

# Hydrogen from Natural Gas with Carbon Capture

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**Dipti Dave**  
Associate Director

**Contributions by Rajiv Narang**  
Executive Director

Process Economics Program

## Contacts

### **Dipti Dave**

Associate Director, Intermediate Organic Chemicals  
dipti.dave@ihsmarkit.com

### **Rajiv Narang**

Executive Director  
rajiv.narang@ihsmarkit.com

### **Michael Arné**

Vice President, Process Economics Program  
michael.arne@ihsmarkit.com

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Contributions by **Rajiv Narang**, Executive Director

**Dipti Dave**, Associate Director, Intermediate Organic Chemicals

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### Abstract

Hydrogen (H<sub>2</sub>) is considered to be a potentially disruptive technology for energy transition. Because of this, considerable attention has been directed to carbon capture and sequestration (CCS) as applied to large-scale H<sub>2</sub> production via steam methane reforming (SMR) of natural gas. This is sometimes known as “blue” H<sub>2</sub>.

In this report, we examine the technology and economics of SMR-based H<sub>2</sub> production of 90 million standard cubic feet per day (MMscf/d), equivalent to 100,500 Nm<sup>3</sup>/hr of the product, without and with CCS. Our CCS case assumes 90% capture of carbon dioxide (CO<sub>2</sub>) emissions from the SMR process as well as the heat and power inputs required for carbon capture and compression, namely, Scope 1 plus Scope 2. This is achieved via an on-site noncondensing steam turbine and generation system.

We have conducted our analysis assuming new stand-alone plant construction for H<sub>2</sub> production. We found that by adding CCS and compression to an SMR unit, with 90% of CO<sub>2</sub> captured, adds \$0.68/kg to the net production cost of H<sub>2</sub> from natural gas.

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## IHS Markit Customer Care:

CustomerCare@ihsmarkit.com

### **Asia and the Pacific Rim**

Japan: +813 6262 1887

Asia Pacific: +604 291 3600

**Europe, Middle East, and Africa:** +44 1344 328 300

**Americas:** +1 800 447 2273

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