

This copy is for your personal, non-commercial use only. To order presentation-ready copies for distribution to your colleagues, clients or customers visit <https://www.djreprints.com>.

<https://www.wsj.com/articles/hydrogens-dirty-little-secret-11602155800>

HEARD ON THE STREET

Hydrogen's Dirty Little Secret

Most of this emission-free gas is currently produced using fossil fuels, and a lot of work is required to clean it up



A man fills the hydrogen tank of a car on July 8, the inauguration day of a hydrogen-filling station in Les Mans, France.

PHOTO: JEAN-FRANCOIS MONIER/AGENCE FRANCE-PRESSE/GETTY IMAGES

By [Rochelle Toplensky](#)

Oct. 8, 2020 7:16 am ET



Listen to this article

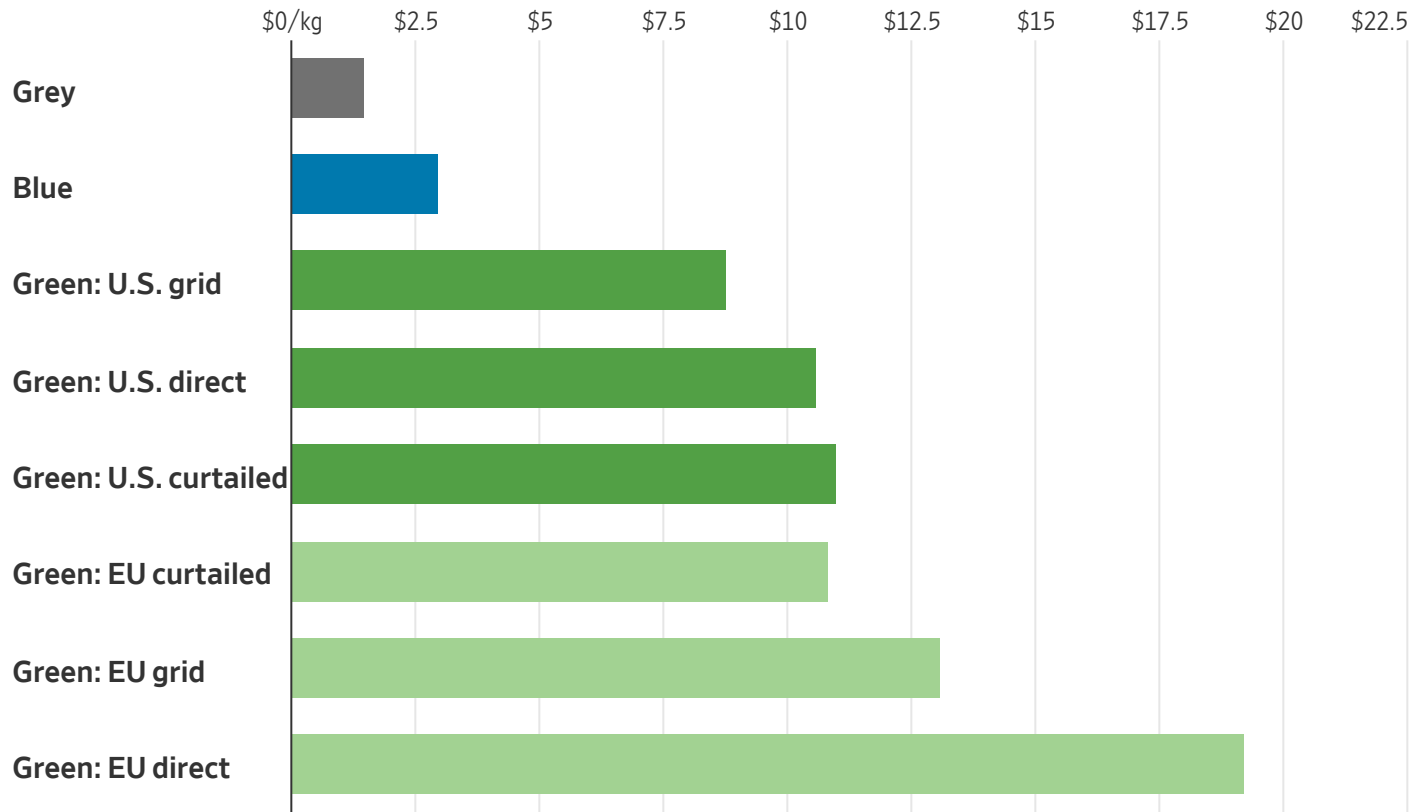
4 minutes

Despite all the [hype over green hydrogen](#), most of the gas supplied now is decidedly not green. The path to cleaning it up is long.

Hydrogen announcements are coming thick and fast. This week alone, hydrogen-powered double-decker buses arrived in Aberdeen, Britain's oil capital; Hyundai delivered seven fuel-cell hauling trucks to Switzerland; and Toyota partnered with Hino to develop its own hydrogen-powered big rigs for the U.S.

Using hydrogen in a fuel-cell vehicle doesn't create emissions, but producing it can. That means green credentials for all these projects rely on the availability of clean hydrogen fuel. In the short run this is very limited. There are currently plans for more than 60 gigawatts of green hydrogen production globally, but less than half will be available by 2035, say researchers at Rystad Energy. Making the gas currently generates more carbon emissions globally than the airline industry, according to Bank of America.

Median production costs of hydrogen



Grey: made with gas; Blue: gas & carbon capture; Green: renewable energy, which can be a) connected direct to the H2 producer b) taken from the electricity grid, or c) excess electricity that would be curtailed.

Source: International Council on Clean Transportation, Liberum

Colors denote how hydrogen is produced. Green versions are made by electrolyzing water using renewable energy—wind, solar or biomass. Grey uses natural gas, which becomes blue if the carbon dioxide is captured and stored. Right now, in most places, green hydrogen is much more expensive to produce, costing between \$9 to \$19 a kilogram, according to an International Council on Clean Transportation study. That compares with \$3/kg for blue and \$1.50/kg for gray, according to Adam Collins at brokerage Liberum Capital.

NEWSLETTER SIGN-UP

Markets

A pre-markets primer packed with news, trends and ideas. Plus, up-to-the-minute market data.

PREVIEW

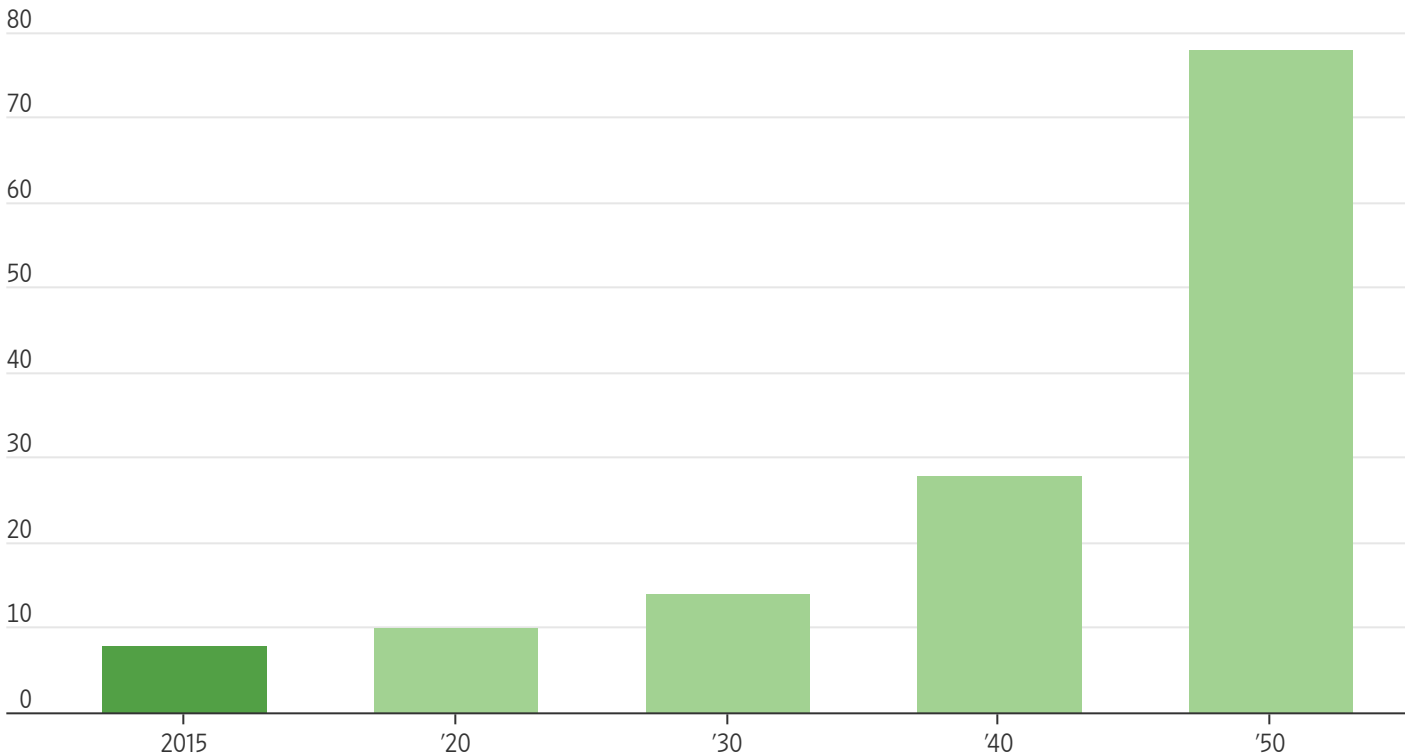


SUBSCRIBE

Whatever the color, making hydrogen is energy-intensive and power accounts for most of the production costs. The competitiveness of the different production methods will therefore depend on how local prices of power, gas and carbon evolve. The cost of green hydrogen is expected to halve by 2030 as the technology is scaled up and renewables become more plentiful.

Global energy demand supplied by hydrogen*

90 Exajoules



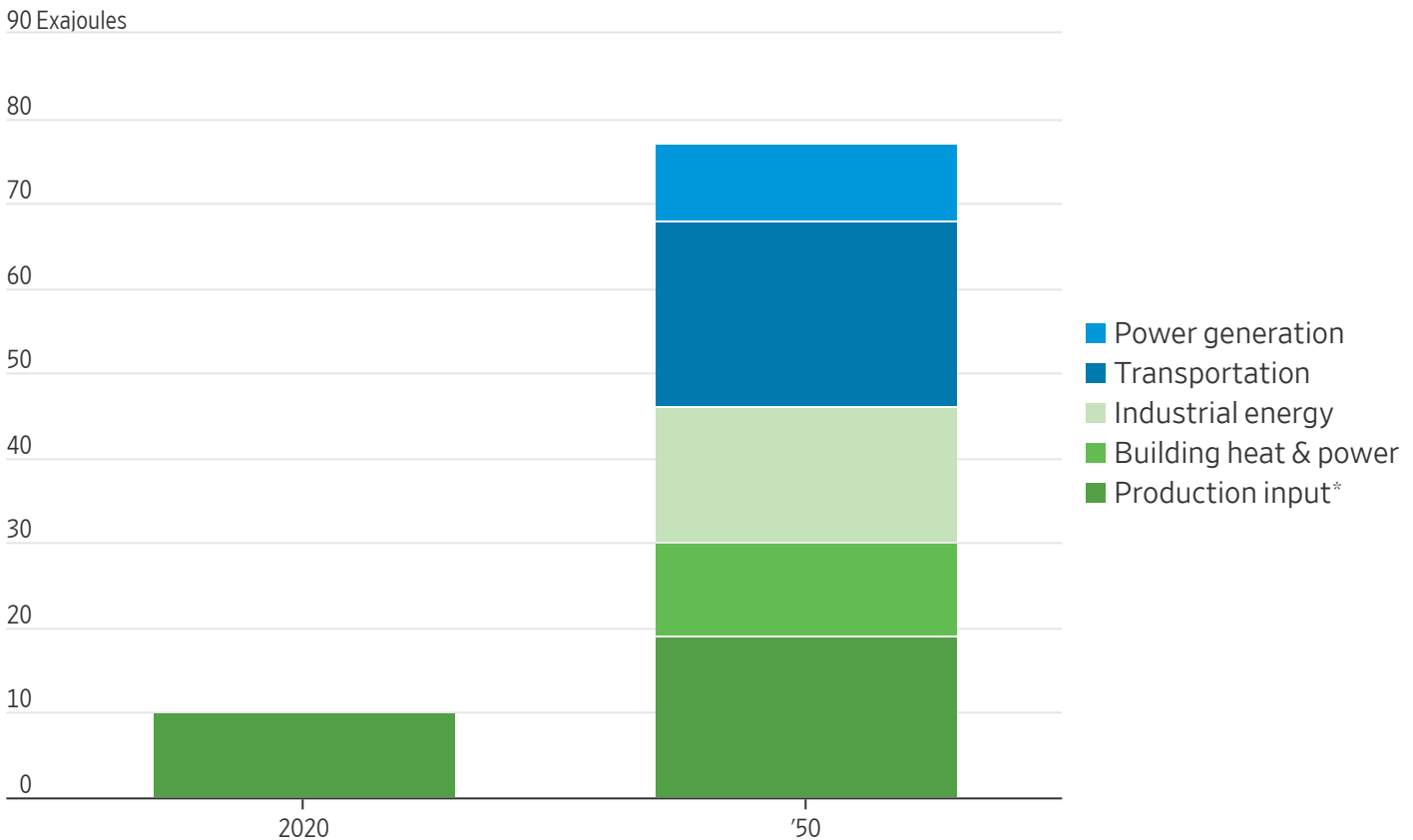
* actual for 2015, projections from 2020.

Source: Hydrogen Council Scaling Up report

Three industrial gas giants— [Air Liquide](#), [Air Products](#) and Linde—currently supply most of the world's hydrogen fuel, nearly all of it gray. It is a small business line for them, supplying mostly refineries and ammonia makers. However, the Hydrogen Council estimates usage of the gas could increase nearly seven fold by 2050.

Gray hydrogen is likely to dominate at the start. To reach anything near those growth ambitions while meeting climate goals, however, both green and blue hydrogen will be needed in abundance. Local resources influence the color chosen: Green will be more cost-effective in windy Northern Europe or sunny Australia, while the gas-rich Middle East, Russia and the U.S. will likely focus on blue.

Global energy demand supplied by hydrogen, by sector



* Feedstock for existing and new uses

Source: Hydrogen Council Scaling Up report

This year, governments have promised billions of dollars to develop hydrogen, much of it with green strings attached. The gas promises to help increase their energy independence and clean up a range of hard-to-decarbonize sectors, such as steel, cement, aviation, and long-haul transport.

Big rigs and buses are likely to be the first market to mature as they scramble to meet tightening emission standards. Hydrogen-powered trains are being tested in Europe. Heavy industries are testing hydrogen in anticipation of higher carbon prices. Even Airbus recently announced long-term plans to build hydrogen-power planes.

Such demonstration projects are getting bigger and appearing in a wider range of industries. However, it will be years before many reach an industrial scale, and their capacity to reduce emissions depends heavily on the evolving technology for hydrogen production. Clean versions of the gas do hold great promise, but there are quite a few stops along the way.

Write to Rochelle Toplensky at rochelle.toplensky@wsj.com

Appeared in the October 9, 2020, print edition as 'Hydrogen Has a Long Way to Go to Be Green.'

Copyright © 2020 Dow Jones & Company, Inc. All Rights Reserved

This copy is for your personal, non-commercial use only. To order presentation-ready copies for distribution to your colleagues, clients or customers visit <https://www.djreprints.com>.