OCED
Office of Clean Energy Demonstrations

REGIONAL CLEAN HYDROGEN HUBS PROGRAM

APPALACHIAN HYDROGEN HUB (ARCH2)

AWARDEE FACT SHEET

APPALACHIAN HYDROGEN HUB (ARCH2)

The Regional Clean Hydrogen Hubs (H2Hubs) Program, managed by the U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations (OCED), aims to create networks of hydrogen producers, consumers, and local connective infrastructure to accelerate the use of hydrogen as a clean energy carrier that can deliver or store tremendous amounts of energy.

Funded through the Bipartisan Infrastructure Law, OCED selected seven H2Hubs to begin award negotiations for up to $7 billion, the largest investment in clean manufacturing and jobs in American history. Following negotiations, in July 2024, OCED awarded the Appalachian Hydrogen Hub—also known as the Appalachian Regional Clean Hydrogen Hub (ARCH2), led by Battelle—with $30 million for the first tranche of funding out of the total project federal cost share of up to $925 million to begin Phase 1 of the project plan. The Hub is determining siting for project locations across West Virginia, Ohio, and Pennsylvania.

Project At a Glance – Phase 1

Total OCED Cost Share Amount:

Up to $925 million

Phase 1 OCED Award Amount:

$30 million*

Phase 1 Total Project Amount:

$96 million**

Phase 1 Scope of Work:

Planning and development activities

Initial Phase Timeline:

Up to 36 months

Recipient:

Battelle

Project Locations:

West Virginia, Ohio, and Pennsylvania

Project Start Date:

July 2024

* Represents OCED's cost share for the initial project phase. Additional funding for this project is subject to future award negotiations at the end of each project phase.

** Represents the total project cost for the initial project phase.

ABOUT THIS PROJECT

Project Description at the Hub-level:

OCED is working with ARCH2 to build the proposed Appalachian Hydrogen Hub, a network of projects that aims to leverage the region's vast resources for diverse clean hydrogen production, storage, delivery, and end-use applications across WV, OH, and PA. The strategic location of the Hub and the proposed development of multiple hydrogen fueling stations and permanent carbon dioxide (CO_2) storage have the potential to drive down the cost of hydrogen distribution and storage. The Appalachian Hydrogen Hub is intended to help the nation lead in the advancement of the hydrogen economy while reducing emissions and pollution that has long affected air quality in Appalachian communities. The Hub intends to produce more than 1,500 metric tons of clean hydrogen per day and reduce CO_2 emissions by 9 million metric tons per year—equivalent to the annual emissions of more than 2 million gasoline-powered cars.

Led by Battelle and supported by a Program Management Office (PMO) comprised of Allegheny Science and Technology, GTI Energy, and TRC Companies, ARCH2 is a collaborative initiative between private industry, state and local governments, academic and technology institutions, non-profit organizations, and community groups working together to build a safe and sustainable clean hydrogen ecosystem in Appalachia.

The scope of the Appalachian Hydrogen Hub includes the proposed design, construction, and operation of diverse projects owned by the subrecipients. Diversity of the proposed projects is a key and differentiating feature of the Hub, from the proposed technologies, hydrogen production feedstocks, and delivery pathways, to end-use sectors and locational benefits. The subrecipients are also diverse, ranging from large, established energy-sector companies, to emerging technology companies, small commercial and regional businesses that bring unique and agile business models, and deeply experienced DOE contractors. ARCH2's portfolio approach balances program risks, helping to ensure Hub objectives are met, with projects that demonstrate proper maturation and support progressing from one phase to the next.

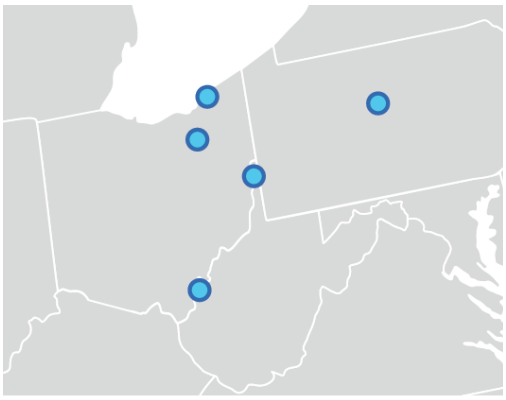
In July 2024, OCED awarded Battelle with $30 million (out of the total project federal cost share of $925 million) to begin Phase 1, which is expected to last up to 36 months and includes planning, design, and community and labor engagement activities. During the first phase, each Hub subrecipient will be responsible for the planning and development of their respective projects, while all entities in the Hub will implement the community benefits commitments jointly.

OCED will provide project management oversight of the Appalachian Hydrogen Hub by evaluating the status and quality of implementation at each phase of the project. Through its phased approach to project management, OCED will review and evaluate the Hub's progress, including community benefits, which impact OCED's decision to continue to provide federal funding and allow a project to progress to the following phase.

DOE will comply with the National Environmental Policy Act and will analyze the potential environmental impacts that could result from creation of the Hub as well as include public involvement.

PROJECT SITES

ARCH2 is determining potential siting and facility options throughout the region, with proposed sites across WV, OH, and PA, including:



Production Sites

*Map includes only proposed production sites announced in July 2024 and does not reflect the full list below.

1

AIR LIQUIDE

Air Liquide plans to build and operate a hydrogen liquefaction facility, on-site storage, and loading facilities to serve offtakers in the mobility sector. The project location is still under consideration but is planned to be co-located with the EQT project.

2

CNX RESOURCES CORP.

CNX Resources Corporation plans to produce clean hydrogen via natural gas autothermal reforming in southern WV. Hydrogen would be used to produce ammonia for potential end-users in the agriculture and marine industries.

3

ENBRIDGE GAS OHIO

Enbridge Gas Ohio plans to produce clean hydrogen via electrolysis at a facility to be located on or near Stark Area Regional Transit Authority (SARTA) in Canton, OH. The project will include on-site storage and connective infrastructure for refueling SARTA's fleet of hydrogen fuel cell buses and vehicles and support other mobility applications.

4

EMPIRE DIVERSIFIED ENERGY

Empire Diversified Energy plans to produce hydrogen from anaerobically digested food waste at a facility in Follansbee, WV. The facility would use biogas generation followed by pyrolysis to convert biomass into clean hydrogen for transportation and industrial uses.

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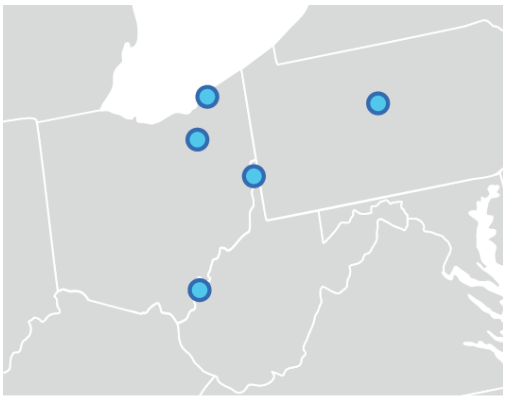

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5

EQT

EQT plans to construct and operate a clean hydrogen production facility to convert natural gas into hydrogen-rich syngas via autothermal reforming and then into low-carbon aviation fuel and other liquid fuels. Hydrogen would be purified from the syngas and used for fuel cell vehicles or blending to gas distribution lines. The project location is still under consideration but is planned to be co-located with the Air Liquide Project.

6

FIDELIS NEW ENERGY

Fidelis New Energy plans to produce clean hydrogen via autothermal reforming of natural gas and biomass with carbon capture at a facility near Point Pleasant, WV. An on-site short-haul pipeline would deliver the hydrogen for end-use in data centers, power generation, and other applications.

7

HOG LICK AGGREGATES

Clean Fuel Services LLC, a subsidiary of Hog Lick Aggregates, plans to develop a Clean Fuel Services Depot near Fairmont, WV, featuring hydrogen vehicle fueling and maintenance facilities. At full capacity, the project would potentially use approximately one metric ton per day of clean hydrogen to power heavy- and medium-duty trucks, buses, and material-handling and processing equipment.

8

HOPE GAS, INC. & WATT FUEL CELL CORP. (WATT)

Hope Gas plans to install up to 5,000 solid oxide fuel cells developed by WATT, of which 40% would go to residents in disadvantaged or rural communities to generate baseload electricity for homes. The project also plans to blend up to 15% clean hydrogen into its gas distribution system servicing areas across OH and WV, some of which will provide hydrogen to the fuel cells.

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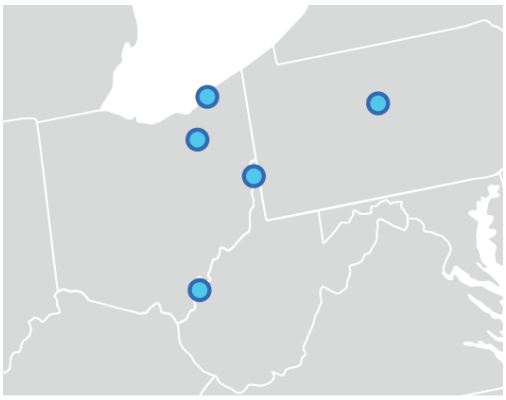

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9

INDEPENDENCE HYDROGEN INC. (IH)

Independence Hydrogen plans to develop a clean hydrogen production facility near Ashtabula, OH, using industrial off-gas at an existing chemical facility as feedstock. The hydrogen produced would be intended for use in material-handling equipment at distribution centers in the region.

10

KEYSTATE ENERGY

KeyState plans to produce clean hydrogen via natural gas autothermal reforming and hydrogen liquefaction near Clinton, Clearfield, and Centre counties in PA. Hydrogen would be used in fuel cell vehicles and industrial heat and to produce ammonia and urea for fertilizer, manufacturing uses, and remediation of diesel and power plant exhaust emissions. The project plans to mitigate 90% of upstream carbon emissions, capture and store 99% of carbon generated by the facility, and utilize near-zero-carbon power using a 100% hydrogen-powered gas turbine.

11

PLUG POWER

Plug Power plans to have two projects within the Hub: a liquid hydrogen project and distribution and on-road mobility project. The liquid hydrogen project plans to retrofit and expand hydrogen production and liquefaction equipment at an existing chemical plant. Hydrogen would be produced using industrial off-gas as feedstock and/or electrolysis and would support offtake in the Appalachian region. The distribution and on-road mobility project plans to feature hydrogen storage of up to 18,000 gallons of liquid hydrogen, refueling stations, and stationary fuel cells to support material-handling equipment, stationary backup power, and fuel cell electric vehicles at two Amazon distribution centers near Etna and North Randall, OH.

COMMUNITY BENEFITS COMMITMENTS

Community benefits commitments are a key component of the Appalachian Hydrogen Hub, to be informed and developed in consultation with local communities, which aim to mitigate potential impacts of this Hub and maximize local community benefits. Community benefits commitments are outlined both at the Hub and project level and are often interlinked. Throughout the project lifetime, the Hub plans to implement:

- An Advisory Board and Community Benefits Steering Committee (CBSC) comprised of diverse stakeholders such as regional governments, labor/trade organizations, nongovernmental organizations (NGOs), academia, and community groups. The CBSC also plans to solicit ongoing local stakeholder input on topics such as safety and emergency planning, public data-sharing methods, and opportunities to increase benefits and reduce negative impacts for host communities, workers, and disadvantaged communities. The CBSC would make recommendations to Hub leadership and provide transparency and accountability for tracking progress of community benefits activities across the Hub.

- Community advisory bodies with membership that reflect the diversity of project stakeholders, including fenceline and disadvantaged communities. Projects plan to work with their local community to determine the advisory body's scope and its member composition, ensuring transparency in the nomination process. Projects aim to consider and implement activities to increase accessibility of these mechanisms.

- Two-way engagement with labor and community stakeholders and work to meaningfully integrate community and labor input, including from disadvantaged communities and underrepresented populations, into community benefits planning.

- Good faith negotiations with labor and trades organizations to ensure a skilled and trained workforce for Phases 3 and 4 (construction and operations), working towards signing Memoranda of Understanding (MOUs) in Phase 1. This will include efforts to create equitable pathways to employment and opportunities for dislocated workers and communities who have lost jobs amid the clean energy transition. Projects will also jointly evaluate the potential for pursuing negotiated agreements such as Community Benefits Agreements together with local communities.

- Thousands of quality jobs, including permanent operations jobs. All projects plan to create workforce development, staffing, and training plans, which will direct efforts to create quality jobs, mitigate any potential negative impacts on the workforce, hire registered apprentices, and recruit and retain underrepresented workers and those from disadvantaged communities. Hub-level workforce development efforts will address cross-cutting gaps or needs across the Hub.

- Robust Justice40 commitments, which will include updates to the Justice40 Assessment and Implementation Strategy during each phase and sharing relevant information for impacted community input. All projects would contribute to these assessments, with best practices and tracking frameworks established at the Hub level. Implementation Strategies will include proposed measurement, monitoring, and mitigation measures. Justice40 impacts may include benefits related to air quality, energy savings, environmental remediation, and clean energy jobs as well as issues like water use and quality, environmental impacts, safety and health, and emergency response.

- Preliminary air quality monitoring plans to conduct baseline air quality monitoring and seek input from relevant community advisory mechanisms.

- A public data-reporting platform to enhance transparency. The platform would provide information about the projects including status updates, information about community advisory mechanisms, including their recommendations and the Hub's response, and engagement mechanisms and events. In later phases, the data reporting platform would include metrics related to community and labor engagement, quality jobs and workforce development, tribal impacts, diversity, equity, inclusion, and accessibility (DEIA), and Justice40 initiatives.

Community benefits commitments will be refined and updated at the end of each project phase. More details on the Appalachian Hydrogen Hub's community benefits commitments can be found here.

REGIONAL CLEAN HYDROGEN HUBS

Program Goals

The Regional Clean Hydrogen Hubs Program goal is to establish H2Hubs across the nation and jumpstart a new clean energy economy in the United States. Funded by the Bipartisan Infrastructure Law, the H2Hubs will accelerate the commercial-scale deployment of clean hydrogen, helping to generate clean, dispatchable power, create a new form of energy storage, and decarbonize heavy industry and transportation. Together, the H2Hubs will kickstart a national network of clean hydrogen producers, consumers, and connective infrastructure while supporting the production, storage, delivery, and end-use of clean hydrogen. Clean hydrogen is a flexible energy carrier that can be produced from a diverse mix of domestic clean energy resources, including renewables, nuclear, and fossil resources with safe and responsible carbon capture. As the most abundant element in the universe, hydrogen has unique characteristics as an energy carrier that make it the best option to decarbonize energy-intensive heavy industry and support heavy-duty transportation. Matching the scale-up of clean hydrogen production to a growing regional demand is a key pathway to achieving large-scale, commercially viable hydrogen ecosystems. The H2Hubs will also help to enable the development of diverse, domestic clean energy pathways across multiple sectors of the economy and serve as a central driver in helping communities benefit from clean energy investments, good-paying jobs, and improved energy security.

Contact

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More Resources

DOE OCED H2Hubs Program Website:
energy.gov/OCED/H2Hubs

ARCH2 Website:
www.arch2hub.com