



**OCEd**  
Office of Clean Energy Demonstrations

# THE OFFICE OF CLEAN ENERGY DEMONSTRATIONS



## Regional Clean Hydrogen Hubs Mid-Atlantic Regional H2Hub Community Briefing

10/25/2023

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



**Emmanuel Taylor**  
Facilitator



**Todd Shrader,**  
Director,  
Project Management,  
OCED



**Suzy Baker,**  
Stakeholder  
Engagement Lead –  
H2Hubs, OCED



**Lydia Kubiak-  
Cardona,**  
Community  
Engagement  
Specialist –  
H2Hubs, OCED



**Collin O'Mara**  
Mid-Atlantic  
Regional  
Hydrogen Hub,  
MACH2





# Opening Remarks

# Agenda

- Welcome
- Opening Remarks
- OCED Overview
- H2Hubs Overview
- Community Benefits and Engagement
- Mid-Atlantic 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

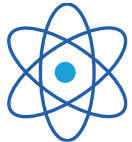
Leverage private sector and broader energy ecosystem to inform OCED and DOE technology commercialization efforts



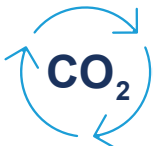
# OCED Scope



Regional Clean Hydrogen Hubs (\$8 billion)



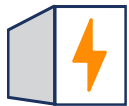
Advanced Reactor Demonstrations (\$2.5 billion)



Carbon Management (\$7 billion)



Industrial Demonstrations (\$6.3 billion)



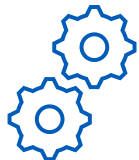
Long-Duration Energy Storage Demonstrations (\$505 million)



Energy Improvements in Rural or Remote Areas (\$1 billion)



Clean Energy Demonstrations on Mine Land (\$500 million)



Other Initiatives (\$133 million)

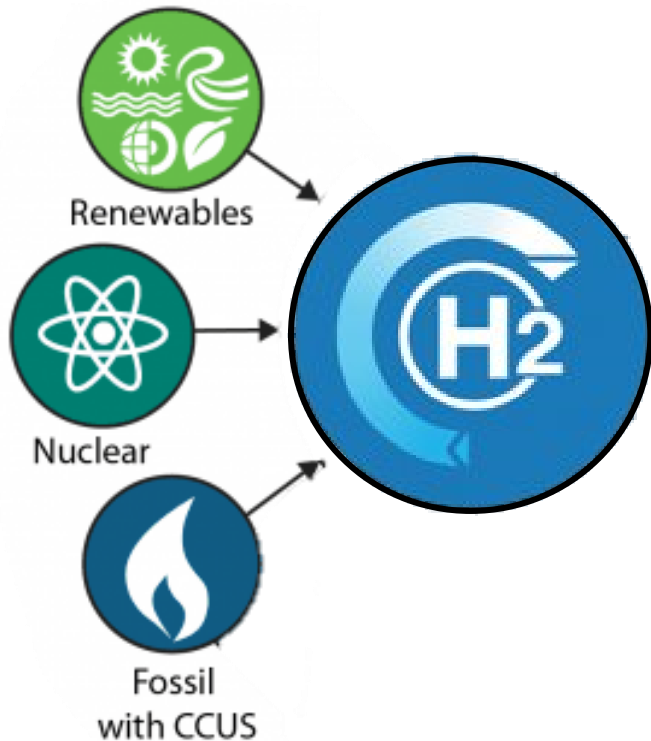


# H2Hubs Overview



# What is Hydrogen?

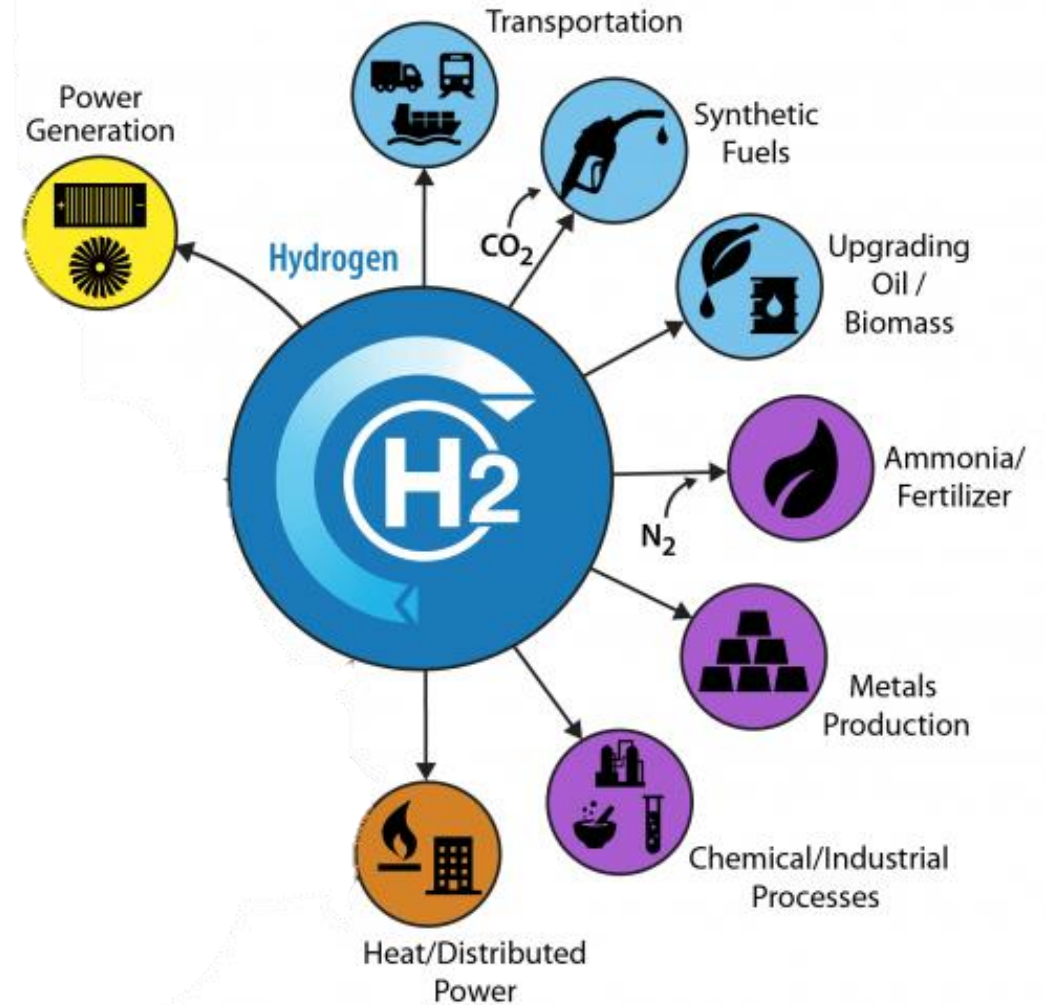
- **Hydrogen (H<sub>2</sub>)** is the simplest and most abundant element known.
  - You might recognize it from the chemical formula for water – **H<sub>2</sub>O!**



- **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**



**Hydrogen Shot**  
*(\$1/kg by 2031)*



**Clean Hydrogen Standard**



**H2Hubs Demand-Side Support Initiative**



**IRA tax incentives**



**Clean Hydrogen Pathways to Commercial Lift-Off Report**



**Coordination with Canada and Mexico**

on building out the clean hydrogen supply chain and economy across North America



**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](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?



- ENERGY
- CONSUMERS
- COMMUNITY
- HYDROGEN PRODUCTION STORAGE

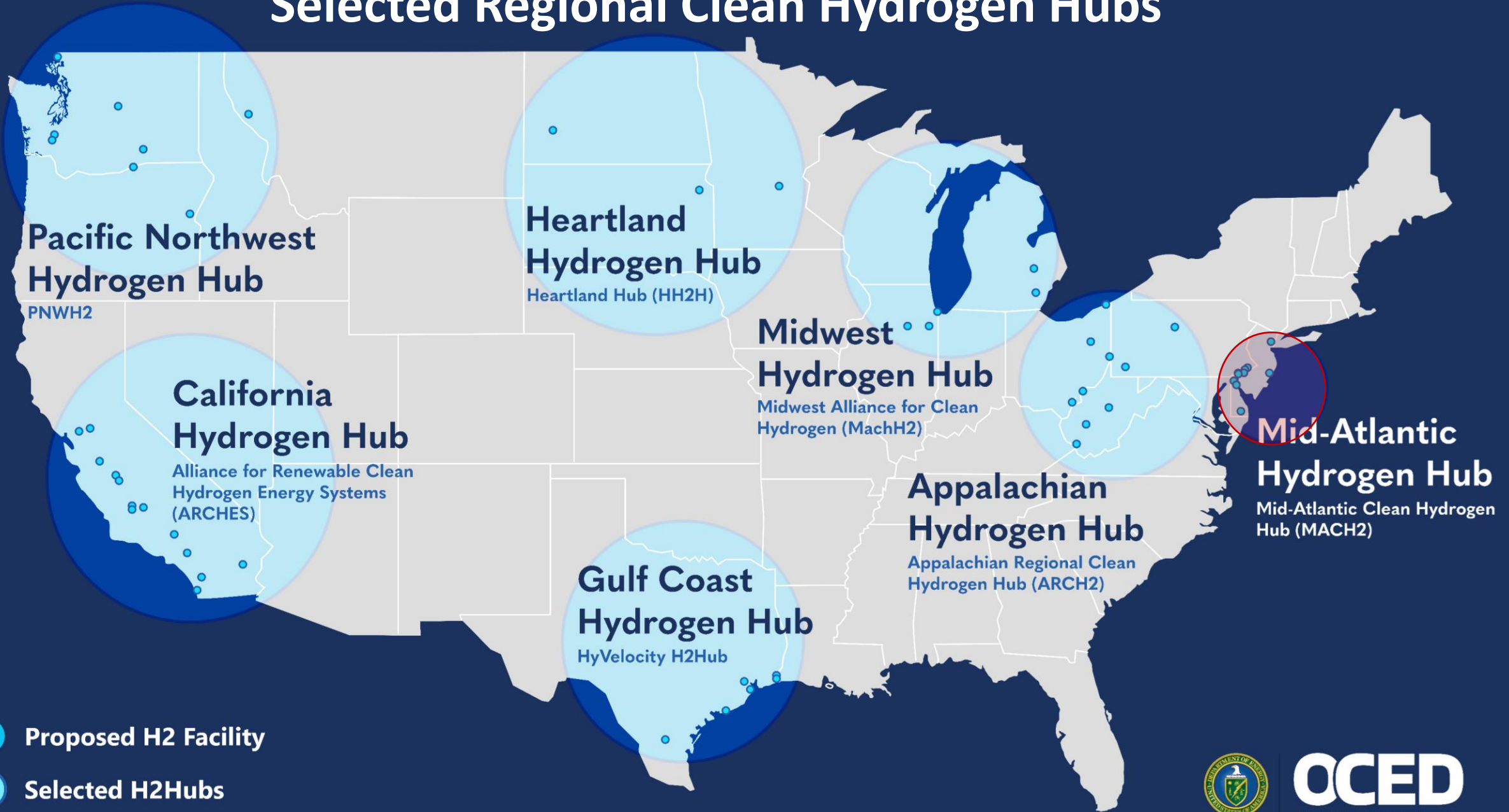


*\*Images are not drawn to scale*





# 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.

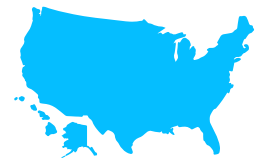
**Community & Labor Engagement**



**Diversity, Equity, Inclusion, & Accessibility**



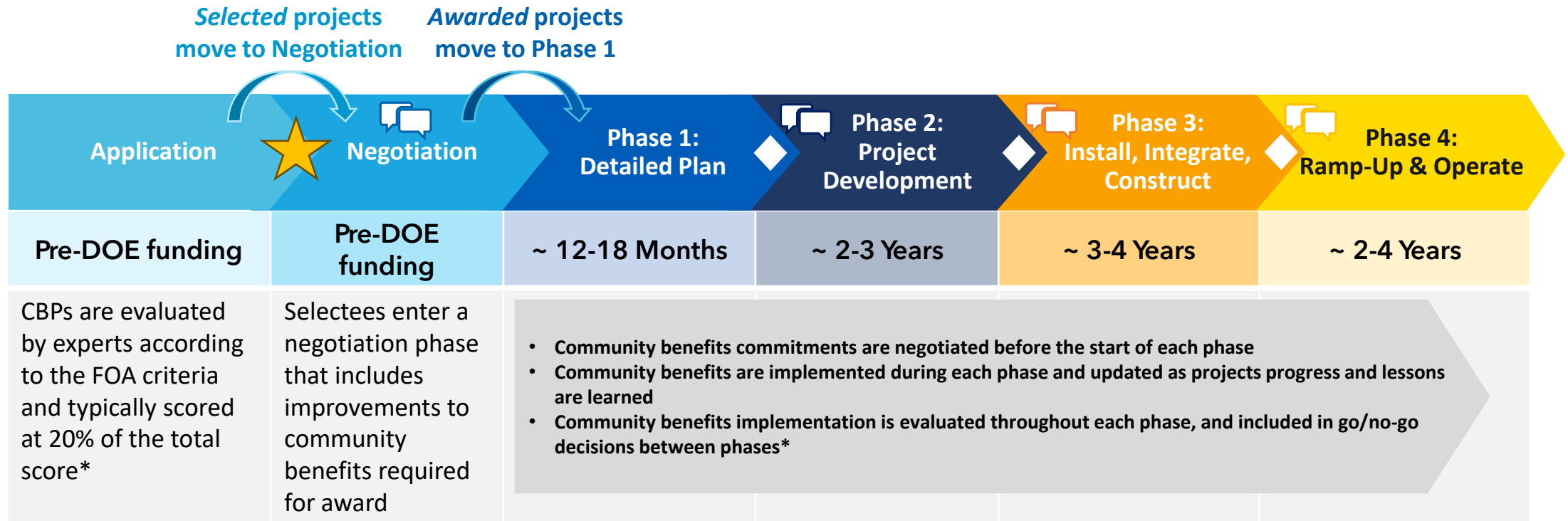
**Investing in the American Workforce**





**Justice40 Initiative**



# Community Benefit Commitments - Implementation Requirements per Phase

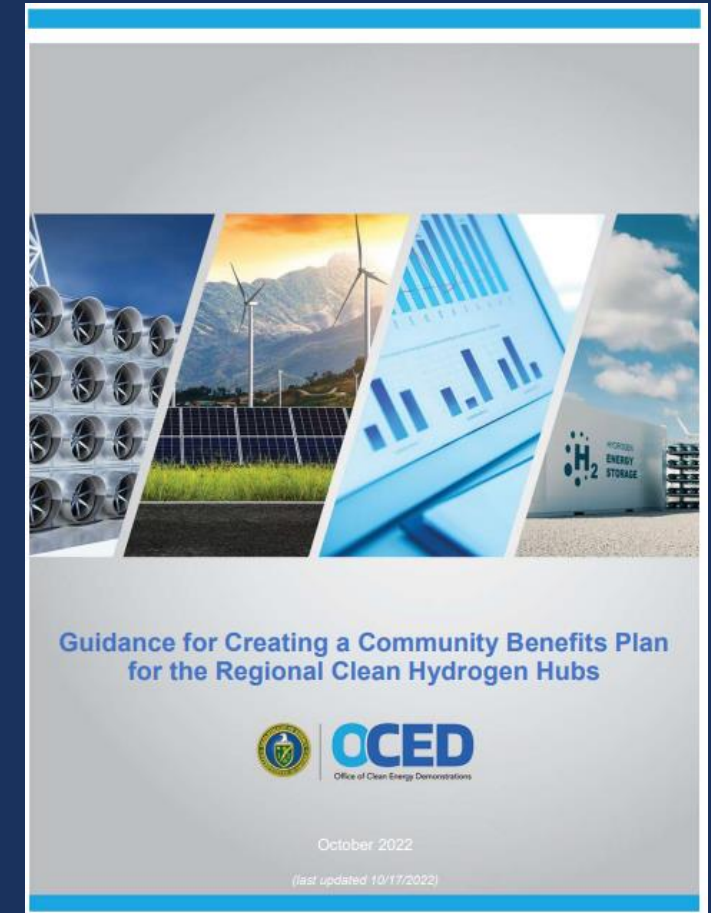


*\*CBPs are considered alongside assessments of engineering, procurement, and construction; business development and management; permitting and safety; and technical data and analysis.*

-  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/>**



# Mid-Atlantic Regional Clean Hydrogen Hub

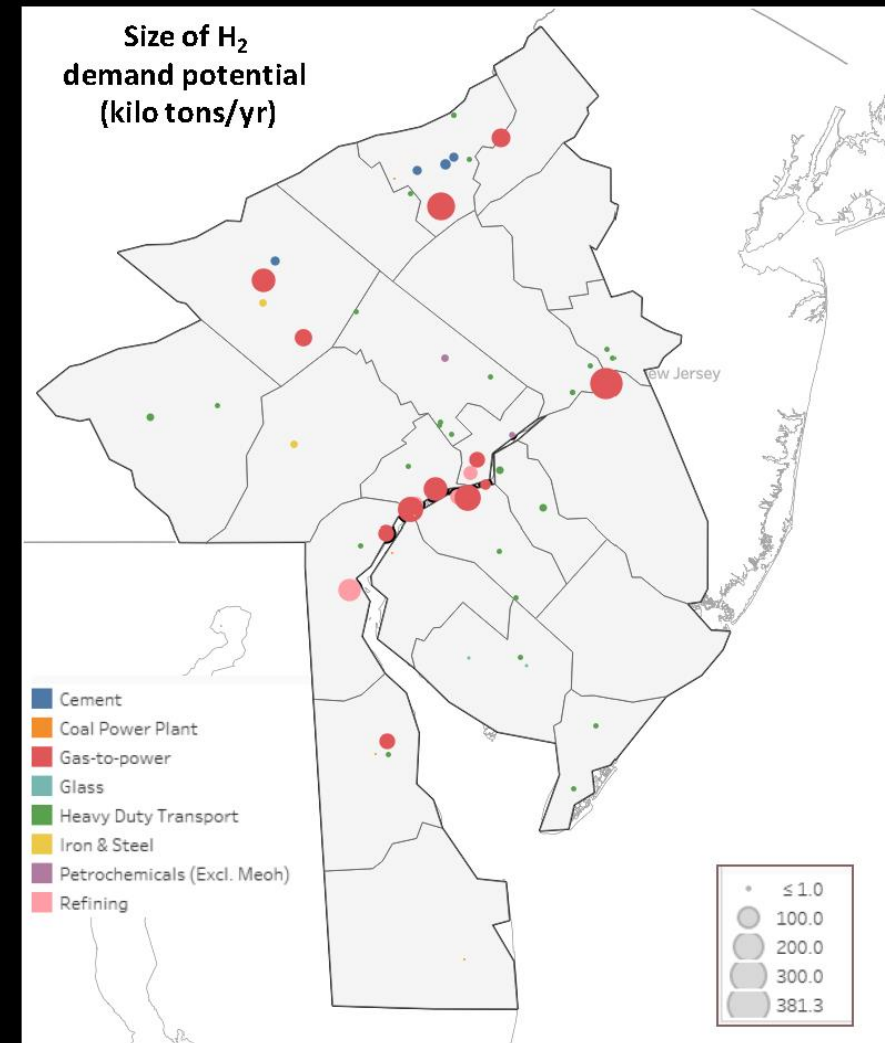
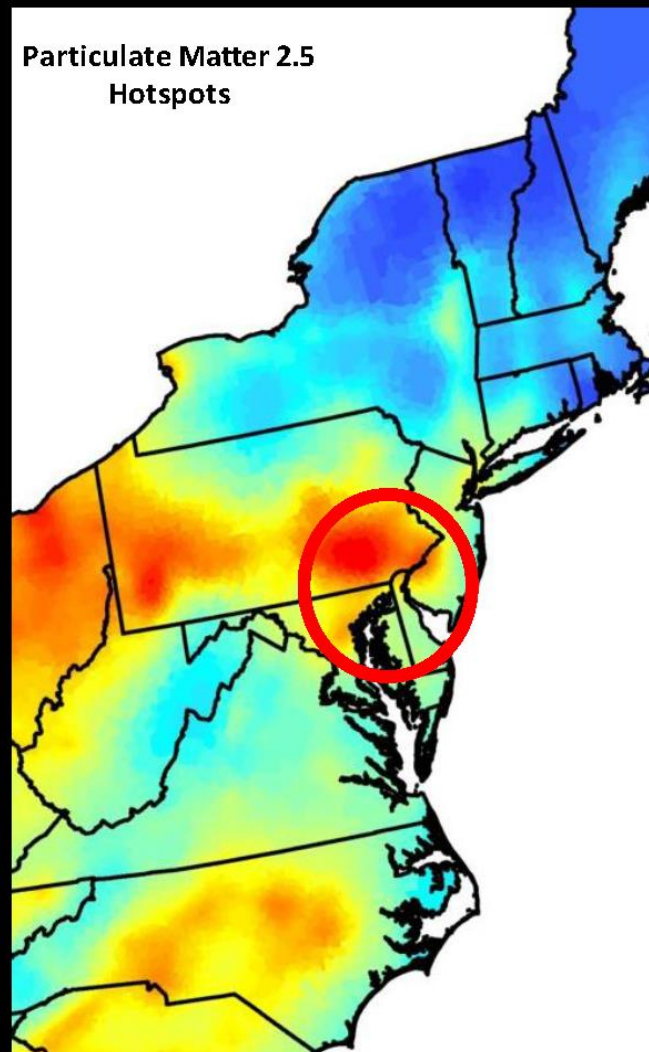
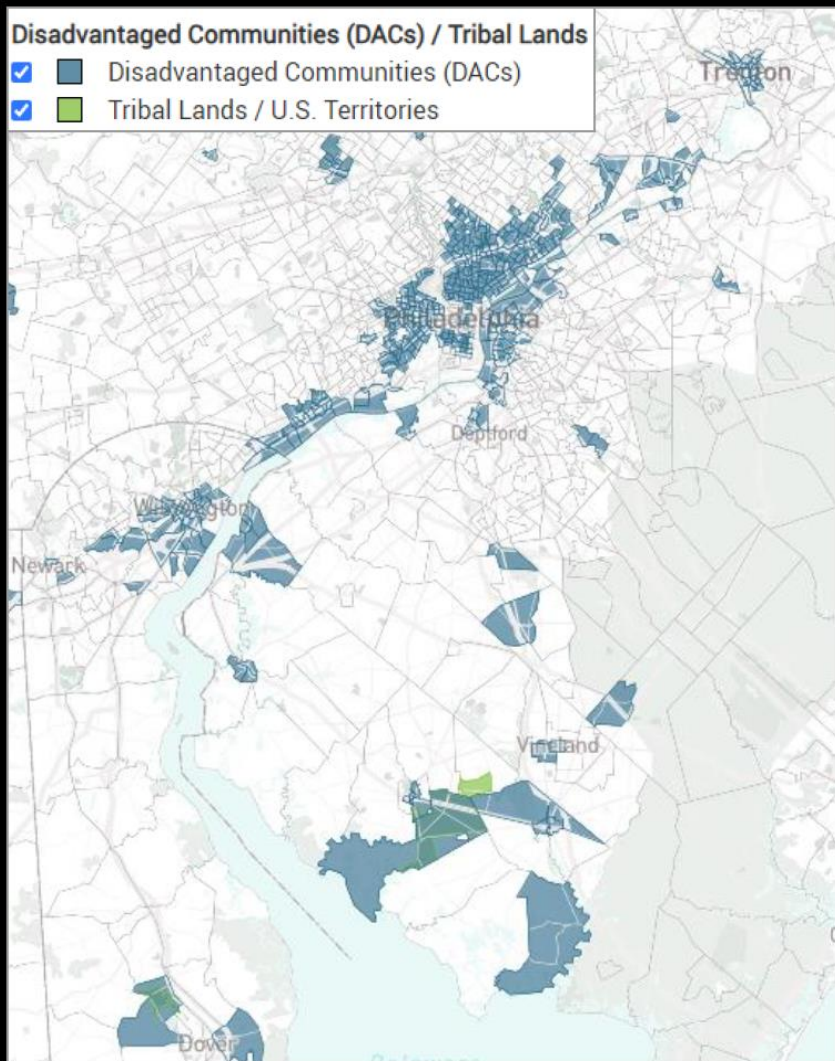
# WHY GREEN/PINK HYDROGEN FOR MID-ATLANTIC?

- Only use energy solutions that reduce both GHG & criteria pollutants
- Seize opportunities to create good, union jobs in clean energy economy
- Reduce emissions in sectors that have high levels of pollution and are difficult to decarbonize/electrify :
  - Industrial Facilities (23% of GHG): chemical manufacturing, steel, cement, logistics facilities
  - Transportation (28% of GHG) : Heavy-duty trucking, transit buses, ports, marine vessels, aviation
- Focus renewable energy electrification in sectors that make most sense: residential, light-duty vehicles, commercial buildings, etc.



# Justice40: MACH<sub>2</sub> will significantly reduce air pollution

## Large emitters in hub area are sources of H<sub>2</sub> demand



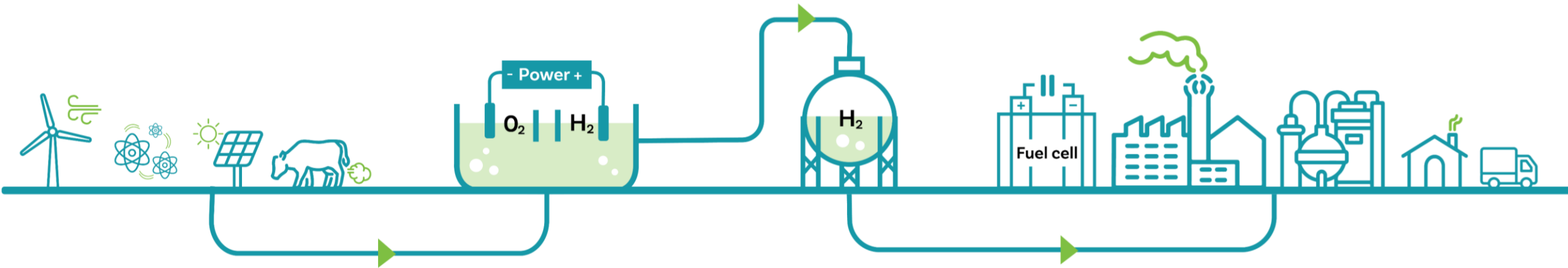
# HOW WILL MACH<sub>2</sub> PRODUCE HYDROGEN?

Using energy produced by clean energy sources like wind, solar, nuclear

...Low to zero carbon electricity could produce hydrogen from water through electrolysis.

Hydrogen is stored safely for when needed.

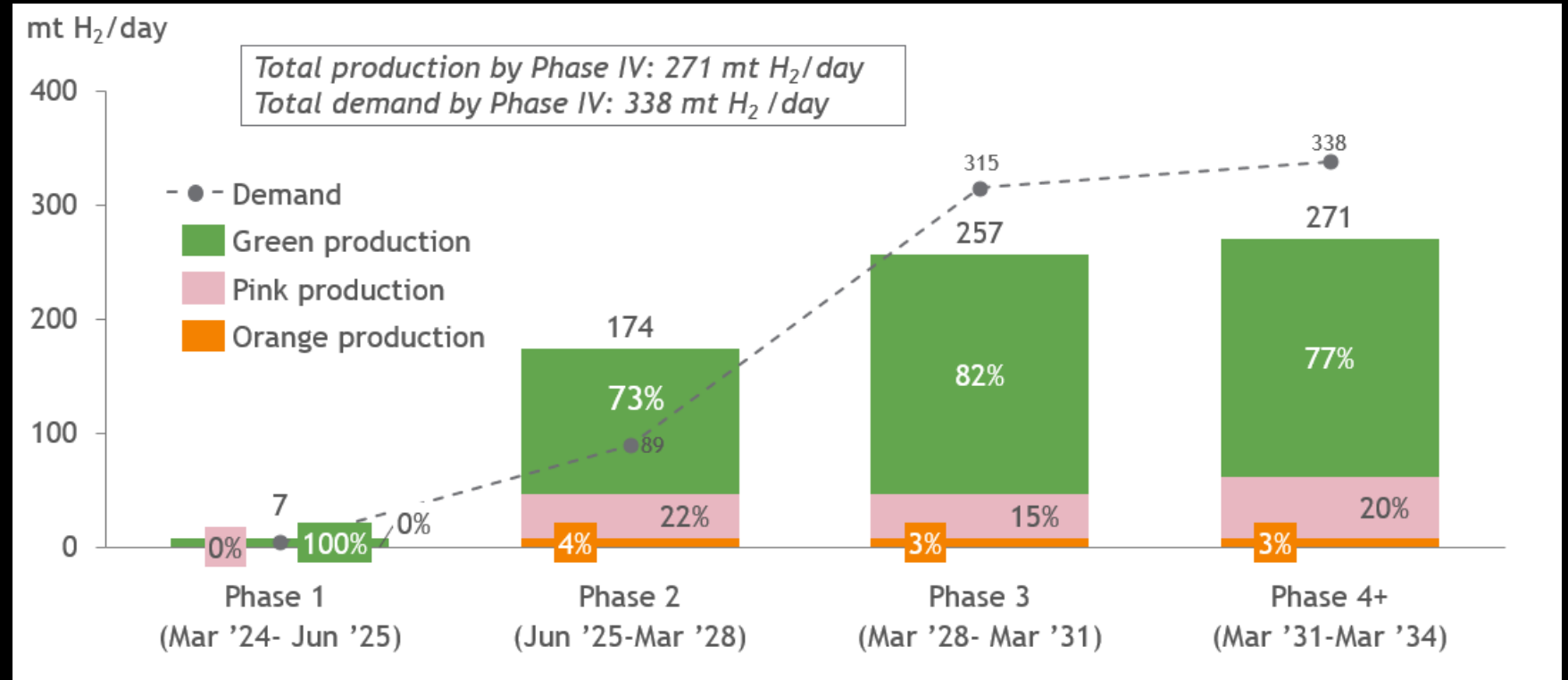
Clean hydrogen could be used for power generation, transportation fuel, refining and other industrial processes.



# MACH<sub>2</sub> IS A FOSSIL FUEL-FREE HUB

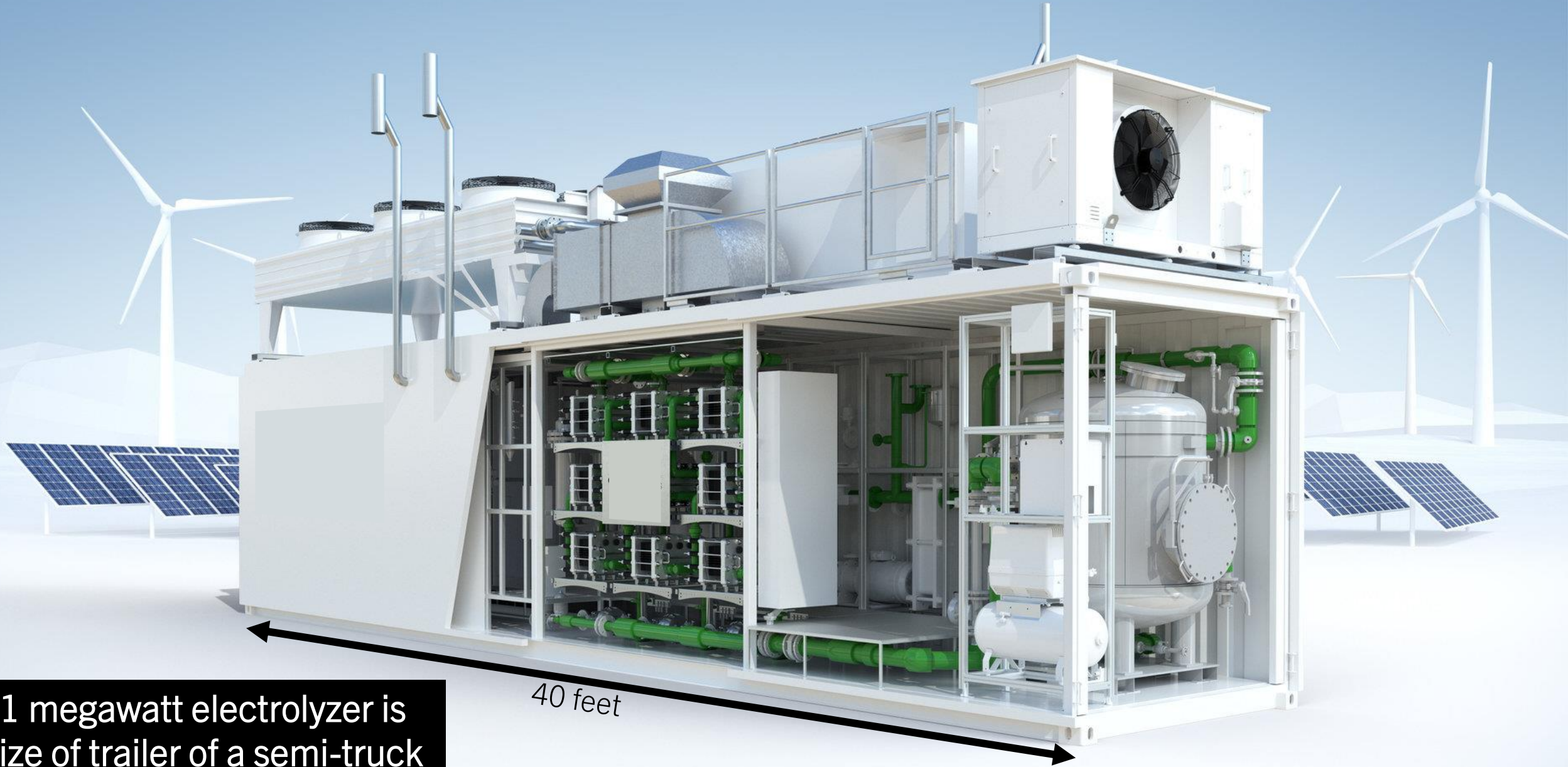
## POWERED BY RENEWABLE & NUCLEAR ENERGY

LEVELIZED H<sub>2</sub> COST: \$3.86/KG



Definition:	Solar or Wind powered electrolyzer	Nuclear powered electrolyzer	Biogas or biomethane in SMR (e.g., RNG)
Carbon intensity:	0 kg CO <sub>2e</sub> /kg H <sub>2</sub>	0.2 kg CO <sub>2e</sub> /kg H <sub>2</sub>	0.2 kg CO <sub>2e</sub> /kg H <sub>2</sub>

# WHAT DO ELECTROLYZERS LOOK LIKE?



1 megawatt electrolyzer is size of trailer of a semi-truck

40 feet

# MACH<sub>2</sub>

## Labor, Workforce & Community Outreach

- PA AFL-CIO
- DE AFL-CIO
- Building Construction Trades
- Pipefitters & Steamfitters
- Delaware Prosperity Partnership
- DESCA
- DE Workforce Development Board
- Philadelphia Works
- University of Delaware
- Cheyney University
- Rowan
- UPenn
- Drexel
- Delaware State University

## Industrial & Commercial Applications

- Monroe Energy
- Braskem
- DuPont Experimental Station
- Vicinity Energy
- PSE&G
- Enbridge
- Hilco
- HyAxiom
- Amazon
- Ameresco

## H<sub>2</sub> Producers & Innovators

- Air Liquide
- PBF Energy
- Bloom Energy
- PGW
- Monroe Energy
- Enbridge
- Versogen
- Holtec
- PSE&G
- Chesapeake Utilities
- sHYp
- Hydropore
- First State Hydrogen

## Transportation Applications

- SEPTA
- DART
- NJ Transit
- Philadelphia Municipal Fleets

## Education, Research & Development

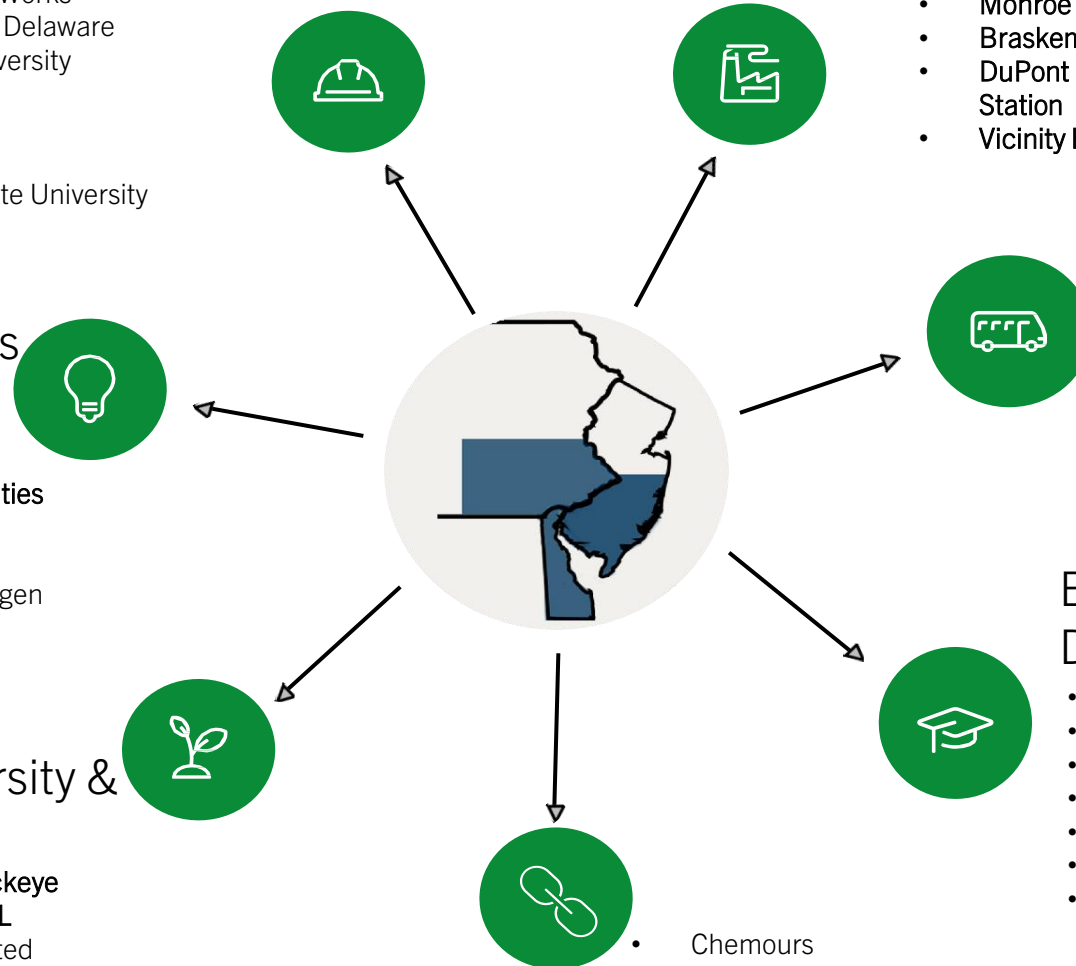
- University of Delaware
- Cheyney University
- Rowan
- UPenn
- Drexel
- Delaware State University
- DESCA

## Feedstock Diversity & Infrastructure

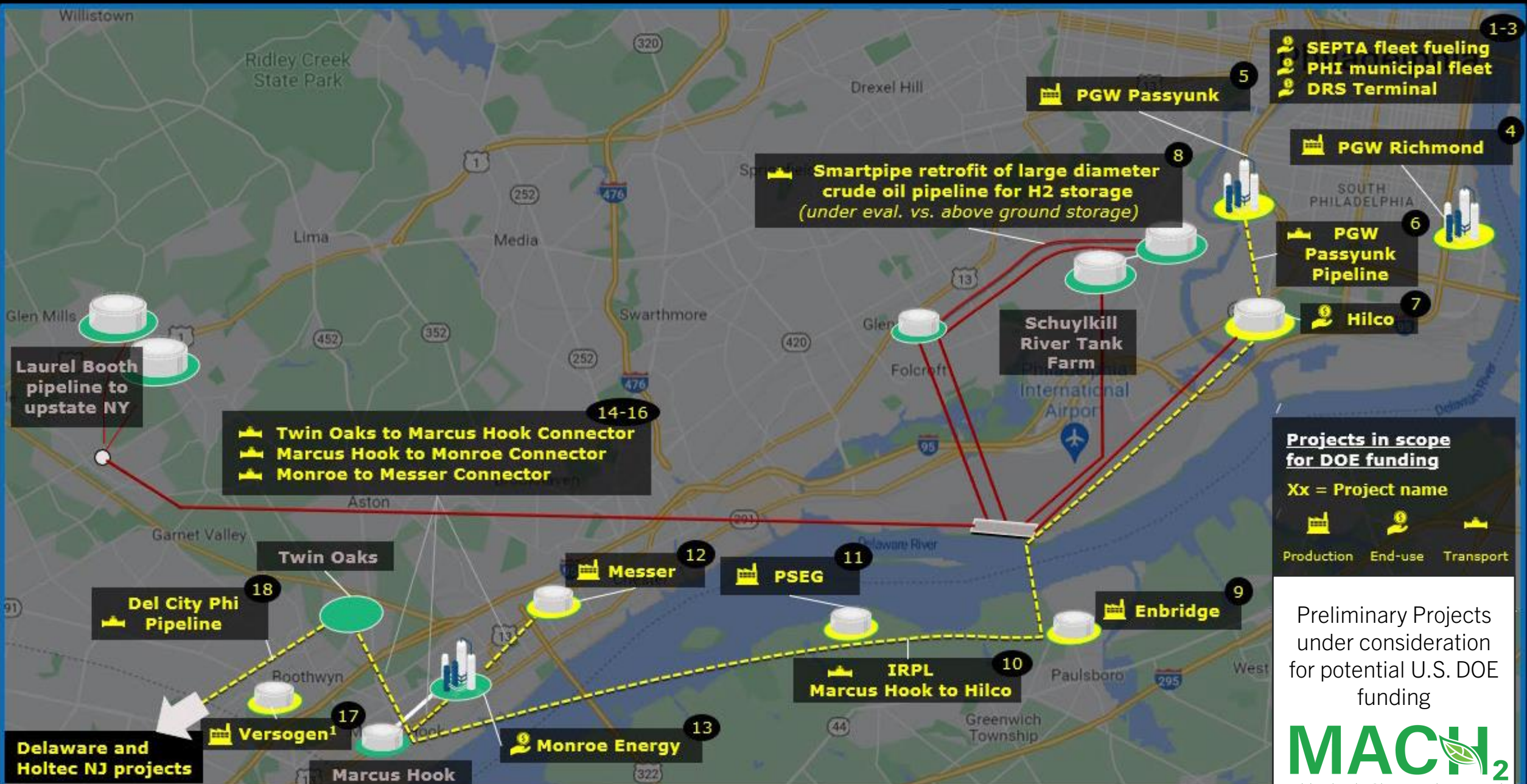
- PECO
- PSE&G
- US Wind
- Buckeye
- IRPL
- Orsted

## H<sub>2</sub> Supply Chain

- Chemours
- DuPont
- WL Gore
- Compact Membrane Systems



# PRELIMINARY DRAFT CONCEPT FOR DISCUSSION



Willistown

Ridley Creek State Park

Drexel Hill

Lima

Media

Swarthmore

Glen

Schuylkill River Tank Farm

International Airport

Glen Mills

Laurel Booth pipeline to upstate NY

Twin Oaks to Marcus Hook Connector  
 Marcus Hook to Monroe Connector  
 Monroe to Messer Connector

Twin Oaks

Messer

PSEG

Enbridge

Del City Phi Pipeline

Delaware and Holtec NJ projects

Versogen<sup>1</sup>

Marcus Hook

Monroe Energy

IRPL  
Marcus Hook to Hilco

Paulsboro

SEPTA fleet fueling  
 PHI municipal fleet  
 DRS Terminal

PGW Richmond

PGW Passyunk Pipeline

Hilco

**Projects in scope for DOE funding**

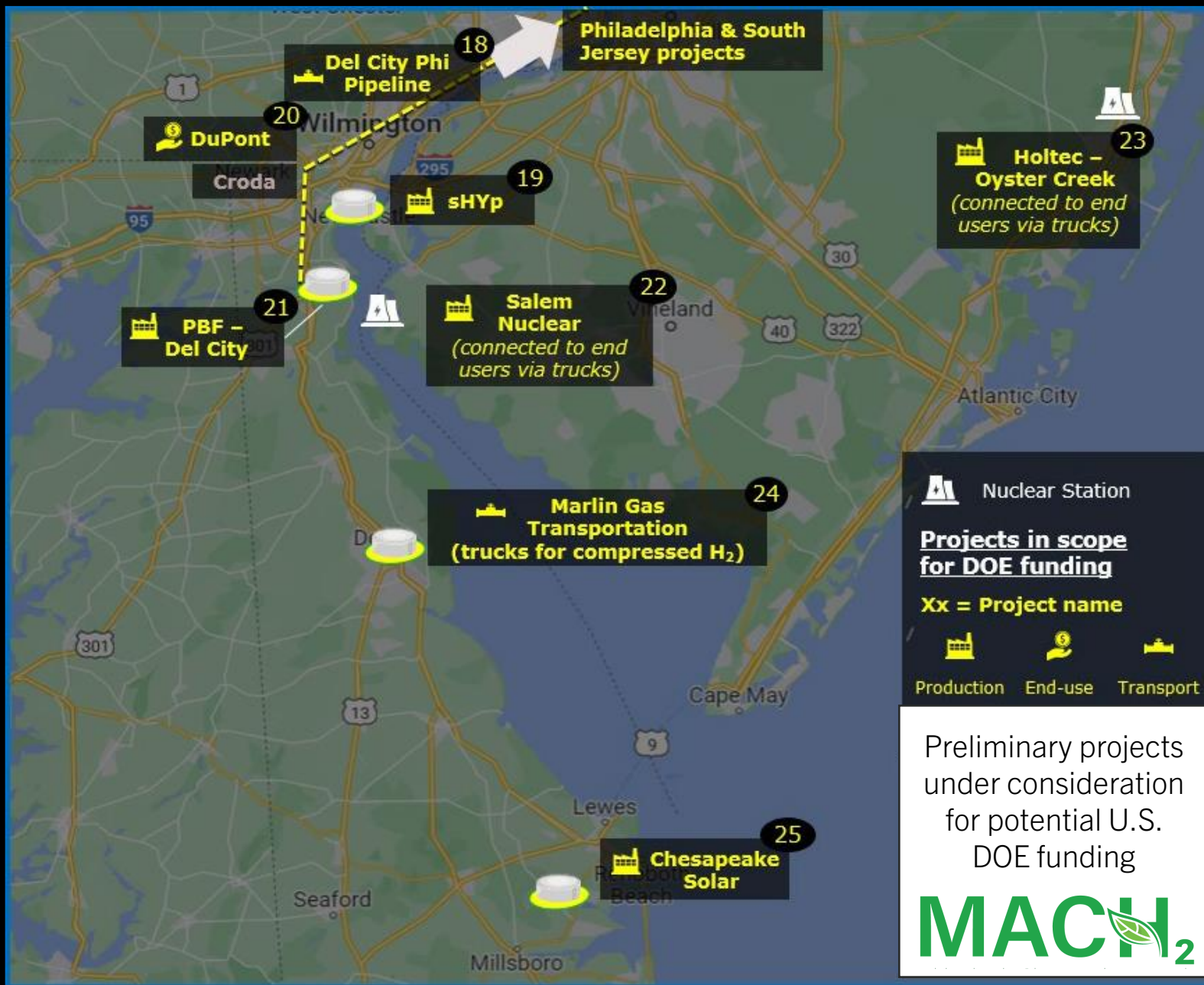
Xx = Project name

Production
 End-use
 Transport

Preliminary Projects under consideration for potential U.S. DOE funding

**MACH<sub>2</sub>**

# PRELIMINARY DRAFT CONCEPT FOR DISCUSSION



# WORKFORCE DEVELOPMENT & JOBS

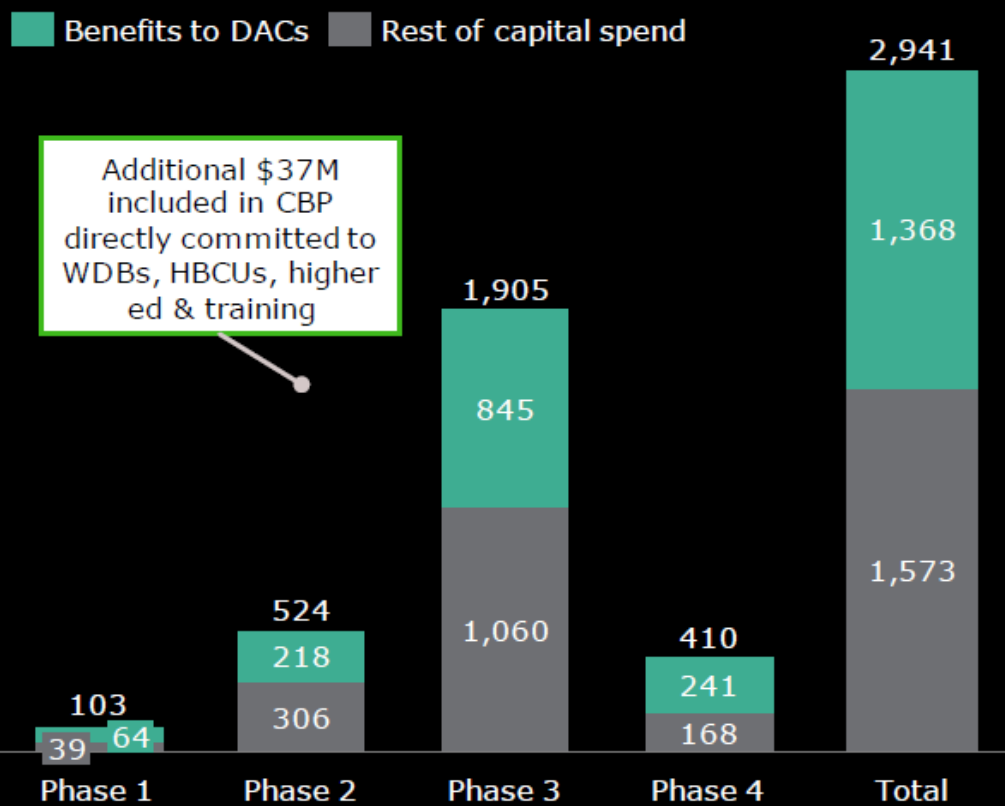


- MACH<sub>2</sub> will create 20,800 well-paying jobs in the clean energy economy, including 13,400 union construction jobs
- The regional Building Trades and AFL-CIO helped lead MACH<sub>2</sub> from the start. Every project will be constructed with project labor agreement
- MACH<sub>2</sub> will coordinate equitable access to next-generation job training opportunities, especially historically underserved communities
- Key workforce partners: Labor, Cheyney University, Delaware Tech, the Collegiate Consortium, Philadelphia Works, DE Workforce Development Board, NJ State Employment and Training Commission, FAME, Inc., LEEP



# MACH2 Community benefits | Investing in America's workforce & engaging DACs & underrepresented groups

Estimated benefits flowing to DACs in line with Justice40 criteria (\$ million)



Select highlights include:

- **Significant portion of project partner spend taking place in regions with high DAC density** allows us to estimate direct benefit of \$1.2-1.5B flowing to DACs in line with Justice40 benefits criteria<sup>1</sup>
- **Investing in America's Workforce** | ~\$14M committed to regional Workforce Development Boards to serve as MACH2 anchor partners for community college training, pre-apprenticeships
- **DEIA, EJ and J40** | \$10M commitment to technical and professional development initiatives for programs to overcome barriers in higher-ed to entry-level & professional careers for underrepresented groups – including Cheyney University, the country's first HBCU, U Penn and others

1. Ranges of spend flowing to DACs vary by project with 20-70% per project flowing to DACs, detail can be found in appendix. This estimate is built in our best understanding of how federal match on MACH2 partner projects will align with the policy priorities as defined under the "What Justice40 Benefits should be considered?" [FAQ on the DOE Community Benefits Plan](#). 2. Includes University of Delaware, Cheyney University, U Penn, Rowan University across higher-ed & technical training

POST AWARD  
ORGANIZATIONAL  
STRUCTURE  
EMBEDS COMMUNITY  
BENEFITS, WORKFORCE  
DEVELOPMENT & EJ40  
ACTIVITIES AT ALL  
LEVELS INCLUDING  
BOARD, ADVISORY  
COMMITTEES,  
EXECUTIVE TEAM &  
COMMUNITY BENEFITS  
STAFF

**BOARD OF DIRECTORS (BOD)**

Up to 15 individuals that represent all 3 states, the Board of Directors holds all fiduciary responsibility for the organization, and authorizes/manages the movement of money, establishes and approves by-laws, codes of conduct and governance structures. Permanent committees oversee audit, compensation, governance

**ADVISORY COMMITTEES (AC)**

Subject matter experts to advise both the BOD and the CEO/Executive Team on hub planning and execution. Members of the AC can also be members of the BOD as well as members of any ad hoc sub-committees formed for the execution of the hydrogen hub. Initially two ACs as a minimum: Industry/Technical and Community/Workforce Development, more to be developed if required.

**Industry AC**

Representatives from industry such as Air Liquide, Bayotech, Bloom Energy, Buckeye, Chesapeake Utilities, CMS, Enbridge, Holtec, Monroe Energy, PBF Energy, PGW, PSEG, Versogen, Schuyler Energy, South River Maritime, MDavis, Engineering, Compliance & Regulatory Expertise

**Community AC**

Environmental Justice Expertise, DESCAs, Chambers of Commerce, Economic Development Partners, UD, UPenn, Rowan, DSU, DTCC, DE Workforce Development Board, Union reps, Philadelphia Works, DEI&A reps, FAME, Inc

**CHIEF EXECUTIVE OFFICER (CEO)**

The CEO will report to the BOD and be accountable for executing the H2Hub plan as specified in the proposal submitted to the DOE. The CEO will be responsible for forming and hiring the executive team, staff, and consultants needed to execute on the plan. This team will also be responsible for forming any and all ad hoc sub-committees required for the execution of the hydrogen hub plan.

**HR & DEIA Director**

**Executive Administrator**

**COO, Technology Director & Staff**

**CFO & Staff**

**Community Benefits Lead & Staff**

**General Counsel**

**Consultant(s) and ad hoc sub-committees as required**



# Next Steps & Resources

# Get Involved

————— Project of Interest Selected/Awarded  
..... Project of Interest not Selected/Awarded

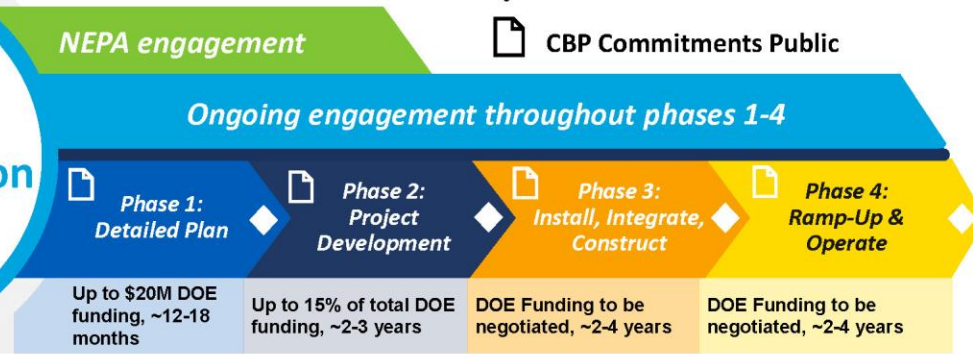
Project of interest selected (Oct 2023)



Project awarded



◇ Go/No-Go Decisions  
📄 CBP Commitments Public



Project not selected

DOE involvement ends\*

## How to engage during negotiation:

- Visit Hub webpages
- Attend Hub-specific virtual briefing
- Email the H2Hub
- Email DOE at [engage\\_H2Hubs@hq.doe.gov](mailto: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

Project not awarded

DOE involvement ends\*

## 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](mailto: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

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](http://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/>

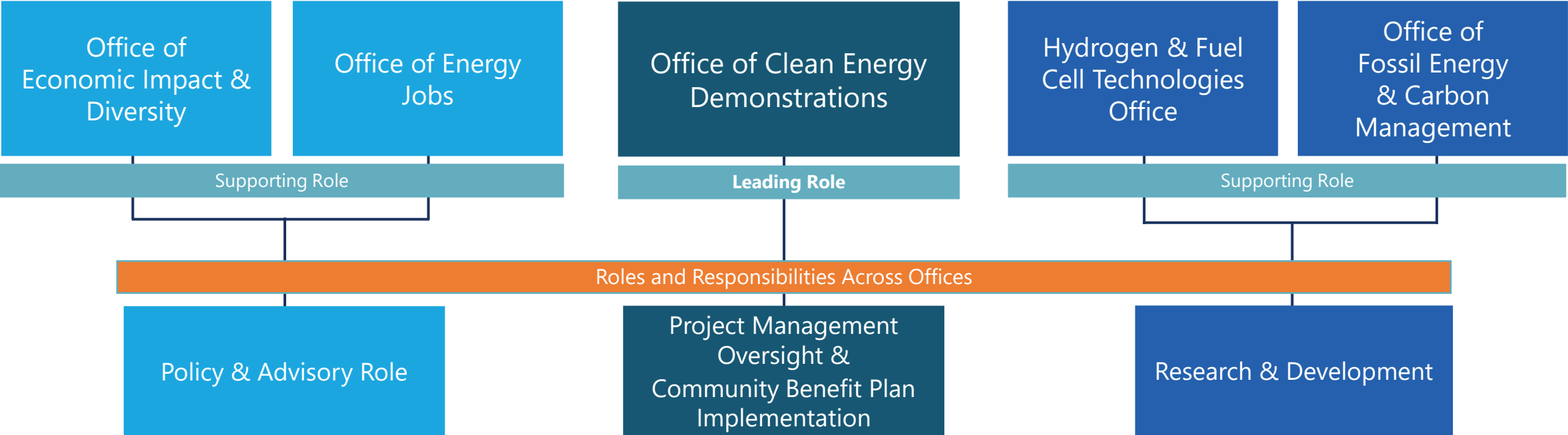
**Pacific Northwest Hydrogen Hub**

<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**  
[midatlantich2hub@hq.doe.gov](mailto:midatlantich2hub@hq.doe.gov)
- **OCED Website & Newsletter Sign-up**  
[energy.gov/oced](https://energy.gov/oced)  
*Scroll to bottom to sign up here:*

**Sign Up for OCED News & Alerts**

Subscribe and stay up-to-date on all upcoming funding opportunities, news announcements, upcoming events, and more.

GO

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



# Thank you!



**OCED**  
Office of Clean Energy Demonstrations



For more information; please visit [energy.gov/OCED](https://energy.gov/OCED)