

TEAM PENNSYLVANIA

A Road Map on Carbon Management and Hydrogen Development in Pennsylvania *at a glance*

Background

Pennsylvania can use carbon management and hydrogen technologies to support the decarbonization of its power and industrial sectors, while creating sustainable, well-paying jobs that boost the state's economy.

[This Road Map](#) provides an approach for the commonwealth to advance carbon management and hydrogen project development to help meet midcentury climate goals outlined by the [Pennsylvania Climate Action Plan](#). The commonwealth must motivate and educate the legislative and executive branches on the most significant issues facing Pennsylvania with respect to carbon management.

Carbon Management and Hydrogen Development Potential

Pennsylvania has a large potential capacity for CO₂ storage, estimated at 88.5 billion metric tons (GtCO₂), or roughly 300 years of Pennsylvania's CO₂ emissions.

The US federal government provides a financial incentive for the capture and long-term storage of CO₂ via Section 45Q of the US Tax Code. This incentive can aid the economic viability of carbon capture, utilization, and storage (CCUS) project development in the commonwealth. Fifty facilities in Pennsylvania are eligible for 45Q and account for 89 percent of all emissions from stationary combustion sources in Pennsylvania. Among the state's 45Q-eligible facilities, 22 are identified as near-term capture opportunities and emit a total of 34.7 MMTPA of capturable CO₂.

Technical, policy, and regulatory needs to implement the Road Map

To successfully implement CCUS and hydrogen, the commonwealth must identify access to and ownership of useable pore space for permanent carbon storage and develop a framework to unitize or amalgamate pore space. This Road Map suggests evaluating risk issues such as orphan wells and uncertainty of plugging and abandonment, conversion of Class II wells to Class VI wells, Class VI primacy, and long-term post-closure stewardship.



Suggested Next Steps

The Road Map recommends several next steps for successfully deploying carbon management and hydrogen technologies. All steps should address environmental justice concerns during their respective processes, with environmental justice considerations outlined at the end of the summary.

Underground Injection Control (UIC) Class VI

Primacy: The commonwealth must decide if it can process Class VI primacy applications more quickly than the EPA. The commonwealth must further identify if it has the resources and technical expertise to take on primacy and if it can afford to maintain this expertise.

Digital Transformation:

Digitizing the commonwealth's subsurface data will provide developers the latest screening data for pore space decisions and will reduce project screening time. Advancing the development of the Exploration and Development Well Information Network (EDWIN) customer-facing portal is a near-term, cost-effective next step.

Consider Regional Approaches (intra- and inter-state collaboration):



Pennsylvania has a great opportunity to participate in a network connecting northeastern US emission sources with low-cost, high-capacity geologic storage in the Ohio River Valley. Pennsylvania must quickly determine what inter-state opportunities it will pursue, which will require predetermined discussions, decisions, and execution of agreements.

Bipartisan Infrastructure Law (BIL) Funding:

There is significant funding under the BIL set aside to address many of the issues and tasks necessary for the full-scale commercial deployment of CCUS and hydrogen production with carbon capture. The commonwealth should identify lead agencies and process the required applications and paperwork to gain access to funding.

Department of Energy (DOE) Hydrogen Hubs:

The commonwealth does not currently have the necessary agreements and structures to be an applicant compliant with the expected hydrogen hubs FOA. The commonwealth should immediately identify any teaming partners, likely neighboring states, and prepare the necessary agreements, memoranda of understanding (MOUs), and structures to allow the state to engage as a prime partner.

Environmental, Energy, and Social Justice (EESJ):

EESJ considerations will need to be incorporated into the commonwealth's carbon management and hydrogen actions. EESJ considerations are a requirement of all BIL funding and will likely be part of any future federal funding. The commonwealth should consider using the EPA's Environmental Justice Screening Tool across all state and federally funded projects and continue developing Pennsylvania Department of Environmental Protection's Environmental Justice Areas Viewer.

*The modeling developed for this Road Map was conducted prior to the signing of the Inflation Reduction Act, which provides several changes to the 45Q tax credit. This analysis is expected to remain valid and useful, though additional facilities may now be considered viable.

Future Studies: Many of the suggestions in the Road Map cannot be addressed until further information, details, structure, statutes, and funding exist:

- CO₂ Capture and Storage Opportunities analysis to identify the commonwealth's potential projects
- Stakeholder engagement and outreach effort to identify, understand, and address stakeholder (e.g., project developers) concerns.
- Jobs and economic analysis to assess the impact of CCUS commercial deployment on the commonwealth.
- Hydrogen production study to serve as the basis for a DOE FOA 2664 Hydrogen Hub submittal
- Hydrogen color-blind study to help address EESJ, stakeholder engagement, social license to operate, and outreach.

Comment and Engage Where Possible:

Pennsylvania is behind other states with respect to the regulatory, statutory, and infrastructure required to advance commercial-scale CCUS. The commonwealth should consider engaging in public discourse and providing thoughtful responses to public inquiries to dispel some negative stakeholder perceptions.



Statutory Framework: The commonwealth must establish a statutory framework that attracts project developers and investors. The commonwealth should immediately commission a study to address the statutory issues identified by the Road Map that concern their legislative and executive branch operational issues to determine the timing and mechanisms to move legislation through the legislature.

Use/Acceptance of Standards and Best Practices:

Standards and best practices can provide clarity and consistency for projects. The commonwealth should consider identifying state agencies that can cite, refer to, or require using a standard or best practice when processing permit applications or permits to operate.