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Biden's "Blue" Hydrogen Plan is not the Answer

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The excitement about hydrogen as a fuel and energy source is similar to buying an electric vehicle (EV) thinking it will reduce your personal CO_2 emissions. On the surface, it seems great! No greenhouse gas emissions while driving is certainly better than the greenhouse gasses released from a normal combustion engine car, but when you consider other effects, it's no longer as great. What if the grid that you plug your EV into is powered primarily by coal? What about the environmental and human rights impacts of mining the materials to make the batteries? What about the lack of a battery recycling program in the United States?

Similarly, on the surface, hydrogen seems great. Like electric cars, it produces no greenhouse gas emissions when it is being used; it's only byproducts are water, electricity, and heat. It can be used to store electricity to stabilize a renewable energy grid, and it can also be used to power vehicles with no emissions. Additionally, fueling a hydrogen fuel cell is as simple and quick as fueling a regular car, so you don't need to wait through the long charging times of an EV.

The other great thing about hydrogen is that it can be produced cleanly to make it a legitimately clean energy source. However, there are other, currently cheaper, ways to produce hydrogen in a dirty, emissions-heavy manner. Sadly, this is what Biden's $1 trillion infrastructure package does.

Hydrogen can be produced in three main ways: “gray,” “blue,” and “green” hydrogen. The “gray” method converts methane into hydrogen and carbon dioxide from natural gas, obviously not ideal since carbon dioxide is a by-product. “Blue” hydrogen theoretically accounts for this problem by using carbon capture technology to sequester and store away that carbon dioxide so that it never enters the atmosphere.

There are several problems with this strategy. Namely, the efficiency of carbon capture technology is good, but not perfect. Additionally, the carbon capture is powered by more burning of natural gas where none of the CO_2, or more importantly, methane is captured. These two facts combine to mean that hydrogen, or at least “blue” hydrogen, is not the silver bullet that it may be advertised as.

So how bad are “blue” and “gray” hydrogen? “Blue” hydrogen is only marginally better than “gray” hydrogen (9-12% better), and it is about 20% worse than just burning coal or natural gas for heat, and 60% worse than just burning diesel oil. Figure 1 below shows a comparison between “blue” and “gray” hydrogen and coal and natural gas.

As we can see, “gray” and “blue” hydrogen are not the clean energy source that we need. The third option, “green” hydrogen, uses electricity produced from renewable sources to separate the hydrogen from the oxygen in water. There are no greenhouse gas emissions associated with this process, and it is what we would need to make hydrogen a true clean energy source.

It’s clear that we need “green” hydrogen, not “blue,” and not “gray.” So, what’s in the infrastructure bill passed by the House and Senate? “Blue” hydrogen is a focus. The plan is to build four regional hubs for hydrogen production, two of which will be in areas with plentiful natural gas resources, and coal is also discussed as a viable option for generating the energy to create the hydrogen. Just one of the $8 billion is going towards green hydrogen research.

While “blue” hydrogen is slightly better than the current “gray” hydrogen, it is still significantly worse than any of our other common energy sources, so expanding this “blue” hydrogen sector to take over some of the coal and natural gas portions of our power supply would be quite harmful. Not only would it increase our greenhouse gas emissions, it would further implant fossil fuels as a necessity for our power supply at a time when it is critical to rid ourselves of them.

Hydrogen is a great energy resource, but we need to be funding the “green” hydrogen that has no associated greenhouse gas emissions. Instead, the infrastructure bill seeks to use harmful, emissions heavy technology and expand its usage. The infrastructure bill, and particularly its hydrogen provisions, will only serve to worsen climate change, not fight it.

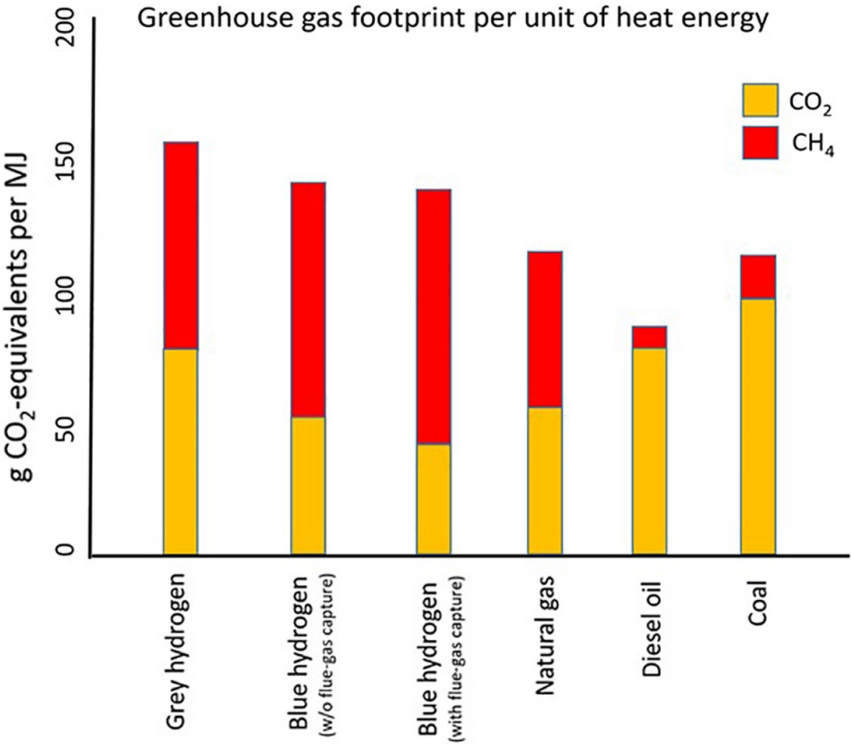

Figure 1

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