

Green Hydrogen

By John Benson

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1. Introduction

Yes, I'm getting a bit **GREEN**, but I'm not sea-sick nor otherwise suffering from an illness. Although I've known about the title resource for some time, and have written the following posts that this interesting substance.

An Electrifying Chameleon (2022): Hydrogen: *That is what this post is about. It all started with an article about a new method to produce it that looks really promising. But then we got to the question of what "color" is the hydrogen it produces. I frequently use the terms **green hydrogen**, **gray hydrogen** and sometimes **blue hydrogen**. **Green hydrogen** is produced via electrolysis using renewable electricity, but what is renewable electricity?*

Various parties have invented other colors for hydrogen, but in my mind, this is a futile effort. There are a huge number of ways to produce hydrogen. Which of these has the best economics and/or produces the least GHG frequently depends on the production and evaluation methods. I will just say that hydrogen is a Chameleon, and it can be any color it wants to.

*This post will look at **green hydrogen**, and more specifically, the above question (what is renewable electricity?). Then it will look at the new method to produce hydrogen that I found.*

<https://energycentral.com/c/cp/electrifying-chameleon>

Hydro-Honda Gets Help from Trains (2023): *I frequently write about transportation. However, it is rarely that I see one flavor of the mobility-industry interact with a completely different flavor. Like, for instance, light road-going electric vehicles interacting with rail-vehicles. This is one of those times.*

In the past Honda has been enamored with hydrogen fuel-cell cars. Although they still are to a degree, they seem to be shifting some of their affection to other products in their corporate network.

I live in Livermore, CA. A few years ago, the City of Livermore (in Alameda County), the county to the east (San Joaquin) and other governmental agencies started a short commuter rail project (26 miles long) called Valley Link. This rail link will connect the Altamont Corridor Express to the Bay Area Rapid Transit System.

*A major part of Valley Link is a solar powered **green-hydrogen** production facility in Tracy (Just east of the Altamont Pass in San Joaquin County in California's Central Valley). This will fuel the Valley Link trains, local hydrogen-fueled busses, and other hydrogen fueling facilities, perhaps including those that fuel light vehicles.*

California currently has only 63 operating light duty vehicle (LDV) hydrogen refueling stations, and 29 additional planned LDV hydrogen refueling stations. None of these are currently in the Livermore or San Joaquin Valleys.

<https://energycentral.com/c/ec/hydro-honda-gets-help-trains>

Developments in Hydrogen Production (2024): Many have advocated a major role for green hydrogen in reducing greenhouse gas (GHG) emissions, and thus mitigating climate change. I posted the paper summarized and linked in this post a couple of months ago. In this paper I looked at the economics of green hydrogen vs. many applications that could reduce their GHG emissions by using this gas.

In this post we examine electrolyzer technologies, and major manufacturers of hydrogen electrolyzers, mostly those that are based in the U.S.

<https://energycentral.com/c/ec/developments-hydrogen-production>

2. New Information

In the last few days as I'm starting to write this post, I have found two new sources regarding the title substance substance. These are referenced in the footnote below,¹ and inserted immediately below.

SACRAMENTO – Gov. Gavin Newsom on Monday night signed Sen. Jerry McNerney's SB 1350, groundbreaking legislation that significantly expands the use of green hydrogen, a clean-energy gamechanger.

SB 1350 allows natural gas power plants to use hydrogen made from renewable resources like wind and solar under California's world-leading clean energy standards as the facilities transition away from fossil fuels.

Under current state law, using green hydrogen in a natural gas power plant does not qualify as a clean energy source under California's Renewables Portfolio Standard. RPS requires utilities to procure 60% of their electricity portfolio from qualified clean energy sources by 2030.

SB 1350 would ensure that the use of green hydrogen in a natural gas power plant also qualifies for RPS credit if it meets clean energy standards, including:

- Green hydrogen can only be produced by state-certified renewable sources
- At least 20% of the fuel used in the facility must be green hydrogen
- The use of green hydrogen must reduce air pollution from the electrical sector.

SB 1350 won unanimous approval in the state Senate earlier Monday (June 29) on a vote of 38-0, after the state Assembly approved the bill on a 74-0 vote. SB 1350 takes effect immediately and is the first such law in the nation.

"California is a world leader in clean energy thanks to solar and wind power and large-scale battery storage. But we won't achieve 100% renewable energy by 2045 by relying on those sources alone. SB 1350 adds green hydrogen to the mix," Sen. McNerney said. "Green hydrogen will help us meet our climate goals, and it will protect good-paying jobs throughout the state."

¹ Senator Jerry McNerney in your authors State Senator and Represents California's District, including Livermore where I reside. Jerry McNerney Press Release, "Gov. Newsom Signs Sen. McNerney's Bill to Boost Green Hydrogen, a Clean-Energy Gamechanger," June 30, 2026,

https://sd05.senate.ca.gov/news/gov-newsom-signs-sen-mcnerneys-bill-boost-green-hydrogen-clean-energy-gamechanger?utm_campaign=senator-mcnerney-sd-5-bills-awaiting-the-governors-signature&utm_medium=email&utm_source=E-Update&utm_content=link

Bill Gates, Gates Notes, "The next generation of electricity is almost here" March 23, 2026

https://www.gatesnotes.com/home/home-page-topic/reader/the-next-generation-of-electricity-is-almost-here?WT.mc_id=20260302300000_Fervo_Electricity_TGN-Pbing&msclkid=ef6495c3025310624c7fff6288385b19

"With SB 1350 now signed into law, California is reinforcing its commitment to innovation, clean energy, and economic development," said Assemblymember Juan Carrillo, D-Palmdale, principal co-author of SB 1350. "I was proud to serve as a principal co-author of this legislation because I've seen firsthand how hydrogen investment is transforming communities like in my district in Lancaster, which has become a global leader in hydrogen development through California's first public hydrogen utility. With the Governor's signature today, we're ensuring California remains at the forefront of hydrogen innovation." SB 1350 was co-sponsored by the Green Hydrogen Coalition and State Building and Construction Trades Council.

Author's comment: Lancaster is a community about 50 miles north of Los Angeles within the Antelope Valley region with a population of around 175,000. City leaders set the goal of becoming the nation's first Net-Zero municipality, wherein the city would produce more clean energy than it consumes. Much of the city's infrastructure including City Hall, local schools, and the minor league baseball stadium are solar-powered. In March 2013, Lancaster became the first city in the USA to require solar panels on all new homes in an effort to make the community more carbon neutral. The rule took effect in January 2014.

"Governor Newsom's signing of SB 1350 is a landmark step toward securing California's clean energy future," said Janice Lin, founder and president of the Green Hydrogen Coalition. "By recognizing the critical role that renewable hydrogen can play in providing reliable, zero-carbon electricity, this legislation gives utilities, developers, and investors the confidence to move forward with the next generation of dispatchable clean power."

"We thank Senator McNerney for his leadership in championing SB 1350 and its technical fix to the Renewable Portfolio Standard Guidebook," said Chris Hannan, president of the State Building and Construction Trades Council. "By enabling electricity generated using qualifying hydrogen, SB 1350 will support new production opportunities in California. This expanded hydrogen supply will help decarbonize hard-to-abate sectors and create thousands of union construction jobs."

3. The Next Generation of Electricity is Almost Here

Greetings from the Lone Star State! I'm in Texas this week for the Breakthrough Energy Ventures Investors Summit. This is one of the best places in the world to see the future of energy, and I can't wait to see how much progress has been made since my last visit.

Author's comment: Although Mr. Gates discusses three subjects in the post referenced under footnote 1 on page 2, reference 2, and none is "green hydrogen," one is "geologic hydrogen", which is a flavor of green hydrogen, and in one way, it is better than hydrogen produced through electrolysis using renewable energy – it already exists. Geologic hydrogen is naturally produced underground, and like natural gas it can be obtained by drilling wells. However, in another way it is not renewable: geologic hydrogen's supply is limited, whereas electrolysis-produced green hydrogen is only limited by the availability of renewable electricity, and thus it is truly "renewable."

There's a lot on the agenda this week, but I'm especially excited to talk about electricity breakthroughs. By 2050, the world will need nearly three times as much power as we use today—and if we're going to decarbonize the economy, we'll have to electrify a lot of things that currently use fossil fuels. That means we need to deliver a huge amount of energy in a clean, reliable, and affordable way.

Geologic Hydrogen: *Hydrogen shows great promise as an energy source, and the discovery of geologic hydrogen is one of the biggest energy surprises of the past decade. Although it's the earliest stage technology on this list, I'm excited about its potential. Geologic hydrogen is a zero-emission power source that is continuously generated underground by the Earth itself. Bourakébougou, a village in Mali, is powered by the small hydrogen field it sits on top of, and researchers have found deposits in the U.S., France, and other places.*

This is an unusual technology to talk about because it's hard to predict a timeline. It could take decades before geologic hydrogen becomes commercially viable at scale—or a company like Koloma or Mantle8² could find a massive deposit tomorrow, and then we're off to the races. Once we find one really good source, it'll be much easier to find the second because we'll know exactly what we're looking for.

If I could hop in a time machine and see what the future looks like a few decades from now, I would expect to see this technology generating a significant chunk of the world's power.

It's amazing to see so much progress being made in so many different areas, because it means that we'll have options for how we generate affordable, reliable, clean electricity at the scale the future demands.

² See <https://www.koloma.com/> & <https://mantle8.com/>