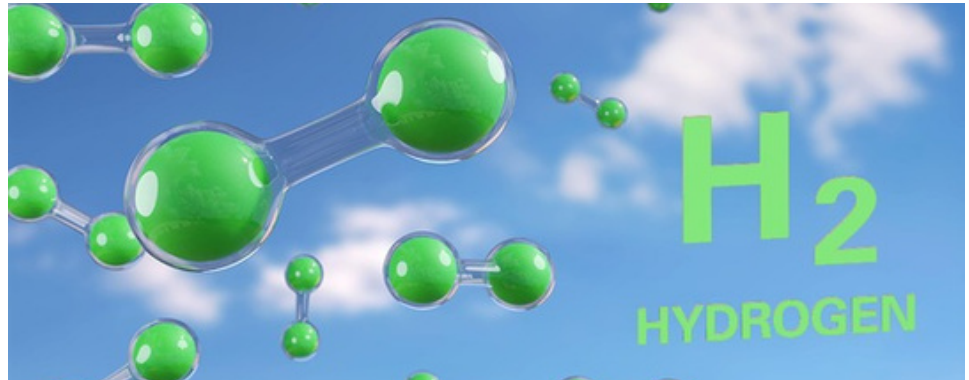


Industry Close Up

Hydrogen

October 2023



Tony Palermo, VP Commercial for New Castle Stainless Plate recently commented on the United States Department of Energy (DOE) announcement for \$7 billion in regional hydrogen hubs (H2Hubs).

Question: What are the benefits of creating these regional hydrogen hubs?

Answer: To jumpstart the proliferation of hydrogen to enable reduced emissions in hard-to-abate sectors, the Department of Energy (DOE) recognized the need to connect hydrogen supply and demand. The hubs are a great step forward in bringing these critical aspects together. Producers can build new or convert existing facilities to hydrogen production plants with increased certainty that there will be future demand. The hubs provide access points for distribution, develop new pathways to hydrogen, and tap into the existing competencies of the chemical, energy, and industrial gas industries.

Q.: What aspects of hydrogen infrastructure do H2Hubs address?

A.: The H2Hub program aims to develop seven regional hydrogen economies that can then begin to interconnect and encourage additional hubs. Through this program, DOE is linking together producers, distributors, and end users in a coordinated and cohesive manner, greatly reducing the risk and inefficiencies that going it alone would entail.

Q.: Where will these hubs be located?

A.: The hub locations were announced in October 2023. They include the Appalachian Hydrogen Hub, the California Hydrogen Hub, the Gulf Coast Hydrogen Hub, the Heartland Hydrogen Hub, the Mid-Atlantic Hydrogen Hub, the Midwest Hydrogen Hub, and the Pacific Northwest Hydrogen Hub. The diversity of these locations clearly demonstrate the flexibility hydrogen solutions can bring to our climate challenge.



The seven H2Hubs were announced in an October 13, 2023 press release from the DOE. The \$7 billion federal investment will be matched by recipients to leverage nearly \$50 billion to strengthen local economies.

[Learn more at the DOE website.](#)

Q.: How will the H2Hubs address clean energy?

A.: Most hydrogen used today is gray and used for applications such as ammonia production. That said, the electrolytic systems to produce cleaner hydrogen have become capable of producing larger amounts of hydrogen and are increasingly efficient, reliable, and affordable. Clean hydrogen can be utilized in a wide variety of applications with little or no carbon emissions—helping industries achieve their zero-emissions targets. As time goes on, industry will find even increasingly efficient ways to produce more clean hydrogen.

Q.: Is the use of hydrogen as energy a new idea?

A.: No. The last time the DOE made a significant investment in hydrogen was during the first Bush Administration, and that was mostly in response to energy security. Global energy security remains a positive attribute of hydrogen, but its full promise is the increased focus on climate friendly solutions for hard-to-abate industries.

Q.: What is the rationale behind the increased focus on hydrogen?

A.: The depth and breadth of clean hydrogen's reach are vast. This includes replacing gray hydrogen with clean hydrogen in a chemical process; serving as a source for industrial heat; or generating clean electrons via a fuel cell. The recent focus and investment in hydrogen makes a lot of sense. Hydrogen can be produced in multiple ways and the final legs of the distribution network draw strong parallels to existing methods for natural gas and bulk industrial gases like nitrogen and oxygen."

Q.: How is hydrogen fuel suitable for mobility?

A.: Although many believe Battery Electric Vehicles (BEV) will own the passenger vehicle space, there are many attributes of Fuel Cell Electric Vehicles (FCEV) that cause many others to believe there is room for both mobility solutions—depending on individual user-specific requirements. As vehicles get larger, FCEV's advantages are more pronounced, due to decreased vehicle weight, reduced fueling time, greater range, and the ability to accommodate factors such as steep grades and frigid temperatures (compared to BEVs). Beyond ground transport, there is increasing interest in marine and aviation applications with exciting developments being announced on a frequent basis. The increased certainty of supply appears to be encouraging more markets to take a serious look at clean hydrogen solutions.

Stainless plate is used in every step of the hydrogen process.

Q.: What other applications are well suited for hydrogen?

A.: Clean hydrogen is a Swiss-army knife of carbon abatement. It can provide green electrons for electrification; be used directly as a fuel in combustion engines and turbines; replace gray hydrogen in existing applications; and provide heat while acting as a reducing agent to produce iron units for green steel production. One recent example—in March 2023, Cleveland-Cliffs ran hydrogen injection trials at their Middletown Works blast furnace. Hydrogen was used in place of some of the coke normally used, resulting in reduced carbon dioxide emissions.

Q.: Anything you'd like to add?

A.: This is hydrogen's moment. It is not just an isolated solution—hydrogen can positively impact multiple segments seeking to reduce carbon emissions while leveraging existing and new resources and competencies to achieve enhanced efficiencies in production, storage, and distribution.

Hydrogen Production and Delivery

