



FREQUENTLY ASKED QUESTIONS

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Disclaimer: Proposed Projects

Please note that all references to "ARCH2 projects" within this document should be understood as "ARCH2 [proposed] projects." All projects, plans, and initiatives described have not been finalized and are subject to change based on ongoing evaluations, stakeholder feedback, and regulatory approval processes. This document is intended for informational purposes only and does not constitute a commitment to proceed with any project as described.

GENERAL

What is ARCH2?

The Appalachian Regional Clean Hydrogen Hub (ARCH2) is a collaborative initiative between the United States Department of Energy (DOE), private industry, state and local governments, academic and technology institutions, nonprofit organizations, and community groups working together to build a safe and sustainable clean hydrogen ecosystem in Appalachia. With a project portfolio that spans West Virginia, Ohio, and Pennsylvania, ARCH2 will leverage the region's vast resources for diverse hydrogen production, storage, delivery, and end-use applications. ARCH2 Project Development Partners include Air Liquide, The Chemours Company, CNX Resources Corp, Enbridge Gas Ohio, Empire Diversified Energy, EQT Corporation, Fidelis New Energy, Hog Lick Aggregates, Hope Gas Inc., Independence Hydrogen Inc., KeyState Energy, Marathon Petroleum, Plug Power, and TC Energy. Management of ARCH2 is led by Battelle Memorial Institute, Allegheny Science and Technology, GTI Energy and TRC Environmental Corporation with support from the National Energy Technology Laboratory (NETL).

Where will ARCH2's proposed projects be located?

ARCH2's proposed projects will be located throughout West Virginia, eastern Ohio, and western Pennsylvania. Potential sites for each project are under evaluation and will be determined following extensive analysis of many factors, including community and stakeholder inputs.

Will ARCH2 solicit community input and feedback in the planning and development stages for its proposed projects and, if so, when will this occur?

DOE structured the H₂Hub program into 5 distinct phases outlined below. These phases are funded incrementally, such that funding for each phase is dependent upon successful completion of extensive Go/No-Go criteria established for the previous phase.

- **Pre-Award** is the period during which award negotiations between DOE and the hubs takes place. As of May 2024, all H₂Hubs are in the pre-award phase.
- **Phase 1** will involve preliminary planning and analysis, incorporating comprehensive community and stakeholder input, to ensure ARCH2's technological and financial feasibility, as well as the social and environmental equity, of ARCH2's proposed project portfolio.
- **Phase 2** will finalize engineering designs and business development, site access, labor agreements, permitting, offtake agreements, with continued community engagement activities.

- **Phase 3** will consist of the construction, installation, and integration activities in accordance with plans developed in prior phases, including extensive health and safety plans.
- **Phase 4** will ramp-up the H₂Hub to full operations, including data collection to analyze the H₂Hub's operations, performance, and financial viability.

Extensive community and stakeholder engagement both at the ARCH2 hub-level and at the project-level will take place during phase 1 to help inform project planning and site decisions. Outreach and engagement efforts have been ongoing through the pre-award phase and will ramp up significantly during phase 1. Highlights of outreach efforts to date include:

- Meeting with a diverse array of organizations across multiple sectors, including labor unions, academic institutions, and construction trades, to name just a few, to foster open communication and begin ongoing dialogues.
- Participating in nearly a dozen external events hosted by a range of organizations, including the Ohio Aerospace Institute, Oak Ridge National Laboratory, Pennsylvania Bar Institute and the West Virginia Building and Construction Trades Council.
- Engaging with local, regional, and national media outlets to educate on the benefits of hydrogen energy and ARCH2's vision and purpose.
- Sharing updates and engaging with stakeholders on social media platforms such as LinkedIn.

Through these multifaceted outreach efforts, ARCH2 has laid a robust foundation for continued engagement and collaboration with our stakeholders.

HYDROGEN PRODUCTION METHODS

How is hydrogen produced?

Hydrogen can be [produced](#) from diverse domestic feedstocks using a variety of process technologies. Hydrogen-containing compounds such as fossil fuels, biomass, or even water can be a source of hydrogen. Thermochemical processes are used to produce hydrogen from fossil fuels such as natural gas and coal or from renewable sources such as biomass. Electricity generated from sunlight, wind, and nuclear sources can be used to electrolytically produce hydrogen from water. Sunlight by itself can also be used to directly produce hydrogen from water using [advanced](#) photoelectrochemical, thermochemical, and photobiological processes.

What is the difference between “green” hydrogen and “blue” hydrogen?

Decarbonized hydrogen, or low-carbon hydrogen, produced from natural gas, is commonly referred to as “blue” hydrogen. Blue hydrogen is generated by capturing and permanently storing the carbon dioxide (CO₂) by-product when hydrogen is manufactured from natural gas. Hydrogen produced by electrolysis with electricity generated from renewable sources is sometimes referred to as “green” hydrogen. It’s important to note that both “green” and “blue” hydrogen are recognized as forms of “clean” hydrogen due to their reduced environmental impacts.

Does hydrogen production emit carbon?

CO₂ is a natural by-product when natural gas-reforming creates hydrogen. Many of ARCH2’s proposed projects will use carbon capture and storage (CCS) to permanently store CO₂ subsurface to produce low-carbon hydrogen.

Collectively, ARCH2 and the other H₂ hubs are expected to produce more than a half million metric tons of hydrogen annually, with anticipated growth in the future lift-off. This will replace usage of fossil fuels in hard-to-decarbonize industrial sectors that emit 30% of total U.S. carbon emissions. By reducing the amount of fossil fuels used, ARCH2 and the other H₂ hubs are expected to initially result in a net reduction of at least 5 million metric tons of CO₂ emissions from end-uses each year—an amount roughly [equivalent](#) to combined annual emissions of 1.1 million gasoline-powered cars.

Will ARCH2’s proposed projects produce clean hydrogen?

ARCH2’s proposed projects will only produce clean hydrogen, meeting the full requirements of DOE’s [definition of clean hydrogen](#).

How much does it cost to produce hydrogen?

The production cost of hydrogen varies based on several factors:

1. type and cost of feedstock used to produce hydrogen;
2. the hydrogen production technology used;
3. the local cost of energy (price of electricity, price of natural gas, etc.);
4. the size of the production plant, among other factors.

Currently, hydrogen from renewable sources costs about \$5 per kilogram to produce in the U.S.¹ Depending on regional gas prices, the levelized cost of hydrogen production from natural gas ranges from \$0.5 to \$1.7 per kilogram (kg)². Using CCS technologies to reduce the CO₂ emissions from hydrogen production [increases](#) the levelized cost of production to around \$1 to \$2 per kg. DOE supports the research and development of a wide range of technologies to produce hydrogen economically and via net-zero-carbon pathways. In 2021, DOE launched the [Hydrogen Shot™](#) as part of its larger [Energy Earthshots](#) Initiative that aims to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions this decade. DOE has a bold “1-1-1” goal to cut the cost of clean hydrogen production to \$1 per 1 kilogram in 1 decade, which is an 80% reduction from the cost in 2020.

Is there a baseline measurement that ARCH2’s proposed projects will be held to with regards to ensuring clean H₂ production?

Carbon intensity is a very important metric for a successful clean hydrogen hub. ARCH2 will monitor all proposed projects to ensure compliance with DOE guidelines and the [Clean Hydrogen Production Standard](#).

Will any of ARCH2’s proposed projects use alternative fuel vehicles?

At least two ARCH2 partners are considering using hydrogen-powered trucks as part of their project scopes. Hydrogen-powered buses for public transportation are also included in the scope of ARCH2.

Will any of ARCH2’s proposed projects produce “green” hydrogen?

At least two of ARCH2’s proposed projects plan to produce “green” hydrogen through water electrolysis as part of their project scopes.

¹ U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. “Hydrogen Shot.” Accessed 05/07/2024. <https://www.energy.gov/eere/fuelcells/hydrogen-shot>.

² “Comparison of Commercial State-of-the-Art, Fossil-Based Hydrogen Production Technologies”, DOE/NETL-2022/3241, April 12, 2022.

Will power that is produced by ARCH2's proposed projects feed into the public power grid managed by electric power utilities? If so, will this result in an increase in consumer energy costs?

At the present time, none of ARCH2's proposed projects are planning to produce hydrogen to feed the public power grid, therefore, there will be no impact on consumer energy costs.

Will ARCH2's proposed projects utilize fossil fuels to produce hydrogen?

ARCH2's proposed projects will use the nation's lowest-cost natural gas – and in many cases, the nation's lowest carbon intensity natural gas – as primary feedstock to enable and sustain a regional clean H₂ economy across multiple end-use sectors in the Appalachian region while ensuring economic benefits are shared fairly and equitably among local communities. ARCH2 believes a holistic, source-agnostic approach to hydrogen production will bring the greatest number of benefits.

Today, the biggest impediment to widespread adoption of hydrogen as an energy source is cost. Thermochemical production processes that utilize carbon-based natural resources are the most economical and cost-efficient methods to produce hydrogen. This supply of low-cost clean hydrogen will enable the build out of a national hydrogen distribution network, help meet clean hydrogen regulatory requirements and ultimately lay the groundwork for the large-scale production and use of clean hydrogen across multiple sectors of the economy.

One of the intents of the ARCH2 hub is to develop hydrogen infrastructure and foster the utilization of hydrogen. The infrastructure will initially be served largely by blue hydrogen but as advancements make green hydrogen more cost competitive, end users will be able to transition to green hydrogen without major adjustments to their operations.

INFRASTRUCTURE

How close will hydrogen infrastructure facilities be sited in relation to residential areas?

Environmental and stakeholder considerations will be considered during site planning at appropriate stages within the project development cycle. Plans will be communicated as soon as they are available, and stakeholders will have the ability to comment and provide input on proposed locations.

What is HyBlend, and will it be utilized in ARCH2's proposed projects?

[HyBlend](#) is a DOE and industry initiative to assess the commercial opportunity and address technical challenges with blending hydrogen into existing natural gas pipelines. The resulting blends can be used to generate heat and power with lower emissions than using natural gas alone. In 2021, DOE announced a [collaborative effort](#) with more than 30 partners in industry, nonprofits, and academia to conduct research that will be used to inform the development of publicly accessible tools that characterize the opportunities, costs, and risks of blending. Hydrogen blending with natural gas is being evaluated as part of ARCH2's development.

CARBON CAPTURE AND STORAGE

What is the current development status of carbon capture technologies? Are they ready for widespread deployment and usage?

According to the [International Energy Agency](#), “The United States is the global leader in CCUS development and deployment, with ten commercial CCUS facilities, some dating back to the 1970s. These facilities have a total CO₂ capture capacity of around 25 Mt/year – close to two-thirds of global capacity.” ARCH2’s proposed projects will build on this success.

While continual improvements in technology are ongoing, the Congressional Research Service authored a comprehensive [report](#) on the development status of CCS in the U.S. The report cites cost as the primary obstacle to the widespread deployment and usage of CCS.

Congress has incentivized the development of CCS through tax credits and appropriations [e.g. Internal Revenue Code Section 45Q tax credit for carbon sequestration and Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58)]. ARCH2’s projects will utilize existing, proven CCS technologies at their proposed sites.

Can you provide detailed, transparent reports on the effectiveness of mitigation strategies like carbon capture?

The effectiveness of CCS technologies and projects has been evaluated by numerous scientific, peer-reviewed studies over the past 3+ decades and there is extensive literature on the topic. A useful high-level assessment of the role of CCS in low-carbon transitions and the readiness of the technology to be deployed globally can be seen in the International Energy Agency report, [CCUS in Clean Energy Transitions](#).

CCS technologies encompass the capture of CO₂ at emission sources, followed by its compression, transport, and geologic storage. Each has been [proven effective](#) as individual components and as integrated systems at commercial scale in numerous settings. A comprehensive list of operations and planned CCS projects across the world is published by the [Global CCS Institute](#). Based on the Institute’s [data](#), there are now 41 currently operational facilities globally capturing 361 million tons per annum (Mtpa) of CO₂.

More importantly, CCS is currently undergoing a major growth phase with more than 198 new facilities in the development pipeline, 26 under construction and 325 in advanced early development. Most of the new projects are at a scale similar to ARCH2’s projects.

Will CO₂ and other emissions be captured throughout the entire hydrogen production, transportation, and storage chain?

CO₂ and other emissions will be controlled over the entire production chain to conform to both carbon intensity objectives and permit limits.

How will the CO₂ emissions associated with hydrogen production be captured and stored?

Hydrogen will be produced using methods with high rates of CO₂ capture. CO₂ captured from the production process will be transferred via pipeline to geologic sequestration. Note that several of ARCH2's proposed projects do not generate CO₂ emissions during the hydrogen production process and will not require CCS.

What are the expected CO₂ emissions of ARCH2's proposed projects?

ARCH2 will produce less than <2 kg-CO₂ emissions per kg-H₂. In fact, ARCH2 estimates the CO₂ emissions to be far less than that level, based on the information provided by project partners. Natural gas to H₂ conversion processes typically produce approximately 9 tons of CO₂ for every ton of H₂. While the total amount of H₂ and its production pathways have not yet been finalized, if we assume 500,000 tons per year of H₂ from ARCH2's proposed projects, the anticipated annual CO₂ production could be between 4 and 5 million tons. Several partners are already planning for increased H₂ production, which will in turn increase CO₂ capture as the H₂ production capacity increases. The CO₂ emissions are assessed by Life Cycle Analysis (LCA) of emissions using approved models such as [GREET \[energy.gov\]](#)[®]. The [GREET \[energy.gov\]](#)[®] (Greenhouse gases, Regulated Emissions, and Energy use in Technologies) model was developed by DOE's Argonne National Laboratory to evaluate energy and environmental performance of technologies to assess research, development, and deployment (RD&D) progress, inform RD&D directions, and inform performance goals set by governments, corporations, and other stakeholders.

Is there a map of the planned CCS locations?

The location of carbon storage facilities will be assessed, planned, and designed at appropriate stages within the project development cycle. Specific details will be communicated as soon as they are available, and stakeholders will have the ability to comment and provide input on proposed storage locations.

What will be done to ensure the sites chosen for carbon storage from ARCH2's proposed projects will work?

Selection and development of CO₂ storage sites is an extensive process incorporating geologic characterization and subsurface testing, assessment of surface use and accessibility, detailed reservoir modeling to assess the likely zone of CO₂ storage within safe injection limits, and preparation and review of injection well permits along with public comment period, prior to construction. This process can take several years and involves seismic surveys and drilling of deep test wells to validate the storage and containment feasibility. Additional data collection and refinement is done during the construction and baseline monitoring to ensure that the environmental, safety, and business goals of the project will be met. Finally, there is ongoing monitoring and modeling during the operations to ensure that the site is operating as conceived and within the permitted parameters.

HYDROGEN STORAGE

Will ARCH2's proposed projects store hydrogen underground? If so, are there regulations in place to ensure it is done safely?

Hydrogen storage in underground bedded salt formations is being considered and will follow the applicable local, state, and federal requirements for siting and safety for construction and operations, including any pipelines transporting product to and from underground facilities.

END USES AND DEMAND

What are the projections for ARCH2 hydrogen production and end uses?

As currently proposed, approximately 2,100+ metric tons per day (MTPD) of hydrogen will be generated, with the majority end-use being hydrogen-based products such as ammonia. Approximately 800+ MTPD of the generated hydrogen will be delivered as either gaseous or liquid hydrogen product with the remaining used to make other hydrogen-based products, such as ammonia, urea, and Low-Carbon Aviation Fuel (LCAF). Initially, approximately 140 MTPD of liquid hydrogen will be used for mobility across the hub.

SAFETY

How will ARCH2's proposed projects ensure operational safety?

Each of the proposed project sites will develop a safety plan, perform risk assessments, and implement risk management processes to manage safe operations. ARCH2 at the hub level will conduct extensive community engagement related to safety, including direct engagement and training with first responders and other local emergency and safety-related personnel. Site safety plans will be informed by engagement with the local workforce and relevant stakeholders to address local priorities and concerns. Safety and disaster response may include hydrogen emergency management, proactive safety measures, reactive safety measures, community responsibilities, containment, and cleanup. Risk assessments will be undertaken to manage risks in accordance with recognized and generally accepted good engineering practice, such as those set forth by DOE.

How will ARCH2 ensure first responders are trained to address emergency situations involving hydrogen?

Training of first responders is of high importance to ARCH2 and is central to our risk mitigation strategy. Emergency preparedness discussions and planning are critical to protecting first responders and providing them with the training and instruction they need to safely respond to potential emergencies at ARCH2 facilities. ARCH2 will work directly with communities to develop a robust and comprehensive training strategy.

Will an odorant be added to hydrogen for safety?

No, currently recognized and generally accepted good engineering practice does not recommend adding an odorant to hydrogen for the transportation or storage phase. Current research indicates that odorants have a negative impact on fuel cell performance and hydrogen storage. While there is currently no requirement for odorant in the transportation of hydrogen by pipelines as set forth in DOT requirements outlined in 49 CFR 192, should industry standards or recognized practices identify the need for an odorant, ARCH2 will evaluate and adopt those practices as appropriate.

REGULATIONS AND PERMITTING

How will hydrogen and carbon dioxide (CO₂) pipelines be regulated?

Federal and/or state agencies regulate hydrogen and CO₂ pipelines, and the scope of their jurisdiction is expanding. At the federal level, the [Pipeline and Hazardous Materials Safety Administration](#) (PHMSA) sets safety standards for interstate pipeline design, construction, operation, and maintenance and conducts inspections to ensure that these standards are being met. Applicable state statutes determine the regulating state agency for intrastate pipelines. ARCH2's proposed projects will fully comply with all applicable pipeline regulations established by federal, state, and local agencies.

Will ARCH2's proposed projects be required to receive state and federal regulatory approvals and comply with those regulations?

All of ARCH2's proposed projects will obtain all required local, state, and federal regulatory approvals, authorizations, and permits from the appropriate agency having jurisdiction for the construction and operations of facilities and associated infrastructure. ARCH2's proposed projects will fully comply with all applicable regulations established by federal, state, and local agencies.

Does ARCH2 have a plan to mitigate any negative environmental impacts?

ARCH2's proposed projects will comply with federal, state, and local permitting requirements to inform appropriate avoidance, minimization, and mitigation actions within each project area. Each project will consider a diverse array of factors, including the specific ecological impacts, local environmental conditions, community needs, technical requirements, and best practices in sustainability, to determine the most appropriate environmental mitigation strategies. Importantly, because ARCH2's Project Development Partners will be receiving federal funding, each project will be subject to the [National Environmental Policy Act](#) (NEPA), which requires that DOE assess the environmental impacts of all ARCH2 projects.

ENVIRONMENTAL PROTECTION

How will ARCH2's proposed projects mitigate threats to drinking water quality for communities near wastewater storage sites?

ARCH2's proposed projects will comply with federal, state, and local statutes, laws, and permit conditions to avoid and minimize impacts to drinking water quality. Consistent with these permitting requirements, ARCH2's proposed projects will be constructed and operated in accordance with all state and federal regulations regarding water use and discharge. Further, any geological sequestration of carbon dioxide will conform to the requirements of EPA's Underground Injection Control (UIC) program, a program specifically intended to protect groundwater.

What types of environmental impact assessments have been or will be conducted?

As part of its obligations under NEPA, DOE will analyze the existing conditions and potential impacts of ARCH2's proposed projects on natural and cultural resources, land use, water and air quality, safety and socioeconomics to the environment and community.

DOE's review will cover the anticipated project activities and potential impacts for both construction and operations. It may also include specific monitoring requirements as a condition of approving ARCH2's award funding.

Federal, state, and local permit applications for individual projects will also require documentation of impacts, and associated permits may also contain specific monitoring requirements to document compliance.

The Justice40 program for ARCH2 also will develop monitoring recommendations to demonstrate that Justice40 community benefits objectives are being met for the lifecycle of the project.

What specific monitoring and compliance mechanisms are in place to ensure that environmental, health, and safety regulations are consistently met throughout the lifespan of the proposed projects?

Monitoring and compliance requirements may be specified by DOE during or outside of the NEPA process.

Specific monitoring and compliance requirements may also be established during the development and approval of permits at the federal, state, and local level, as required.

The Justice40 objectives may also specify monitoring to track the status of community benefits.

Are there mechanisms in place to revise or halt project components if ongoing environmental assessments reveal unforeseen negative impacts?

DOE will require ongoing monitoring and mitigation of unforeseen negative impacts as part of its project oversight role.

All of ARCH2's proposed projects will be subject to federal, state, and local permitting, which will establish regulatory requirements for each project. Permits may contain permit conditions that set forth limits, restrictions, or other requirements during construction and/or operation.

How will ARCH2's proposed projects impact air quality and the health of those living in the vicinity of the projects?

In the Appalachian region, ARCH2's proposed projects with CCS technology anticipate contributing to a reduction in carbon emissions. Air quality metrics can be viewed through online tools such as [AirNow.gov](https://www.airnow.gov).

Can you provide specific studies or data on the health impacts of utilizing locally produced natural gas to develop hydrogen?

Research confirms natural gas is being safely and responsibly developed in the Appalachian Basin. The region is home to the lowest methane emission intensity of all major oil and natural gas basins in the country, which has led transformative emissions reductions for the United States. Locally, studies have also found that natural gas development does not pose a threat to area water quantity or quality.

Additional information is available through these sources:

- [Health & Environmental Impacts Studies](#) | Marcellus Shale Coalition
- [Health & Safety Studies](#) | Energy In Depth
- [Appalachian Methane Initiative 2023 - Multi-scale Methane Measurements in the Appalachian Basin: A Pilot Study](#) | Matthew Harrison and Teclé Rufael, SLR International Corporation | March 2024

- [Measurements of methane emissions at natural gas production sites in the United States](#) | David T. Allen, Vincent M. Torres, James Thomas, and John H. Seinfeld | Proceedings of the National Academy of Sciences | September 2013

ENVIRONMENTAL JUSTICE AND JUSTICE40

How does ARCH2 plan to ensure that the proposed projects adhere to principles of environmental justice?

The ARCH2 Community Benefits Plan includes a Justice40 Implementation Plan that will work with ARCH2's Project Development Partners to ensure the Justice40 Policy Priorities deliver benefits to communities and mitigate potential impacts, with a focus on existing conditions and burdens experienced by disadvantaged communities (see policy priorities [here](#)). Justice40 is designed to be responsive to community concerns identified through engagement. Justice40 will track progress towards hub-level goals, taking into consideration community priorities and concerns, and ensure benefits are flowing to disadvantaged communities in the project areas.

How will ARCH2 address environmental justice concerns from the communities impacted by the proposed projects?

Environmental justice communities often face disproportionate burdens on health due to the impacts of greenhouse gas emissions and related climate impacts, such as increases in severe weather. The role of H₂Hubs is pivotal as a proactive step towards acknowledging and addressing environmental justice concerns. By fostering clean hydrogen networks, the H₂Hub contribute to a more equitable and sustainable future by mitigating the impact on communities of industrial activities that negatively impact health outcomes and by aligning with the principles of fairness and inclusivity in environmental stewardship. ARCH2 is committed to actively engaging communities throughout decision-making process.

How will former coal mining and similar communities benefit from ARCH2?

Historically, frontline communities have been reliant on coal, oil, or gas infrastructure, not only for energy but also for the economic benefits derived from jobs and tax revenue. Unfortunately, the closure of many industrial plants and mines in these areas has led to substantial economic setbacks. Providing the skills, certifications, and education required for the hydrogen economy jobs is part of the effort to build on existing local knowledge and skills and help individuals who work or formerly worked in coal mining or oil and gas to benefit from job and supplier opportunities in the hydrogen economy. Communities that once thrived as coal mining and power plant hubs are now given the opportunity to be part of the clean hydrogen economy.

Will ARCH2 collaborate with other hydrogen hubs?

DOE's goal for hydrogen hubs is to create a national clean hydrogen network. ARCH2 is dedicated to the advancement of a hydrogen economy and will work with other hubs to achieve DOE's goal.

TIMING AND PROJECT LOGISTICS

What is the source of funding for ARCH2 and other hydrogen hubs?

The funding for ARCH2 and the other H₂Hubs is coming from a public and private sector cost share. U.S. federal government funding for the H₂Hubs will be in accordance with the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL). Funded by the Bipartisan Infrastructure Law (BIL), DOE announced \$7 billion in funding to jumpstart the hydrogen economy by establishing the H₂Hubs.

What elements of the proposed projects can be changed at this point?

The ARCH2 portfolio of proposed projects is subject to potential modifications in response to evolving economic conditions, regulatory directives, technology maturity, and other pertinent external factors. Project decisions can be informed and adjusted based on updated inputs, such as community input, local specificities, such as community context, agreements to be negotiated, cost dependent considerations, and other factors. Project site locations are subject to evaluation, including inputs received through community engagement efforts, during phase 1 of project execution, and the NEPA process.

How will truck drivers, carrier companies, & logistics companies that rely on petroleum be impacted by these efforts?

H₂ trucking operations will be separate from diesel trucking operations. H₂-fueled trucks will co-exist on roads with diesel-fueled trucks. One of ARCH2's partners is seeking additional funding to develop an H₂ commercial driver license training program that will certify drivers to transport H₂ and refuel with H₂ safely. H₂-powered trucks and logistics have the potential to generate new jobs in the future for drivers, trainers, and manufacturers.

Will hydrogen be used for residential or commercial heating?

ARCH2 includes a proposed project that will provide clean hydrogen for residential fuel cell applications, demonstrating feasibility of this application.

WORKFORCE

How many jobs will ARCH2 create?

At this time, ARCH2 can only reference preliminary job estimates provided by project partners through analysis of the preliminary project plans. The initial job projections for ARCH2 include 18,000 construction jobs and 3,000 permanent, operational jobs. We expect to conduct a more thorough analysis and refine estimates throughout the detailed design (phase 1). Construction will occur in phase 3 and will include the largest number of jobs. ARCH2 will also create jobs through business-to-business spending (indirect impacts) and induced spending, as households spend their incomes in the local economies. Estimates of these types of secondary economic benefits will also be developed beginning in phase 1, with results shared publicly.

Will the labor agreements for ARCH2's proposed projects include requirements for hiring locally?

ARCH2 is committed to hiring locally first, followed by bringing back displaced workers originally from our region.

What are the specific skills needed for hub workers?

ARCH2 is currently working with our project partners to define the specific skill sets needed for their projects and with labor/trade and to ensure all workers have the skills that are required. Workforce development programs, informed by the analysis of current capabilities and project needs, will build local capacity, and expand opportunities for local workers. Additionally, train-the-trainer programs will be in place to ensure appropriate safety and [Occupational Safety and Health Administration](#) (OSHA) training is available and accessible throughout the region within each proposed project area.

COMMUNITY BENEFITS AND ENGAGEMENT

How were the community benefit plans (CBP) in the initial application to DOE created?

During the application process, ARCH2 integrated high-level input from regional entities, labor representatives, academic institutions, and other stakeholders to produce a preliminary CBP. The CBP submitted with our application is being updated during the pre-award phase based on feedback from DOE. The CBP provides a high-level approach to how we plan to conduct and measure our community engagement; workforce development; diversity, equity, inclusion, and accessibility (DEIA); and Justice40 strategies, along with representative benefits that projects may provide, based on preliminary analysis. As we move into the detailed design phase (phase 1), community and stakeholder outreach will be expanded to include public forums and provide opportunities for meaningful public participation in the planning process. Specific community benefits will be determined at the project level between each project and its local communities. We will make the CBP plan available to the public once revisions are finalized, which will be soon after the ARCH2 award. The CBP will be a living document that will be refined and updated, with stakeholder input, over the course of ARCH2 program execution.

When will the regional engagement events occur? How will feedback from regional engagement events be evaluated?

Final details are forthcoming, but we expect the regional (state-level) engagement events to occur in 2024, with project-level meetings following regional events based on the schedule of the individual project. Feedback from community engagement events will be considered as it applies to each project. ARCH2 projects will only be able to advance to the next funding phase once all milestones have been met. DOE has assembled CBP teams responsible for overseeing each hub's CBP efforts and will work closely with the ARCH2 CBP team.

How will the ARCH2 Advisory Board and the Community Benefits Steering Committee operate?

Community engagement is paramount to ARCH2. An inclusive Community Benefits Steering Committee, composed of regional governments, labor/trade organizations, NGOs, academia, and community groups, will keep communities first. This steering committee will provide recommendations to ARCH2's leadership on a range of topics throughout the scope of the hub through the ARCH2 Advisory Board. Steering committees will be established to address and provide recommendations on specific topic areas. The by-laws and structure of ARCH2 Advisory Board and the Community Benefits Steering Committee will be finalized in phase 1. However, we are compiling a list of individuals who have expressed interest in participating

on the Steering Committee. Our goal for the committee is to ensure representation across organization types from each state in ARCH2. More information will be made available as the process solidifies.

How will ARCH2 approach community engagement?

ARCH2 will integrate community input into our plans to maximize the benefits to each project community. Preliminary conversations began in the concept paper phase. Since then, we have expanded our community engagement efforts, and will continue to do so through direct conversations and open forums at the regional and project levels. We expect the first regional open forums to occur in 2024, with local-level engagements occurring as each project is ready. During phase 1, each project will expand its community engagement and develop a CBP demonstrating how the project will engage and collaborate with its local project community(ies). Evidence of this engagement and collaboration may be a Community Benefit Agreement, Memorandum of Agreement, or other form of document, as agreed upon by the project team and community leaders and approved by DOE.

How will feedback from community engagement be considered in the project planning and decision-making process? Can you provide examples of changes made based on community input?

Throughout phase 1, ARCH2 Project Development Partners will identify opportunities for communities to contribute to project-planning and decision-making processes. They will solicit feedback on initial project goals and plans and input on local community priorities. The opportunities to engage with ARCH2 projects will be unique to each project but may include a variety of mechanisms such as public forums, workshops, surveys, and web forms.

The impact of community feedback on project plans and decisions will also be unique to each ARCH2 project. As phase 1 progresses, ARCH2 Project Development Partners will communicate to their communities regarding the impact of their engagement activity. Potential impacts may include project design, environmental considerations, infrastructure, safety/health, community benefits, or public awareness/education.

Is ARCH2 engaging with historically underrepresented stakeholder groups?

Throughout the application process, ARCH2's proposed projects undertook outreach efforts to historically underrepresented stakeholder groups. As we conducted our preliminary stakeholder analysis, the projects had the opportunity to interact with many different organizations at events throughout the region. As we move forward with the detailed design phase, ARCH2 remains committed to actively engaging with historically underrepresented

groups to ensure diverse viewpoints are heard and integrated into our initiatives. We will continue these efforts through direct conversations and open forums at the regional and project levels. We expect the first regional open forums to occur in 2024, with local-level engagements to occur as each project is ready.