THE OFFICE OF

CLEAN ENERGY DEMONSTRATIONS

Regional Clean Hydrogen Hubs
Appalachian Regional H2Hub Community Briefing

10/24/2023

Office of Clean Energy Demonstrations

U.S. Department of Energy

Welcome!

Welcome & Meeting Objectives

- The Office of Clean Energy Demonstrations (OCED) at DOE recently announced the selection of seven Regional Clean Hydrogen Hubs (H2Hubs)
- We at DOE wanted to connect to help clarify our process and the opportunities to plug in and help shape your community's energy future
- Engage with DOE and the partners involved in these H2Hubs

Introductions

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Facilitator

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Appalachian
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Allegheny Science
and Technology

Opening Remarks

Agenda

- Welcome
- Opening Remarks
- OCED Overview
- H2Hubs Overview
- Community Benefits and Engagement
- Appalachian Regional H2Hub Project Overview
- Next Steps & Resources
- Feedback Session
- Wrap-up & Close

OCED Overview

OCED Mission

Deliver clean energy technology **demonstration projects at scale** in partnership with the **private sector** to **accelerate deployment**, **market adoption**, and the **equitable transition** to a decarbonized energy system.

OCED Mandate

SCALE EQUITABLE, CLEAN ENERGY

Help enable 100% clean electricity by 2035 and net zero emissions by 2050 through an equitable energy transition

UNLOCK NEW INVESTMENT

Unlock and scale trillion-dollar clean energy follow on investment from the private sector and other sources of capital

DE-RISK TECHNOLOGY

Maintain risk-based, balanced, and defensible portfolio of investments

SERVE AS CENTER OF EXCELLENCE

Serve as primary DOE office to deliver full scale clean energy demonstration projects and project management oversight excellence

ENGAGE & COLLABORATE

Leverage private sector and broader energy ecosystem to inform OCED and DOE technology commercialization efforts

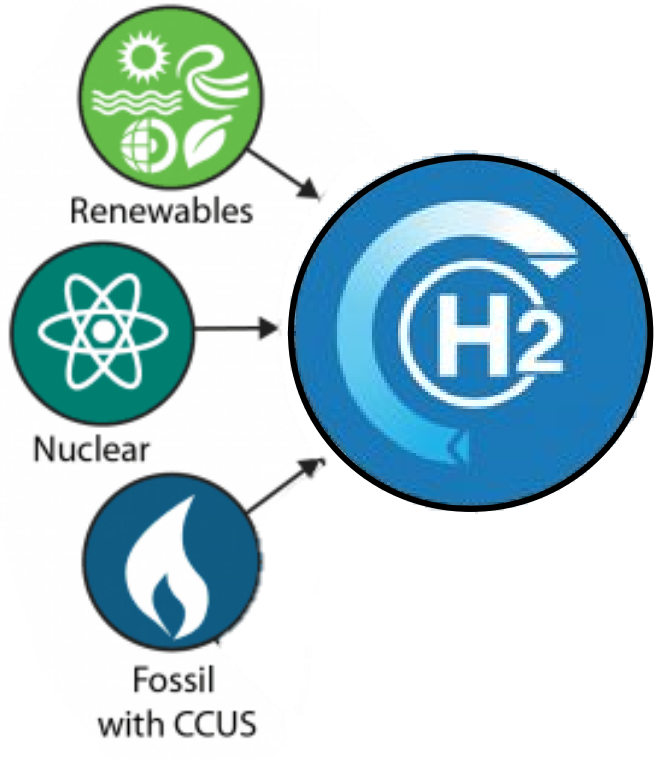
OCED Scope

- Regional Clean Hydrogen Hubs ($8 billion)
- Advanced Reactor Demonstrations ($2.5 billion)
- Carbon Management ($7 billion)
- Industrial Demonstrations ($6.3 billion)
- Long-Duration Energy Storage Demonstrations ($505 million)
- Energy Improvements in Rural or Remote Areas ($1 billion)
- Clean Energy Demonstrations on Mine Land ($500 million)
- Other Initiatives ($133 million)

H2Hubs Overview

What is Hydrogen?

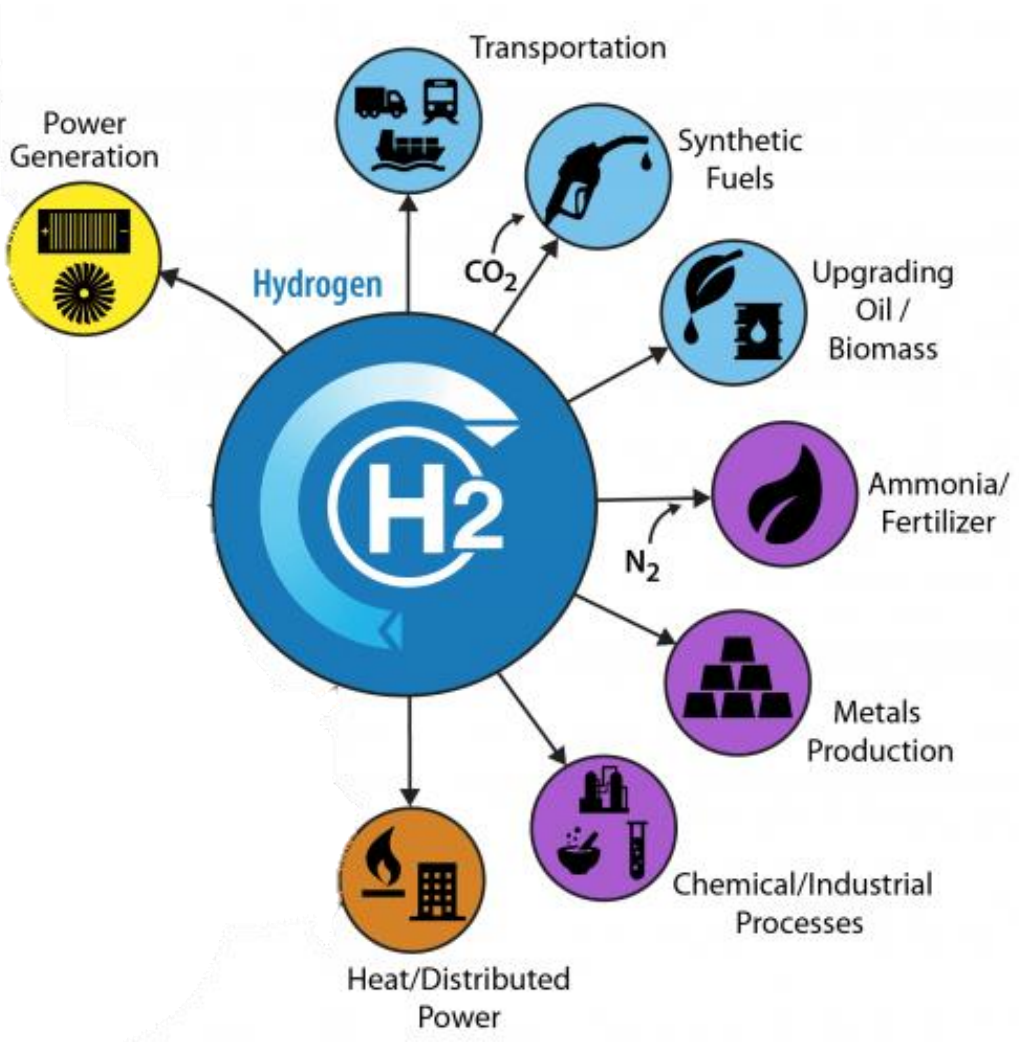
- **Hydrogen (H_2)** is the simplest and most abundant element known.
  - You might recognize it from the chemical formula for water – **H_2O**!



- **Hydrogen can be made using a variety of domestic energy resources.**
- Hydrogen can be produced through several processes, including:
  - Electrolysis; Direct Solar Water Splitting
  - Steam Methane Reforming
  - 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.
- 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.



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 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

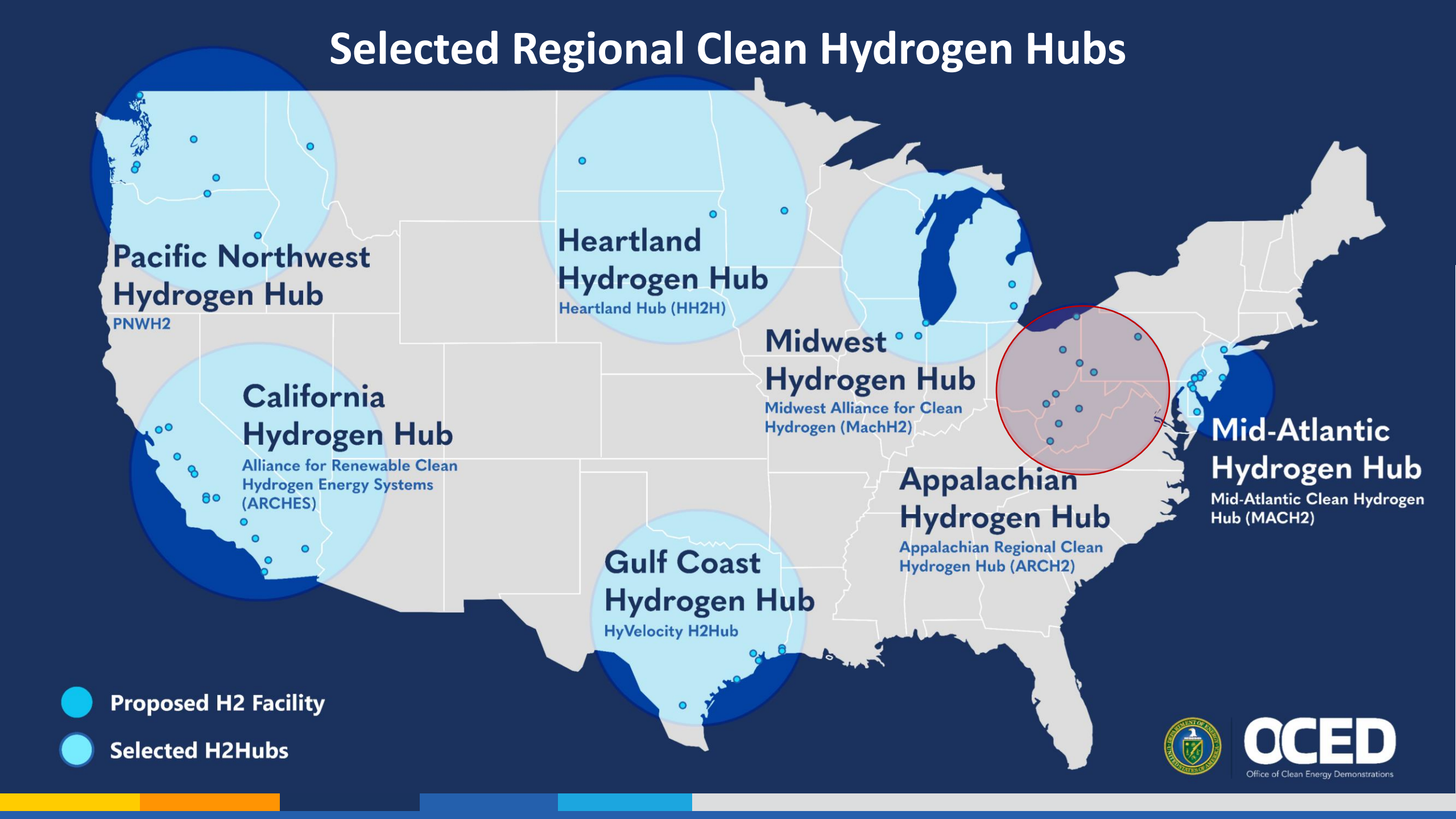
H2Hubs Current Status

- **October 2023: DOE announced 7 projects selected for award negotiations.**

What is a Regional Clean Hydrogen Hub?

OCED
Office of Clean Energy Demonstrations

Selected Regional Clean Hydrogen Hubs



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

Community Benefits

Prioritizing Community Benefits in OCED Projects

OCED **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; equity; security; and resilience.

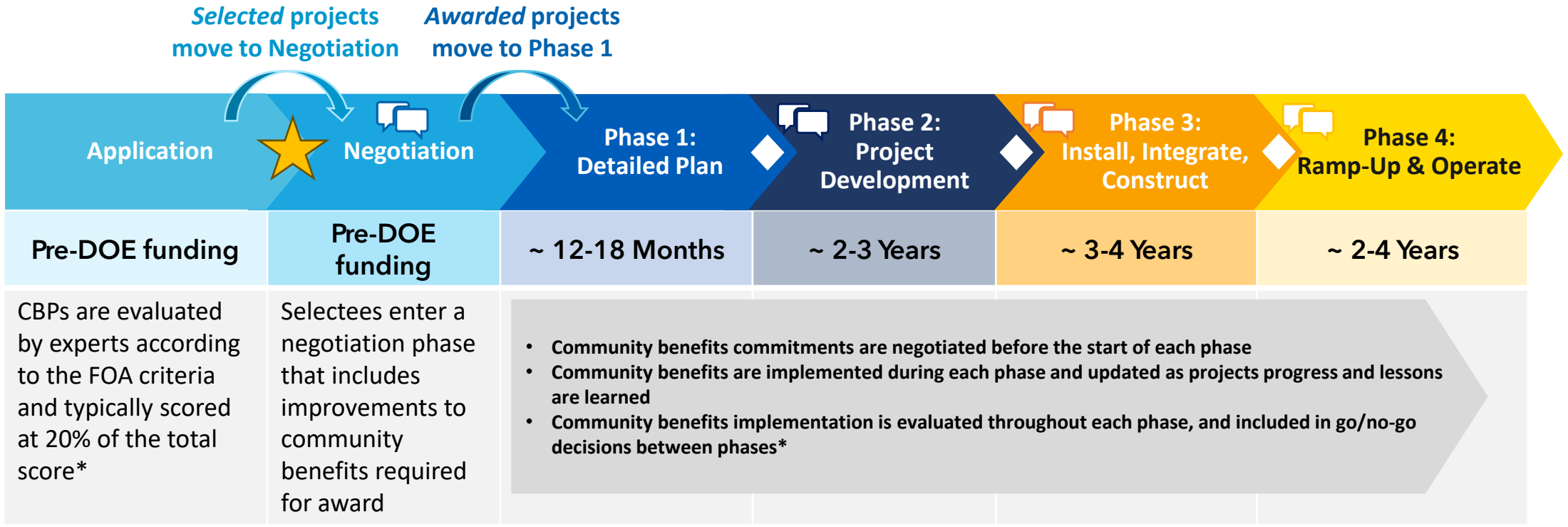
Community & Labor Engagement

Diversity, Equity, Inclusion, & Accessibility

Investing in the American Workforce

Justice40 Initiative

Community Benefit Commitments - Implementation Requirements per Phase



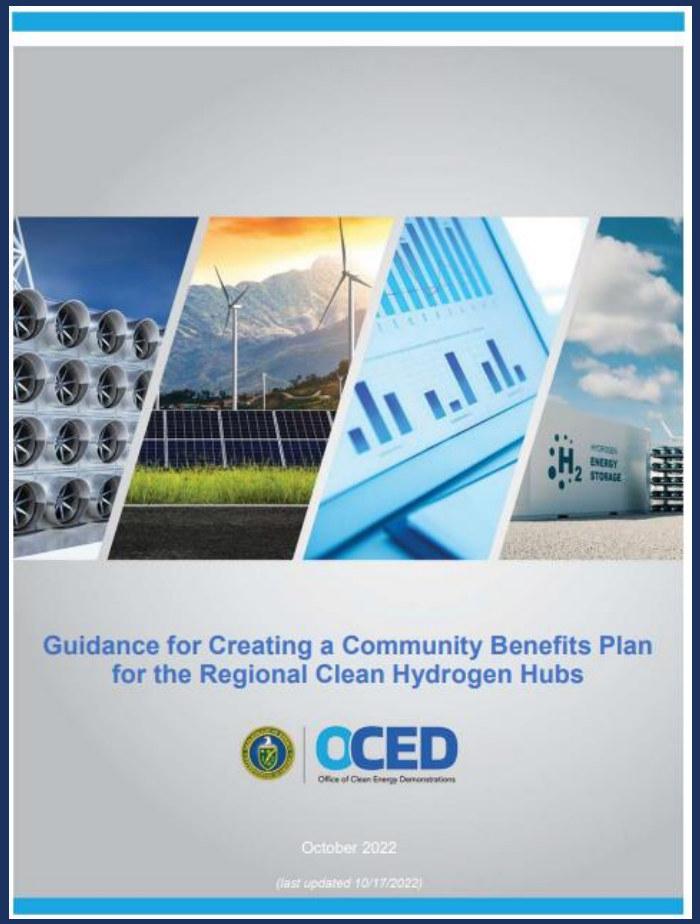
**CBPs are considered alongside assessments of engineering, procurement, and construction; business development and management; permitting and safety; and technical data and analysis.*

Negotiations Conducted

Go/No-Go Decisions

Strong Community Benefits Commitments

- 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/

Appalachian Regional Clean Hydrogen Hub

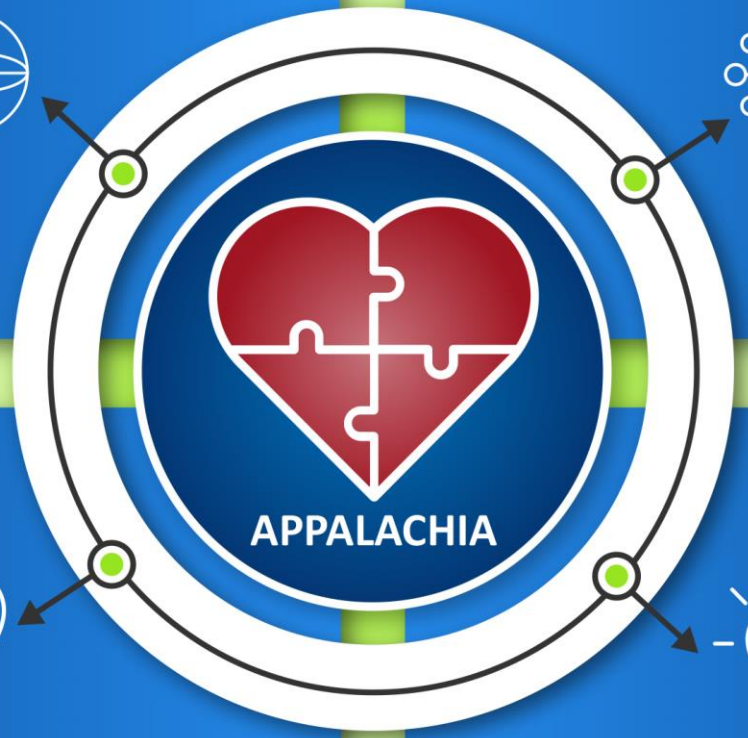
Why ARCH2

RESOURCES

- Largest natural gas-producing formation in the United States (EIA, 2022)
- Natural gas spot prices consistently discounted to Henry Hub
- Renewable electricity sources for H_2 production
- Subsurface CO_2 and H_2 storage

COMMUNITIES

- Long history of energy production vital to US economic growth
- Disadvantaged by energy transition from coal
- Designated ENERGY COMMUNITY by IWG



LOCATION

- Close to major demand centers in all directions key for interhub connectivity
- Includes eight of the top 25 priority communities as designated by the Interagency Working Group (IWG) on Coal and Power Plant Communities and Economic Revitalization

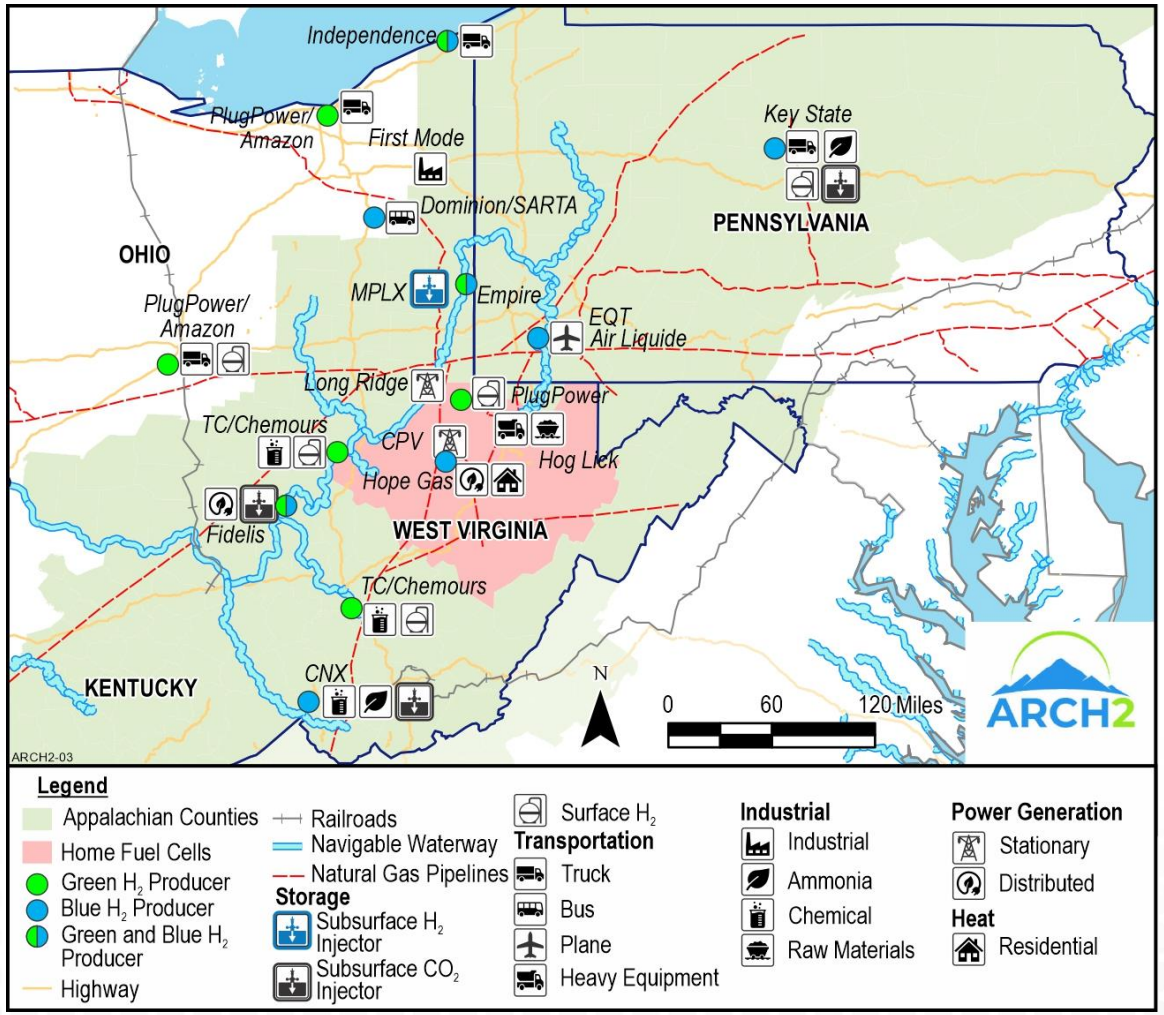
Project Development Partners

- Decades of expertise in the region
- Strong financial commitment to ARCH2
- Leadership in ESG and Climate initiatives

Re-energizing Appalachia
Economically • Socially • Environmentally

ARCH2
APPALACHIAN REGIONAL CLEAN HYDROGEN HUB

ARCH2 Overview



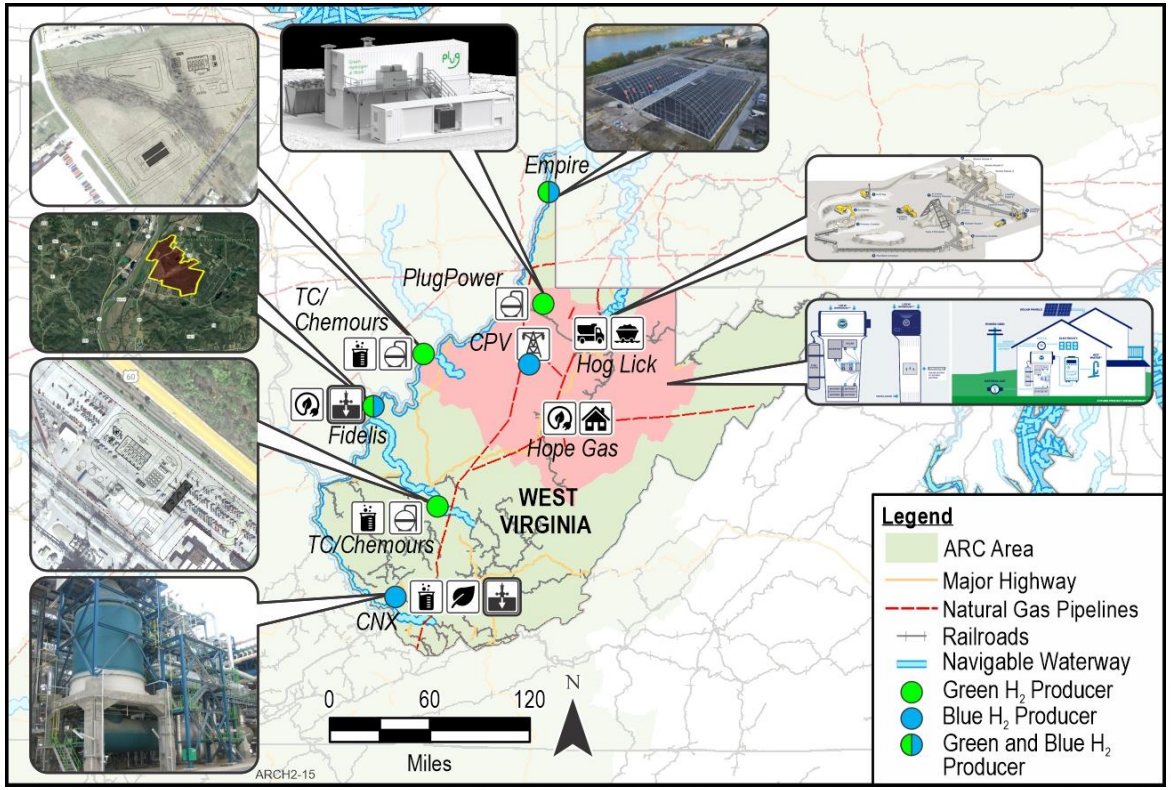
Note: Proposed project locations based on preliminary siting are subject to change during the detailed planning phase (phase 1).

Re-energizing Appalachia
Economically • Socially • Environmentally

ARCH2 APPALACHIAN REGIONAL CLEAN HYDROGEN HUB

ARCH2 Project Summaries

- **CNX/ TransGas:** Low-CI ammonia production
- **TC Energy/ Chemours**: Electrolysis-based H2 production in two chemical facilities
- **Fidelis / Mountaineer GigaSystem**: NG + biomass to produce Low CI H2 for datacenters, other off-takers.
- **HLA:** H2 off-taker: H2 use as fuel for off-site aggregate delivery trucks and on-site haul trucks/equipment.
- **Hope Gas/ WATT Fuel Cell Corp / EQT**: Produce clean H2 from NG for blending in Hope local distribution system and residential fuel cells.
- **Empire Diversified Energy**: Anaerobically digested food waste based H2 production for industrial and transportation fuel.
- **Plug Power/ Amazon:** Green H2 production facility in northern WV.



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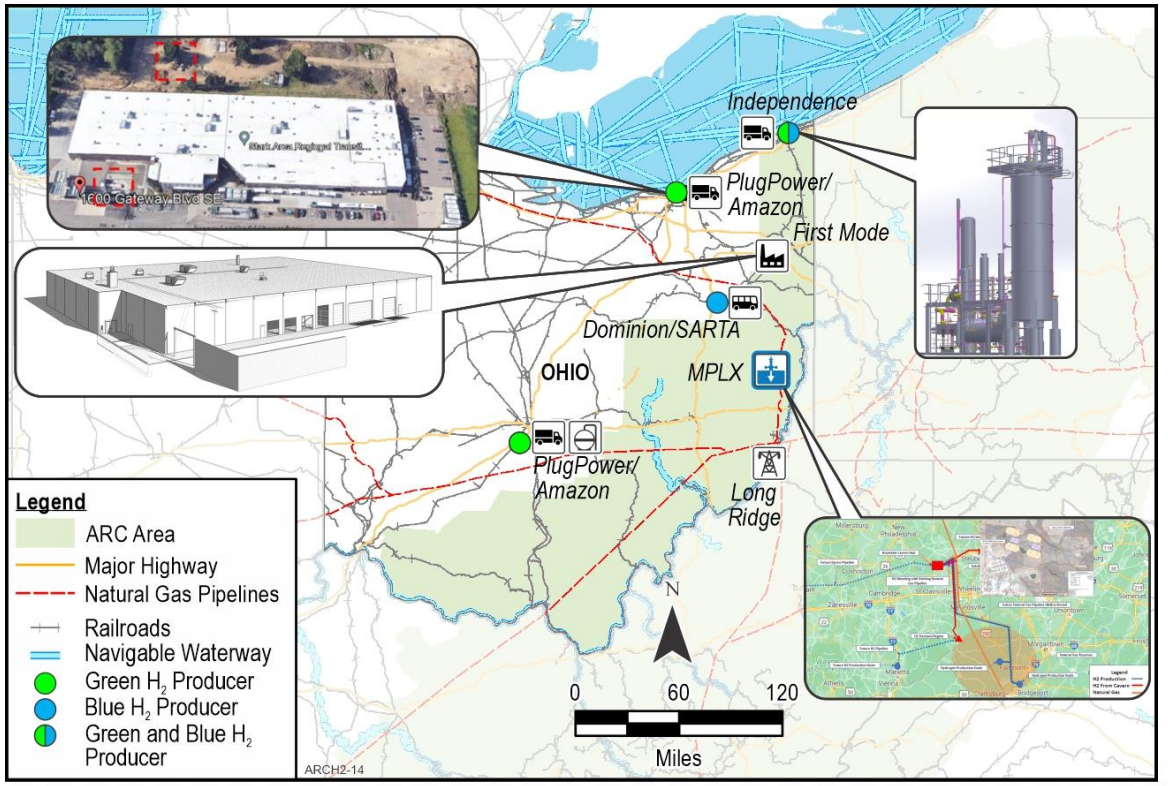
Re-energizing Appalachia
Economically • Socially • Environmentally

ARCH2
APPALACHIAN REGIONAL CLEAN HYDROGEN HUB

ARCH2 Project Summaries

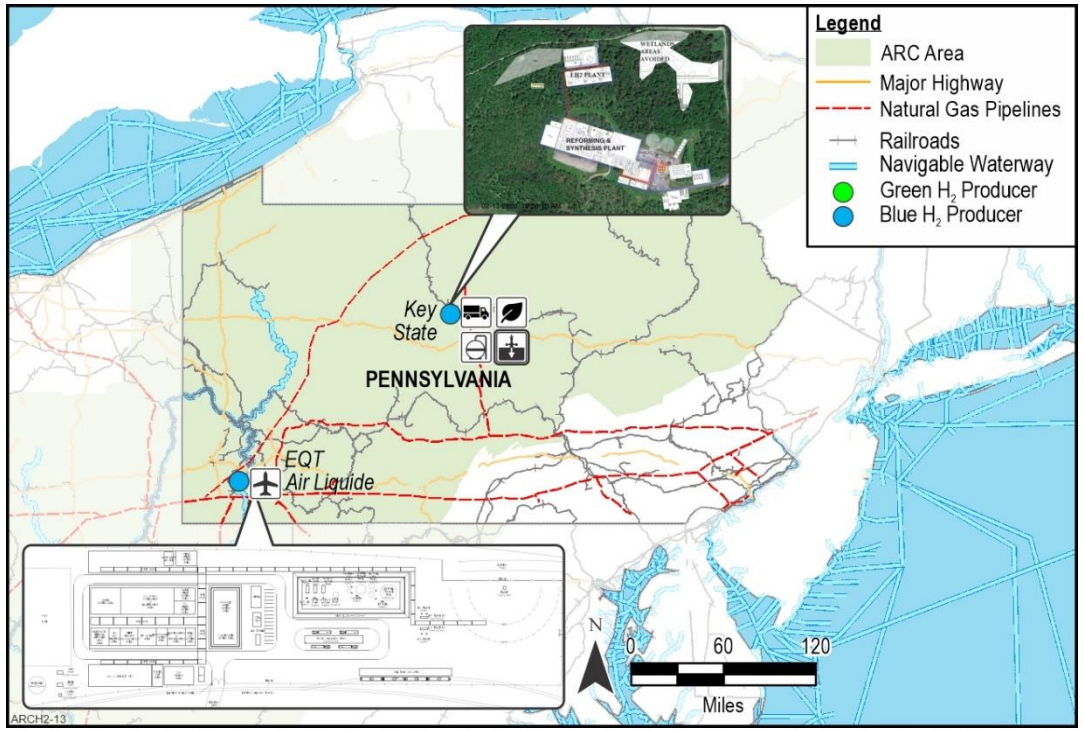
- **MPLX:** H_2 storage facility development with connective infrastructure to support ARCH2 producers, storage, and end-users
- **Dominion Energy Ohio**: H2 production with CO_2 capture to supply H_2 to regional transit (e.g., SARTA)
- **Plug Power/ Amazon:** One distribution center with H_2 fueling MHE; fueling station FCEV delivery trucks.
- **First Mode:** H_2 end-user: Manufacturing facility for retrofitting mining trucks with H_2 fuel cell power system.
- **Independence Hydrogen:** H2 production facility using industrial off-gas as feedstock in Ashtabula, Ohio to provide clean hydrogen for material handling equipment at distribution centers.



Note: Proposed project locations based on preliminary siting are subject to change during the detailed planning phase (phase 1).

ARCH2 Project Summaries

- **EQT-GTL:** Low-carbon NG and renewable natural gas (RNG) (as required) to produce low-carbon aviation fuel.
- **Air Liquide -** Liquified H2 facility in southwest PA to serve as an offtake for EQT's excess hydrogen to be used in the mobility sector.
- **KeyState:** H_2 production plus other products (NH3, urea/diesel exhaust fluid (DEF))



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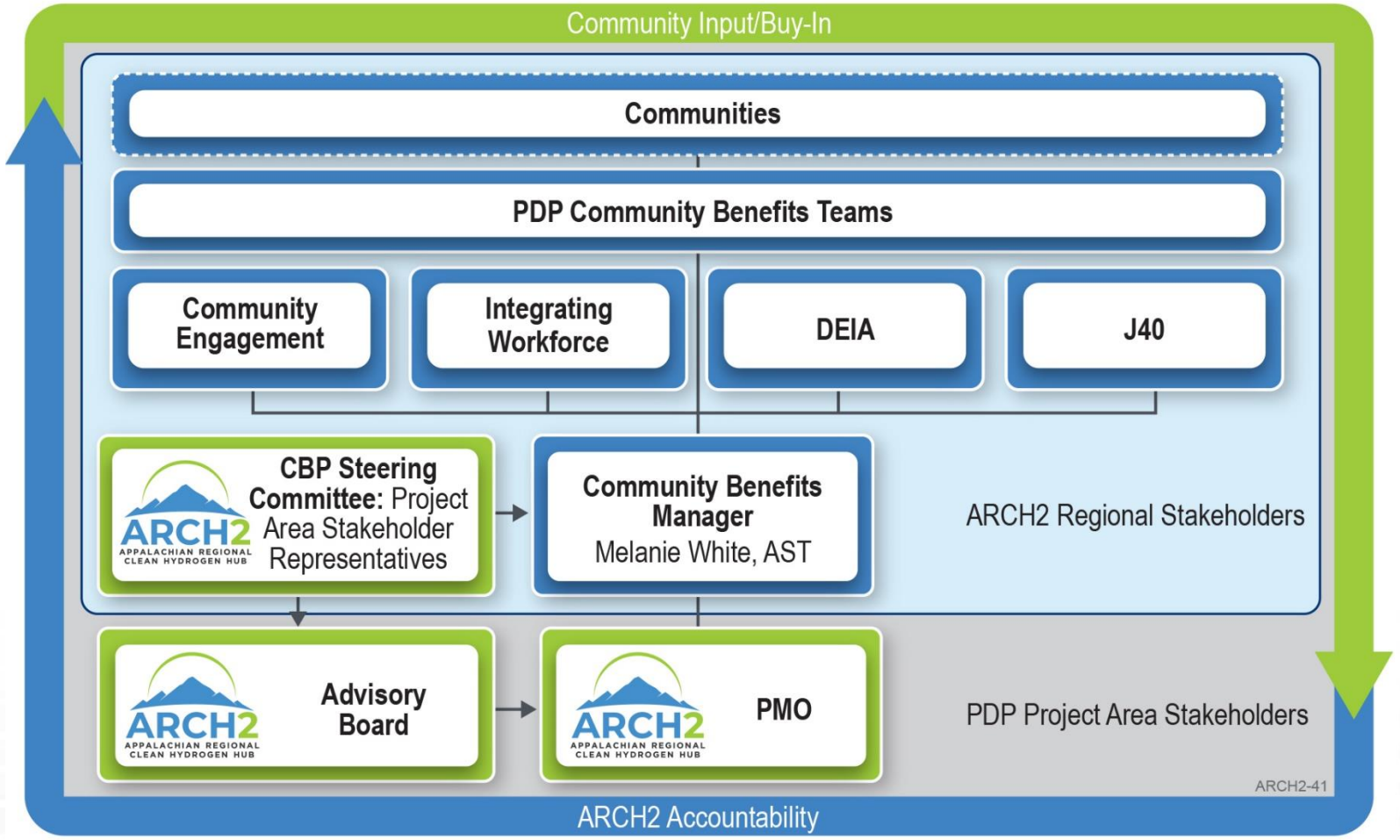
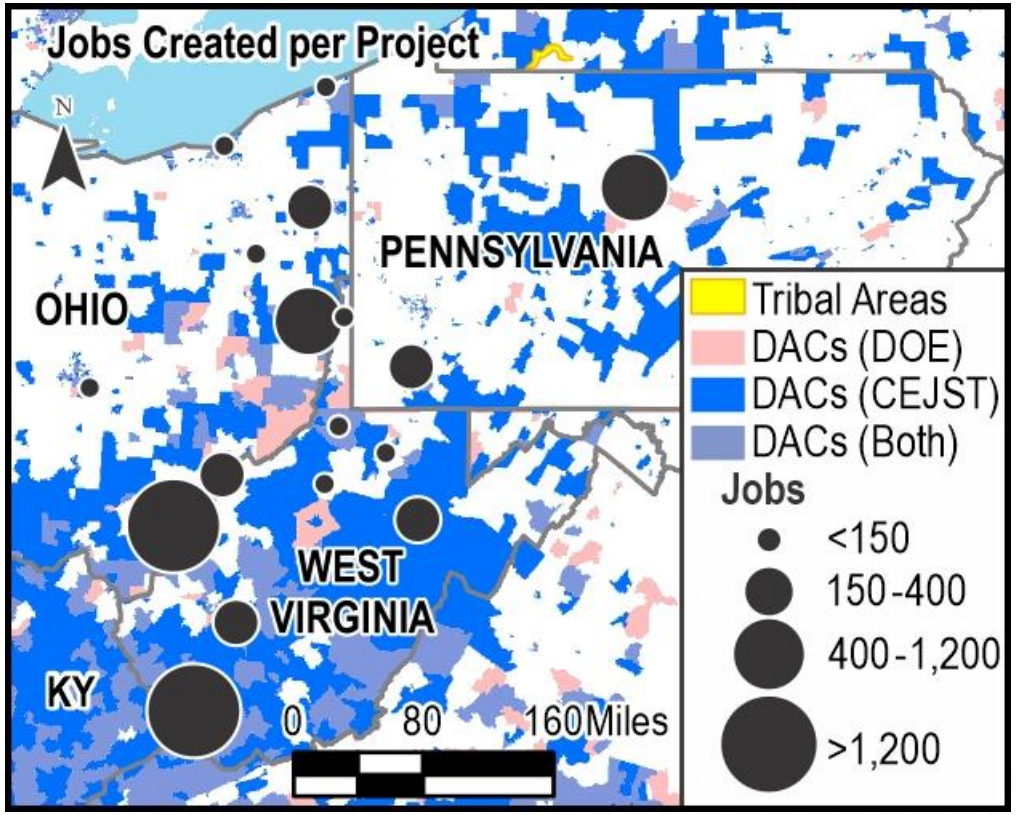
ARCH2 Communities First Approach



ARCH2 Jobs Impact

- ARCH2 will foster a just energy transition in a region disproportionately impacted by the loss of extractive industry jobs
  - Environmental benefits
  - Economic benefits
  - Jobs creation
  - Workforce development
- At its peak ARCH2 is expected to create more than 21,000 jobs
  - More than 18,000 in construction jobs
  - More than 3,000 permanent jobs.



ARCH2 Regional Outreach

Labor / Trades / Workforce Development

TRI-STATE BUILDING TRADES UNIONS
Value on Display. Every Day.

AFL-CIO

PMA

Building and Construction Trades Council AFL-CIO West Virginia State

United Brotherhood of Carpenters and Joiners of America

JobsOhio
Ohio's Economic Development Corporation

> 10 unions, trades organizations, and employment agencies

Business Development / Industry Organizations

Steptoe & Johnson PLLC

Ohio Chamber of Commerce

OGA Ohio Gas Alliance

EPRI Electric Power Research Institute

PA Chamber of Business and Industry

KOGA

High Technology Foundation
Building a Stronger West Virginia

Canton Regional Chamber of Commerce

Chemical Alliance

The Midwest Hydrogen Center of Excellence
A Key Initiative of the Renewable Hydrogen Fuel Cell Collaborative

> 40 service providers

Community / Environment / Non-Profits

CATF Clean Air Task Force

New Vision Renewable Energy

WVPEC

PIOGA Pennsylvania Independent Oil & Gas Association

Team Kentucky Energy and Environment Cabinet

DRWV Foundation

BRITE Energy Innovators

IN2MARKET Innovation Realized

> 15 environmental, special interest groups, and faith-based organizations

Academia

West Virginia University

Marshall

University of Kentucky

The Ohio State University

Cleveland State University

West Virginia Community & Technical College System

Pierpont Community & Technical College

Kentucky Community & Technical College System

WVSU

Mountwest Community & Technical College

BlueRidge Community College

> 15 universities, community colleges, and trade schools

Government

United States Congress

United States Senate

Commonwealth of Kentucky

State of West Virginia

Great Seal of the State of Ohio

Commonwealth of Virginia

County of Clinton Pennsylvania

DCNR

Welcome to Gallipolis

Marietta Ohio

> 25 federal, state, local, and tribal

Re-energizing Appalachia
Economically • Socially • Environmentally

ARCH2 Appalachian Regional Clean Hydrogen Hub

Next Steps & Resources

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

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.

Next Steps – Virtual H2Hub Community Briefings

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
6:00-7:30 p.m. ET

Mid-Atlantic Hydrogen Hub
Wednesday, October 25, 2023
6:00-7:30 p.m. ET

California Hydrogen Hub
Wednesday, October 25, 2023
8:00-9:30 p.m. ET

Gulf Coast Hydrogen Hub
Monday, October 30, 2023
6:00-7:30 p.m. ET

Pacific Northwest Hydrogen Hub
Monday, October 30, 2023
8:00-9:30 p.m. ET

Midwest Hydrogen Hub
Wednesday, November 1, 2023
6:00-7:30 p.m. ET

Heartland Hydrogen Hub
Wednesday, November 1, 2023
8:00-9:30 p.m. ET

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

Next Steps – Negotiations

Award Negotiations: OCED will commence negotiations with project selectees.

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

- Selectees enter into cooperative agreement with 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

Selectee Webpages

Appalachian Hydrogen Hub	https://www.arch2hub.com/
California Hydrogen Hub	https://archesh2.org/
Heartland Hydrogen Hub	www.HeartlandH2Hub.com
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/

Key DOE Offices for H2Hubs

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

Additional DOE Resources

- Office of Economic Impact and Diversity assistance to advance equity & CBP in communities
- Office of Energy Jobs technical assistance to advance CBP jobs, labor & skilled workforce

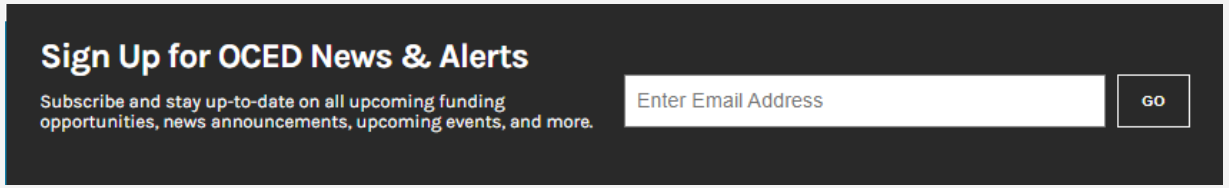
Feedback Session

Ground Rules for Discussion

- Submit questions using the Q&A feature.
  - You can also see and upvote other questions that have been asked.
- Reserve judgement
- One idea at a time
- It is okay to build on the ideas of others
- Clarifying questions are okay

For more information

- **Reach OCED about the H2Hubs**
  appalachianh2hub@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/

Thank you!

OCED

Office of Clean Energy Demonstrations

For more information; please visit energy.gov/OCED