8 November 2022

Comments re: the Clean Hydrogen Production Standard

Dear Secretary Granholm:

Friends of the Earth is grateful for this opportunity to provide feedback to the Department of Energy (DOE) on the development of its Clean Hydrogen Production Standard (CHPS). Billions of our tax dollars–and potentially billions of tons of emissions–are at stake.

Hydrogen, sustainably produced from renewable energy, has a role to play in the decarbonization of key sectors, particularly in manufacturing. But it is not a silver bullet. The hype around a 'hydrogen economy' could easily lead to reckless deployment, delaying the transition away from fossil fuels and increasing emissions.[1] [2] [3] The implementation of the recent wave of federal support for hydrogen will determine which of the two paths this technology takes. The DOE's role as gatekeeper for much of this funding must be executed responsibly.

The DOE is right to pay keen attention to the potential interactions between the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). Although changing the CHPS to a lifecycle rather than facility level standard is an improvement, an aspirational standard is only appropriate where there are truly aspirational requirements. The new production tax credit (PTC) only offers the lowest tier of subsidy for hydrogen produced at 4.0 kgCO2e/kgH2, with significantly higher incentives for hydrogen produced with lower carbon intensity. We remain concerned that the proposed CHPS is designed to subsidize a suite of speculative fossil fuel technologies that will either barely meet the standard or fail to meet it entirely (potentially by significant margins). The DOE has considerable flexibility in both the application of the proposed CHPS and in project selection. This flexibility, without clear prioritization for funding, is most likely to benefit financially risky blue and gray hydrogen investments that fail to meet the CHPS intensity target while aggravating Environmental Justice (EJ) harms.

The DOE has a long history of gambling–and losing–with our tax dollars, as was noted recently by the Government Accountability Office vis a vis funding for carbon capture and sequestration.[4] We are concerned that the DOE will take the promises of developers to "demonstrably aid the achievement" of CHPS too credulously. A "bait and switch" is all too easy to imagine with projects securing federal support based on guarantees to advance CHPS that never materialize. The result could easily be billions diverted away from green hydrogen applications that are

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[1] Bruce Buckheit, Deconstructing the Hype on Hydrogen Hubs (2022) https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2022/07/Deconstructing-the-Hype-on-Hydrogen-Hubs-FINAL-.pdf

[2] Howarth, RW, Jacobson, MZ. How green is blue hydrogen? Energy Sci Eng. 2021; 9: 1676– 1687. https://doi.org/10.1002/ese3.956

[3] Howarth, RW, Jacobson, MZ. Reply to comment on "How Green is Blue Hydrogen?". Energy Sci Eng. 2022; 10: 1955- 1960. doi:10.1002/ese3.1154

[4] https://www.gao.gov/products/gao-22-105111

deployable now and going to benefit instead incumbent fossil fuel interests likely to never achieve CHPS.

If the DOE does not intend to use the CHPS as a strict bar for hub funding, then we strongly encourage it to develop an application process that prioritizes projects that 1.) do not exacerbate existing environmental harm in EJ and other marginalized communities 2.) can exceed the lifecycle CHPS standard with existing, proven and scalable technologies and 3.) go to support end-use applications where electrification alternatives are not currently available.

We have included specific answers to some of your key questions below and look forward to continuing dialogue:

1) Data and Values for Carbon Intensity

1b) Lifecycle analysis to develop the targets in this draft CHPS were developed using GREET. GREET contains default estimates of carbon intensity for parameters that are not likely to vary widely by deployments in the same region of the country (e.g., carbon intensity of regional grids, net emissions for biomass growth and production, avoided emissions from the use of waste-stream materials). In your experience, how accurate are these estimates, what are other reasonable values for these estimates and what is your justification, and/or what are the uncertainty ranges associated with these estimates?

The calculations of avoided emissions have frequently allowed inaccurate representations of the carbon intensity of biomethane gas. The treatment of biomethane under regimes like the EPA's Renewable Fuel Standard (RFS) and California's Low Carbon Fuel Standard (LCFS) use inaccurate comparisons for avoided emissions, which dramatically overstate the climate benefits. The RFS compares the climate benefit of biomethane captured from landfills to simply flaring or burning it on-site. This ignores 1) the perverse incentive landfill operators have to abandon best practices in order to produce more methane and 2) the more accurate comparison to best climate practices, such as ongoing work reducing the amount of organic waste that ends up in landfills.

Similarly, the LCFS treats biomethane from manure digesters as a byproduct rather than a (very lucrative) co-product. California's application of GREET (CA-GREET3.0) to biomethane from animal manure neglects to attribute the full lifecycle emissions associated with animal waste – including emissions from producing animal feed, enteric fermentation, trucking livestock, fuel combustion at the livestock facility, emissions from digestate, etc – to the produced biomethane. GREET also fails to account for the spillover effects resulting from incentivizing production of animal manure to sell for LCFS credits on herd sizes. Several California dairies have substantially increased their herd sizes since installing manure digesters, and the increased emissions from these facilities are not factored into the high negative carbon intensity awarded to biomethane from animal manure.

Allowing CNG and RNG to claim avoided emissions for displacing gasoline, while also benefiting from lax to nonexistent regulation of fugitive emissions and leakage and the treatment

of byproduct and coproduct emissions, allow dramatically overinflated claims of negative emissions.[5] The DOE should calculate LCA emissions on their actual emissions, as estimates of so-called avoided emissions (often intentionally) ignore how such a policy penalizes more climate friendly practices that reduce overall emissions, rather than capturing the gas for sale.

2) Methodology

2b) Use of some biogenic resources in hydrogen production, including waste products that would otherwise have been disposed of (e.g., municipal solid waste, animal waste), may under certain circumstances be calculated as having net zero or negative CO2 emissions, especially given scenarios wherein biogenic waste stream-derived materials and/or processes would have likely resulted in large GHG emissions if not used for hydrogen production. What frameworks, analytic tools, or data sources can be used to quantify emissions and sequestration associated with these resources in a way that is consistent with the lifecycle definition in the IRA?

As discussed above, the emission calculations of "biogenic" resources have been allowed to operate under widely over-inflated climate claims. For example, claiming that biomethane gas from CAFO manure has negative emissions is false and distorts the market to favor highly polluting CAFOs over more regenerative practices, such as pasturing livestock, and to incentivize increased animal production. This fundamental error is echoed by emission estimates for biomethane captured from landfills. The bold climate claims of landfill gas depend on narrow comparisons to flaring or burning onsite, ignoring the best practice of reducing organic waste that ends up in a landfill.

Further, these feedstocks have severe pollution and EJ harms that DOE must not turn a blind eye to. The communities where CAFOs and landfills are sited are disproportionately BIPOC. Landfill leachate can introduce nitrate, phosphate, ammonium, and oxides into groundwater. Further, proximity to landfills keeps property values low, embedding cycles of economic inequality.[6] CAFOs emit ammonia, hydrogen sulfide, and volatile organic compounds, causing higher rates and severity of respiratory illness. Merely living in close proximity to a CAFO decreases life expectancy.[7] Manure digesters can worsen pollution impacts by increasing ammonia and nitrous oxide emissions and increasing risk of groundwater contamination. BIPOC communities have historically been sacrifice zones to fossil fuel pollution and DOE must not further embed that toxic legacy under the guise of clean energy.

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[5] Younes, A. and Fingerman, K. (2021). Quantification of Dairy Farm Subsidies Under California's Low Carbon Fuel Standard. Arcata, CA.

[6] Maheshi Danthurebandara, Stevan Passel, Dirk Nelen, Yves Tielemans, and Karel Van Acke, "Environmental and Socioeconomic Impacts of Landfills", Linnaeus ECO-TECH (2013). https://www.researchgate.net/publication/278738702_Environmental_and_socio-economic_impacts_of_landfills

[7] Julia Kravchenko, Sung Han Rhew, Igor Akushevich, Pankaj Agarwal, and H Kim Lyerly, "Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations", 79 North Carolina Medical Journal 278 (2018). https://www.ncmedicaljournal.com/content/ncm/79/5/278.full.pdf

3) Implementation

3c) Should renewable energy credits, power purchase agreements, or other market structures be allowable in characterizing the intensity of electricity emissions for hydrogen production? Should any requirements be placed on these instruments if they are allowed to be accounted for as a source of clean electricity (e.g. restrictions on time of generation, time of use, or regional considerations)? What are the pros and cons of allowing different schemes? How should these instruments be structured (e.g. time of generation, time of use, or regional considerations) if they are allowed for use?

The market instruments proposed in this question pose a real risk of turning the CHPS and hubs program into a federally subsidized carbon shell game. If the DOE allows market structures like renewable energy credits (REC) or power purchasing agreements (PPA) there must be unbendable requirements to demonstrate additionality and compliance with the intended CHPS carbon intensity. A hydrogen producer must be able to demonstrate additionality of the "clean" electricity powering production, and regional and time-of-use requirements will be key.

Using electricity to produce 'clean' hydrogen only makes sense when producers can demonstrate the direct additionality of the clean energy claimed during their LCA. Redirecting existing renewable capacity into hydrogen runs the risk of increasing emissions by diverting clean renewables. A core limitation of hydrogen is the loss between energy input and output – so increasing electricity demand on a grid without a matched increase in renewable capacity will result in a spike of GHG that will never be able to be matched by the ability of this 'clean' hydrogen displacing dirtier fuels downstream.

Even worse, this approach stands to worsen harm in many of the EJ sacrifice zones that the Biden Administration has pledged to address - as 'clean' hydrogen production would dramatically increase emissions in the communities surrounding the facility, all in the name of providing purportedly "clean" energy elsewhere.

There are clear steps the DOE must take to prevent the CHPS becoming exploited by incumbent fossil fuel interests. Producers qualifying for hub funding under the CHPS must be able to demonstrate that they have a PPA with a newly constructed wind or solar facility, bundled with RECs that are retired after use by the hydrogen producer. The renewable electrons claimed through this PPA should be connected to the same balancing authority used for hydrogen production. It will also be important to implement timing restrictions, so the hydrogen production is powered within a reasonable timeframe of claimed renewable electrons entering the grid (ie within the same hour).

The DOE must not allow market instruments without these additionality requirements. Hydrogen hubs must not be allowed to claim unbundled RECs for energy produced far afield from their production facilities. This would undermine any climate benefit of the program and raise significant EJ concerns. Communities should not be forced to bear increased pollution from "clean" hydrogen hubs spiking grid demand, even if this increased fossil consumption is purportedly 'offset' elsewhere.

4) Additional Information

4a) Please provide any other information that DOE should consider related to this BIL provision if not already covered above.

Green hydrogen can play an important role in achieving the Biden Administration's climate goals, but only if the DOE exercises its authority to ensure hydrogen funding is allocated based on project merit and climate impact, with a careful eye to long-term sustainability and EJ considerations during its seeding of expanded hydrogen infrastructure. The overarching nature of the hub program grants the DOE purview over the infrastructure proposed along every step of the hydrogen supply chain, giving DOE a unique ability to prioritize funding to hydrogen development that is not only produced sustainably, but also is situated to fill the demand of industries that can make the best use of this green hydrogen.

Simply because hydrogen *can* be used in a given application does not mean it *should* be used. Hydrogen is incredibly energy and water intensive, so even green hydrogen must be used wisely, or we will undermine the ability of growing renewable capacity to displace dirtier fuels most effectively. The same renewable energy used to power hydrogen production will always be able to displace more dirty energy (and GHG) if used directly. So hydrogen only makes sense as a climate response in areas not well suited to direct electrification.[8] While the hubs program text in IIJA calls for end-use demonstration diversity, the DOE maintains broad authority to prioritize funding towards demonstration use in sectors that can achieve the greatest GHG reductions with green hydrogen, or don't have other clear emission reduction strategies (at least given current technological limitations). This should clearly deprioritize funding towards 'blue hydrogen' and proposals for blending hydrogen with fossil gas for use in the power and heating sectors.

It is therefore crucial that the DOE set a stricter CPHS, as a truly aspiration standard would be better suited to direct funding towards the needed aspirational growth of green hydrogen. Once again, we emphasize the urgency of the DOE prioritizing projects that 1.) do not exacerbate existing environmental harm in EJ and other marginalized communities 2.) can exceed the lifecycle CHPS standard with existing, proven and scalable technologies and 3.) go to support end-use applications where electrification alternatives are not currently available.

Conclusion

We are grateful for this opportunity to provide feedback and look forward to helping the DOE refine a rigorous and fair application process. Please do not hesitate to reach out to Sarah Lutz, slutz@foe.org, with any questions or concerns.

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[8] Bruce Buckheit, Deconstructing the Hype on Hydrogen Hubs (2022) https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2022/07/Deconstructing-the-Hype-on-Hydrogen-Hubs-FINAL-.pdf