S&P Global Platts
Hydrogen Market Coverage
Creating transparency for a new pathway to decarbonization
Why Hydrogen?

- Hydrogen is already used in industrial processes across the world, largely for oil refining and ammonia production. The vast majority of the world’s current hydrogen production comes from fossil fuels, including natural gas and coal. Production is largely through Steam Methane Reforming (SMR) or gasification. These production pathways emit carbon into the atmosphere.

- Hydrogen is attracting interest as a decarbonization tool from investors, policymakers and energy market participants, who see the potential of hydrogen as a clean fuel for transportation, and a lower-carbon substitute for natural gas in industrial processes, power generation and materials production, as well as for commercial and residential use.

Global Pure Hydrogen Demand

![Graph showing global pure hydrogen demand from 1975 to 2019E.](source: Platts Analytics World Energy Demand Model; International Energy Agency)
The fuel of the future

As investors, governments and industry look to a decarbonized future, they are eyeing technologies such as Carbon Capture and Storage (CCS), which captures carbon produced from fossil fuels, and Proton Exchange Membrane (PEM) and Alkaline Electrolysis, which use electricity to produce hydrogen from water.

The industry typically refers to Steam Methane Reforming with CCS as ‘blue’ hydrogen, or low-carbon hydrogen production, and refers to producing hydrogen through Electrolysis as ‘green’ hydrogen when the electricity is derived from zero-carbon sources such as wind and solar.

In a decarbonized world, the future of hydrogen will be blue or green. Energy companies are racing to commercialize these processes. Its early days and the costs are high, but the potential prize is a material slice of future fuel, chemical and industrial feedstock markets.

Each form of hydrogen has a different set of costs associated with its production. To come to a fair contract price for distribution, you require an independent, unbiased view of your specific product. Leveraging our global presence and long history in the commodities markets, Platts is dedicated to providing fair price assessments that reflect market conditions, giving you the confidence to quickly and confidently execute transactions in this growing market.
Blue and Green Hydrogen – Pathways to decarbonization

Hydrogen production pathways

- Coal/lignite + Steam + O₂ → Methane + Steam
- CH₄ + Steam → H₂O + renewable power
- H₂O + power → H₂, CO₂ + H₂, CO₂

Gasification
Steam methane reformer
Electrolysis

Carbon capture utilization/storage

Low carbon energy carrier

- H₂ blue hydrogen
- H₂ green hydrogen

Hydrogen’s disruptive potential

Fuel
- Transportation: Fuel cell EVs and heavy duty fuel cell trucks, Feedstock for synthetic fuels
- Energy storage: Integration of variable renewables via hydrogen production and long duration storage
- Engines/turbines: Generation by fuel cell, co-firing of gas turbines, or combined heat and power

Chemical
- Petroleum recovery and refining: Enhanced oil recovery, increasing well pressure, hydrocracking and desulphurization of crude and products
- Electronics: Semiconductors, LED displays, photovoltaics
- Chemical production: Methanol, ammonia, urea for fertilizer production

Industry
- Industrial heat: High grade heat for metals refining, cement production
- Building heat: Decarbonization of gas grid through direct H₂ injection, combined heat and power fuel cells
- Industrial feedstock: Replacement of fossil H₂ use with low carbon H₂, Direct reduction of iron
A market in need

The current market for hydrogen is opaque, with little opportunity for price discovery. To help provide transparency, Platts hydrogen assessments provide the market different ways to value the cost of hydrogen production in order to more accurately evaluate it as a fuel.

5 reasons why price assessments matter to your business

- \( \text{Protect your margins} \)
  Unclear pricing can badly affect margins.

- \( \text{Comply with regulations} \)
  Mark your books with respected information.

- \( \text{Negotiate from a position of knowledge} \)
  Be confident that the price you’re using is the market value.

- \( \text{Spot prices are vital} \)
  Spot prices are the basis for term contracts, futures settlements and derivatives.

- \( \text{Benchmark your position} \)
  Set benchmarks for your business with impartial and independent information.

5 characteristics of a good benchmark

- \( \text{Adherence to international norms of trading} \)
  For a price to be relevant, the conventions of a free and open market place must be adhered to. Any distortion could see prices vary from the true market value.

- \( \text{Development of a forward market} \)
  When an actively-traded forward market forms around the benchmark, it’s a strong indicator that it’s gained marked acceptance.

- \( \text{Market acceptance} \)
  The true definition of a good benchmark is when the market accepts it and utilizes it in legally binding contracts.

- \( \text{High degree of transparency} \)
  Transparency leads to the confidence needed for an assessment to become a benchmark.

- \( \text{Chain formation} \)
  The market needs to be confident of on-selling a commodity further down the value chain based on a certain price. Therefore the benchmark is a marker for other materials which will be priced against it.
## Platts Hydrogen Assessments

- Platts hydrogen assessments reflect the cost of hydrogen production at hubs in North America, Europe and Japan using Platts daily gas and power assessments.
- For each production method, Platts will publish an assessment reflecting the cost of production without capital expense assumptions, and with capital expense assumptions.

The assessments will include a commodity price as well as a commodity plus production cost, for the following hydrogen production hubs:

### Canada
- Alberta (SMR w/o CCS, Alkaline Electrolysis, PEM Electrolysis, excluding and including CapEx)

### United States
- (SMR w/o CCS, Alkaline Electrolysis, and PEM Electrolysis, all excluding and including CapEx)
  - Appalachia • Gulf Coast
  - Midcontinent • Northeast
  - Northern California • Northwest
  - Rockies • Southeast
  - Southern California • Upper Midwest

### The Netherlands
- SMR w/o CCS • SMR with CCS
- PEM Electrolysis • Alkaline Electrolysis

### Japan
- SMR w/o CCS • PEM Electrolysis
- Alkaline Electrolysis
Platts Analytics Scenario Planning Service (SPS)

Platts Analytics Scenario Planning Service (SPS), offers clients insights into the different pathways around the Energy Transition and achieving long term climate goals – supporting informed decisions in this rapidly moving space. Hydrogen is a flexible energy carrier that can reduce emissions from key sectors where renewables/battery solutions are challenged to provide meaningful decarbonization. SPS combines global, comprehensive, cross-commodity modeling together with deep dives into transformative technologies and policies – with hydrogen a key areas of focus. Detailed research includes analysis of hydrogen production and transport pathways, cost trajectories and uptake in key sectors such as longhaul transport and steelmaking.

Platts SPS is:

Quantitative
Platts SPS focuses on and quantifies the parameters that are most important to you — namely, prices and supply/demand volumes — along with our assessment of probabilities.

Ongoing
Platts SPS is an ongoing retainer service — not a multi-client study — so that we can keep the scenarios evergreen, track the key assumptions behind each one, and let clients know if and when developments in energy markets change our views on possible outcomes and probabilities.

Customizable
Each client may have their own particular views or concerns over key assumptions. Platts SPS allows subscribers to get a consistent view of the energy world, under their assumptions, using S&P Global Platts proprietary models. We also work with clients to assist them in determining how best to incorporate the conclusions of the scenario work into their decision-making process.

Relevant
Platts SPS covers many of the most important and relevant issues affecting the global commodities markets today.