

# DELAWARE BUSINESS TIMES

## VIEWPOINT: Green hydrogen is neither clean nor 'green'

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President Joe Biden announced in October that the [federal government is investing \\$7 billion](#) in hydrogen development across the nation. Most of these “hydrogen hub” projects will involve the use of fossil gas, which is about 95% methane, the most potent of greenhouse gasses on a 20-year time horizon – labeled “blue hydrogen.” Energy experts explain that “blue hydrogen” is a disaster at all levels. “Green hydrogen” is to be produced using renewable energy sources. Billions more in tax credits are available to hydrogen producers through the Inflation Reduction Act.

But no matter whether hydrogen is produced by fossil fuels or renewables, it cannot change its stripes. When hydrogen is burned, it pollutes the air, emitting oxides of nitrogen (NOx). In fact, the combustion of hydrogen emits six times as much NOx as burning methane. Nitrogen dioxide (NO<sub>2</sub>) and NOx are harmful gasses that negatively impact peoples’ lungs and heart and impair neurological development.

A recent report found that premature death associated with exposure to nitrogen dioxide (NO<sub>2</sub>) is more likely to occur with people of color, making this an unavoidable environmental justice issue, particularly considering that many hydrogen hub projects are planned for construction in environmentally overburdened communities. NOx also reacts with volatile organic compounds (VOC) in the atmosphere producing ozone (smog), which imposes additional serious health damage and worsens climate impacts.

It is ironic that the purported reason for developing hydrogen is to create energy that will reduce greenhouse gas emissions, helping to ameliorate the climate crisis. This is a false claim. Over a 10-year period, hydrogen has about 100 times more powerful warming effect than carbon dioxide (CO<sub>2</sub>). That’s

because the hydrogen molecule indirectly extends the lifetime of methane and other greenhouse gasses (GHGs).

Additionally, hydrogen is the tiniest molecule known and is extremely light, with a great potential for leaking. In processing about 4% of hydrogen is lost, contributing to global warming. Between hydrogen's global warming potential and its inevitable leakage over its full life cycle, the ginning up of hydrogen from the small applications that could be used by niche industries to the dramatic scale fueled by the Department of Energy spells climate disaster by increasing atmospheric warming when we are facing disastrous tipping points over the next decade. President Biden has set a goal of reducing the nation's greenhouse gas emissions by 50-52% below 2005 levels by 2030. Paradoxically, the "hydrogen shot" will fatally undermine this goal.

You would think that to counter these failings, hydrogen must be loaded with energy benefits. Just the opposite. The hydrogen production process consumes enormous amounts of water, uses so much energy to make that it is actually a net loss, and is very expensive. Hydrogen is not an efficient energy storage medium (batteries are superior) and does not perform efficiently in use (electric motors are superior). Handling and using hydrogen poses safety risks due its flammability and explosive properties, especially in populated regions. The tiny molecules not only leak out but also become lodged within steel pipelines and fittings, causing dangerous embrittlement of the metal. The wide use of hydrogen would require expensive and time-consuming infrastructure retrofitting and build out.

To reduce greenhouse gas emissions now on the scale and timeline required, the direct use of renewable and clean electricity and battery storage is far more efficient, affordable, and it's immediately available. The development of hydrogen, including so-called "green" hydrogen, misdirects funding that is urgently needed to support and produce truly clean, efficient, renewable and affordable greenhouse gas-free energy sources and systems such as wind, solar, that are urgently needed to replace polluting fuels and to meet critical climate goals.

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