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Environmental Health Project (EHP) Statement on the Public Health Impacts of Blue Hydrogen Production (August 3, 2022)

Background

Blue hydrogen *is produced through an energy-intensive process that mixes methane gas with water to create carbon dioxide and hydrogen. The hydrogen becomes an available fuel while the carbon dioxide emissions are captured and stored underground. This underground storage process is called carbon capture and storage or carbon capture and sequestration (CCS).*

CCS technology is a problematic solution to controlling fossil fuel emissions. According to a current article in Scientific American, "[C]arbon dioxide doesn't necessarily stay in the rocks and soil. It may migrate along cracks, faults and fissures before finding its way back to the atmosphere. Keeping pumped carbon in the ground—in other words, achieving net negative emissions—is much harder. Globally there are only [a] handful of places where this is done. None of them is commercially viable…. Meanwhile numerous CCS plants have failed. In 2016 the Massachusetts Institute of Technology closed its Carbon Capture and Sequestration Technologies program because the 43 projects it was involved with had all been canceled, put on hold or converted to other things."[1]

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. So, blue hydrogen may offer a way to temporarily decarbonize such uses. But 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.

EHP's Statement

Setting aside serious technology and business uncertainties, the production of blue hydrogen raises the risk of public health impacts and the related healthcare costs in several critical ways.

First, blue hydrogen production requires the extraction of fossil fuels—typically shale gas—as feeder stock, demanding more hydraulically fractured shale gas wells in areas already overburdened by this heavy industry. Increased well production means greater emissions of a variety of toxic chemicals, such as fine particulate matter ($PM_{2.5}$), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), glycol, and radium into local communities. Studies have found that these emissions may raise the risk of asthma and other respiratory illnesses, heart disease and heart attacks, birth defects and pre-term deliveries, mental health issues, and cancer.

Additionally, the production of blue hydrogen itself raises the same elevated health risks for people living in proximity to these large-scale industrial complexes. With larger facilities comes greater emissions and greater risks of spills, leaks, or other contamination events. Given the right atmospheric conditions, pollution can travel for miles, impacting unsuspecting residents far from the source of emissions.

Public health may also be impacted by 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.

A large-scale blue hydrogen industry would also 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.

EHP calls for robust and comprehensive public health protections around any fossil fuel extraction, transportation, or production process:

- Industry must be compelled to effect stringent emissions detection and reporting—working with communities to reduce exposure and alert the public of any unusual releases, whether planned or accidental.
- Government agencies must be intrinsically involved in making sure industry complies with pollution standards, holding operators accountable when they do not comply.
- Health impact assessments and other community health monitoring must be put in place to ensure public health is protected today and into the future. Residents must be informed fully about health risks to which they are exposed.
- It is not enough to regulate sources of emissions singly. All sources of emissions must be aggregated to determine actual levels of pollution the public is exposed to in any given locality.
- Production facilities, well pads, compressor stations, and other infrastructure must be situated far enough from areas of human activity—including homes, schools, businesses, and recreational facilities—to protect public health. EHP recommends these setback distances be at least one-half mile.

When public health becomes part of the blue hydrogen conversation, only then can we truly begin to limit the serious risk to human health this industry poses.

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[1] Oreskes, N. (August 1, 2022). Carbon-Reduction Plans Rely on Tech That Doesn't Exist, *Scientific American* 327, 2, 90. https://doi:10.1038/scientificamerican0822-90