State Energy Strategy, Renewable Fuels and Green Hydrogen

Policy updates and opportunities in Washington

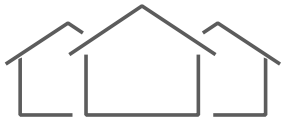
Glenn Blackmon and Stephanie Celt

WASHINGTON STATE DEPARTMENT OF COMMERCE – ENERGY OFFICE

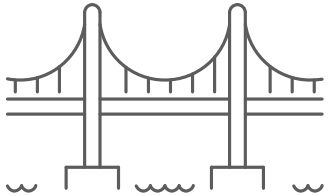
6/15/2022

Washington State Department of Commerce

We strengthen communities



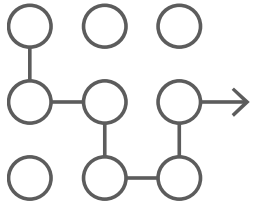
HOUSING
HOMELESSNESS



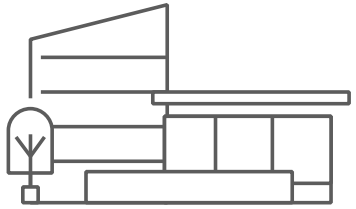
INFRASTRUCTURE

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

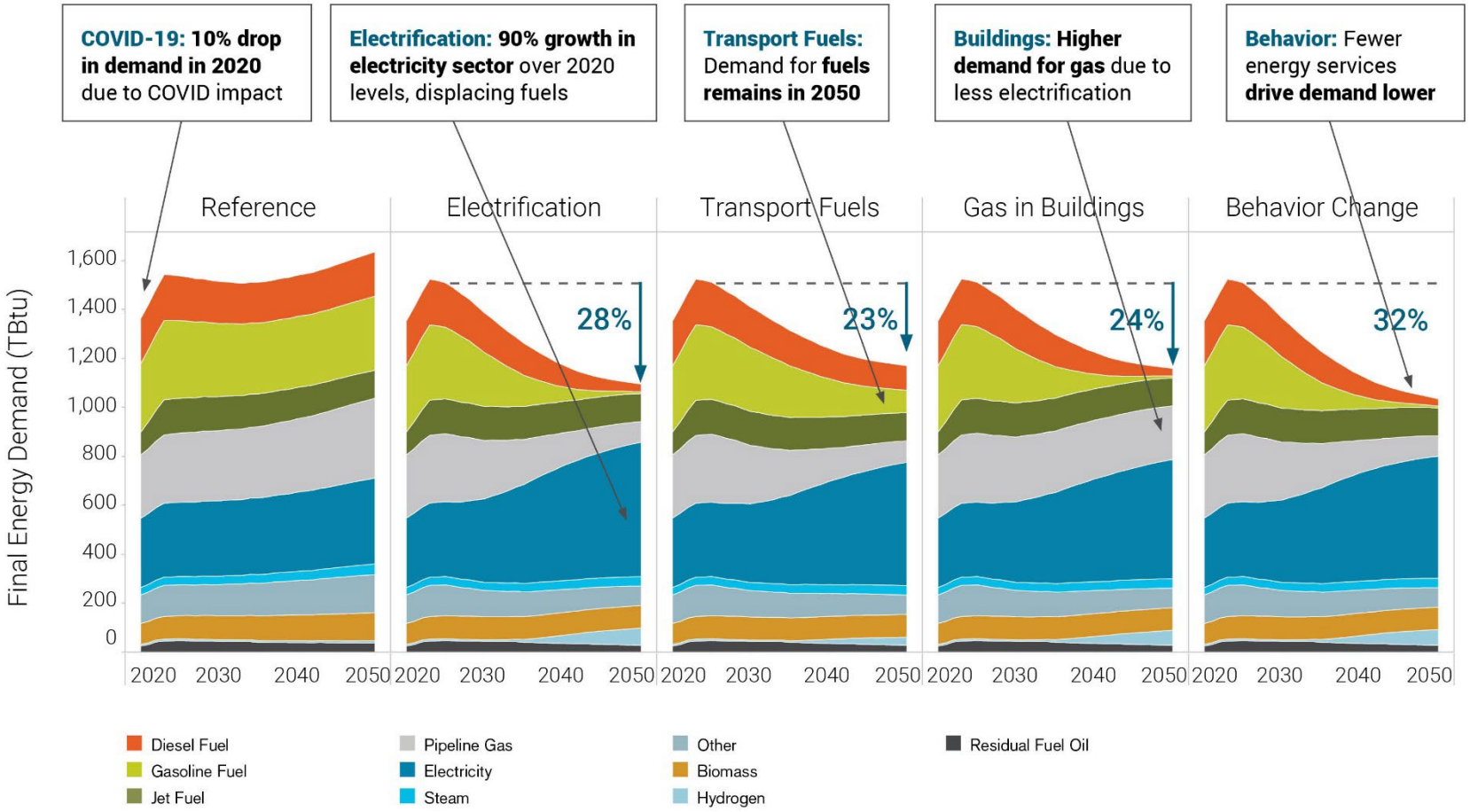
Meeting the state's energy needs

- Maintain reasonable and fair **prices** and sufficient **supply** of energy
- Promote a competitive clean energy **economy** and **workforce** development
- Understand and address the needs of **low-income and vulnerable populations**
- Reach and respond to **urban and rural communities**

Aligning energy and climate policy

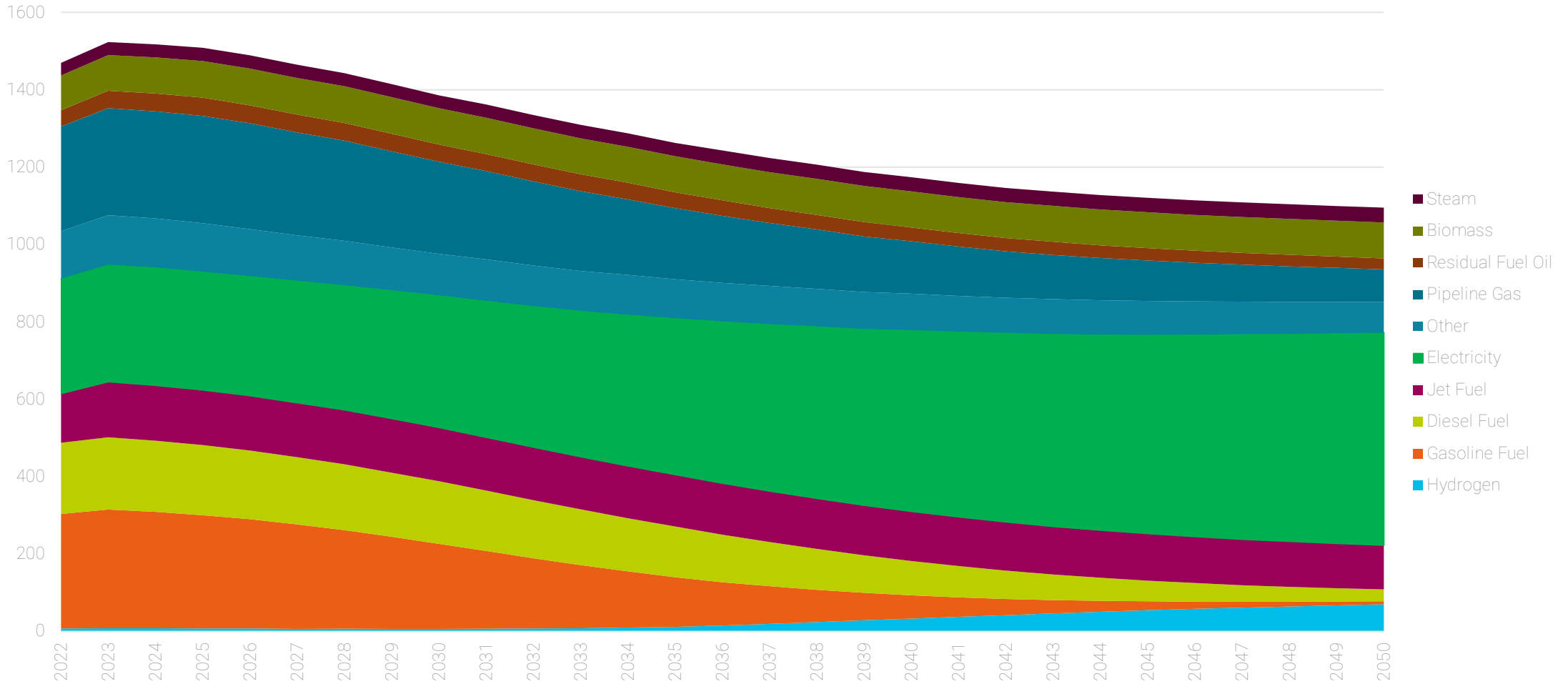
- Align strategy with clean electricity laws
  - Energy Independence Act (I-937, 2006)
  - Clean Energy Transformation Act (SB 5611, 2019)
    - After 2025, no coal in resource mix
    - By 2030, greenhouse neutral electricity supply
    - By 2045, 100% renewable or non-emitting sources
- Align strategy 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.

Final energy demand 2020-2050



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

Final energy demand by energy form



Role of hydrogen in the Energy Strategy

- Source of flexible load for the power system
  - Wind and solar plants are variable
  - Hydrogen production can ramp up and down to absorb excess generation
- Replacement for transportation fuels
  - Marine and heavy duty vehicles
- Industrial processes
  - Replace existing sources of fossil-derived hydrogen
  - Replace fossil fuels for high-temperature processes

Washington state and federal hydrogen updates

Recent policy updates

Washington policy context

- Clean Energy Transformation Act
  - 100% clean electricity standard by 2045
- Net zero GHG emission limits
  - Statutory targets of net zero by 2050
- Climate Commitment Act
  - Cap and invest program covering about 75% of emissions
- HEAL Act
  - Requirements for state agencies to advance environmental justice
- Labor standards incentives

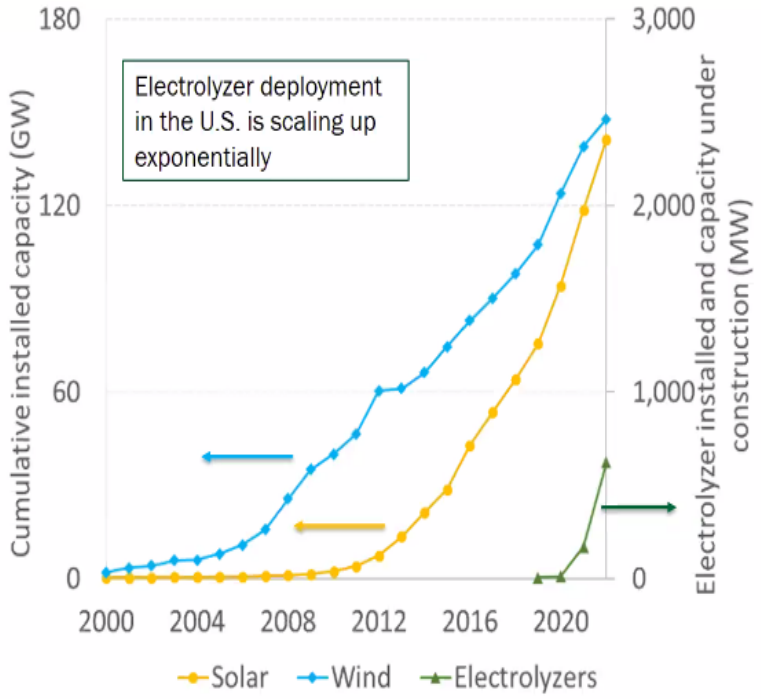
Hydrogen policy updates 2022

- SB 5910
  - New Office of Renewable Fuels
  - "Green electrolytic hydrogen" definition
  - Authorities
  - H2Hub references, including engagement
  - Report and recommendations
- HB 1812
  - Siting for clean energy projects, including hydrogen
- HB 1988
  - Clean energy manufacturing incentives, including for hydrogen
  - Labor standards

Green hydrogen capacity and growth

Hydrogen production: Strong steer to move from grey to green.

<1GW installed electrolyzer capacity now – but opportunity for exponential growth.



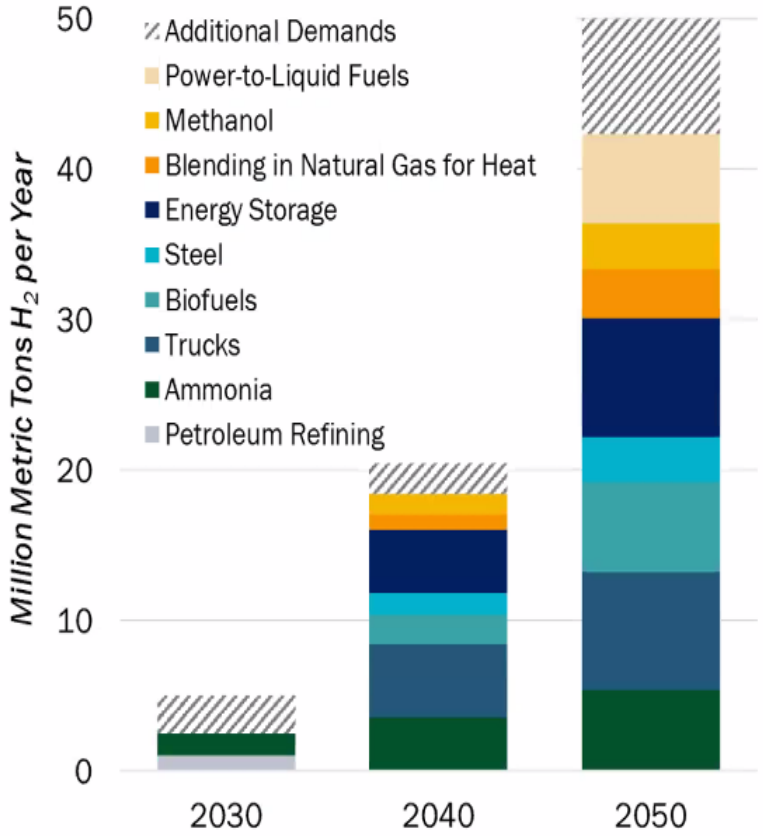
Global electrolyzer market estimates vary

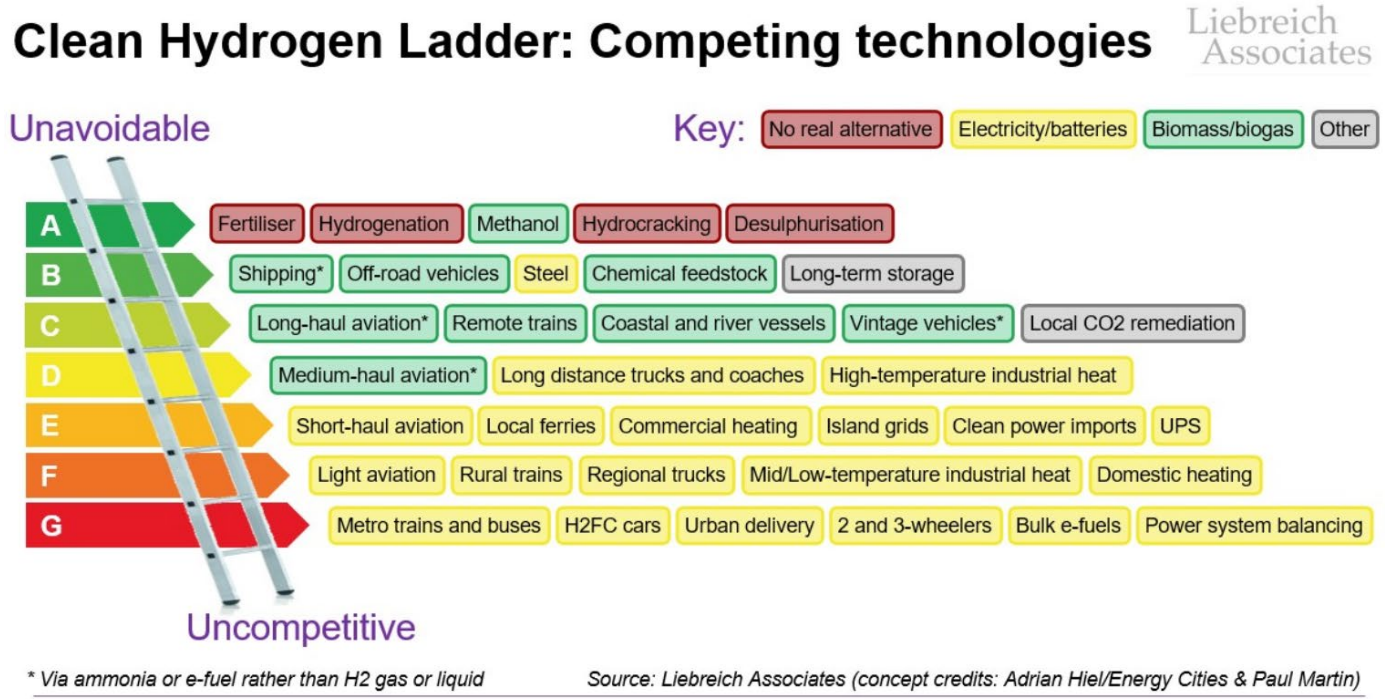
Scenarios show over 60 GW by 2030

Sources: M. Koleva, HFTO/NREL, BNEF, 2021, Global Installed Capacity, IHS Markit, 2021, Hydrogen – CEH, Arjona, V. and Buddhavarapu, P., 2021, DOE Hydrogen Program Record. Electrolyzer Capacity Installations in the United States, Arjona, V., 2022, DOE Hydrogen Program Record. PEM Electrolyzer Capacity Installations in the United States, M. Klippenstein, CHFCA, EIA

Source: US Department of Energy 2022 Annual Merit Review and Peer Evaluation Meeting

What about the end uses?





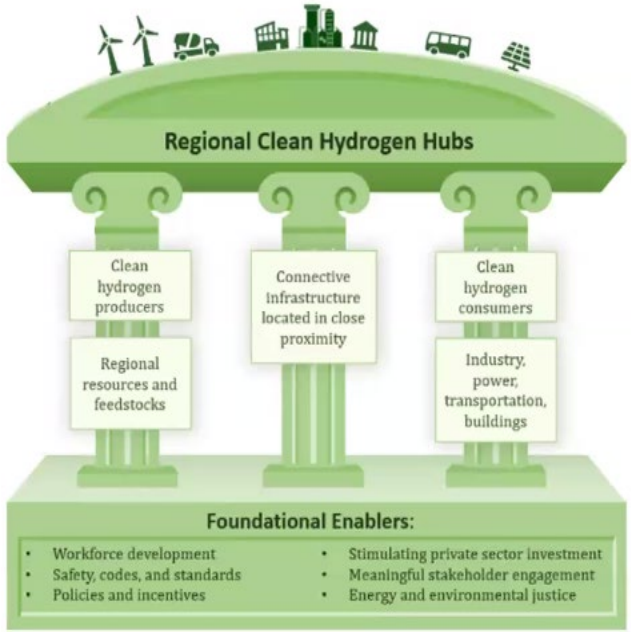
Source: US Department of Energy 2022 Annual Merit Review and Peer Evaluation Meeting

Federal goals and funding

- Department of Energy Hydrogen Shot – "1 1 1"
  - Reduce the cost of clean hydrogen to $1 per kilogram in one decade
- Infrastructure Investment and Jobs Act
  - $8 billion Regional Clean Hydrogen Hubs
  - $1.5 billion Clean Hydrogen Manufacturing, Recycling and Electrolysis

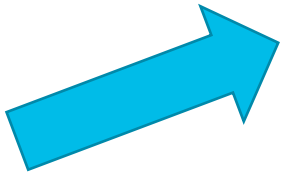
H2Hubs key information

- $8 billion to at least four hubs
- At least one each based on:
  - Renewable hydrogen
  - Natural gas with carbon capture and storage
  - Nuclear
- At least one each for different end uses:
  - Electric power generation
  - Industrial sector
  - Residential and commercial heating
  - Transportation sector
- 10 year timeframe
  - Notice of intent released, full applications likely Q1/Q2 2023
  - For work done over 8-10 year timeframe



DOE H2Hub priorities

- Hydrogen Shot:
  - Contribute to 80% cost reduction
- Support clean hydrogen
  - With intent to evaluate life cycle emissions
- Align production and use
  - Avoid hydrogen "stranded assets"
- Equity, Environmental and Energy Justice, Justice40
  - Justice40 program
  - Non-GHG air quality improvements
  - Consent-based siting
- Employment and job creation
  - Focus on U.S. jobs, manufacturing and engaging existing workforce



Justice40 and HEAL Act

40% of overall benefits of certain Federal investments must flow to disadvantaged communities

DOE: "Hub deployment will focus both on reducing harm and increasing benefits to disadvantaged communities"

WA context : Alignment with HEAL Act

Local opportunities

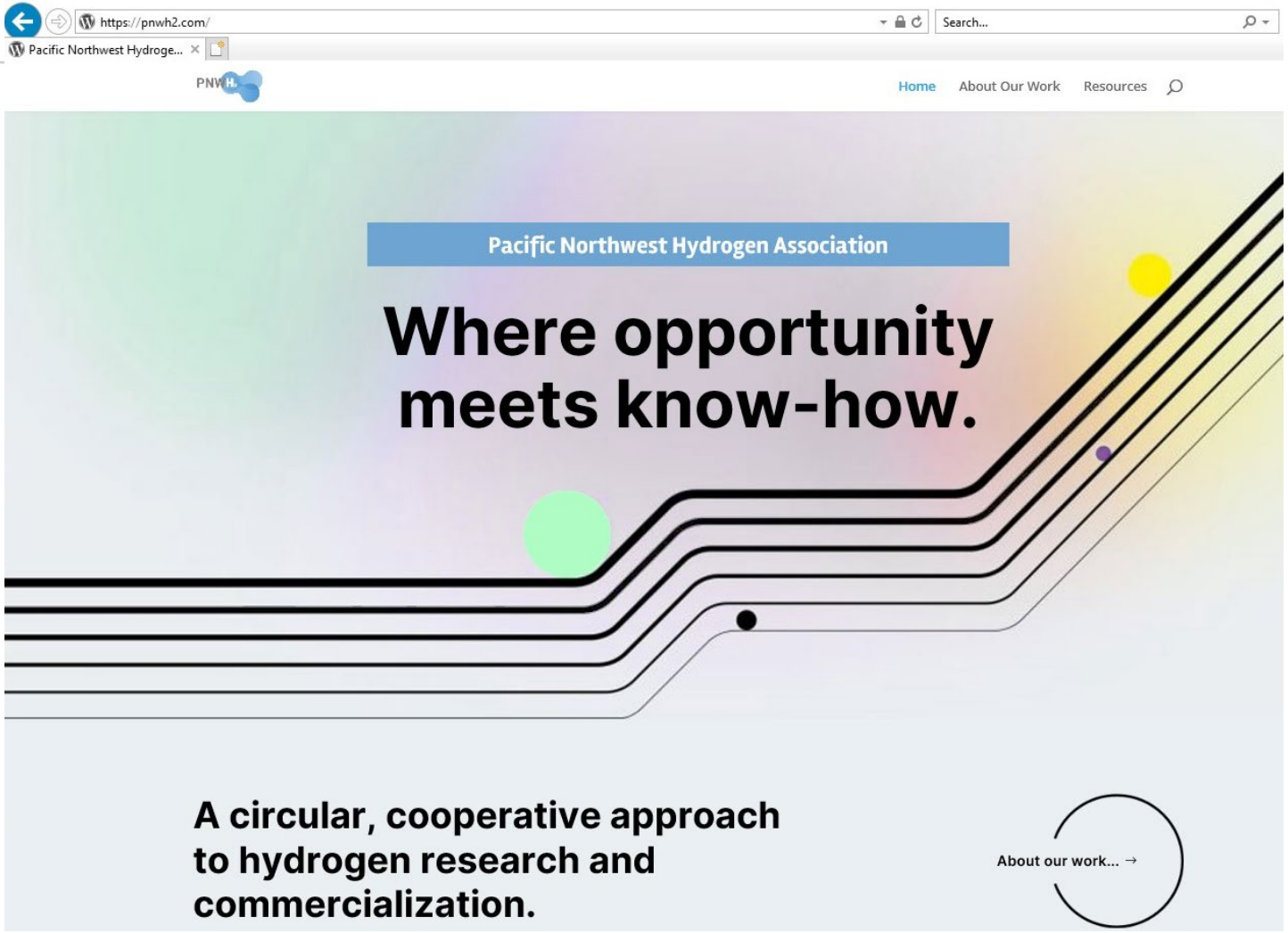
Washington planning for H2Hubs

Commerce updates

RFI responses

Established Pacific Northwest Hydrogen Association

Office of Renewable Fuels



Critical next steps

- Equity, Environmental & Energy Justice Plan
- Workforce Development and Jobs Plan
- Tribal Engagement – multiple pathways
- Community engagement
- Use of mapping and geospatial tools & data
- Domestic, clean technology manufacturing
- Energy emergency management and planning
- Industry clusters

Thank you!

Glenn Blackmon, Ph.D.
MANAGER, ENERGY POLICY OFFICE

Glenn.Blackmon@commerce.wa.gov

360.339.5619

Stephanie Celt
SENIOR ENERGY POLICY SPECIALIST

Stephanie.Celt@commerce.wa.gov

360-819-3521

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