

Everything About Hydrogen and ARCH2 Is Awful

The April 9th minutes summary of Denise Brinley's sales pitch for the hydrogen project doesn't reflect the presentation that was given by her. She spent nearly an hour recounting her personal background and upbringing. It couldn't have been more tone-deaf. No one is clamoring against these hydrogen waste-heaps because the representative of them doesn't have a good enough back-story. The only thing hydrogen has proven to do efficiently is burn public money for the benefit of petroleum interests.

It was good to see that some of the board members were asking more pointed questions later on in the presentation though and it was revealed that Denise really didn't know anything technical at all about hydrogen and that the project was actually waiting on funding before they would attempt to back up any of their claims. No other project pitched to this board with such brazen entitlement would be humored as ARCH2 is. The April 9th minutes write as follows:

"The Appalachian Regional Clean Hydrogen Hub (ARCH2)'s mission is to use the nation's lowest cost natural gas as primary feedstock to enable and sustain a regional hydrogen economy while ensuring the economic benefits are shared fairly and equitably among local communities."

It seems that because this project is filled with bribes and feeds the bellies of oil interests, it's avoiding proper scrutiny. Later into the presentation, as harder questions were being put to Denise, the meeting mysteriously cut out and did not return. Probably just a coincidence that the first time this board stops throwing softballs to its grant queens, it cuts out. None of this business detail was included in the minutes. The minutes go on:

"[the] DOE is going to have a third party firm do the environmental impact statement on their behalf and that they are going to make sure that the agencies and the public are well informed on the process and impacts of these projects well in advance, rather than waiting until the last minute."

This is a good start but doesn't go far enough. We should be evaluating why hydrogen is even being discussed as part of a carbon reduction plan in the first place when it is completely speculative, unproven and has many known issues that are being swept under the rug by the branch of the oil industry that calls themselves ARCH2. I'll quickly outline the ones I'm aware of:

1. **Hydrogen is a STORAGE medium, not a generator of energy**, and so does nothing to address fossil fuel dependency; and indeed ARCH2 specifically are choosing their locations in Pennsylvania with the express intention of being near cheap natural gas reserves to use them as "primary feedstock".
2. **One of the biggest proponents of hydrogen, the Hydrogen Council, touts "blue" hydrogen as a climate-friendly initiative.** "Blue" hydrogen is supposed to be better for the climate than "black", "brown" or "grey" hydrogen, and these colors correlate with the energy inputs used to produce said hydrogen ("black" is derived

from coal, "grey" from gas and methane, "brown" from lignite, etc). The Hydrogen Council was created by the oil and gas industry; its members have a financial interest to switch from natural gas to hydrogen produced from natural gas. In 2021, two American researchers found that "blue" hydrogen produces only slightly less carbon than "grey", and about the same emissions as burning natural gas directly. It's noteworthy too that the ARCH/MACH projects aren't even proposing to produce "blue" hydrogen, they're proposing "black" or "grey"; not that it would matter anyway from a carbon emissions perspective.

3. **"Green" hydrogen appears to mostly be a green-washing diversion tactic** as well. Researchers from Australia showed that green hydrogen produced from solar energy produced only 1/4 of the emissions of grey hydrogen in the most ideal scenario. Under more realistic conditions, they found the emissions are comparable to grey hydrogen. The inherent inefficiency of this process makes this type of hydrogen much more expensive, which further incentivizes the production of grey/black/brown hydrogens; which again benefits oil and gas interests coincidentally.
4. **A complete overhaul of infrastructure would need to be created to accommodate a fleet of hydrogen vehicles.** This means new gas stations, new motors, new vehicle production, new storage mechanisms. All of these things are incredibly energy intensive to create and maintain. Also, the very high pressures hydrogen fuel cells require make a safe and efficient refilling solution much more difficult and costly.
5. **Transitioning to a hydrogen-based transportation system would require a large amount of fresh water.** With the increasing scarcity of clean drinking water, we don't need added pressures on this precious resource. Some researchers estimate that if we replaced just 18% of fossil fuels with hydrogen that we would use 2%-4% of the water we currently used for irrigation.
6. **Hydrogen production requires the rare and expensive noble metals platinum and iridium** for the proton exchange membranes used in electrolysis. The entire hydrogen economy depends on the availability of those two metals, making it an extremely precarious foundation to rely on. China has heavily invested in hydrogen and is already feeling the consequences of this limited supply even at such an early stage in development.
7. **Hydrogen sucks to deal with.** Besides being cold intolerant, leading to complicated and costly startup issues, and requiring very high PSI for its fuel cells to reach an energy density comparable to gasoline, hydrogen is also the smallest chemical element and so will creep into the storage tank walls, compromising the chemical structure and making it brittle. This is known as "hydrogen embrittlement" and requires all storage tanks to be much thicker and specially coated; making them very heavy and expensive, and therefore adding significant efficiency losses. The city of Wiesbaden in Germany had to retire 6 new hydrogen

buses because the overly complicated and difficult filling station broke down, costing the city millions of euros.

For more information please watch this video by the science communicator Sabine Hossenfelder:

Click here --> <https://www.youtube.com/watch?v=Zklo4Z1SqkE>

Some Better Ways to Spend \$10,000,000,000

Rather than giving billions to the petroleum industry in the form of grants for hydrogen plants soaked from greenwashing, we should be investing in proven solutions that EVERYONE can participate in and benefit from. One quarter to one third of all GHG emissions come from the animal agriculture sector. Why aren't we investing some of those billions into **educational campaigns to teach people how to buy and eat a well-balanced plant-based diet** that will benefit their health, their community, their local ecology, the planet and go far to undo the untold suffering of slaughterhouse workers and of course the animals involuntarily exploited.

Another quarter to a third of emissions come from transportation. Why can't some of those billions go into **solutions to allow us to walk and bicycle more to meet our needs?** We're currently hostages to our cars and it's because our communities have all but been paved over and made outright hostile to pedestrian travel by steady, rote, visionless planning over the course of many years by PennDOT and local planning agencies. The only benefactors of this transportation system they've scrawled onto our landscape are car manufacturers and oil billionaires. Again, probably just a coincidence.

Lastly, electricity and heat generation make up another third of emissions. Why not allocate some of these funds to **educating people on how they can do basic home maintenance** to make their windows less leaky and their home more energy efficient? Also we could do with a few **campaigns to alert people that maybe they should be layering up their clothing in the winter instead of wearing a t-shirt and shorts in their house in the middle of January.** I get that we're all deathly afraid of anything having to do with the natural world at this point, but maybe creating a perma-climate of 70 degrees in all of our spaces year-round wasn't the greatest idea and should be reevaluated.

Closing Thoughts

Likely these alternative solutions wouldn't even cost \$10B and yet if implemented would reduce carbon emissions by orders of magnitude over anything this hydrogen nonsense will do in its entire, useless lifecycle. These low-complexity solutions aren't waiting to be figured out; they're already solved. They're already fully scalable at every level. The only step left to obtain their massive results is to implement them. Do any of us here really believe Earth is inexhaustible? Do we all really believe that there's no problem with the amount of waste and excess we participate in with our daily habits? If we don't tackle the root of the issue, which is our habituation of waste, excess and inactivity, then we'll only ever be delaying the problem at best, or wasting other people's money on giant, golden-parachute greenwashing projects like ARCH2 at worst.

Also, nuclear sucks too for its own special reasons and if the governor wants to build a reactor I think he should volunteer his backyard where he can risk his own family's health in the comfort of his strong faith in its safety; and he can keep his risk-taking beliefs far from our communities that aren't interested in that carnival ride.

One more thing, I just had to address this. The April 9th minutes read:

"Also, DEP is looking into educating the public on hydrogen and hydrogen hubs, but the concept is so new it has been difficult to get that information out quickly."

This is so incredibly condescending. Ah yes, the ignorant masses don't like hydrogen because they're just not educated enough. None of the objections they brought up were even worthy of mentioning or addressing! The board knows its good already because the oil lobbyists told them it was and they have lots of money so they must be right (and maybe they'll share it!). And people say government is out of touch!

If any part of this comment resonates with you, feel free to send me a message at:

chris.greentown@gmail.com