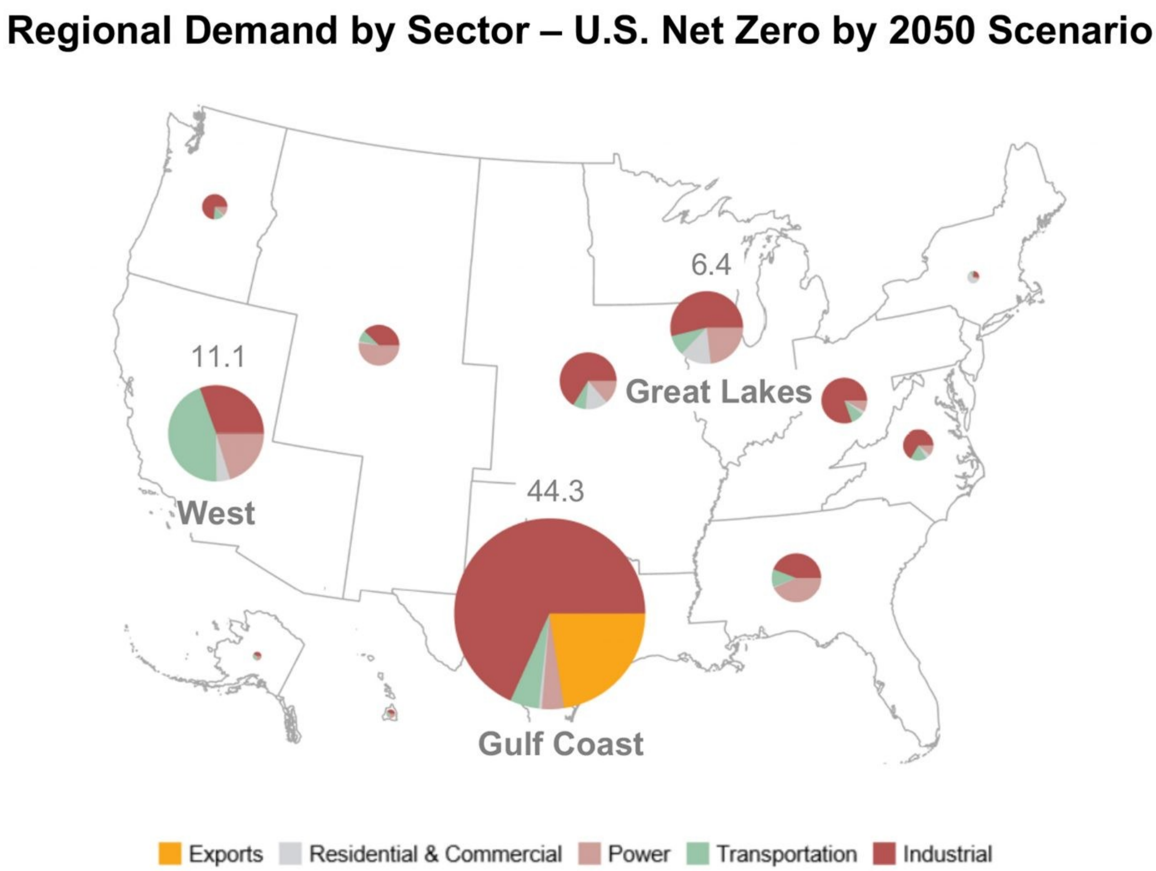
The Texas Hydrogen Industry Needs Water, New Study Provides Details on How Much

MARCH 5, 2025

| Twitter (https://twitter.com/intent/tweet?text=The%20Texas%20Hydrogen%20Industry%20Needs%20Water,%20New%20Study%20Provides%20Details%20on%20How%20Much&url=https%3A%2F%2Fwww.jsg.utexas.edu%2Fnews%2F2025%2F03%2Fthe-texas-hydrogen-industry-needs-water-new-study-provides-details-on-how-much%2F)

| Facebook (https://www.facebook.com/sharer/sharer.php?u=https%3A%2F%2Fwww.jsg.utexas.edu%2Fnews%2F2025%2F03%2Fthe-texas-hydrogen-industry-needs-water-new-study-provides-details-on-how-much%2F)

| LinkedIn (https://www.linkedin.com/shareArticle?mini=true&url=https%3A%2F%2Fwww.jsg.utexas.edu%2Fnews%2F2025%2F03%2Fthe-texas-hydrogen-industry-needs-water-new-study-provides-details-on-how-much%2F&title=The%20Texas%20Hydrogen%20Industry%20Needs%20Water,%20New%20Study%20Provides%20Details%20on%20How%20Much)



(https://www.jsg.utexas.edu/news/files/hydrogen-demand-in-2050_mck-2-scaled.jpg)

The Gulf Coast is projected to need 44.3 million metric tons of hydrogen per year by 2050 in a net-zero emissions scenario, according to a study by the National Petroleum Council. Producing that hydrogen requires a lot of water. Credit: National Petroleum Council.

There are many ways to make hydrogen — a carbon-free energy source and petrochemical ingredient. But no matter the method, all hydrogen production requires a lot of water.

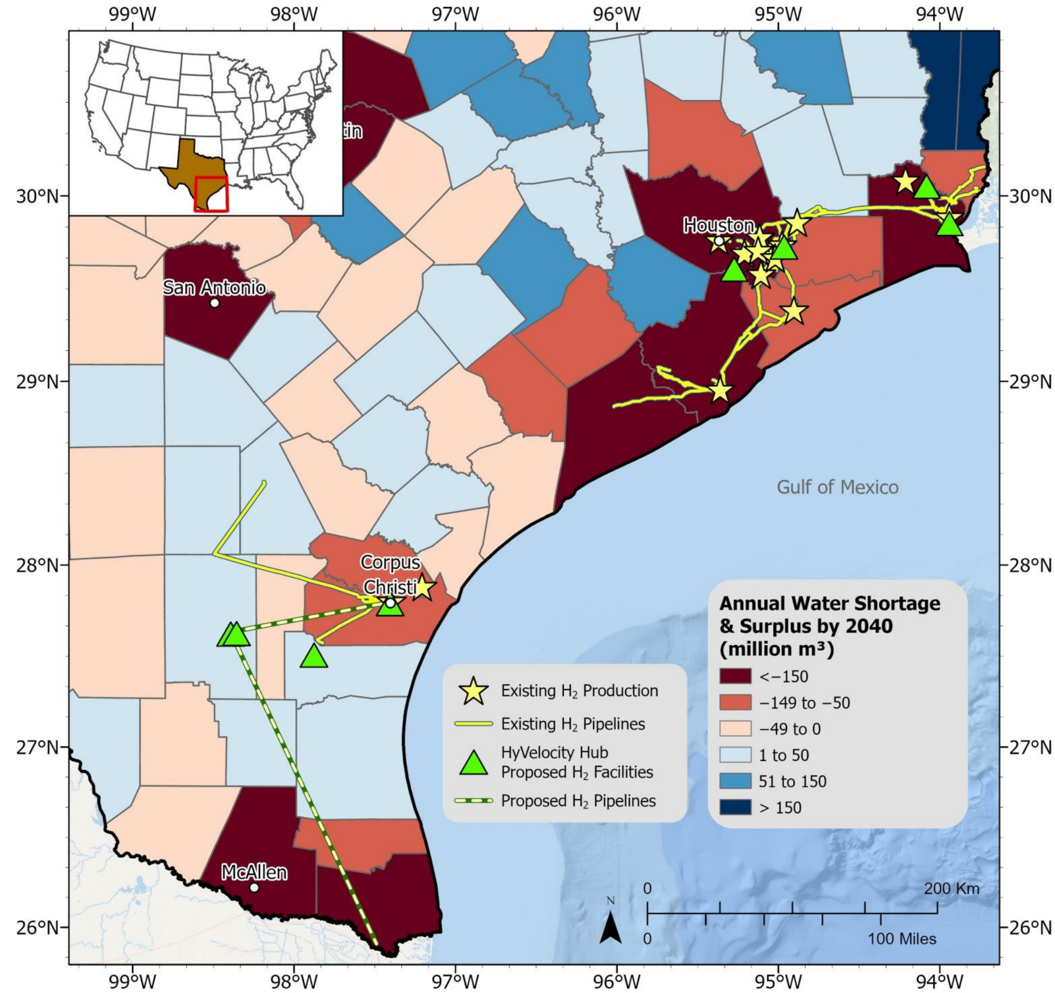
In a recent study, researchers from The University of Texas at Austin examined just how much water the growing Texas hydrogen economy might need. They found that by 2050 new hydrogen production facilities could account for 2–6.8% of water demand in the state.

In comparison to big water draws, such as irrigation or municipal use, hydrogen's demand is relatively small, said the study's lead author Ning Lin, an energy economist at UT's Bureau of Economic Geology. But it has the potential to disproportionately affect communities that face future water issues.

This includes the Gulf Coast, where most current hydrogen infrastructure is built and where most new hydrogen infrastructure is planned. The State Water Plan projects this region to face large annual shortages of fresh groundwater by 2040.

"Where you put a project can make a huge difference locally," Lin said. "With multiple hydrogen facilities planned in water-stressed Gulf Coast counties, this study highlights the urgent need for integrated water and energy planning and provides a solid foundation to help policymakers, industry, and communities make informed decisions about hydrogen and water management," she said.

The research was published in the journal *Sustainability (https://*



(https://www.jsg.utexas.edu/news/files/hydrogen-plant-map-scaled.jpg)

Existing and proposed hydrogen infrastructure as of 2024 in the Gulf Coast region of Texas overlaying projected water needs by 2040 per county. Credit: Lin et al.

www.mdpi.com/2071-1050/17/2/385).

Eight new hydrogen production facilities are planned for the Gulf Coast and in South Texas as part of the HyVelocity Hub project, a collaboration between industry, academia and non-profits that seeks to build up the hydrogen economy in Texas.

To estimate future water demand, Lin and her colleagues used data from a 2024 National Petroleum Council study that estimated the regional hydrogen demand from 2030–2050 based on two policy scenarios: a net-zero scenario and a stated policy scenario.

The UT researchers examined the water requirements from all aspects of hydrogen production, including water used for cooling. They also examined the water needed for different mixes of "blue hydrogen" and "green hydrogen." Green hydrogen is produced from water using electricity without carbon dioxide emissions. Blue hydrogen produces emissions and is made by burning natural gas. It can be made low-carbon by trapping its emissions underground using carbon capture and storage technology.

Based on a 50:50 mix of blue and green hydrogen, the researchers determined that water demand for net-zero hydrogen is about 3.4 times more than status-quo hydrogen: 6.8% compared to 2%. Much of the additional water demand is associated with capturing and storing the carbon dioxide emissions from blue hydrogen production.

"Decarbonization is expensive," Lin said. "You don't get rid of carbon for free."

As part of the study, the researchers also provide an overview of water use and water quality for a range of production methods, which affects whether water left over after hydrogen production can be recycled.

For example, green hydrogen production requires ultrapure water that undergoes extensive filtering, so leftover water could be potentially returned to the water supply without much treatment. Blue hydrogen doesn't have as high of purity requirements for incoming water. But the leftover water it produces usually requires more treatment.

Lin said that by taking stock of different water needs and requirements, both communities and companies can understand the potential options available to them.

Robert Mace, the Executive Director of the Meadows Center for Water and the Environment at Texas State University, said the hydrogen water requirements described in the paper are substantial and that the study could help with future planning.

"In order to plan for water needs, somebody has to figure out what those future demands might look like, and this paper puts some numbers to that that, I think, will be very helpful," said Mace, who was not part of the study.

The study was co-authored by Mariam Arzumanyan, Edna Rodriguez Calzado and Jean-Philippe Nicot. They are all researchers at the Bureau of Economic Geology, a research unit at the UT Jackson School of Geosciences.

The study was funded by the bureau's State of Texas Advanced Resource Recovery (https://starr.beg.utexas.edu/) research group and the GeoH2 (https://geoh2.beg.utexas.edu/) research consortia.

For more information, contact: Anton Caputo (mailto:anton.caputo@jsg.utexas.edu), Jackson School of Geosciences, 210-602-2085; Monica Kortsha (mailto:mkortsha@jsg.utexas.edu), Jackson School of Geosciences, 512-471-2241; Constantino Panagopulos (mailto:costa@ig.utexas.edu), University of Texas Institute for Geophysics.

Tags: Bureau of Economic Geology (https://www.jsg.utexas.edu/news/tag/bureau-of-economic-geology/), energy transition (https://www.jsg.utexas.edu/news/tag/energy-transition/), GeoH2 (https://www.jsg.utexas.edu/news/tag/geoh2/), hydrogen (https://www.jsg.utexas.edu/news/tag/hydrogen/), Ning Lin (https://www.jsg.utexas.edu/news/tag/ning-lin/)

News (https://www.jsg.utexas.edu/news)

Media Releases (https://www.jsg.utexas.edu/news/releases/)

Dean's Office (https://www.jsg.utexas.edu/news/deans-office/)

Blogs (https://www.jsg.utexas.edu/news/blogs/)

Scientist Profiles (https://www.jsg.utexas.edu/news/scientist-profiles/)

Newsletter (https://www.jsg.utexas.edu/news/newsletter/)

The Geoscientist (https://www.jsg.utexas.edu/news/the-geoscientist/)

Advancing Excellence (https://www.jsg.utexas.edu/news/advancing-excellence/)

Media Contacts & Communications Resources (https://www.jsg.utexas.edu/about/offices/communications/)

Media Releases

Select Month

< OLDER POST (HTTPS://WWW.JSG.UTEXAS.EDU/NEWS/2025/03/NEW-DIRECTOR-FOR-THE-BUREAU-OF-ECONOMIC-GEOLOGY/)

NEWER POST > (HTTPS://WWW.JSG.UTEXAS.EDU/NEWS/2025/03/RESEARCHERS-QUANTIFY-THE-WAY-RIVERS-BEND-OPENING-UP-THE-POSSIBILITY-FOR-IDENTIFYING-ORIGINS-OF-CHANNELS-ON-OTHER-PLANETS/)

TEXAS Geosciences
The University of Texas at Austin
Jackson School of Geosciences (/)

Mailing Address
Jackson School of Geosciences
2305 Speedway Stop C1160
Austin, TX 78712-1692

Phone
(512) 471-6048

SUPPORT JSG (/ALUMNI/SUPPORT/WAYS-TO-GIVE/)

Departments & Units

Department of Earth and Planetary Sciences (https://eps.jsg.utexas.edu/)

Bureau of Economic Geology (https://www.beg.utexas.edu/)

Institute for Geophysics (https://ig.utexas.edu/)

Administration & Offices

College Leadership (/about/leadership/)

Career Services (/careers/)

Business Services (/about/offices/business-services)

Development and Alumni Relations (/alumni/)

Office of Communications (/about/offices/communications/)

Information Technology Office (/about/offices/information-technology/)

Helpful Links

UT Austin (http://www.utexas.edu)

UT Direct (https://utdirect.utexas.edu)

Emergency Information (http://emergency.utexas.edu)

IT Help (/help)

Jackson School Directory (/people)

Jackson School Profiles (https://apps.jsg.utexas.edu/profiles)

Contact Us (/about/contacts/)

(https://www.facebook.com/UTJSG) (https://x.com/txgeosciences) (https://www.youtube.com/user/JSGUTAUSTIN) (https://www.instagram.com/txgeosciences/)

Web Privacy (https://cio.utexas.edu/policies/web-privacy) | Web Accessibility Policy (https://cio.utexas.edu/policies/web-accessibility) | Adobe Reader (https://get.adobe.com/reader/)