



# international association for hydrogen energy

Clean and Abundant Energy for Sustainability

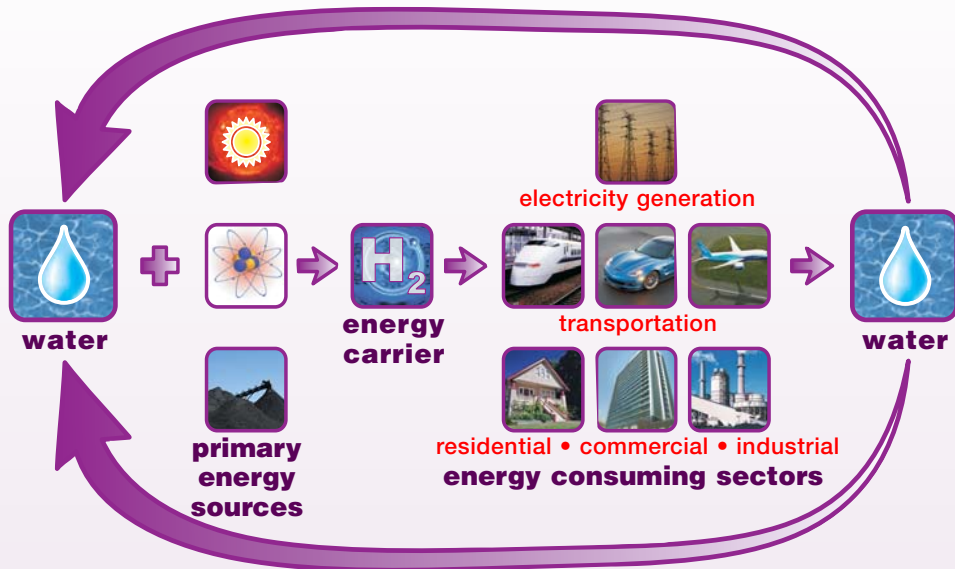
## A Remarkable Prophecy

“... water decomposed into its primitive elements ... and decomposed doubtless, by electricity, which will then have become a powerful and manageable force...”

Yes my friends, I believe that water will one day be employed as fuel, that **hydrogen** and **oxygen** which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable.

Water will be the coal of the future!”

Jules Verne, *Mysterious Island*, 1874



## Hydrogen is the energy of the future...

**H**ydrogen is widely regarded as an ideal energy carrier for use in the foreseeable future. It can be produced from water using a variety of energy sources, such as solar, nuclear and fossil. It can be converted into useful energy forms efficiently and without detrimental environmental effects. Most energy conversion methods generate only water or water vapor as by-product. If air is used for flame combustion of hydrogen small amounts of NOx are produced. When solar energy is used to produce hydrogen from water, both the primary and secondary forms of energy are renewable and environmentally compatible. This results in an ideal, clean and permanent energy system - the *solar hydrogen energy system*.

Hydrogen can be used in any application where fossil fuels are being used today, with the sole exception of cases in which carbon is specifically needed. Hydrogen can be used as a fuel in furnaces, internal combustion engines, turbines and jet engines. It can do so even more efficiently than fossil fuels like coal, petroleum and natural gas. Automobiles, buses, trains, ships, submarines, airplanes and rockets can run on hydrogen. Hydrogen can also be converted directly to electricity by fuel cells, with a variety of applications in transportation and stationary power generation. Metal hydride technologies offer a variety of applications in refrigeration, air conditioning, and hydrogen storage and purification. Combustion of hydrogen with oxygen results in pure steam, which has many applications in industrial processes and space heating.

Moreover, hydrogen is an important industrial gas and raw material in numerous industries, including the computer, metallurgical, chemical, pharmaceutical, fertilizer and food industries.



# The future has already started!

## Environmental Benefits

The *hydrogen energy system* is also the permanent solution to global environmental problem, such as global warming, climate change, ozone layer depletion, acid rains, air pollution, oxygen depletion, oil spills and noise. When hydrogen is produced using renewable energy sources and/or nuclear energy, it does not produce CO<sub>2</sub> and other greenhouse



gases. There are no chemicals to harm the ozone layer, no acid rain ingredients, no pollutants, and no risk of oil spills. Since the required amount of oxygen is generated when hydrogen is produced, atmospheric oxygen will not be depleted. Since fuel cells have no moving parts, no noise will be produced when hydrogen is converted to energy this way.

## Objective

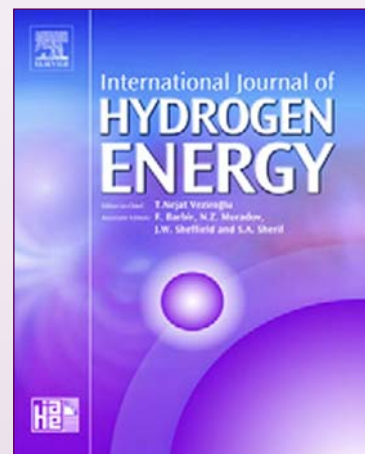


The Association strives to advance the day when *hydrogen energy* will become the principal means by which the world will achieve its long-sought goal of *abundant clean energy for mankind*. Toward this end, the Association stimulates the exchange of information in *the hydrogen energy field* through its publications and sponsorship of international workshops, short courses, symposia and conferences. In addition, the Association endeavors to inform the general public of the important role of *hydrogen energy* in the planning of an inexhaustible and clean energy system.

## Information Dissemination

The Association has an official scientific journal, the **International Journal of Hydrogen Energy (IJHE)**, published fortnightly by Elsevier. The journal, started in 1976, publishes peer-reviewed papers on all aspects of *hydrogen energy*. Originally, it was a quarterly. As the importance of *hydrogen energy* grew, the frequency of publication increased, reaching the present number of twenty-four issues a year.

IAHE organizes biennial **World Hydrogen Energy Conferences (WHECs)** in even years and biennial **World Hydrogen Technologies Conventions (WHTCs)** in odd years - including exhibitions - around the world. In addition, the Association maintains and updates an Internet site, [www.iahe.org](http://www.iahe.org), that includes membership information, hydrogen-related papers and links to hydrogen-related sites.



## Organization

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\*deceased

## WHEC and WHTC Meetings

1974	THEME	 Miami Beach, FL, U.S.A.	2000	13 WHEC	 Beijing, China
1976	1 WHEC	 Miami Beach, FL, U.S.A.	2002	14 WHEC	 Montreal, Canada
1978	2 WHEC	 Zurich, Switzerland	2004	15 WHEC	 Yokohama, Japan
1980	3 WHEC	 Tokyo, Japan	2005	WHTC '05	 Singapore, Malaysia
1982	4 WHEC	 Pasadena, CA, U.S.A.	2006	16 WHEC	 Lyon, France
1984	5 WHEC	 Toronto, Canada	2007	WHTC '07	 Montecatini Terme, Italy
1986	6 WHEC	 Vienna, Austria	2008	17 WHEC	 Brisbane, Australia
1988	7 WHEC	 Moscow, Russia	2009	WHTC '09	 Delhi, India
1990	8 WHEC	 Honolulu, HI, U.S.A.	2010	18 WHEC	 Essen, Germany
1992	9 WHEC	 Paris, France	2011	WHTC '11	 Glasgow, U.K.
1994	10 WHEC	 Cocoa Beach, FL, U.S.A.	2012	19 WHEC	 Calgary, Canada
1996	11 WHEC	 Stuttgart, Germany	2013	WHTC '13	 Shanghai, China
1998	12 WHEC	 Buenos Aires, Argentina	2014	20 WHEC	 Kwangju City, Korea

## IAHE Awards

IAHE has established awards to formally recognize those individuals and organizations who have made major contributions to the promotion of hydrogen energy worldwide. It recognizes five categories of such contributions, each award being named after a pioneer in the history of hydrogen energy's development:

- **IAHE Jules Verne Award** for Superior Service (a general area of involvement). Jules Verne, of course, predicted the hydrogen energy idea in his 1874 novel *The Mysterious Island*.
- **IAHE Rudolph A. Erren Award** for Leadership in Thermochemical Area (involvement with heat engines and combustion, thermochemical production, facets of hydrogen transmission, distribution and storage, e.g., metal hydrides). Rudolph Erren was the noted dynamic German developer of hydrogen-fueled motor vehicles, demonstrated in fleet service in the 1930s.
- **IAHE Sir William Grove Award** for Leadership in Electrochemical Area (involvement with fuel cells and electrolyzers, and other electro-chemical means relating to hydrogen processing). Sir William Grove was the inventor of the fuel cell in England in 1839, producing electricity and water from hydrogen and oxygen.
- **IAHE Akira Mitsui Award** for Leadership in Biological Area (relating to biological processes for producing hydrogen and synthesizing valued products utilizing hydrogen). Dr. Mitsui was a noted Japanese-American researcher in the photo-biological hydrogen production field, using special types of algae and micro-organisms to this end.

- **IAHE Konstantin Tsiolkovsky Award** for Leadership in Aerospace Area (relating to the use of hydrogen as the leading aerospace propulsion fuel and energy carrier in space vehicles, satellites and stations). Professor Tsiolkovsky was the Russian pioneer of astronautics, first proposing hydrogen-fueled rocket propulsion for spaceflight in the late 1890s.

The above is an outstanding international representation of visionaries, scientists and technologists, who have done much early on to elevate hydrogen to its rightful place as the leading clean, renewable energy prospect for the future. With these awards IAHE honors the pioneers, as well as our contemporaries, who have contributed so much to forwarding progress in this noble field of endeavor.

An International Awards Committee has been established, consisting of distinguished hydrogen energy scientists from around the world: Dr. Frano Barbir (Chair), U.S.A., Prof. Bao Deyou, China, Prof. K.F. Knoche, Germany, Prof. Stanislav P. Malysenko, Russia, Prof. O.N. Srivastava, India, Dr. C.E. (Sandy) Thomas, U.S.A., and Prof. Kunio Yoshida, Japan. The committee will forward their recommendations to the IAHE Board of Directors for final decision.

Suggestions from the members regarding this recognition initiative are welcome, and nominations for specific individuals and/or organizations for these awards should be forwarded to the IAHE Awards Committee Chairman at the following address:

**Prof. Dr. Frano Barbir**  
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R. Boskovic bb  
21000 Split, Croatia  
[fbarbir@fesb.hr](mailto:fbarbir@fesb.hr)  
[barbir@unido-ichet.org](mailto:barbir@unido-ichet.org)

## IAHE Awards

The following are past recipients of IAHE awards:

### • IAHE Jules Verne Award:

- 1998 - John O'M. Bockris, U.S.A.; Cesare Marchetti, Austria
- 2000 - Tokio Ohta, Japan; Robert M. Zweig, U.S.A.
- 2002 - William D. Van Vorst, U.S.A.; Mylopore V.C. Sastri, India
- 2004 - Bragi Arnason, Iceland; Carl-Jochen Winter, Germany
- 2006 - Zong Qiang Mao, China; David Sanborn Scott, Canada
- 2008 - U.S. DOE Hydrogen Program, U.S.A.; Ludwig-Bölkow-Systemtechnik GmbH, Germany

### • IAHE Rudolph A. Erren Award:

- 1998 - World Energy NETwork (WE-NET) Project, MITI, Japan
- 2000 - Victor A. Goltsov, Ukraine and Vladimir D. Rusanov, Russia
- 2002 - BMW A.G., Germany
- 2004 - Royal Dutch/Shell Group, Netherlands
- 2006 - Linde A.G., Germany; Shoichi Furuhashi, Japan
- 2008 - Japan Steel Works, Ltd., Japan; M.A.N. AG, Germany

### • IAHE Sir William Grove Award:

- 1998 - Ballard Power Systems, Canada
- 2000 - Stanford R. Ovshinsky, U.S.A.; DaimlerChrysler Corporation, Germany/U.S.A.; Ford Motor Company, U.S.A.
- 2002 - UTC Fuel Cells, U.S.A.
- 2004 - Toyota Motor Corporation, Japan; Honda Motor Company, Japan; General Motors Corporation, U.S.A.
- 2006 - Milan M. Jaksic, Serbia
- 2008 - Janusz Nowotny, Australia; Gang Wan, China

### • IAHE Akira Mitsui Award:

- 2002 - Jun Miyake, Japan
- 2004 - Peter Lindblad, Sweden
- 2008 - Debabrata Das, India

### • IAHE Konstantin Tsiolkovsky Award:

- 1998 - National Aeronautics and Space Administration (NASA), U.S.A.
- 2000 - Aerospatiale Matra, France
- 2004 - Airbus S.A.S., E.U.
- 2006 - ROSCOSMOS, Russian Federal Space Agency, Russia; Iwatani International Industry Co. Ltd., Japan
- 2008 - Aerovironment, Inc., U.S.A.

## Membership

The Association has four categories of membership:

- **Members:** Professional persons, who are active in fields relating to some aspect of Hydrogen Energy.
- **Associate Members:** Laypersons, who have an interest in Hydrogen Energy.
- **Emeritus Members:** Persons who are in a retired status and have no income other than retirement payment.
- **Institutional Members:** Organizations which are involved in or wish to relate to the field of Hydrogen Energy.



Membership benefits include a no-cost subscription to the International Journal of Hydrogen Energy, savings on all IAHE publications, and reduced registration fees for workshops, symposia and conferences organized by the Association. Institutional Members receive four copies of each Journal issue.

- If*
- *You are concerned about the environment and the future of our planet,*
  - *You work or would like to work in the clean energy field,*
  - *You would like to take part in research and development for clean and permanent energy infrastructure,*
  - *You would like to advocate hydrogen energy, and*
  - *You would like to be informed about the latest research results,*

*You should join the International Association for Hydrogen Energy by applying for membership online at our web site:*

[info@iahe.org](mailto:info@iahe.org)

[www.iahe.org](http://www.iahe.org)

It will be a pleasure for us to welcome you as a member of IAHE!



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