OCED
Office of Clean Energy Demonstrations

THE OFFICE OF
CLEAN ENERGY DEMONSTRATIONS

Regional Clean Hydrogen Hubs
National Environmental Justice Briefing

October 16, 2023

Office of Clean Energy Demonstrations

U.S. Department of Energy

Welcome

Agenda

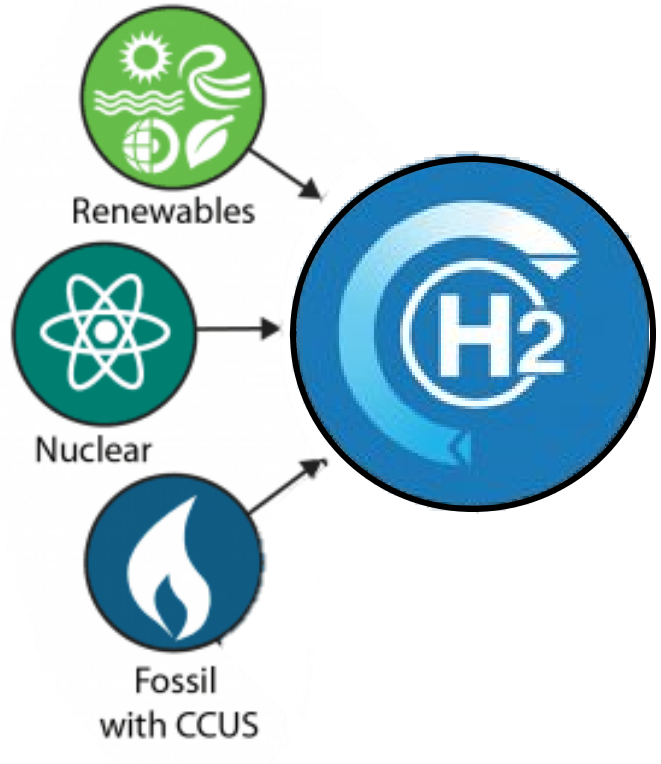
- Welcome and Opening Remarks
- Overview
- Selected Regional Clean H2Hubs Projects Overview
- Community Benefits
- Next Steps & Resources

Opening Remarks

Overview

What is Hydrogen?

- **Hydrogen (H_2)** is the simplest and most abundant element known.
  - You might recognize it from the chemical formula for water – **H_2O**!

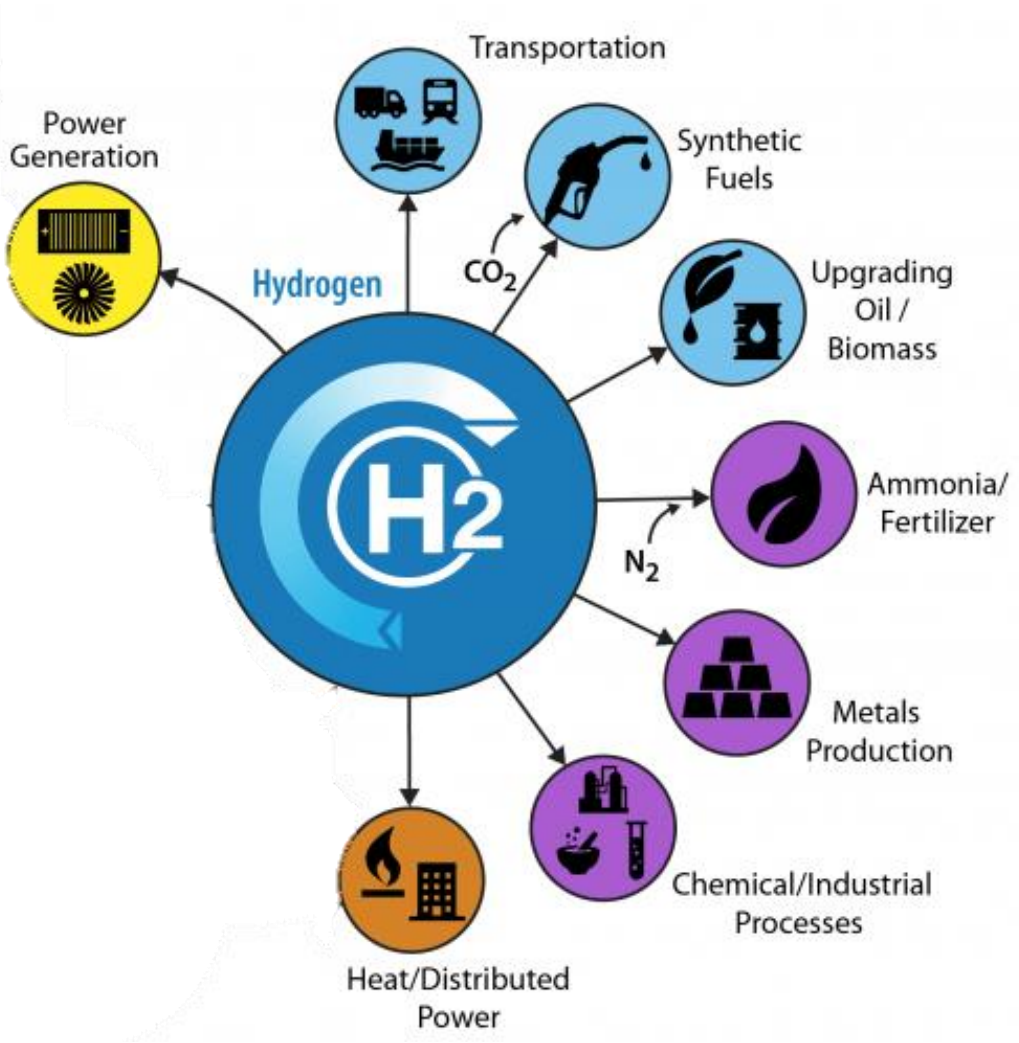


- **Hydrogen can be made using a variety of domestic energy resources.**
- Hydrogen can be produced through several processes, including:
  - Electrolysis; Direct Solar Water Splitting
  - Thermal Conversion Processes
  - Biological (e.g., algae)
- **Currently, the U.S. produces 10 million metric tons of hydrogen each year.**

What Can Hydrogen Do?

- Hydrogen is **part of a suite** of solutions that can help our nation achieve its net-zero goals and reduce dependence on fossil fuels.
- Helps hard-to-decarbonize sectors such as **heavy-duty transportation**, **steel and chemicals** manufacturing, and production of **liquid fuels**.
- Supports **increased integration of renewable energy** into the grid and offers multiple revenue streams for clean power generation.

Due to environmental injustice these industries are disproportionately placed in disadvantaged communities, therefore, decarbonization efforts should happen in partnership with disadvantaged communities



Hydrogen End Use Benefits for DACs

Why decarbonize industries in disadvantaged communities?

Refining and chemical production make up 60% of industrial greenhouse gas emissions: decarbonization needed to reach climate goals.

Solar, wind, geothermal and other clean energy technologies require raw materials (e.g. steel, aluminum, chemicals) from hard to decarbonize industries.

Decarbonizing these industries can reduce pollution impacts in disadvantaged communities

Transport: Air pollution disproportionately affects people in disadvantaged communities contributing to higher rates of asthma, heart disease other health problems. Hydrogen fuel cell vehicles only emit water and heat and will eliminate many of the air pollutants caused by traditional combustion engine vehicles.

Metals, Chemical Manufacture, Refining and Electricity Generation: These industries cause air pollution beyond GHGs including PM, SOx and ozone. Replacing fossil fuels with H2 can help address emissions from heavy industry and on-site power generation.

Whole of Government Approach to Clean Hydrogen

U.S. National Clean Hydrogen Strategy and Roadmap

Clean Hydrogen Standard

IRA tax incentives

Coordination with Canada and Mexico
on building out the clean hydrogen supply chain and economy across North America

Hydrogen Shot
($1/kg by 2031)

H2Hubs Demand-Side Support Initiative

Clean Hydrogen Pathways to Commercial Lift-Off Report

Additional DOE funding:
Clean H2 Electrolysis
Clean H2 Manufacturing and Recycling
(additional $1.5B)

AND…

Regional Clean Hydrogen Hubs

Build 6-10 regional clean H2Hubs across the country to create networks of clean hydrogen producers, consumers, and local connective infrastructure to accelerate use of clean hydrogen.

H2Hubs Demand-Side Support Initiative

- Sept 2023: Announced $1B RFP. Responses are due on October 26, 2023.
- Learn more about the initiative here: https://www.youtube.com/watch?v=QgOL_Xg7K1Q

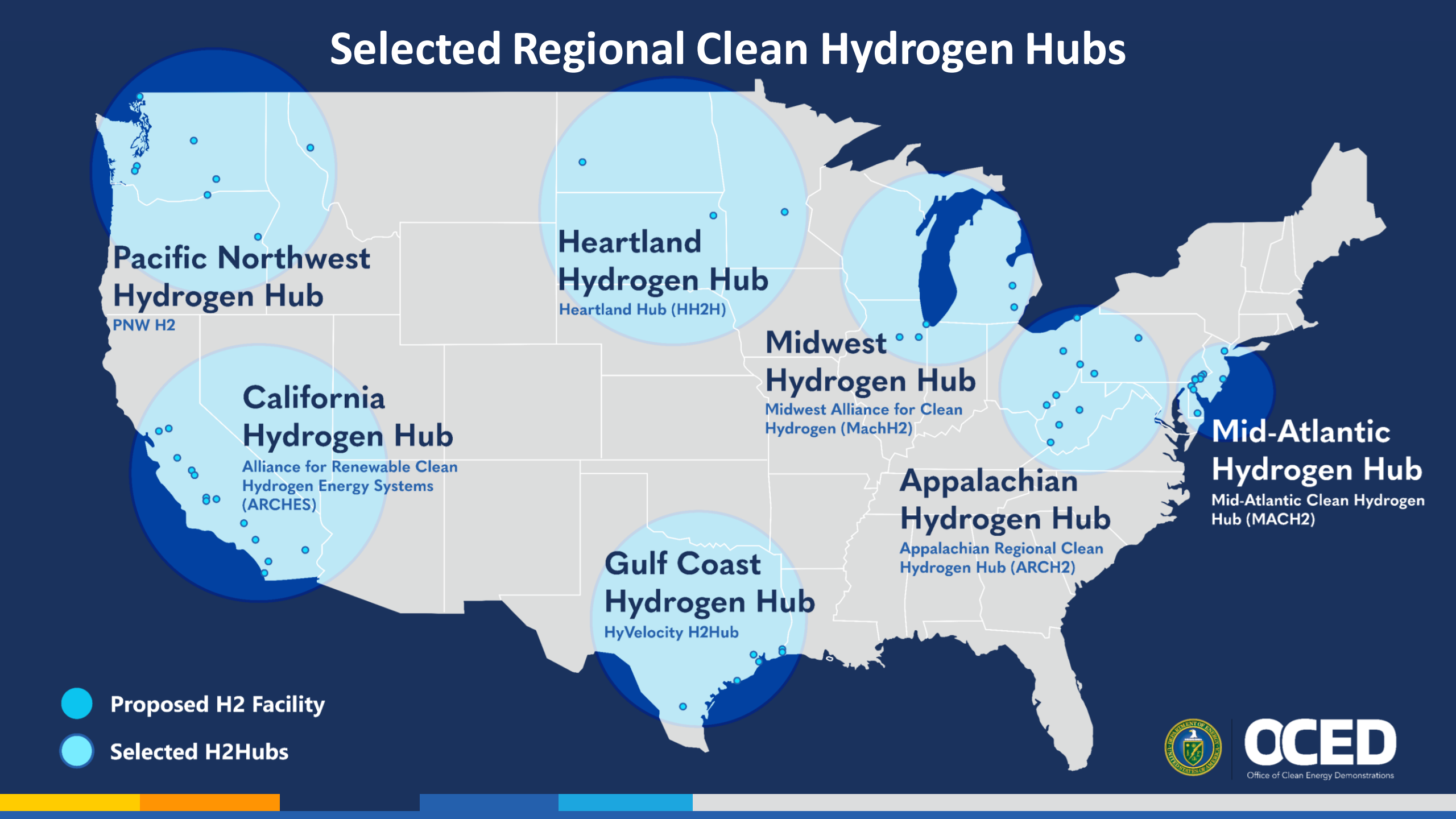
H2Hubs Current Status

- **October 2023: DOE announced 7 projects selected for award negotiations.**
- April 2023: Received full applications.

What is a Regional Clean Hydrogen Hub?

Selected H2Hubs Project Overviews

Selected Regional Clean Hydrogen Hubs



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Selected H2Hubs Overview

Unprecedented Investment in America's Hydrogen Infrastructure

Federal investment of $7 billion

To accelerate adoption of hydrogen technologies

Approximately 3 Million Metric Tons of Hydrogen Production per Year

Providing tangible benefits for Americans

Dedicated Dollars for Community Benefits

Tens of Thousands of Jobs

Greenhouse Gas Reduction of 25 million Metric Tons Per Year

Appalachian Hydrogen Hub

Selectee: Appalachian Regional Clean Hydrogen Hub (ARCH2)

Project Overview

Prime Applicant:
Battelle Memorial Institute

Locations:
Ohio, Pennsylvania, and West Virginia

Federal Cost Share:
Up to $925 Million*

*Pending negotiations

Production

- Thermal conversion
- Electrolysis

Midstream

- Hydrogen pipelines
- Hydrogen fueling stations
- Permanent CO_2 storage

End Uses

- Fuel cell electric mining vehicles
- Heavy duty vehicles
- Heavy industry

Appalachian Hydrogen Hub

Selectee: Appalachian Regional Clean Hydrogen Hub (ARCH2)

Community Benefits - Highlights

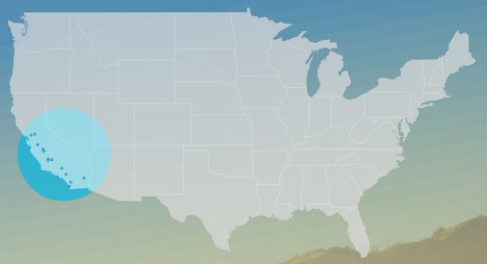
Creation of over 21,000 jobs, including more than 18,000 construction jobs and 3,000 permanent jobs.

Plan to make a Community Benefits Advisory Board to oversee implementation of the Community Benefits Plan (CBP).

Plan to make a Community Commitment Fund to ensure it reenergizes the Appalachian region economically, socially, and environmentally.

California Hydrogen Hub

Selectee: Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES)



Project Overview

Prime Applicant:
Alliance for Renewable Clean Hydrogen Energy Systems

Location:
California

Federal Cost Share:
Up to $1.2 Billion*

*Pending negotiations

Production

- Thermal conversion
- Electrolysis

Midstream

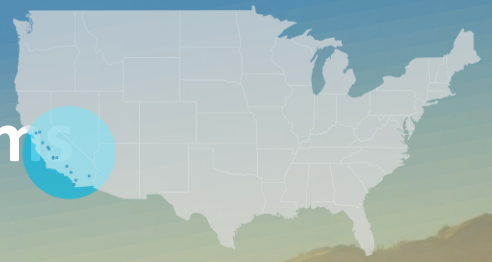
- Freight network between California & Pacific Northwest Hub
- Hydrogen fueling stations

End Uses

- Backup power generation
- Heavy duty vehicles
- Port equipment
- Public transit

California Hydrogen Hub

Selectee: Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES)



Community Benefits - Highlights

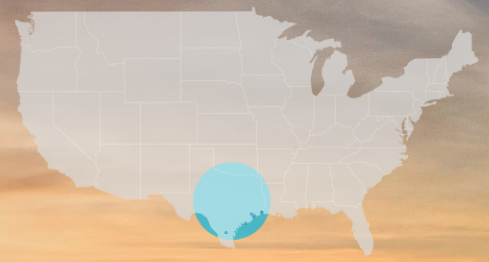
Creation of 220,000 jobs, including 130,000 construction jobs, and 90,000 permanent jobs.

Inclusion of independent monitoring and a CBP scorecard with monetary penalties for noncompliance.

Committed to requiring Project Labor Agreements (PLAs) for all projects connected to the Hub.

Gulf Coast Hydrogen Hub

Selectee: HyVelocity H2Hub



Project Overview

Prime Applicant:
HyVelocity, Inc.

Location:
Texas

Federal Cost Share:
Up to $1.2 Billion*

*Pending negotiations

Production

- Thermal conversion
- Electrolysis

Midstream

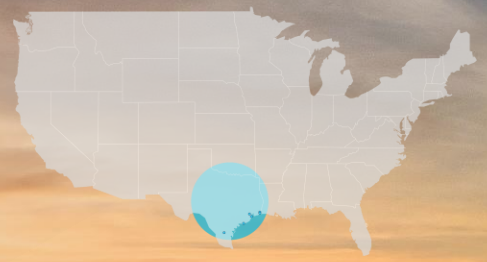
- Hydrogen pipeline
- Salt cavern storage
- Hydrogen refueling stations

End Uses

- Heavy duty vehicles
- Power generation
- Ammonia
- Refineries / petrochemicals
- Marine fuel

Gulf Coast Hydrogen Hub

Selectee: HyVelocity H2Hub



Community Benefits - Highlights

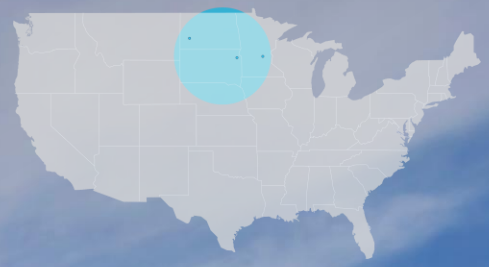
Creation of approximately 45,000 jobs, including 35,000 construction jobs, and 10,000 permanent jobs.

Plan to create a Community Advisory Board, which includes two councils that will leverage the capabilities of education and community partners, to support inclusive and equitable workforce development and community investment.

A key Justice40 benefit is the reduction of air pollution, including particulate matter.

Heartland Hydrogen Hub

Selectee: Heartland Hub (HH2H)



Project Overview

Prime Applicant:
Energy and Environmental Research Center (EERC)

Locations:
Minnesota, North Dakota, and South Dakota

Federal Cost Share:
Up to $925 Million*

*Pending negotiations

Production

- Thermal conversion
- Electrolysis

Midstream

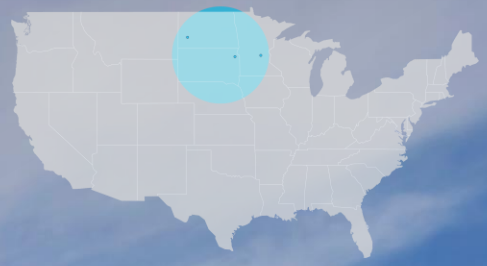
- Open access storage and pipeline infrastructure

End Uses

- Fertilizer
- Power generation

Heartland Hydrogen Hub

Selectee: Heartland Hub (HH2H)



Community Benefits - Highlights

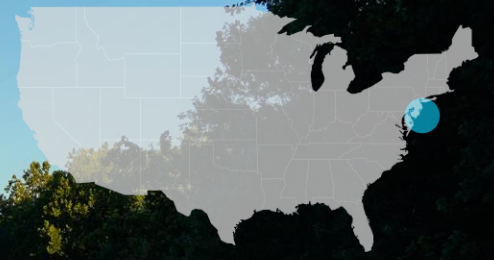
Creation of over 3,880 jobs, including more than 3,067 construction jobs, and 703 permanent jobs.

Creation of an education consortium to oversee career development, workforce training, apprenticeship programs, and K – 12 STEM education.

Goal to contract millions of dollars for businesses owned by women, minorities, disabled veterans, disadvantaged communities, or LGBTQ persons.

Mid-Atlantic Hydrogen Hub

Selectee: Mid-Atlantic Clean Hydrogen Hub (MACH2)



Project Overview

Prime Applicant:
Mid-Atlantic Clean Hydrogen Hub, Inc.

Locations:
Delaware, New Jersey, Pennsylvania

Federal Cost Share:
Up to $750 Million*

*Pending negotiations

Production

- Thermal conversion
- Electrolysis

Midstream

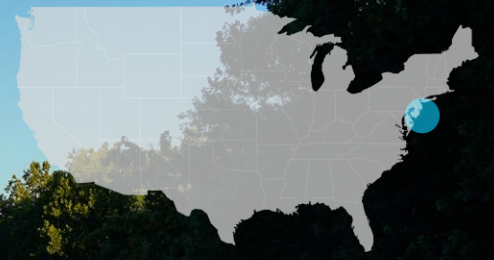
- Expanded pipeline infrastructure
- Upgraded bus mechanic depots
- Hydrogen refueling stations

End Uses

- Heavy duty vehicles
- Refuse and sweeper trucks
- Power generation
- Combined heat and power

Mid-Atlantic Hydrogen Hub

Selectee: Mid-Atlantic Clean Hydrogen Hub (MACH2)



Community Benefits - Highlights

Creation of 20,800 jobs, including 14,400 construction jobs, and 6,400 permanent jobs.

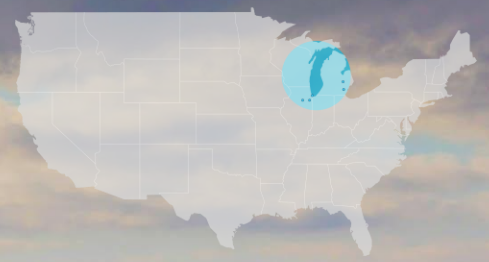
Plan to negotiate project labor agreements (PLAs) for all projects.

Anticipate providing close to $14 million for regional Workforce Development Boards that will serve as partners for community college training and pre-apprenticeships.

Plan to provide additional $10 million for technical and professional development initiatives.

Midwest Hydrogen Hub

Selectee: Midwest Alliance for Clean Hydrogen (MachH2)



Project Overview

Prime Applicant:
Midwest Alliance for Clean Hydrogen (MachH2)

Locations:
Illinois, Indiana, Michigan

Federal Cost Share:
Up to $1 Billion*

*Pending negotiations

Production

- Electrolysis
- Thermal conversion

Midstream

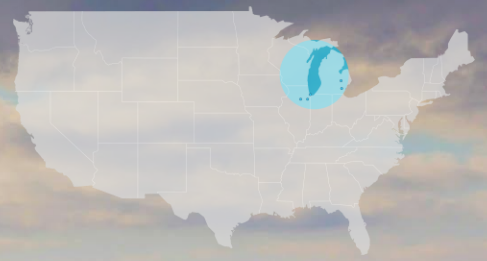
- Hydrogen refueling stations

End Uses

- Steel and glass production
- Power generation
- Refining
- Heavy duty vehicles
- Sustainable aviation fuel

Midwest Hydrogen Hub

Selectee: Midwest Alliance for Clean Hydrogen (MachH2)



Community Benefits - Highlights

Creation of over 13,600 jobs, including 12,100 construction jobs, and 1,500 permanent jobs.

Created specific targets, including 40% of total subcontracted dollars going to Minority/Disadvantaged Business Enterprises (M/DBEs), roughly $30 million for new startups through an inclusive entrepreneurship program (focusing on M/DBEs), and a target of 45% diverse hiring.

Plan to invest $15 Million in wrap-around services for a worker education program.

Pacific Northwest Hydrogen Hub

Selectee: PNWH2

Project Overview

Prime Applicant:
Pacific Northwest Hydrogen Association

Locations:
Montana, Oregon, and Washington

Federal Cost Share:
Up to $1 Billion*

*Pending negotiations

Production

- Electrolysis

Midstream

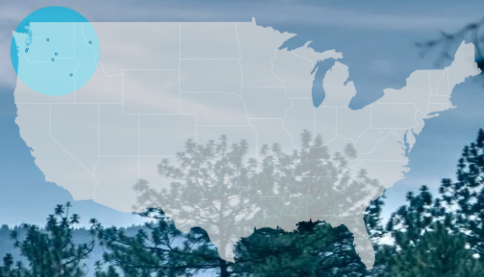
- Freight network between California & Pacific Northwest Hubs

End Uses

- Heavy duty vehicles
- Ports
- Peaking plants / generators
- Refineries
- Data centers

Pacific Northwest Hydrogen Hub

Selectee: PNWH2



Community Benefits - Highlights

Creation of over 10,000 jobs, including more than 8,050 construction jobs, and 350 permanent jobs.

Committed to negotiating Project Labor Agreements (PLAs) for all projects over $1 million and investing in joint labor-management/state-registered apprenticeship programs.

Prioritizing hiring programs for former coal industry workers and investing more than $4 million in the Centralia College training center to provide worker training.

*Pending negotiations

Community Benefits

Prioritizing Community Benefits

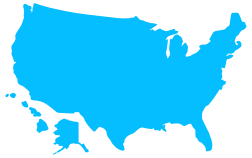
DOE **requires** applicants to include a Community Benefits Plan (CBP) to help ensure broadly shared prosperity in the clean energy transition.

By **prioritizing community benefits**; we can ensure the next chapter in America's energy story is marked by greater justice; accountability; equity; security; and resilience.

Community & Labor Engagement

Diversity; Equity; Inclusion; & Accessibility

Investing in the American Workforce



Justice40 Initiative

Community Benefit Plans - Implementation Requirements per Phase

**CBPs are considered alongside assessments of engineering, procurement, and construction; business development and management; permitting and safety; and technical data and analysis.*

Negotiations Conducted

Go/No-Go Decisions

CBP Requirements – Regional Clean Hydrogen Hubs

Community & Labor Engagement

- Background
- Social Characterization (Community history & dynamics)
- Initial Stakeholder Analysis Summary
- Engagement Methods and Timeline
- Two-way Engagement Statement
- Workforce and Community Agreements Statement
- Engagement Evaluation Strategy
- Resource Summary

Diversity, Equity, Inclusion, & Accessibility

- Background
- Strategies, Milestones, and Timelines
- Resource Summary

Investing in the American Workforce

- Background
- Quality Jobs
- Workforce Development
- Worker Rights
- Strategies, Milestones, and Timelines
- Resource Summary

Justice40 Initiative

Assessment

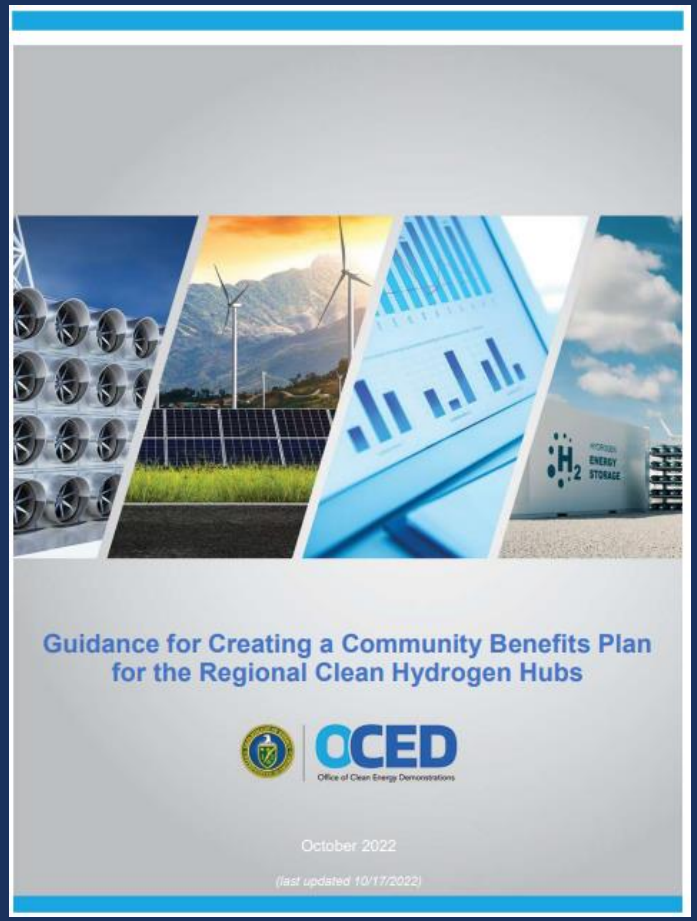
- Impacted communities and groups
- Benefits and where they flow
- Negative impacts and where they flow
- Information Gaps

Implementation Plan:

- Background
- Milestones and Timelines
- Barriers to realizing benefits and minimizing negative impacts
- Resource Summary

Strong CBPs…

- Demonstrate moving beyond a vision or assessment into **actionable goals, outcomes, and implementation steps** supported by adequate money, people, and time resources
- Include mechanisms for **accountability to and transparency with** impacted communities
- Propose clear **metrics** to measure success
- Match proposed actions to the **needs and priorities** of impacted communities
- **Robustly address** all four topic areas
- **Minimize and mitigate negative impacts** and harm, especially to already overburdened communities
- **Create quality jobs**, equitable access, and invest in workforce development
- **Evolve** to incorporate community and worker feedback
- **Build** toward lasting and enforceable Community and Labor Agreements



OCED FOA CBP Guidance docs available with each FOA at: https://oced-exchange.energy.gov/

Next Steps & Resources

Get Involved

How to engage during negotiation:

- Visit **Hub webpages**
- Attend **Hub-specific virtual briefing**
- **Email the H2Hub**
- **Email DOE** at engage_H2Hubs@hq.doe.gov
- **Attend local engagements** (details TBD)
- Read **Initial CBP summary**

DOE will use feedback from engagements to inform the negotiation process

How to engage during Phases 1-4:

- **Attend facilitated sessions** with DOE and project performers to raise priorities and concerns
- **Reach out to H2Hub teams** any time
- **Participate in H2Hub engagements**; workforce or community agreements; or advisory boards H2Hubs may have as part of their CBP activities
- **Reach out to DOE** if any questions or concerns are not being adequately addressed **engage_H2Hubs@hq.doe.gov**
- Each phase has a go/no-go where DOE will assess project performance including CBP – **your feedback matters!**

How NEPA will work:

- **DOE will comply** with the National Environmental Policy Act (NEPA) and related requirements for the Hubs.
- Feedback via early engagement will **inform initial scope of NEPA reviews**.
- **Stakeholder engagement** throughout the NEPA process, including at scoping and draft NEPA document review stages.

Communities and labor can still engage with the applicant based on the information they released to date to explore a path forward without this specific source of federal funding.

OCED Engagement

OCED aims to support meaningful **community-awardee-OCED** engagement through the life of the awarded H2Hub. **How?**

Local Engagements

Small community dialogues

Deliberative forum

Outcomes

Establish process for long-term engagement

Co-develop priorities

Next Steps – Virtual H2Hub Community Briefings

DOE OCED will hold seven community briefings to share information with the communities hosting H2Hubs.

Information and to register: https://www.energy.gov/oced/h2hubs-local-engagement-opportunities

Appalachian Hydrogen Hub
Tuesday, October 24, 2023

Mid-Atlantic Hydrogen Hub
Wednesday, October 25, 2023

California Hydrogen Hub
Wednesday, October 25, 2023

Gulf Coast Hydrogen Hub
Monday, October 30, 2023

Pacific Northwest Hydrogen Hub
Monday, October 30, 2023

Midwest Hydrogen Hub
Wednesday, November 1, 2023

Heartland Hydrogen Hub
Wednesday, November 1, 2023

*Subject to change based on negotiations. Negotiations may take several months.

Next Steps – Negotiations

Award Negotiations: DOE OCED will commence negotiations with project selectees.

After Award: ***IF the projects receive an award (successful negotiations)***

- Selectees enter into cooperative agreement with DOE OCED
- Detailed Project Plan begins
- OCED will work with selectees to ensure compliance with the National Environmental Policy Act (NEPA)
- Significant engagement with OCED and awardee

H2Hubs Resources

Regional Clean Hydrogen Hubs

- Program Page
- Press Release
- Overview of Selected Projects
- Local Engagement Opportunities
- OCED CBP fact sheet

Demand-Side Support Initiative for Clean Hydrogen

- Request for Proposals (RFP)
- Video: OCED Update on Demand-Side Support Initiative

Additional Clean Hydrogen Resources

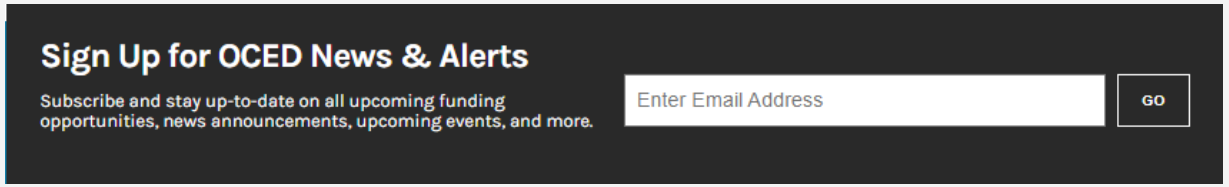
- U.S. National Clean Hydrogen Strategy and Roadmap
- Clean Hydrogen Pathways to Commercial Liftoff Report
- Hydrogen Shot

Justice40 Resources

- Justice40 Initiative
- Energy Justice Dashboard (BETA)
- Climate and Economic Justice Screening Tool

For more information

- **Reach DOE OCED about the H2Hubs**
  Engage_h2hubs@hq.doe.gov
- **OCED Website & Newsletter Sign-up**
  energy.gov/oced
  Scroll to bottom to sign up here:



- **OCED Exchange (RFIs, NOIs, and FOAs)**
  oced-exchange.energy.gov
- **Follow us on LinkedIn**
  linkedin.com/company/doe-oced/

Selectee Webpages

Appalachian Hydrogen Hub	https://www.arch2hub.com/
California Hydrogen Hub	https://archesh2.org/
Heartland Hydrogen Hub	Forthcoming
Gulf Coast Hydrogen Hub	https://www.hyvelocityhub.com
Mid-Atlantic Hydrogen Hub	https://mach-2.com/
Midwest Hydrogen Hub	https://machh2.com/
Pacific Northwest Hydrogen Hub	https://pnwh2.com/

Thank you!

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For more information; please visit energy.gov/OCED