



# Pacific Northwest Hydrogen Hub: Decarbonizing hard to abate sectors while building stronger communities in the PNW

## Chris Green

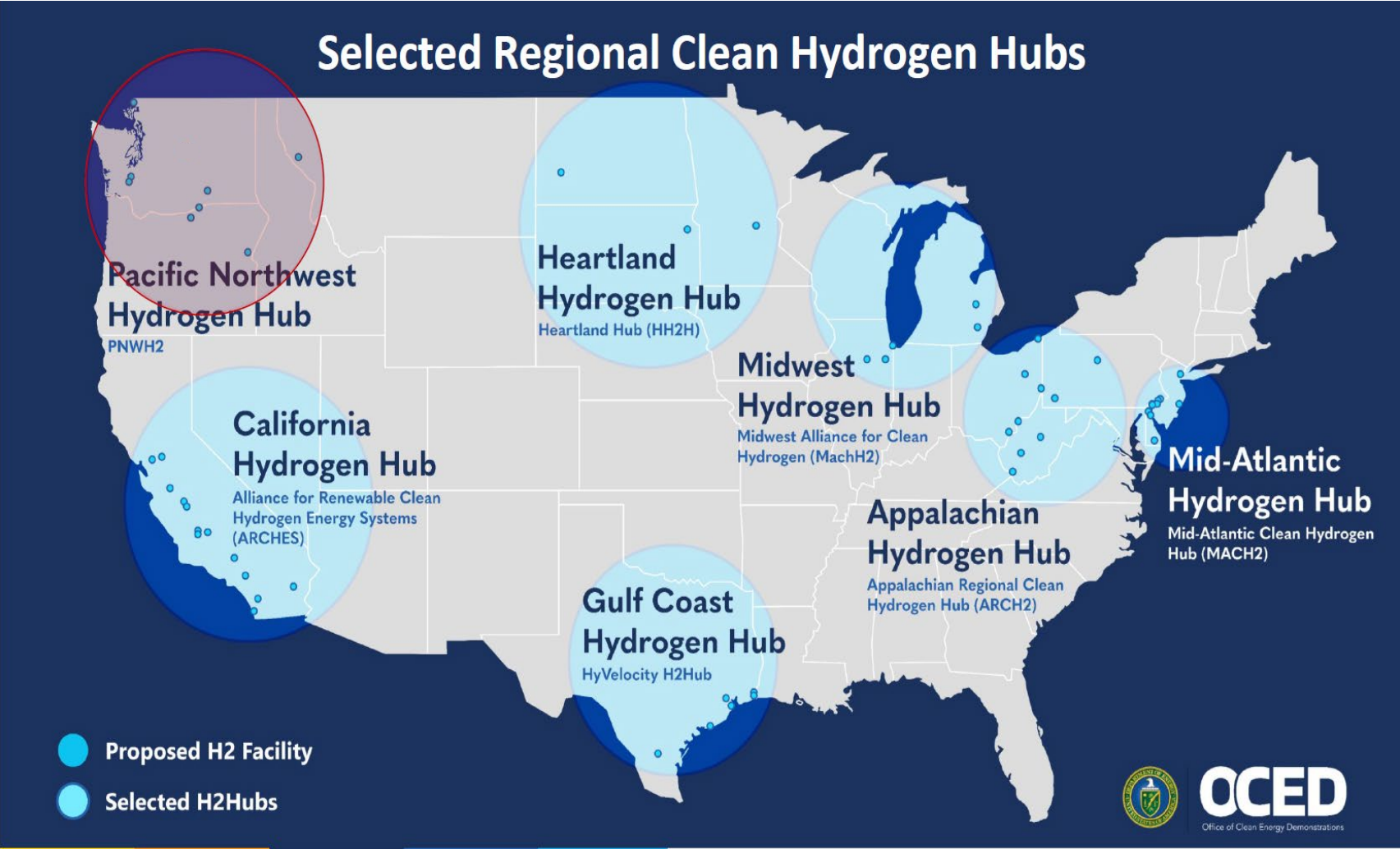
May 9, 2024

DOE Hydrogen Program  
2024 Annual Merit Review and Peer  
Evaluation Meeting

AMR Project ID# OCED002



# Overview: PNWH2 Hub is located across Washington, Oregon and Montana



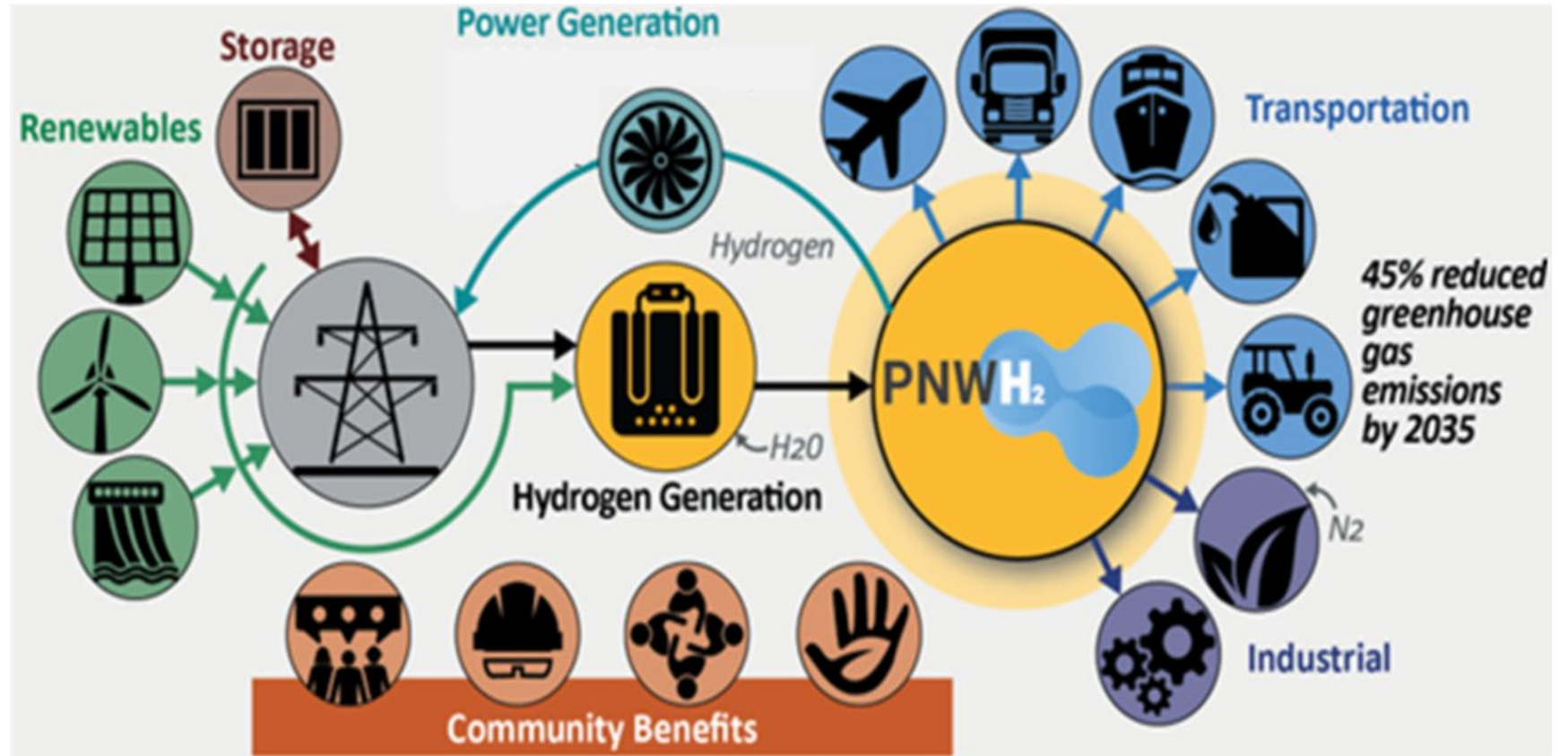
Source: <https://www.energy.gov/oced/regional-clean-hydrogen-hubs-selections-award-negotiations>

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# Overview: PNWH<sub>2</sub> Hub

Decarbonizing hard to abate sectors while building stronger communities in the PNW

- 17 Projects
- 8 Nodes
- 3 States
- ~400 MT/day H<sub>2</sub>
- 100% Green feedstock
- >10,000 Jobs
- Revitalizing communities
- 15 Tribes/Tribal Nations contacted
- >100 Community letters of support

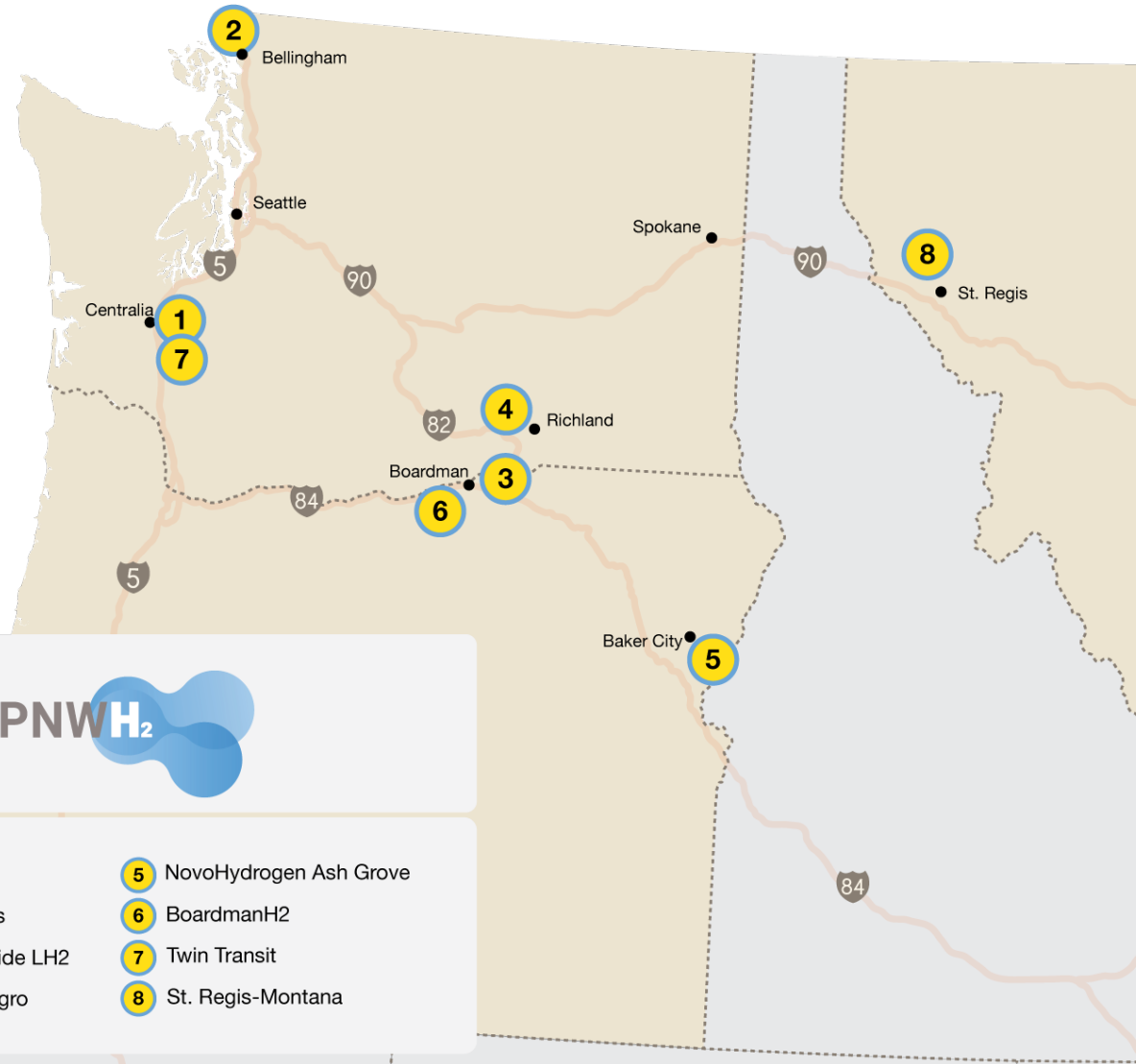


**~400MT/day H<sub>2</sub> production**



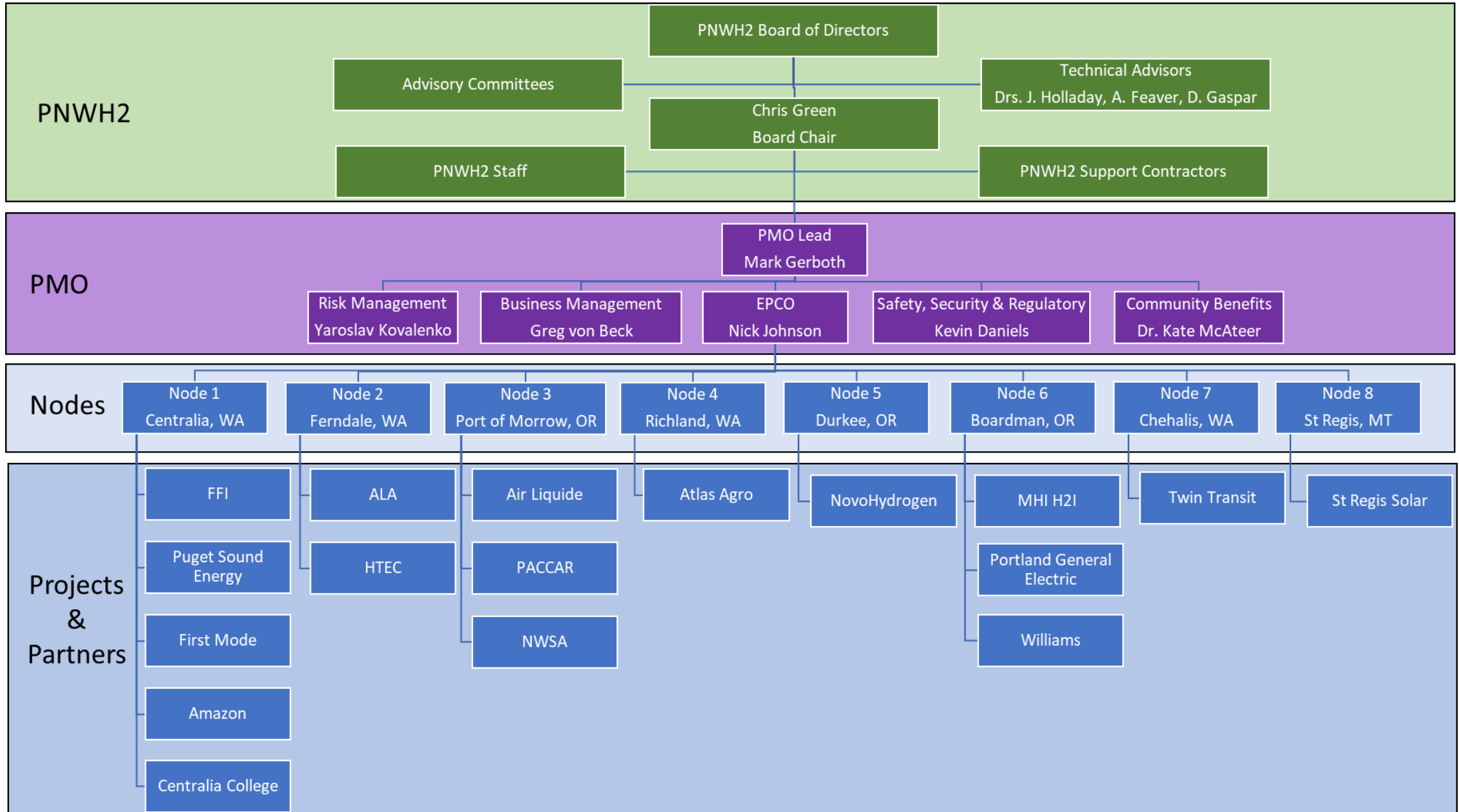


# Potential Project Locations



- USA Fortescue Future Industries; First Mode; Puget Sound Energy; Amazon; Centralia College**
  - H2 for clean energy and heavy-duty transportation
  - H2 training and workforce development facilities
- ALA Renewable Energy LLC; HTEC Systems**
  - H2 production for heavy-duty transportation, refineries, and power generation
- Air Liquide; NW Seaport Alliance; PACCAR**
  - Liquefied H2 for heavy duty transportation
- Atlas Agro**
  - H2 for calcium ammonium nitrate fertilizer production
- NovoHydrogen Holdings LLC**
  - H2 for heavy duty transportation
- MHI Hydrogen Infrastructure LLC; Williams Field Services Group, LLC; Portland General Electric Company**
  - H2 for clean electricity generation
  - Providing H2 to other parts of Hub for heavy duty transportation
- Twin Transit**
  - H2 for public transit
- St. Regis Solar LLC**
  - H2 for heavy-duty transportation

# Overview: PNWH2 is Organized for Success



# Impact: Providing Community Impact by Enabling Deep Decarbonization

## Workforce Development



**Benefits:** >10,000 new high-quality jobs, workforce development incl. apprenticeships and displaced worker training & employment. Foster workplace diversity, equity, inclusion and accessibility.

## Redevelopment & Remediation



**Benefits:** Re-development of contaminated brownfield sites including former coal, aluminum smelter and remediated Hanford Reservation sites

## Economic Activity



**Benefits:** Catalyze direct and indirect economic activity via the creation of local jobs and sustainable economic growth for project locations

## Reduced Air Pollution



**Benefits:** 45% reduced GHG by 2035. Reduced air pollution/improved air quality near clean H2 production and use sites

## Tax Revenue



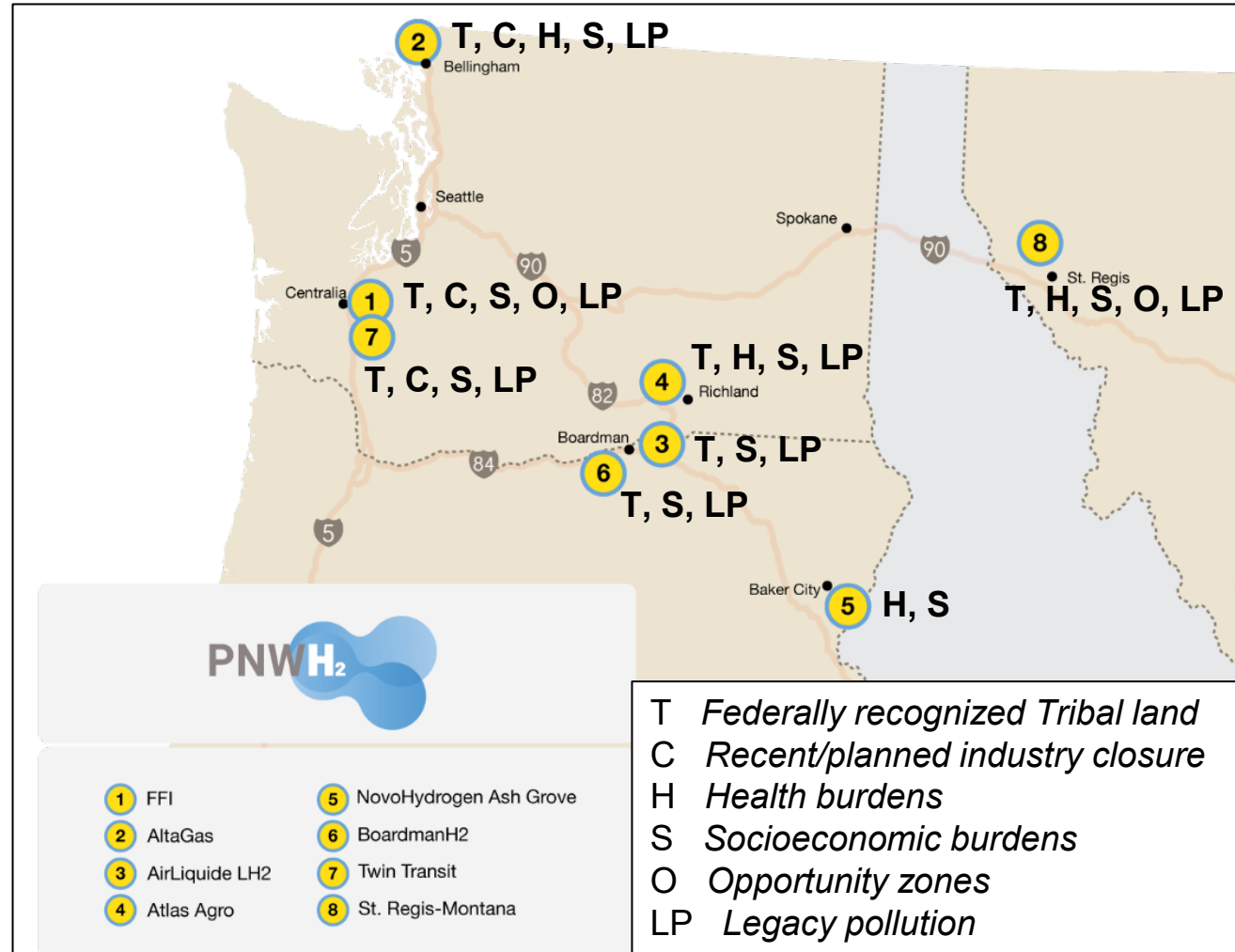
**Benefits:** Local/county tax revenues. Potential increase in revenue generated from taxes going towards supporting vital government services



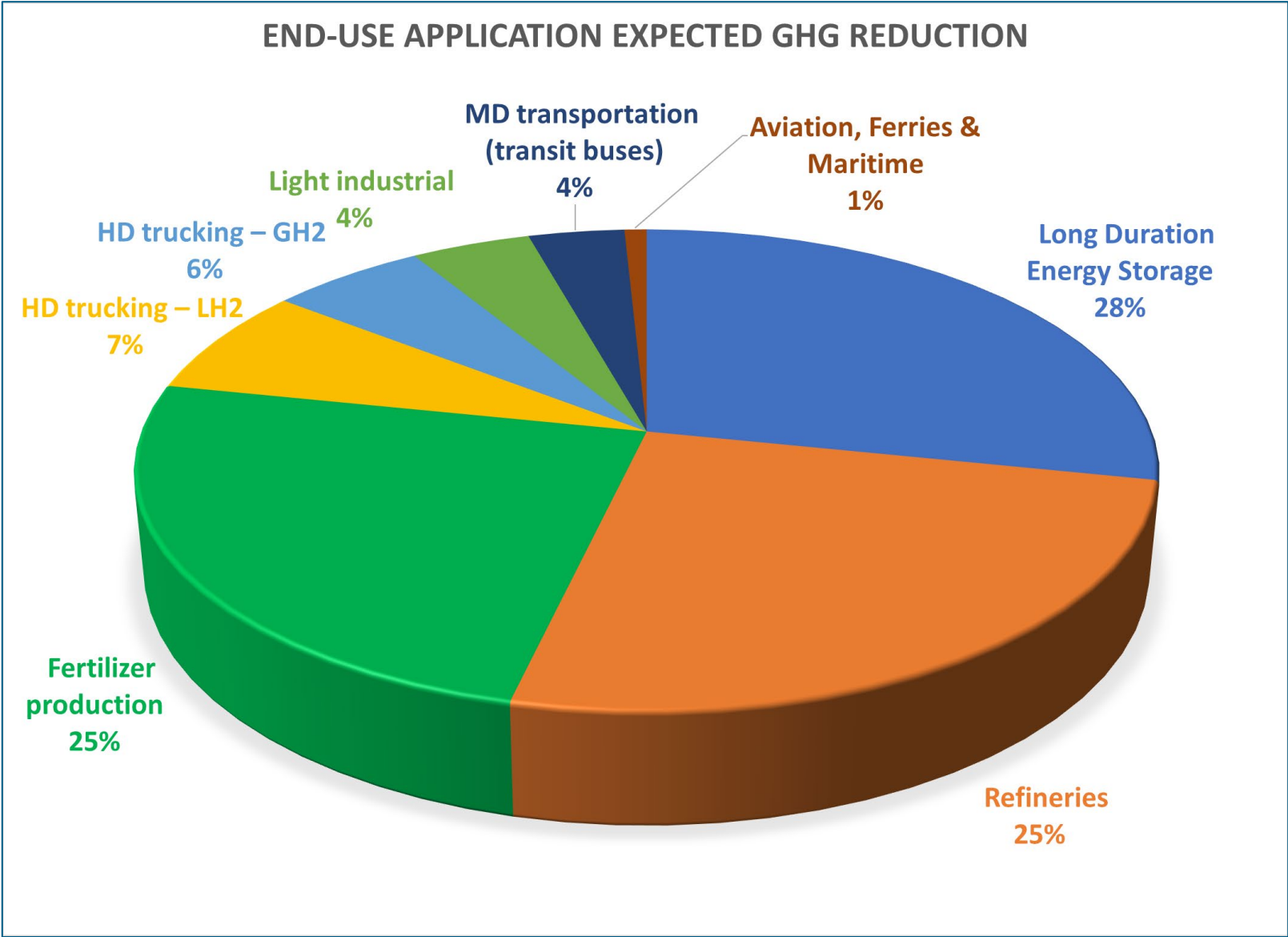
# PNWH2 J40 Priorities – Strengthening Disadvantaged Communities

By the Numbers:

- **8 Nodes** relieve Socioeconomic Burdens
- **7 Nodes** on or near Tribal Land
- **7 Nodes** improve areas with Legacy Pollution
- **4 Nodes** help communities with Health Burdens
- **3 Nodes** in Recent/Planned Industry Closure zones
- **2 Nodes** in Opportunity Zones

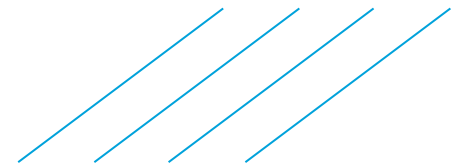
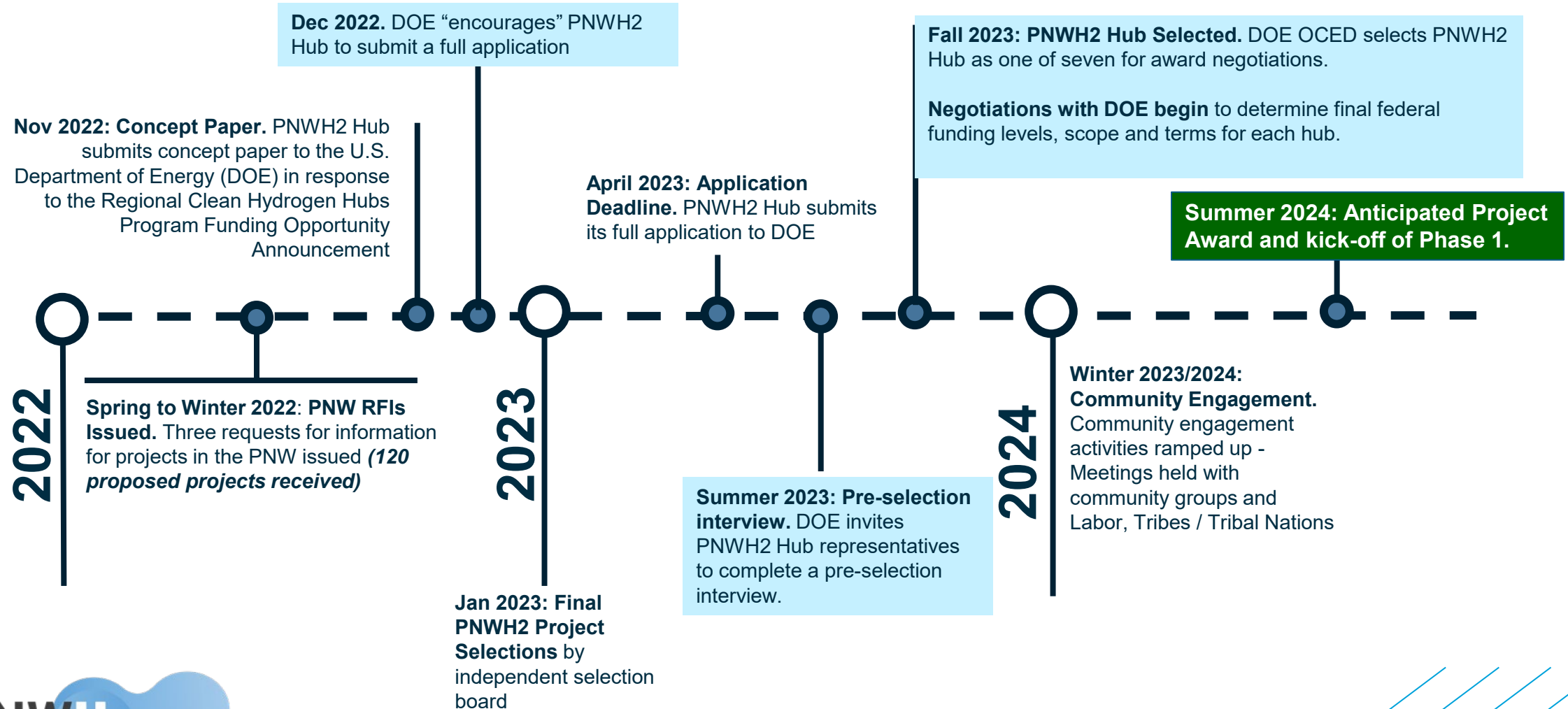


# Impact: Projected Decrease GHG in the PNW by up to 1.3MMT/y

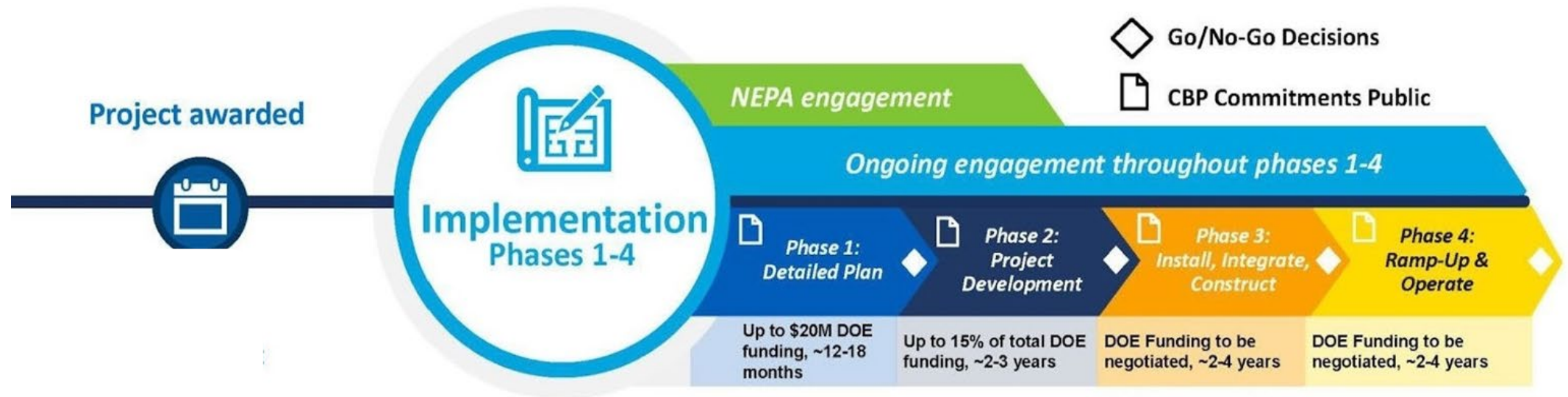




# Schedule: PNWH2 Hub Timeline Pre-Award



# Schedule: PNWH2 Hub Timeline Post-Award



This graphic was originally created and published by the U.S. Department of Energy's Office of Clean Energy Demonstrations.



# CBP: PNWH2 Hub - Building Stronger Communities

By decarbonizing hard to abate sectors using clean hydrogen in the PNW

PNWH2 CBP mission is to equitably improve the lives of the people in our communities & the environments they live in for the long-term

## **Community Benefits Plan Elements**

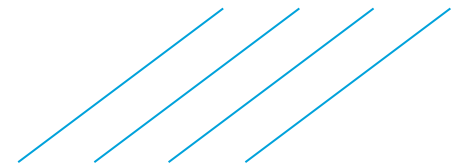
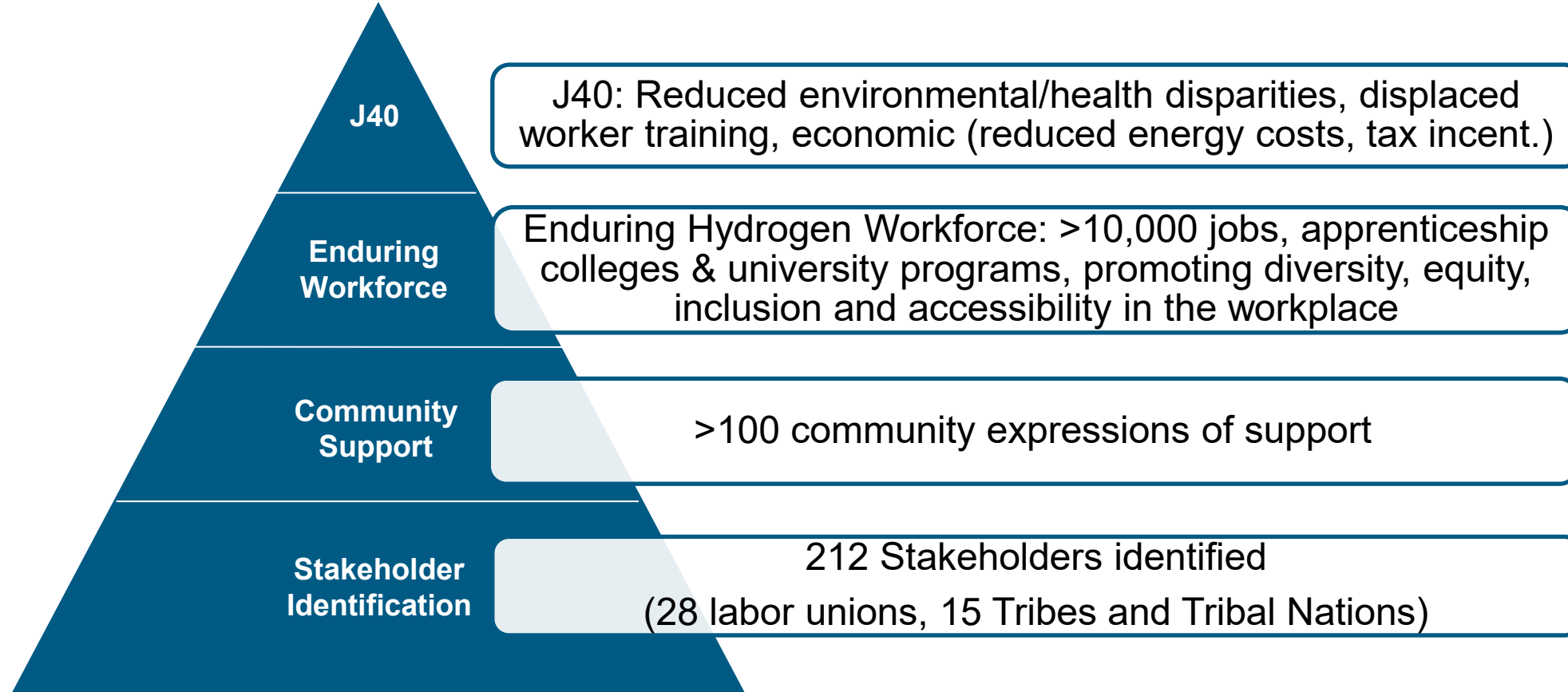
- Shared Principles
- **Justice40 (J40)**
- **Tribes / Tribal Nation Engagement**
- **Community Engagement**
- **Workforce Development and Jobs Plan**
- Advancing Diversity, Equity, Inclusion & Accessibility
- Energy Equity and Environmental Justice Plan
- Use of Mapping and Geospatial Tools & Data to Advance Equity
- Domestic Clean Technology Manufacturing
- Energy Emergency Management & Planning
- Industry Cluster Development



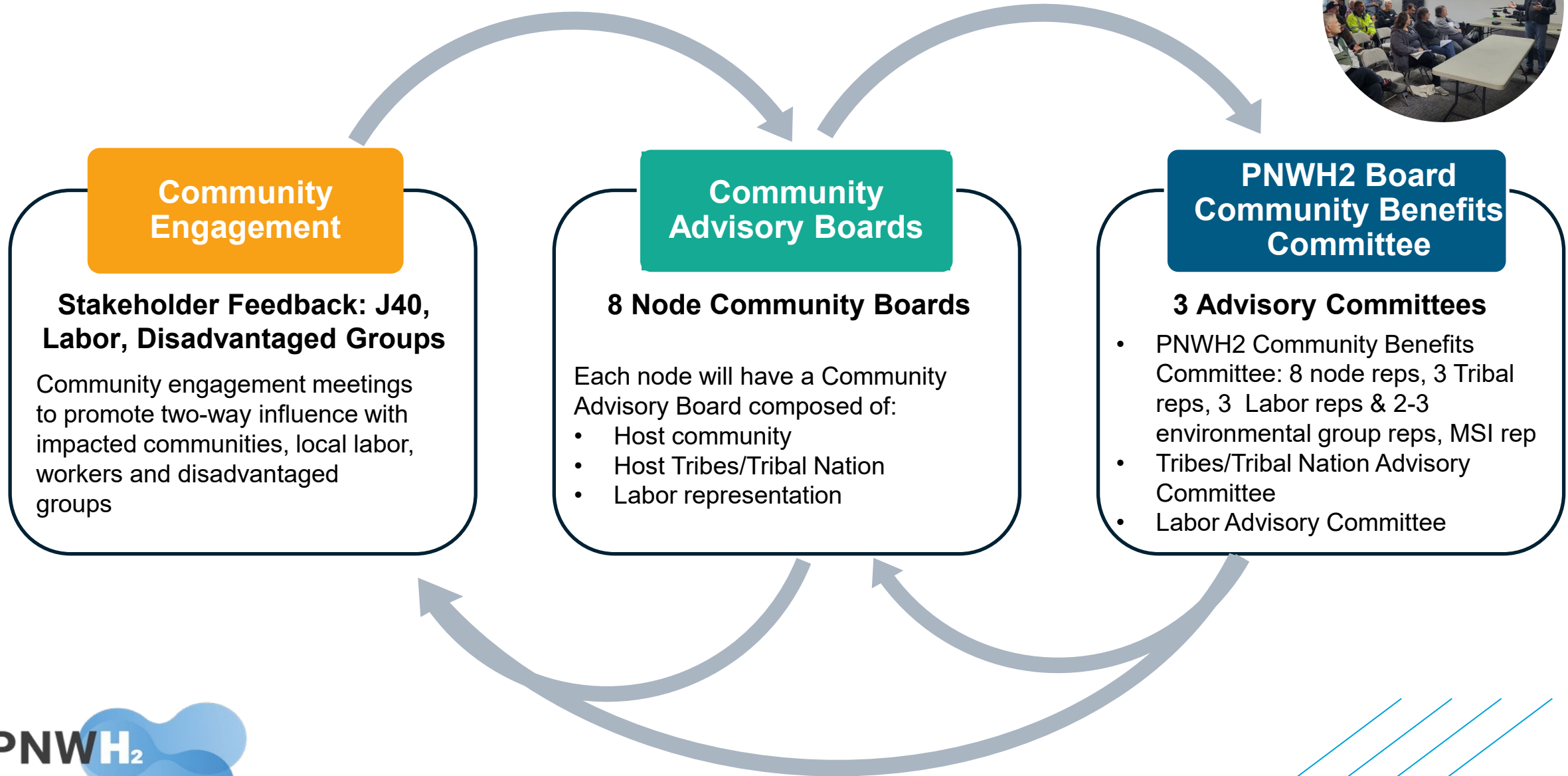
STEM opportunities play a central role in building a pipeline for an equitable workforce.



# CBP: Building on Engagement to Provide Meaningful Community Benefits



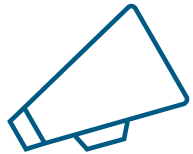
# CBP: Community Engagement Strategy





# CBP: Strengthening Collaborations with Tribes/Tribal Nations:

## *Building Solidarity Through Support & Ongoing Engagement*



- Active Tribal representation (Cowlitz Indian Tribe) on PNWH2 Board
- Initial support letters from, Cowlitz Indian Tribe, Chehalis Tribe, and Confederated Tribes of the Umatilla Indian Reservation
- Shoalwater Bay Tribe, Lummi Nation, Cowlitz Indian Tribe and Chehalis Tribe involved with aspects of hub planning
- Engagement and feedback cycle
  - Goal: Transparent communication early and often soliciting valuable feedback
  - Invitation to be on advisory committee(s)
  - Presentations at significant events (e.g., ATNI conventions, ATNI Climate summit meetings, 2023 Centennial Accords, DOE Tribal Energy Summit)
  - "Dear Tribal Leaders" letters (April 2022, April 2023, February 2024)
  - Interactive Webinars
- Continuous dialogue
  - Our ongoing dialogue with Tribal Nations is fundamental to the vision and success of the H2Hub Project.
  - Resourceful and informative dedicated website: [pnwh2.com/tribal-relations](https://pnwh2.com/tribal-relations)



# CBP: Investing in the American Workforce



Engagement with Labor



Center of Excellence in Clean Energy at Centralia College



Workforce and Education Coalition that includes Minority Serving Institutions and Tribal Colleges.



Specific focus on workers displaced from fossil or carbon-based industries



Partnership with STEM academies/camps for K-12 to engage and build the pipeline for an equitable workforce

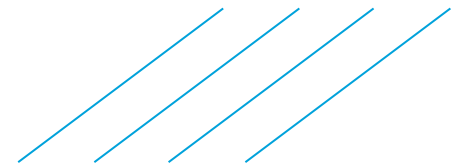


Students from a STEM Summer Academy learned to build hydrogen powered cars.

# CBP: Advancing Diversity, Equity, Inclusion, and Accessibility



- Improve business opportunities for diverse populations
- Increase supply chain and contracting opportunities for local and disadvantaged businesses
- Co-develop goals for Native American business subcontracting
- Partnerships with MSIs, Tribal College and institutions that serve large populations of minority students
- Set target for % of air quality improvements impacting disadvantaged communities
- Employ data evaluation and learning at all phases of the employment cycle

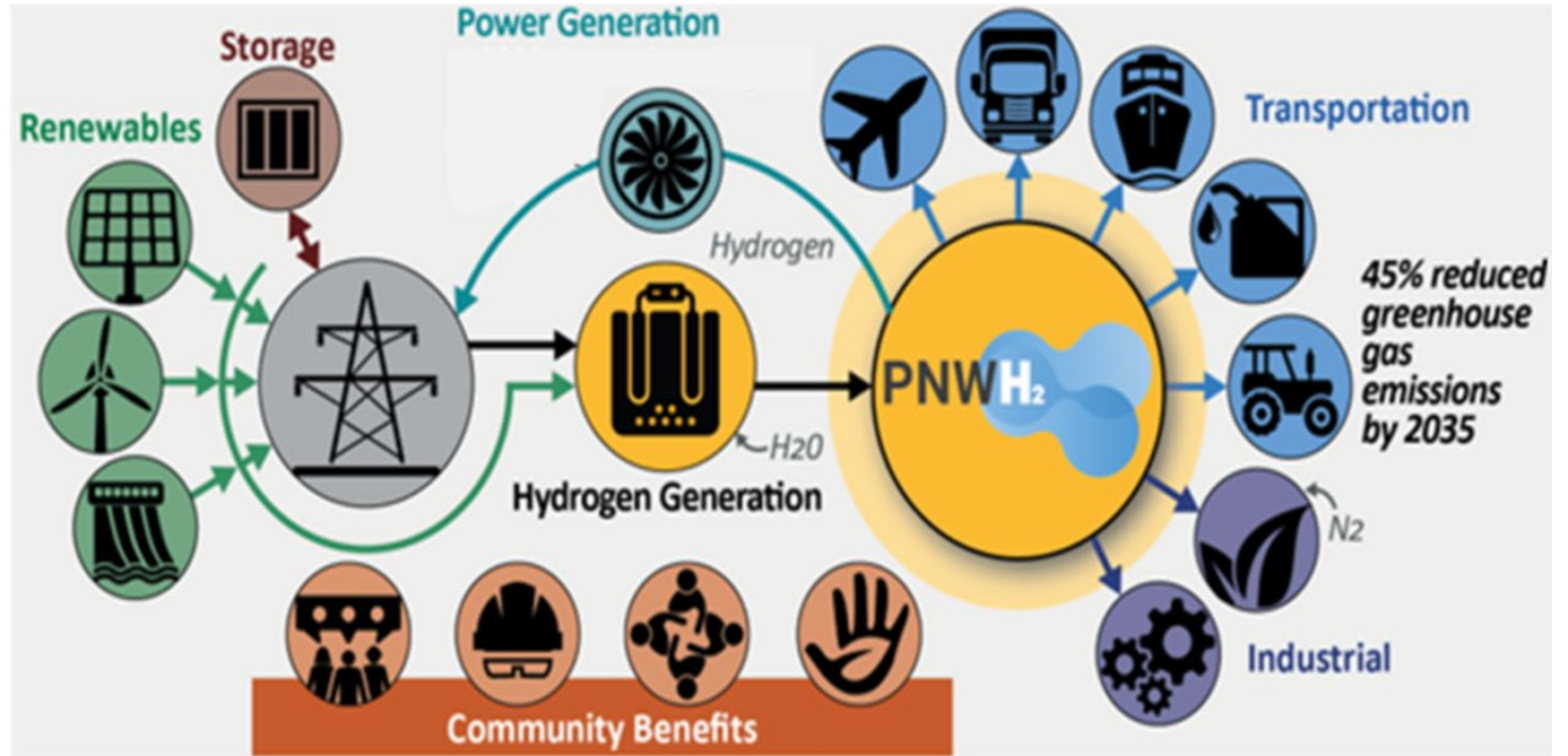




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>400MT/day H<sub>2</sub> production



# Thank you!

PNWH2.com

X @PNWH2Assoc

 @Pacific-Northwest-Hydrogen-Association

Take a picture to access  
PNWH2 Website

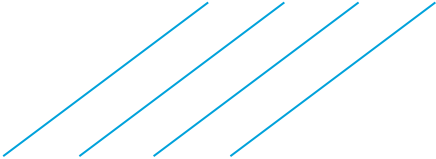




# Backup slides

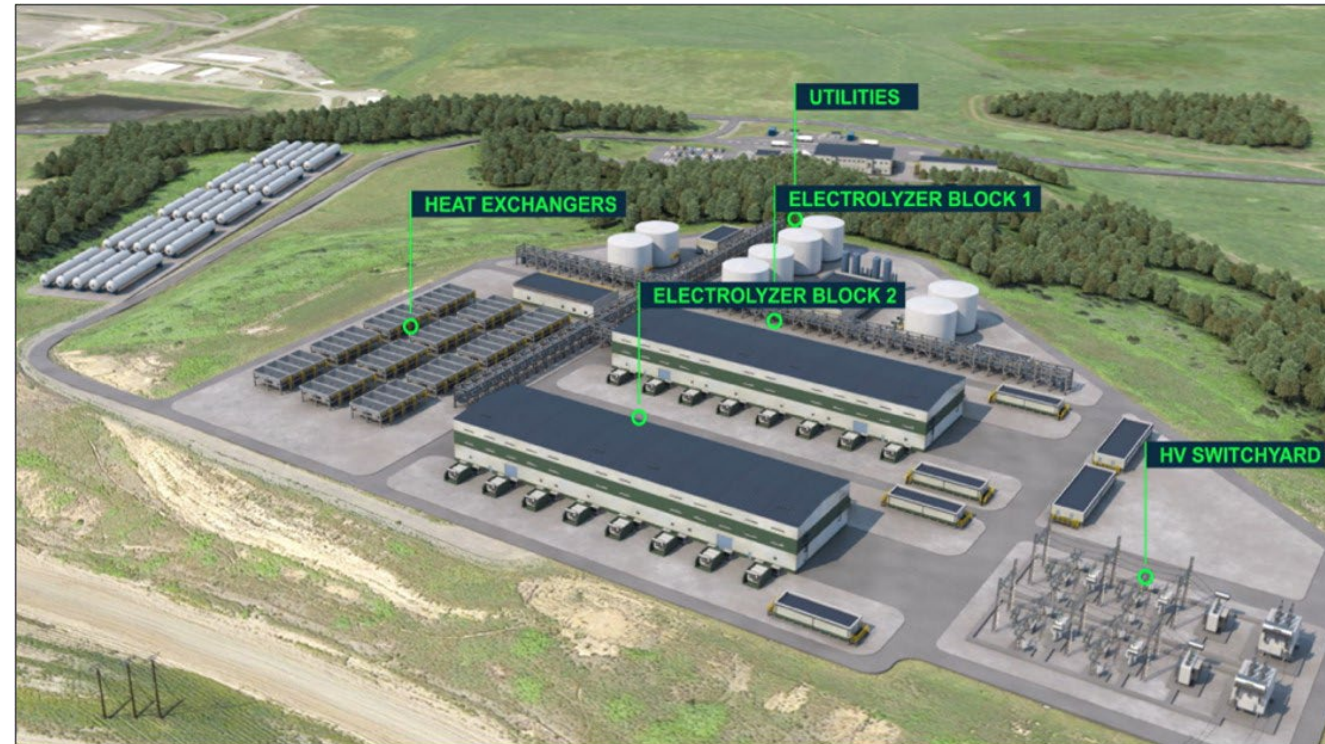


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# Node 1: Centralia, WA

- Lead: Fortescue Future Industries
- Redevelopment of brownfield site (decommissioned coal power plant)
- Located near Tribe/Tribal Nation land
- Employing displaced workers from closed coal power plant
- Location is an opportunity zone, potential to reduce legacy pollution and provide socioeconomic benefits
- Synergistic alliances with community
- Centralia College - Center of Excellence For Clean Energy workforce development
- Anchor end uses: Power generation and MD/HD transportation



Artist rendering only. The pictured plant and its final design and layout are all subject to further feasibility and environmental engineering studies, and various approvals

## Node 2: Ferndale, WA

- Lead: ALA Renewable Energy LLC
- Redevelopment of brownfield site (decommissioned aluminum smelter)
- Located near Tribe/Tribal Nation land
- Community: Reduce legacy pollution, local GHG reduction and provide other socioeconomic benefits
- Enthusiastic community partners for workforce development programs and living wage jobs
- Anchor end uses: Peaking power, refinery, LH2 for up to 10 HD trucks refueling stations, transit buses and port equipment



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# Node 3: Port of Morrow, OR

- Lead: Air Liquide
- Hydrogen from Node 6 via pipeline
- H2 liquefaction & supply chain to bring hydrogen to market
- Community: Reduce legacy pollution, local GHG reduction and provide other socioeconomic benefits
- Anchor end uses: Heavy Duty transportation along I5, I90 and I84. Port activity decarbonization with NWSA (drayage, cargo handling)



Air Liquide's North Las Vegas Hydrogen Liquefaction Plant



## Node 4: Richland, WA

- Lead: Atlas Agro
- Greenfield site part of Hanford reservation
- Located near Tribe/Tribal Nation land
- Community: Reduce legacy pollution, local GHG reduction and provide other socioeconomic benefits
- Community engagement including labor, PUD, farmers, RE suppliers and others
- Rail line to site for fertilizer transport
- Anchor end uses: Fertilizer production with commitments from local farmers to purchase



**ATLAS  
AGRO**

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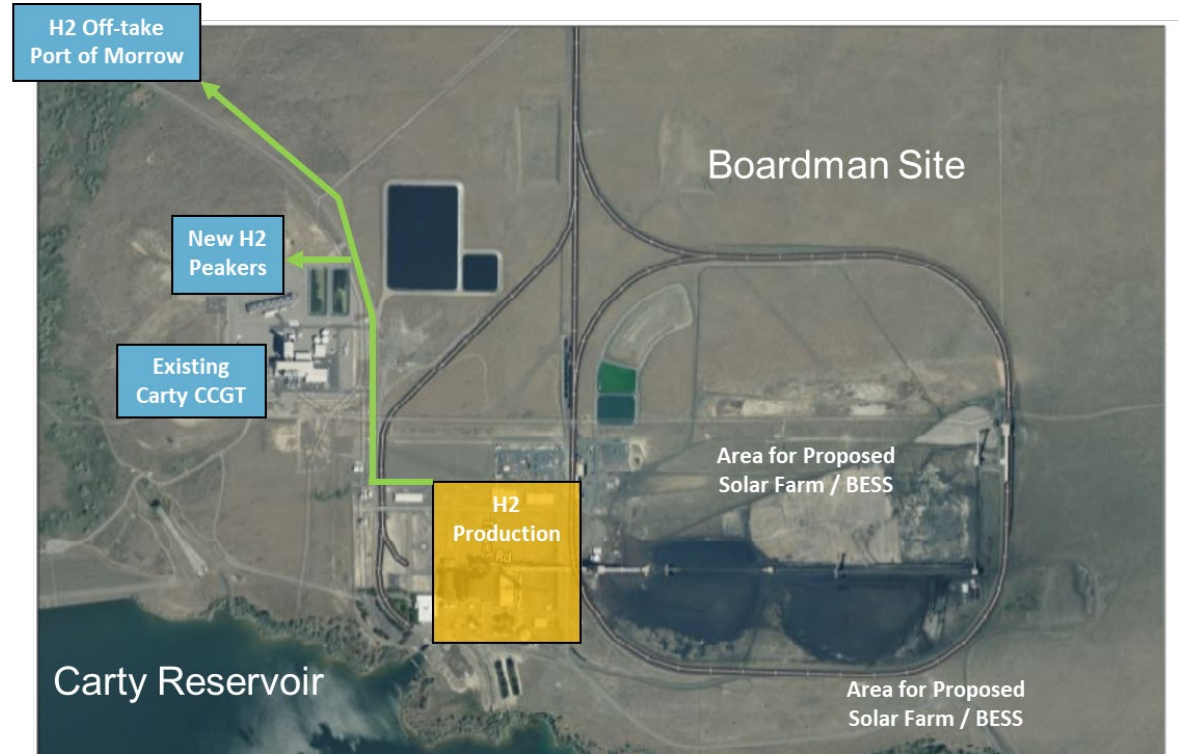
# Node 5: Durkee, OR

- Lead: NovoHydrogen Holdings LLC.
- Community: Provide socioeconomic benefits with potential reduction in health burdens
- Robust local community engagement
- New dedicated pipelines, above ground storage, refueling station
- Anchor end uses: Mining and other HD trucks. O<sub>2</sub> for cement production



# Node 6: Boardman, OR

- Lead: MHI Hydrogen Infrastructure
- Redevelopment of brownfield site (decommissioned coal power plant)
- Located near Tribe/Tribal Nation land
- Community: Reduce legacy pollution, local GHG reduction and provide other socioeconomic benefits
- Ongoing community engagement
- Long Duration Energy Storage, H2 pipeline along existing pipeline right of way
- Anchor end uses: Dispatchable 100% H2 turbines, providing H<sub>2</sub> to Node 3
- Other end uses: HD transportation



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## Node 7: Chehalis, WA

- Lead: Twin Transit / Lewis County Transit
- Located near Tribe/Tribal Nation land
- Community: Reduce legacy pollution, local GHG reduction, provide employment to displaced workers from industry closure and provide other socioeconomic benefits
- Fantastic community support
- Renewable Energy Vehicle and Infrastructure Technician (REVIT) training program with certificates and degree potential
- Anchor end uses: Transit buses and HD/MD truck refueling along I-5





## Node 8: St Regis, MT

- Lead: St Regis Solar LLC
- Located near Tribe/Tribal Nation land
- Community: Located in an opportunity zone, potential to reduce legacy pollution, local GHGs and provide other socioeconomic benefits
- Signed MOU with Bunker Hill Mining Corporation in Kellogg, Idaho to help decarbonize mining operations
- Anchor end uses: HD transportation,
- Other end uses: data center, aviation (drones) and long duration energy storage (peaking power)



Photo courtesy of PACCAR

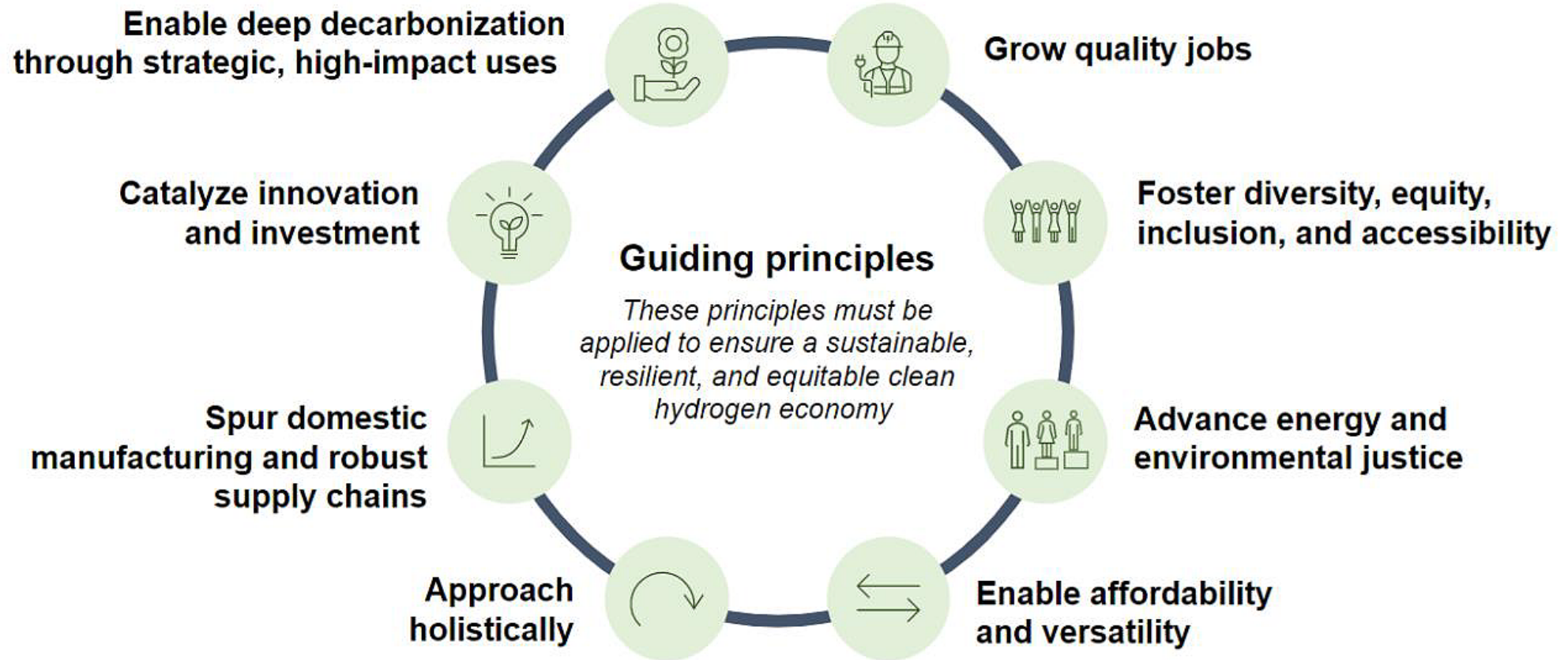


**SRSH2**  
St. Regis Solar Hydrogen

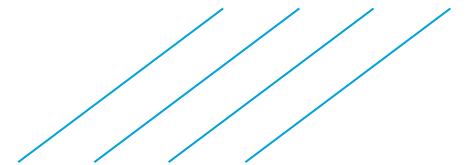


# Pacific Northwest Hydrogen Hub

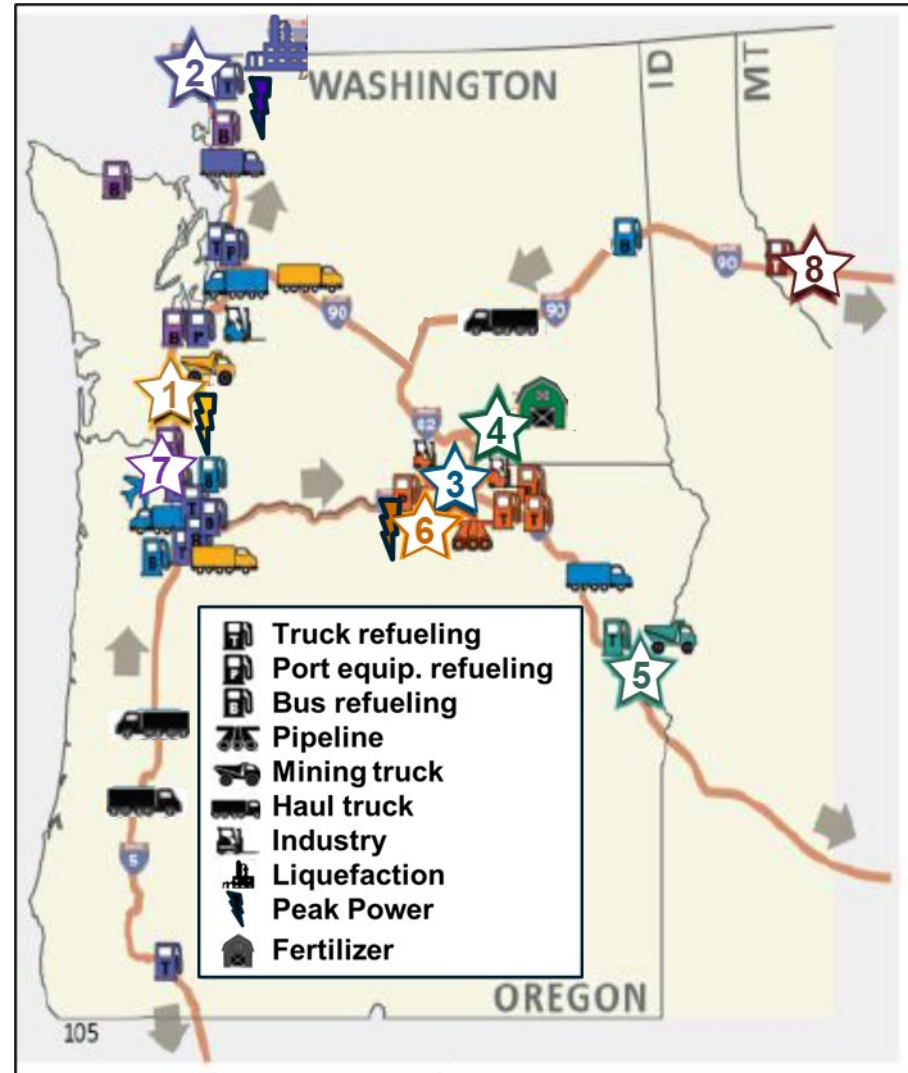
## Applying National Guiding Principles



This graphic was originally created and published by the U.S. Department of Energy.



# PNWH<sub>2</sub> Nodes Form a Regional Hydrogen Network



\*These are initial offtakers which may change and other offtakers are in discussion