

# H<sub>2</sub>PS 2003

The 2003 Hydrogen  
Production & Storage Forum

Assessing the "Here-and-Now"  
Technical, Strategic and  
Commercial Opportunities  
for Generating and Storing  
Hydrogen Fuel

DECEMBER 3-5, 2003  
HILTON GARDEN INN, FRANKLIN SQUARE  
WASHINGTON DC

## Conference Highlights

Conference  
Chair:



JAY LASKIN  
*Principal*  
HyEnergy Consulting  
*former Director*  
Teledyne Energy Systems, Inc.

BMW  
DOE  
Fair PR  
Fluor Daniel  
FIBA  
GTI  
General Motors  
HyRadix  
Mitretek  
Plug Power  
Praxair  
REB Research  
Sierra Lobo

Air Products & Chemicals  
ASME International  
ChevronTexaco Ovonix  
Energy Conversion Devices  
Global Hydrogen  
H2Gen Innovations  
National Hydrogen Association  
Proton Energy Systems  
QUANTUM Technologies  
Sustainable Partners  
Technology & Management Services  
University of Michigan

Strategic  
Insight  
From:

"This conference greatly exceeded any expectations. Good speakers, sharp dialogue."  
Kevin Lewis, Business Development Manager,  
TOKYO BOEKI

"A quality forum where many of the key figures in hydrogen-related technology and investment are represented."  
Raymond L. Posey, General Manager,  
McDERMOTT TECHNOLOGY, INC.

In Association With:



# H<sub>2</sub>PS 2003

## 9 Reasons to Attend This Pivotal Event

1. Find out the status of the hydrogen economy, storage and production technologies, codes and standards, and what technologies are being selected for transportation, portable and stationary power applications.
2. Discover how hydrogen is being developed from coal and natural gas and the impact for fuel cell vehicles of the future.
3. Learn new strategies for producing low-cost, on-site hydrogen and how industrial gas markets and natural gas reserves will be affected.
4. Get a complete assessment of how much capital is being invested and the approximate operating costs necessary for making H<sub>2</sub>.
5. Get updated on the status of standardization, including discussion of infrastructure and automotive standards, and what the ASME is doing to further these along.
6. Understand how MOFs, an entirely new class of porous materials, are improving storage capacity and increasing surface area and pore size.
7. Hear the latest in high-pressure storage technologies and transportation equipment, and how these will affect the hydrogen infrastructure.
8. Get a complete review of metal, complex and chemical hydrides in the solid storage of hydrogen.
9. Meet and network with the leaders of the energy industry at any of ten networking functions.

## The Changing Age of Energy

*H2PS 2003* - the only conference devoted exclusively to the technology and business issues of moving to a hydrogen economy - will focus on the consumer trends, technical innovations, emerging applications, and market opportunities for hydrogen in large and small scale energy generation.

By attending *H2PS 2003*, you'll get an appraisal of the hurdles and drivers in moving to hydrogen fuel cells by exploring the key elements - storage and production technologies, infrastructure developments, and international codes and standards - as well as consumer acceptance issues and the likely timetable of events needed to transition to hydrogen.

### Industry Overview

Enormous investments in hydrogen technologies are being made today. Between 2003-2005 at least eight major car manufacturers will be introducing low-volume fuel cell cars. The European Commission is investing \$2 billion over the next three years to research a renewable hydrogen-based energy economy - targeting 22% of electricity from renewable resources by 2010. The latest US Department of Energy's FreedomFUEL program also targets reducing the cost of hydrogen by a factor of 4 and the cost of fuel cells by a factor of 10, with \$720 million ear-marked for funding over the next 5 years. Likewise, Japan, Korea and China have ambitious national development programs for hydrogen underway.

With analysts now predicting that 1% of US homes will be powered by residential fuel cells by 2010 and certain isolated regions - Iceland, Hawaii, Singapore and Japan's Yakushima Island - committed to converting to a hydrogen infrastructure by 2025 or earlier, *H2PS 2003* is taking place at a pivotal time during the transition to hydrogen.

Whether you are an industry veteran or a newcomer - you'll find *H2PS 2003* is a rich source of important new business and technical information, contacts, and up-to-the-minute information you can use for market development, product deployment and regulatory compliance. By attending, you'll not only hear from the industry's leaders, but you'll also have an unrivaled opportunity to exchange important information critical to shaping the hydrogen economy of the future.

### Who Should Attend ...

*H2PS 2003* is designed for business development managers, R&D specialists, technology planners, venture capitalists and anyone involved in the energy production, transmission, conversion, and distribution industries as well as anyone connected with applications where hydrogen will play a key role - such as transportation, electric power generation and mobile battery-powered devices.

Questions? Call Brian Santos at 207.781.9618





# Pre-Conference Seminars

Wednesday, December 3

## 1 Hydrogen and Fuel Cells: Engineering Decisions, Customer Benefits and Financial Outcomes 8:30 am

This seminar will explore the technological and business issues affecting the advancement of the hydrogen economy and fuel cell development. Discussion will focus on what initial investments are required, how market forces advance technology and what entrepreneurial options are available. Key topics to be covered include:

- The hydrogen economy: the potential size and key players
- Why hydrogen differs from other energy technologies
- How to make and store hydrogen
- Hydrogen purification options: membranes, pressure swing, and membrane reactors
- Fuel cells: options, costs and benefits
- Fuel cell company technology, financials and likely outcomes

This seminar is geared towards financial analysts, investment managers, corporate venture investors and CFOs as well as hydrogen and fuel cell engineers, business managers, corporate development specialists, and those involved in marketing and sales.



**Instructor:** Robert E. Buxbaum is President and Founder of REB Research & Consulting, a company specializing in hydrogen separation and membrane reactors. He is a renowned expert on hydrogen generators and has been involved with hydrogen since getting his Ph.D. at Princeton in 1982. He is the author of more than 65 technical and financial analysis articles and his company has collaborated with virtually every hydrogen purifier and fuel cell company in one capacity or another in the field of hydrogen generation.

## 2 The Phoenix Project: Shifting from Fossil & Nuclear Fuels with Wartime-Speed 1:30 pm

The Phoenix Project is a 5-year, \$6 trillion project intended to help transform oil and utility companies into manufacturers and suppliers of solar hydrogen by 2010, a transformation that would supercharge the global economy and impact automobiles and power plants alike. This seminar will discuss the steps necessary for transitioning to a hydrogen economy through examination of "Windships" - mass-producible, sea-based, wind-powered hydrogen production systems - as well as other important systems that will support a change in global energy policy. Key topics to be discussed include:

- Hydrogen production costs
- Vehicle conversion considerations
- The proposed Fair Accounting Act legislation
- Avoiding the exponential icebergs
- Mass production of wind-powered systems

This course will be useful for anyone interested in understanding the transition to hydrogen including scientists, engineers, business development managers, R&D specialists, technology planners and venture capitalists and investors. This course will also be of interest to the general public and the media.



**Instructor:** Harry Braun has been working as an energy analyst for the past 30 years. He is CEO of Sustainable Partners LLC, a systems integration firm that is involved in a number of renewable energy projects, including the development of a \$180 million wind farm project in New Mexico. Harry is also the Founder and Chairman of the non-profit Hydrogen Political Action Committee

(h2pac.org), which is focused on helping to organize Hydrogen Hearings in the U.S. Congress, which will be a prerequisite for the passage of the Fair Accounting Act legislation.

# Conference Agenda

## Wednesday, December 3

- 8:30 Pre-Conference Seminar 1: (Additional fee required.)  
*Hydrogen and Fuel Cells*
- 1:30 Pre-Conference Seminar 2: (Additional fee required.)  
*The Phoenix Project*
- 6:00 *Registration - Check-in for the conference and join fellow participants for a complimentary wine and cheese reception.*

## Thursday, December 4

- 7:00 *Registration & Coffee - Enjoy a continental breakfast & informal discussion with your colleagues.*
- 8:00 *Welcome & Chair Introduction*  
PATRICIA KINZER - Intertech Conferences  
JAY LASKIN - HyEnergy Consulting

## Session 1: Industry Overview, Market Drivers & Government Regulations

- 8:15 *The Government's Role in Demonstrating Hydrogen Technologies*  
- Support the development of fuel cells for transportation, stationary and portable power applications  
- Complement the R&D of production technologies  
- Collaborate on the validation of production, storage, and utilization of hydrogen technologies  
- Coordinate the dev. of codes, standards, and safety procedures  
- Direct the education of the public  
CHRISTOPHER BORDEAUX, Technology Dev. Manager  
The Department of Energy
- 8:45 *On the Road to Hydrogen: Policies and Priorities*  
- Production and the role of renewable energy  
- Applications and the role of transportation, portable and stationary power  
- Fuel cells and the role of alternative conversion technologies  
JEFF SERFASS, President  
National Hydrogen Association
- 9:15 *ASME Hydrogen Codes and Standards*  
- Standardization supports hydrogen infrastructure development  
- Industry needs drive standards development  
- Industry support of consensus standards committees is essential  
- Overview of ASME hydrogen standards activities  
JOHN KOEHR, Director, C&S Technology Institute  
ASME International
- 9:45 *Fueling Our Future: Setting the Stage for the Coming Hydrogen Economy*  
- Steps to a reliable, cleaner, decentralised energy supply where H2 plays a key role  
- Consumer motivation and incentives to buy new products  
- An overview of hydrogen in Europe and China  
ARNO EVERS, President  
FAIR-PR
- 10:15 *Refreshment Break*

## Session 2: Hydrogen Production Technologies

- 10:45 *Hydrogen Production Economics - A Technology Comparison*  
- Overview of commercial production technologies  
- Capital and operating costs to make H2  
- Fossil fuel vs. other energy sources  
BOB HENDERSON, Director, Process Engineering  
Fluor Daniel

Attend BOTH seminars and save \$200!



## Friday, December 5

### Session 3: Hydrogen Storage Technologies

- 11:15 **Advances in On-Site Electrolysis Hydrogen Generation Technology: Roadmap to Hydrogen Fuel**  
 - Technology and capital risk  
 - Operating costs  
 - Operational complexity  
 - Safety and reliability  
 - Well-to-wheels efficiency  
 - Environmental stewardship  
 DR. LARRY SWEET, Chief Operating Officer  
 Proton Energy Systems, Inc.
- 11:45 **Hydrogen Production as Seen by a Fuel Cell System Developer**  
 DR. WILLIAM D. ERNST, V.P. and Chief Scientist  
 Plug Power, Inc.
- 12:15 **Roundtable Luncheon**
- 1:45 **Low-Cost, On-Site Hydrogen Production**  
 - On-site vs. central hydrogen production  
 - On-site electrolysis vs. on-site fuel processors  
 - Industrial gas markets for hydrogen  
 - Natural gas reserves and hydrogen production  
 C.E. THOMAS, President  
 H2Gen Innovations, Inc.
- 2:15 **Hydrogen Production via On-Site Fuel Reforming**  
 - An economically viable solution to hydrogen supply  
 DAVID CEPLA, Vice President Business Development  
 HyRadix, Inc.
- 2:45 **Modular Hydrogen Production Technology**  
 - Microchannel technology advantages  
 - Entry market: refinery revamps  
 - Future market: refueling infrastructure  
 JEFF MCDANIEL, Business Development Manager  
 Global Hydrogen
- 3:15 **Using DFMA to Reduce the Cost of Hydrogen from Small Steam Methane Reformer Based Systems**  
 - Current state-of-the-art industrial steam methane reformer (SMR) based systems  
 - Market and system parameters  
 - Design for manufacturing and assembly (DFMA) approach applied to SMR based systems  
 - Economic impact of DFMA approach on the cost to produce hydrogen from natural gas  
 TIM AARON, Senior Development Associate  
 Praxair, Inc.
- 3:45 **Refreshment Break**
- 4:15 **Biogenic Hydrogen Production from Biosolids and Renewable Biomass Applying Bacteria Grown in Hollow Fiber Bioreactors**  
 - Multi-stage fermentations for hydrogen production  
 - Microorganisms, including Thermotoga, photosynthetic species, and fermenters  
 - Hollow-fiber bioreactors and hydrogenogenic biofilms  
 - Feedstocks: manures and energy crops  
 DR. ROBERT PATEREK  
 Manager, Environmental Biotechnology  
 Gas Technology Institute
- 4:45 **Hydrogen from Coal and Natural Gas - The National Benefits of Clean and Secure Fuel for Fuel Cell Vehicles**  
 MARK ACKIEWICZ, Associate  
 JOHN ANDERSON, Senior Associate  
 Technology & Management Services, Inc.
- 5:15 **Hydrogen From Fossil Fuels: Technologies, Costs and Challenges**  
 - Challenges associated with transformation to a hydrogen economy  
 - Current state of technology for production of hydrogen from coal  
 - Advanced technologies for coal-based hydrogen production  
 - Impact of carbon capture on these technologies  
 DR. DAVID GRAY, Director, Energy Systems Analysis  
 Mitretek
- 6:00 **Cocktail Reception - Meet with speakers and fellow attendees over cocktails and hors d'oeuvres**

- 8:30 **Addressing the Challenges of Hydrogen Storage**  
 - What are the goals and the options?  
 - What's the status of storage technology development?  
 - What's the perspective in practical hydrogen storage systems for transportation applications?  
 JAMES SPEAROT, Director, Chemical & Environmental Sciences Lab  
 General Motors
- 9:00 **High Pressure Hydrogen Storage: Lessons-Learned and the Path Forward**  
 - State-of-the-art of compressed storage technologies  
 - Lessons-learned in field applications  
 - Map of path forward based on current knowledge-base  
 DR. NEIL SIROSH, Director, Advanced Technologies  
 QUANTUM Technologies Worldwide, Inc.
- 9:30 **Solid Hydrogen Storage - An Overview**  
 - What is solid hydrogen storage?  
 - A brief review of metal, complex and chemical hydrides  
 - Current status of solid hydrogen storage: materials and systems  
 - Challenges ahead  
 ROSA YOUNG, Vice President Technology  
 ChevronTexaco Ovonic Hydrogen Systems
- 10:00 **Design and Function of Liquid Hydrogen Storage and Fuel System for the New BMW 7 Series**  
 - Tank and insulation  
 - Fuel supply system  
 - Safety issues  
 - Refueling interface  
 GREGOR FISCHER  
 General Manager, Clean Energy Fuel Systems  
 BMW AG
- 10:30 **Refreshment Break**
- 11:00 **Comparison of Hydrogen Purification Technologies**  
 DAVID E. GURO, Product Manager  
 Air Products & Chemicals, Inc.
- 11:30 **PANEL DISCUSSION: The Industry's Leaders Discuss and Debate Key Issues Affecting the Industry**
- 12:30 **Roundtable Luncheon**
- 2:00 **On-Board, No-Vent Liquid Hydrogen Storage System Technologies**  
 - Benefits of liquid hydrogen storage  
 - Issues with liquid hydrogen storage  
 - No-vent liquid hydrogen storage system technologies  
 - Low-cost mass gauging of liquid hydrogen  
 MARK HABERBUSCH, Director of Research and Technology  
 Sierra Lobo, Inc.
- 2:30 **Solid-State Metal Hydrides for Near-term Commercialization of Hydrogen Combustion**  
 - Hydrides for the safe and compact storage of hydrogen  
 - Potential for early hydrogen commercialization in developing countries  
 - Availability of cost-effective, domestic, renewable hydrogen  
 - Need for sustainable growth  
 DR. KRISHNA SAPRU, Director, Thermal Hydride Products  
 Energy Conversion Devices, Inc.
- 3:00 **Hydrogen Storage & Transportation Equipment**  
 - High-pressure gas storage equipment  
 - High-pressure gas transportation equipment  
 - Cryogenic storage equipment  
 - Cryogenic transportation equipment  
 JACK FINN, President  
 FIBA
- 3:30 **Conference Summary and Closing Remarks**

# Register by October 31st and save \$100!

## Washington DC



The 2003 Hydrogen Production & Storage Forum will be held at the Hilton Garden Inn at Franklin Square, centrally located in downtown Washington, DC and within walking distance of McPherson Square Metro Station, the Smithsonian, shopping and national monuments. The hotel is 3 blocks to the White House, the Washington DC Convention Center, the MCI Arena and is 4.5 miles from Reagan National Airport, minutes to the Kennedy Center of Performing Arts, Ford and National Theaters.

## Registration Info

**Please Note** To guarantee your place, payment is required in advance of the conference. The conference proceedings, luncheons, refreshment breaks, access to the exhibit area and receptions are included in the conference fee. Separate fees are charged for the pre-conference seminars. You will receive a written confirmation of your registration within one week of registering.

**Hotel Information** A limited number of discounted rooms has been reserved for attendees who make reservations by November 11. Please contact the hotel directly and be sure to mention you are attending *Intertech's Hydrogen Conference*. Registrants are responsible for making their own hotel and travel reservations. Contact the Hilton Garden Inn at:

**Hilton Garden Inn, Franklin Square**  
815 14th Street, N.W.  
Washington DC 20005  
Tel: 202.783.7800  
Fax: 202.783.7801

**Substitutions & Cancellations** Registration fees are fully refundable if cancellations are made in writing by November 21. After this date, a \$100 cancellation fee will be applied. Substitutions may be made at anytime at no charge.

**Team Participation** Sign up 3 or more colleagues from your company at the same time and SAVE \$200 on each registration! This is an excellent way for your entire team to get updated, meet potential customers and network with industry experts. Registrations must be submitted at the same time.

**Update Your Library** If you cannot attend, you can still take advantage of the important information and contacts from the conference. Order the conference proceedings, and receive a complete set of all papers presented at the meeting. To order, use the registration form or call 207.781.9800.

## Sponsorships & Exhibits

Take this opportunity to increase your visibility before a highly qualified audience of key decision-makers. Sponsorships are still available for several functions at the conference, and we also offer tabletop exhibit space and advertising in the book of conference proceedings. For details on these opportunities, contact Brian Santos: Tel: 207.781.9618, Fax: 207.781.2150 or email: bsantos@intertechusa.com.

## 5 Easy Ways to Register

1. Phone USA +207.781.9618
2. Fax USA +207.781.2150
3. E-Mail bsantos@intertechusa.com
4. Web [www.intertechusa.com/hydrogen.com](http://www.intertechusa.com/hydrogen.com)
5. Mail 19 Northbrook Drive  
Portland, Maine 04105 USA

## Registration Form

Please circle one: Mr. Mrs. Ms. Dr.

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**Registration Fees (142-03)**

<input type="checkbox"/> EARLY BIRD REGISTRATION FEE (through October 31st)	US	\$1295	_____
<input type="checkbox"/> Conference Registration Fee (after October 31st)	US	\$1395	_____
<input type="checkbox"/> Preconference Seminar 1 (Hydrogen and Fuel Cells)	US	\$ 395	_____
<input type="checkbox"/> Preconference Seminar 2 (The Phoenix Project)	US	\$ 395	_____
<input type="checkbox"/> Seminars 1 and 2 <b>Save \$200!</b>	US	\$ 595	_____
<input type="checkbox"/> Conference Proceedings (for those who can't attend)	US	\$ 995	_____
<input type="checkbox"/> Exhibit Table (I am registered to attend)	US	\$ 695	_____
<input type="checkbox"/> Exhibit Table (I am not registered to attend)	US	\$1295	_____

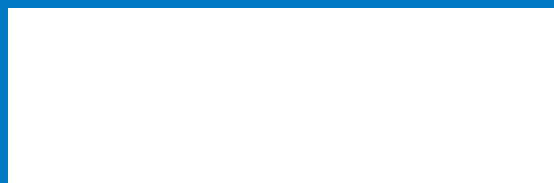
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# The 2003 Hydrogen Production & Storage Forum

# H<sub>2</sub>PS 2003

DECEMBER 3-5, 2003 HILTON GARDEN INN, FRANKLIN SQUARE – WASHINGTON DC

## A comprehensive update on

- low-cost, on-site hydrogen production
- gas storage equipment
- early hydrogen commercialization
- safety and reliability
- capital risk and operating costs
- hydrogen storage economics
- market drivers and growth outlook



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## What participants at last year's conference said . . .

"This conference provides a well-rounded overview of the opportunities and challenges shaping the emerging Hydrogen/Fuel Cell economy."

Frank Walter, Partner - Impala Communications

"Well executed and thoughtful conference."

Jon Fox-Rubin, President & CEO - Hypercar, Inc.

"We need more of these kinds of forums!"

Manoj Guha, Manager, Corporate Technology Dev. - American Electric Power

"Excellent start for those interested in the hydrogen economy investment and development."

Ewan Choroszylow, Business Development Manager - Combined Heat & Power, Inc.

"Excellent forum for emerging technology review."

Blake Morrison, Director - Business Development - Kinectrics NA

"A well balanced perspective between hydrogen investors and producers."

Michael Gan, GM - Hamilton Sundstrand Space Systems International, Inc.

"Well balanced view of a series of complex and interconnected issues."

Marianne Asaro, Senior Chemist - SRI International

## Key Contributions By:

Air Products & Chemicals, Inc.

ASME International

BMW AG

ChevronTexaco Ovonic Hydrogen

Department of Energy

Energy Conversion Devices, Inc.

Fair PR

Fluor Daniel

FIBA

Gas Technology Institute

General Motors

Global Hydrogen

H2Gen Innovations, Inc.

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