

HYDROGEN TODAY

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WORLD SURVIVAL FOUNDATION DONATES CAR FOR H₂ CONVERSION, RACING

TEMPE, AZ. The World Survival Foundation has donated the use of a new 1991 Oldsmobile Cutlass Calais to the American Hydrogen Association for conversion to hydrogen fuel. The car will be modified in the AHA headquarter's shop and test facility and prepared for showroom stock racing. This will allow the vehicle to enter competitive racing events while still being street-driveable for demonstration purposes.

The Cutlass is equipped with a 180-HP, High-Output Quad Four engine, four-wheel disk brakes, all-wheel independent suspension, and a roomy trunk for one or two hydrogen fuel tanks.

These features, incorporated into a stylish vehicle that is a masterpiece of U.S. automotive technology, make the Cutlass an ideal, highly - competitive H₂ conversion car.

Much of the fossil fuel technology in today's automobiles was developed, tested, and proven at the world-famous "brick yard" of the Indianapolis 500 or at other race tracks around the world. Over 50 million people annually watch some kind of motor racing event that showcases personal achievement and mechanical perfection.

It seems appropriate, therefore, for AHA to pursue a program of hydrogen racing development to promote the virtues of solar-produced hydrogen as a clean fuel. It is a win-win situation for everyone.

Hydrogen is essentially a ZERO emissions fuel, producing no hydrocarbons, carbon monoxide,

particulates, or even carbon dioxide when burned. It also has the highest power by weight of any fuel. It can improve engine efficiency and actually be safer than conventional fossil fuels.

The technology, however, needs to be made more cost-effective, and on-vehicle storage problems need to be solved. The competitive proving grounds of racing sport are the ideal laboratories. Hydrogen can turn performance-hungry competitive motor

to challenge you to prove it in fair competition. That spirit, for better or worse, has sparked many great accomplishments.

"The American Hydrogen Association (AHA) has a strong desire to bring the promise of hydrogen to the the level of everyday Americans. So why not enter the 'race to save the planet' and add a little serious competition?"

An AHA H₂ Racing Team is now forming around the Cutlass conversion project. Can this car be made into a competitive racing vehicle powered by hydrogen? "Absolutely," says Wagner. "We already have some trade secrets that will make this car a serious competitor for gasoline-powered cars. Our first possible competitive event could be a try at the hydrogen fuel land speed record at the Bonneville Salt Flat in August." Interested persons who would like to support the team are

encouraged to participate. (Call AHA headquarters for details.)

Major sponsorship is being sought to further AHA racing development and additional funds are needed now to fund the hardware conversion of the Cutlass and a national promotional campaign for the converted vehicle.

The new Cutlass (still unconverted) will make its first public appearance at the inaugural Solar and Electric 500 at the Phoenix International Raceway, April 5-7. At that show, AHA plan to display one or more other vehicle that have been converted to run on hydrogen.



Demetri Wagner is shown handing over the keys for the 1991 Oldsmobile Cutlass Calais to AHA President Roy. E. McAlister.

racing into a "green" sport; and H₂-powered vehicles will certainly not be labeled as underpowered "sissy machines".

A SPIRIT OF COMPETITION

As Demetri Wagner, newly-appointed manager of racing development, observes, "There is something about the challenge of competition that catches the American spirit like nothing else can. Make a declaration that you are the best at anything and there will be ten others

U.S. SENATOR DISCUSSES H₂ DEMO PROJECT

PHOENIX, AZ. U.S. Senator John McCain (R-AZ) met in mid-March with representatives from AHA to discuss U.S. funding support for a major hydrogen demonstration project involving fleet vehicles from several major Arizona cities.

The meeting, which was arranged by Darrell Baxter, chairman of the Rocky Mountain Fleet Managers Association and manager of fleet vehicles for the City of Tempe (AZ), served to apprise Senator McCain of the demonstration project plans and to enlist his support in getting Federal financial support.

First Phase is \$3 Million:

The project, as currently planned, involves, in a first phase, converting 25 fleet vehicles to operate on hydrogen fuel with state-of-the-art and advanced fuel storage and injection technology. This phase of the project is scheduled to take about 24 months and has a tentative budget of \$3 million.

Hydrogen for the fleet vehicles will initially be generated from water using electrolyzers and, during sunlight hours, a solar point-focus concentrator and Stirling engine electrical generator system (called a solar gen-set). Supplementing this system during nights and weekends will be off-peak electricity for the electrolyzers supplied by local utility companies.

Sen. McCain Offers Help:

Senator McCain expressed strong interest in the program and indicated that timing is right for such a proposal. He pledged to arrange the necessary meetings with key representatives in Washington, DC from the Departments of Energy, Transportation, and the EPA.

Largest H₂ Fleet In World:

When completed, this project will result in the largest hydrogen-powered fleet of vehicles in the world. The program is also planned to include funding for applied research into advanced hydrogen storage technologies and the most cost-effective methods of extracting hydrogen from biomass sources such as sewage sludge, landfill matter, and other garbage.

Editorial:

The views expressed below are those of the author and do not necessarily reflect the views of the American Hydrogen Association. Opposing views are welcome.

PRESIDENT BUSH INTRODUCES "NEW" ENERGY POLICY

By Robert B. Liden

While the U.S. military forces in the Persian Gulf pounded out a spectacular and resounding victory over Iraq, the President announced to Congress a very unspectacular new energy policy for the U.S. This new program calls for increased domestic oil and natural gas production, an increased reliance on nuclear power, and a vague "lip-service" reference to alternative fuels research and production. There is also an appeal for additional energy conservation actions.

The President recommended the relaxing of environmental laws regarding off-shore oil drilling, protection of natural wilderness areas, and restrictions regarding new nuclear plant construction.

Mr. Bush's obvious rationale is to encourage the U.S. to become more self-reliant.

Unfortunately, the strategies selected by the President and his staff to accomplish this goal are about as misguided as Saddam Hussein's plans to fight the U.S. and coalition forces in Kuwait with the same techniques his army used against Iran. In both instances, the approach selected is worn-out and already proven to be ineffectual.

The U.S. and its allies won the war in the Middle East last month by utilizing the latest technologies in a daring and unrestrained fashion. Our forces used thousands of smart bombs, delivered by stealth bombers and other highly-sophisticated aircraft. In short, the U.S. and its coalition partners won the war because they gave it their best: the best weapons and the best-trained, best-equipped, best-supported men and women.

Unfortunately, this is not the case with his Administration's new energy policy. Here, Mr. Bush relies on the same basic approach the U.S. has employed for at least the past thirty years: Drill more oil and gas wells; build some more nuclear plants; and tell people to drive less and insulate their homes more.

This approach will fail again ... just as it has failed in the past. Why?

* The majority of the oil and natural gas reserves in the world are not in the U.S. -- and the U.S. uses far more (nearly twice as much) energy per capita as any other major country in the world.

* We consume energy at a much faster rate than we can develop new fossil fuel production.

* Conserving energy almost always equates to sacrificing something of the standard of living we Americans have come to enjoy. (That may not be a bad thing for us to do --- but it is unpleasant and, therefore, if the actions are voluntary, they generally don't succeed to a very large extent.)

* The primary thrust of the President's recommended program is environmentally irresponsible.

Mr. Bush has expressed loud anger and indignation at Saddam Hussein's actions to poison the environment by dumping oil into the Persian Gulf and then setting fire to the majority of Kuwait's oil wells.

But why, then, is his Administration -- apparently so concerned for the environment -- so willing to let our remaining natural wilderness be sacrificed to oil and coal production; let our coastlines be imperiled by pollution from more off-shore drilling, piping, and shipping operations; or let our survival be threatened by the use of more nuclear materials we have no fall-safe way of storing or getting rid of, materials that remain highly toxic for thousands of years? And why is Mr. Bush so willing to endorse the use of fuels that leave many poisonous residues behind when burned and load our atmosphere with ever-increasing amounts of carbon and other known "Greenhouse gases"?

Maybe it's because Mr. Bush and his advisors are overly influenced by special interest groups that are short-sighted and intent on making the most near-term profits they can. Or maybe it's because Mr. Bush and his energy specialists do not understand or appreciate the potential of hydrogen energy.

To the extent that the true reason behind the Administration's decision to support this lack-luster energy policy is this latter of these alternative excuses, we in AHA must share some of the blame.

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companies, they can play a valuable role in producing and delivering hydrogen and ultimately making more profits with substantially less risk than they can with oil.

The future of our country and world -- its political and economic stability, its very existence -- depends on our educating ourselves and our neighbors to both the causes of the world's problems and also to the smart answers.

The American Southwest is a perfect place for a beginning of a smart new world. Let us take unused, inhospitable land and let it work with the sun. This solar-hydrogen project will provide substantial new employment, free us from dependence on foreign-sourced oil, and reduce our burgeoning national debt.

can better understand the effects of various policy choices.

We are not aware of any analysis that supports your conclusion that a transition from petroleum to CNG, methanol, or electricity would be a "costly mistake" or an "environmental disaster". With regard to the long-term use of renewable fuels, we believe that increased use of CNG, methanol, or electricity will actually ease the eventual transition to biomass-produced alcohols or photovoltaic-based hydrogen.

Thank you for taking the time to give us your detailed thoughts on alternative fuels. We share many of your views and believe that, in the long term, a variety of alternative fuels will be necessary to meet the needs of the national transportation market.

Sincerely,

Linda G. Stuntz
 Deputy Under Secretary
 Policy, Planning and Analysis
 U.S. Department of Energy
 Washington, DC 20585

Ed. Note: The "high cost" of producing hydrogen can be easily resolved by mass-producing solar-hydrogen production technologies. These include point-focus concentrators coupled to Stirling engines and electrolyzers; and biomass, ocean-thermal, and wind-energy conversion systems. It is apparent, however, that the potential of these technologies to produce low-cost hydrogen is not well known by Washington energy specialists. As long as these information gaps continue, hydrogen will continue to be thought of as a long-term rather than near-term solution.

Editorial

AMERICAN SOUTHWEST CAN TAKE THE LEAD

By Marcia Greenshield

The American Southwest can be the wealthiest region in the world. It can reverse the debtor trend of this nation. It can even renew the environment.

Boastful words? No. They are assuredly spoken, for sunshine, a plentiful and prevalent resource in the part of our planet, can, through a solar-hydrogen economy, make it all happen.

The desert areas of Arizona and its Southwest neighbors cover about 200 million acres. Only a small fraction -- less than 10 percent -- of that area is needed to produce all the energy needs of our nation. In Arizona alone there is more than ample room for the 400 million solar "gensets" estimated to provide all the energy needs of our country ... and provide excess energy, stored in the form of hydrogen, that could be exported to every part of the world unable to produce its own energy.

This past year, a coalition of U.S. automobile manufacturers and oil companies met to study alternative, cleaner-burning energy sources for the cars and trucks of tomorrow. The outcome: an on-going study to come up with a cleaner-burning gasoline.

Obviously, the automobile companies need to become aware of the opportunities they have to make super-clean-burning hydrogen-powered vehicles that cost less and run better. And to learn of the new business opportunities they, along with defense contractors, have to produce solar gensets and other equipment to support a hydrogen economy. The oil companies need to focus on the fact that, as energy

LETTER FROM THE DEPT. OF ENERGY

Ed. Note: This letter was received by AHA member Charles Terrey in response to his January letter to D.O.E. (reprinted in the last issue of Hydrogen Today).

Dear Mr. Terrey:

Thank you for your letter of January 20, 1991, to Secretary Watkins supporting the use of hydrogen as an alternative transportation fuel and enclosing your comments on the Department of Energy's report, "Assessment of Costs and Benefits of Flexible and Alternative Fuel Use in the U.S. Transportation Sector".

This report is part of an ongoing assessment examining how the U.S. transportation sector can make the transition away from complete dependence on petroleum products. We are studying the fuels that appear to be the most likely candidates for starting that transition.

Hydrogen has many positive attributes. However, the high cost of production and the difficulty of vehicle storage stand in the way of practical use in the near- or mid-term. If these problems can be overcome, mainly through increased research and development that is also supported by the Department of Energy, hydrogen may provide an attractive long-term alternative.

The Department of Energy's efforts are aimed at estimating the costs and benefits of various ways to reduce the transportation sector's dependence on petroleum. With this information, the Administration, Congress, and the public

NEW AHA PUBLICATION SOON TO BE RELEASED

The first issue of a new quarterly magazine-format Journal of Hydrogen will soon be released. This magazine will feature technical articles and other reports on the rapidly-changing status of hydrogen energy technology, accompanied by pictures and other graphics. Copies of this exciting new Journal will be mailed to all members of AHA and may be ordered by others at a cost of \$3 per copy. (See the enclosed order form, or call or write AHA at its Tempe offices.)

CALENDAR OF EVENTS

- March 13 - 15:** 2nd Annual Meeting of National Hydrogen Association, "Hydrogen Applications For a Sustainable Future", Ritz-Carlton Hotel - Pentagon City, Arlington, VA
- March 13 - 15:** Environmental Expo, Las Vegas, NV
- March 20:** ASU-AHA Meeting - Student Services Bldg. Amphitheater, ASU Campus, Tempe, AZ, 7 PM
- March 30:** 2nd Annual Valley of the Sun Peace Fair for a Livable World, Patriot Park, Phoenix, AZ, 11 AM - 5 PM
- April 4:** Union of Concerned Scientists & Sierra Club Meeting on Energy & the Environment, Unitarian Universalist Church, 4027 E. Lincoln Dr., Paradise Valley, AZ, 7:30 PM
- April 5:** Union of Concerned Scientists & Sierra Club Meeting on Energy & the Environment, College of Architecture & Environmental Design, Room AED 60, ASU Campus, Tempe, AZ, 11:45 AM
- April 5-7:** Solar & Electric 500 Oval Track Race, Phoenix International Raceway
(See AHA Entry at Race. Story in this issue of Hydrogen Today.)
- April 16:** Harry Braun to speak at Cal. State University at Los Angeles. A hydrogen-fueled truck will be displayed. Contact Steve Bluestone, (213) 343-2450 for more details.
- April 17:** ASU-AHA Meeting - Co-sponsored by Schools of Architecture and Engineering, Room 62, AED Bldg., ASU Campus, Tempe, AZ, 7 PM
- April 18:** Harry Braun and Dr. Robert Zwiig will speak at Univ. of Calif. at Fresno. Noon-day energy forum in Main Mall; slide presentation at 7 PM. Contact David Windt, (209) 278-2938 for more info.
- April 20:** "Working Together For a Better Environment", sponsored by City of Avondale (AZ), 525 N. Central, Avondale, 9:30 AM. Call (602) 932-1909 for more info.
- April 20 - 21:** Earthfest '91, sponsored by Valley Forward Association, Tempe Diablo Stadium, Tempe, AZ
- April 21:** Earth Day '91 Celebration, sponsored by the Green Party, Hayden Square, Tempe, AZ
- April 23 - 24:** Worldcon '91 Conference & Expo on Energy & the Environment, presented by The Assoc. of Energy Engineers, Disneyland Hotel & Convention Center, Anaheim, CA
- May 5:** "The Clean Air Challenge", an environmental fair organized by the AZ Lung Association, Phoenix, AZ, 8 AM - 4 PM. Call (602) 258-7505 for more info.

The Hydrogen Association

dba The American Hydrogen Association in the United States

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 Phoenix, AZ 85021

SUGGESTED READING ON SOLAR-HYDROGEN

In addition to the books listed on the reverse side of this page, please consider these books and technical papers on energy systems that are available in most libraries.

Compiled by Irv Jorgenson

- International Journal of Hydrogen Energy*, The Official Journal of the International Association of Hydrogen Energy. A technical journal for engineers and scientists published by IAHE, P.O. Box 248266, Coral Gables, FL 33124.
- The Hydrogen Economy*, SCIENTIFIC AMERICAN magazine, Vol. 228, No. 1, pp. 13-21, Jan. 1973.
- Principals and Applications of Stirling Engines*, by Colin D. West. This book gives the history of the Stirling engine and research and development reports by various companies. It includes current and projected economics of Stirling engine systems and is very easy to read.
- Wind Power*, by Gary L. Jacobson. This book focusses on the history of wind systems, from very early to the latest designs,

and includes economics and applications. Chapter 7 includes a lengthy section on the use of wind systems in the Hydrogen Economy.

- Solar Energy Handbook*, by J. F. Kneider and F. Keith. This book is a comprehensive study of various solar energy systems. Chapter 6 includes a section on Hydrogen Energy storage and use; and Chapter 20 reports on parabolic solar collectors and their cost-effectiveness.
- Energy Options - Real Economics and the Solar Hydrogen System*. A Technical Summary by J. O'M. Bockris. This book provides an overview of problems facing the Solar Hydrogen System, based on the current state-of-the-art.
- The Forever Fuel: The Story of Hydrogen*, by Peter Hoffmann, Westview Press, Boulder, CO, 1981. This is an excellent overview of hydrogen energy and its advantages.
- Hydrogen Economy*, by J. O'M. Bockris, SCIENCE magazine, Vol. 176, No. 1041, p. 1323, June 23, 1972. Though slightly dated, this article provides a brief but excellent summary of the concept of a hydrogen economy.

* * * * *

Join the American Hydrogen Association And Help To Make a Transition To Renewable Resources.

A transition from fossil and nuclear energy sources to solar-hydrogen technologies could fundamentally resolve many of the most serious environmental problems including global greenhouse warming, acid-rain, oil spills, sewage and trash recycling, stratospheric ozone depletion, urban air pollution, or the production of additional radioactive wastes.

Take part in the most important transformation in history. Become a member of the American Hydrogen Association and help make a transition from the fossil depletion economy, to a renewable solar-hydrogen economy that will last forever. Do it for the children; do it to preserve the remaining wild animals that are struggling to survive in the vanishing wilderness areas; do it for yourself; *but do it soon. The time to stand and be counted is rapidly slipping away.* . .

* * * MEMBERSHIP APPLICATION * * *

Yes, I want to join and help make a transition to clean, renewable solar hydrogen energy.

New Member Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: Home: () _____ Office: () _____

Occupation and/or areas of special interest: _____

- | | | |
|--|---|--|
| <input type="checkbox"/> Regular Membership (\$ 30/year) | <input type="checkbox"/> Seniors (60 +) Membership (\$ 15/year) | <input type="checkbox"/> Family Membership (\$ 40) |
| <input type="checkbox"/> Student Membership (\$ 15/year) | <input type="checkbox"/> Sustaining Membership (\$ 100/year) | <input type="checkbox"/> Life Membership (\$ 1,000) |
| <input type="checkbox"/> Corporate Sponsor (\$ 1,000/year) | <input type="checkbox"/> Foreign Government (\$ 1,000/year) | <input type="checkbox"/> Other Gift (specify amount) |

Signature: _____ Date: _____

Enclose check or money order and mail to: American Hydrogen Association, 219 S. Siesta Ln., Ste. 101, Tempe, AZ 85281

Available from AHA:

HYDROGEN PUBLICATIONS, VIDEOS, AND SUCH

To order, fill out form below, enclose check or money order, and mail to:
American Hydrogen Association
 219 S. Siesta Ln., Ste. 101, Tempe, AZ 85281
 Allow two weeks for delivery.

- | | Specify
Quantity | Cost/ea. |
|--|---------------------|----------|
| HYDROGEN TODAY: Official publication of American Hydrogen Association – Back Issues. <input type="checkbox"/> \$ 3.00
(Please specify which issue[s]: _____) | | |
| JOURNAL OF HYDROGEN: Quarterly Magazine-format publication of AHA (1st Edition) <input type="checkbox"/> \$ 3.00 | | |
| <i>The Solar-Hydrogen Economy</i> , An 8-minute video, AHA, 1990. <input type="checkbox"/> \$14.95
This VHS-format video concisely illustrates the exciting potential of renewable hydrogen fuel. | | |
| H. W. Braun, <i>The Phoenix Project: An Energy Transition to Renewable Resources</i> , 1990. <input type="checkbox"/> \$14.95
Harry Braun presents and interrelates a wide range of information related to the growing economic and environmental crises resulting from our continued reliance on fossil and nuclear fuels. Most importantly, the book documents the types of solar-technologies that could be mass-produced for large-scale hydrogen production. | | |
| Joan M. Ogden, Robert H. Williams, <i>Solar Hydrogen: Moving Beyond Fossil Fuels</i> , 1989. <input type="checkbox"/> \$10.00
This book is an excellent handbook describing a solar-hydrogen based transportation-energy system, with emphasis on photovoltaic supply. It includes comparisons between alternate sources of energy and their pollution products and costs and proposes a practical path to the hydrogen economy. | | |
| Michael A. Peavey, <i>Fuel From Water: Energy Independence With Hydrogen</i> . <input type="checkbox"/> \$16.00
(Formerly <i>Hydrogen Home and Auto Fuel Conversion</i> : – first copyrighted in 1979)
This is a technical report of hands-on research and experimentation in hydrogen production, storage, and use. Originally published in the 1970's, this book is still invaluable to the technical individual who wants a specific understanding of hardware. | | |
| Ed Phillips, <i>Crisis In The Atmosphere: The Greenhouse Factor</i> , 1990. <input type="checkbox"/> \$6.95

A plain-talk book written by a meteorologist to explain the important atmospheric changes being observed. | | |
| Deborah Gordon, et al, (The Union of Concerned Scientists), <i>Steering a New Course</i> , 1991. <input type="checkbox"/> \$10.00
An in-depth review of air pollution and alternative energy sources, their benefits and costs. | | |

	Specify Quantity	Cost/ea.
Walter H. Corson, <i>The Global Ecology Handbook: What You Can Do About the Environment</i> , 1990. <input type="checkbox"/> \$16.95 A comprehensive overview of the interrelationships between the environment, economic development, energy policy, population growth, and related issues.		

- | | |
|--------------------------------|--|
| AHA Solar-Hydrogen T-Shirt | \$15.00
Please specify size :
(Small) <input type="checkbox"/> (Medium) <input type="checkbox"/> (Large) <input type="checkbox"/> (Extra Large) <input type="checkbox"/> |
| AHA Solar-Hydrogen Sport Shirt | \$20.00
Please specify size :
(Small) <input type="checkbox"/> (Medium) <input type="checkbox"/> (Large) <input type="checkbox"/> (Extra Large) <input type="checkbox"/> |
| AHA Racing Team Cap | <input type="checkbox"/> \$10.00 |

Total cost of items ordered above: \$ _____

State & City sales tax (6.5%):
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Shipping (\$2.00 per item, except *Journal* and *Hydrogen Today*, which cost \$0.30 ea. to mail): _____

Total cost of order \$ _____

If paying by check, please make checks payable to the **American Hydrogen Association.**

Please send the above-noted items to:

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Title: _____

Organization: _____

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(Home) _____

Signature _____

Date _____

NOTE: The net proceeds from these sales go to A H A to help support non-profit activities.