

Energy Sources for Electric Generation.

Until fusion is perfected for commercial use, there are only a few sources of energy available to produce electricity or steam. Natural gas, coal and petroleum produce about 60% of our electricity. Non-GHG producing sources, nuclear and renewables, produce about 40% of our electricity.

Energy Sources of Electric Generation
2020

- **Natural Gas:** about 40% of U.S. electricity generation in 2020.
- **Nuclear:** about 20% of U.S. electricity generation in 2020.
- **Coal:** the third-largest energy source for U.S. electricity generation in 2020 about 19%.
- **Petroleum:** less than 1% of U.S. electricity generation in 2020.
- **Renewables:** the source of about 20% of total U.S. electricity generation in 2020.
 - **wind:** 8.4%
 - **hydroelectric:** 7.3%
 - **solar:** 2.3%
 - **biomass:** 1.4%
 - **geothermal:** 0.5%

Source: EIA.gov

WHAT ABOUT HYDROGEN? See next pages...

Petroleum is a minor source for electrical generation although it is the primary energy source for the transportation sector.

Non-GHG producing sources, nuclear and renewables, produce about 40% of our electricity. Nuclear waste is a problem yet to be solved although Europeans and others are doing a better job than the US in reusing/recycling their waste thereby reducing their disposal volumes. Renewables contributions are growing and continue to be supported by federal incentives and technological advances.

Hydrogen is a growing source of vehicle power. Other industrial applications are emerging. Nuclear fusion is a great answer, but not now.

From...energy.gov, Hydrogen and Fuel Cell Technologies Office

Hydrogen Production Pathways



CCUS: carbon capture, utilization, and storage; **SMR:** steam methane reforming; **ADG:** anaerobic digester gas; **STCH:** solar thermochemical hydrogen.

PEC: photoelectrochemical

The U.S. Department of Energy (DOE) is focused on developing technologies that can produce hydrogen at \$2/kg by 2025 and \$1/kg by 2030 via net-zero-carbon pathways. This is in direct support of the Hydrogen Energy Earthshot goal of reducing the cost of clean hydrogen by 80% to \$1 per 1 kilogram in 1 decade ("1 1 1"). To reach these goals, the program looks at a wide portfolio of processes over a range of time frames.

Currently, most hydrogen in the United States is produced by large-scale natural gas reforming without carbon capture and storage. This established technology has been shown to be able to reach the cost targets; however, the goal is to reach the cost target via low-carbon pathways. To produce hydrogen economically and via net-zero-carbon pathways, DOE supports the research and development of a wide range of technologies.

In the near- and mid-term, electrolysis pathways (where electricity is used to split water into hydrogen and oxygen) are anticipated to begin reaching the cost targets.

In the mid- to long-term, innovative approaches, such as those using waste streams and others based on solar energy, are expected to become viable.

LINK: <https://www.energy.gov/eere/fuelcells/hydrogen-production-pathways>

From...CANARY MEDIA...

The biggest green hydrogen hub in the **US** could be coming soon to Mississippi.

Hy Stor Energy wants to use renewables to produce hydrogen in the oil and gas industry's heartland.

LINK: <https://www.canarymedia.com/articles/hydrogen/the-biggest-green-hydrogen-hub-in-the-us-could-be-coming-soon-to-mississippi>

19 October 2021

From CT.org: Hydrogen is an important part of America's comprehensive energy program.



(Fabian Sommer/Picture Alliance via Getty Images)



[Jeff St. John](#)

The **United States** could see its biggest green hydrogen hub by far up and running in Mississippi by **2025** — if a team of former natural-gas storage developers and a major Canadian energy infrastructure developer can pull off their plans.

On Tuesday, **Hy Stor Energy** announced that it intends to build a green hydrogen production and storage complex that could match the large size of such projects being **constructed in Europe**. By **2025**, the first phase of the project could be making **110,000** metric tons of green hydrogen per year and storing more than **70,000** metric tons of it in underground salt caverns.

Read the rest of the story at: <https://www.canarymedia.com/articles/hydrogen/the-biggest-green-hydrogen-hub-in-the-us-could-be-coming-soon-to-mississippi>

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Hydrogen Brings New Hope to an Old Industry Titan.

Thyssenkrupp planning minority IPO of electrolyzer business that can be repurposed to serve production of potential wonder fuel.

By

Rochelle Toplensky

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Spinning trendy green assets out of venerable industrial companies at high valuations is a strategy that often [sounds better in theory than in practice](#). But Thyssenkrupp 's promising hydrogen business could be an exception.

On Thursday, the German company best known for steel production gave investors a closer look at a 66%-owned joint venture long buried within its conglomerate structure: Uhde Chlorine Engineers, now rebranded as Thyssenkrupp Nucera. The unit has long been making chlorine electrolyzers, which generate hydrogen as a byproduct. A product redesign means its existing facilities can now crank out one gigawatt annually of green-hydrogen electrolyzers at competitive costs to be installed and serviced by its existing network.

LINK: https://www.wsj.com/articles/hydrogen-brings-new-hope-to-an-old-industry-titan-11642097502?mod=hp_minor_pos20