



**Pennsylvania Environmental Council**  
**Comments to the Senate Environmental Resources & Energy Committee**  
September 19, 2022

## **Introduction**

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The Pennsylvania Environmental Council (PEC) respectfully submits these comments to the Senate Environmental Resources & Energy Committee on the topic of carbon capture and clean energy hubs in Pennsylvania. We appreciate the Committee's informational hearing on these important subjects. Advancing decarbonization strategies is both critical and complex. While there is an immediate need to act on climate and the potential for considerable federal investment, the process must be deliberate and inclusive.

PEC has been focused on the issue of decarbonization for some time, dating back to a stakeholder-driven process leading to publication of our Climate Change Roadmap in 2007.<sup>1</sup> In fact, the Roadmap identified the need for appropriate legal and regulatory frameworks to achieve geologic carbon sequestration in the Commonwealth by 2025.

That Roadmap has been followed by a 2017 Deep Decarbonization Pathways dialogue and Report,<sup>2</sup> as well as a series of policy recommendations.<sup>3</sup> In April of this year we co-hosted a convening on opportunities and challenges presented by carbon capture and storage.<sup>4</sup> We are continuing this work and are supportive partners in efforts like the Carbon Capture Coalition<sup>5</sup> and the collaborative led by the Team Pennsylvania Foundation.<sup>6</sup>

Pennsylvania needs a comprehensive decarbonization strategy. Both clean hydrogen and carbon capture can be key pieces of the puzzle if done correctly and applied judiciously. Responsible deployment must follow legal and regulatory frameworks that ensure technical and environmental integrity, accountability, and equity. To bend the familiar phrase to the issue

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<sup>1</sup> <https://pecpa.org/news/climate-change-roadmap/>

<sup>2</sup> <https://pecpa.org/wp-content/uploads/2021/12/PECDeepCarbonReductionsReportFINAL.June2017-1.pdf>

<sup>3</sup> <https://pecpa.org/wp-content/uploads/2021/12/Decarbonization-report-2021-FINAL.pdf>

<sup>4</sup> A summary of the event can be found at <https://pecpa.org/wp-content/uploads/2022/08/April-2022-CCS-Forum-Summary.pdf>

<sup>5</sup> <https://carboncapturecoalition.org/>

<sup>6</sup> <https://teampa.com/2022/07/team-pennsylvania-foundation-announces-cross-sector-collaborative-to-reduce-carbon-emissions-and-accelerate-economic-growth/>

at hand, while we cannot let any one decarbonization ideal be the enemy of the good, we also cannot let “good enough” substitute for what is necessary and right.

What follows reflects our preliminary thoughts and suggestions on how Pennsylvania can approach the opportunities and challenges presented by clean energy hubs and carbon capture.

## Hydrogen

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From a decarbonization perspective, verified clean hydrogen will be critical for applications that are hard to electrify or otherwise offset, most notably industry and heavy-duty transportation uses. It may also be used as a means of energy storage, particularly when concerns about availability of power generation come into play. However, production and transport of hydrogen – regardless of feedstock – are energy intensive and carry significant emission concerns.

### Emissions Performance Standards

The process of hydrogen production and delivery poses significant leakage risks if not actively managed. Hydrogen is an indirect greenhouse gas that can lead to the formation of ozone and methane. These impacts are only beginning to be understood, but preliminary analysis projects significant short-term climate impacts that can far exceed those of carbon dioxide. Both the Environmental Defense Fund<sup>7</sup> and the Columbia University Center on Global Energy Policy<sup>8</sup> have recently released preliminary research highlighting this issue. Both sets of research also note that the technology to measure hydrogen leakage is not yet demonstrated at scale.

When hydrogen is produced from natural gas, there are additional upstream methane emission concerns – the same challenges we have from natural gas development today, where independent monitoring has demonstrated that leakage is occurring at rates much higher than projected.

A specific policy recommendation is for robust emission performance standards that include frequent, verified (i.e., not simply based on projections) monitoring and repair requirements for the full life cycle of any hydrogen production, transport, and use. These safeguards must be built into our requirements and the systems themselves from the outset, not retrofitted or addressed down the road. By then any benefits gained could have already been lost.

For hydrogen that is produced from natural gas, an additional recommendation is for state establishment of a performance standard that requires that lifecycle emissions remain below a

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<sup>7</sup> Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions, *Atmos. Chem. Phys.*, 22, 9349–9368, <https://doi.org/10.5194/acp-22-9349-2022> (July 2022).

<sup>8</sup> ‘Hydrogen Leakage: A Potential Risk for the Hydrogen Economy’, Columbia Center on Global Energy Policy (July 2022)  
<https://www.energypolicy.columbia.edu/sites/default/files/pictures/Hydrogen%20Leakage%20Regulations,%20de%20signed,%207.21.22.pdf>

certain level per kilogram of hydrogen produced. This concept has already been identified by the U.S. Department of Energy (DoE) as a priority for funding eligibility under the Infrastructure Investment and Jobs Act,<sup>9</sup> underscored further by tax incentives in the recent Inflation Reduction Act. If stakeholders in Pennsylvania want to successfully pursue federal funding, it is in our collective best interest to set a nation-leading standard. Comments submitted to the Pennsylvania House Democratic Policy Committee in August of this year by the Natural Resources Defense Council (NRDC) recommend a life-cycle standard that is no less stringent than 2.5 kilograms of carbon dioxide equivalent per kilogram of hydrogen production (2.5 kgCO<sub>2</sub>e/kgH<sub>2</sub>) – including both upstream emissions as well as emissions at the site of production. Included as an addendum to these comments is a chart from NRDC’s comments outlining the comparative basis for this standard.

### Priority Applications and Siting

We also agree with NRDC’s recommendation that Pennsylvania should prioritize deployment of hydrogen toward applications that are hardest to electrify to avoid increasing the costs of the energy transition. Given the current state of the technology, the most promising uses for hydrogen reside in heavy industry and heavy transportation. Any policy or other financial incentives for hydrogen should include clear metrics with respect to cost efficiency, community benefits and impacts, and overall emission reductions, favoring production and deployment only where other, lower-emitting options are not feasible.

Proximity between production and use is also a factor for consideration; DoE has flagged that “close proximity” (to be further defined in subsequent guidance) will be one of the determining factors in funding selection.<sup>10</sup> Putting a priority on siting proximity can also help alleviate some of the concerns with respect to infrastructure (pipeline) buildout and associated safety and community impacts.

### Infrastructure and Communities

The state should take this opportunity to thoroughly review and bolster authority granted to the Public Utility Commission and the Department of Environmental Protection with respect to safety, siting, and the integrity of pipelines and related infrastructure. Given the occurrence of multiple incidents associated with pipeline development in our state, the need is critical – particularly since hydrogen will present its own set of management challenges. This authority review and enhancement is also necessary for addressing increased transmission demands associated with renewable energy development, so both issues could be addressed at the same time.

With respect to community impacts and environmental justice, DoE has indicated that community engagement and quantified benefit will also greatly factor into funding decisions on

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<sup>9</sup> <https://oced-exchange.energy.gov/Default.aspx>

<sup>10</sup> <https://oced-exchange.energy.gov/Default.aspx#Foaldb2ae7a4e-b071-4e77-9694-dba3c9ab0333>

hydrogen hubs<sup>11</sup> as well as carbon capture demonstration projects.<sup>12</sup> Guidance on the latter specifically points toward the importance of stakeholder engagement and the development of community consent and benefit agreements. Pennsylvania policy should effectuate these principles as well, including enhancements to DEP’s environmental justice efforts. This is where the “on the ground” and “in the air” benefits can both be realized.

## **Carbon Capture and Storage**

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Given that natural gas is currently the predominant means of hydrogen production,<sup>13</sup> carbon capture and storage (CCS) will be an essential part of Pennsylvania’s decarbonization pathway. This is true even without contemplating hydrogen – several industries will require CCS to decarbonize – particularly those that have considerable process emissions like cement (which represents 8% of global emissions), steel, and commodity chemicals. These materials are made and used throughout the world every day and should be identified as a top priority for decarbonization.

As with hydrogen, there should be a preference for CCS deployment based on cost efficiency, availability of alternative means (like electrification) to reduce emissions where feasible, and siting proximity between capture points and available storage or reuse. CCS will also require significant policy development and rigorous protection standards. At a bare minimum, these include:

- Providing additional resources and authority to the Department of Environmental Protection, Department of Conservation & Natural Resources, and Public Utility Commission for administrative capacity and regulatory oversight.
- Defining ownership of captured carbon dioxide, as well as addressing pore space ownership rights.
- Addressing interstate cooperation for transport and storage infrastructure, if needed.
- Determination on primacy for Class VI injection wells, while ensuring that state standards with respect to well siting, integrity, and financial assurance are preserved and improved.
- Establishing adaptive authority for an oversight and management program that addresses:
  - Induced seismicity.
  - Emission performance standards and monitoring.
  - Groundwater protection.
  - Storage integrity issues, including area of review to address hazards created by active or abandoned wells.
  - Site closure.
  - Long-term liability and ownership issues.

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<sup>11</sup> Id.

<sup>12</sup> <https://oced-exchange.energy.gov/Default.aspx#Foald3ec25bcf-a385-4b5a-87d2-2a0b8fa4ca5a>

<sup>13</sup> Factoring necessary emission controls, the costs of hydrogen production from renewable or nuclear energy may soon be equally or even more cost efficient.

- On this particular point, PEC believes the state should not absolve operators of financial or legal responsibility for storage integrity or management failures caused by negligence or fraudulent actions (or omissions).
- In addition, the state should establish a long-term stewardship fund, paid for through permitting fees, to support ongoing state monitoring and the potential need to address emergencies or threats to public safety.

As with hydrogen, the state should take this opportunity to closely review the sufficiency of authority granted to both the Public Utility Commission and the Department of Environmental Protection with respect to pipelines and all related infrastructure.

In addition, Pennsylvania should develop state procurement standards that help build demand for zero- and low-emission products and materials. This will directly benefit in-state efforts to attract and grow homegrown green manufacturing and businesses, and make us more competitive in the years to come.

## **Conclusion**

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There is no silver bullet to addressing emissions reduction; it will require consideration and advancement of a range of policies and standards, including clean hydrogen and carbon capture with appropriate priorities and safeguards. But we should not lose sight of the larger picture that we also need additional policies that further drive emissions reductions and clean energy production.

We recognize these comments may seem more critical than supportive, but that is not the case. PEC wants Pennsylvania to lead. Climate policy can be industrial policy, economic development policy, environmental policy, and public health policy all rolled into one. But mutual goals require equal focus and commitment. This requires a lot of work up-front before we can promise success, including standing up robust and adaptive oversight standards to ensure public safety and emission reductions in addition to supply-push and demand-pull incentives.

The Pennsylvania Environmental Council is committed to working with you and all stakeholders to make this happen. Thank you for your consideration.

Sincerely,

John Walliser  
Senior Vice President, Legal and Government Affairs  
Pennsylvania Environmental Council  
810 River Avenue, Suite 201  
Pittsburgh, PA 15212  
[jwalliser@pecpa.org](mailto:jwalliser@pecpa.org)

## Addendum

### NRDC 2.5 kgCO<sub>2</sub>e/kgH<sub>2</sub> Comparative Table:

Jurisdiction/Initiative	Carbon Intensity Limit/Production Standard	Scope of Emissions
Proposals in response to DoE Hydrogen Hub RFI	2 - 2.5 kgCO <sub>2</sub> e/kgH <sub>2</sub>	Includes upstream emissions and emissions at the site of production
New Mexico House Bill 4 – Hydrogen Hub Development Act (not passed) <sup>14</sup>	2 kgCO <sub>2</sub> e/kgH <sub>2</sub>	Includes upstream emissions and emissions at the site of production
European Union Clean Hydrogen Standard <sup>15</sup>	3 kgCO <sub>2</sub> e/kgH <sub>2</sub>	Includes upstream emissions and emissions at the site of production
<i>Minimum</i> threshold defining “Clean hydrogen” in the context of the hydrogen PTC in the Inflation Reduction Act of 2022 <sup>16</sup>	4 kgCO <sub>2</sub> e/kgH <sub>2</sub>	Includes upstream emissions and emissions at the site of production (expressed as "well-to-gate")

*The Pennsylvania Environmental Council thanks the Natural Resources Defense Council for allowing the inclusion of their recommendations in this document.*

<sup>14</sup> <https://www.env.nm.gov/wp-content/uploads/2022/01/2022-01-24-HHDA-Version-221299.16.pdf>

<sup>15</sup> <https://www.insideenergyandenvironment.com/2021/04/the-european-commission-approves-the-eu-criteria-on-sustainable-hydrogen-activities/>

<sup>16</sup> <https://www.congress.gov/bill/117th-congress/house-bill/5376/text/eas?r=2>