



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Testimony of

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**Carbon Capture, Utilization, and Storage Technology and Efforts to Advance a Clean
Energy Hub in the Pennsylvania, Ohio, and West Virginia Region**

Before the Senate Environmental Resources & Energy Committee

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Good morning Chairman Yaw, Senator Comitta, and members of the Senate Environmental Resources & Energy Committee. My name is Ramez Ziadeh, and I am the Acting Secretary for the Pennsylvania Department of Environmental Protection (DEP). Thank you for the invitation to participate in this discussion regarding Carbon Capture, Utilization, and Storage (CCUS) technology and the collaborative efforts to advance a clean energy hub in the Pennsylvania, Ohio and West Virginia region.

The Wolf Administration is committed to working with stakeholders to support a path forward for industrial sector decarbonization with an emphasis on the deployment of clean hydrogen and carbon capture, utilization, and storage technologies and to ensure that the U.S. Department of Energy invests in Pennsylvania for a Regional Clean Hydrogen Hub funded under the 2021 Bipartisan Infrastructure Law. Doing so is a critical step in comprehensively addressing climate

change while also ensuring the commonwealth is competitive in attracting investment and creating jobs in all parts of its economy.

As we move toward this new energy ecosystem, the Department has been considering the environmental benefits of pursuing these new technologies and identifying the appropriate regulatory structure for CCUS and clean hydrogen.

Climate Impacts of Decarbonizing the Industrial Sector

Pennsylvania's draft 2022 Greenhouse Gas (GHG) Inventory Report highlights that the sectors with the largest contribution to the commonwealth's GHG emissions are the industrial, electricity production, and transportation sectors. Together, these three sectors annually account for approximately 83% of Pennsylvania's gross GHG emissions.

The industrial sector was once again the highest GHG producing sector in the commonwealth in 2019, producing 32% of emissions from Pennsylvania. Additionally, emissions from the industrial sector, which is particularly difficult to decarbonize, have been trending upward with few solutions in place. From 2005 to 2019, industrial sector GHG emissions in Pennsylvania increased roughly 11% with most of that increase having occurred recently with an increase of 8% between 2016 and 2019.

Pennsylvania's 2021 Climate Action Plan identifies hydrogen and carbon capture technologies as enabling technologies with significant opportunities to contribute to the decarbonization of the industrial sector. Potential hydrogen resources and discussions in Pennsylvania are mainly centered around blue hydrogen, which is hydrogen derived from natural gas and paired with Carbon Capture and Sequestration technology. Hydrogen, however, is a fuel that can be derived through various processes and fuel sources, including but not limited to, via electricity from Renewable Energy (Green Hydrogen) or Nuclear Energy (Pink Hydrogen). Pennsylvania's Climate Action Plan while discussing various potential hydrogen production technologies is ultimately colorblind regarding creation of hydrogen other than to expect that the development of hydrogen (i.e., its production, distribution, and end use) should result in a significant net-outcome emissions profile that aligns with local, state, and federal GHG emission reduction goals.

In addition, the best use of hydrogen resources should result in a high concentration of large, hard-to-decarbonize industrial emitters and or portions of the transportation sector achieving decarbonization in an expedited manner if the resource becomes available. Lastly, the flexibility of the resultant hydrogen fuel can be an advantage as it can be stored and transferred to other locations by truck or pipeline, used for various purposes especially in industrial sectors that require high-temperature processes, combined heat and power systems, as fuels for heavy-duty and off-road vehicles or as an increasing supplemental fuel source for natural gas use.

Overall, development of clean hydrogen resources and infrastructure present Pennsylvania and its neighbors with meaningful opportunities to reduce GHG emissions and to make the energy systems that fuel our economy more sustainable, resilient, and reliable while attracting substantial investments and job opportunities to the state and region.

(CCUS) Facility Permitting Requirements

As we move toward deployment of clean hydrogen and carbon capture, utilization, and storage in Pennsylvania, it's important to understand how such technologies would currently be permitted by the Department.

Wells used for geologic sequestration of carbon dioxide are covered by the definition of "well" in Pennsylvania's consolidated oil and gas statutes (Title 58, Section 3203), and therefore must obtain a "Drill and Operate Well (DOW)" permit under Act 13 of 2012 to be permitted to operate. These wells are defined as "conventional wells." All Act 13 requirements, such as notice, setbacks, bonding, and appealability, apply to the DOW permit application. Chapter 102 permits (for erosion and sediment control) and Chapter 105 permits (for waterway obstructions or encroachments) may be required to construct or operate the facility, depending on the facility location. Waste management permits are generally not required for underground injection control (UIC) wells in accordance with the exemption established in statute (58 Pa.C.S. § 3273.1(a)). Air quality permits may be required depending on how the facility is constructed and operated, but air quality permits are typically not required for UIC facilities due to limited emissions.

The U.S. Environmental Protection Agency (EPA) defines wells used for geologic sequestration of carbon dioxide as "Class VI Underground Injection Control (UIC) Wells." Currently, EPA maintains federal primacy for the review and issuance of Class VI UIC well permit applications in Pennsylvania; however, DEP also reviews the EPA permits to ensure state regulatory requirements are also met prior to issuing a permit for well usage.

In order to issue the DOW permit, DEP must first receive from the operator a drilling application that includes: the EPA-issued UIC permit; the completed DOW Permit Application; a Control and Disposal Plan; an Erosion and Sedimentation (E&S) Control Plan (if no E&S permit is required); and a Casing and Cementing Plan. To ensure the well can accept the carbon dioxide at proposed rates and pressures, DEP performs a geologic analysis and a mechanical integrity assessment of the well that includes review of the Casing and Cementing Plan. DEP reviews the Control and Disposal Plan and the E&S Control Plan to ensure compliance with the Department's applicable regulations. DEP may choose to hold a public hearing on its intent to issue a UIC permit.

Future Considerations for CCUS Permitting and Development of Hydrogen and Hydrogen Hubs

To maximize the environmental and economic development benefits of CCUS and clean hydrogen, the Department has been considering ways to streamline the permitting process for carbon capture projects and how best to develop hydrogen and hydrogen hubs.

In terms of permitting improvements, DEP can potentially seek program primacy for the Class VI UIC well permitting and oversight program in Pennsylvania, which would greatly simplify the administrative requirements related to Class VI well permitting. In order to do this, DEP will need to upgrade its UIC regulations to meet the requirements of 40 CFR Part 145 (relating to State UIC Program Requirements). In addition, because of a lack of sufficient federal grant

funding to operate the UIC program, DEP will require additional resources for permitting and oversight staff to carry out the federal program. Based on the Department's experience with oversight of Class II disposal UIC wells, the Department anticipates 1.5 to 2 full time employees per well would be needed for the permitting of a Class VI well, and dedicated field staff would be required to oversee the construction and operation of the Class VI facility. DEP and EPA Region III have begun discussions regarding what level of effort and resources would be required for DEP to effectively administer the UIC program in Pennsylvania.

In addition to permitting authority, other local considerations would also have to be taken into account. Siting of facilities and the required related infrastructure should avoid Environmental Justice (EJ) areas if and where possible, and possible site locations should be communicated to local government and community groups as soon as possible to create an open dialogue.

If properly formulated, DEP could potentially support legislation that would specifically address issues surrounding CCUS projects. The cornerstone of this legislation should be regulatory authorities necessary for DEP to meet federal requirements, and its mission of protecting Pennsylvania's air, land and water from pollution, and to provide for the health and safety of our fellow citizens. In addition, the Department believes that it will be critical to include a robust public comment process, particularly if hydrogen hub infrastructure of CCUS is being proposed in an economic justice community. Finally, while beyond the scope of DEP's area of expertise, the General Assembly will likely want to consider addressing unresolved issues of ownership related to the pore space into which carbon will be injected and stored, an issue which is currently unresolved under state law.

When considering the proliferation of hydrogen as a new fuel source along with how to best develop hydrogen infrastructure (i.e., production, distribution, and new end uses), it will be important to include a planning phase regarding how hydrogen can supplement the energy systems in Pennsylvania and neighboring regions, and how hydrogen can expand the benefits those systems provide to Pennsylvanians and our neighbors. These benefits can include increased resilience and reliability through enhanced opportunities for greater energy storage and a more diverse fuel supply.

Additionally, when considering the development of this resource, the opportunity to address impacts to vulnerable communities during project planning, development, employment, and end use is again paramount. EJ mapping tools, such as EPA's EJSCREEN and DEP's EJ Areas Viewer, should be used to assess which communities could benefit the most, specifically planning towards benefitting communities that are disadvantaged, underinvested, and environmentally burdened or are vulnerable based on lack of critical services or other demographic, socioeconomic, or health factors. These communities should benefit as much as possible as Pennsylvania and the neighboring region develop clean hydrogen resources and infrastructure to make our energy system and economy more sustainable, resilient, and reliable.

Conclusion

In conclusion, Pennsylvania is well-positioned to develop CCUS and clean hydrogen resources. The Department is committed to ensuring the responsible development of these technologies and

resources in order to maximize the environmental and economic benefits that CCUS and clean hydrogen can provide.

Thank you again for the opportunity to provide comment for today's hearing.