

# Hydrogen Production and Storage Technologies: Market Research Report

<https://marketpublishers.com/r/H9BE3BC6C1FEN.html>

Date: June 2012

Pages: 544

Price: US\$ 4,450.00 (Single User License)

ID: H9BE3BC6C1FEN

## Abstracts

This report analyzes the worldwide markets for Hydrogen Production and Storage Technologies in US\$ Million by following Technologies: Production, and Others (includes Storage and Distribution Technologies).

The report provides separate comprehensive analytics for the US, Japan, Europe, and Rest of World.

Annual estimates and forecasts are provided for the period 2009 through 2018.

The report profiles 98 companies including many key and niche players such as Acta S.p.A, Advanced Materials Corporation, Air Products and Chemicals, Inc., Airgas, Inc., Ballard Power Systems, Inc., Diversified Energy Corporation, Dynetek Industries Limited, Foster Wheeler AG, Fuel Cell Energy, Inc., General Atomics, Haldor Topsøe A/S, Hy9 Corporation, Hydrogenics Corporation, IdaTech plc, Praxair, Inc., Quantum Fuel Systems Technologies Worldwide, Inc., ReliOn, Inc., ThyssenKrupp Uhde GmbH, and Xebec Adsorption, Inc.

Market data and analytics are derived from primary and secondary research.

Company profiles are primarily based upon search engine sources in the public domain.

## Contents

### I. INTRODUCTION, METHODOLOGY & PRODUCT DEFINITIONS

Study Reliability and Reporting Limitations  
Disclaimers  
Data Interpretation & Reporting Level  
Quantitative Techniques & Analytics  
Product Definitions and Scope of Study

### II. EXECUTIVE SUMMARY

#### 1.INDUSTRY OVERVIEW

A Prelude  
Market Overview  
Current & Future Analysis  
Hydrogen Production: Captive Vs. Merchant Production  
Hydrogen Generation: On-Site Vs. Centralized Generation  
Steam Reforming of Natural Gas: The Dominant Production Technology  
Asia-Pacific Represents the Leading Producer and Consumer of Hydrogen  
Hydrogen Demand Expected to Witness Robust Growth Momentum  
Petroleum Refining and Ammonia Production: The Key Demand Drivers  
Price Competitiveness to Decide the Future of Hydrogen Commercialization  
Hydrogen Technology Finds Widespread Application in Automotive Industry  
Hydrogen-based Internal Combustion Engines  
Hydrogen Fuel Cell Vehicles  
Challenges of On-board Hydrogen Storage Hindering Deployment of Hydrogen Technology  
New Technologies to Pave Way for Hydrogen Commercialization  
Technological Trends  
Biomass Gasification - An Emerging Hydrogen Production Technology  
'Caldicellulosiruptor saccharolyticus' Bacterium Increases Hydrogen Production  
Major Research Breakthroughs  
Researchers Discover Methods to Enhance Solar-Driven Water-Splitting Hydrogen Production  
University of Leeds Develops Eco-Friendly and Energy-Efficient Hydrogen Production System  
Carnegie Institution Discovers New Hydrogen Storage Method

Market Drivers  
Energy Security  
Economic Competitiveness  
Environmental Advantages  
Market Inhibitors  
Technology Barriers  
Production  
Fuel Cells  
Electrolysis  
Storage  
Economic Barriers  
National Energy Policy  
Regulatory Issues  
Risk  
Safety Codes and Standards  
Education  
Fueling Infrastructure  
Production Cost  
Select Global Efforts in Hydrogen Energy Development  
International Partnership for a Hydrogen Economy (IPHE)  
International Energy Agency (IEA)  
International Organization for Standardization Technical Committee on Hydrogen Technologies

## **2.PRODUCT OVERVIEW**

Introduction  
Properties of Hydrogen  
Hydrogen Production Technologies  
Thermochemical Production Technologies  
Steam Methane Reforming (SMR)  
Advantages  
Disadvantages  
Partial Oxidation  
Autothermal Reforming  
Sulfur-Iodide Cycle/Thermochemical Water-Splitting Process  
Gasification of Heavy Hydrocarbons  
Coal Gasification  
Biomass Gasification

Electrolytic Production Technologies

Water Electrolysis

Alkaline Electrolysis

Polymer Electrolyte Membrane (PEM) Electrolysis

High-Temperature Electrolysis

Photolytic Production Technologies

Photoelectrochemical Hydrogen Production

Photobiological Hydrogen Production / Biophotolysis

Direct Biophotolysis

Indirect Biophotolysis

Other Hydrogen Production Technologies

Dark Fermentation

Hydrogen Storage Technologies

Challenges Faced by Hydrogen Storage Technologies in Transportation Applications

Efficiency

Volume and Weight

Cost

Codes and Standards

Refueling Time

Durability

Select Hydrogen Storage Technologies

Compressed Hydrogen Gas Tanks

Liquefied Hydrogen Gas Tanks

Mechanisms of Storing Hydrogen in Materials

Adsorption

Absorption

Chemical Reaction

Chemical Hydrogen Storage

Hydrolysis Reactions

Advanced Chemical Approaches

Metal Hydrides

Carbon Nanotubes

Microspheres

### **3.APPLICATION OF HYDROGEN IN SELECT END-USE DOMAINS**

Production of Chemical Compounds

Petrochemical Industry

Metallurgical Industry

Food Industry  
Space Exploration and Nuclear Reactors  
Usage of Hydrogen as Fuel in Road Vehicles  
Power Generation Sector  
Other Industries

#### **4.PRODUCT INTRODUCTIONS/LAUNCHES**

Proton Energy Systems Unveils HOGEN C Series of Hydrogen Generation System  
OriginOil Develops Breakthrough Hydrogen Production Technology  
SiGNa Chemistry Introduces New Hydrogen Production Technology  
Air Products and Chemicals Develops Retail Compression-Less Hydrogen Fueling Station  
Acta to Exhibit Hydrogen Fuel Enrichment System  
McPhy Unveils Hydrogen Storage Tanks  
Horizon to Introduce Horizon Hydrofill  
Horizon Launches New Hydrogen Fuel Generator Cartridge  
Hydrogen Catalyst and Dekonta Develop New Hydrogen Production Technology  
Global Hydrogen Introduces Hydrogen Production Unit  
Sandia National Laboratories Unveils New Hydrogen Storage System  
Linde Develops Technology for Producing Hydrogen  
Hy9 Unveils New Range of Palladium Hydrogen Purifiers  
Hy9 Launches HGS-M Hydrogen Generators Series

#### **5.RECENT INDUSTRY ACTIVITY**

Turbine Truck Engines Signs Joint Venture Agreement with Energy Technology Services  
Quantum Fuel Systems Technologies Worldwide Wins Contract from Mahindra & Mahindra  
Hydrogenics and Enbridge Ink Agreement  
AGA Gas Collaborates with Sandvik  
NITOL Group Commences Hydrogen Production at Silicon Plant  
SABIC Technology Selects Hydrogen Reactor/ Generator System of Phoenix Canada Oil  
Green Planet Group Establishes AAQIS  
Vodik Labs Takes Over Ovonic Hydrogen Storage Division of Energy Conversion Devices  
Horizon Fuel Cell Technologies Enters into Strategic Alliance with Pilus Energy

McPhy Energy Obtains Contract from Enel Group  
UPS Systems and Air Liquide Hydrogen Energy Ink Distribution Agreement  
Acta Inks Agreement with Claind  
Xebec Adsorption Inks Agreement with Nuvera Fuel Cells  
Air Liquide Collaborates with Coca-Cola  
Hydrogen Link Signs Binding Letter Agreement with IBC Advanced Alloys  
National Hydrogen Association and US Fuel Cell Council Merge  
eHydrogen Solutions Completes Additional Intellectual Property Transfer Agreement  
Sparta Recommences Commercial Sales of HGS in Australia  
eHydrogen Solutions Enters into Intellectual Property Transfer Agreement  
Air Liquide Affiliates Purchase HGM Technology from H2Gen Innovations  
eHydrogen Solutions Enters into IP Transfer Agreement for Purchasing ODHP Assets  
Claind Inks Agreement with Proton Energy Systems  
Proton Energy Systems Enters into Joint Venture with SupplyCore Middle East  
Air Liquide Enters into Three-Year Joint Partnership with University of Kyushu  
ATK Enters into Alliance with Toro  
Technip Bags Hydrogen Contracts in the US  
Air Products and Chemicals Establishes New Hydrogen Plant in Malaysia  
Acta Inks Agreement with Girelli Bruni  
Hydrogenics Enters into Partnership Agreement with CommScope  
Air Liquide Korea Acquires H-Plus SGS  
Praxair Commences Hydrogen Supply to Indiana  
Praxair and Powertech Labs Enter into Alliance  
Topsoe Establishes Hydrogen Production Unit  
Air Products and Chemicals Wins Long-Term Contract from POSCO  
Xebec Merges with QuestAir Technologies  
Proton Energy Systems Demonstrates High-Pressure Hydrogen Generation  
Hynergreen Technologies Signs Agreements with HyGear  
Praxair Enters into Agreement with Uhde  
Nuvera Fuel Cells and Airgas Enter into Agreement  
Ajwaa Gases Emirates Sets Up New Hydrogen Production Plant and ASU  
Abraham Group and Proton Energy Systems Ink Cooperative Agreement  
Catalyx Nanotech Collaborates with Dudek  
Air Products and Chemicals and ExxonMobil Sign Contract  
Hydrogenics Bags Electrolyzer Installation Order from Bhushan Power & Steel  
Air Liquide Inks Industrial Gases Contract with Bayer Polyurethanes  
Praxair Bags Indian Oil Order  
Praxair Bags Hydrogen Supply Contract from Cetane Energy  
Dynamic Fuels Awards Hydrogen Contract to Praxair

Topsoe Inks Contract with Larsen & Toubro  
Shell Oil Awards Hydrogen Contract to Praxair  
Air Products and Chemicals Inks Agreement with Marathon Petroleum Company  
Eden Energy Divests Stake in US-based Subsidiaries  
Iwatani Establishes First Liquid Hydrogen Plant in Chiba  
Praxair Canada to Develop Hydrogen Storage Infrastructure with ATCO  
Air Products and Chemicals Acquires Hydrogen Facility from MarkWest Energy Partners

## 6.FOCUS ON SELECT KEY PLAYERS

Acta S.p.A (Italy)  
Advanced Materials Corporation (US)  
Air Products and Chemicals, Inc. (US)  
Airgas, Inc. (US)  
Ballard Power Systems, Inc. (Canada)  
Diversified Energy Corporation (US)  
Dynetek Industries Limited (Canada)  
Foster Wheeler AG (Switzerland)  
Fuel Cell Energy, Inc. (US)  
General Atomics (US)  
Haldor Topsøe A/S (Denmark)  
Hy9 Corporation (US)  
Hydrogenics Corporation (Canada)  
IdaTech plc (UK)  
Praxair, Inc. (US)  
Quantum Fuel Systems Technologies Worldwide, Inc. (US)  
ReliOn, Inc. (US)  
ThyssenKrupp Uhde GmbH (Germany)  
Xebec Adsorption, Inc. (Canada)

## 7.GLOBAL MARKET PERSPECTIVE

**Table 1.** World Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Geographic Region – US, Japan, Europe, and Rest of World Markets Independently Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)



**Table 2.** World 10-Year Perspective for Hydrogen Production and Storage Technologies by Geographic Region – Percentage Breakdown of Revenues for US, Japan, Europe, and Rest of World Markets for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

**Table 3.** World Recent Past, Current and Future Analysis for Hydrogen Production Technologies by Geographic Region – US, Japan, Europe, and Rest of World Markets Independently Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 4.** World 10-Year Perspective for Hydrogen Production Technologies by Geographic Region – Percentage Breakdown of Revenues for US, Japan, Europe, and Rest of World Markets for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

**Table 5.** World Recent Past, Current and Future Analysis for Other Technologies by Geographic Region – US, Japan, Europe, and Rest of World Markets Independently Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 6.** World 10-Year Perspective for Other Technologies by Geographic Region – Percentage Breakdown of Revenues for US, Japan, Europe, and Rest of World Markets for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### **III. MARKET**

#### **1. THE UNITED STATES**

##### A. Market Analysis

US Government Efforts on Hydrogen Energy Development

Product Launches

Strategic Corporate Developments

Key Players

Advanced Materials Corporation

Air Products and Chemicals, Inc.

Airgas, Inc.

Diversified Energy Corporation

Fuel Cell Energy, Inc.

General Atomics



Hy9 Corporation

Praxair, Inc.

Quantum Fuel Systems Technologies Worldwide, Inc.

ReliOn, Inc.

B. Market Analytics

**Table 7.** US Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 8.** US 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

## 2.JAPAN

A. Market Analysis

Market Scenario

Strategic Corporate Developments

B. Market Analytics

**Table 9.** Japanese Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 10.** Japanese 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

## 3.EUROPE

A. Market Analysis

Market Overview

Iceland

Product Launches

Strategic Corporate Developments

Key Players

Acta S.p.A (Italy)

Foster Wheeler AG (Switzerland)

Haldor Topsøe A/S (Denmark)

IdaTech plc (UK)

ThyssenKrupp Uhde GmbH (Germany)

B. Market Analytics

**Table 11.** European Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Geographic Region – France, Germany, Italy, UK and Rest of Europe Markets Independently Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 12.** European 10-Year Perspective for Hydrogen Production and Storage Technologies by Geographic Region – Percentage Breakdown of Revenues for France, Germany, Italy, UK and Rest of Europe Markets for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

**Table 13.** European Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 14.** European 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### **3A.FRANCE**

Market Analysis

**Table 15.** French Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes

corresponding Graph/Chart)

**Table 16.** French 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### **3B.GERMANY**

Market Analysis

**Table 17.** German Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 18.** German 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### **3C.ITALY**

Market Analysis

**Table 19.** Italian Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 20.** Italian 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### **3D.THE UNITED KINGDOM**

## Market Analysis

**Table 21.** UK Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 22.** UK 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### 3E.REST OF EUROPE

## Market Analysis

**Table 23.** Rest of Europe Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 24.** Rest of Europe 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

### 4.REST OF WORLD

#### A. Market Analysis

##### Select Regional Markets

Canada

Brazil

Malaysia

Product Launches

Strategic Corporate Developments

Key Players

Ballard Power Systems, Inc. (Canada)

Dynetek Industries Limited (Canada)

Xebec Adsorption, Inc. (Canada)  
B. Market Analytics

**Table 25.** Rest of World Recent Past, Current and Future Analysis for Hydrogen Production and Storage Technologies by Technology – Production Technologies and Others Analyzed with Annual Revenues in US\$ Million for Years 2009 through 2018 (includes corresponding Graph/Chart)

**Table 26.** Rest of World 10-Year Perspective for Hydrogen Production and Storage Technologies by Technology – Percentage Breakdown of Revenues for Production Technologies and Others for Years 2009, 2012 and 2018 (includes corresponding Graph/Chart)

#### **IV. COMPETITIVE LANDSCAPE**

Total Companies Profiled: 98 (including Divisions/Subsidiaries - 103)

The United States (59)

Canada (8)

Japan (1)

Europe (24)

- France (5)

- Germany (5)

- The United Kingdom (2)

- Italy (2)

- Spain (1)

- Rest of Europe (9)

Asia-Pacific (Excluding Japan) (10)

Middle-East (1)

## I would like to order

Product name: Hydrogen Production and Storage Technologies: Market Research Report

Product link: <https://marketpublishers.com/r/H9BE3BC6C1FEN.html>

Price: US\$ 4,450.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/H9BE3BC6C1FEN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:  
Last name:  
Email:  
Company:  
Address:  
City:  
Zip code:  
Country:  
Tel:  
Fax:  
Your message:

**\*\*All fields are required**

Customer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970