



Testimony

Submitted on behalf of the
Pennsylvania Chamber of Business and Industry

Carbon Capture, Utilization and Storage

Before the:
Pennsylvania Senate
Environmental Resources and Energy Committee

Presented by:
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Good morning Chairman Yaw, Minority Chair Comitta, and members of the Senate Environmental Resources and Energy Committee,

My name is Kevin Sunday, director of government affairs for the Pennsylvania Chamber of Business and Industry, the largest, broad-based business advocacy organization in the Commonwealth. Our nearly 10,000 members are of all sizes and all commercial and industrial sectors.

Thank you for the opportunity to appear before you this morning to discuss the potential and challenges concerning carbon capture, sequestration, use, and storage (CCUS). This technology has been used across the country for decades in certain applications and has been identified by leaders in energy policy and government as a key tool to meeting energy goals and climate-related commitments, alongside other advances in energy production and transportation.

Provided the state and federal government develop and implement a regulatory framework that allows for its expanded use, CCUS technology, which has been used across our nation for decades, can help us grow our manufacturing and energy sectors sustainably while spurring additional economic and environmental gains.

CCUS Can Be Part of the Next Chapter in PA's Storied History of Energy Leadership

The abundant natural resources of our state have led this country through every major energy transition that has occurred in the past 165 years, from the first oil well drilled in this country in Titusville in 1859, to the first delivery of natural gas to a major metro in Pittsburgh in 1884, to the first commercial nuclear plant in Shippingport in 1958, to today's prolific production of shale gas and many exciting innovations in advanced manufacturing and distributed energy resources.

We are presently the nation's largest exporter of natural gas and electricity, the second largest exporter of coal to international markets, and the second largest producer of electricity from nuclear power. We are home to universities that are producing globally recognized engineering talent and trade schools that train and develop highly in-demand technical talent. We host the headquarters of PJM, which manages the delivery of power to 65 million Americans in 13 states across what is the world's largest organized grid from offices in southeastern Pennsylvania. We are also home to several of the last remaining refineries in the northeast and are proud to count among the Chamber's members companies who are leading in areas like advanced manufacturing, renewable power, distributed energy resources, robotics, electrified heavy trucking, carbon capture, and hydrogen production.

Our state's energy resources have helped dramatically improve the nation's energy security, as well as that of our allies, as well as significantly reducing our emissions. Among all states, we are second in the reduction of greenhouse gas emissions since 2005, and we are for the first time in decades monitoring attainment statewide for all but one federal ambient air quality standards. The evolution of the energy resource mix in Pennsylvania and neighboring Appalachian states, through competitive markets and enhanced production and use of natural gas in heating and power generation, represented 61% of the emissions reductions during that time. As a result, the United States is a world leader in emission

reductions, with the increase use of gas in domestic power generation alone having the same impact as the second, third, fourth and fifth leading nations.¹

As our nation and our allies abroad look to meet their energy goals, which include affordable and reliable supplies of energy that are produced responsibly and sustainably by, ideally, free-market democracies, CCUS can be used to lower emissions and enable zero-emissions production of hydrocarbons, electricity and vital commodities like steel and fertilizer. Given the size of Pennsylvania's energy and manufacturing sector, as well as globally recognized engineering talent and research and development capabilities at our colleges and universities and the Department of Energy's National Energy Technology Lab (NETL) outside of Pittsburgh, we are well-poised to leverage our historic strengths into solving this technical challenge. As Dr. Brian Anderson, director of NETL, informed this committee two years ago², achieving decarbonization goals require transformational technology development like CCUS. Columbia University's Center for Global Energy Policy, in analyzing various pathways to decarbonization, has noted that any modeled scenario to significantly reduce greenhouse gas emissions by mid-century in the majority of cases cannot get there without CCUS. The minority of examined pathways that posit there is such a path without CCUS do so at twice the cost than with CCUS.³

US Energy Secretary Jennifer Granholm has also called CCUS a "crucial clean energy technology,"⁴ and her agency is administering several billion in various federal grant and loan investments to spur further research and deployment of this technology across various industries. Venture capital is also pouring billions into the space each year, according to the International Energy Agency⁵, and leading voices in organized labor in Pennsylvania and across the country have also championed expanded adoption of the technology.

¹ Source: IEA World Energy outlook 2021; EIA emissions data. <https://www.iea.org/reports/world-energy-outlook-2021> and <https://www.eia.gov/electricity/data/emissions/>.

² Senator Yaw Convenes Briefing on Carbon Capture Technology. March 11, 2021. <https://www.pasenategop.com/news/yaw-convenes-briefing-on-carbon-capture-technology/>

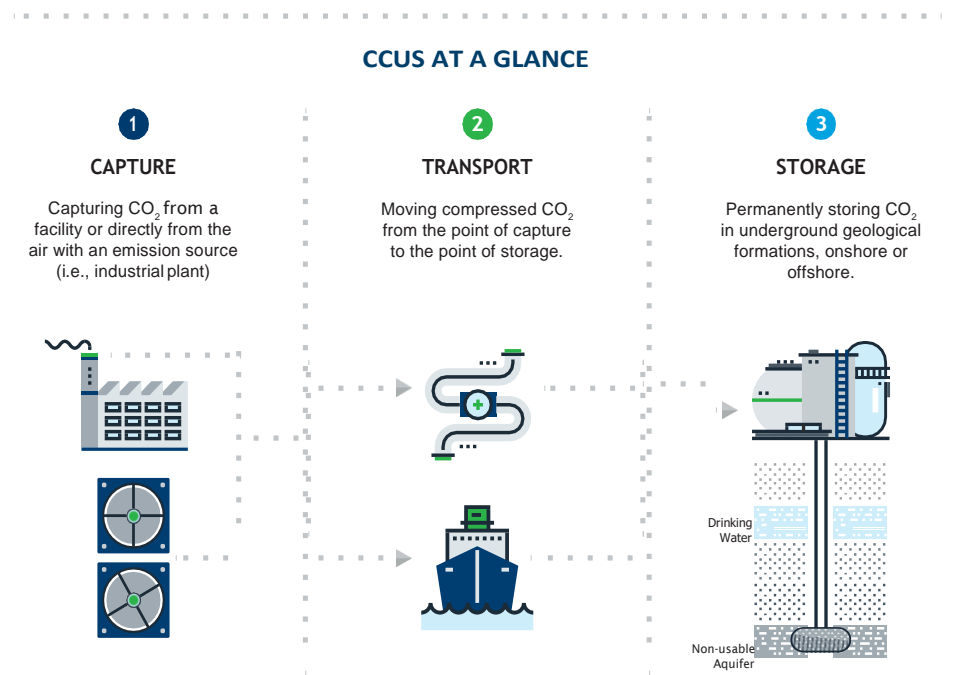
³ Enhancing the Future of CCUS. Columbia University Center on Global Energy Policy, May 2019. <https://www.energypolicy.columbia.edu/publications/enhancing-future-ccus/>

⁴ Secretary Granholm Launches Carbon Negative Earthshots. Nov. 5, 2021. <https://www.energy.gov/articles/secretary-granholm-launches-carbon-negative-earthshots-remove-gigatons-carbon-pollution>

⁵ Carbon capture, utilization and storage. IEA, December 2022. <https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage>

The Basics of Carbon Capture and Its Role in Reducing Emissions

CCUS encompasses three general activities – permanently disposing of CO₂ in underground geologies; temporarily storing CO₂ for further use in a manufacturing or energy production context; or using the CO₂ at the site for manufacturing or energy production. CO₂ can be captured after combustion at the facility where power generation or industrial processes are occurring, or through direct air capture systems which filter ambient air to draw CO₂ from the atmosphere.



For nearly fifty years, the predominant uses of CCUS have been to enhance oil recovery from underground reservoirs. The gas can be used to stimulate additional outflows of oil. Some CO₂ has also been captured for use in flash freezing of foods and medicines. According to the research firm Wood Mackenzie, domestic CCUS capacity stands capable of mitigating 43 million tonnes per year. 562 million tonnes of capacity have been announced for applications beyond EOR and refrigeration, but this figure needs to grow ten-fold by 2050 to meet Paris climate accord goals through reducing emissions from power generation and industrial sectors.⁶

CCUS can be leveraged in additional heavy industries, including steel, cement, and fertilizer production. Doing so will require an expanded network of pipeline infrastructure and a regulatory environment that provides certainty to those looking to invest in the space. While Congress has authorized significant spending in new tax credits and other investments into the space, permitting new wells and granting additional authorizations to states to take over permitting from the EPA has been extremely protracted. To date, only North Dakota and Wyoming have successfully been approved by EPA to permit CCUS wells on their own, and these delegation approvals took an average of seven years.

The PA Chamber recently joined several other state business groups in encouraging EPA to more quickly authorize more states to permit this type of infrastructure.⁷

⁶ Carbon capture, utilization and storage: market insights. Wood Mackenzie, May 2023.

<https://www.woodmac.com/market-insights/topics/ccus/>

⁷ PA Chamber Joins Coalition Urging EPA to Speed Up Permitting for Carbon Capture Projects. March 14, 2023.

https://www.pachamber.org/media/9615/pa_chamber_joins_coalition_in_urguing_epa_to_speed_up_permitting_for_carbon_capture_projects/

Opportunities for Pennsylvania

The Pennsylvania Geologic Survey, housed within the Department of Conservation and Natural Resources, has done a tremendous amount of work over the past two decades analyzing the state's geology for its potential for CCUS. The team, led by Dr. Kristin Carter, has engaged with other state officials in the Midwest and across the country in various consortiums to discuss a regional approach to CCUS, including those related to issues of transporting CO₂. I encourage this committee to further engage with Dr. Carter and her colleagues given their wealth of knowledge and expertise on the matter, and to delve into the material and reports produced by the Survey on this matter. The team has conducted several field studies and mapping exercises, particularly in geologies in western PA, to determine where CCUS might best be developed in Pennsylvania.

TeamPA, the dynamic non-profit that has for the better part of three decades supported economic development efforts in the state, has partnered with the Great Plains Institute to devise a roadmap for further use of CCUS and hydrogen hubs in Pennsylvania.⁸

Expanded use of carbon capture, utilization, and storage can benefit many of Pennsylvania's existing industries and expand new innovations. As the committee is well aware, the Shell ethane processing facility in Monaca is an anchor of a proposed regional carbon capture and hydrogen production hub. Several leading energy producers and manufacturers are also proposing another hub in Appalachia that would also benefit manufacturers in Pennsylvania that look for sustainably produced, low-emissions hydrogen to reduce emissions from steel and iron production. CCUS can also be used in various pharmaceutical, cement, agriculture, and food manufacturing facilities, many of which are located in Pennsylvania.

Another of Pennsylvania's leading energy companies, CONSOL, is partnering with the US Department of Energy on a project to develop an innovative "power plant of the future" that uses a mix of waste coal and biomass to offset emissions. Coupled with CCUS, the concept is for this to be one of the first CO₂-negative power plant in the nation. CO₂ emissions would be sequestered deep underground. Making this project, and others like it, a reality will require a workable state and federal regulatory framework.

Legislative Issues to Address

Currently, the EPA governs the permitting of CCUS wells through what is dubbed the Class VI well permitting program. There are various classifications of waste disposal wells, such as nuclear or hazardous waste. It is a very protracted process for EPA to directly permit these wells outside of enhanced oil recovery applications, and it is our understanding EPA has to date permitted only two CCUS wells, both in Illinois.

As speed is of the essence, states may apply for primacy for permitting. North Dakota and Wyoming have done so, taking respectively six and eight years to do so. The PA Chamber earlier this year joined

⁸ Successful Deployment of Carbon Management and Hydrogen Development. TeamPA and Great Plains Institute, September 2022. <https://teampa.com/2022/09/team-pennsylvania-foundation-releases-road-map-on-carbon-management-and-hydrogen-development-in-pennsylvania/>

with several business groups around the country urging EPA to expedite these permitting delegations. We are pleased to see the Pennsylvania Department of Environmental Protection has announced its intention to apply for primacy – a necessary step in our view to facilitate the deployment of this technology and the associated investment benefits.

Garnering the aforementioned federal support for investments into carbon capture and hydrogen production will require the state to provide certainty on its regulatory framework. This will include, as other testifiers this morning will address, clarifying state law governing pore space, or the geology in which CO₂ may be stored or disposed of. State law should also provide certainty to the private sector and confidence to the public through a balanced and responsible bonding requirement that provides for adequate liability protections long-term.

In sum, Pennsylvania is well-suited to be a leader in this space, as it has been in every energy transition throughout our nation's history, provided the Governor and legislature work with stakeholders to construct a welcoming regulatory framework. We are encouraged to see bipartisan support for this policy and look forward to working with you and your colleagues to advance these efforts.