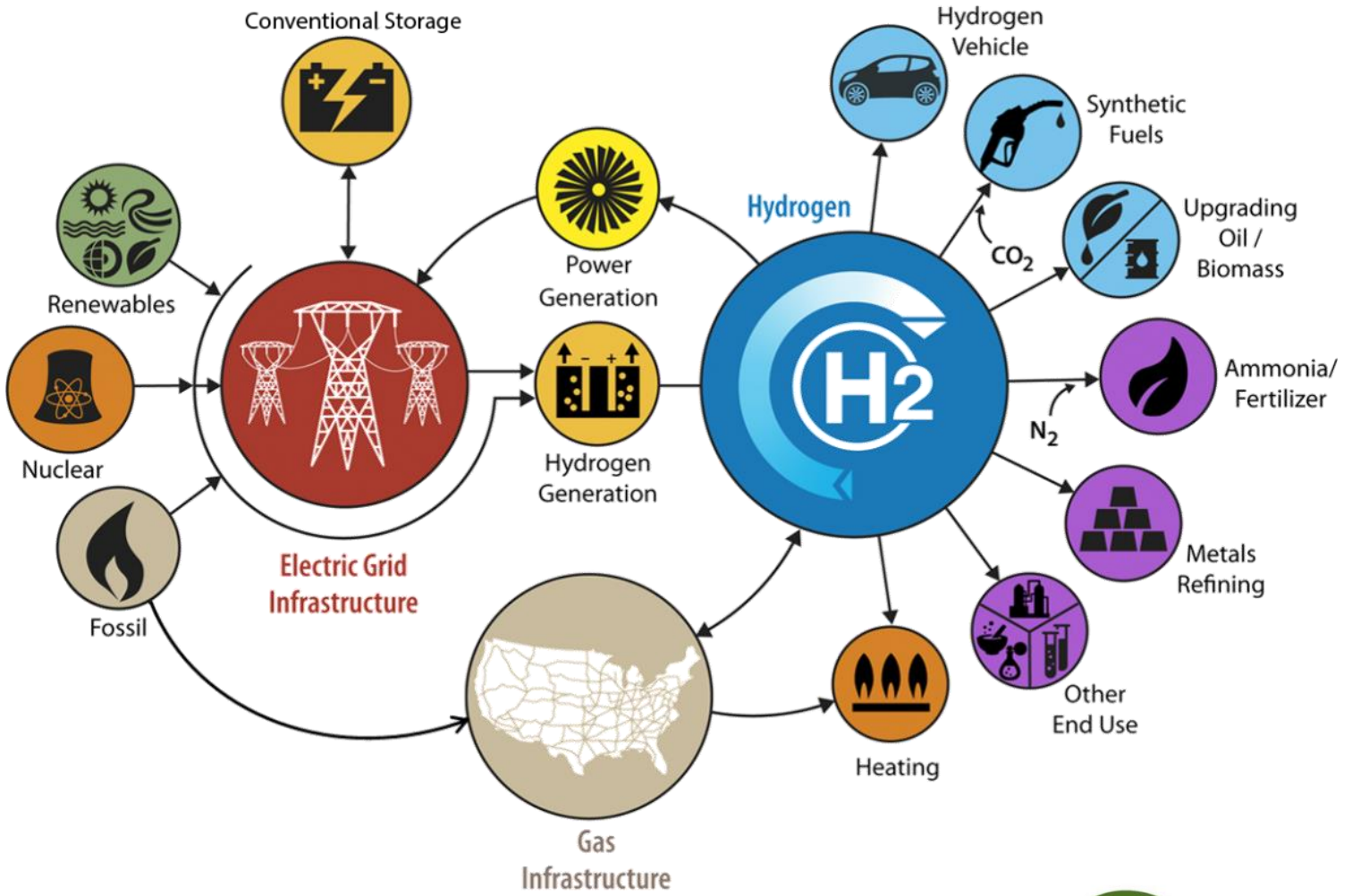


Oregon Department of ENERGY

Oregon + RH2 Stakeholder Workshop

Rebecca Smith
September 15, 2022



WORKSHOP AGENDA

- Welcome and logistics
- Business Oregon Introduction
- Recap of H2 hub opportunity
- Presentation on PNWH2
- Guided discussion
- Recap and next steps





OREGON DEPARTMENT OF ENERGY

Leading Oregon to a safe, equitable, clean, and sustainable energy future.

Our Mission

The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do

On behalf of Oregonians across the state, the Oregon Department of Energy achieves its mission by providing:

- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

HOW THIS MEETING WILL BE FACILITATED

Panelists and Attendees

- **Panelists** – ODOE staff and Business Oregon staff for introductions; ODOE staff facilitating Q&A and moderating the discussion.
- **Attendees** – Time is reserved for attendee feedback & discussion after the presentations. During the presentations, attendees may ask clarifying questions.

Community Agreements:

- Be present and ready to learn.
- Be respectful to others.
- Learning happens outside of our comfort zones.
- Listen to learn first, and to supply information or perspectives second.
- Thank you for being flexible and patient around any technology needs or changes.
- If you need something at this meeting, please ask for it!
- Technical issues or questions: Contact “**Host**” in the chat or send an email to Linda.Ross@Energy.Oregon.Gov

OPTIONS TO ASK QUESTIONS AND PROVIDE FEEDBACK

Objective of Today's Workshop: Share information about the Regional Clean Hydrogen Hub opportunity and the work underway for a joint WA-OR concept, provide opportunity for the public to ask clarifying questions, and provide an opportunity for discussion with ODOE, the Technical Advisory Committee, and among stakeholders and the public.

During Today's Workshop

- During the presentations, please use the chat to ask any clarifying questions. We will continually pause to see if there are any questions or to address those that have been entered into the chat.
- We have set aside the second half of the workshop for discussion. You may enter questions or comments for discussion in the chat during the presentation, but we will wait to address them until the discussion period. During the discussion, you can indicate a question in the chat or use the “raise hand” function. When the moderator calls on you, please unmute yourself to speak.

After the Workshop

- Please submit any additional written feedback after today's meeting to Rebecca Smith at

USING WEBEX

Audio Options

Mute *Microphone On*

Unmute *Microphone Off*

Speaker

- Use system setting (ThinkPad USB-...)
- Headset Earphone (ThinkPad USB-...)
- Speakers (Realtek(R) Audio)
- E1342CKR (Intel(R) Display Audio)

Microphone

- Use system setting (ThinkPad USB-...)
- Microphone Array (Realtek(R) Audio)
- Headset Microphone (ThinkPad US-...)

Webex smart audio

Noise removal

Audio settings...

You're using computer for audio

Switch audio

You can check Speaker and Microphone settings by clicking the arrow next to Mute/Unmute.

The screenshot shows a Cisco Webex Events window. The main content area displays a presentation slide titled "Oregon Department of ENERGY" and "Oregon + RH2 Stakeholder Workshop" by Rebecca Smith on September 15, 2022. To the right of the slide is a circular diagram illustrating the hydrogen energy cycle, including components like Conventional Storage, Hydrogen Vehicle, Synthetic Fuels, Upgrading Oil/Biomass, Ammonia/Fertilizer, Metals Refining, Other End Use, Heating, Gas Infrastructure, Hydrogen Generation, Power Generation, Nuclear, Renewables, and Fossil. The diagram is centered around a blue circle with "H2".

On the right side of the window, there is a "Participants (2)" list showing "shIELa.alICar@energy.orego..." as the Host (internal) and "DEMO Att... Me" as an Attendee. Below this is a "Chat" section with a "To: Everyone" dropdown and an "Enter chat message here" input field. At the bottom of the window, there is a control bar with an "Unmute" button, a "Reactions" icon, and "Participants" and "Chat" buttons.

Second Raise Hand Option

You can also click on the hand next to your name in the Participant list to raise your hand.

Click on Lower hand when you are done.

This close-up shows the "Attendees (1)" section of the participant list. It displays the name "DEMO Att... Me" with a small hand icon to its right, indicating the option to raise one's hand.

Chat

You can chat to Everyone in the meeting.

This screenshot shows a chat window with a message from "shIELa.alICar@energy.oregon.gov to everyone" at 12:59 PM that says "Hello to Everyone!". The "To:" dropdown is set to "Everyone".

You can send a private message to the Host or Presenter (or all Panelists when there is a Panel).

This screenshot shows a private chat window. The "To:" dropdown is set to "shIELa (Host)". A message from "shIELa (Presenter)" at 1:00 PM says "Hello to Sheila!".

Reactions

This screenshot shows the "Reactions" menu. It includes a "Raise hand" button, a "Send reaction" section with various emoji icons, and a "Lower hand" button at the bottom.

Click to Raise your hand.

This close-up shows the "Lower hand" button, which is used to indicate that the participant has finished their presentation or question.

Click on Lower hand when you are done.

This close-up shows the "Attendees (1)" section of the participant list, highlighting the hand icon next to the name "DEMO Att... Me".



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The Regional Clean Hydrogen Hub Opportunity

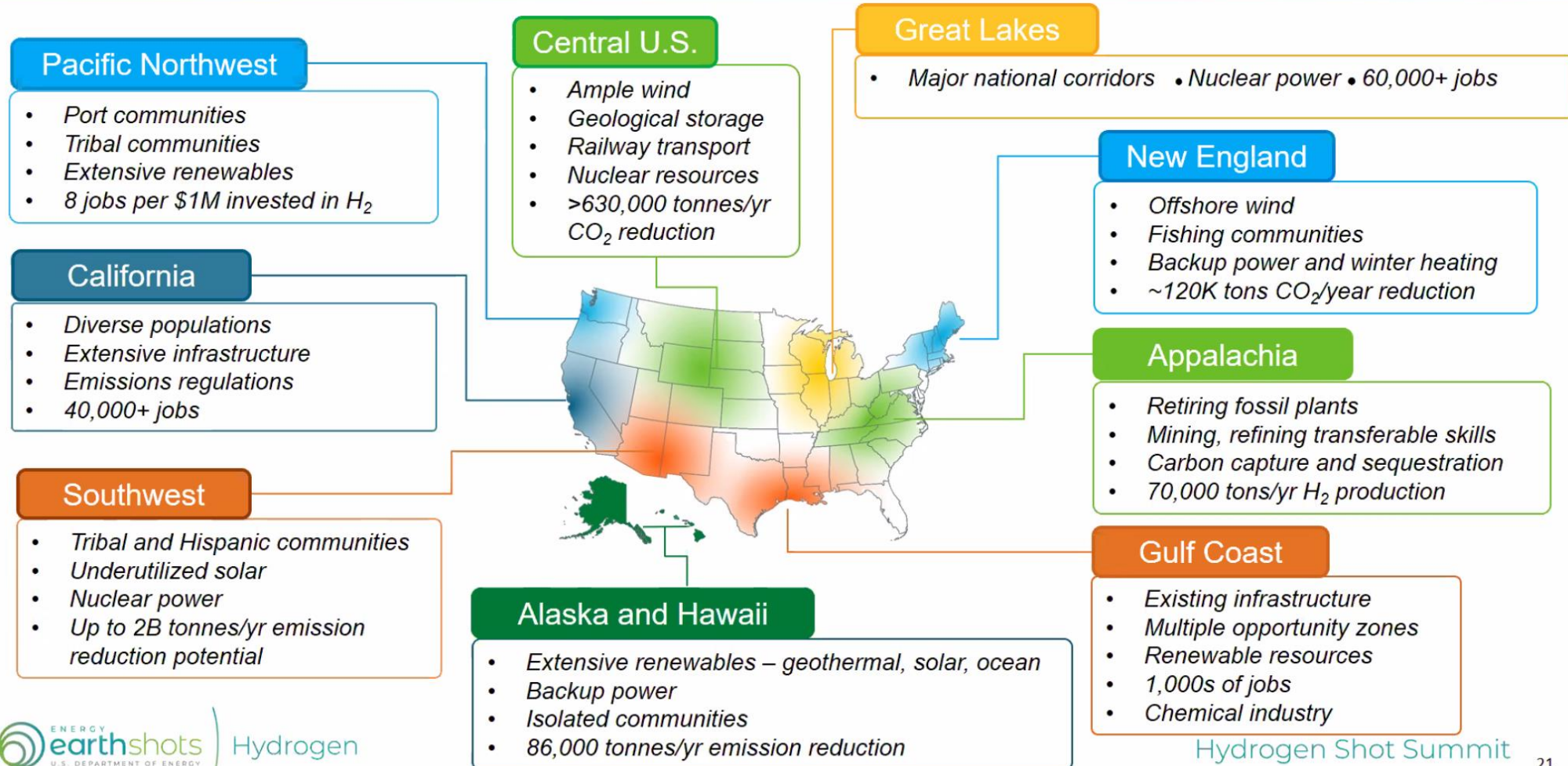


Regional Clean H2 Hub Opportunity

- \$8 billion dollars in funding for hubs as part of IIJA (2021)
 - Possibly \$500 million - \$1 billion per hub
- Part of U.S. DOE Hydrogen Shot – goal of \$1 per 1kg in 1 decade (“1 1 1”)
- Technology agnostic approach as long as low-carbon threshold is met
- Hub applications must address each part of the make, move, store, and use part of the hydrogen lifecycle
- Official funding opportunity announcement expected in Sept. or Oct.
 - First step is to submit concept paper
 - From concept papers, DOE will invite certain respondents to submit full proposals

U.S. DOE RFI FINDINGS

RFI findings: Regional clusters and geographic factors



U.S. DOE RFI FINDINGS (CONT'D)

Pacific Northwest Regional Cluster Responses

Regional resources for production and infrastructure

- Ample hydropower, nuclear, and wind
- Sites: Port of Tacoma, Richland, Boardman, Centralia
- Production of 20 – 400 tons/day, 3-4 H₂ fueling stations funded and planned in WA in the next year
- High-capacity electrical infrastructure - up to 100 MW electrolyzer complexes

Emissions Reduction Potential

- 35% emissions reduction and up to 75% reduction when CCS is used
- 15,000 - 92,000 tons of CO₂ reduction potential per year

End Users, Cost, Value Proposition

- Estimated \$3.50-\$18/kg production cost
- CAPEX/project between \$12.5-100M and OPEX ~\$200K
- Portable and back-up power, data centers, oil refining and port cargo handling, chemicals, FCEVs

DEI, Jobs, EJ

- Diverse tribal and Hispanic communities
- Fugitive gas and CCS can transition current oil and gas jobs

Co-location Potential

- Projects on land owned by local tribe
- Estimates 8 jobs per \$1m invested in H₂ infrastructure
- Projects in areas with 30%-65% non-white population





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Pacific Northwest H2 Association (PNWH2)

Trillium Lake, Mt. Hood

BACKGROUND ON PNW HUB + PNWH2

Nov 2021 – Mar 2022

Discussions on potential hub led by CHARGE in WA, with ODOE and Oregon entities participating

April 2022

PNWH2 incorporated as public-private partnership to coordinate the development of a PNW H2 hub proposal

June 2022

PNWH2 opens first RFI, Executive Board formed

July – Sept 2022

Executive Board meetings, development of project concept ideas and project grading criteria, M&O contractor secured, RFI reopened

PNWH2 EXECUTIVE BOARD

LABOR

- WA State Labor Council AFL-CIO
- United Steelworkers Local 12-591
- ILWU WA Area District Council

UTILITIES

- Tacoma Public Utilities
- Douglas County PUD
- Puget Sound Energy

STATE GOVERNMENT

- Washington Dept. of Commerce
- Oregon Dept. of Energy

TRIBAL REPRESENTATIVES

- Confederated Tribes of the Chehalis Reservation
- Cowlitz Indian Tribe

OIL + GAS

- PAR Pacific
- BPAmerica

OTHER

- Sierra Club
- Amazon
- CHARGE (WA state innovation cluster member)
- First Mode (Engineering firm)
- Plug Power (H2 industry)
- Fortescue Future Industries (H2 industry)

PNWH2 ADVISORY COMMITTEE

- WA Dept. of Commerce accepted to Advisory Committee anyone who submitted application (resume and references)
- 58 members at this time - many are RFI respondents
 - 33% from advocacy, NGOs, lobbyists
 - 30% from industry
 - 25% from government, utility, port, or transit board
 - 13% from academia
- Plan to allow Advisory Committee members to self-select into sub-committees:
 - Engineering, Procurement, Construction, Operations
 - Business Development and Management
 - Permitting and Safety
 - Community Engagement and Impacts
 - Technical Data and Analysis
 - Production
 - Storage
 - Transport
 - End Use
 - Ports and Maritime Applications
 - Ground Transportation End-Use and Infrastructure
 - Industrial Uses

PNWH2 ADVISORY COMMITTEE (CONT'D)

ROLES + RESPONSIBILITIES

- Serve as focus groups of experts and provide input to inform Executive Board's strategic decision-making and actions.
- Engage stakeholders, including communities, companies, and organizations in the region – provide important avenue for outreach and dissemination of information regarding the proposed hub.
- May be asked to develop and/or review elements of the hub application – if so, would be required to sign NDA.
- Each Advisory Committee sub-committee will have a Chair and a Board liaison.

FIRST RFI

- Put together and published by CHARGE and WA Dept. of Commerce before first Executive Board meeting – Open from June 23 to July 26
- Goal of first RFI was to get a feel for the landscape of potential projects with understanding that this would not be the only opportunity to get information on projects
- Received 76 complete responses
 - Majority of projects submitted located in WA and Puget Sound region
 - Significant number of projects in Eastern WA
 - Over half of responses from private, for-profit entities
 - Over 20 percent of responses from government entities

PROJECT SELECTION COMMITTEE + M&O

PROJECT SELECTION COMMITTEE

- Separate from Executive Board due to antitrust issues
- Projects to be scored in a “clean room” format according to grading criteria
 - Grading criteria in draft form – to be finalized with input from M&O contractor as soon as FOA is live

M&O CONTRACTOR

- WA Dept. of Commerce issued RFQQ for M&O contractor – in final contracting stages
- M&O contractor hired to lead hub planning and application development (phase 1) and hub construction and deployment (phase 2)

DISCUSSION



DISCUSSION QUESTIONS

PNWH2 AND OREGON'S ROLE

- What questions or concerns do you have related to the PNWH2, its Executive Board, or its Advisory Committee?
- How would you like to see ODOE use its role on the Executive Board with respect to development of the hub concept, project selection criteria, timeline, or other factors?

PNWH2 AND OREGON'S ROLE

- What should be the key attributes of the PNW H2 Hub?
- If the hub is focused on renewables and transportation, as is likely, how do we separate ourselves from other renewable- and transportation-focused hub concepts?
- What key benefits might we expect to achieve locally, including those related to economics, clean energy development, technology, and environmental justice?

PNWH2 AND OREGON'S ROLE

- How would you like to use this opportunity for convening Oregon stakeholders interested in renewable hydrogen development and/or consumption?



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