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## Alabama

### DEPLOYMENT: Birmingham, AL

Air Liquide is building and operating a hydrogen fueling station in Birmingham.

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UAB developed a hydrogen-fuel-cell bus operated in Birmingham-Jefferson County.

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General Motors and Autocar Industries signed a joint development agreement to create a range of zero-emissions heavy-duty vehicles powered by GM's Hydrotec power cubes. The heavy-duty trucks are expected to go into production in 2026 at the Autocar plant in Birmingham, Alabama.

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### DEPLOYMENT: Huntsville, AL

Air Products and Linde signed a deal to supply NASA with roughly 15 million pounds of liquid hydrogen for a variety of its facilities in Alabama, Mississippi, Ohio, and Florida.

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### DEPLOYMENT: McIntosh, AL

Linde announced plans to build a new hydrogen plant in Washington County as part of an \$83 million growth project in the region. The plant is expected to start operations in 2024.

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### DEPLOYMENT: Montgomery, AL

Alabama State University currently has the world's first hydrogen fuel cell sport utility vehicle, the Hyundai NEXO.

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Hyundai Motor Group building electric vehicles including hydrogen refueling stations as part of \$7.4 B investment, some made in Montgomery.

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### DEPLOYMENT: Opelika, AL

Hanwha Cimarron is building a manufacturing plant for its carbon fiber-wrapped hydrogen storage tanks in the Northeast Opelika Industrial Park.

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### DEPLOYMENT: Theodore, AL

Chart Industries producing bulk hydrogen storage tanks in Mobile County.

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## DEPLOYMENT: Tuscaloosa, AL

Mercedes-Benz utilizing Plug Power at Tuscaloosa, AL plant.

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## RESEARCH: Tuscaloosa, AL

University of Alabama granted DOE grant for advancing hydrogen gas turbines for use in electricity generation.

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## RESEARCH: General

Gas Technology Institute (GTI) is leading a study to demonstrate the use of hydrogen as a means of long-term energy storage at a natural gas combined cycle power plant operated by Southern Company subsidiary Alabama Power.

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## OPPORTUNITY: General, AL

The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

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## Alaska

### OPPORTUNITY: Aleutian Islands, AK

A working paper from the International Council for Clean Transportation (ICCT) found that hydrogen-powered ships could generate substantial and diversified demand for liquid hydrogen at Aleutian Islands ports.

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### DEPLOYMENT: Anchorage, AK

Universal Hydrogen signed a letter of intent (LOI) with Ravn Alaska, an Anchorage-based regional airline, committing to purchasing five of Universal Hydrogen's conversion kits that will integrate the company's modular hydrogen capsule technology and hydrogen powertrain into Ravn's growing regional turboprop fleet.

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Alaskan Airline Ravn Alaska ordered 30 of ZeroAvia’s hydrogen-electric engines and announced a partnership with Edmonton International Airport to bring hydrogen flight to Canada.

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## OPPORTUNITY

Future Hydrogen Production in Alaska.

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Alaska Governor Mike Dunleavy signed an administration order to create the Office of Energy Innovation. The office will develop policies to support alternative energy development in Alaska. In his proclamation, Dunleavy specifically points to hydrogen as an industry where Alaska can lead.

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Governor of Alaska Mike Dunleavy wrote an op-ed highlighting Alaska’s potential to accelerate commercial-scale clean hydrogen production.

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During his State of the State address, Governor of Alaska Mike Dunleavy said that the state is ready to “unlock” north slope natural gas to boost hydrogen production.

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## Arizona

### DEPLOYMENT: Casa Grande, AZ

Air Products has said will it develop a 10 metric ton per day liquid hydrogen plant to support zero-emissions mobility in California that will be operational by 2023.

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### DEPLOYMENT: Coolidge, AZ

Nikola Corp. factory in Coolidge producing electric and hydrogen powered heavy trucks.

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Nikola has launched its hydrogen fuel cell electric vehicle (FCEV) at its manufacturing facility in Coolidge, Arizona, the US.

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Nikola produced 42 and sold 35 Class 8 Nikola hydrogen fuel cell electric vehicles (FCEVs) in 2023. The FCEV commenced serial production on July 31, 2023, with the commercial launch on September 28.

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### DEPLOYMENT: La Paz County, AZ

# HYDROGEN FORWARD

The Department of the Interior's Bureau of Land Management (BLM) awarded exclusive right to lease an area within the Brenda Solar Energy Zone (SEZ) to Heliogen in order to build a 20,000-tonne green hydrogen production plant.

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## DEPLOYMENT: Litchfield Park, AZ

Arizona Hydrogen Manufacturing, Inc located in Litchfield Park.

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## DEPLOYMENT: Palo Verde, AZ

Idaho National Laboratory is partnering with PNW Hydrogen to use a low-temperature electrolysis system to produce clean hydrogen fuel from electricity generated by the Palo Verde Generating Station. The DOE is contributing \$20 million in funding through its Earthshot Initiative.

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## DEPLOYMENT: Phoenix, AZ

Air Liquide plans to invest nearly 60 million U.S. dollars to build, own and operate onsite plants and systems at a new manufacturing site in Phoenix, Arizona, in support of a long-term agreement to supply ultra-high purity hydrogen, helium, and carbon dioxide to one of the world's largest semiconductor manufacturers.

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PNW Hydrogen LLC will produce clean hydrogen from nuclear power at the Palo Verde Nuclear Generating Station in a project through the DOE's H2@Scale and Hydrogen Shot Programs.

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Nel will become Fortescue's supplier for their 80 MW electrolyzer, for a total consideration of about USD 20 million, at their Phoenix Hydrogen Hub.

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## DEPLOYMENT: Scottsdale, AZ

United Energies Development Corporation is constructing the patented Photovoltaic and Electrolyzer hybrid facility in Scottsdale.

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## RESEARCH: Scottsdale, AZ

Arizona State University: HydroGEN Seedling: Mixed Ionic Electronic Conducting Quaternary Perovskites, Materials by Design for Solar Thermochemical Hydrogen.

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## RESEARCH: Tempe, AZ

Southwest Gas announced a pilot project to determine the optimal blend of hydrogen and natural gas for safety and the environment, including the physical impacts of hydrogen on distribution system infrastructure and common gas appliances.

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Southwest Gas Corporation signed agreements with the University Nevada, Las Vegas (UNLV) and the Arizona State University in Tempe (ASU) to conduct a study to see how hydrogen-blended natural gas can further reduce carbon emissions while still providing clean and reliable energy without disrupting the daily routines of customers.

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## RESEARCH: Tonopah, AZ

Palo Verde Generating Station is expected to demonstrate a low-temperature electrolysis system and begin producing hydrogen by 2024, pending award negotiations between the DOE's Office of Energy Efficiency & Renewable Energy (EERE) and project developers PNW Hydrogen and Arizona Public Service (APS).

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## DEPLOYMENT: Tucson, AZ

Caterpillar will utilize renewable hydrogen production from solar energy at its proving ground in Tucson.

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## DEPLOYMENT: General, AZ

NextEra is partnering with Linde to use electrolysis for its hydrogen fuel generation, and the project has reportedly been encouraged to apply for DOE hydrogen hub funding.

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## OPPORTUNITY General, AZ

New report sees Arizona leading the way on clean energy.

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Desert Mountain Energy is now offering consulting for the purpose of developing bedded and domal salt cavern hydrogen energy storage in Arizona.

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Desert Mountain Energy Corporation has identified multiple locations for hydrogen to be extracted from wells in Arizona.

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Four state energy providers (Arizona Public Service Co., Salt River Project, Tucson Electric Power, Southwest Gas) and Arizona’s three state universities (Arizona State University, the University of Arizona, Northern Arizona University) established the “Center for an Arizona Carbon-Neutral Economy,” with the goal of attaining a carbon neutral economy in Arizona, in part through the creation of a regional hydrogen hub.

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Arizona, the Navajo Nation, and Nevada are partnering with The Center for an Arizona Carbon Neutral Economy to launch the Southwest Clean Hydrogen Innovation Network, or “SHINe,” and apply for DOE hydrogen hub funding.

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## Arkansas

### RESEARCH: Fayetteville, AR

University of Arkansas researchers finding cost-effective methods for hydrogel fuel production process.

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### DEPLOYMENT: Little Rock, AR

Entergy Corp. joining forces with Mitsubishi Power to integrate green hydrogen into utility business.

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### RESEARCH: Lowell, AR

J.B. Hunt in Lowell testing hydrogen-fueled electric trucks produced by Navistar.

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### RESEARCH: Russellville, AR

Arkansas Tech University conducting an experimental investigation of a hydrogen fuel cell engine in a lightweight vehicle.

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### OPPORTUNITY

Arkansas, Louisiana, and Oklahoma’s HALO hydrogen Hub received encouragement from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## California

### HYDROGEN HUBS: Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES)

DOE AWARDEE: The Governor of California, Gavin Newsom, established the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), a nonprofit public-private partnership that aims to secure DOE funding for a California hydrogen hub.

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### DEPLOYMENT: Alameda, CA

First commercial hydrogen ferry in production in Alameda.

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### DEPLOYMENT: Bakersfield, CA

Mote is building a facility that will create hydrogen fuel from wood waste. The plant is expected to produce about 7 million kilograms of carbon negative hydrogen.

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Fusion Fuel and Electus Energy are embarking on a joint venture to develop a large-scale renewable hydrogen facility. The project is a roughly 75 MW solar-to-hydrogen facility that will have the ability to support over 1,000 Class 8 trucks or buses per day.

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### RESEARCH: Berkeley, CA

Lawrence Berkeley National Laboratory: Lab Call FY18 (Membrane): Stable Alkaline Membrane Based on Proazaphosphatranes Organic Super Base.

[READ MORE »](#)

Lawrence Berkeley National Laboratory: Lab Call FY18 (Reversible Fuel Cell): Technology-Enabling Materials, Cell Design for Reversible Proton Exchange Membrane Fuel Cells.

[READ MORE »](#)

Lawrence Berkeley National Laboratory: Novel Bifunctional Electrocatalysts, Supports, and Membranes for High Performing and Durable Unitized Regenerative Fuel Cells.

[READ MORE »](#)

Lawrence Berkeley National Laboratory: Integrated Systems Modeling of the Interactions between Stationary Hydrogen, Vehicle, and Grid Resources.

[READ MORE »](#)

A team of researchers led by Berkeley Lab have examined backup power systems based on sponge-like materials called metal-organic frameworks, or MOFs, and

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found that with further research and development, they could be cost-competitive with other energy storage technologies for backup power and can help store hydrogen for long durations at low cost and high energy efficiency.

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## DEPLOYMENT: Borrego Springs, CA

San Diego Gas and Electricity is piloting a project to demonstrate hydrogen's capabilities in long-duration energy storage.

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## OPPORTUNITY: Calistoga, CA

Ohmium raised over \$250 million to increase its production of electrolyzers.

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## DEPLOYMENT: Chatsworth, CA

H2U Technologies completed its Catalyst Discovery Engine, a rapid screening process developed over 10 years at the California Institute of Technology (Caltech) through a \$122M Department of Energy (DOE) grant. This process allows scientists to make, characterize, and quantify the catalytic activity of thousands of material compositions per week.

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## DEPLOYMENT: Central Valley, CA

The California Energy Commission awarded \$2 million to Symbio, a joint venture between Michelin and Faurecia, to develop a hydrogen-fueled Freightliner Cascadia Class 8 truck that will run for a year on a 400-mile route between Southern California's Inland Empire and the Northern San Joaquin Valley, using hydrogen infrastructure provided by Air Liquide, Shell and Trillium, beginning in the second half of 2023.

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## DEPLOYMENT: Coachella Valley, CA

The STAR-H2 demonstration project, led by SoCalGas, will produce hydrogen from renewable natural gas to help fuel SunLine's hydrogen fuel cell electric buses.

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## DEPLOYMENT: Downey, CA

SoCalGas and ATCO are demonstrating hydrogen-natural gas blends in a model home.

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SoCalGas's H2 Hydrogen Home project is now using renewable hydrogen that is produced onsite to power a fuel cell to provide power when solar isn't available.

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The California Energy Commission awarded Southern California Gas Co. (SoCalGas) a \$750,000 grant to pursue development of a novel hydrogen production system using biogas to create affordable, scalable, renewable hydrogen.

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## DEPLOYMENT: Escondido, CA

San Diego Gas and Electricity is piloting the Palomar Green Hydrogen System blending hydrogen in with natural gas.

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Japanese firm Nikkiso Clean Energy & Industrial Gases Group was awarded multiple contracts to construct hydrogen fueling stations in Escondido and Murrieta, with the stations expected to be operational in Q4 2023 and Q2 2024.

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## DEPLOYMENT: Fontana, CA

Hyzon Motors delivered four FCEVs to Performance Food Group (PFG), and showcased the new FCEVs by offering ride along demonstrations, in a joint ceremony held at PFG's Vistar facility in Fontana.

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## DEPLOYMENT: Fremont, CA

EnerVenue raised \$100m to build a nickel-hydrogen battery gigafactory and is expected to start construction in 2022.

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After outgrowing the 200 MW capacity at its fuel cell factory in Sunnyvale, Bloom made a \$200 million capital investment to open a larger factory in Fremont. This transition came as a response to high demand, which required more space, workers, and machinery. The factory is expected to produce 1 GW of fuel cells powered by natural gas by the end of 2023. As operation continues, production capabilities will continue to rise.

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## OPPORTUNITY: Fremont, CA

Fremont, CA-based green hydrogen electrolyzer provider Ohmium International has secured \$45 million in a Series B investment round led by existing investor Fenice Investment Group, thanks to new investor Energy Transition Ventures.

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Chevron and Angelicoussis are engaging in a Joint Study Agreement (JSA) to assess how tankers can be utilized to efficiently transport clean ammonia.

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## DEPLOYMENT: Fresno, California

H2B2 Electrolysis Technologies, Inc. (H2B2) unveiled SoHyCal – the largest operational green hydrogen production plant powered entirely by renewable energy in North America to date.

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## DEPLOYMENT: Hollister, CA

Hydrogen-electric aviation company ZeroAvia is collaborating with Shell to develop ZeroAvia's U.S. Hydrogen Airport Refueling Ecosystem (HARE) on a larger scale.

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## DEPLOYMENT: Humboldt, CA

The California State Transportation Agency awarded the Humboldt Transit Authority (HTA) a \$38.7m grant through its Transit and Intercity Rail Capital Program, to launch plans for a hydrogen-powered bus fleet and refueling station. HTA will receive 11 New Flyer fuel cell-electric buses, as well as a hydrogen refueling station at its facility in Eureka, California, US, with potential to create a hydrogen fueling network in Northern California.

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## DEPLOYMENT: Indio, CA

SunLine Transit Agency and the City of Indio have launched a pilot of liquid hydrogen gas (H2) pump technology and a mobile refueling system.

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## DEPLOYMENT: Irvine, CA

Southern California Gas Co. and GTI Energy are studying the feasibility of blending hydrogen into the natural gas network with up to 100 percent hydrogen, while also testing the use of hydrogen in commercial and industrial processes.

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## RESEARCH: Irvine, CA

UC Irvine granted DOE grant for advancing hydrogen gas turbines for use in electricity generation.

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## OPPORTUNITY: Irvine, CA

SoCalGas and the University of California, Irvine submitted a proposal to blend hydrogen into the gas system on the University's campus. If the project is approved, these demonstrations could begin by 2024.

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## DEPLOYMENT: Lancaster, CA

Energy company SGH2 is bringing the world's biggest green hydrogen production facility to Lancaster.

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The City of Lancaster, CA has partnered with Japan-based Choshu Industries to seek to integrate Choshu's 'SHiPS,' a containerized hydrogen production and refuelling station system, and 'MizTomo,' a stationary fuel cell power system into Lancaster's Green Energy Microgrid (GEM) system.

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Solar energy and green hydrogen production company Heliogen has entered a Letter of Intent (LOI) with sustainable fuels company, Dimensional Energy to produce sustainable aviation fuels (SAF).

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Element Resources plans to construct and operate a renewable hydrogen production facility that will produce 20,000 tons of hydrogen annually.

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## OPPORTUNITY: Lancaster, CA

The City of Lancaster, along with Hawai'i Country and Namie, Japan, has won an inaugural DOE Twin Cities initiative award for its H2 – TRANS – PACIFIC Team proposal to develop clean renewable H2 solutions for energy sustainability and strengthening ties across the Pacific. Lancaster and Namie have also pledged to share best practices and strategies to accelerate renewable hydrogen in Hawaii.

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## DEPLOYMENT: Livermore, CA

Sandia National Laboratories, National Renewable Energy Laboratory: HyMARC: A Consortium for Advancing Hydrogen Storage Materials.

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The Gas R&D Program awarded ZeroAvia \$3.25 million in funding – administered by the California Energy Commission and authorized by the California Public Utilities Commission – to develop a mobile liquid hydrogen refueling truck for heavy-duty applications, including aviation and maritime.

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**RESEARCH: Livermore, CA**

Sandia National Laboratories: H-Mat Overview: Steels [READ MORE »](#)

Sandia National Laboratories: Metal Hydride Compression [READ MORE »](#)

Sandia National Laboratories: Maritime Fuel Cell Generator Project [READ MORE »](#)

Sandia National Laboratories: R&D for Safety, Codes and Standards: Materials and Components Compatibility [READ MORE »](#)

Sandia National Laboratories: R&D for Safety, Codes and Standards: Hydrogen Behavior [READ MORE »](#)

Lawrence Livermore National Laboratory: Molten Hydroxide Dual-Phase Membranes for Intermediate Temperature Anion Exchange Membrane Fuel Cells [READ MORE »](#)

**RESEARCH: Lodi, CA**

PG&E is launching the nation’s most comprehensive end-to-end hydrogen study and demonstration facility in partnership with Northern California Power Agency [NCPA], Siemens Energy, the City of Lodi, GHD Inc., and University of California at Riverside. [READ MORE »](#)

**DEPLOYMENT: Los Angeles, CA**

HyDeal LA, initiative to achieve at-scale green hydrogen procurement at \$1.50/kg in LA Basin by 2030. [READ MORE »](#)

SoCalGas partnering with H2U Technologies to evaluate cost reduction of green hydrogen production in commercial settings. [READ MORE »](#)

Zero- and Near Zero- Emission Freight Facilities Shore to Shore Project [READ MORE »](#)

LADWP embarks on hydrogen generation project. [READ MORE »](#)

Toyota and Kenworth Truck have successfully demonstrated the efficacy of their jointly designed heavy duty, Class 8 fuel cell electric vehicle (FCEV) in the companies’ 12- month Shore to Shore project at the Port of Los Angeles. [READ MORE »](#)

Mitsui E&S Machinery and PACECO have partnered to offer a demonstration of a commercially feasible hydrogen fuel model at the Port of Los Angeles. The New Energy and Industrial Technology Development Organization have plans to support the project with funding from a hydrogen supply chain. [READ MORE »](#)

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Southern California Gas Co. is proposing what it says will be the nation's largest green hydrogen energy infrastructure system, the Angeles Link, to deliver clean, reliable energy to the Los Angeles region.

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Gemini Motor announced plans to launch a fleet of autonomous hydrogen fuel cell trucks by 2025. They are currently developing the first “RoboTruck” prototype with plans to test in 2023.

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SoCalGas is working with Ford Motor Company on a demonstration project to reduce commercial fleet emissions by developing a F-550 Super Duty Hydrogen Fuel Cell Electric Truck, as part of the U.S. Department of Energy's (DOE) SuperTruck 3 program aiming to significantly reduce emissions in medium and heavy-duty trucks.

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Hyster Company is testing a hydrogen fuel-cell-powered container handler at Fenix Marine Services in the Port of Los Angeles.

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Foothill Transit will begin operating the first hydrogen-powered transit buses in LA County on December 5, 2022. By mid-February of 2023, the agency expects 33 fuel-cell electric buses to be in operation.

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## RESEARCH: Los Angeles, CA

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NewHydrogen sponsored research at UCLA into efficient hydrogen.

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USC Dornsife chemist Travis Williams is developing new technology to store hydrogen in a liquid carrier, and then release hydrogen on-site through catalysis.

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Southern California Gas Co. (SoCalGas) announced that Kore Infrastructure began successful testing and demonstration of its modular waste-to-energy carbon-negative renewable hydrogen and renewable natural gas system at the Kore Infrastructure facility in Los Angeles. The waste-to-energy modular system produces carbon-negative hydrogen and renewable natural gas (RNG).

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Canadian hydrogen and methanol solutions firm, Azolla Hydrogen, has partnered with California State University, Los Angeles (Cal State LA) to accelerate a demonstration project at the university's Hydrogen Research and Fueling Facility (HRFF).

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Researchers at UCLA developed a low-platinum fuel cell catalyst that generates 75 times more catalytic activity and 65% more power than standard fuel cell catalysts, a potential lower-cost, higher-impact hydrogen production strategy.

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The DOE is providing \$1.5 million in funding for five projects that will advance key clean-hydrogen technologies at minority serving institutions. One of the

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projects selected is at the University of Los Angeles and is titled Developing Highly Porous Metal-Organic Frameworks and Composite Materials for Hydrogen Storage. The project will aim to develop novel materials with improved capabilities for hydrogen storage.

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## OPPORTUNITY: Los Angeles, CA

The Port of Los Angeles is offering \$5 million in voucher incentives for zero-emissions trucks to operate at the facility through a program using California's existing Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) funding application process.

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Boeing and Equatic are partnering to deploy carbon removal technologies and produce clean hydrogen.

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Toyota and PACCAR are expanding their efforts to develop FCEVs and are aiming to sell commercial vehicles by 2024.

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## DEPLOYMENT: Menlo Park, CA

Mainspring Energy announced its Linear Generator successfully completed tests to run on 100% hydrogen and 100% ammonia. It is hoped the generator can be used to decarbonize back-up power generator for applications such as large grids, microgrids, data centers, and more where constant back-up power is needed.

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## RESEARCH: Merced, CA

The Thermal and Electrochemical Energy Laboratory at UC Merced is focused on developing hydrogen-based energy solutions through multiple projects and a trans-Pacific partnership to conduct experimental and simulation research to efficiently generate hydrogen and convert it directly to electricity.

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## DEPLOYMENT: Napa, CA

PG&E Corp. and Energy Vault Holdings Inc. plan to create a microgrid in Calistoga that partially runs on hydrogen fuel cells to serve as a low-carbon backup source of energy to the electrical grid.

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## DEPLOYMENT: Newport Beach, CA

FirstElement Fuel and Hyundai are partnering to test Hyundai's Class 8 Fuel Cell Electric Trucks.

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## DEPLOYMENT: North County, CA

The North County Transit District has received a \$4.8 million federal grant to help purchase eight electric buses powered by hydrogen fuel-cell technology.

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## DEPLOYMENT: Oakland, CA

Hyundai plans to build a hydrogen refueling station in Oakland as part of its "NorCAL ZERO" project with capacity to fuel 50 trucks back-to-back.

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FirstElement Fuel announced the public opening of a new high-capacity retail hydrogen station in Oakland, California, expanding its True Zero hydrogen network to 41 fully public, retail locations.

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Nikola's HYL A brand and FirstElement Fuel (FEF) formalized a 10-year agreement to refuel Nikola's hydrogen fuel cell electric truck at FEF's hydrogen refueling station in Oakland, California.

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## RESEARCH: Oakland, CA

The California Energy Commission has funded a project to demonstrate the value and feasibility of bidirectional electric vehicle charging to support a first-of-its-kind vehicle-to building resilience hub. Both battery-powered electric buses and hydrogen fuel cell-electric buses will be used to power buildings in the project.

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## OPPORTUNITY: Oakland, CA

Mayor of Oakland Libby Schaaf penned a letter outlining her resolution to make the City of Oakland a clean hydrogen hub in order to reduce harmful air pollution.

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## DEPLOYMENT: Ontario, California

Accelera by Cummins, SoCalGas, Center for Transportation and the Environment (CTE), and the University of Texas, partnered to deploy 15 vans retrofitted with

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hydrogen fuel cell electric powertrains for delivery operations in Southern California.

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Nikola, via its Hyla brand, opened its first Hyla hydrogen refueling station in Southern California, capable of fueling up to 40 Nikola hydrogen fuel cell electric Class 8 trucks daily.

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## DEPLOYMENT: Oceanside, CA

NCTD building hydrogen fueling station in Oceanside

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Orange County Transportation Authority have bought hydrogen buses.

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## DEPLOYMENT: Oxnard, CA

Wiggins Lift Co. will use Loop Energy fuel cell systems for its new hydrogen-electric forklift fleet, expected to be deployed in late 2023.

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## DEPLOYMENT: Palm Springs, CA

Hydrogenics links with StratosFuel on 2.5 MW California project.

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SunLine Transit Agency in Palm Spring driving hydrogen buses.

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ZEV Station is receiving \$4 million from the California Energy Commission (CEC) to build and test a heavy-duty hydrogen refueling station.

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## DEPLOYMENT: Palo Alto, CA

Electric Power Research Institute in Palo Alto gets award to test moving-bed gasifier to generate clean hydrogen.

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## RESEARCH: Palo Alto, CA

The DOE announced that H3, a Palo Alto based hydrogen experiment, is a phase one winner of the Hydrogen Shot Incubator Prize. H3 is a system that integrates high-temperature solid oxide electrolyzers with thermal energy storage to enable continuous hydrogen production even when using intermittent renewable sources.

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Stanford researchers invented a way to create ammonia from water droplets and nitrogen in the air, representing a new method of hydrogen development.

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## DEPLOYMENT: Paramount, CA

Air Products has joined an agreement with World Energy to build a new \$2 billion major expansion project at World Energy's Sustainable Aviation Fuel (SAF) production and distribution hub, including a new hydrogen plant to be operated by Air Products and the extension of Air Products' Southern California hydrogen pipeline network.

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## DEPLOYMENT: Pasadena, CA

Liox Power: HyMARC Seedling: Electrolyte Assisted Hydrogen Storage Reactions

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Southern California Gas Company and Bloom Energy announced they will power a portion of Caltech's grid via a hydrogen project, leveraging existing infrastructure with electrolyzers and fuel cell technology.

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## DEPLOYMENT: Pico Rivera, CA

SoCalGas and HyET Hydrogen are field-testing technology that separates and compresses hydrogen from natural gas blends.

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## DEPLOYMENT: Port Hueneme, CA

Reversible Solid Oxide Fuel Cell Demonstrated at NAVFAC EXWC at Port Hueneme.

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## DEPLOYMENT: Port of Long Beach, CA

Toyota builds first 100% renewable power and hydrogen generation station at Port of Long Beach.

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Toyota Motor North America will build the world's first megawatt-scale carbonate fuel cell power generation plant to support its operations at the Port of Long Beach.

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Nikola is building a refueling station to service the Port of Long Beach to support growing demand for hydrogen-powered trucks.

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FuelCell Energy and Toyota announced the completion a first-of-its-kind "Tri-gen system" at Toyota's Port of Long Beach operations.

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## OPPORTUNITY: Port of Long Beach, CA

The Port of Long Beach plans to switch to mostly hydrogen-powered drayage trucks by 2035 to comply with California Air Resources Board rules banning the sale of new gas-powered vehicles by the same year.

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The City and Port of Long Beach have joined California's public-private hydrogen hub proposal, the Alliance for Renewable Clean Hydrogen Energy Systems. Part of the hydrogen produced by the hub will be used to power trucks from the Port's trucking company partner, Kenworth, who plans to convert to a zero-emissions fleet by 2025.

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## DEPLOYMENT: Richmond, CA

Raven SR received approval from the Richmond City Council to develop the first organic waste-to-hydrogen bioenergy project.

[READ MORE »](#)

## RESEARCH: Richmond, CA

The DOE announced that PAX Water Technologies, a Richmond-based company, is a phase one winner of the Hydrogen Shot Incubator Prize. The company's proposed concept, titled PAX H<sub>2</sub>(O), is a technology that could reduce the capital and operating expenses of an electrolysis system by producing clean water using waste heat from the electrolyzer.

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## RESEARCH: Riverside, CA

Investment firm Climate Adaptive Infrastructure and developer Meridian Clean Energy are partnering to demonstrate decarbonization in peaker plants by testing blends of hydrogen and natural gas. The first test site will be at Sentinel Energy Center, an 850 MW peaker plant.

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A portion of \$1.5 million in DOE funding for five projects to advance key clean-hydrogen technologies at minority serving institutions will go to two projects at the University of Riverside. *Single-Walled Carbon Nanotubes with Confined Chalcogens as the Catalysts and Electrodes for Oxygen Reduction Reaction in Fuel Cells* will investigate a new type of PGM-free catalyst for use in fuel cells, while *Large-Scale Density Functional Tight Binding (DFTB) Calculations to Probe Structural Effects and Bridge Multiple Length Scales in Hydrogen-Metal Systems* aims to improve understanding of the effects of hydrogen on metals for developing improved materials.

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## DEPLOYMENT: Sacramento, CA

Cummins Inc. opened its Hydrogen Fuel Cell Powertrain Integration Center in West Sacramento, California.

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Mote Inc. announced it will establish its second biomass-to-hydrogen and carbon sequestration plant in Sacramento which could deliver “carbon-negative” hydrogen.

[READ MORE »](#)

## DEPLOYMENT: San Bernardino, CA

Ballard Power Systems has been awarded a contract by Stadler Rail to deliver fuel cell engines for the first hydrogen-fueled train in the US. The train, operated by Stadler, is expected to begin operating in 2024.

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Arrow rail service began revenue service on October 24, and is expected to be one of the first hydrogen fuel-cell powered trains in the U.S. The equipment is currently undergoing testing in Europe before it is deployed in the U.S.

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## DEPLOYMENT: San Diego, CA

Naval architecture and marine engineering company Glosten has been selected by UC San Diego’s Scripps Institution of Oceanography as the naval architect for the university’s new California coastal research vessel, which will include a first-of-its-kind hydrogen-hybrid propulsion system.

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## RESEARCH: San Diego, CA

General Engineering & Research, LLC: Low-Cost Magnetocaloric Materials Discovery

[READ MORE »](#)

San Diego Gas & Electric Company (SDG&E) filed a proposal with the California Public Utilities Commission for a hydrogen blending demonstration project on University of California San Diego’s campus. If accepted, the project will begin mixing hydrogen in natural gas pipes, and continually increase hydrogen’s percentage of the mixture up to 20%.

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## DEPLOYMENT: San Francisco, CA

The first hydrogen-powered ferry has arrived in San Francisco and been approved for service by the San Francisco Transportation Authorities.

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## DEPLOYMENT: San Joaquin, CA

The Federal Transit Administration (FTA) has approved Valley Link's entry into the Project Development Phase of the Capital Investment Grants (CIG) Program opening the door for hundreds of millions in federal funding to support the project. The Valley Link rail project will be the first passenger rail system in California running on self-produced green hydrogen and a hydrogen fuel production facility able to support other transit and heavy truck operators.

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Toyota and Chevron are supporting Valley Clean Air Now (Valley CAN) to establish a pilot program to provide hydrogen-powered certified pre-owned, zero-emission Toyota Mirai Fuel Cell Electric Vehicles (FCEV) at no cost to 27 San Joaquin Valley residents to replace their older gasoline-powered cars.

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San Joaquin Valley Regional Rail Authority and Linde have formed a strategic collaboration to advance the Valley Link renewable hydrogen production facility.

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Carbon TerraVault Holdings LLC and Grannus LLC are collaborating to construct a hydrogen and ammonia plant. The hydrogen and ammonia will be produced by natural gas and paired with carbon capture to reduce emissions .

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## DEPLOYMENT: Santa Barbara, CA

SunHydrogen unveiled a prototype of its hydrogen production technology, which includes panels that use electrical charges created by sunlight to generate hydrogen.

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H2 Clipper's innovative hydrogen-powered 'Pipeline-In-The-Sky' airship has achieved a major milestone after simulated wind tunnel testing. The firm anticipates final construction of a prototype in 2025, and full-sized flights in 2028.

[READ MORE »](#)

## RESEARCH: Santa Clara County, CA

Stanford University: HydroGEN Seedling: Protective Catalyst Systems on III-V and Si-Based Semiconductors for Efficient, Durable Photoelectrochemical Water Splitting Devices

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## DEPLOYMENT: Santa Clarita, CA

Electricore: Innovative Advanced Hydrogen Mobile Fueler

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The city of Santa Clarita installed a new hydrogen fuel cell backup power system at the intersection of Soledad Canyon Road and Whites Canyon Road in Canyon Country, which will keep traffic signals in normal operation for more than 50 hours after power disruption, significantly longer than the eight hours afforded by traditional battery backup systems.

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ANGI Energy Systems will supply its first full hydrogen refueling station to Santa Clarita, California, for bus refueling.

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## DEPLOYMENT: Santa Cruz, CA

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Santa Cruz Metropolitan Transit District's (METRO) Board of Directors unanimously approved the purchase of 57 New Flyer hydrogen-powered, fuel cell electric buses (FCEBs); the largest acquisition of FCEBs yet in North America.

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## DEPLOYMENT: Silicon Valley, CA

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Californian electrolyzer start-up Verdagy announced plans for a new manufacturing facility in Silicon Valley.

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## RESEARCH: Stanford, CA

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Researchers at Stanford University and at the University of Mannheim in Germany have developed reversible power-to-gas systems that can easily convert hydrogen back to electricity when power prices spike higher, making them an economically viable source of backup electricity during periods of surging prices.

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Stanford University launched the Stanford Energy Hydrogen Initiative research and education program to figure out the best uses of hydrogen for decarbonization and to fund development of the necessary technologies, policies, and financial mechanisms.

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## DEPLOYMENT: Thousand Palms, CA

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SoCalGas has begun construction on the H2 SilverSTARS 36-month demonstration project to fuel Sunline Transit Agency's fleet of 17 hydrogen fuel cell buses with hydrogen produced from renewable natural gas.

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SoCalGas, Cummins, received a DOE grant to advance hydrogen fuel cell technology for heavy-duty trucking and transit.

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SoCalGas submitted initiatives to the DOE “Earthshot” program at UC Irvine, UCLA, and with the Green Hydrogen Coalition.

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## DEPLOYMENT: Torrance, CA

Crane-producer Mi-Jack has selected US Hybrid to develop a hydrogen- powered rubber tire gantry crane to aid in decarbonizing intermodal terminals.

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## DEPLOYMENT: Ventura, CA

Public transport provider, Gold Coast Transit District (GCTD) is trialing a hydrogen-fuel cell battery-electric bus and has applied for a Federal Transit Administration (FTA) Low- or No-Emission Bus Program for Buses and Bus Facilities Program grant to purchase five hydrogen fuel cell buses and upgrade its facilities to incorporate hydrogen refueling.

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## OPPORTUNITY: Yermo, CA

PowerTap Hydrogen Capital Corp. and Newport Realty Group signed an agreement to prompt the development of hydrogen refueling stations.

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## DEPLOYMENT: Yosemite, CA

Yosemite Clean Energy was awarded \$1 million for biomass-to-hydrogen projects that will produce carbon negative hydrogen.

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## DEPLOYMENT: Various

Overview station map of H2 fueling stations

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Hyzon Motors working with Raven SR to build waste-to-hydrogen hubs, two in California

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California is decarbonizing public transportation with a fleet of Xcelsior CHARGE H2 hydrogen fuel cell powered buses

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Hyundai’s “NorCAL ZERO” project Will deploy 30 Class 8 XCIENT Fuel Cell trucks around Northern CA, beginning in 2023

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PowerTap Hydrogen Capital and Capstone Green Energy signed a strategic manufacturing and licensing agreement for the manufacturing of PowerTap's third generation production and dispensing station, which will be in California

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Tersus Power is aiming to develop a new hydrogen production and dispensing system capable of supplying 1,250kg of hydrogen per day to enable the rollout of a hydrogen highway in California

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Chevron U.S.A. Inc. and Iwatani Corporation of America (ICA) have an agreement to co-develop and construct 30 hydrogen fueling sites in California by 2026

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Honda will install a stationary fuel cell power station on its California corporate campus by 2023 as part of its larger plans to achieve climate neutrality in all products and corporate activities in 2050

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ZeroAvia and ZEV Station signed an MoU to construct a hydrogen refuelling network at California airports

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South Korean Hanwha Solutions will supply Shell with their 2,000-liter Neptune carbon fiber Type IV high-pressure hydrogen tanks to be used for transport within its state networks of refueling stations

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17 local governments and transit agencies in California will receive more than \$236 million in grants from the Department of Transportation's Buses and Bus Facilities Program and Low or No Emission Vehicle (Low-No) Program to aid the transition to zero-emission buses and renovate and construct the infrastructure needed for zero-emission transit vehicles

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California Transportation authorities have signed a Memorandum of Understanding for the design and delivery of four zero-emission hydrogen trains. The contract includes options for 25 additional trains, which could replace current diesel locomotives, given that the zero-emission trains are efficacious

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A partnership between Hyundai and South Coast Air Quality Management District has been approved for a \$3.5 million grant to build five 6x4 XCIENT Fuel-cell trucks as part of the Environmental Protection Agency's Targeted Airshed Grant (TAG) program. The trucks will transport liquified hydrogen to refueling stations operated by First Element fuel beginning in 2023 and will be used for traditional commercial service after 5 years of service

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A-1 Alternative Fuel Systems is leading a consortium dedicated to developing fuel cell electric shuttle buses for the California public transit authority. The buses will be developed in Wisconsin and Indiana

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Nikola is purchasing multiple liquid storage tanks, mobile and modular refueling stations, and liquid hydrogen transport trailers from Chart Industries to help deploy the Nikola Tre fuel cell electric vehicles.

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California and Japan are collaborating to develop a “green shipping” corridor to support the deployment of zero emission hydrogen projects at Californian ports.

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## OPPORTUNITY

California Hydrogen Coalition: Major Push For Hydrogen As Part of State’s Zero-Emission Vehicle Strategy

[READ MORE »](#)

California Is Trying to Jump-Start The Hydrogen Economy

[READ MORE »](#)

California and Japan have signed a Memorandum of Cooperation, covering renewable energy, zero-emissions vehicles, trade and investment, and public transportation among others

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San Diego Gas & Electric released a study with recommendations designed to help meet the monumental challenge of achieving California’s goal of carbon neutrality by 2045. The report recommends hydrogen usage across several areas

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A proposed regulation issued by the California Air Resources Board would require 35% of new passenger cars sold in the state to be powered by hydrogen or electric batteries by 2026 and rise to 100% by 2035

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UK-based hydrogen fuel cell vehicle company Riversimple signed an agreement with the California Mobility Center (CMC) for the CMC to support the company in mass producing its hydrogen vehicles

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The Governor of California, Gavin Newsom, established the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), a nonprofit public-private partnership that aims to secure DOE funding for a California hydrogen hub

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The California Senate passed a bill that would mobilize funds from the State Treasury to support clean hydrogen projects and match federal funds granted to a regional clean hydrogen hub

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A "first-of-its-kind" California program to incentivize medium- and heavy-duty ZEV infrastructure is now accepting applications for hydrogen fueling projects

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The California Air Resources Board approved a commitment requiring all new passenger cars and light trucks sold in the state of be electric vehicles or other emissions-free models (including hydrogen FCEVs) by 2035

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The California Energy Commission's Clean Transportation Program announced the availability of up to \$27 million in grant funds for projects that provide publicly available hydrogen refueling stations. [READ MORE »](#)

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The California Energy Commission (CEC) authorized a \$2.9 billion investment plan that aims to accelerate California's plan to decarbonize its roads. The funds include \$90 million for hydrogen refueling stations across the state. [READ MORE »](#)

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Labor Unions are partnering with the ARCHES hydrogen hub to ensure skilled labor will be available for the hub's development. [READ MORE »](#)

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The California Air Resources Board (CARB) granted Toyota a zero emission powertrain (ZEP) executive order for its hydrogen-powered fuel cell electric power train. [READ MORE »](#)

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Governor Gavin Newsom directed the Governor's Office of Business and Economic Development (GO-Biz) to develop California's Hydrogen Market Development Strategy. [READ MORE »](#)

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## Colorado

### RESEARCH: Arvada, CO

Toyota Motor North America is collaborating with the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) to build, install and evaluate a 1-megawatt (MW) proton exchange membrane (PEM) fuel cell power generation system at NREL's Flatirons Campus to identify performance limitations and degradation over time. [READ MORE »](#)

### DEPLOYMENT: Aurora | CO

Plug Power installed and commissioned a one-megawatt proton exchange membrane electrolyzer system at an Amazon fulfillment center in Aurora, Colorado. [READ MORE »](#)

### DEPLOYMENT: Boulder, CO

University of Colorado Boulder: HydroGEN Seedling: Computationally Accelerated Discovery and Experimental Demonstration of High-Performance Materials for Advanced Solar Thermochemical Hydrogen Production. [READ MORE »](#)

### RESEARCH: Boulder, CO

NREL and Xcel Energy have partnered on the Wind2H2 demonstration project, researching how to improve the system efficiency of producing hydrogen from renewable resources in quantities large enough and at costs low enough to compete with traditional energy sources such as coal, oil, and natural gas.

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GKN Hydrogen and Southern California Gas Co. (SoCalGas) won \$1.7 million in DOE funding to work with the DOE's National Renewable Energy Laboratory (NREL) on a hydrogen storage solution using GKN Hydrogen's HY2MEGA hydrogen storage subsystem at NREL's Flatirons Campus.

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## DEPLOYMENT: Denver, CO

AAA Denver is partnering with New Day Hydrogen LLC to have hydrogen-powered tow trucks and other emergency rescue vehicles in Colorado.

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The Wyoming Energy Authority has issued a request for proposals (RFP) for a prime contractor for the Western Inter-States Hydrogen Hub, a proposed regional clean hydrogen hub that Colorado, New Mexico, Utah and Wyoming have teamed up to develop. The prime contractor will support the submission of an application for funding to the Department of Energy (DoE) and, if successful, it will manage the implementation of the project.

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## OPPORTUNITY: Denver, CO

Colorado set goals to have at least 35,000 electric or hydrogen-fueled medium- and heavy-duty vehicles on the road by 2030.

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## DEPLOYMENT: Fort Collins, CO

Colorado State University acquires a fuel station to generate hydrogen

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The U.S. Department of Transportation awarded Colorado State University \$8.9 million in funding to build three public hydrogen fueling stations in Fort Collins, Denver, and Pueblo, servicing medium-to-heavy-duty vehicle fleets and future light-duty passenger vehicles.

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## RESEARCH: Fort Collins, CO

Colorado State University's Energy Institute acquired an industrial turbine generator, which will be used to study the potential of various hydrogen and natural gas fuel blends.

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Hydrofuel Canada Inc. has entered into a Collaborative Research and Development Agreement (CRADA) with Colorado State University (CSU) to bring Georgia Tech's MAPS technology to market. The CRADA will provide funding to hire 12 researchers to work with 6 CSU Ph.D. students to complete a commercial demonstration of the technology.

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**DEPLOYMENT: Golden, CO**

National Renewable Energy Laboratory: Industrially Scalable Waste CO2 Reduction to Useful Chemicals and Fuels

[READ MORE »](#)

National Renewable Energy Laboratory: BioHydrogen (BioH2) Consortium to Advance Fermentative Hydrogen Production

[READ MORE »](#)

National Renewable Energy Laboratory: Hydrogen Storage System Modeling: Public Access, Maintenance, and Enhancements

[READ MORE »](#)

National Renewable Energy Laboratory: HyMARC Seedling: Atomic Layer Deposition Synthesis of Novel Nanostructured Metal Borohydrides

[READ MORE »](#)

National Renewable Energy Laboratory, Sandia National Laboratories: HyMARC: A Consortium for Advancing Hydrogen Storage Materials

[READ MORE »](#)

National Renewable Energy Laboratory: Advanced Ionomers and Membrane Electrode Assemblies for Alkaline Membrane Fuel Cells

[READ MORE »](#)

National Renewable Energy Laboratory: Lab Call FY18 (Membrane): Spirocyclic Anion Exchange Membranes for Improved Performance and Durability

[READ MORE »](#)

National Renewable Energy Laboratory: Lab Call FY18 (Reversible Fuel Cell): Bipolar Membrane Development to Enable Regenerative Fuel Cells

[READ MORE »](#)

National Renewable Energy Laboratory, Los Alamos National Laboratory: Membrane Working Group

[READ MORE »](#)

National Renewable Energy Laboratory: Dispenser Reliability

[READ MORE »](#)

National Renewable Energy Laboratory: Market Segmentation Analysis of Medium- and Heavy-Duty Trucks with a Fuel Cell Emphasis

[READ MORE »](#)

National Renewable Energy Laboratory: H2@Scale Analysis

[READ MORE »](#)

National Renewable Energy Laboratory: Energy Storage Analysis

[READ MORE »](#)

National Renewable Energy Laboratory: Membrane Electrode Assembly Manufacturing R&D	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: Material-Process-Performance Relationships in Polymer Electrolyte Membrane Catalyst Inks and Coated Layers	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: Fuel Cell Bus Evaluations	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: Hydrogen Station Data Collection and Analysis	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: Optimal Stationary Fuel Cell Integration and Control (Energy Dispatch Controller)	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: H2@Scale: Experimental Characterization of Durability of	<a href="#">READ MORE »</a>
National Renewable Energy Laboratory: NREL Hydrogen Sensor Testing Laboratory	<a href="#">READ MORE »</a>
Colorado School of Mines: HydroGEN Seedling: Accelerated Discovery of Solar Thermochemical Hydrogen Production Materials via High-Throughput Computational and Experimental Methods	<a href="#">READ MORE »</a>
Advanced Electrolyzer Concepts in Dynamic Loading	<a href="#">READ MORE »</a>
<b>RESEARCH: Golden, CO</b>	
National Renewable Energy Laboratory: HydroGEN Overview: A Consortium on Advanced WaterSplitting Materials	<a href="#">READ MORE »</a>
Scientists at the National Renewable Energy Laboratory (NREL) analyzed an emerging water-splitting technology called solar thermochemical hydrogen (STCH) production, which can be potentially more energy efficient than producing hydrogen via the commonly used electrolysis method.	<a href="#">READ MORE »</a>
Researchers from the National Renewable Energy Laboratory recently published a study describing a system for producing hydrogen without a carbon footprint and at a cost of about \$2.50 per kilogram.	<a href="#">READ MORE »</a>
<b>DEPLOYMENT: General, CO</b>	
Chart Industries signed an MoU with BNG Clean Fuel Corporation to supply hydrogen liquefaction process technology, associated equipment, and hydrogen	<a href="#">READ MORE »</a>

refueling stations, which will begin to be deployed alongside the Denver H2 pilot hub.

## OPPORTUNITY

Colorado, New Mexico, Utah, and Wyoming’s Western Interstate Hydrogen Hub (WISHH) received a recommendation from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## Connecticut

### DEPLOYMENT: Danbury, CT

Danbury manufacturer given grant to turn nuclear into hydrogen.

[READ MORE »](#)

FuelCell Energy, Inc.: Proton-Conducting Ceramic Electrolyzers for High-Temperature Water Splitting

[READ MORE »](#)

FuelCell Energy, Inc.: Modular Solid Oxide Electrolysis Cell System for Efficient Hydrogen Production at High Current Density

[READ MORE »](#)

### DEPLOYMENT: East Hartford, CT

United Technologies Research Center: HydroGEN Seedling: Thin-Film, Metal-Supported HighPerformance, and Durable Proton-Solid Oxide Electrolyzer Cell

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United Technologies Research Center: High-Performance Polymer Electrolyte Fuel Cell Electrode Structures

[READ MORE »](#)

United Technologies Research Center: High-Performance Non-Platinum-Group-Metal Transition Metal Oxide Oxygen Reduction Reaction Catalysts of Polymer Electrolyte Membrane Fuel Cells

[READ MORE »](#)

### DEPLOYMENT: Farmington, CT

Mott’s new facility will produce ultra-thin, porous metal sheets, which are an essential component in the production of renewable hydrogen.

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### DEPLOYMENT: Hartford, CT

# HYDROGEN FORWARD

Two hydrogen fueling stations in Hartford and Wallingford, third opening in New Haven.

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Windsor's Infinity Fuel & Hydrogen creates zero-gravity fuel cells for space, under water.

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## DEPLOYMENT: Stamford, CT

Stamford Health is installing hydrogen fuel cells at two locations.

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## DEPLOYMENT: Storrs, CT

University of Connecticut: HydroGEN Seedling: Proton-Conducting Solid Oxide Electrolysis Cells for Large-Scale Hydrogen Production at Intermediate Temperatures.

[READ MORE »](#)

The University of Connecticut installed a 460kW HyAxiom fuel cell on campus to provide energy for heating and electrical power for the Depot Campus labs.

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## DEPLOYMENT: Wallingford, CT

Proton Energy Systems: HydroGEN Seedling: High Efficiency Proton Exchange Membrane Water Electrolysis Enabled by Advanced Catalysts, Membranes, and Processes

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Proton Energy Systems: HydroGEN: Benc

[READ MORE »](#)

## OPPORTUNITY: Windsor, CT

Infinity Fuel Cell and Hydrogen Inc. is seeking to deploy its XStorra-II renewable hydrogen regenerative fuel cell mobile microgrid in new markets in 2023 after initial by the US Navy. The technology uses a solar panel array to fuel an electrolyzer during peak sunlight hours, and the hydrogen produced powers a fuel cell to generate electricity at night.

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## OPPORTUNITY

Avangrid proposed constructing a 20 MW electrolyzer and hydrogen storage facility for its Connecticut gas and electric utilities.

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New York, New Jersey, Massachusetts and Connecticut agreed to work with about 40 clean power companies, utilities and universities to create plans for a regional hydrogen hub.

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## Delaware

### DEPLOYMENT: Harrington, DE

Xergy Inc.: Novel Non-Perfluorosulfonic Acid Proton Exchange Membrane for Fuel Cell Application

[READ MORE »](#)

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### DEPLOYMENT: Newark, DE

Versogen is moving development of its prototype electrolyzer stacks and expanding production of their patented anion exchange membranes to a lab at FMC Stine Research Center in Newark.

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Bloom Energy is creating a new renewable hydrogen production facility at the same location as their Bloom Energy servers production plant, providing the plant with the ability to rely on the existing solid-oxide platform to streamline existing production.

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### RESEARCH: Newark, DE

University of Delaware engineers have demonstrated a way to effectively capture 99% of carbon dioxide from air using a novel electrochemical system powered by hydrogen, a significant advance for carbon dioxide capture.

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### DEPLOYMENT: Wilmington, DE

Versogen green hydrogen start-up based near Wilmington

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The Chemours Company announced it will invest \$200 million to expand capacity and advance technology for its Nafion ion exchange materials. The materials' chemical properties can help generate clean hydrogen from water electrolysis.

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The Chemours company and BWT are embarking on a joint venture, THE Mobility F.C. Membranes Company GmbH, which will integrate the companies' complementary capabilities, resources, and technological expertise to expedite supply of end-product membranes required in the transportation fuel cell market.

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## Florida

### DEPLOYMENT: Amelia Island, FL

Chesapeake Utilities Corp is working with Solar Turbines to explore using a blend of renewable natural gas and hydrogen to fuel an existing power plant.

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### DEPLOYMENT: Dania Beach, FL

GE launched the commercial operation of its GE 7HA.03 gas turbine at the Florida Power & Light Company (FPL) Dania Beach Clean Energy Center. The turbine has the capability to burn up to 50% by volume of hydrogen when blended with natural gas.

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### DEPLOYMENT: DeBary, FL

Duke Energy has recently proposed one-of-its-kind demonstration project to create clean energy using an end-to-end system to produce, store and combust hydrogen at its DeBary plant.

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### DEPLOYMENT: Jacksonville, FL

BrainDrip, LLC announced the measured dissemination of their SG technologies to aid in the repurposing of pipelines for hydrogen transportation.

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### DEPLOYMENT: Juno Beach, FL

NextEra Energy Inc., one of the largest solar and wind utilities, is planning to convert 16 of 20 GW and natural gas electrical generation fleet to run on green hydrogen to continue working toward the goal of zero carbon emissions.

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Cummins will supply Florida Power and Light Company with a 25 MW electrolyzer to integrate hydrogen production into the Cavendish NextGen Hydrogen Hub in Florida.

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### DEPLOYMENT: Merritt Island, FL

Air Products and Linde signed a deal to supply NASA with roughly 15 million pounds of liquid hydrogen for a variety of its facilities in Alabama, Mississippi, Ohio, and Florida.

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## DEPLOYMENT: Orlando, FL

University of Central Florida granted DOE grant for advancing hydrogen gas turbines for use in electricity generation.

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## DEPLOYMENT: Okeechobee, FL

NextEra's Florida Power & Light Co. utility is on schedule to begin commercial operations this year at Florida's first renewable hydrogen plant.

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## RESEARCH: Orlando, FL

University of Central Florida researchers designed the first nanomaterial that can be used to extract hydrogen fuel from seawater.

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UCF scientists received an \$800,000 DOE grant to research how to implement hydrogen in modern, electricity-generating turbines, including exploring the best fuel blends and their combustion characteristics.

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Ansys simulation tools will be used in a five-year University of Central Florida (UCF) study to analyze, test, and qualify the use of ammonia as an alternative fuel to power zero-carbon jet engines as part of a \$10m NASA-funded project seeking to use liquid ammonia as a main hydrogen carrier to decarbonize the aviation industry.

[READ MORE »](#)

## DEPLOYMENT: Rockledge, FL

Mainstream Engineering : In-Line Quality Control of Polymer Electrolyte Membrane Materials

[READ MORE »](#)

## RESEARCH: Sanford, FL

The DOE announced that BoMax Hydrogen is a phase one winner of the Hydrogen Shot Incubator Prize. The company's proposed concept is a system that integrates light-activated nanoparticles with an enzyme to produce clean hydrogen from sunlight.

[READ MORE »](#)

## RESEARCH: Tampa, FL

# HYDROGEN FORWARD

CyberFuels, a division of EncounterCare Solutions, ECSL, has signed a letter of intent with an international green hydrogen producer to work in conjunction with CyberFuels' current distribution of its own proprietary low-carbon alternative fuels and additives, with the first prototype of the commercial units to be placed at the new CyberFuels Gateway Terminal.

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## DEPLOYMENT: Titusville, FL

GenH2 and Chart Industries are collaborating to market and distribute small-scale hydrogen liquification technologies.

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## OPPORTUNITY

Florida Leading the Nation in Hydrogen Development

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Florida Power & Light, Florida's largest electricity provider, and its parent company NextEra Energy announced plans to eliminate its carbon emissions by 2045 by halting its fossil fuel usage and greatly increasing its reliance on solar energy, including using it to turn water into hydrogen to power its generating plants.

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## Georgia

### DEPLOYMENT: Atlanta, GA

Georgia Tech granted DOE grant for advancing hydrogen gas turbines for use in electricity generation.

[READ MORE »](#)

Georgia Institute of Technology: Durable, High-Performance Unitized Reversible Fuel Cells Based on Proton Conductors

[READ MORE »](#)

Center for Transportation and the Environment Fuel Cell Hybrid Electric Delivery Van:

[READ MORE »](#)

Plug Power will invest \$84 million to build hydrogen refinery.

[READ MORE »](#)

### RESEARCH: Atlanta, Georgia

Georgia Tech and Hyundai Motor Company announced a multi-decade partnership as part of Hyundai's investments in the state of Georgia, including hydrogen.

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## OPPORTUNITY: Ball Ground, GA

Chart Industries and FuelCell Energy signed an MOU to utilize the companies' respective advantages in deploying carbon capture and liquified clean hydrogen.

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## DEPLOYMENT: Smyrna, GA

Georgia Power, Mitsubishi Power, and the Electric Power Research Institute (EPRI) successfully validated fuel blending of hydrogen and natural gas at both partial and full load on an M501G natural gas turbine at Georgia Power's Plant McDonough-Atkinson. This was the first project to validate 20% hydrogen fuel blending on an advanced class gas turbine in North America.

[READ MORE »](#)

## DEPLOYMENT: Woodbine, GA

One week after the official commencement of operations of its Woodbine, Georgia hydrogen production plant, Plug Power completed the first fill of a Plug tanker with liquid green hydrogen for use at Walmart, Amazon, and Home Depot sites.

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## OPPORTUNITY

Georgia joins the race to produce green hydrogen.

[READ MORE »](#)

Georgia U.S. Sen. Jon Ossoff visited Georgia Tech's campus on Friday, April 29 and brought major stakeholders in Georgia together in a roundtable discussion to explore the potential for a hydrogen hub in the Southeast.

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Sen. Jon Ossoff (D-GA) is leading a coalition of energy companies, universities, public transportation agencies, and clean energy advocates in a bid to earn federal hydrogen hub funding.

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The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has received encouragement from the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

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United States Senator Jon Ossoff and Georgia Public Trust Commissioner Tim Echols launched the Georgia Hydrogen Energy Braintrust to strengthen energy security, attract new investment, and boost clean hydrogen production.

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## Hawaii

### DEPLOYMENT: Hawaii County, HI

The County of Hawai'i will purchase 6 fuel cell electric buses and hydrogen refueling infrastructure with funding from "Buses and Bus Facilities" and "Low or No Emission" grants allocated in the Bipartisan Infrastructure Law.

[READ MORE »](#)

### OPPORTUNITY: Hawai'i County, HI

Lancaster, CA and Namie, Japan, the world's first renewable hydrogen cities, have pledged to share best practices and strategies to accelerate renewable H2 and fuel cell use in Hawai'i County, the Big Island.

[READ MORE »](#)

### DEPLOYMENT: Honolulu, HI

Hawaii Hydrogen power park

[READ MORE »](#)

University of Hawaii: HydroGEN Seedling: Novel Chalcopyrites For Advanced Photoelectrochemical Water Splitting

[READ MORE »](#)

University of Hawaii: HyMARC Seedling: Development of Magnesium Boride Etherates as Hydrogen Storage Materials

[READ MORE »](#)

### RESEARCH: Honolulu, HI

Hawai'i Natural Energy Institute (HNEI) at University of Hawai'i developed patented invention that enhances longevity and performance of fuel cells.

[READ MORE »](#)

### DEPLOYMENT: Kaliua-Konam, HI

The County of Hawai'i Mass Transit Agency (MTA), in partnership with the Hawai'i Natural Energy Institute (HNEI) and U.S. Hybrid, deployed its first hydrogen fuel-cell-powered bus in May 2022.

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### OPPORTUNITY

Hawaii Lawmaker Pushes Expanded Role For Hydrogen Fuel

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A new policy by the legislature is encouraging the state to shift to more firm renewable energy sources such as hydrogen, geothermal or pumped storage

[READ MORE »](#)

Hawaii's hydrogen hub has been encouraged by the DOE to submit a full application to the regional clean hydrogen hubs funding under the IIJA.

[READ MORE »](#)

## Idaho

### RESEARCH: Idaho Falls, ID

Idaho National Laboratory: Dynamic Modeling and Validation of Electrolyzers in Real-Time Grid Simulation

[READ MORE »](#)

Idaho National Laboratory: High-Temperature Electrolysis Test Stand

[READ MORE »](#)

Bloom Energy is working with Idaho National Laboratory (INL) to independently test the use of nuclear energy to create clean hydrogen through Bloom Energy's solid oxide, high-temperature electrolyzer.

[READ MORE »](#)

A demonstration trial between Bloom Energy and Idaho National Laboratory (INL), is said to have produced hydrogen at 'record-setting efficiencies' using a high-temperature electrolyser installed at a nuclear facility.

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Researchers at the Idaho National Laboratory and the Pacific Northwest National Laboratory are evaluating the potential to produce hydrogen at existing hydropower plants.

[READ MORE »](#)

### OPPORTUNITY

A step closer to clean hydrogen

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## Illinois

### HYDROGEN HUBS: Midwest Alliance for Clean Hydrogen (MachH2)

After receiving encouragement to submit a full application to the DOE, the Midwest Alliance for Clean Hydrogen (MachH2) and the Midwest Hydrogen Corridor Consortium (MHCC) merged to become a single applicant for regional clean hydrogen hub funding under the MachH2 application.

[READ MORE »](#)

Constellation plans to build the world's largest nuclear-powered clean hydrogen facility at its LaSalle Clean Energy Center in Illinois as part of the MachH2 hydrogen hub.

[READ MORE »](#)

### DEPLOYMENT: Boilingbrook, IL

Hyzon Motors manufacturing key HFC components in Illinois

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## RESEARCH: Chicago, IL

Argonne National Laboratory: HydroGEN Seedling: Platinum-Group-Metal-Free Oxygen Evolution Reaction Catalysts for Proton Exchange Membrane Electrolyzers

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Argonne National Laboratory: System Analysis of Physical and Materials-Based Hydrogen Storage

[READ MORE »](#)

Argonne National Laboratory: Tailored High-Performance Low-Platinum-Group-Metal Alloy Cathode Catalysts

[READ MORE »](#)

Argonne National Laboratory: Lab Call FY19: Polymer Electrolyte Fuel Cell Electrode Structures with Encased Catalysts to Eliminate Ionomer Adsorption on Catalytic Sites

[READ MORE »](#)

Argonne National Laboratory: Analysis of Fuel Cells for Trucks

[READ MORE »](#)

The U.S. Department of Energy awarded the University of Chicago \$12.5 million to investigate innovative solutions for long-term hydrogen use. Specifically, it will focus on developing new catalysts, which are substances that can increase the rate of electrolysis.

[READ MORE »](#)

## RESEARCH: DuPage County, IL

U.S. Department of Energy's (DOE) Argonne National Laboratory partnered with Achates Power to develop a hydrogen-powered engine primarily for long-haul commercial vehicles.

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## DEPLOYMENT: Evanston, IL

Northwestern University: HydroGEN Seedling: Degradation Characterization and Modeling of a New Solid Oxide Electrolysis Cell Utilizing Accelerated Life Testing

[READ MORE »](#)

Northwestern University: HydroGEN Seedling: Transformative Materials for High-Efficiency Thermochemical Production of Solar Fuels

[READ MORE »](#)

## RESEARCH: Evanston, IL



Northwestern University: Efficient Reversible Operation and Stability of Novel Solid Oxide Cells

[READ MORE »](#)

The Toyota Research Institute is partnering with Northwestern University to use the world's first data factory to synthesize Northwestern's "Megalibraries" to identify new catalysts for hydrogen fuel cell vehicles.

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## RESEARCH: Lemont, IL

Researchers at Argonne National Laboratory developed a low-cost cobalt-based catalyst to help produce hydrogen from electrolysis.

[READ MORE »](#)

## DEPLOYMENT: Nelson Township, IL

U.S. firm Invenergy announced its first green hydrogen project, Sauk Valley, which will generate green hydrogen by utilizing power from Invenergy's co-located solar plant and Ohmium International low-carbon, electrolyzer technology. The project is expected to generate up to 52 tons of hydrogen annually and will have capacity to store up to 400 kilograms (kg) of hydrogen on site and can provide hydrogen to Invenergy's 584-megawatt Nelson Energy Center. The company hopes to be operational by the end of 2022.

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## DEPLOYMENT: Urbana, IL

Champaign-Urbana introduced its first zero-emission hydrogen fuel cell electric buses in 2021 (plus fueling stations).

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## DEPLOYMENT: Various

81 Illinois schools have hydrogen fuel cell systems donated by Ameren.

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DOT deploying signs on "alternative fuel corridors" to direct to stations offering alternative fuels, including hydrogen fueling stations.

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## OPPORTUNITY

IL has high concentration of steel mills, which can replace coke with green carbon to decarbonize steel making.

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After receiving encouragement to submit a full application to the DOE, the Midwest Alliance for Clean Hydrogen (MachH2) and the Midwest Hydrogen Corridor Consortium (MHCC) merged to become a single applicant for regional clean hydrogen hub funding under the MachH2 application.

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The University of Illinois Urbana-Champaign, Argonne National Laboratory, and ArcelorMittal partnered to create the Midwestern Hydrogen Partnership and apply for federal hydrogen hub funding.

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## Indiana

### DEPLOYMENT: Carmel, IN

Carmel retrofitting fleet vehicles with new technology that produces cleaner-burning and more fuel-efficient hydrogen energy.

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### OPPORTUNITY: Columbus, IN

Cummins signed a Memorandum of Understanding (MoU) with Terex® Advance Mixer Inc., to produce, trial and prove concrete mixer trucks powered by Cummins' zero-carbon, hydrogen fueled internal combustion engines.

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### DEPLOYMENT: East Chicago, IN

Cleveland-Cliffs successfully completed a hydrogen injection trial at its Indiana Harbor #7 blast furnace, the largest blast furnace in North America.

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### RESEARCH: Hammond, IN

Purdue University Northwest signed a licensing agreement with the Purdue Research Foundation to commercialize a newly discovered process that uses food waste to biologically produce hydrogen for use as a sustainable energy source. Scale up tests will be conducted through the end of 2022, and the university expects construction could start on the first commercial prototype in 2023.

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### RESEARCH: Indianapolis, IN

Indiana University Purdue University Indianapolis: Mesoporous Carbon-Based Platinum-GroupMetal-Free Catalyst Membrane Electrode Assemblies.

[READ MORE »](#)

The DOE announced that Biomass Super Gasifier is a phase one winner of the Hydrogen Shot Incubator Prize. The proposed concept creates hydrogen through

[READ MORE »](#)

an indirectly heated pyrolytic gasification process to convert carbon-based feedstocks into syngas.

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## DEPLOYMENT: West Terre Haute, IN

Wabash Valley Resources producing hydrogen energy and capture and story in West Terre Haute.

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## DEPLOYMENT: General, IN

A-1 Alternative Fuel Systems is leading a consortium dedicated to developing fuel cell electric shuttle buses for the California public transit authority. The buses will be developed in Wisconsin and Indiana.

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## OPPORTUNITY

Indiana is becoming America's hydrogen innovation hub

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Indiana has high concentration of steel mills, which can replace coke with green carbon to decarbonize steel making.

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After receiving encouragement to submit a full application to the DOE, the Midwest Alliance for Clean Hydrogen (MachH2) and the Midwest Hydrogen Corridor Consortium (MHCC) merged to become a single applicant for regional clean hydrogen hub funding under the MachH2 application.

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## Iowa

### RESEARCH: Ames, IA

A new study pioneered by researchers from the University of Oklahoma and Iowa State University has received a \$4 million grant from the federal government to investigate utilizing Oklahoma's abundant natural resources and Iowa's vast supply of renewable biomass to produce hydrogen.

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### DEPLOYMENT: Iowa City, IA

University of Iowa scientists to develop technology to make hydrogen from sunlight and any source of water.

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## OPPORTUNITY

Iowa could become hot spot for green hydrogen technology.

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The governors of Iowa, Nebraska, and Missouri have partnered to create the Mid-Continent Clean Hydrogen Hub to pursue \$1 billion in funding from the DOE's H2 hubs program.

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## Kansas

### RESEARCH: Coffeyville, KS

Global CCS Institute; Global Carbon Capture and Storage Institute Response to the National Hydrogen Strategy Issues Papers

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CVR Energy selected Honeywell UOP Ecofining™ technology for a 'lower-carbon' hydrogen production study at its Coffeyville site.

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### DEPLOYMENT: Lawrence, KS

Avium LLC, headquartered at University of Kansas gets grant to advance technology that can broaden the popularity and ease of owning cars with hydrogen fuel cells

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### RESEARCH: Lawrence, KS

University of Kansas: Stationary Direct Methanol Fuel Cells Using Pure Methanol

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### DEPLOYMENT: Overland Park, KS

Kansas company WindSoHy highlights Kansas' regional benefits for hydrogen by producing hydrogen from wind power and utilizing natural storage in underground caverns.

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## Kentucky

### DEPLOYMENT: Calvert City, KY

Airgas builds a liquid hydrogen plant in Calvert City.

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## DEPLOYMENT: Georgetown, KY

Toyota is establishing a dedicated line for hydrogen fuel cell modules at its Kentucky facility, scheduled to begin production in 2023.

[READ MORE »](#)

## RESEARCH: Lexington, KY

University of Kentucky Center for Applied Energy Research: Precursor Processing Development for Low-Cost, High-Strength Carbon Fiber for Composite Overwrapped Pressure Vessel Applications.

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## OPPORTUNITY

Louisville Gas and Electric Company and Kentucky Utilities joined an initiative to support the development of a hydrogen hub in Kentucky.

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The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IJJA.

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The ARCH2 hydrogen hub, a collation between West Virginia, Ohio, Kentucky, and Pennsylvania, has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IJJA.

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## Louisiana

### DEPLOYMENT: Ascension Parish, LA

Air Products Announces \$4.5 Billion Blue Hydrogen Clean Energy Complex in Eastern Louisiana.

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CF Industries is evaluating a site for an ammonia production facility for a joint export project between CF Industries and Mitsui & Co., Ltd.

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### OPPORTUNITY: Ascension Parish, LA

Ascension Clean Energy (ACE), a partnership between project development company Clean Hydrogen Works, Denbury Carbon Solutions, and Hafnia is exploring plans to build a large-scale ammonia and hydrogen production facility. The facility would produce hydrogen through steam methane reforming and contain a carbon capture component.

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## DEPLOYMENT: Baton Rouge, LA

Koch Engineered Solutions developing renewable energy complex to produce green hydrogen in Baton Rouge.

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Gron Fuels \$9.2 million multi-year program will produce green hydrogen, renewable diesel, sustainable aviation fuels, and bio-plastic feedstocks.

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Delta Air Lines signed an offtake agreement with DG Fuels to use sustainable aviation fuel derived from hydrogen produced by an 839MW electrolyzer installation at DG Fuel's Louisiana facility.

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## RESEARCH: Lafayette, LA

Louisiana State University (LSU) will support the research, workforce development and execution of the hydrogen initiative between Louisiana, Oklahoma, and Arkansas.

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## DEPLOYMENT: Donaldsville, LA

CF Industries plans 20-MW electrolyzer to produce hydrogen in Louisiana with thyssenkrupp for Green Ammonia Project.

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CF Industries Holdings Inc announces engineering and procurement contract.

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Monarch Energy is exploring building a \$426m hydrogen production facility to produce hydrogen intended for green feedstock sale for industrial and chemical processes.

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## DEPLOYMENT: Geismar, LA

Praxair is building one of nation's largest hydrogen plants in Louisiana.

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Air Products hydrogen production facility in Geismar.

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## DEPLOYMENT: Laplace, LA

The Port of Louisiana, US, is building a new hydrogen and ammonia production facility to provide zero-carbon fuel for the shipping industry and energy transfer

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## RESEARCH: Lafayette, LA

The University of Louisiana at Lafayette was awarded a \$1 million grant from the DOE to develop high-performance metal-supported solid oxide electrolysis cells and innovative diagnostic methodologies to achieve net-zero or negative emissions and advance clean hydrogen technology.

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## DEPLOYMENT: New Orleans, LA

Entergy Corp. joining forces with Mitsubishi Power to integrate green hydrogen into utility business.

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A memorandum of understanding (MoU) for a methane-hydrogen fuel cell tugboat development project was signed to develop an H<sub>2</sub>-powered inland tugboat that will operate across the Port of New Orleans waterway network.

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## DEPLOYMENT: Port of South Louisiana, LA

The U.S. Economic Development Administration awarded a \$50 million federal grant to 25-member partnership H<sub>2</sub>theFuture, which plans to develop a hydrogen “cluster” across South Louisiana incorporating research institutions, hydrogen production facilities, and the first U.S. hydrogen fueling barge in the Port of South Louisiana.

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## OPPORTUNITY: St. Charles Parish, LA

St. Charles Clean Fuels is assessing the potential to develop a \$1.6 billion clean ammonia facility.

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## DEPLOYMENT: St. Gabriel, LA

Plug Power Inc. and Olin Corporation will begin construction of a 15-ton-per-day renewable hydrogen plant through a joint venture named Hidrogenii.

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## OPPORTUNITY

Louisiana could be key player in building a hydrogen economy.

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Louisiana’s newly released climate action plan lists “no-carbon hydrogen” as one of the three key policy pillars are needed for Louisiana to achieve net zero by 2050.

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Governors John Bel Edwards of Louisiana, Kevin Stitt of Oklahoma, and Asa Hutchinson of Arkansas announced their states have entered into a bipartisan three-state partnership to establish a regional hub for development, production, and use of clean hydrogen as fuel and manufacturing feedstock.

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Louisiana's Climate Initiatives Task Force is evaluating several ongoing projects including a transition to hydrogen energy and building electrical vehicle infrastructure.

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The HyVelocity Hub, a coalition led by GTI Energy, The Center for Houston's Future, The University of Texas at Austin, Air Liquide, and Chevron, is applying for DOE hydrogen hub funding. The hub intends to advance hydrogen deployment in Texas, Southwest Louisiana, and the surrounding Gulf Coast region.

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Arkansas, Louisiana, and Oklahoma's HALO hydrogen Hub received encouragement from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## Maine

### OPPORTUNITY

Central Maine Power (CMP) is exploring how to help advance green hydrogen consumption in existing manufacturing processes.

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Renewable Hydrogen News: Power-to-Gas Mania Hits Maine

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Maine and Rhode Island joined the New-York led coalition of six state governments and over 60 private businesses planning to apply for federal hydrogen hub funding.

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## Maryland

### DEPLOYMENT: Montgomery County, MD

The Montgomery County Department of Transportation will use a \$15 million "Low or No-Emissions" grant from the Federal Transit Administration to purchase 13 hydrogen fuel cell buses and a hydrogen fueling station.

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### DEPLOYMENT: Various



Ally Power is raising \$40 million to build 6 hydrogen fueling stations around the DC, MD, and VA area.

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## OPPORTUNITY: General, MD

The Mid-Atlantic Hydrogen Hub, a Maryland, Virginia, and Washington, D.C. coalition led by regional nonprofit Connected DMV, received encouragement from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## Massachusetts

### DEPLOYMENT: Boston, MA

Giner, Inc.: High-Temperature Alkaline Water Electrolysis

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Giner, Inc.: ElectroCat: Durable Mn-Based Platinum-Group-Metal-Free Catalysts for Polymer Electrolyte Membrane Fuel Cells

[READ MORE »](#)

Advent Technologies, Inc.: Facilitated Direct Liquid Fuel Cells with High-Temperature Membrane Electrode Assemblies:

[READ MORE »](#)

### RESEARCH: Boston, MA

Northeastern University: HydroGEN Seedling: Developing Novel Platinum-Group-Metal-Free Catalysts for Alkaline Hydrogen and Oxygen Evolution Reactions

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Northeastern University: Developing Platinum-Group-Metal-Free Catalysts for Oxygen Reduction Reaction in Acid: Beyond the Single Metal Site

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### OPPORTUNITY: Boston, CA

Researchers at MIT are partnering with Doosan Mobility Innovation to develop the first hydrogen fuel-cell-powered motorcycle.

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### DEPLOYMENT: Braintree, MA

Air Liquide opens hydrogen stations in Braintree and Mansfield.

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### RESEARCH: Cambridge, MA

MIT researchers developed a model that shows hydrogen-fired power generation can be the more economical option when compared to lithium-ion batteries.

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MIT researchers developed a hydrogen supply chain planning model and found that flexible scheduling for trucks and pipelines would allow them to serve as both storage and transmission.

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## DEPLOYMENT: Charlestown, MA

Hyundai and Advent signed a joint development agreement after successfully testing a Membrane Electrode Assembly technology for supplying Hyundai's fuel cells.

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## DEPLOYMENT: Devens, MA

Electric Hydrogen (EH2) will start building 100 MW electrolyzers in early 2024 with the aim of reducing the cost of renewable hydrogen.

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## DEPLOYMENT: Mansfield, MA

Air Liquide opens hydrogen stations in Braintree and Mansfield.

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## RESEARCH: Natick, MA

Electric Hydrogen, a startup developing large scale electrolyzer systems for industrial operations that resist direct decarbonization through renewable electricity, had a \$198 million round of funding for a patented, industrial scale electrolysis system from backers including the legacy firms Honeywell, Mitsubishi Heavy Industries, and Rio Tinto. Previous round funders include Breakthrough Energy Ventures, Capricorn Partners, Energy Impact Partners, and Prelude Ventures.

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## RESEARCH: Newton, MA

Giner ELX, Inc.: Electrochemical Compression INS GVD Corporation: Coatings for Compressor Seals

[READ MORE »](#)

## DEPLOYMENT: Northborough, MA

Saint-Gobain: HydroGEN Seedling: Development of Durable Materials for Cost Effective Advanced Water Splitting Utilizing All Ceramic Solid Oxide Electrolyzer Stack Technology

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## DEPLOYMENT: Rehoboth, MA

Daimler's truck division shifting towards zero-emission vehicles (think H2).

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## RESEARCH: Somerville, MA

Ivys Energy Solutions: Advancing Hydrogen Dispenser Technology by Using Innovative Intelligent Networks

[READ MORE »](#)

## DEPLOYMENT: Waltham, MA

Giner, Inc.: FY18 SBIR IIB: Ionomer Dispersion Impact on Advanced Fuel Cell and Electrolyzer Performance and Durability

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Giner, Inc.: High-Efficiency Reversible Alkaline Membrane Fuel Cells

[READ MORE »](#)

## DEPLOYMENT: General

New York and Massachusetts, US-based National Grid, has said it had located 'robust' stocks of hydrogen and renewable natural gas (RNG) that could be used as part of its fossil-free energy strategy for the Northeast of the US. According to National Grid, a May 2022 RFI revealed that at least 33 trillion BTUs will be available over the next three years, which is more than double of the amount needed in 2025.

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EvoLOH is building the world's largest hydrogen electrolyzer manufacturing plant in Massachusetts.

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## OPPORTUNITY

Op-ed: Hydrogen is the missing piece of Mass. Clean energy economy

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New York, New Jersey, Massachusetts and Connecticut agreed to work with about 40 clean power companies, utilities and universities to create plans for a regional hydrogen hub.

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## Michigan

### DEPLOYMENT: Ann Arbor, MI

University of Michigan: HyMARC Seedling: Optimized Hydrogen Adsorbents via Machine Learning and Crystal Engineering

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### RESEARCH: Ann Arbor, MI

University of Michigan: HydroGEN Seedling: Monolithically Integrated Thin-Film/Silicon Tandem Photoelectrodes for High Efficiency and Stable Photoelectrochemical Water Splitting

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The DOE announced that NX Fuels Inc. is a phase one winner of the Hydrogen Shot Incubator Prize. The company's proposed concept is a technology that harnesses sunlight to produce hydrogen from seawater using a photoelectrochemical process.

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The University of Michigan launched MI Hydrogen, a venture to foster collaboration among U-M researchers and affiliates to explore hydrogen as a solution to a just energy transition through projects on transportation and industrial applications, as well as an analysis statewide demand for the energy carrier.

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### DEPLOYMENT: Brownstown, MI

Honda & GM are producing advanced fuel cell systems.

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GM and Honda began commercial production at their 50-50 hydrogen fuel cell system manufacturing joint venture production facility, FCSM.

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### DEPLOYMENT: Detroit, MI

General Motors: Highly Accessible Catalysts for Durable High-Power Performance

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General Motors: Durable High-Power Membrane Electrode Assemblies with Low Platinum Loading

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FusionOne's first HydroPlas Reactor is expected to be in operation by mid-2022. The technology produces hydrogen from plastic, and additional reactor sites will be announced through 2022.

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BayoTech Inc. is partnering with the American Center for Mobility to expand its distributed hydrogen network in the Detroit region. ACM's 500-acre site in Ypsilanti Township will be home to the BayoGaaS Hydrogen Hub and produce 350 tons of low carbon hydrogen per year.

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## RESEARCH: Marquette, MI

Wärtsilä, in collaboration with WEC Energy Group, EPRI and Burns & McDonnell, used hydrogen blended fuel to power an 20-MW Wärtsilä 50SG engine, making it the largest internal combustion engine ever to continuously operate on a hydrogen fuel blend.

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## DEPLOYMENT: Plymouth Charter Township, Michigan

Nel ASA selected Plymouth Charter Township, Michigan, as the location for its next alkaline and PEM gigafactory in the US for electrode manufacturing.

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## DEPLOYMENT: Southfield, MI

DTE opens hydrogen technology park in Southfield.

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## DEPLOYMENT: Wayne, MI

Ford Motor Company: Vapor Deposition Process for Engineering of Dispersed Polymer Electrolyte Membrane Fuel Cell Oxygen Reduction Reaction Pt/NbOx/C Catalysts

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## DEPLOYMENT: Upper Peninsula, MI

WEC Energy Group will test co-firing hydrogen with natural gas at one of its power generation plants in Michigan's Upper Peninsula.

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## DEPLOYMENT: Various

DOE is working with Michigan Economic Development Corp to enhance R&D and provide job creation.

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Michigan Department of Environment, Great Lakes, and Energy (EGLE) is offering a second round of funding for electric, hydrogen fuel cell or diesel-electric hybrid commercial and mass transit vehicles to replace older, diesel-fueled models.

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Nel is building a \$400 million automated electrolyzer manufacturing facility. The project will create more the 500 jobs and become one of the largest electrolyzer manufacturing plants in the world.

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## OPPORTUNITY

DOE is working with Michigan Economic Development Corp to enhance R&D and provide job creation.

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[READ MORE »](#)

MI has high concentration of steel mills, which can replace coke with green carbon to decarbonize steel making.

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Seven Midwest states, including Michigan, formed the M-H2 hydrogen hub coalition aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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After receiving encouragement to submit a full application to the DOE, the Midwest Alliance for Clean Hydrogen (MachH2) and the Midwest Hydrogen Corridor Consortium (MHCC) merged to become a single applicant for regional clean hydrogen hub funding under the MachH2 application.

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The Great Lakes Hydrogen Partnership (GLCH), comprised of companies and utilities primarily in Ohio and Michigan, has been encouraged by the DOE to submit a full application to the regional clean hydrogen hubs funding under the IJA.

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## Minnesota

### DEPLOYMENT: Fridley, MN

Accelera by Cummins is producing electrolyzers at its manufacturing plant in Fridley, making it the first electrolyzer production facility in the United States.

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### DEPLOYMENT: Maplewood, MN

3M Company: Novel Ionomers and Electrode Structures for Improved Polymer Electrolyte Membrane Fuel Cell Electrode Performance at Low Platinum Group Metal Loadings.

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3M Company: Low-Cost, High-Performance Catalyst Coated Membranes for Proton Exchange Membrane Water Electrolyzers.

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## RESEARCH: Maplewood, MN

3M Company: Highly Active, Durable, and Ultra-Low-Platinum-Group-Metal Nanostructured Thin Film Oxygen Reduction Reaction Catalysts and Supports.

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## DEPLOYMENT: Minneapolis, MN

Construction expected next year on hydrogen production utilizing steam and water.

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Centerpoint is working on a green hydrogen pilot project to blend less than 5% into existing natural gas system.

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## RESEARCH: New Prague, MN

Chart Industries, Inc. and Ballard Power Systems successfully tested a fuel cell powered by liquid hydrogen by pairing a Ballard FCmove™-HD fuel cell with a Chart liquid onboard hydrogen ("HLH2") vehicle fuel system at Chart's hydrogen test facility in Minnesota.

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## RESEARCH: Red Wing, MN

Prairie Island Nuclear Generating Plant was awarded funding to demonstrate an innovative high-temperature electrolysis project with hopes to scale. Production is expected to begin in early 2024, pending negotiations between The DOE's Office of Energy Efficiency & Renewable Energy (EERE) and project developers Bloom Energy and Excel Energy.

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## DEPLOYMENT: St. Cloud, MN

A wastewater treatment facility plans to produce clean hydrogen fuel and pure oxygen on-site by running water through an electrolyzer that uses renewable electricity to separate the H<sub>2</sub>O molecule into hydrogen and oxygen.

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## DEPLOYMENT: St. Paul, MN

Caterpillar Inc. has partnered with Minnesota-based District Energy St. Paul on a three-year project to demonstrate a hydrogen-fueled combined heat and power (CHP) system.

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## DEPLOYMENT: Wayne, MN

Prairie Island nuclear plant will transition to producing hydrogen from water.

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## DEPLOYMENT: Welch, MN

Bloom Energy will install an electrolyzer at an Xcel Energy nuclear plant in Welch, Minnesota. The electrolyzer is expected to ensure 99% uptime, increasing reliability in the winter months of Minnesota.

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## OPPORTUNITY

The Natural Gas Innovation Act opens the door to establish a regulatory framework for flowing renewable natural gas, or RNG, and green hydrogen to Minnesota gas customers.

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The North Dakota Department of Commerce is working to form a partnership with South Dakota, Montana, Minnesota, and Wisconsin to apply for federal hydrogen hub funding.

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Seven Midwest states, including Minnesota, formed the M-H2 hydrogen hub coalition aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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Minnesota joined with three other Midwestern states to develop a proposal for a “Heartland Hydrogen Hub” aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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## Mississippi

### DEPLOYMENT: Hancock County, MS

Hy Stor Energy entered a strategic partnership with the Hancock County Port and Harbor Commission to provide zero-carbon, zero-methane hydrogen to Port

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# HYDROGEN FORWARD

Bienville Industrial Park and Stennis International Airport. Through this partnership, Port Bienville will be the first port in the Gulf Region to integrate renewable hydrogen as a fuel into its operations.

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## DEPLOYMENT: Renova, MS

Entergy Corp. joining forces with Mitsubishi Power to integrate green hydrogen into utility business.

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## DEPLOYMENT: St Louis, MS

Entergy Corp. joining forces with Mitsubishi Power to integrate green hydrogen into utility business.

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## DEPLOYMENT: Various

Hy Stor Energy LP and Connor Clark & Lunn are partnering to create the Mississippi Hydrogen Hub to use arrays of solar panels to generate electricity to electrolyzers that split hydrogen from water molecules. The zero-carbon hydrogen would be stored in underground salt caverns then piped or trucked away to serve as fuel for fuel cell vehicles or be blended into natural gas systems.

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## Missouri

### DEPLOYMENT: St. Louis, MO

BayoTech Partners and Ranken Technical College partnered to develop the BayoGaaS Hydrogen Hub expected to produce 350 tons of low-cost and low-carbon hydrogen per year.

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### RESEARCH: St. Louis, MO

Washington University in St. Louis: Corrosion-Resistant Non-Carbon Electrocatalyst Supports for Polymer Electrolyte Fuel Cells.

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### DEPLOYMENT: Wentzville, MO

Hydrogen is now being produced by US-based hydrogen transport and storage player BayoTech at its BayoGaaS™ Hydrogen Hub in Wentzville, Missouri.

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## OPPORTUNITY: St. Louis, MO

A 15-member coalition of industry and academic institutions has formed the Greater St. Louis and Illinois Regional Clean Hydrogen Hub Industrial Cluster to apply for federal hub funding in the Midwest, with a goal of decarbonizing the region's industrial sector.

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## OPPORTUNITY: General, MO

The governors of Iowa, Nebraska, and Missouri have partnered to create the Mid-Continent Clean Hydrogen Hub to pursue \$1 billion in funding from the DOE's H2 hubs program.

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## Montana

### OPPORTUNITY: Butte, MT

Hydrogen projects are ripe for Montana, NorthWestern Energy.

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Mitsubishi proposed building a hydrogen plant that would extract hydrogen from the water in the Berkeley Pit.

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### DEPLOYMENT: Great Falls, MT

Montana Renewables has secured financing for a renewable hydrogen plant, expected to be operational in late 2022.

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### OPPORTUNITY: General

The North Dakota Department of Commerce is working to form a partnership with South Dakota, Montana, Minnesota, and Wisconsin to apply for federal hydrogen hub funding.

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Montana joined with three other Midwestern states to develop a proposal for a "Heartland Hydrogen Hub" aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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## Nebraska

### DEPLOYMENT: Geneva, NE

# HYDROGEN FORWARD

HyTerra and Natural Hydrogen Energy (NH2E) will begin testing operations at a natural hydrogen production project.

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## DEPLOYMENT: Lincoln, NE

Chemical and energy company Monolith received conditional approval for a \$1bn loan from the US DOE to create a clean hydrogen and carbon black production facility.

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## DEPLOYMENT: Papillion, NE

Siemens Energy is providing two SGT6-5000F turbines that run on up to a 30% hydrogen blend to power Omaha Public Power District's (OPPD) new Turtle Creek Station peaking plant.

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## OPPORTUNITY: General

Nebraska LB1099, introduced by Sen. Bruce Bostelman of Brainard, would require the Nebraska Department of Economic Development to create a working group for the state's selection as a regional hub.

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The governors of Iowa, Nebraska, and Missouri have partnered to create the Mid-Continent Clean Hydrogen Hub to pursue \$1 billion in funding from the DOE's H2 hubs program.

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## Nevada

### RESEARCH: Henderson, NV

Southwest Gas announced a pilot project to determine the optimal blend of hydrogen and natural gas for safety and the environment, including the physical impacts of hydrogen on distribution system infrastructure and common gas appliances.

[READ MORE »](#)

### DEPLOYMENT: Las Vegas, Nevada

The Regional Transportation Commission of Southern Nevada (RTC) launched the first of the two buses at the University of Nevada, Las Vegas' (UNLV) Black Fire Innovation; the "first" hydrogen fuel cell electric buses to be operational state-wide.

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## RESEARCH: Las Vegas, NV

Southwest Gas Corporation signed agreements with the University Nevada, Las Vegas (UNLV) and the Arizona State University in Tempe (ASU) to conduct a study to see how hydrogen-blended natural gas can further reduce carbon emissions whilst still providing clean and reliable energy without disrupting the daily routines of customers.

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## DEPLOYMENT: North Las Vegas, NV

Air Liquide has opened their largest liquid hydrogen production and logistics facility to supply the hydrogen vehicle market.

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Air Liquide committed to producing renewable hydrogen for the West Coast mobility market with new liquid hydrogen plant.

[READ MORE »](#)

## DEPLOYMENT: General, NV

Airbus' Blue Condor made its first hydrogen-powered flight over Nevada, marking the first ever use of hydrogen as a sole fuel source for this Airbus aircraft.

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## OPPORTUNITY: General, NV

Arizona, the Navajo Nation, and Nevada are partnering with The Center for an Arizona Carbon Neutral Economy to launch the Southwest Clean Hydrogen Innovation Network, or "SHINE," and apply for DOE hydrogen hub funding.

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## New Hampshire

### OPPORTUNITY

New Hampshire Could Kick Off Renewable Hydrogen Revolution.

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## New Jersey

### DEPLOYMENT: Howell, NJ

New Jersey Resources Corp. has begun blending renewable hydrogen into its natural gas distribution system in order to reduce its emissions while maintaining reliability.

[READ MORE »](#)

## DEPLOYMENT: Newark, NJ

Bloom Energy operates a fuel cell production plant in Newark.

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## RESEARCH: Newark, NJ

Rutgers University: HydroGEN Seedling: Best-in-Class Platinum-Group-Metal-Free Catalyst Integrated Tandem Junction Photoelectrochemical Water Splitting Devices

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## DEPLOYMENT: Princeton, NJ

TreadStone Technologies, Inc.: Novel Structured Metal Bipolar Plates for Low-Cost Manufacturing

[READ MORE »](#)

## DEPLOYMENT: Various

SJI partnered with Atlantic Shores on a green hydrogen pilot program, which will research, monitor, and analyze the deployment of hydrogen technology and natural gas blending, expected to be fully operational in 2028.

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## OPPORTUNITY: General

New York, New Jersey, Massachusetts and Connecticut agreed to work with about 40 clean power companies, utilities and universities to create plans for a regional hydrogen hub.

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## New Mexico

### DEPLOYMENT: Albuquerque, NM

Pajarito Powder: Active and Durable Platinum-Group-Metal-Free Cathodic Electrocatalysts for Fuel Cell Application.

[READ MORE »](#)

BayoTech is building its first of 50 planned “hydrogen hubs”; a hydrogen dispensation station for hydrogen-powered vehicles expected to be operational by summer 2022.

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Universal Hydrogen has signed an letter of intent with the City of Albuquerque to invest over \$250 million to build a manufacturing and distribution center on 50 acres of land in New Mexico.

[READ MORE »](#)

## RESEARCH: Albuquerque, NM

Sandia National Laboratories: Lab Call FY19: Electrode Ionomers for High Temperature Fuel Cells

[READ MORE »](#)

Sandia National Laboratories: Hydrogen Stations for Urban Sites

[READ MORE »](#)

Sandia National Laboratories: Hydrogen Quantitative Risk Assessment

[READ MORE »](#)

## DEPLOYMENT: Bernalillo, NM

Universal Hydrogen is developing a major hub to manufacture and distribute hydrogen storage modules at the Albuquerque International Sunport.

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## OPPORTUNITY: Crownpoint, New Mexico

A newly expanded partnership between Los Alamos National Laboratory and Navajo Technical University, supported by the Department of Energy's Hydrogen and Fuel Cells Technology Office Native American Fellowship, is helping foster a STEM-adept workforce for careers in hydrogen.

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## RESEARCH: Farmington, NM

San Juan College has a new certification program focusing on hydrogen fuel cell technology's implementation within the automotive industry.

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## RESEARCH: Los Alamos, NM

Los Alamos National Laboratory: Lab Call FY18 (Reversible Fuel Cell): Microstructured Electrodes and Diffusion Layers for Enhanced Transport in Reversible Fuel Cells

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Los Alamos National Laboratory: Lab Call FY19: Low-Cost Gas Diffusion Layer Materials and Treatments for Durable High-Performance Polymer Electrolyte Membrane Fuel Cells

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Los Alamos National Laboratory: Fuel Quality Assurance R&D and Impurity Testing in Support of Codes and Standards

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## DEPLOYMENT: Prewitt, NM

Escalante H2 Power (EH2), wants to convert the Escalante Generating Station into a hydrogen-fueled plant. EH2 plans to produce hydrogen at the Escalante site through reformation of methane from natural gas. 97% or more of the CO2 produced in the process would be captured and stored, resulting in so-called blue hydrogen. The CO2 will not be used for enhanced oil recovery. Escalante is expected to provide about 265 MW of dispatchable power from hydrogen.

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## DEPLOYMENT: General

The New Mexico Economic Development Department (EDD), Energy, Minerals and Natural Resources Department, and Environment Department (EMNRD) entered into a Memorandum of Understanding (MOU) with Los Alamos National Laboratory (LANL) and Sandia National Laboratories to build a zero-carbon hydrogen economy not only in New Mexico but across the United States.

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The Wyoming Energy Authority has issued a request for proposals (RFP) for a prime contractor for the Western Inter-States Hydrogen Hub, a proposed regional clean hydrogen hub that Colorado, New Mexico, Utah and Wyoming have teamed up to develop. The prime contractor will support the submission of an application for funding to the Department of Energy (DoE) and, if successful, it will manage the implementation of the project.

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## OPPORTUNITY

New Mexico's oil and gas regions could become leaders in hydrogen power, congresspeople say.

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Northwest New Mexico seeks to become hydrogen hub.

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New Mexico's robust resources and highly skilled workforce capable of supporting a diverse industrial sector gives it a leading edge as other states vie to become the next hydrogen powerhouse.

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Colorado, New Mexico, Utah and Wyoming will jointly apply for federal money to create a regional hydrogen hub and compete for \$8 billion set aside for such projects in the 2021 Infrastructure Investment and Jobs Act.

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Environment Secretary James Kenney highlighted a number of hydrogen initiatives in New Mexico on an appearance in the Hydrogen Rising Podcast, including the state's proposed financing of hydrogen development via public-private partnerships, its partnership with the U.S. Department of Energy's Los.

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Alamos and Sandia National Laboratories on hydrogen best practices, and the Western Inter-State Hydrogen Hub (WISHH) alliance.

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Governor Lujan Grisham said hydrogen is the only way for the state to get to “net zero” carbon emissions by 2050.

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Colorado, New Mexico, Utah, and Wyoming’s Western Interstate Hydrogen Hub (WISHH) received a recommendation from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## New York

### DEPLOYMENT: Brentwood, NY

NY invests in green hydrogen demonstration project at Brentwood Power Plant on Long Island.

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### DEPLOYMENT Buffalo, NY

Plug Power moving forward with plans for a “green hydrogen” plant in Genesee County.

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McDermott’s storage business, CB&I, will design and build two 500,000-gallon double-wall liquid hydrogen spheres for Plug Power Inc.’s new green hydrogen production facility in Genesee County.

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### DEPLOYMENT: Busti, NY

Cummins plans to begin producing 15-liter hydrogen internal combustion engines at its Busti, NY plant in 2024.

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### DEPLOYMENT: Capital Region, NY

National Grid and Standard Hydrogen are awaiting regulatory approval for their Energy Transfer System hydrogen infrastructure.

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### RESEARCH: East Northport, NY

The DOE announced that Evolve Hydrogen Inc. is a phase one winner of the Hydrogen Shot Incubator Prize. The company’s proposed concept is a novel

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electrolyzer system design that can use seawater as a feedstock without the need for precious metal materials.

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## DEPLOYMENT: Holtsville, NY

FourGen-H LLC and FourGen-S LLC will construct a fuel-cell facility thanks to economic incentives from the Town of Brookhaven Industrial Development Agency.

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## RESEARCH: Ithaca, NY

Professor Héctor D. Abruña of Cornell University has been awarded \$8.3 billion to further his group's research on hydrogen fuel-cell-powered vehicles. Cornell will engage with automotive companies such as GM, Toyota, Tesla, Mercedes-Benz, Nissan, and Hyundai to potentially bring their research to market.

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## OPPORTUNITY: Ithaca, NY

Cornell University and two Cornell research-startups have joined the New York-led consortium that aims to propose a Northeast hydrogen research hub across NY, MA, CT, and NJ.

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## DEPLOYMENT: Latham, NY

Microsoft has demonstrated a 3MW power generation system powered by hydrogen - the latest step in its project to move towards zero-carbon backup power for data centers. The system was built by Plug Power and uses hydrogen fuel cells in two 40ft shipping containers in a parking lot at Plug's headquarters in Latham, New York. Microsoft has added a simulated data center load and run it through the same acceptance tests it normally applies to diesel generators, proving that it can keep the load running when the grid power fails.

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Plug Power has expanded its Genkey offering to enable fuel cell adoption for warehouses that operate fewer than 100 electric forklifts, further expanding the opportunity for hydrogen-powered forklift adoption.

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## DEPLOYMENT: Massena, NY

The NYPA board approved 94 MW of low-cost St. Lawrence hydropower to Air Products for its significant project investment and creation of 90 jobs in

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Massena. The project supports New York State's goal of becoming a Regional Clean Energy Hydrogen Hub.

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## DEPLOYMENT: New York, NY

The Metropolitan Transit Authority will pilot hydrogen-powered buses across eight routes in the Bronx thanks to an \$8 million grant from the New York State Energy Research and Development Authority (NYSERDA). The grant will also fund the construction of a hydrogen fueling station with a 40 bus capacity.

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## RESEARCH: New York, NY

Researchers at Cornell University have developed a hydrogen fuel cell anode made from nitrogen-doped, carbon-coated nickel. This catalyst doesn't require any of the precious metals used in conventional catalysts, so it could be produced at a fraction of the cost.

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## OPPORTUNITY: New York, NY

Ambient Fuels received a \$250 million investment from Generate Capital to support clean hydrogen infrastructure that decarbonizes heavy industry and transportation.

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## DEPLOYMENT: Newburgh, NY

In Newburgh, Danskammer Energy is working with Mitsubishi Energy's Green Power project.

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## DEPLOYMENT: Niagara Falls, NY

Linde announced it will build a 35-megawatt PEM (Proton Exchange Membrane) electrolyzer to produce renewable hydrogen. The project is expected to begin in 2025 and is the first of several electrolyzers Linde expects to build in the U.S..

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## DEPLOYMENT: Oswego, NY

Constellation Energy's Nine Mile Point Nuclear Plant has begun producing clean hydrogen at its demonstration-scale hydrogen facility, using 1.25 MW of energy per hour to produce 560 kilograms of clean hydrogen per day.

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## RESEARCH: Oswego, NY

The DOE's Office of Energy Efficiency & Renewable Energy (EERE) is supporting Constellation Energy's development of a low-temperature electrolysis program at the Nine Mile Point nuclear power plant. It will be the first nuclear-powered clean hydrogen production facility in the U.S. and the hydrogen will be used to help cool the plant.

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## OPPORTUNITY: Oswego, NY

The U.S. Department of Energy awarded Exelon Generation a grant to explore the potential benefits of on-site H2 production at the Nine Mile Point Nuclear Station in Oswego, New York.

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## DEPLOYMENT: Slingerlands, NY

Plug Power has opened a fuel cell manufacturing facility to expand its line of GenDrive fuel cell systems, drop-in fuel cell solutions for existing electric truck fleets.

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## DEPLOYMENT: Rochester, NY

Ionomr Innovations is building a fuel cell and green hydrogen electrolysis research and development center at the Metro Business Park.

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The Rochester Genesee Regional Transportation Authority received a grant of \$5 million to purchase hydrogen fuel cell buses from Governor Hochul.

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BAE Systems will provide Gen3 systems to support the City of Rochester's plan to deploy three hydrogen fuel cell-powered buses.

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## OPPORTUNITY: Rochester, NY

Avangrid proposed utilizing hydrogen for transportation and is assessing opportunities to construct a multi-use hydrogen production and distribution facility.

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## DEPLOYMENT: Schenectady, NY

TFP Hydrogen Products is developing a state-of-the-art coating facility to support the rapid growth in the hydrogen sector, by increasing production capacity of coatings that improve the efficiency and durability of polymer electrolyte membrane (PEM) water electrolyzers, thus reducing the cost of green hydrogen production.

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## DEPLOYMENT: Slingerlands, NY

Plug Power is building a new 350,000-square-foot plant to expand the company's line of GenDrive hydrogen fuel cell systems.

[READ MORE »](#)

## RESEARCH: St. Bonaventure, NY

An associate professor of chemistry at St. Bonaventure University has been awarded a National Science Foundation (NSF) CAREER grant for his research proposal titled "Investigating the Molecular Corking Effect for Potential Hydrogen Storage."

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## RESEARCH: Troy, NY

Rensselaer Polytechnic Institute: Cyclic Olefin Copolymer-Based Alkaline Exchange Polymers and Reinforced Membranes

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## RESEARCH: Upton, NY

Brookhaven National Laboratory: Platinum Monolayer Electrocatalyst

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## DEPLOYMENT: Yaphank, NY

The Yaphank Fuel Cell Park at the Brookhaven Landfill generates 4 megawatts of energy from three SureSource 3000 carbonate fuel cell power plants.

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## DEPLOYMENT: Various

McDermott International's CB&I Storage Solutions and New Energy Development Company completed engineering for two 50-MW energy projects that can each produce nearly 24,000 kg/day of renewable hydrogen.

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New York and Massachusetts, US-based National Grid, has said it had located 'robust' stocks of hydrogen and renewable natural gas (RNG) that could be used as part of its fossil-free energy strategy for the Northeast of the US. According to National Grid, a May 2022 RFI revealed that at least 33 trillion BTUs will be available over the next three years, which is more than double of the amount needed in 2025.

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## OPPORTUNITY

Hydrogen heats up in New York

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New York is considering a program to develop resources like hydrogen and biomethane, as well as fuel cells and natural gas paired with carbon capture systems, at scale.

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New York released an Initial Draft Scoping Plan that outlines how the state can achieve its ambitious emissions reduction mandates. The plan states that "Across all modeled pathways, New York's hydrogen demand is met with green hydrogen."

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New York's Governor Kathy Hochul has released a blueprint to develop a renewable hydrogen hub in the state linking several regions into a single hydrogen production and consumption network.

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New York, New Jersey, Massachusetts and Connecticut agreed to work with about 40 clean power companies, utilities and universities to create plans for a regional hydrogen hub.

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The Governor of New York, Kathy Hochul, announced that the state will provide \$16.6 million in awards for five long duration energy storage projects, including three hydrogen-focused projects.

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The Governor of New York Kathy Hochul announced \$10 million for clean hydrogen research, development, and demonstration projects.

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## North Carolina

### RESEARCH: Raleigh, NC

Researchers from North Carolina State University have developed a new technique for extracting hydrogen gas from liquid carriers which is faster, less expensive and more energy efficient than previous approaches.

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## OPPORTUNITY

Dominion Energy is analyzing which of their two North Carolina training facilities (Gastonia and Cary) will run a pilot project to advance how hydrogen can be used as a clean energy source.

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The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

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Educational nonprofit the Green Hydrogen Coalition (GHC) launched the HyBuild Carolinas initiative, which aims to develop a vision and roadmap for accelerating the role of clean hydrogen in North and South Carolina. Supporters include American Airlines, Nucor Corporation, and various utilities in the region.

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## North Dakota

### HYDROGEN HUBS: Heartland Hydrogen Hub

DOE AWARDEE: North Dakota joined with three other Midwestern states to develop a proposal for a “Heartland Hydrogen Hub” aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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### DEPLOYMENT: Beulah, ND

Bakken Energy and Mitsubishi Power are creating world-class clean hydrogen hub in North Dakota.

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The Mandan, Hidatsa and Arikara Nations have a memorandum of understanding with Bakken Energy and Mitsubishi Power Americas to be the natural gas supplier for the Great Plains Hydrogen Hub.

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### DEPLOYMENT: Grand Forks, ND

The North Dakota Industrial Commission awarded \$10 million in engineering and design subsidies for the “Liberty H2 Hub” project. The project is led by The University of North Dakota's Energy and Environmental Research Center and aims to stimulate development of low-carbon hydrogen.

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### RESEARCH: Grand Forks, ND

The University of North Dakota was awarded two \$1.6 million grants to study producing hydrogen from biomass.

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## OPPORTUNITY

North Dakota could be largest, lowest cost producer of blue hydrogen in North America.

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The North Dakota Department of Commerce is working to form a partnership with South Dakota, Montana, Minnesota, and Wisconsin to apply for federal hydrogen hub funding.

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North Dakota joined with three other Midwestern states to develop a proposal for a “Heartland Hydrogen Hub” aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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## Ohio

### DEPLOYMENT: Canton, OH

Canton Ohio public transit has 14 hydrogen buses in their fleet, and a fueling station.

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The Stark Area Regional Transit Authority has gotten a \$2.39 million federal grant to buy two hydrogen-powered zero-emission fuel-cell buses and expand the capacity of its hydrogen fueling station.

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### DEPLOYMENT: Columbus, OH

Ohio State University granted DOE grant for advancing hydrogen gas turbines for use in electricity generation.

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pH Matter LLC: FY18 SBIR Phase II Release 1: Multi-Functional Catalyst Support

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Hyperion Motors launched its Hyper:Fuel Mobile Stations that are capable of refueling both hydrogen fuel cell electric vehicles as well as battery electric vehicles. The refueling stations will be deployed across the country in 2023 and are produced in Columbus, Ohio.

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### RESEARCH: Columbus, OH

DNV opened a dedicated hydrogen testing and research laboratory in their materials performance and testing laboratory that aims to quantify the performance of materials used within hydrogen transportation and storage.

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## DEPLOYMENT: Hannibal, OH

A gas-fired power plant in Ohio had successfully been run with a 15-20% hydrogen blend. General Hydrogen Corporation's plant in Proctor, West Virginia supplied Long Ridge Energy Terminal's 485MW natural gas-fired power plant in Hannibal, Ohio, with hydrogen gas during the test, with a view to utilize 100% hydrogen in its process over time.

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## DEPLOYMENT: Monroe County, OH

Long Ridge Energy Terminal announced plans to transition its 538 MW combined-cycle power plant to run on carbon-free hydrogen.

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## RESEARCH: Oak Harbor, OH

The DOE's Office of Energy Efficiency & Renewable Energy (EERE) is working with Energy Harbor to demonstrate a low-temperature electrolysis system at the Davis-Besse Nuclear Power Station. The project aims to prove the technical feasibility and economic benefits of clean hydrogen production, and a single unit reactor is expected to produce hydrogen by 2023.

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## DEPLOYMENT: Piketon, OH

The Southern Ohio Diversification Initiative, an economic development group working with Ohio University and the Texas company Newpoint Gas, will produce low-carbon hydrogen from natural gas at the site of a former uranium enrichment facility.

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## DEPLOYMENT: Pike County, OH

Trillium H2 Power (tH2 Power) awarded Shell Catalysts & Technologies a contract to deliver a Shell Blue Hydrogen Process license agreement for tH2 Power to build multiple large-scale, low-carbon-hydrogen-fueled power generation and manufacturing projects at the former Portsmouth Gaseous Diffusion Plant.

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## DEPLOYMENT: Portsmouth, OH

Babcock & Wilcox signed a teaming agreement to provide advanced hydrogen generation, decarbonization, and combustion technologies as part of Newpoint Gas' \$1.51bn redevelopment of a former uranium enrichment facility at the Portsmouth Gaseous Diffusion Plant site.

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## DEPLOYMENT: Sandusky, OH

Air Products and Linde signed a deal to supply NASA with roughly 15 million pounds of liquid hydrogen for a variety of its facilities in Alabama, Mississippi, Ohio, and Florida.

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## OPPORTUNITY: Toledo, OH

Included in the appropriations bill passed by US House is \$3M for the University of Toledo to help aid in transitioning Northern Ohio into a clean nuclear hydrogen hub in partnership with the Ohio Aerospace Institute, Owens Community College, and Northwest State Community College. The bill is pending Senate approval.

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## OPPORTUNITY

Ohio has high concentration of steel mills, which can replace coke with green carbon to decarbonize steel making.

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EQT Corporation, Equinor, GE Gas Power, Marathon Petroleum (including its affiliate MPLX), Mitsubishi Power, Shell Polymers and U. S. Steel have formed a new alliance to work with stakeholders on a shared vision for a low-carbon and hydrogen industrial hub in Ohio, Pennsylvania and West Virginia that can be a national model for sustainable energy and production systems.

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Developing a Hydrogen Economy in Ohio: Challenges and Opportunities, a comprehensive study released by JobsOhio and the Stark Area Regional Transit Authority (SARTA), asserts that Ohio is poised to become a leader in the clean hydrogen-fueled, zero-emission economy of the 21st Century, and also validates Ohio as a prime location for a Clean Hydrogen Hub.

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The Clean Hydrogen Hub Alliance includes the state's public and private sectors teaming up to make Ohio one of the largest clean energy hubs in the country

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Seven Midwest states, including Ohio, formed the M-H2 hydrogen hub coalition aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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The Great Lakes Hydrogen Partnership (GLCH), comprised of companies and utilities primarily in Ohio and Michigan, has been encouraged by the DOE to submit a full application to the regional clean hydrogen hubs funding under the IIJA.

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The ARCH2 hydrogen hub, a collation between West Virginia, Ohio, Kentucky, and Pennsylvania, has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

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The National Energy Technology Laboratory released a report stating the Appalachian region is well suited to be one of the nation's clean energy hydrogen hubs, citing its natural gas resources, infrastructure, storage capacity, workforce, and industrial demand.

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## Oklahoma

### DEPLOYMENT: Ardmore, OK

Australian energy company Woodside has secured a lease and an option to purchase land at the Westport Industrial Park in Ardmore, Oklahoma, to build an initial 290MW hydrogen facility that could be expanded up to 550MW in the future.

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Woodside Energy Group awarded Nel a contract to supply electrolyzers to its proposed H2OK hydrogen production project aiming to produce liquid hydrogen for long-haul vehicle.

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Air Liquide Engineering and Construction will supply the liquefaction equipment for Woodside Energy's proposed H2OK hydrogen project in Ardmore, Oklahoma.

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### RESEARCH: Norman, OK

A new study pioneered by researchers from the University of Oklahoma and Iowa State University has received a \$4 million grant from the federal government to investigate utilizing Oklahoma's abundant natural resources and Iowa's vast supply of renewable biomass to produce hydrogen.

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### DEPLOYMENT: Pryor, OK

# HYDROGEN FORWARD

Governor Kevin Stitt of Oklahoma has pledged \$15 million to Canoo, a start-up electric and hydrogen-fueled vehicle company, with plans to open a manufacturing facility, customer service, and financial center in Pryor's MidAmerica Industrial Park.

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LSB Industries will use Bloom Energy's solid oxide electrolyzers to produce 'low-cost hydrogen' at a large scale.

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## OPPORTUNITY

Energy Secretary hopes to make Oklahoma 'epicenter' of hydrogen fuel industry.

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The Oklahoma Hydrogen Production, Transportation, and Infrastructure Task Force (OK H2 Task Force) report details Oklahoma's strong potential in hydrogen.

[READ MORE »](#)

Arkansas, Louisiana, and Oklahoma's HALO hydrogen Hub received encouragement from the Department of Energy (DOE) to submit a full application for the Regional Clean Hydrogen Hubs Program.

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The Oklahoma State Senate has passed two measures to grant tax incentives to businesses and individuals that use and produce hydrogen energy in support of Oklahoma's hydrogen hub partnership with Arkansas and Louisiana.

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During the 58th Oklahoma State Legislature, Oklahoma legislators have passed nine new laws creating a legal infrastructure for hydrogen fuel to better position residents and businesses to make, use and distribute the alternative energy source.

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## Oregon

### HYDROGEN HUBS: Pacific Northwest Hydrogen Hub (PNW H2)

DOE AWARDEE: The Pacific Northwest Hydrogen Hub (PNWH2) was encouraged by the DOE to submit a full application for funding to construct a regional hydrogen hub in Washington and eastern Oregon.

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### RESEARCH: Corvallis, OR

Oregon State University: Novel Hybrid Microbial Electrochemical System for Efficient Hydrogen Generation from Biomass

[READ MORE »](#)

Oregon State University research into the design of catalysts has shown that hydrogen can be cleanly produced with much greater efficiency and at a lower cost than is possible with current commercially available catalysts.

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## DEPLOYMENT: Eugene, OR

Northwest Natural Holding Co. is building a 2-MW to 10-MW green hydrogen production facility.

[READ MORE »](#)

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## OPPORTUNITY: Hermiston, OR

The Obsidian Pacific Northwest Hydrogen Hub, a private coalition applying for federal funding, is reportedly working with the government-funded Pacific Northwest Hydrogen Association to coordinate one hub proposal for the region.

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## OPPORTUNITY: Klamath, OR

Avangrid proposed the colocation of green hydrogen production at Avangrid Renewables' Klamath Cogeneration Plant.

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## RESEARCH: Pendleton, OR

A research collaboration between Insitu, Washington State University, and Mississippi State University successfully flew uncrewed aircraft powered by liquid hydrogen fuel in Eastern Oregon, demonstrating the efficacy of the lightweight tank and portable hydrogen refueling station.

[READ MORE »](#)

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## OPPORTUNITY: General

The Pacific Northwest Hydrogen Association (PNWH2), a public private partnership in Washington and Oregon, submitted a concept paper to the Department of Energy in an attempt to secure hydrogen hub funding from the bipartisan infrastructure bill.

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Ballard Power Systems signed a new Long-Term Supply Agreement with NFI Group Inc. focused on deployment-level volumes of fuel cell powered buses across all of NFI's major brands.

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## Pennsylvania

### HYDROGEN HUBS: Mid-Atlantic Clean Hydrogen Hub (MACH2)

Mid-Atlantic Hydrogen Hub (Mid-Atlantic Clean Hydrogen Hub (MACH2); Pennsylvania, Delaware, New Jersey) — The Mid-Atlantic Hydrogen Hub will help unlock hydrogen-driven decarbonization in the Mid-Atlantic while repurposing historic oil infrastructure and using existing rights-of-way.

[READ MORE »](#)

### DEPLOYMENT: Clinton County, PA

Keystone to Zero proposed hydrogen gas production plant in Clinton County, PA slated to begin in 2023, awaiting permits and funding.

[READ MORE »](#)

### DEPLOYMENT: Lancaster, PA

Pennsylvania's first green hydrogen plant planned for Lancaster County.

[READ MORE »](#)

Lancaster, Pennsylvania-based startup GenHydro has launched its novel reaction-based hydrogen production technology. The company asserts their reactors can produce on-demand hydrogen at competitive cost, without the need to establish a logistical network to see hydrogen delivered to end users, offering scalable technology at lower costs.

[READ MORE »](#)

### DEPLOYMENT: Philadelphia, PA

The Southeastern Pennsylvania Transportation Authority (SEPTA) purchased 10 fuel-cell electric buses to help reduce carbon emissions in Philadelphia.

[READ MORE »](#)

### RESEARCH: Philadelphia, PA

Drexel University: Polymerized Ionic Liquid Block Copolymer/Ionic Liquid Composite Ionomers for High Current Density Performance.

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### DEPLOYMENT: Pittsburgh, PA

The first battery-electric freight train, the FLXdrive, reduces fuel consumption by 11% and can cut 300 million tons of emissions per year.

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Pittsburgh International Airport (PIT) and CNX Resources Corporation, announced on May 20, 2022 it will use hydrogen as part of a fuel strategy to reduce aviation emissions and costs.

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U.S. Steel, Shell, and Equinor entered a non-exclusive cooperation agreement to advance a collaborative clean energy hub in the Pennsylvania, Ohio, and West Virginia region.

[READ MORE »](#)

## RESEARCH: Pittsburgh, PA

Carnegie Mellon University: ElectroCat: Advanced Platinum-Group-Metal-Free Cathode Engineering for High Power Density and Durability

[READ MORE »](#)

## OPPORTUNITY: Pittsburgh, PA

The CEO of the Port Authority of Allegheny County stated that the agency will shift away from diesel powered buses and be emission free by 2045, and in her statement, indicated that hydrogen powered vehicles could be a key contributor in meeting the company's goals.

[READ MORE »](#)

## RESEARCH: State College, PA

Pennsylvania State University: Developing a New Polyolefin Precursor for Low-Cost, High-Strength Carbon Fiber

[READ MORE »](#)

Pennsylvania State University: Advanced Anion Exchange Membranes with Tunable Water Transport for Platinum-Group-Metal-Free Anion Exchange Membrane Fuel Cells

[READ MORE »](#)

## OPPORTUNITY

Why Pennsylvania could be poised for a new wave of energy leadership with hydrogen.

[READ MORE »](#)

Pennsylvania State Representative Steve Malagari introduced HR 178 on March 14, 2022, urging the Biden administration to name Pennsylvania a hydrogen hub.

[READ MORE »](#)

The ARCH2 hydrogen hub, a collation between West Virginia, Ohio, and Pennsylvania, has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

[READ MORE »](#)

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Pennsylvania's congressional delegation issued a bipartisan statement supporting Governor Tom Wolf's efforts to make Pennsylvania a leader in the development of clean hydrogen and ensure Pennsylvania's competitiveness to be a Regional Clean Hydrogen Hub.

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The Decarbonization Network of Appalachia (DNA H2Hub), a private-public coalition, submitted a concept paper to the Department of Energy in an attempt to secure hydrogen hub funding from the bipartisan infrastructure bill.

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Pennsylvania House Bill 1059 establishes a \$50 million per year H2 tax credit specifically for a manufacturing facility that is part of a Regional Clean Hydrogen Hub as designated by the Department of Energy. The bill is an investment from the state government to show commitment to their DNA H2Hub application.

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Nikola Corporation and KeyState Natural gas Synthesis are working together to create a low-carbon production value chain in Pennsylvania to expand the hydrogen supply for Nikola's zero-emissions heavy-duty fuel cell electric vehicles. The hydrogen will be produced through steam-methane reforming and include full integration of carbon capture and storage.

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The National Energy Technology Laboratory released a report stating the Appalachian region is well suited to be one of the nation's clean energy hydrogen hubs, citing its natural gas resources, infrastructure, storage capacity, workforce, and industrial demand.

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## Rhode Island

### RESEARCH: Kingstown, RI

University of Rhode Island chemist Dugan Hayes won an Early Career Award from the U.S. Department of Energy and will now have research funding for five years to study a surprising chemical reaction that could be useful in releasing hydrogen for fuel cells.

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### RESEARCH: Narragansett, RI

University of Rhode Island researchers found that when producing hydrogen from seawater, sediment in the water made the production process more effective.

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### DEPLOYMENT: Providence, RI

Air Liquide built one hydrogen fueling station, with plans for more.

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## OPPORTUNITY

Maine and Rhode Island joined the New-York led coalition of six state governments and over 60 private businesses planning to apply for federal hydrogen hub funding.

[READ MORE »](#)

## South Carolina

### DEPLOYMENT: Aiken County, SC

Greenway Energy, LLC: ElectroCat: Platinum-Group-Metal-Free Engineered Framework NanoStructure Catalysts.

[READ MORE »](#)

### RESEARCH: Aiken, SC

An office within the DOE awarded Savannah River National Laboratory with \$3 million to further research in enabling pathways for hydrogen storage and production technologies.

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### DEPLOYMENT: Anderson, SC

Bosch Group is investing over \$200 million to produce fuel cell stacks at its Anderson, SC facility, for use in the fuel-cell power modules for Nikola Corp.'s hydrogen trucks.

[READ MORE »](#)

### RESEARCH: Clemson, SC

Clemson University: Laser 3-D Printing of Highly Compacted Protonic Ceramic Electrolyzer Stack.

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### DEPLOYMENT: Clover | SC

OneH2 purchased a new manufacturing facility in Clover, South Carolina for warehousing and manufacturing of hydrogen equipment. The \$16 million investment will create 87 jobs by 2026.

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### DEPLOYMENT: Greenville, SC



The Advanced Research Projects Agency-Energy (ARPA-E) has awarded GE Gas Power \$4.2m in funding to develop 'breakthrough' decarbonization technologies, including hydrogen and natural gas mixing to power advanced gas turbines.

[READ MORE »](#)

## RESEARCH: Jackson, SC

The US Department of Energy's Office of Science Basic Energy Science Program awarded \$3m in funding to the Savannah River National Laboratory to research pathways for hydrogen production and storage, including the interactions between two-dimensional ceramic materials and hydrogen.

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## OPPORTUNITY

Duke Energy filed plans to retire coal power plants and replace them with natural gas-fired plants that will use a minimum 30% hydrogen blend, with plans to shift to 100% hydrogen by 2030.

[READ MORE »](#)

The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IHA.

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Educational nonprofit the Green Hydrogen Coalition (GHC) launched the HyBuild Carolinas initiative, which aims to develop a vision and roadmap for accelerating the role of clean hydrogen in North and South Carolina. Supporters include American Airlines, Nucor Corporation, and various utilities in the region.

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## South Dakota

### DEPLOYMENT: Lake Preston, SD

Gevo Inc. and Zero6 Energy finalized a deal to develop a 20-megawatt hydrogen production facility using Cummins' electrolyzer technology.

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## OPPORTUNITY

The North Dakota Department of Commerce is working to form a partnership with South Dakota, Montana, Minnesota, and Wisconsin to apply for federal hydrogen hub funding.

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The House Committee on Commerce and Energy submitted a bill requesting hydrogen pipelines be placed under Public Utility Commission oversight.

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## Tennessee

### DEPLOYMENT: Charleston, TN

Plug Power hydrogen plant generates 6.4 tons of hydrogen daily.

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### DEPLOYMENT: East TN

A collaborative project between Southern Co. Gas, Electro-Active Technologies, and T2M Global to advance tech for producing clean hydrogen from waste was funded by the DOE.

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### RESEARCH: Knoxville, TN

The DOE announced that Electro-Active Hydrogen is a phase one winner of the Hydrogen Shot Incubator Prize. The proposed concept is a system that integrates solar energy with algal hydrothermal liquefaction and microbial electrolysis to generate clean hydrogen, leveraging the chemical energy from organic matter.

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### RESEARCH: Nashville, TN

Vanderbilt University: Fuel Cell Membrane Electrode Assemblies with Platinum-Group-Metal-Free Nanofiber Cathodes.

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Vanderbilt University: Composite Polymer Electrolyte Membranes from Electrospun Crosslinkable Poly(Phenylene Sulfonic Acid)s.

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### RESEARCH: Oak Ridge, TN

Oak Ridge National Laboratory: Novel Plasticized Melt Spinning Process of Polyacrylonitrile Fibers Based on Task-Specific Ionic Liquids.

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[READ MORE »](#)

Oak Ridge National Laboratory has entered into a cooperative research and development with Wabtec to advance research on hydrogen powered trains.

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### OPPORTUNITY

The Southeast Hydrogen Hub, comprised of Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Georgia, and Alabama has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IIJA.

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## Texas

### HYDROGEN HUBS: HyVelocity Hub

DOE AWARDEE: The HyVelocity Hub, a coalition led by GTI Energy, The Center for Houston's Future, The University of Texas at Austin, Air Liquide, and Chevron, is applying for DOE hydrogen hub funding. The hub intends to advance hydrogen deployment in Texas, Southwest Louisiana, and the surrounding Gulf Coast region.

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### DEPLOYMENT: Austin, TX

H2@Scale Project Launched in Texas

[READ MORE »](#)

### RESEARCH: Austin, TX

Researchers at UT created a framework to integrate hydrogen gas into existing US infrastructure.

[READ MORE »](#)

### DEPLOYMENT: Baytown, TX

ExxonMobil plans to utilize Topsoe's SynCOR hydrogen technology to produce low carbon hydrogen. The facility is expected to produce 1 billion cubic feet per day of natural-gas-derived hydrogen and capture 98% of emissions.

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### DEPLOYMENT: Beaumont, TX

Plug Power entered an agreement with New Fortress Energy (NFE) to build a 120MW industrial-scale green hydrogen plant near Beaumont, Texas. The US-based companies have said the plant is expected to be one of the largest of its kind in North America, leveraging on Plug Power's proton exchange membrane electrolysis technology to produce more than 50 tonnes of green hydrogen per day.

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Linde is partnering with Exxonmobil to develop a world-class clean hydrogen production facility on the Gulf Coast.

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## OPPORTUNITY: Bridge City, TX

Entergy proposed building a 1,215-megawatt (MW) hydrogen power plant.

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## DEPLOYMENT: Brownfield, TX

HydrogenPro is expanding to the U.S. to develop a 500 MW clean hydrogen plant.

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## DEPLOYMENT: Clear Fork, TX

ING Americas, Clean Energy Holdings, LLC, and Equix Inc. have partnered on a renewable energy supplied green hydrogen and liquefaction project.

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Clear Energy Holdings signed an offtake letter for the sale of up to 30,000 kg per day of liquified renewable hydrogen from its plant in Clear Forks, TX.

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## DEPLOYMENT: Clear Lake, TX

Linde expanded its withstanding agreement with Celanese Corporation and will now supply Celanese's manufacturing facility in Clear Lake, Texas, with CO<sub>2</sub> and hydrogen to use as an alternative feedstock to produce methanol with lower carbon intensity.

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Linde announced it will start supplying hydrogen to Celanese as feedstock to produce methanol with a lower carbon intensity at its Fairway Methanol LLC joint venture with Mitsui & Co., Ltd..

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## DEPLOYMENT: Corpus Christi, TX

Apex Clean Energy, Ares, EPIC Midstream, and PCCA have entered into a nonbinding memorandum of understanding (MoU) to explore the development of leading green hydrogen production, storage, transportation, and export operation, including a newly constructed dedicated pipeline and a green fuels hub on the Texas Gulf Coast.

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Enbridge and Humble plan to develop a utility-scale ultra-low carbon production facility, capable of supplying both low-carbon hydrogen and ammonia, located at the Enbridge Ingleside Energy Center (EIEC).

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## OPPORTUNITY: Corpus Christi, TX

Avangrid Renewables identified an opportunity for an electrolysis project to convert wind power into green hydrogen and ultimately into green ammonia.

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The Port of Corpus Christi's Horizons Clean Hydrogen Hub (HCH2) has been encouraged to submit a full application to the DOE Hydrogen Hubs Funding opportunity.

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AmmPower and the Port of Corpus Christi Authority are analyzing the prospect of developing a large renewable hydrogen facility, with the goal of exporting products.

[READ MORE »](#)

The Port of Corpus Christi and Trans Permian hydrogen hub applications have merged to jointly apply for DOE funding under the Port of Corpus Christi application regional clean hydrogen hubs program. Both hub concept papers received encouragement to submit a full application to the DOE.

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## DEPLOYMENT: Dallas, TX

Home Depot opens automated Dallas fulfillment center with hydrogen-powered forklifts.

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## DEPLOYMENT: Duval County, TX

Green Hydrogen International has announced it is developing a 60GW integrated renewable hydrogen production, storage, and transportation hub, which would be the world's largest green hydrogen production and storage hub.

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Green Hydrogen International (GHI) and Hydrogen Optimized signed a Memorandum of Understanding for the proposed development of a Hydrogen Optimized RuggedCell electrolyzer manufacturing facility that will supply GHI's Hydrogen City project.

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## DEPLOYMENT: El Paso, TX

El Paso Electric utilizing gas turbines that were designed to be operated on up to 100% hydrogen in the future.

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## RESEARCH: El Paso, TX

A portion of \$1.5 million in DOE funding for five projects to advance key clean-hydrogen technologies at minority serving institutions will go to two projects at the University of Texas at El Paso. *Combustion Synthesis of Nanoscale Magnesium Borides with Improved Hydrogen Uptake and Release* will produce advanced materials for hydrogen storage, while *Metal-Organic Framework-based Heterostructure Electrocatalysts with Tailored Electron Density Distribution for Cost-Effective and Durable Fuel Cells and Electrolyzers* aims to reduce the cost and increase the availability of fuel cell and electrolyzer components by eliminating platinum group metals.

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## DEPLOYMENT: Houston, TX

Entergy Corp. joining forces with Mitsubishi Power to integrate green hydrogen into utility business.

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Proenergy's string-test facility is hydrogen-ready and will host tests with the clean energy carrier in the future to explore real world operating conditions for hydrogen fuel mixes.

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BP and Linde are joining forces to develop a major carbon capture and sequestration project along the Texas Gulf Coast that will store up to 15 million mt/year of CO<sub>2</sub> while producing low-carbon hydrogen.

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Linde signed a long-term contract to supply low-carbon hydrogen to OCI NV's ammonia plant near Houston. The hydrogen and ammonia will be produced from natural gas and paired with carbon capture.

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John Cockerill Hydrogen entered the U.S. market through the acquisition of manufacturing space in Baytown for a new electrolyzer gigafactory.

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John Cockerill broke ground at its new US electrolyzer gigafactory in Texas in December 2023 and plans to kick-start electrolyzer production in the summer of 2024.

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HNO Internationalis, Element One Energy, and Pneumatic and Hydraulic Company are set to develop the world's first 500 kg per day hydrogen production facility in Houston, Texas.

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## RESEARCH: Houston, TX

Researchers from the Texas Center for Superconductivity at the University of Houston have developed an NiFe (nickel and iron)-based electrocatalyst that interacts with CuCo (copper cobalt) to create high-performance seawater electrolysis.

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The DOE announced that Gold Hydrogen Team is a phase one winner of the Hydrogen Shot Incubator Prize. The proposed concept is a process using dark fermentation to biologically produce hydrogen in spent oil wells.

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Researchers from Rice and Princeton Universities created a scalable catalyst that only requires the power of light to convert ammonia into clean hydrogen fuel.

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The U.S. Department of Energy awarded the University of Houston \$17.4 million in funding for 19 early-stage research projects focused on expanding clean energy technologies across U.S. universities.

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## OPPORTUNITY: Houston, TX

The Leading in Gulf Coast Hydrogen Transition Hub (LIGH<sub>2</sub>T) has received encouragement from the DOE to submit a full application to the regional clean hydrogen hubs program funded by the IIJA.

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Houston has many existing hydrogen users and infrastructure already in place that could help establish the state as one of the hotspots for clean hydrogen production, use and exportation.

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The Center for Houston's Future released a report, *Houston as the epicenter of a global clean hydrogen hub*, laying out how a strong base of regional and state assets can be leveraged to create a global hub.

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The Center for Houston's Future promoted the Port of Corpus Christi as a "a strategic export hub for selling clean hydrogen to global markets."

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McKinsey & Co. has opened a Global Decarbonization Hub in Houston to accelerate clean energy efforts. This hub plans to help Houston companies continue their progress on building out hydrogen pipelines.

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The Houston Energy Transition Initiative and the Center for Houston's Future teamed up with the Mission Possible Partnership to accelerate the development of a regional clean industrial hub. The project will focus on the development and deployment of low-carbon hydrogen.

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## DEPLOYMENT: Irving, TX

ExxonMobil announced a contract award for front-end engineering and design (FEED) for its planned Baytown hydrogen and carbon capture facility.

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## DEPLOYMENT: La Porte, TX

Linde's new plant, scheduled to start up in 2021 will produce over 30 tons per day of high purity liquid hydrogen.

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## RESEARCH: Lubbock, TX

The DOE announced that The Hope Group is a phase one winner of the Hydrogen Shot Incubator Prize. The proposed concept involves in-situ microwave-assisted catalytic heating to crack methane and generate hydrogen directly from depleted natural gas reservoirs.

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## DEPLOYMENT: Port Arthur, TX

Port Arthur develops steam methane reformer hydrogen production facility.

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Carbon Capture Project at Air Products' Port Arthur Hydrogen Production Facility

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8 Rivers Capital is developing the Cormorant Clean Energy Project, an ultra-low-carbon ammonia production facility powered by 8 Rivers' proprietary 8RH2 hydrogen process, in Port Arthur, Texas.

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## OPPORTUNITY: Port of Victoria, TX

Uniper and First Ammonia have announced a cooperation agreement on a hydrogen-based green ammonia project at the Port of Victoria.

[READ MORE »](#)

## RESEARCH: San Antonio, TX

Southwest Research Institute: Hydrogen Compression Application of the Linear Motor Reciprocating Compressor.

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## DEPLOYMENT: Wilbarger County, TX

Air Products and AES are building a \$4 billion renewable hydrogen production facility capable of producing more than 200 metric tons of clean hydrogen per day.

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## DEPLOYMENT: Various

Big Hill Materials plans to invest \$6-8 billion over the next 7 years on hydrogen projects including 5 natural gas/hydrogen fuel power plants with carbon capture technology, two hydrogen electrolyzers, a hydrogen and carbon blending plant, and a hydrogen fuel/natural gas/oil trading facility.

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## OPPORTUNITY

Texas could become nation's leader in production of hydrogen energy.

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How The Lone Star State Is Building A Green Hydrogen Future

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Texas has resources, infrastructure to become global hydrogen hub—Houston specifically.

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A bipartisan coalition of Texas Congressional Representatives wrote a letter to Secretary of Energy Jenifer Granholm advocating for one of the DOE's chosen hydrogen hubs to be in Texas. The letter did not endorse any specific hub proposal.

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The HyVelocity Hub, a coalition led by GTI Energy, The Center for Houston's Future, The University of Texas at Austin, Air Liquide, and Chevron, is applying for DOE hydrogen hub funding. The hub intends to advance hydrogen deployment in Texas, Southwest Louisiana, and the surrounding Gulf Coast region.

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MMEX Resources Corp. is coordinating an application for a federally funded hydrogen hub funding in the Permian Basin.

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Belgian and Texan companies and ports, including the Center for Houston's Future, Waterstofnet, Port Houston, Port of Antwerp-Bruges, Exmar and the Blue Sky Maritime Coalition, signed a memorandum of understanding to explore an "import-export" coalition for renewable and low-carbon molecules and a green shipping corridor.

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## Utah

### DEPLOYMENT: Central UT

Mitsubishi Power and Magnum Development announced the launch of the Advanced Clean Energy Storage project.

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## DEPLOYMENT: Delta, UT

Intermountain Power Agency Orders MHPS JAC Gas Turbine Technology for Renewable-Hydrogen Energy Hub in Delta.

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Conversion of 1,800MW Intermountain coal plant in Utah to 840MW gas-hydrogen facility moving forward.

[READ MORE »](#)

The U.S. Department of Energy's (DOE) Loan Programs Office (LPO) closed on a \$504.4 million loan guarantee to the Advanced Clean Energy Storage project in Utah to help finance construction of the largest clean hydrogen storage facility in the world. This is the first loan guarantee for a new clean energy technology project from the LPO since 2014.

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Mitsubishi Power Americas has delivered the first shipment of HydrogenPro Electrolyzers for its Hydaptive™ integrated hydrogen production plant in Utah.

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## DEPLOYMENT: Salt Lake City, UT

Dominion has a pilot program blending 5% hydrogen into their test system at their training academy.

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## DEPLOYMENT: South of Salt Lake City, UT

130 miles south of SLC engineers working on salt dome to create that will become one of the largest renewable energy reservoirs.

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## DEPLOYMENT: West Valley City, UT

Grid-scale energy storage with renewable hydrogen production and utilization forms core of Advanced Clean Energy Storage project in central Utah.

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## DEPLOYMENT: General

The Wyoming Energy Authority has issued a request for proposals (RFP) for a prime contractor for the Western Inter-States Hydrogen Hub, a proposed regional clean hydrogen hub that Colorado, New Mexico, Utah and Wyoming have teamed up to develop. The prime contractor will support the submission of an application for funding to the Department of Energy (DoE) and, if successful, it will manage the implementation of the project.

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As part of the first phase of the ACES Delta hydrogen hub, WSP has successfully completed drilling operations for two new cavern wells to store hydrogen that will support intermittent renewable energy.

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HydrogenPro delivered its first shipment of electrolyzers to the ‘world’s largest’ renewable energy storage hub in Utah.

[READ MORE »](#)

## OPPORTUNITY

Colorado, New Mexico, Utah, and Wyoming’s Western Interstate Hydrogen Hub (WISHH) received a recommendation from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## Vermont

### OPPORTUNITY: Essex Junction, VT

Vermont Gas Systems, the University of Vermont (UVM), and GlobalFoundries have partnered through Vermont Green Hydrogen Partnership, a statewide group of Vermont utilities and industries working with UVM to advance the state’s clean energy goals, in a project for GlobalFoundries to reduce its carbon emissions by introducing renewable hydrogen into its natural gas pipelines.

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## OPPORTUNITY

Vermont signed on to the New York-led hydrogen hub application for DOE funding for New York, Connecticut, Maine, Massachusetts, New Jersey, and Rhode Island.

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## Virginia

### DEPLOYMENT: Arlington, VA

Strategic Analysis, Inc.: Analysis of Advanced Hydrogen Production Pathways

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Strategic Analysis, Inc.: Hydrogen Storage Cost Analysis

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Strategic Analysis, Inc.: Fuel Cell Systems Analysis

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## OPPORTUNITY: Blacksburg, VA

The Virginia Tech Corporate Research Center plans to build an electrolyzer as part of the Mid-Atlantic Hydrogen Hub.

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## RESEARCH: Charlottesville, VA

The University of Virginia received a three-year, \$3.7million Department of Energy “Earthshot” grant to study more efficient catalysts and components for hydrogen electrolyzers in order to lower the cost of clean hydrogen.

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## DEPLOYMENT: Chickahominy District, VA

Balico, LLC is working with Mitsubishi Energy’s Green Power project.

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## DEPLOYMENT: Pembroke, VA

Nanosonic, Inc.: FY17 SBIR II Release 1: Novel Hydrocarbon Ionomers for Durable Polymer Electrolyte Membranes.

[READ MORE »](#)

NanoSonic, Inc.: Cryogenically Flexible, Low Permeability Hydrogen Delivery Hose (D).

[READ MORE »](#)

## OPPORTUNITY

The Governor of Virginia, Glenn Youngkin, announced a \$10M proposal to create the Virginia Power Innovation Fund for research and development in innovative energies. A large part of the plan includes funding for hydrogen, specifically for home heating, industrial processes, and electrical generation.

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The Mid-Atlantic Hydrogen Hub, a Maryland, Virginia, and Washington DC coalition led by regional nonprofit Connected DMV, received encouragement from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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## Washington

### DEPLOYMENT: Chehalis, WA

Twin Transit and the Port of Chehalis are on track to submit pre-application materials in summer 2022 for what is planned be the state’s first hydrogen fueling station. Current station plans show a 700-bar fuel pressure “light duty”

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fueling station for cars and light duty trucks on one side and a 350-bar “heavy duty” fueling station for medium- and heavy-duty trucks on the other.

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## DEPLOYMENT: Bellevue, WA

Puget Sound Energy working with Mitsubishi Power to collaborate on green hydrogen storage assets.

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## RESEARCH: Benton County, WA

Pacific Northwest National Laboratory: Materials Challenges for Cryogenic Hydrogen Storage Technologies

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Pacific Northwest National Laboratory: ElectroCat: Highly Active and Durable Platinum-GroupMetal-Free Oxygen Reduction Reaction Electrocatalysts through the Synergy of Active Sites

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Pacific Northwest National Laboratory: Lab Call FY19: Solid Phase Processing for Reduced Cost and Improved Efficiency of Bipolar Plates

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Pacific Northwest National Laboratory: Magnetocaloric Hydrogen Liquefaction

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Pacific Northwest National Laboratory: Hydrogen Safety Panel, Safety Knowledge Tools, and First Responder Training Resources

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Pacific Northwest National Laboratory: H-Mat Overview: Polymers

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## DEPLOYMENT: Centralia, WA

Fortescue Metals Group entered into a binding exclusivity agreement with an industrial park near TransAlta Corp.’s Centralia facility to employ the existing coal workforce for a green hydrogen facility.

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## DEPLOYMENT: Douglas County, WA

Global technology and power solutions leader Cummins Inc. (NYSE: CMI) will provide its 5-megawatt PEM electrolyzer to enable renewable energy for the Douglas County Public Utility District.

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## DEPLOYMENT: East Wenatchee, WA

# HYDROGEN FORWARD

OneH2 has been awarded a \$2.9 million contract to supply hydrogen fueling equipment for the development of Douglas County Public Utility District's (PUD) hydrogen terminal and fueling station. The terminal and station forms part of Douglas County PUD's larger initiative to produce hydrogen at a new facility in East Wenatchee, with the refueling station expected to be built nearby.

[READ MORE »](#)

## DEPLOYMENT: Lewis County, WA

Hydrogen fueling station planned as part of US hydrogen highway network, scheduled to open in 2022.

[READ MORE »](#)

## OPPORTUNITY: Lewis County, WA

Lewis County Has Potential to Be First Hydrogen Valley in Pacific Northwest.

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## DEPLOYMENT: Moses Lake, WA

Universal hydrogen successfully tested a hydrogen-powered airplane that reached 3,500 feet for a duration of 15 minutes.

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## RESEARCH: Moses Lake, WA

Universal hydrogen successfully tested a hydrogen-powered airplane that reached 3,500 feet for a duration of 15 minutes.

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## RESEARCH: Quincy, WA

A project funded by the US Department of Energy's H2@Scale Initiative will explore the use of large-format hydrogen fuel cells to produce sustainable backup power for Microsoft data centres at a facility in Quincy.

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## DEPLOYMENT: Redmond, WA

Microsoft announced its first successful testing of a hydrogen fuel cell system that is powerful enough to replace a traditional diesel-powered backup generator. To halt use of diesel as an energy source, Microsoft has been looking into cleaner energy at its data centers and is experimenting with the goal of eliminating diesel fuel from backup power systems by 2030.

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## RESEARCH: Richland, WA

The Pacific Northwest National Laboratory (PNNL) is conducting research to understand hydrogen infrastructure in depth. The lab is working to perform risk analysis and provide expert recommendations for improving the safety of hydrogen activities and how materials can withstand stresses caused by pressure changes in hydrogen systems.

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Researchers at the Idaho National Laboratory and the Pacific Northwest National Laboratory are evaluating the potential to produce hydrogen at existing hydropower plants.

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## DEPLOYMENT: Seattle, WA

Alaska Airlines signs agreement for use of hydrogen and solid waste as bio fuel.

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Anglo American is developing the world's largest zero-emission hydrogen-powered fuel cell mining truck in partnership with First Mode that will be used at its global mining sites.

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## RESEARCH: Seattle, WA

The Port of Seattle and Seattle City Light, assisted by Pacific Northwest National Laboratory and Sandia National Laboratories, will take a deeper look at using hydrogen fuels to reduce greenhouse gas emissions in two studies funded by \$2.12 million in Energy Department grants.

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The Port of Seattle is studying if and how it should get into the business of producing and distributing hydrogen, part of a strategy to increase traffic

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## DEPLOYMENT: Snohomish County, WA

ZeroAvia was awarded a \$350,000 Washington State grant for setting up new offices and R&D space at the Paine Field airport near Seattle, in Snohomish County.

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## DEPLOYMENT: Sumner, WA

Global technology and power solutions leader Cummins Inc will provide its 5-megawatt PEM electrolyzer to enable renewable energy.

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## OPPORTUNITY

Renewable hydrogen could play a key role in Washington's clean-energy future. [READ MORE »](#)

The Pacific Northwest Hydrogen Association was directed by Governor Jay Inslee to coordinate a hydrogen hub proposal for the state, which is expected to extend across the larger Pacific Northwest. [READ MORE »](#)

The Washington Department of Ecology proposed a rule that will require all new light-duty cars to meet zero-emission vehicle standards by 2035. The rule states that hydrogen-powered vehicles qualify to meet the new standards. [READ MORE »](#)

The Pacific Northwest Hydrogen Hub (PNWH2) has been encouraged by the DOE to submit a full application for funding to construct a regional hydrogen hub in Washington and eastern Oregon. [READ MORE »](#)

## Washington, D.C.

### HYDROGEN HUBS: Washington, D.C.

The U.S. Department of Energy (DOE) Office of Clean Energy Demonstrations selected a consortium consisting of EFI Foundation, S&P Global, and Intercontinental Exchange (ICE) to design and implement demand-side support mechanisms to help accelerate commercial liftoff of the clean hydrogen economy. [READ MORE »](#)

### RESEARCH: Washington, D.C.

Argonne National Laboratory has entered into a cooperative research and development with Wabtec to advance research on hydrogen powered trains. [READ MORE »](#)

The Department of Energy announced a funding opportunity for clean hydrogen R&D aimed at furthering low carbon fuels and decarbonized steel production. [READ MORE »](#)

The National Energy Technology Laboratory was awarded a patent for a new fiber optic sensor designed to detect hydrogen leaks at storage facilities. [READ MORE »](#)

## OPPORTUNITY



# HYDROGEN FORWARD

The adoption of hydrogen power in key sectors such as long-haul trucking and data centers could bring 8,900 jobs to the D.C. region by 2030 and generate nearly \$1.7 billion in new economic activity, according to a new report from a nonprofit focused on growing the region's economy.

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The U.S. Department of Energy (DOE) released a Notice of Intent (NOI) to fund the Bipartisan Infrastructure Law's \$8 billion program to develop regional clean hydrogen hubs (H2Hubs) across America. H2Hubs will create networks of hydrogen producers, consumers, and local connective infrastructure to accelerate the use of hydrogen as a clean energy carrier.

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The Mid-Atlantic Hydrogen Hub, a Maryland, Virginia, and Washington DC coalition led by regional nonprofit Connected DMV, received encouragement from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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Senators Chris Coons (D-DE) and Jon Cornyn (R-TX) reintroduced the Hydrogen Infrastructure Initiative, a package of four bills to boost clean hydrogen uptake across the economy.

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The U.S. Department of Energy (DOE) announced up to \$20M in funding for geologic hydrogen.

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## West Virginia

### HYDROGEN HUBS: Appalachian Regional Clean Hydrogen Hub (ARCH2)

DOE AWARDEE: The ARCH2 hydrogen hub, a collation between West Virginia, Ohio, Kentucky and Pennsylvania, has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IJIA.

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KeyState Natural Gas Synthesis, a clean hydrogen and carbon storage project is set to receive funding from the US Department of Energy (DOE) Appalachian Regional Clean Hydrogen Hub (ARCH2) grant.

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### DEPLOYMENT: Mason County, West Virginia

Gov. Jim Justice announced that Fidelis New Energy®, LLC (Fidelis) selected Mason County to build its new lifecycle carbon neutral hydrogen production facility.

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### DEPLOYMENT: Mingo County, WV

CNX Resources Corp. and Adams Fork Energy’s multi-billion-dollar clean ammonia production facility is advancing and plans to support the ARCH2 hydrogen hub.

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## RESEARCH: Morgantown, WV

West Virginia University: HydroGEN Seedling: Intermediate Temperature Proton-Conducting Solid Oxide Electrolysis Cells with Improved Performance and Delivery

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Xingbo Liu, professor in the Department of Mechanical and Aerospace Engineering, will help develop new coatings for the blades of turbines used in large-scale power generation. If the WVU team can engineer a coating that successfully protects turbine blades from extreme heat and corrosion of hydrogen combustion that also works with the principles and technologies of existing natural gas turbines, then power plants will be one critical step closer to running on a mix of hydrogen and natural gas, reducing their carbon emissions and increasing demand for natural gas as an energy-producing fuel source.

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## DEPLOYMENT: General, WV

The Chemours Company and TC Energy signed an MOU to develop two electrolysis-based hydrogen production facilities for the ARCH2 hydrogen hub.

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## OPPORTUNITY

U.S. Senators Joe Manchin, D-W.Va., Shelley Moore Capito, R-W.Va. and Gov. Jim Justice launched the WV Hydrogen Hub Working Group on February 15 “to collaborate and support a strong West Virginia candidate to be chosen to develop a hydrogen hub.”

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West Virginia’s legislature passed two bills designed to make it easier for the state to attract hydrogen hubs. The bills allow some types of state-owned land to be leased for economic development projects that remove harmful gas emissions from the atmosphere to encourage investment in carbon capture.

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The ARCH2 hydrogen hub, a collation between West Virginia, Ohio, Kentucky and Pennsylvania, has been encouraged by the DOE to submit a full application for regional clean hydrogen hubs funding under the IJJA.

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The National Energy Technology Laboratory released a report stating the Appalachian region is well suited to be one of the nation’s clean energy

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hydrogen hubs, citing its natural gas resources, infrastructure, storage capacity, workforce, and industrial demand.

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## Wisconsin

### DEPLOYMENT: Milwaukee, WI

Advanced Ionics is developing industrial electrolyzers that produce hydrogen — a key component of materials like metal, glass and plastic — in a way it says is more sustainable and costs less than the current fossil fuel-derived hydrogen.

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### OPPORTUNITY: Shawano, WI

Charbone Hydrogen plans to produce renewable hydrogen at a 700kW hydropower plant in Shawano as part of the company's plans to develop and construct modular, scalable hydrogen production facilities in the coming years.

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### OPPORTUNITY

Wisconsin Hydrogen Breakthrough May Be Steps Toward Cleaner Energy

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The North Dakota Department of Commerce is working to form a partnership with South Dakota, Montana, Minnesota, and Wisconsin to apply for federal hydrogen hub funding.

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Seven Midwest states, including Wisconsin, formed the M-H2 hydrogen hub coalition aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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Wisconsin joined with three other Midwestern states to develop a proposal for a "Heartland Hydrogen Hub" aimed at advancing clean hydrogen production in the Midwest. The group intends to apply for Department of Energy Hydrogen Hub funding.

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A-1 Alternative Fuel Systems is leading a consortium dedicated to developing fuel cell electric shuttle buses for the California public transit authority. The buses will be developed in Wisconsin and Indiana.

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## Wyoming

### DEPLOYMENT: Cheyenne, WY

Bill Gates funding coal and hydrogen production facility

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The Wyoming Energy Authority and Energy Resources Council approved funding for the Tallgrass Energy, “Eastern Wyoming Sequestration Hub” to study the potential to sequester CO2 in the Wyoming Denver-Julesburg Basin in support of developing a commercial scale sequestration hub in Eastern Wyoming.

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The Wyoming Energy Authority and the Cheyenne-Laramie County Corporation for Economic Development released a five-year plan for establishing the state as a leader on hydrogen. The agency’s “road map” groups energy interests into six categories and outlines specific steps each will need to take to form a hydrogen economy. Wyoming is eyeing two lower-emitting approaches: sticking with natural gas but adding carbon capture and using renewable electricity (likely from wind) to split water molecules into hydrogen and oxygen.

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Caterpillar, Microsoft, and Ballard Power Systems successfully demonstrated the viability of using large-format hydrogen fuel cells to supply backup power for data centers at Microsoft’s data center in Cheyenne, Wyoming.

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## DEPLOYMENT: Douglas, WY

Nordex USA is hoping to break ground on a privately-funded \$2.2 billion clean hydrogen extraction/fuel plant located in Niobrara and Converse counties by late 2025 or early 2026.

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## DEPLOYMENT: Evanston, WY

The Wyoming Energy Authority and Energy Resources Council approved funding for North Shore Energy and Starwood Energy Group’s “Project Phoenix,” joint exploration in the development of an ammonia complex with on-site carbon capture and sequestration capabilities at existing depleted hydrocarbon reservoirs and processing facilities.

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The Wyoming Energy Authority and Energy Resources Council approved funding for 8 Rivers’ study “The 8RH2 Process for Producing Clean Hydrogen with Autothermal Reforming and Carbon Capture” to conduct a Pre-Front-End Engineering Design (Pre-FEED) study for a new-build hydrogen plant.

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## RESEARCH: Laramie, WY

University of Wyoming’s School of Energy Resources partnered with The Williams Cos. Inc. on the Wyoming Hydrogen Pilot Project researching hydrogen production from renewable energy sources.

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The U.S. Department of Energy’s (DOE) Office of Fossil Energy and Carbon Management (FECM) announced up to \$644,000 in funding for the University of Wyoming School of Energy Resources to assess the economic impacts of fossil energy production in Wyoming and evaluate opportunities and research needs to deploy clean hydrogen technologies.

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The University of Wyoming School of Energy Resources (SER) is seeking proposals from current UW faculty members on hydrogen energy. Topics of interest for the proposals include all levels of the supply chain, such as hydrogen production, use, transportation, and storage. The opportunity will fund projects up to 15 months in duration and with a maximum budget of \$100,000.

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## DEPLOYMENT: General

The Wyoming Energy Authority has issued a request for proposals (RFP) for a prime contractor for the Western Inter-States Hydrogen Hub, a proposed regional clean hydrogen hub that Colorado, New Mexico, Utah and Wyoming have teamed up to develop. The prime contractor will support the submission of an application for funding to the Department of Energy (DoE) and, if successful, it will manage the implementation of the project.

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## OPPORTUNITY

The future of hydrogen energy in Wyoming: A conversation with the head of the Wyoming Energy Authority

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All Green Hydrogen Roads Lead to ... Wyoming

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Wyoming Energy Authority announced funding for three hydrogen production/use projects.

[READ MORE »](#)

Colorado, New Mexico, Utah, and Wyoming’s Western Interstate Hydrogen Hub (WISHH) received a recommendation from the Department of Energy (DOE) to submit a full application to the Regional Clean Hydrogen Hubs Program.

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Focus Clean Energy plans to develop a renewable hydrogen facility in eastern Wyoming primarily powered by wind turbines. Construction is expected to begin in 2026.

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