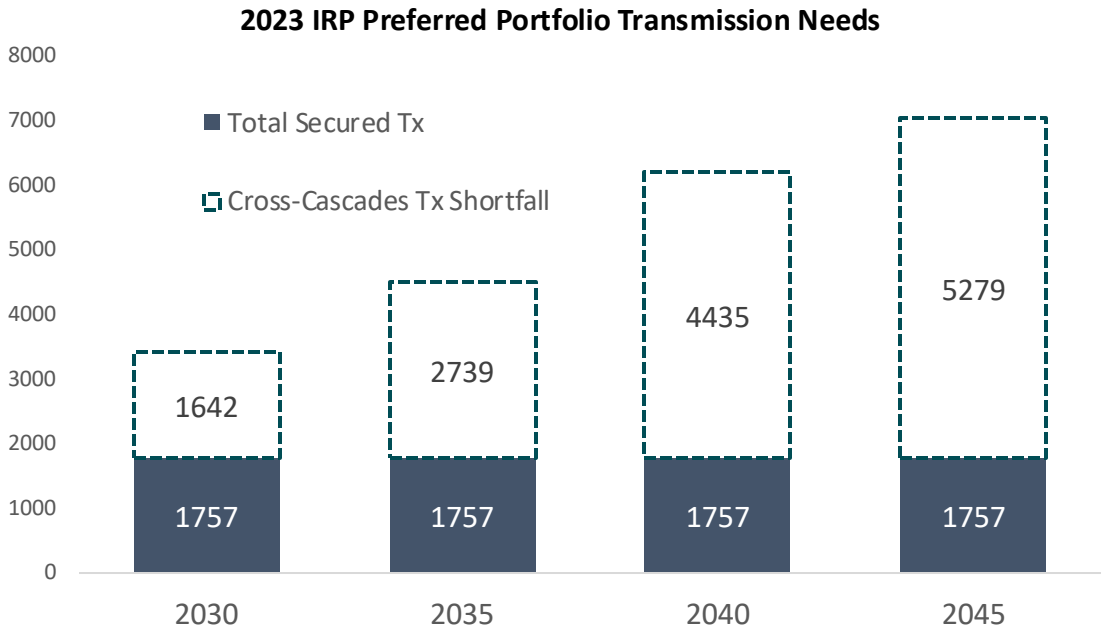



Green Electrolytic Hydrogen and Renewable Fuels: Recommendations and Deployment for Washington, Washington State Department of Commerce

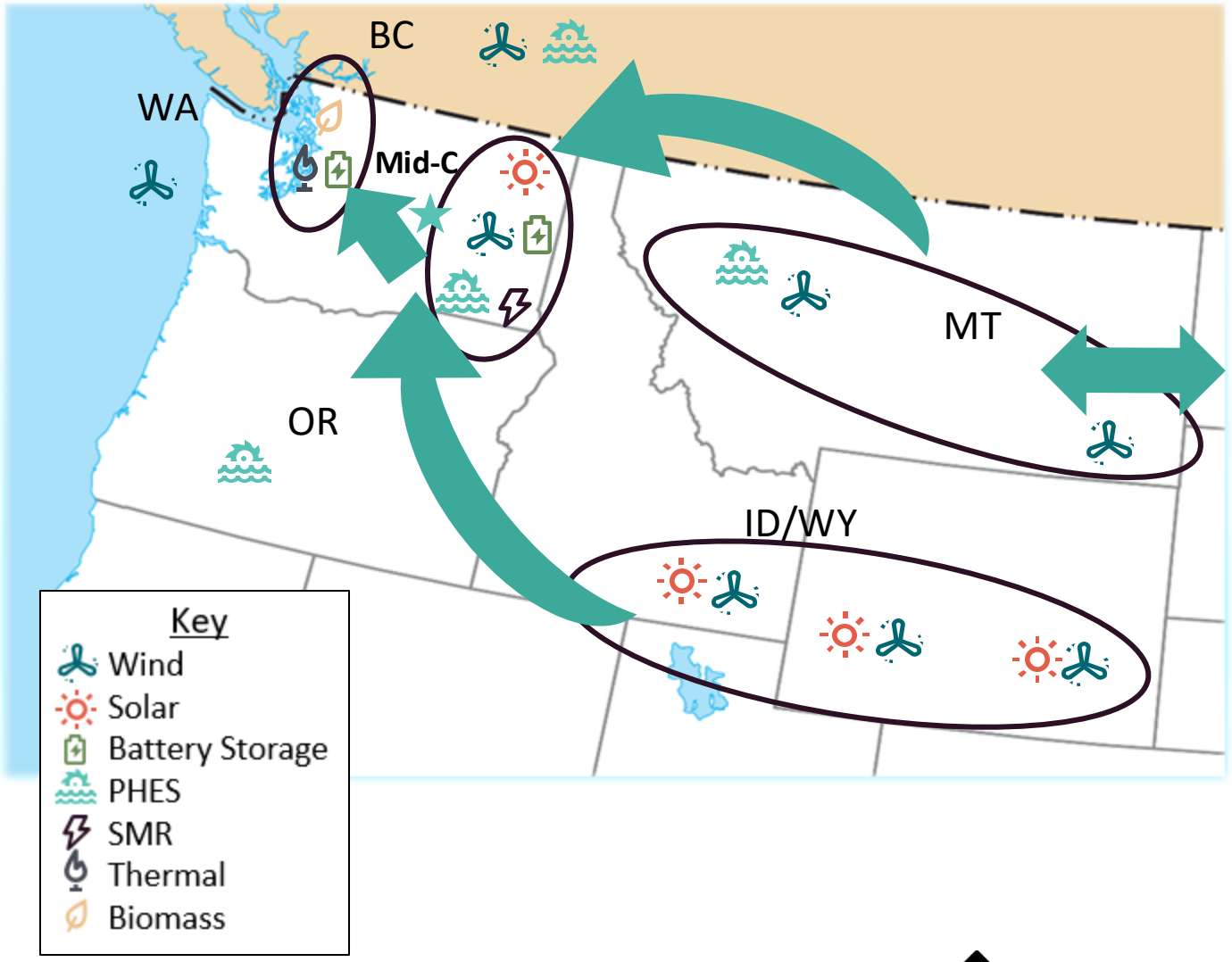


PSE PUGET SOUND ENERGY

# Transmission expansion is needed to deliver clean energy beyond 2030




- BPA is the major transmission provider in the region, providing about 75% of Washington's capacity
- Current East-West transmission capacity is about 11GW, and is fully subscribed
- Major project proposed to add 1.1GW of new capacity






PSE PUGET SOUND ENERGY

# Questions?

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