

Legislative Testimony
Hearing before the Pennsylvania House Environmental Resources and Energy Committee
Hydrogen Hubs and Climate Change
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Good morning, Chairman Vitali, Chairman Causer, and members of the committee. Thank you for having me here today to speak to you about hydrogen hubs and climate change.

My name is Joanne Kilgour, and I serve as the Executive Director of the Ohio River Valley Institute, an independent, nonprofit research and communications center producing sound research for a more sustainable, equitable, and prosperous Appalachia.

Over the last two years, our research team has been analyzing the environmental, economic, and financial landscape of the proposed buildout of hydrogen and carbon capture, use, and sequestration (CCUS) infrastructure in Pennsylvania and throughout the Ohio Valley. Based on this analysis, my testimony today focuses on five key issues for consideration by this committee:

1. The underlying economics for key components of the proposed hub are costly and uncompetitive, even with available subsidies and tax credits;
2. The public has had little insight into the details of the plans and viability of the business model for hydrogen hub development in Pennsylvania;
3. The entire cost of this infrastructure buildout, including a profit margin for industry, could be inflicted on taxpayers and ratepayers;
4. The proposed hubs are unlikely to deliver growth in jobs and prosperity; and,
5. Resources and attention devoted to hydrogen hub development in Pennsylvania could delay true clean energy transition in our region and prevent consideration of and investment in better, more viable economic and job development strategies.

First, I will address the underlying economics for key components of the proposed hub development and why our research shows that they are costly and uncompetitive.

It is important to reinforce that while the framing for this proposed new infrastructure buildout has focused on hydrogen, a hydrogen hub in Pennsylvania would necessarily be accompanied by a significant build out of complementary carbon capture, use, and sequestration infrastructure. For that reason, throughout my testimony I will be discussing both hydrogen and CCUS.

In October 2021, the [Roosevelt Project released a study](#) titled “A Low Carbon Energy Transition in Southwest Pennsylvania.” This study examined the cost of a carbon capture hub for a 13-county region in southwestern Pennsylvania and found it would cost \$2.9 billion per year or just

over \$2,300 per household for the 1.25 million household study region. (See page 96 of the above-linked report).

[Using the same cost data](#) as the Roosevelt study, our researchers at the Ohio River Valley Institute conducted an [analysis](#) of the cost impact of CCS in gas and coal-fired power generation. Using just the example of CCS in gas plants, consider a 1,000 megawatt gas-fired power plant that generates 7 million megawatt hours of electricity annually. Using the average wholesale price of electricity in the five years before the war in Ukraine temporarily caused prices to spike, the plant could expect to be paid about \$223 million dollars for its output. But, if the plant were retrofitted with CCS, under the Inflation Reduction Act, it could also be paid \$85 per metric ton for capturing and sequestering the carbon emissions it creates, or about \$262 million.

In other words, the plant could be paid more for creating and sequestering the carbon emissions it creates than it would for producing electricity. And customers and taxpayers could end up paying \$485 million for electricity that otherwise would cost \$223 million.

With respect to how this relates back to the hydrogen production component of a proposed hub, the [economic outlook](#) for blue hydrogen - hydrogen produced from natural gas with CCS - suggests that even the [blue hydrogen manufactured using CCS will be matched or undercut in cost by 2030 by green hydrogen](#) - hydrogen generated from renewable energy. And if hub awards are made in 2024 with an expected implementation timeline of 8 - 12 years, green hydrogen is likely to meet or exceed the cost-effectiveness of blue hydrogen well within that time horizon. If we invest in blue hydrogen infrastructure now, rather than green, we could be putting the region at a long-term disadvantage in the market.

It is worth noting that the poor economic outlook for blue hydrogen and CCUS discussed above would not be fully mitigated by the provisions of the Inflation Reduction Act that pertain to CCS. A [February 2023 study](#) released by Ernest Moniz and the Energy Futures Initiative, for example, finds that additional public subsidies will be required to make CCS viable in power generation. [Additional analyses](#) show that, even with near 100% subsidies for carbon capture and sequestration contained in the IRA bill, at best only 20-30% of gas fired power would be retrofitted for CCS and only 10-15% of coal-fired power would be retrofitted.

In the most optimistic of analyses, CCS is expected to capture only 20% of current emissions from coal and gas-fired power by 2035 and less than 10% of industrial emissions by 2035. Further, the Inflation Reduction Act would not fund construction in the region of the 1,400 miles (or more) of CO2 pipelines that would likely accompany a hydrogen hub in Pennsylvania, or related transportation and storage infrastructure that could cost tens of billions of dollars and require additional legislation and appropriations.

Even where federal investments may be available, it is important to note that access to federal funds does not make a project free - residents end up paying through our tax bills, our utility bills, or a combination of both. So our hydrogen hub investment decisions matter to the people

in every district of the Commonwealth.

Next, I will discuss why it matters that the public has had little insight into the technical details of the hub development plans or viability of the business model for hub development in Pennsylvania.

Another key issue for consideration by this committee is that while some of the hydrogen hub applicants have shared certain anchor projects or notional layouts for a regional hydrogen hub, the detail of these proposals has not been shared with the public and many who do have access to the plans are subject to non-disclosure agreements. The Department of Energy has said that it will not release details of concept papers or full applications but will leave it to the discretion of the applicant whether to make detailed plans publicly available. This means that with the exception of general, broad concepts or individual press statements about potential projects, we do not currently have insight into which facilities would be included or excluded. Similarly, we do not currently have insight into the extent of pipeline build-out that would be necessary to accompany such hub development, or the extent of the overall footprint of that pipeline network within our communities. And, we lack information on the share of industrial emissions that a regional hydrogen and carbon capture hub would capture or fail to capture.

Similarly, the public has not been given a justification for the viability of the business model contemplated to develop and sustain a regional hydrogen hub. Many of the presumed customers for the carbon capture component of the proposed hub, including coal and gas-fired power plants, are already struggling to remain competitive with low-cost renewable resources and, therefore, as articulated in the February 2023 Energy Futures Initiative paper, would require greater than-100% subsidies to absorb a technology that would in many cases increase operating costs by two times or more. There is also the added risk that because the subsidies for carbon capture provided in the Inflation Reduction Act would last only 12 years, plants and factories may struggle to fully recover the immense up-front capital investment required by CCS.

The publicly available document closest to being able to suggest a business model for the proposed hydrogen and carbon capture hub is the “[Building to Net-Zero](#)” report from the Labor Energy Partnership. But the conditions for [the quasi-federal business model](#) (see page 40 of the linked Energy Futures Initiative report) suggested by former Energy Secretary Ernest Moniz and his colleagues in this report, which is based on the Bonneville Power Administration (BPA), do not exist. The [BPA is a self-financing entity](#) whose costs are paid entirely by its customers. Neither BPA nor its customers receive federal appropriations. Moniz’s suggestion that a federal entity would own and operate the carbon pipeline network and sequestration operations and charge the cost back to its customers would likely require that those customers receive a federal subsidy greater than the value of the service. In other words, the federal government would have to give the customers the money to hand back to the federal government.

Next, it is likely that the entire cost of a hydrogen and carbon capture hub, including a profit margin for industry, would be inflicted on taxpayers and ratepayers and will come at a

premium.

As referenced above, the proposed solution to the financing and economic problems associated with the development of a blue hydrogen hub is 100%+ taxpayer subsidization of carbon capture, use, and sequestration.

One key mechanism for taxpayer subsidization of activities like carbon capture have come in the form of tax credits. [The Inflation Reduction Act](#) of 2022 raised the value of the section 45Q tax credit to \$85/MTCO₂ and made it a direct payment for up to seven years, which means that it would no longer be necessary for the taxpayer to have sufficient tax liability in order to take advantage of the credit. In most cases, the \$85/MTCO₂ figure is equal to or greater than the actual cost of carbon capture and that doesn't include many other tax and regulatory provisions the administration is recommending that states take to reduce industry costs and shift liability.

The need for a 100%+ subsidy isn't just our contention or that of the Energy Futures Initiative, it's a fact verified by [a briefing document](#) that emerged from a meeting between Sen. Joe Manchin, the chair of the West Virginia Public Service Commission, and the CEO of American Electric Power, one of the nation's largest investor-owned electric utilities. The parties were discussing the possibility of outfitting a 1,300 MW coal-fired power plant with CCS. Quoting from the briefing document:

- "If the entire plant could be converted, the capital cost may be between \$3 to \$5 billion and operating costs may increase by 25% to 35%."
- "Adding a utility level rate of return to a \$4 billion capital investment for the carbon capture would add close to \$400 million per year, or close to \$50 per ton, or \$50 per MWH."
- "That level of cost for utility customers in West Virginia is unsustainable. Therefore, federal funding of close to 100% of the capital costs is needed."

Shortly after this meeting, [Senator Manchin said this to reporters](#). "I'd love to have carbon capture, but we don't have the technology because we really haven't gotten to that point. And it's so darn expensive that it makes it almost impossible."

In addition to the challenges noted above, the proposed hydrogen and carbon capture hub is unlikely to deliver growth in jobs and prosperity.

The principal effects of a regional hydrogen and carbon capture hub would be the preservation and possible expansion of the natural gas industry and the buildout of familiar fossil fuel infrastructure like pipelines and underground injection wells. In fact, [the Allegheny Conference in its decarbonization pathway](#), anticipates 65% growth in the natural gas industry between now and 2030.

However, the natural gas industry's past failures and structural inability to induce job growth and prosperity, especially in PA's rural counties, have now been well-documented.

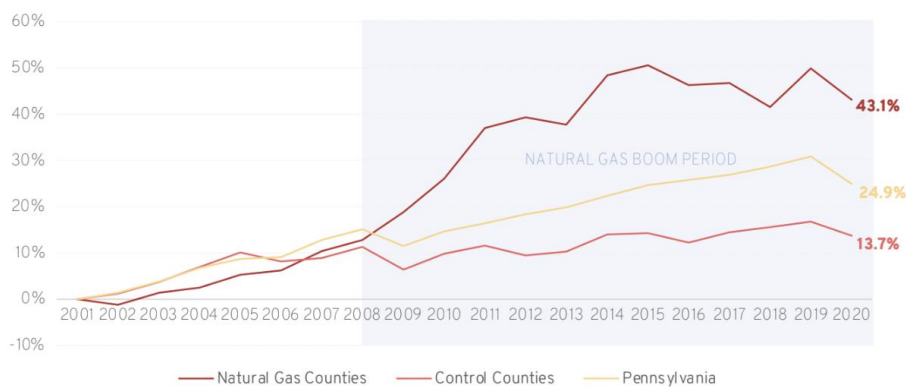
A [February 2021 Ohio River Valley Institute report](#) found that, despite immense growth in GDP,

fracking counties experienced meager growth in jobs and income and absolute losses in population.

A follow-up report determined that the [reasons for these failures are structural](#) and, therefore: increased natural gas production is unlikely to deliver job growth; and any job growth that does arise diminishes over time.

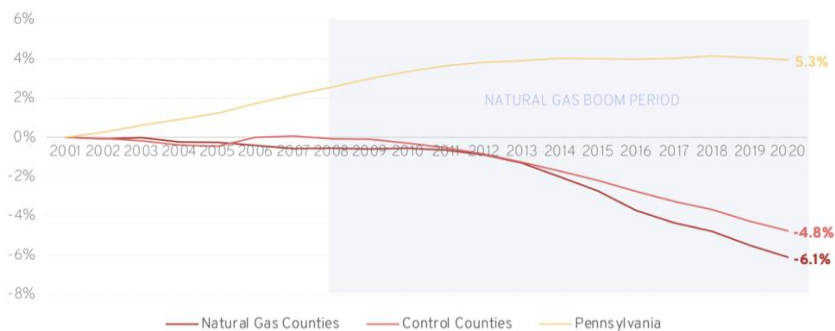
And a [third report demonstrates](#) that PA rural counties that participated heavily in the natural gas boom did little better than those that did not for job growth and experienced even greater population loss.

Figure 3: Change in Real GDP, 2001-2020



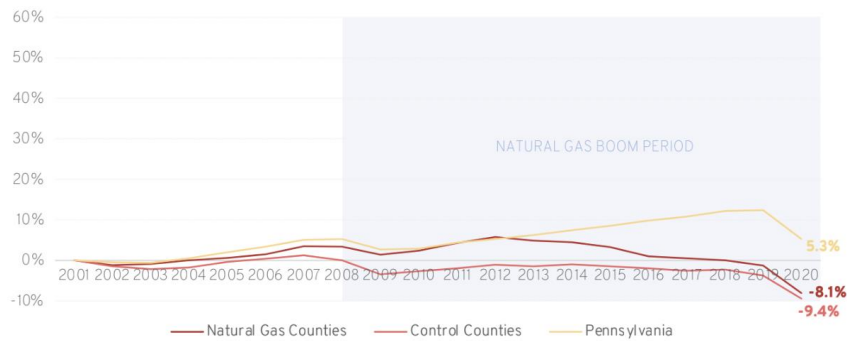
Source: Author's calculations using Bureau of Economic Analysis data

Figure 5: Change in Population, 2001-2020



Source: Author's calculations using Bureau of Economic Analysis data

Figure 4: Change in Total Employment, 2001-2020



Source: Author's calculations using Bureau of Economic Analysis data

Finally, it is important for this committee to consider that resources and attention devoted to the likely false promise of the hydrogen hub could delay true clean energy transition in our region and prevent consideration and development of better, more viable economic and job development strategies.

[The Allegheny conference decarbonization pathway report](#), which included deploying blue hydrogen as one of its strategic levers, is one example of local leaders premising regional economic development strategies on industries that have demonstrated a structural inability to deliver lasting, shared prosperity to our local communities.

Pursuit of these strategies would further shackle the region to these industries and divert resources that could be used to help the region join the rest of the country in benefitting from the cost savings and job growth associated with true clean energy transition.

While jobs in fossil fuels are declining, the [clean energy sector is adding jobs at a rate 50% faster](#) than the nation as a whole. And, [decarbonization pathways that rely more heavily on clean energy and energy efficiency](#) and help us meet our climate goals at a lower cost and with greater potential job creation in our local communities.

We even see this in communities that have been historically dependent on fossil fuel industries, but which have chosen to transition. One is [rural Lewis County, Washington](#) where a coal mine and power plant were the anchors of the local economy and where, for decades, jobs and population change mirrored that of many Appalachian counties. But, when Lewis County embraced an economic transition strategy focused on investments in energy efficiency, education, and renewable generation, it caused job and income growth to spike, with incomes growing 50% faster than the national average and jobs growing at twice the rate of the nation.

We have been down this path of grandiose visions and promises before, first with the natural gas boom and then with the "petrochemical manufacturing renaissance" for which we contributed billions of taxpayer dollars and assumed immense liability, but for which industry still owes us [200,000 jobs in the case of the fracking boom](#) (See chart on page 34) and another [100,000 jobs in the case of the petrochemical cluster](#) that they never delivered. Are we sure we

are not destined for that same outcome with the development of a blue hydrogen hub?

Thank you for the opportunity to speak with you all today.