

# HYDROGEN TODAY

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## APS SPOKESMAN OUTLINES PUBLIC UTILITY SOLAR PROGRAMS

By Sara Tennant

During the June meeting of the ASU/AHA chapter, Tom Lepley, Solar Projects Manager in the Research Department of Arizona Public Service Company (APS), described some of the current solar energy projects and future plans of Southwest electric utility companies.

Lepley discussed the two general types of solar power generation, solar-thermal and photovoltaic, and outlined projects in Arizona and California that employ these technologies.

*Solar Thermal technology* uses the heat energy of the Sun directly. A simple example of a solar thermal device is a solar water heater used to provide the potable hot water needs for a home or apartment. This type of heater is generally unable to heat the water to the temperatures necessary for higher-grade energy applications, such as industrial steam or steam/electric generation. To achieve these types of temperatures requires heat focusing or "concentration".

One type of solar thermal plant, called a power tower, consists of an array of mirrors that are focused on a point-focus tower receiver. Fluid is pumped into the tower, where it is heated by the intense focused sunlight to 1,000 + degrees Fahrenheit. The hot liquid can then be used to produce steam to drive a turbine generator to produce electricity.

*Solar One*, a "power tower" plant near Barstow, CA (pictured in the last issue of Hydrogen Today), generated about 10 megawatts (MW) of electricity when it was operating. The plant is composed of a point-focus receiver atop a 300-foot tower and a 160-acre collector field. The need for curved mirrors, or

"heliostats", on the perimeter of the field was one of the factors that caused this project to be quite expensive. Stressed-membrane heliostats made of a metallized, flexible film rather than silver-backed glass, could help solve this problem.

Another problem at the Solar One project occurred when clouds blocked the Sun, which reduced the amount of incoming solar radiation and caused the steam-generation to cease. This caused the turbine to shut down, which then had to be restarted after the clouds passed.

This problem is being addressed as the plant is being reconditioned and re-designed as *Solar Two*. Molten salt will be used instead of water as the high-temperature working fluid. This salt has the capability of storing enough heat to keep the turbine going during brief cloud shadow periods.

*The Luz Plant*, also located in Southern California, utilizes parabolic trough mirrors that focus the Sun onto a line or pipe. The mirror structures are rows 12 to 15 feet tall that heat up oil that is run through the pipe to about 750 degrees Fahrenheit. The hot oil is then used to produce steam and subsequently recirculated through the pipe to be heated again.

Natural gas is used to co-fire the plant at night when the Sun is unavailable, but Federal law limits its usage to no more than 25% of energy produced.

The Luz Plant is the largest solar plant in the world, with 350 MW on line currently. It is being expanded by about 80 MW in nine months. Tax credits and other support provided by the California state government help make

## Utilities Agree To Spend \$2 Billion To Clean Coal-Burning Plant

In early August, the U.S. Department of Energy and Arizona public utilities announced an agreement whereby the utilities will spend \$2 billion on filtration equipment and other changes to clean up the stack emissions from the coal-fired Navajo Generating Station near Page, AZ.

These changes are projected to cut sulfur dioxide emissions from the plant by 90% and should eliminate about half of the smoke and haze that currently is drifting into the Grand Canyon. The remainder of the haze and smog, according to EPA officials, comes from the Los Angeles basin and is the result of the industrial and automotive pollution that is so prevalent in that area.

The plant is maintained by the Salt River Project (SRP) and is co-owned by Arizona Public Service, Tucson Electric Power, and SRP.

*(Ed. Note: Although it is a positive step to clean up some of the dirty emissions from a coal-fired plant, we can't help but think about what \$2 billion could do if it were spent to build a solar-hydrogen plant. This plant could either replace the dirty coal-fired electric plant or be used to produce clean-burning hydrogen fuel for the cars and trucks of the LA basin ... or both.)*

(Please See "APS Looks..." on Pg. 3)

## AHA Members Attend Clean Energy Confab in New Mexico

"Leading The Way: Clean Energy Alternatives For New Mexico and the World" was the title for a conference held August 6, 1991, in Santa Fe, NM. AHA member Demetri Wagner was a guest speaker at the one-day conference, which was hosted by NM State Land Commissioner Jim Baca.

Wagner's speech was entitled "Foundations for Prosperity - Energy Policy and the Dawn of the Hydrogen Age." In his address, he observed that "This is a time for action. New Mexico can, by virtue of its oil, natural gas, and abundant solar energy, certainly become energy-independent early in the 1990s.

"But that should be only the beginning. With a progressive renewable energy policy, New Mexico can move beyond independence, allowing fossil resources to be conserved for more valuable uses other than transportation fuels and heating processes. New Mexico's real future lies in developing its natural resources to become a net exporter of solar energy. There are two ways to do this: one, by producing electricity for the national grid; and two, by producing hydrogen and exporting it via pipelines, trains, and trucks.

"The American Hydrogen Association cannot recommend that New Mexico follow the national energy strategy as outlined by the current administration. New Mexico should break free and develop its own state energy strategy based on renewable solar energy. New Mexico is uniquely poised to step out in front of the nation and become a much-needed leader for America and the world."

In addition to the speech by Wagner, a Clean Energy Park that would be built on state lands was discussed. "New Mexico wants to encourage and promote renewable energy for the state," said Commissioner Baca. "By designating a Clean Energy Park, we hope to encourage research, development, demonstration, and manufacturing of clean energy technologies here in New Mexico."

During the conference, two other AHA volunteers, Tim Munchweiler and

Jennifer Sauve, assisted at a display booth, giving demonstrations on electrolysis to produce hydrogen and Stirling engine gen-set technology, and passing out literature, answering questions, and selling books and AHA T-shirts. (Among those buying T-shirts were Governor Bruce King and Commissioner Baca.)

## APS LOOKS AT SOLAR ENERGY TECHNOLOGIES

*(Cont. from previous page)*

the plant competitive with traditional fossil fuel generation.

APS is considering a facility like the Luz Plant for its next generating station, but does not forecast a need for additional capacity until at least the late 1990s. The utility believes that even at that time only a 210 MW-sized plant will be needed.

*Photovoltaic (PV) technology* involves the use of solar cells to produce electricity directly from sunlight. As Lepley describes it, "the photovoltaic cell acts like a pump. The sunlight basically pumps electrons out and forces them to move around." An external circuit can be attached to utilize this flow of electrons.

The use of photovoltaics for energy production has many advantages over other methods. It requires no water or oils for working fluids; there are no fuel expenses; few people are needed to maintain a PV plant; the energy source, the Sun, is available to anyone; and the technology is modular, so generation capacity can be adjusted as needed.

The disadvantages of PVs at the present time are basically economic -- the cells are still quite expensive to make, resulting in electricity that costs at least 20 cents/KW hour. Lepley believes, however, PVs will become competitively viable by the late 1990s.

In the recent past, APS has worked on a number of home PV projects, in Yuma, Flagstaff, and other sites. At Phoenix Sky Harbor airport, APS had a project consisting of 80 Sun-tracking photovoltaic cells that generated about 225 kW. This system was installed in

1982 but dismantled in 1987 when the airport needed the land for development. The collectors were taken from the site and are being reused or donated to universities and other groups.

APS has a Solar Test and Research ("STAR") Center near the AHA headquarters in East Tempe, AZ. This facility is being used to test a large number of PV systems, some of which are fixed, others designed with single-axis tracking, and the remainder with double-axis tracking systems. Each unit is a 2 kW system.

Based on test results to date, Lepley says that the single-axis models are probably the best buy for Arizona; "during the summer months, the single-axis trackers work almost as well as the more expensive dual-axis models, and that's when we need the power."

There have been problems with some of the inverters, which turn PV current into power-line current, and Lepley says that this is a "key problem area" that must be resolved before the utility can consider investing heavily in the technology.

Lepley says it is still difficult to tell whether generating solar power at a large-scale, centralized plant would be better than installing PV panels on individual homes, but the two concepts will likely be combined.

Also under test by APS is a "portable power plant" fueled by the Sun. This plant consists of a 2.5 kW PV solar array attached to a trailer, with 40 kW-hours of batteries, a 6 KW propane generator, and a 10 kW inverter. For brief periods, this setup could operate at up to 10 kW, and its panels can be stored inside the trailer for towing to wherever the power is needed.

"If solar is going to work anywhere," Lepley observes, "it should work here in Arizona. This region of the U.S. has the potential to become an energy exporter by using solar combined with hydrogen storage."

Although APS has not done any work in the area of hydrogen fuel, the company is becoming more aware of environmental issues and other reasons for converting to a hydrogen-based energy system.

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## ----- AHA in Southern California -----

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Dr. Robert Zweig

### **Hydrogen Pioneer Prepares Paper For International H<sub>2</sub> Association Conference**

Southern California resident and long-standing spokesman for hydrogen energy, Dr. Robert M. Zweig, M.D., has completed the draft of a major new paper of hydrogen energy entitled "Pollution Solution / Revisited".

This paper, which Dr. Zweig plans to present at the next annual International Association of Hydrogen Energy Conference, observes that a recent review of present world health data regarding pollution-related health costs emphasizes the need for immediate implementation of a "Hydrogen Energy" policy.

Fossil fuel combustion products and by-products are taking an enormous toll of human life. Morbidity and mortality rates are increasing as the result of decreased ozone layer protection, increased atmospheric carbon dioxide/greenhouse effect, acid rain problems, and urban smog; all contributing directly to a huge human health-related medical budget. Indirect health costs result from oil-related war casualties, oil and gasoline spills, and other fossil fuel production, distribution, and end use complications.

Dr. Zweig observes that a rapid transition to the Hydrogen Economy would eliminate all of the above and provide a more compatible environment for human health.

"There is mounting evidence that present use of fossil fuels for energy throughout the world is becoming an intolerable problem," reports Dr. Zweig, "effecting inanimate material losses as

well as damage to flora and fauna and human health."

Based on studies of such places as Mexico City and the Los Angeles Basin, "we are able to prove that long-term exposure to present fossil fuel combustion products and by-products are causing increasing environmental health problems in heavily impacted areas. The cost of caring for these pollution-related diseases could better be spent developing the hydrogen economy whereby solar-electrolysis hydrogen could replace fossil fuels in all aspects of fuel needs.

"The development of a new infrastructure for hydrogen replacement would act as an economic, environmental, and energy benefit to the nation and to the world population. The many complications from fossil fuel production, refining, transportation, and end-use would be reduced on a global basis to the point where hydrogen would act as an excellent replacement.

**"It is noted," concludes Dr. Zweig, "that worldwide interest in hydrogen has increased by leaps and bounds in the last five years, and with this momentum it should be a much shorter time span for implementation of a full hydrogen economy compared with the original concept proposed in 1975."**

*(Ed. Note: Dr. Zweig is a founding member of the Southern California Chapter of AHA. He has converted a pick-up truck to run on hydrogen, which was featured at the Solar/Electric Race at Phoenix International Raceway this past Spring. Dr. Zweig has been instrumental in establishing and leading a three-year program at Riverside Community College that will institute a "mini-hydrogen economy". This program calls for the conversion of several fleet trucks on campus to run on hydrogen and includes the production of hydrogen by means of a photovoltaic electrolyzer generating plant.)*

### **So. Cal. Chapter Meeting Features Three Speakers**

*By H. G. Richard Williams*

At its monthly meeting August 6 in Santa Fe Springs, CA, the Southern California Chapter of AHA hosted three speakers on various hydrogen-related topics.

Dr. Robert J. Teitel presented his patented process for hydrogen storage using glass microcavities. These microcavities are from 5 to 300 microns in length, are available on a commercial basis, and are capable of storing concentrated amounts of hydrogen under heat and pressure. This glass storage system is lighter than typical metal hydride storage and requires less heat to extract the hydrogen.

David M. Moard, Fuel Cell Development Manager for Southern California Gas Company, discussed the commercial aspects of a natural gas fuel cell, including the latest designs for fuel cells and their construction and installation.

Finally, Steve Koester, a fireman and Hazardous Materials Expert in Santa Fe Springs, presented a comprehensive overview of the safety features of hydrogen, including methods of avoiding and handling spills, leaks, fires, and explosions.

The next monthly meeting is scheduled for September 10, 1991, in the Town Center Hall. Featured will be the Alternative Fuels Manager for Southern California Rapid Transit District. The meeting starts at 5 PM.

The So. Cal AHA Chapter has scheduled its future monthly meetings for the second Tuesday of each month. For information regarding meetings or membership in AHA- So. Cal., contact Dick Williams at 9816 Arlee Avenue, Santa Fe Springs, CA 90670; (213) 949-9482. The So. Cal. Chapter welcomes non-members to its meetings.

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**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.*

## AN ENERGY TRANSITION TO HYDROGEN IS NEEDED NOW

By Charles Terrey

Now is the time to make the transition to a hydrogen fuel economy. Deficit spending of energy (fossil fuel) will lead to bankruptcy as surely as deficit fiscal spending.

The United States is presently importing more than 2.56 billion barrels of the 6.2 billion barrels of oil per year required to run our economy. At \$20 per barrel, this amounts to a \$51 billion annual balance of trade deficit that goes primarily to O.P.E.C. countries.

O.P.E.C. controls about 80% of the world's known oil reserves. The combined population of all of the O.P.E.C. countries is about 116 million people. This means that .023% of the world's population controls about 80% of the world's known oil reserves.

The known United States oil reserve, which at one time held over 200 billion

barrels, now stands at less than 25 billion barrels of oil. We are supplying our own needs at a 3.65 billion barrels per year rate. At this rate we will have consumed all of our present known reserves in less than 7 years.

### *Finding new oil on our own territory is becoming more and more difficult.*

The most optimistic estimated oil reserves to be found is in Arctic National Wildlife Refuge (ANWR), which has 3 billion barrels -- or about a 6 months supply at our present rate of consumption.

We would need to make an oil find of this large twice every year in order to not loose ground on our present reserve.

If we include other environmentally-sensitive areas, there is a total of 7.7 billion barrels of new economically recoverable oil or slightly more than one year's consumption. This means that before the turn of the century that the United States will be totally dependent on foreign oil.

We currently have a false sense of security because our economic engine is still running and we are able to supply more than half of the oil we use. What will happen when our oil reserves reach the bottom of the barrel and we must purchase all (more than 6.2 billion barrels \$124 billion at \$20 per barrel) of our oil from foreign sources? If we are presently economically dependent on O.P.E.C. and other oil-rich nations, we will then be economic slaves.

Is natural gas the salvation? In 1989 our natural gas reserves were 167 trillion cubic feet. In 1967 our reserves were 292 trillion cubic feet. In the 22 years between 1967 and 1989 we used 125 trillion more cubic feet of natural gas than we were able to find. The government says that drilling on the continental shelf will unlock 9.4 trillion cubic feet of natural gas -- about 6 months' supply, based on our 1967-89 average natural gas consumption level.

The U.S. Department of Energy has proposed that we replace 25% of our oil consumption with natural gas. 5,700 cubic feet of natural gas has about the

same energy content as 1 barrel of oil. Twenty (25)% of our 6.2 billion barrel annual oil consumption is 1.55 billion barrels or 8.8 trillion cubic feet of natural gas per year. Even without adding this burden to our natural gas reserves, we will run out of natural gas in about 9 years.

Consider this analogy. If you automobile's fuel gage is running close to empty and you ignore it, you are going to run out of gas. We have very little choice if we want to keep our economic engine running. We must find a reliable filling station that can supply our energy need ... now and for the distant future. I don't have a comfortable feeling about letting the O.P.E.C. cartel be our filling station.

The United States must become energy independent if we are to be in charge of our own economic destiny. We have an opportunity to create our own reliable renewable energy supply using solar energy to produce hydrogen from water.

The advantages are that it is non polluting and we will never run out as long as the Sun shines. The disadvantage is that we are going to have to buy a new car. In other words, we need to invest in the infrastructure to produce and use hydrogen fuel.

Our government's energy policy is business as usual and let the market determine the energy policy. Either our government has failed to analyze the energy situation correctly or it is failing to acknowledge it, or maybe it just wants to surprise us.

We are now in a recession in which the government was reluctant to acknowledge its beginning and eager to pronounce it end. It was aggravated by the jump in oil price caused by the Persian Gulf war.

What this country needs now is a project that will convert from a fossil fuel economy to a hydrogen fuel economy. There is more than enough work in this project to end the recession and to keep us all challenged and working well into the next century to provide pollution-free prosperity that is unparalleled not only for us but for the entire world.

**Letters  
To  
AHA**

*Are 'Lay People'  
Welcome in AHA?*

DEAR AHA:

We recently saw your organization featured on a local PBS program about Hydrogen Energy ("Horizon" on KAET - Ch. 8, Tempe, AZ). Although we had previously heard about AHA, we did not know how to contact you. This TV show not only gave us your address -- it gave us a wealth of information about what is currently going on in the field of hydrogen fuels...

We are very excited about hydrogen as a safe, clean, renewable energy source and would like to learn more on the subject.

We would also like to know if you permit lay people to become members of your organization ... We would welcome the opportunity to learn from such an innovative group of people.

Very truly yours,

Joseph and Kerin Fuzy  
Phoenix, AZ

Dear Joe and Kerin:

Our editorial staff has struggled for hours to come up with an innovative way to say "Yes, you're welcome to join AHA!"

The best we can come up with, however, is just that. Does that change your mind about what an "innovative group" we are?

(We hope not. Just fill out the Membership Application form enclosed and send it, along with the nominal annual dues payment that applies, to our Tempe headquarters. We look forward to meeting with you.) --- Editors.

*Thanks, AHA!*

DEAR PERSONS,

On behalf of the *Don't Waste Arizona Coalition* and *Friends of Hydrogen Association*, I want to extend our gratitude for the technical expertise, educational information, and advice provided to our organizations in the effort to stop the proposed ENSCO waste incinerator planned for Mobile, Arizona. Being able to show that there are other alternatives to incineration effectively defused industry assertions that "dumping in the desert" would result if incineration wasn't used.

Also, due to the scientific sleuthing of some of your members, we have been able to provide technical papers and information about a solar detoxification method using point-focus concentrators to the governor's staff and to environment committees of both the Arizona House and Senate.

Happily, the points of the initiative filed by us have now been adopted in legislation.

Again, our thanks and salute!

Sincerely,

Steve Brittle  
Chair, Research Committee  
*Don't Waste AZ Coalition*

Dear Steve:

You're welcome. Although AHA is not a political lobbying organization (our non-profit status does not permit us to participate in this type of activity), we are pleased to be able to assist in educating the community and its leaders about ways of avoiding pollution and waste ... particularly through the use of hydrogen technology. --- Editors.

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GENTLEMEN:

I am upset! Alternatives to gasoline-powered engines (hydrogen, solar, electric) are long overdue. Our environment (the earth) is being destroyed and our health is adversely affected by pollutants resulting from the abuse of petroleum. Our dependence on the OPEC nations for oil and the resulting political situations, loss of lives, and huge expenditures of taxpayers' money are totally unnecessary.

*I am upset by the shortsightedness, gutlessness, apathy, and selfishness of our politicians, especially the "oil men" running our government these days.*

Sincerely yours,

Ralph W. Melin  
Phoenix, AZ

Dear Ralph:

So are we -- both the gentlemen and the ladies of AHA ---- Editors.

*If you would like to write us, please send your letter to our Tempe offices, 219 South Siesta Lane, Suite 101, Tempe, AZ 85281, Attn: Editors - Hydrogen Today. Because of space constraints, we cannot promise that we can print your letter, but we will certainly try!*

--- Editor.

## CALIFORNIA LEGISLATURE ATTACKS POLLUTION

The California State legislature continues to lead the nation in implementing aggressive legislation to reduce automotive and urban pollution. At the present time, more than twenty bills are pending before the California Senate or Assembly houses that specifically address the issue of urban pollution created by transportation vehicles. Some of these include the following:

- \* SB 1212, which would require all vehicles purchased in the state after 1993 to be low-emission or alternative fuel motor vehicles. It would also provide tax credits for both new and converted alternative fuel vehicles.
- \* SB 135, which would by Jan. 1, 1993 require all transit vehicles operating in any district that does not meet state ambient air quality standards to be low-emission vehicles.
- \* SB 1213 would authorize Air Quality Management Districts throughout the state to require operators of public and commercial fleets to purchase low-emission motor vehicles when they buy new vehicles.
- \* SB 431 would apply sales tax credits and surcharges on the sale or lease of vehicles on the basis of the level of specified pollutants emitted.
- \* AB 505 would prohibit any person who operates a heavy-duty motor vehicle

from causing the engine to idle for more than five consecutive minutes. Violators would be subject to civil penalties.

- \* SB 1113 would impose a \$25 fee on the purchase of new vehicles if they do not meet standards relative to low-emission vehicles, safety, and roadworthiness.
- \* AB 1607 would permit the Public Utilities Commission to authorize natural gas utilities to construct and maintain compressed natural gas (CNG) refueling stations to be owned and operated by the utility or be transferred to non-utility operators. In addition, the Commission would support construction of CNG vehicle conversion facilities and provide incentives for the conversion of motor vehicles to CNG. The reasonable costs associated with these projects would be recovered through rate increases.
- \* Several bills have been introduced to encourage ridesharing and telecommuting, whereby employers would implement programs to allow certain of their employees to work in their homes, communicating with their offices via computers, telephones, and telefax machines.

These many bills are augmented by other legislation being developed by city and county governments throughout the state.

Although none of these many bills specifically focuses on hydrogen, the climate for adopting this clean-burning renewable energy source is certainly ripe in California.

### Harkin Bill:

## New Hydrogen Bill In U.S. Senate

WASHINGTON, DC - Senator Tom Harkin (D- IA), a potential presidential contender, introduced in late June another hydrogen bill, S. 1269, that would build on the landmark Matsunaga bill passed by Congress last year.

Under Harkin's bill, five specific renewable energy R&D projects and three cost-shared government/industry demonstration projects would be supported. The bill would also require the Energy Department to draw up a specific plan for the development of renewable hydrogen, "including projection of life-cycle costs of a zero emission transportation system based on electric vehicles driven by fuel cells powered by renewable hydrogen".

Harkin did not request any specific funding levels at this stage.

The Energy Department opposes the bill for three basic reasons: DOE believes it "would showcase the limitations rather than the potential of new technology," says Robert L. San Martin, Deputy Assistant Secretary for Utility Technologies. In addition, "this bill would restrict DOE's flexibility in managing its hydrogen research and fuel cell program"; and, finally, "in light of on-going R&D activities relating to hydrogen conversion, storage and utilization, the requirements of the bill would be largely premature."

The National Hydrogen Association, while basically supporting the bill, said that a 30-year requirement for manufacturing, production, and cost projections called for in the bill are too long and should be shortened to a more realistic 15 to 20 years.

Harkin's bill is the latest addition to the growing number of hydrogen bills in Congress. According to a tally of NHA made in June, some 16 pieces of legislation, two or which are already passed, are in various stages of deliberation in Congress.

## CALENDAR OF EVENTS

- July 17, 1991 - ASU/AHA Chapter Meeting, 7 PM, Student Services Building Amphitheater, ASU Campus, Tempe, AZ.
- August 6, 1991 - So. Cal. AHA Chapter Meeting, 5 PM, Town Hall Center, Santa Fe Springs, CA.
- August 17, 1991 - ASU/AHA Chapter Meeting, 7 PM, Student Svcs. Building Amphitheater, ASU Campus, Tempe, AZ.
- Sept. 3, 1991 - Tucson AHA Chapter Meeting, 7 PM, Nanini Public Library (Shannon Rd. just north of Ina Street). This is the first meeting for this Chapter. Please call Jim Wolford (742-3126) or Al Anzaldue (742-0173) for info.
- Sept. 3, 1991 - Chandler (AZ) Rotary Club, 7 PM, Chandler Hospital, Chandler Blvd. & Dobson Rd. AHA Spokesman to discuss "Prosperity Without Pollution".
- Sept. 10, 1991 - So. Cal. AHA Chapter Meeting, 5 PM, Town Hall Center, Santa Fe Springs, CA.
- Sept. 18, 1991 - ASU/AHA Chapter Meeting, 7 PM, Student Svcs. Building Amphitheater, ASU Campus, Tempe, AZ.
- Sept. 24 - 25, 1991 - American Wind Energy Association Annual Meeting, Palm Springs, CA.
- Sept. 25, 1991 - ASU Hayden Library and Memorial Union Center, 11 AM - 2 PM, ASU Campus, Tempe, AZ. ASU Founding Member Harry Braun to speak on "Prosperity Without Pollution".
- Sept. 26, 1991 - Environmental Issue Speech, 7:30 PM, Mem. Union Cochise Room, ASU Campus, Tempe, AZ. Speaker is George Paul; topic is "In Defense of Bio-Diversity".
- Sept. 26 - 27, 1991 - Joint Environmental Conference, 7:30 AM - 10 PM, Mesa (AZ) Community Center. Sponsored by the Arizona Commission on Environment, the Arizona Lung Association, and the Natural Resources and Environmental Law Section of the State Bar of Arizona. Topic is "The 1990 Federal Clean Air Act Amendments: Their Interpretation, Impacts, and Implications for Arizona".

## AHA Seeks Sponsors

The American Hydrogen Association is looking for a few good sponsors! These sponsors, whether individuals or institutions, help our volunteers gather information, inform the public, and better serve our membership.

Arizona State University has created a new opportunity for sponsorship of special value by recognizing AHA as a non-profit agency working in the public interest. This recognition qualifies AHA to employ students in ASU's College Work-Study Program. In this program, selected students can gain valuable experience working for AHA while earning money and continuing their education, with ASU and AHA sharing in the costs of the students' wages. Students work on a part-time basis around their study schedule.

Once AHA is successful in developing the budget needed to hire, the students selected would become an important addition to our headquarters' office staff -- aiding in day-to-day operations, responding to inquiries, and otherwise supporting our volunteer staff.

If interested in becoming a sponsor, please contact the AHA Tempe offices.

## In Coming Issue of Hydrogen Today

**NAT'L. ENERGY SECURITY ACT OF 1991** -- Not as bad as it has been represented to be?

**AHA DEVELOPING HIGH SCHOOL STUDY PLAN ON HYDROGEN** -- Curriculum for two-week study program, teaching kits being designed by Curriculum Development Task Force.

**WIND ENERGY GENERATING SYSTEMS** -- How they work; Where Do they work best; and What role will these play in the Hydrogen Economy?

**BUCKYBALL -- THE MAGIC MOLECULE** -- What is this new kind of carbon and what is its potential for efficient hydrogen storage?

**AND MUCH, MUCH MORE ...**

*Hydrogen Today* is mailed to all AHA members as soon as it's off the presses. Make sure your membership is current and active. You won't want to miss out.

### New Edition of **JOURNAL OF HYDROGEN** To Be Published Soon

The second edition of the *Journal of Hydrogen* is currently being put together. Articles are being collected for publication at the present time; if you have any suggestions or submissions, please contact editor Harry Braun or the Tempe offices of AHA. Call (602) 921-0043 or send your written material to:

219 South Siesta Lane, Suite 101  
Tempe, AZ 85281  
Attn: Harry Braun

A publication date of early Fall is currently planned.

# **CAN THIS NATION BE SAVED?**

*By Marcia Greenshields*

Lately, I have often asked myself that question. I am inclined to answer "NO" ... particularly when I consider what we are up against: environmental pollution, over-population, inadequate education, greedy corporate executives, unprincipled politicians, expensive and unequal health care, violence and ineffective rehabilitation, over-burdened taxpayers, and drugs. And each generation after ours will face exponentially greater difficulties -- unless we make some drastic changes.

It is our challenge, then, to inform everyone we know that by passing laws requiring zero emissions for vehicles, we can still own big cars, we can have fresh water, and we can enjoy a stable economy.

We need to set an example for the rest of the world of determination to do the right thing and -- for once -- leave this planet better than we found it. If we do not do this immediately, this country may well slip into darkness.

Scientists throughout the world recognize that hydrogen can make everything better. It is ironic that Japan and Germany, the losers of WW II, are far ahead of us in this quest for a cleaner tomorrow, one based on solar hydrogen. Saudi Arabia, despite its immense oil riches, is also forging ahead, advancing the knowledge and use of hydrogen.

**Why are we in the United States dragging out feet? We could surpass everyone.**

Instead of retooling our automobile industry to compete with Japan and others, let's instead build clean hydrogen cars and force others to follow our lead.

Let's turn our slacking defense industry into a robust, productive one by having this industry build solar-electric "Gen-sets" that would use mirrored solar concentrating collectors and heat engines to generate electricity and split water into hydrogen and oxygen.

Let's rejuvenate our dying ship-building industry by directing it to the production of hydrogen-carrying tankers and ocean-thermal energy conversion (OTEC) plants for the production of hydrogen, potable water, and increased food.

Let's utilize people incarcerated in our prisons in a positive environmental task force to help clean up landfills, recycle waste products, and allow much of our garbage to be converted into inexpensive hydrogen energy.

If we do not educate people to real solutions, hope for a bright future will continue to diminish. Problems will soon become impossible to reverse. Nature will force a final solution.

We are the answers to the many problems we face. Together, we can provide positive direction, we can take the proper steps, we can make a better world. Come join my friends and me in the American Hydrogen Association as we do just that.

**The Hydrogen Association**  
*dba The American Hydrogen Association in the United States*

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**DELUSION IS NOT THE SOLUTION TO POLLUTION.**  
(IF IT WERE WE WOULD BE HAPPY WITH GASOLINE)

**DILUTION IS NOT THE SOLUTION TO POLLUTION.**  
(IF IT WERE THE OCEANS WOULDN'T BE DYING)

**YOU ARE THE SOLUTION TO POLLUTION: BE BOLD;**  
**ADVANCE THE RENEWABLE RESOURCES REVOLUTION**