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Environmental Health Project Statement on ARCH2 Funding

Some projects in the planned ARCH2 hub will increase toxic pollution, raising the risk of public health harms; public transparency and inclusiveness of frontline communities has fallen woefully short.

Background

Yesterday, the U.S. Department of Energy (DOE) Office of Clean Energy Demonstrations announced it will release the first round of funding for Appalachian Regional Clean Hydrogen Hub (ARCH2) projects spanning West Virginia, Ohio, and Pennsylvania. A total of \$30 million in federal funding will be released to partners involved in developing the projects. In all, the DOE is committing up to \$925 million in funding to [11 projects and a dozen companies](#), which include facilities that plan to source and deliver hydrogen for transportation fuel, chemical production, and residential use.

Unlike most of the other proposed hydrogen hubs around the country, some of the ARCH2 projects will produce [“blue hydrogen”](#)—the production of hydrogen through an energy-intensive process that mixes methane gas with water to create carbon dioxide and hydrogen. Most of the methane used in the blue hydrogen process is extracted from fracking wells, meaning it will require the extraction of fossil fuels in the region and extend the life of this high-polluting industry. The second key feature of blue hydrogen is the capture and storage of the carbon dioxide released during processing, referred to as [“carbon capture, utilization, and storage”](#) (CCUS), an unproven technology with health risks of its own.

Many experts believe that some end uses—long-haul heavy-duty trucking, high-temperature industrial processes like steelmaking, and long-duration energy storage of renewable energy—may not be readily electrified or decarbonized through other less polluting technology. Consequently, blue hydrogen may offer a way to temporarily decarbonize such uses, but understanding potential economic and health risks are important steps before moving forward. Furthermore, experts also advise that the technology should be deployed only when it serves the most efficient pathway to a decarbonized economy, complementing proven and readily available alternatives.

Environmental Health Project Statement

Alison L. Steele, Executive Director

The DOE's decision to move forward with certain ARCH2 projects that produce blue hydrogen sourced from fossil fuels shows that the federal government has not yet considered the long-term public health consequences of these projects. The blue hydrogen lifecycle is far from clean. It begins with the extraction of fossil fuels—typically shale gas fracked near communities already burdened by health impacts from this heavy-polluting industry. Blue hydrogen's reliance on shale gas wells as feed stock negates any downstream benefits in emissions.

EHP strongly recommends that blue hydrogen projects in the ARCH2 plan not be approved or funded with taxpayer dollars. Public funding should be targeted to a just transition away from fossil fuels and toward renewable energies, which offer greater public health protections and more opportunities for job growth and consumer cost reductions than energies sourced from methane gas. Further, for any ARCH2 projects, transparency and community participation in the process must be improved. Anticipated health risks of projects and related infrastructure, including the shale gas feedstock sourced for blue hydrogen projects, must be fully assessed and mitigated before any of these projects break ground, and all potential future health risks must be communicated to frontline residents so that they have an opportunity to respond and protect themselves from harms going forward.

Why blue hydrogen creates a health burden

The [fracking process](#) emits unhealthy fine particulate matter (PM_{2.5}) and a variety of toxic substances such as volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), glycol, and radium into Pennsylvania communities. There are more than [two dozen epidemiological studies](#) and [hundreds of other studies and investigations](#) that associate proximity to shale gas development with negative health outcomes, including the [Pennsylvania Environment and Health Studies](#) (or Pitt Study) released just last year, which found associations with poor birth outcomes, childhood cancer, and asthma exacerbation. Other health impacts identified by the broader body of literature include heart failure and high blood pressure, upper and lower respiratory issues, cancer, chronic fatigue and migraines, and stress and anxiety.

There are also serious public health concerns related to the transportation and storage of gas feeder stock, used wastewater, gas byproducts, and the hydrogen itself once produced. Whether these products or byproducts are transported by diesel trucks, trains, ships, or pipelines, potentially harmful emission releases occur at every stage of the process. The risks of accidents and explosions also increase. Additionally, operators are challenged to find proper ways to [store or dispose of waste](#), which typically contains hazardous chemicals and often radioactive substances.

Why blue hydrogen and CCUS will not solve the climate crisis

The idea that blue hydrogen and its associated CCUS technology will help solve the climate crisis is false. A large-scale blue hydrogen industry would facilitate more releases of climate-altering methane, which carries a heavy public health burden, as lethal storms, fires, heat waves, floods, and other extreme weather events impact people's physical and mental health worldwide. Hydrogen itself, when reacting with other chemicals in the atmosphere, can [facilitate the creation of greenhouse gases](#).

A [2021 study by researchers at Cornell and Stanford Universities](#) estimates that the greenhouse gas footprint of blue hydrogen is more than 20% greater than burning shale gas for heat, largely due to the methane emissions during the shale gas lifecycle. The researchers' analysis also assumes that CO₂ is captured and stored indefinitely, which they consider "an optimistic and unproven assumption." A [2023 study modeled the carbon intensity of blue hydrogen](#) with more realistic assumptions about capture rates, leakages, and emissions. Under these assumptions, blue hydrogen is at least three times more carbon intensive than the federal standard.

CCUS will also contribute significantly to climate warming through the energy it requires and technological failures. CCUS technology is unlikely to meet the [Clean Hydrogen Production Standard](#) set by the federal government. To date, many [carbon capture projects have not been able to meet the 90% capture rate](#) promised by industry, with some projects well below 40%.

How the process has failed communities to date

Finally, but no less important, transparency of the ARCH2 project details and inclusiveness of frontline communities in making project plans has, so far, [fallen woefully short](#).

The DOE has failed to sufficiently include frontline communities in planning, siting, or structuring the ARCH2 hub, and community listening sessions have tended to devote more time to descriptions of the project than to opportunities for residents and community groups to provide actionable feedback. A total of 55 community organizations recently [petitioned the DOE](#) urging greater transparency around the ARCH2 hub. While the DOE did share some information with the petitioners in a recent virtual presentation and seems to be taking some concerns into consideration, frontline communities and advocates still indicate that they have generally been left in the dark on the details of the projects.

Further, to date, there is no indication that ARCH2 or the project leads will meaningfully assess the cumulative public health impacts of these projects, including blue hydrogen projects and their associated pipelines and CCUS facilities.

According to the DOE's [initial funding announcement](#) in early 2023, the following documentation should have been developed during the last 10 months of prefunding negotiations:

- Safety history/culture description
- Permitting workflow overview
- Environmental Considerations Summary

This first installment of funding is intended to support up to three years of community engagement and project planning. If the DOE wishes to earnestly collect meaningful feedback from impacted communities in each phase, and especially in the subsequent planning phase, it would behoove the agency to release the above documents to allow for more specific and constructive feedback on the comprehensive impacts of the projects. Without providing more information about risk mitigation plans, communities will likely end up reiterating their feedback from the prefunding phase. It would also behoove the DOE to release their criteria for reviewing and evaluating the hub's progress, including community benefits at each phase of the process, which impact future funding decisions.

True project management means that the DOE must require corporations involved to do proper due diligence with respect to environmental and health impacts, and true community engagement means that the DOE and the corporations have an obligation to provide communities with any plans and assessments that might impact the communities' ability to offer meaningful feedback and recommendations going forward.

About EHP

The [Environmental Health Project](#) (EHP) is a nonprofit public health organization that defends public health in the face of shale gas development. EHP provides frontline communities with timely monitoring, interpretation, and guidance while engaging diverse stakeholders: health professionals, researchers, community organizers, public servants, and others.