Pennsylvania House of Representatives
Committee on Environmental Resources and Energy
Public hearing on Hydrogen Hubs and Climate Change
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Testimony of Danny Cullenward, JD, PhD

Dear Chair Vitali, Chair Causer, and Members of the Committee:

Thank you for the opportunity to testify. My name is Danny Cullenward, and I'm a climate policy researcher with expertise in economics, law, and climate science. Although I'm speaking to you today from California, where I live, I'm very glad to have a local connection through my academic appointment as a Senior Fellow with the Kleinman Center for Energy Policy at the University of Pennsylvania.[1]

My testimony today is on the consequences of hydrogen production that claims to be clean based on accounting tricks and the use of questionable feedstocks. Although my comments primarily concern the climate impacts of different production choices, some can also cause significant harms to local air and water quality. And as I'll explain below, some will likely waste substantial taxpayer funds as well.

Today's hearing focuses on the U.S. Department of Energy's $7 billion regional hydrogen hub program, which is working with two candidate projects in Pennsylvania that are known as MACH2 and ARCH2.[2] But to understand the issues with hydrogen hubs, it is necessary to talk about a related hydrogen production tax credit under Section 45V of the tax code, which the U.S. Treasury Department is expected to finalize in the months ahead and which the hydrogen hubs seek to influence.

Tax regulations don't always attract as much interest as direct government funding, but their impact will be far bigger here. Credible industry estimates project fiscal outlays worth hundreds of billions of dollars in the decades ahead.[3] With so much money on

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1 You can find a full list of my affiliations and research publications at my personal website, along with comprehensive funding and consulting disclosures. Please note that my testimony today is in my individual capacity as an academic researcher and not on behalf of anyone else.

2 U.S. Department of Energy, Regional Clean Hydrogen Hubs Selections for Award Negotiations.

3 Electric Power Research Institute, Impacts of IRA's 45V Clean Hydrogen Production Tax Credit (Nov. 3, 2023). EPRI estimates $385 to $756 billion in fiscal outlays through 2045, though only 13% to 25% of that is projected in the 10-year budget window for the current tax credit.

the table, it's no wonder that hydrogen producers want to access to these valuable tax credits — especially MACH2, ARCH2, and the other regional hydrogen hubs. But getting that access is a challenge for producers who want to make hydrogen from fossil fuels because the tax code requires these credits only be made available to facilities that meet exacting pollution standards.[4]

Today, more than 99% of hydrogen is made from unabated fossil fuels.[5] You would think these incumbent technologies couldn't qualify for an innovation-based tax credit, which is among the most lucrative in U.S. energy policy history.

Unfortunately, you would be wrong.

Hydrogen producers are arguing that they should be able to qualify for the federal production tax credit using methane offsets. This nifty little accounting trick allows producers to say that although they are making hydrogen from methane gas and emitting carbon dioxide in the process, they prevented someone *else* from emitting methane directly to the atmosphere.[6]

By stopping someone else from emitting methane, the argument goes, it's appropriate to zero-out their own substantial emissions to qualify for the valuable hydrogen production tax credit. But as my colleague Dr. Emily Grubert and I showed in a recent analysis, it only takes a small share of methane offsets to qualify a conventional hydrogen production process for the hydrogen tax credit. Using conservative numbers, we found that a conventional process run on fossil fuels would only need to claim that 25% of its fuel was coming from offset projects;[7] using more realistic assumptions, that share could be much lower.[8]

Put simply, hydrogen projects could use methane offsets without changing anything about the conventional fossil-fuel-based production process for hydrogen. If

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4 26 U.S.C. § 45V(b)(2).

5 International Energy Agency, Global Hydrogen Review 2023 (Sept. 2023) at Figure 3.1.

6 To make matters worse, through so-called "book and claim" methods, some programs allow methane users to simply pretend that they are using this special methane, even if the methane in question isn't injected into the same physical pipeline network. For more, *see* Julie McNamara, Biomethane Threatens to Upend the Clean Hydrogen Tax Credit, Union of Concerned Scientists (May 24, 2023); Julie McNamara, The Serious Risks Around Treatment of Biomethane in 45V, Union of Concerned Scientists (Feb. 2, 2024).

7 Emily Grubert and Danny Cullenward, The New Hydrogen Rules Risk Opening the Door to Methane Offsets, Heatmap News (Feb. 9, 2024).

8 *Id*.; *see also* Morgan Rote and Chelcie Henry-Robertson, The safeguards 45V needs to avoid fossil hydrogen regrets, Environmental Defense Fund (June 13, 2024).

proponents get their way, they could claim to be clean enough to qualify for the lavish production tax credit. That's not just a climate problem; if "clean" hydrogen is made from fossil fuels using conventional technologies, taxpayers will end up footing the bill for something the market already knows how to provide without a subsidy.

So where are the hydrogen producers going to get these methane offsets? Most are looking to make claims based on two categories of methane feedstocks, one called biomethane that is produced from agricultural sources and another called "fugitive" methane that is emitted from fossil fuel infrastructure.[9]

The first category, biomethane, has already led to significant controversy. California gives methane offset credits to large dairies for installing capture devices on their manure lagoons.[10] State policy sends hundreds of millions of dollars a year to biomethane producers around the country to sustain the fiction that a small amount of biomethane used in California actually cleans up the atmosphere — even though it's combusted and there are no current requirements to physically deliver those supplies to the California's market.[11] (Some of those biomethane supplies come from places that don't even have pipeline flows connecting to California consumers.[12])

The second category, fugitive emissions, is poised to create new problems. Fossil fuel infrastructure emits a lot of methane — from coal mines, from oil and gas wells, and across the gas pipeline network. Although methane emissions are usually seen as a regulatory liability, clever advocates are making the case for capturing those methane emissions as offsets. This could be done, for example, by installing a drainage well in a gassy coal mine or by preventing flaring or leaks from oil and gas equipment.

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[9] Technically there is a third category, biomethane produced from landfills. But most landfills in the U.S. are required to control their methane emissions, which significantly reduces the climate benefits parties can claim when using these fuels as offsets.

[10] For an overview, *see* Ruthie Lazenby, Mitigation Emissions from California's Dairies, UCLA Emmett Institute on Climate Change and the Environment (Jan. 2024).

[11] California Air Resources Board, LCFS Data Dashboard at Figures 2 and 4. In 2023, for example, the regulator issued over 5.3 million credits to biomethane projects; at average market prices of about $75 per credit, these credits were worth just over $400 million. The regulator is proposing to adopt deliverability requirements that wouldn't apply to hydrogen producers until 2046. California Resources Board, Low Carbon Fuel Standard ISOR (Dec. 19, 2023) at 30-31. Many people think this should change. *See*, *e.g.*, Jeremy Martin, Something Stinks: California Must End Manure Biomethane Accounting Gimmicks in its Low Carbon Fuel Standard, Union of Concerned Scientists (Feb. 15, 2024).

[12] Hanna Pierce and Aaron Strong, An evaluation of New York state livestock carbon offset projects under California's cap and trade program, *Carbon Management* 14: 2211946 (2023).

In both cases, the argument is the same. Hydrogen producers want to claim that their methane was going to be emitted to the atmosphere and take credit for avoiding this problematic and underregulated outcome. While it might sound good to capture manure pond emissions or drain leaky coal mines, the net effect is, at best, a wash: the hydrogen producer earns a tax credit that lets it pollute because it paid someone else not to. This only shifts where the climate pollution occurs, not how much; and it doesn't do anything to reduce hydrogen producer's impact on local air and water quality.

Companies operating in Pennsylvania are particularly interested in creating a fugitive emissions loophole. According to reporting from Capital & Main, CNX Resources Corporation recently made its hydrogen plans near Pittsburgh contingent on being able to qualify its projects for the federal tax credit using methane offsets from a coal mine in Virginia. [13] And CNX appears to have successfully lobbied Governor Shapiro's office, sharing talking points that showed up in a comment letter the Governor sent to the Treasury Department to advocate for coal mine methane offsets.[14]

Governor Shapiro's letter is just one of many examples of elected leaders advocating for the narrow interests of polluting industries that are lining up to access a tax credit that was designed for an entirely different purpose — supporting the innovation of truly low-carbon electrolyzers. But the Governor is not alone. My home state of California pioneered the biomethane loophole that fossil fuel companies and special interests are now seeking to nationalize,[15] and the California government is just as supportive of these perverse outcomes as anyone else. [16]

When I criticize the use of methane offsets from dairy digesters and fugitive fossil fuel emissions, those who see the matter differently like to ask: but isn't it good that we clean up dairy and coal mine pollution? Of course it is. But paying for that outcome through hydrogen tax credits is wrong for four reasons.

First, we can't justify building new, emissions-intensive infrastructure on the back of offsets. Stabilizing the climate requires eliminating methane and carbon dioxide

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[13] Audrey Carleton, The Road to a Decarbonized Future or Just Another Lifeline for Fossil Fuels?, Capital & Main (May 24, 2024).

[14] *Id*.; Section 45 Tax Credit, Rulemaking Docket IRS-2023-0066, Comment from Commonwealth of Pennsylvania (Feb. 26, 2024).

[15] Jeff St. John, The biomethane boondoggle that could derail clean hydrogen, Canary Media (Sept. 11, 2023).

[16] Section 45 Tax Credit, Rulemaking Docket IRS-2023-0066, Comment from the California Department of Food and Agriculture (Feb. 26, 2024).

emissions, not shifting them from one sector to another.[17] You can't offset your way to a stable climate, no matter how many lobbyists you hire to say otherwise.

Second, the hydrogen tax credit is extremely generous because it was designed to support innovative new technologies, not accounting tricks from incumbent firms. If you want to pay dairies and fossil fuel companies to reduce their emissions, you should pay them directly — which would cost only a fraction of the tax credit outlays — and not through a fossil hydrogen producer in the middle.

Third, policymakers need to regulate large methane emitters, not give them special treatment. But offsets perpetuate under-regulation: once a pollution control practice is required by law, it can no longer be used as an offset. So it's no surprise that offsets create vested special interests who lobby against any future regulations that would require them to do the things they are getting paid for as offsets. There is even evidence that suggests California's coal mine methane offsets program may have helped convince the Obama administration not to regulate mine methane emissions.[18]

Fourth, subsidizing hydrogen production premised on offsets creates significant fiscal and environmental liabilities.[19] At the end of the 10-year tax credit eligibility window, these same hydrogen producers will be back with their hands out, asking for more incentives. If they don't get what they want, they can keep using fossil fuels because the original offsets let them build and operate a conventional production process. As the energy transition continues, this fossil infrastructure will eventually become a stranded asset, too, which is precisely why building uneconomic projects to chase lucrative tax credits is a bad financial strategy and a waste of taxpayer money.

Thank you for the opportunity to provide testimony today and for allowing me to appear remotely. I look forward to answering your questions.

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17 Danny Cullenward et al., Carbon offsets are incompatible with the Paris Agreement, *One Earth* 6: 1085-88 (2023).

18 Barbara Haya et al., Managing uncertainty in carbon offsets: insights from California's standardized approach, *Climate Policy* 20: 1112-26 (2020).

19 Gernot Wagner and Danny Cullenward, Get tax right or clean hydrogen will be bigger boondoggle than biofuels, *The Washington Post* (Apr. 27, 2023).