

# Hydrogen Today



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*'We Deliver Clean Air'*

## Show Me The Hydrogen



The Essential Element (being water) in Merztown, PA, manufactures the HYDRA, a mobile solar hydrogen, water purification and electricity generating station. Solar panels power an electrolyzer, a pump for water filtering and a battery charger. Hydrogen runs a cookstove and a fuel cell. 110 & 230 VAC and 12 VDC are available for lights, electronics or refrigeration. [www.theessentialelement.com](http://www.theessentialelement.com) See also Spectra Watermakers' Solar Cube. [www.spectrawatermakers.com/solarcube](http://www.spectrawatermakers.com/solarcube)

## "Quotations"

"Nobody has to die for solar energy." (Paul Wilkins)

"We...must avoid the impulse to live only for today, plundering, for our own ease and convenience, the precious resources of tomorrow. We cannot mortgage the material assets of our grandchildren without risking also the loss of their political and spiritual heritage. We want democracy to survive for all generations, not to become the insolvent phantom of tomorrow." (Farewell speech of President Dwight D. Eisenhower, January 1961)

Hydrogen Today:  
Journal of the American  
Hydrogen Association  
2350 W. Shangri La Rd.  
Phoenix, AZ 85028 USA  
602-328-4238

[www.clean-air.org](http://www.clean-air.org)  
[www.goh2.org](http://www.goh2.org)

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#### AHA Chapters

AHA Northwest  
[www.ahanw.org](http://www.ahanw.org)  
Portland, OR

AHA Silicon Valley  
[www.ahasvc.org](http://www.ahasvc.org)  
Palo Alto, CA

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\*\* SAFETY FIRST \*\*

## Editorial

Someone asked Saudi Arabian oil minister *Ali al-Naimi* if people would stand for \$100 a barrel oil. His answer was, "What else do you have?" Well, sir, I'm glad you asked. We've got syngas, hydrogen, methane hydrates and moonshine, all courtesy of the sun.

I recently discovered a cache of the Journal of Solar Science and Engineering. There are hundreds of technical articles on solar refrigeration, solar tracking, solar cells, solar cooking, solar hot water, solar furnaces and solar distillation- all starting from 1957. It was published here in Phoenix. How many of you recognize the name Maria Telkes, one of the authors. She ran MIT's solar energy lab in 1939. During WWII, she designed solar stills for Navy life rafts. She passed away in 1995 at the age of 95. Who's going to fill the shoes of all these pioneers? Who's going to study and experiment, think and write technical articles? You and me.

If you have trouble like I do remembering which electrolyzer electrode is which, try Positive = Oxygen.

## Hydrogen on the Internet

Subscribe to (or renew) Homepower magazine for \$10 when their Facebook page hits 2000 likes. **The offer is only good for 48 hours.** Currently at 1990. [www.facebook.com/homepower](http://www.facebook.com/homepower)

Get a science kit from Kelvin Educational for making your own MAGLEV train. Or wind tunnel or earthquake tester or biodiesel fuel. [www.kelvin.com](http://www.kelvin.com)

If you'd rather build a 225 MPG diesel hybrid vehicle, then Robert Q. Riley Enterprises is the place. Plans for alternative cars, boats, bicycles and a jet engine. Valuable information on working with composites and how to register your homebuilt for legal street use. [www.rqriley.com](http://www.rqriley.com)

Greenfire Energy, based in Salt Lake City, is developing a geothermal electric plant near Springerville, Arizona that doesn't use water. The working fluid is super critical CO<sub>2</sub>, some of which will be trapped in the rock. [www.greenfireenergy.com](http://www.greenfireenergy.com)

The SCORE low-cost biomass cookstove, a project of Los Alamos National Lab and several U.K. universities, also generates electricity with sound waves. [www.score.uk.com/research](http://www.score.uk.com/research)

Subscribe to Biofuels Digest for a free daily dose of new technology. Find out about lawnmowers overheating on higher ethanol gasoline. [www.biofuelsdigest.com](http://www.biofuelsdigest.com)

A free weekly newsletter from Biodiesel magazine covers research, manufacturers, producers, government antics and events. Lots on algae. Find out what's going on in your own backyard that you don't even know about. [www.biodieselmagazine.com](http://www.biodieselmagazine.com)

## Hydrogen Events

Alternative Clean Transportation Expo. Long Beach (CA) Convention Center, May 4-6, 2011. Pretty much covers it all- propane, natural gas, electric and hydrogen for all size vehicles, including infrastructure. Visit a hydrogen fueling station. Check out their resources page. [www.actexpo.com](http://www.actexpo.com)

The Phoenix American Hydrogen Association now meets the second Thursday of every month from 6 to 8pm at Denny's restaurant, 650 N. Scottsdale Rd. in Tempe, AZ (SW Scottsdale Rd/202, one mile north of ASU light rail station). Call 480-964-0458 or 480-229-0828 for details.

## Books & Publications

Saving Energy, Growing Jobs: How Environmental Protection Promotes Economic Growth, Profitability, Innovation and Competition, David Goldstein, 2007.  
Bay Tree Publishing, \$5.95, 333 pages.

Goldstein, director of the National Resources Defense Council's energy program, does a middling job of convincing us that the cost of environmental quality does not have to hurt businesses & consumers or restrict our freedom of choice. He gives examples of how small investments can keep big cash in your pocket. A skyscraper remained lit all night because no one knew where the light switches were. LED traffic lights rapidly pay for themselves in saved electricity and maintenance, besides the additional benefit of working on batteries when utility power fails. How does a 50% return on home insulation sound? Smart communities are being designed that are cheaper and far more livable where buyers demand it. He also bashes the free market as the only economic arbiter. When California enacted energy standards for refrigerators in 1975, manufacturers complained they'd be put out of business. Nobody would buy a more expensive appliance, even if it did save \$2000 worth of electricity. Companies proceeded to build refrigerators that were 4 times more energy efficient, 20% larger and 50% cheaper. The powers that be often stifle innovation and risk-taking. He implies it won't be Detroit or Congress that builds a 100 MPG car. He sees a great future for process engineers whose innovation can save resources. A solar oven in your backyard doesn't really mean you're a communist. Unfortunately, the author writes in lawyerese. It's hard work getting the jewels out of the hardrock.

## AHA Poured-Earth Field Trip Peeples Valley, Arizona



On March 26<sup>th</sup>, the AHA took a field trip to a poured-earth home under construction by architect Michael Frerking. Poured-earth is not quite as simple as throwing shovelfuls of your backyard into a cement mixer. Frerking uses a well-proven blend of soil, binder and cement as well as sturdy aluminum forms to assure success. The 12 inch thick walls are unfinished inside to minimize maintenance, although tints can be added for interest as seen in the photo above. The exterior is covered with 4 inches of insulation. The home will use only one eighth the energy of a house built to code. Metal reflectors placed below clerestory windows will spread diffused, comforting daylight throughout every room. By acting as both architect and contractor, Frerking can reduce the homes' price by about 20%. He is preparing a poured-earth technology course. [www.michaelfrerking.com](http://www.michaelfrerking.com)

### Thanks

Bruce- Fixing solar Stirling and SCORE stove article.  
Ken W- Projector screen and stand.  
Michael- Poured-earth tour, Ben for driving and MaryLou for the Frosties.  
Mike M-Fabulous Facts and lemons.  
DK- Historical AHA documents.  
Ken V, Gus, Shane- M920, turbine case.  
Roy- M920, Green Diamonds.  
Claude- barrels, moving Alvey.

## H2 BUYERS GUIDE

### ELECTROLYZERS

Avalence LLC  
1240 Oronoque Rd.  
P.O. Box 2246  
Milford, CT 06460  
203-701-0052  
[www.avalence.com](http://www.avalence.com)

Hydrofiller 15, 12 SCFH @ 2500psi, 1.8kW, \$95,000. Also Models 50, 85 and 170.

"Build A Solar Hydrogen Fuel Cell System" by Phillip Hurley.  
Downloadable ebook. 294 pgs. \$16.95. Covers power from solar cells, a practical PVC electrolyzer and a PEM fuel cell to use the hydrogen. See other Hurley ebooks.  
[www.goodideacreative.com/shfc\\_sys.html](http://www.goodideacreative.com/shfc_sys.html)

El Paso Solar Energy Association  
P.O. Box 26384  
El Paso, TX 79926  
[www.epsea.org](http://www.epsea.org)

Send \$15 for their 3 gallon/day solar still plans. Distilled water for your electrolyzer that you can also drink.

Eagle-Research, Inc.  
1306 Main Street  
Oroville, WA 98844  
250-492-7400  
[www.eagle-research.com](http://www.eagle-research.com)

Publishes Brown's Gas Book 1 and 2 (\$14 & \$24). Build an electrolyzer and discover for yourself the weird nature of monatomic hydrogen. Note well- Brown's gas is an explosive mix of H<sub>2</sub> and O<sub>2</sub>, for direct immediate use in engines and welding torches.

Hydrocap  
975 NW 95<sup>th</sup> St.  
Miami, FL 33150  
305-696-2504

The Hydrocap is a small catalytic recombiner that replaces normal 12 volt car battery caps. They may have some use in removing O<sub>2</sub> from your H<sub>2</sub> supply. About \$5.50 each.

H-Ion Solar  
6095 Monterey Ave.  
Richmond, CA 94805  
510-237-7877

[www.hionsolar.com](http://www.hionsolar.com)

This is Walter Pyle. Author of Solar Hydrogen Chronicles (\$30); Double-Bubbler scrubs residual caustic from electrolyzer output (\$455, plans \$25); purification filter with coalescing filters, flashback arresters & catalytic H<sub>2</sub>/O<sub>2</sub> recombiner (\$2323, plans \$25 + \$3 shipping).

HySolGenics, Inc.  
7011 Realm Dr., Suite A-4  
San Jose, CA 95119  
408-224-5100

[www.hysolgenics.com](http://www.hysolgenics.com)

M2 series Solar Hydrogen Generators. 0.4-3.3 cubic meters H<sub>2</sub>/hour at 60-10,000psi.

Hydrogen Wind Inc.  
31086 Timberlost Rd.  
Lineville, Iowa 50147  
641-876-5665

[www.hydrogenwindinc.com](http://www.hydrogenwindinc.com)

This is L. Spicer. Economical electrolyzers for \$250 per unit. Send \$1.00 for their brochure. Publishes the Hydrogen Files, 50 pages of miscellaneous notes on electrolyzer design (\$30).

Hydrogenics Corp. (former Stuart Energy Systems)  
220 Admiral Boulevard  
Mississauga, Ontario L5T 2N6  
905-361-3660

[www.hydrogenics.com](http://www.hydrogenics.com)

HySTAT electrolyzers and fuel cells.

Hydrogen Technologies (former Norsk Hydro, now Statoil)

<http://www.electrolysers.com>

Electrolyzers and H<sub>2</sub> fuel stations from Norway. 10-500 cubic meter/hr.

"Practical Hydrogen Systems: An Experimenter's Guide"- Phillip Hurley. E-book only available by downloading. 364 pages. \$16.95. Build a small completely automated electrolyzer system. All stainless steel here. Excellent coverage of technical and safety information.

[www.goodideacreative.com/wheelockmtn.html](http://www.goodideacreative.com/wheelockmtn.html)

Proton Energy Systems  
10 Technology Dr.  
Wallingford, CT 06492  
203-678-2000  
[www.protonenergy.com](http://www.protonenergy.com)

Hogen PEM electrolyzers, 10 to 40 SCFH, 200psi working pressure.

Teledyne Energy Systems, Inc.  
10707 Gilroy Rd.  
Hunt Valley, MD 21031  
410-771-8600  
[www.teledyne.com](http://www.teledyne.com)

Titan hydrogen generators, 100 SCFH and up.

Thermodyne Systems  
4083 West Ave. "L", #107  
Quartz Hill, CA 93536  
[www.hydrogenappliances.com](http://www.hydrogenappliances.com)

Used to sell smaller electrolyzers, but now lists 700 l/min for \$325,000. Also hydrogen detectors, 12V water heater elements and wind turbines for good measure.

Treadwell Corp.  
341 Railroad St.  
Thomaston, CT 06787  
860-283-8251  
[www.treadwellcorp.com](http://www.treadwellcorp.com)  
PEM electrolyzers 20-170 SLPM @ 1000psi.

#### TOOLS & HARDWARE

Circor International  
Hoke Inc.  
[www.hoke.com](http://www.hoke.com)  
Gyrolock fittings

Circle Seals Control, Inc.  
[www.circle-seal.com/alternative\\_fuels/index.html](http://www.circle-seal.com/alternative_fuels/index.html)  
Stainless steel fittings and excess flow, relief, check and ball valves.

Figaro USA, Inc.  
Suite 203  
121 S. Wilke Rd., Suite 300  
Arlington Heights, IL 60005  
847-832-1701  
[www.figarosensor.com](http://www.figarosensor.com)  
Sensors for H2 in air and O2 in H2.

GE Panametrics  
221 Crescent St.  
Waltham, MA 02453  
781-899-2719  
[www.ge-mcs.com/en/gas/oxygen-analysis/xmo2-transmitter.html](http://www.ge-mcs.com/en/gas/oxygen-analysis/xmo2-transmitter.html)  
XMO2 oxygen analyzer, measures 0.1 to 100% O2 in H2. \$2950

Harbor Freight Tools  
3491 Mission Oaks Blvd.  
Camarillo, Ca 93011  
[www.harborfreight.com](http://www.harborfreight.com)  
Huge selection of affordable imported tools.

Jameco Electronics  
1355 Shoreway Rd.  
Belmont, CA 94002  
[www.jameco.com](http://www.jameco.com)  
All the standard electronic parts and tools you need.

Kal-Equip (Actron Manufacturing Co.)  
15825 Industrial Parkway  
Cleveland, OH 44135  
800-228-7667  
[www.actron.com/product\\_detail.php?pid=16163](http://www.actron.com/product_detail.php?pid=16163)  
Automotive test equipment including sensor simulators & testers.

Macurco Inc.  
3946 S. Mariposa St.  
Englewood, CO 80110  
303-781-4062  
[http://solutions.3m.com/wps/portal/3M/en\\_US/Health/Safety/Products/Catalog/?PC\\_7\\_RJH9U5230GE3E02LES9MG812H2\\_nid=53R0L4WBGtbeCJMCGKJR71gl](http://solutions.3m.com/wps/portal/3M/en_US/Health/Safety/Products/Catalog/?PC_7_RJH9U5230GE3E02LES9MG812H2_nid=53R0L4WBGtbeCJMCGKJR71gl)  
12 volt and 120 volt fixed hydrogen detectors.

McMaster-Carr Supply Co.  
P.O. Box 54960  
Los Angeles, CA 90054  
562-695-0677  
[www.mcmaster.com](http://www.mcmaster.com)  
Massive on-line catalog of every imaginable industrial material or tool. They accept small orders.

Northern Arizona Wind & Sun  
4091 E. Huntington Dr.  
Flagstaff, AZ 86004  
[www.solar-electric.com](http://www.solar-electric.com)  
Full range of renewable energy products, active forum and technical information.

Northern Tool & Equipment Co.  
P.O. Box 1499  
Burnsville, MN 55337  
800-533-5545

[www.northerntool.com](http://www.northerntool.com)

Good-sized catalog has tri-fuel engines, tools, shop & automotive supplies, trailer & go-kart parts.

Parker Hannafin Corp.  
800-272-7537

[www.parker.com](http://www.parker.com)

[www.globalfluid.com/c-global/Alternative\\_fuel.htm](http://www.globalfluid.com/c-global/Alternative_fuel.htm)

Online catalog of quality tube and hose fittings, coalescing filters. Local distributors.

Snap-Tite Quick Disconnect and Valve Division  
201 Titusville Rd.  
Union City, PA 16438  
814-438-3821

[www.snap-](http://www.snap-titequickdisconnects.com)

[titequickdisconnects.com/products/natural\\_gas\\_vehicle\\_products\\_ng/index.html](http://titequickdisconnects.com/products/natural_gas_vehicle_products_ng/index.html)

Natural gas nozzles and valves.

Swagelok Co.  
29500 Solon Rd.  
Solon, OH 44139  
440-248-4600

[www.swagelok.com](http://www.swagelok.com)

Quality stainless steel high pressure fittings and tools for fuel lines. Local distributors.

Surplus Center  
1015 W. "O" Street  
P.O. Box 82209  
Lincoln, NE 68501

[www.surpluscenter.com](http://www.surpluscenter.com)

Catalog has wondrous assortment of reasonably priced hydraulic, electrical and pneumatic odds and ends; small diesel engines.

Tescom Corp.  
Industrial Controls Div.  
12616 Industrial Blvd.  
Elk River, MN 55330  
800-447-1250

[www.tescom.com](http://www.tescom.com)

High pressure reducing regulators, filters and metering, shut-off and flow limit valves.

United States Plastic Corp.  
1390 Neubrecht Rd.  
Lima, OH 45801  
800-537-9724  
[www.usplastic.com](http://www.usplastic.com)  
Catalog has every description of plastic supplies.

## VEHICLES

AFC (Advanced Fuel Components), Inc.  
300 Wooley Drive  
Marshall, MI 49068  
269-781-1111  
[www.afcvalves.com/main.html](http://www.afcvalves.com/main.html)  
High/low pressure manual/solenoid shut-off valves, line filters.

Beam Garretson- see Impco

Carburetion & Turbo Systems Inc.  
1879 Eagle Creek Blvd.  
Shakopee, MN 55379  
952-445-3910  
[www.carbturbo.com](http://www.carbturbo.com)  
CNG & LPG small engine conversion kits and supplies, turbochargers and test equipment.

Dynetek Industries Ltd.  
4410 46 Ave. SE  
Calgary, AB T2B 3N7  
888-396-3835  
[www.dynetek.com/hydrogen.php](http://www.dynetek.com/hydrogen.php)  
Lightweight compressed CNG & H2 cylinders.

Eco Fuel Systems Inc.  
#2-20043 92 AVE.  
LANGLEY, BC V1M 3A5  
604-888-8384  
[www.ecofuel.com](http://www.ecofuel.com)  
Programmable fuel injector computer for alt fuel vehicles.

Electro Automotive  
[www.electroauto.com](http://www.electroauto.com)  
Long-time electric vehicle (EV) parts supplier.

Fuelmaker Corp.  
Bought by Honda and sold to Fuel Systems Solutions.  
[www.brcfuelmaker.it/ing](http://www.brcfuelmaker.it/ing)  
Small compressors for refueling CNG vehicles from home gas mains.

IMPCO Technologies  
3030 S. Susan St.  
Santa Ana, Ca 92704  
714-656-1200  
[www.impcoco.ws](http://www.impcoco.ws)

Large online gaseous fuel conversion components catalog. Training at Cerritos College. OEM only.

Hendrix Industrial Gastrux  
1301 Old Rand Road  
Wauconda, IL 60084  
847-526-1700  
[www.hendrixsystems.com](http://www.hendrixsystems.com)  
LPG and CNG conversion parts.

KTA Services  
[www.kta-ev.com](http://www.kta-ev.com)  
Long-time EV parts supplier

Landi Renzo  
[www.landi.it/eng](http://www.landi.it/eng)  
LPG and CNG components from Italy.

Lincoln Composites  
4300 Industrial Ave.  
Lincoln. NE 68504  
402-464-8211  
[www.lincolncomposites.com](http://www.lincolncomposites.com)  
High pressure composite fuel tanks.

Megasquirt  
[www.bgsoflex.com/megasquirt.html](http://www.bgsoflex.com/megasquirt.html)  
Reasonably priced experimental fuel injector controller kits. Lots of educational and support material. Also wideband O2 sensors.

Mogas  
#13-4855 57<sup>th</sup> St.  
Delta, British Columbia V4K 3E7  
604-312-2339  
[www.mogas.ca](http://www.mogas.ca)  
CNG regulators, various electronic controls.

MSD Ignition  
1355 Pullman Drive  
El Paso, TX 79936  
<http://www.msdpowersports.com/Products/Small-Engine/Small-Engine-Intro>  
Electronic ignitions for small engines.

OPW (Ohio Pattern Works) Fueling Components  
P.O. Box 405003  
Cincinnati, OH 45240  
[www.opw-fc.com](http://www.opw-fc.com)  
Full line of hydrogen refueling hardware.

Parallax, Inc.  
599 Menlo Drive, Suite 100  
Rocklin, CA 95765  
888-512-1024  
[www.parallax.com](http://www.parallax.com)  
Inexpensive postage-stamp sized Basic Stamp microcomputer. Fascinating experiment manuals for digital logic, earth measurement sensors, industrial control, renewable energy and robots. Program with your own PC.

PDC Machines, Inc.  
1875 Stout Drive  
Warminster, PA 18974  
215-443-9442  
[www.pdcmachines.com/fuel-cell-tech](http://www.pdcmachines.com/fuel-cell-tech)  
H2 diaphragm compressors.

Rix Industries  
4900 Industrial Way  
Benecia, CA 94510  
707-747-5900  
[www.rixindustries.com/hydrogencompressors.html](http://www.rixindustries.com/hydrogencompressors.html)  
H2 compressors  $\frac{3}{4}$  to 60HP.

SCI (Structural Composite Industries)  
325 Enterprise Place  
Pamona, CA 91768  
909-594-7777  
[www.scicomposites.com](http://www.scicomposites.com)  
Composite fuel tanks.

Spark Injectors  
Clean Air Conversions  
7030 W. Oakland St.  
Chandler, AZ 85226  
[www.cleanairconversions.com](http://www.cleanairconversions.com)

Synflex (purchased by Eaton Hydraulics)  
14615 Lone Oak Rd.  
Eden Prairie, MN 55344  
888-258-0222  
[www.eaton.com/hydraulics/synflex](http://www.eaton.com/hydraulics/synflex)  
Synflex electrically conductive transfer hose for CNG refueling. Prevents sparks by dissipating static charge.

US Carburetion, Inc.  
HC 79 Box 130, Bldg. B-1  
Canvas, WV 2662  
800-553-5608

[www.uscarburetion.com](http://www.uscarburetion.com)

DIY small engine propane, NG conversion kits.

Westport

<http://www.westport.com/better-world/alternative-fuels>

Hydrogen direct injectors. Show them your money and they say they'll start production.

### STEAM POWER

Mike Brown  
P.O. Box 4884  
Springfield, MO 65808  
417-8908636

<http://home.EarthLink.net/~dlaw70/12stmng.htm> and  
<http://mikebrownsolutions.com/aeindex.htm>

1-3 HP steam engines, plans books, videos.

Skip Goebel  
Sensible Steam  
125 von Goebels Lane  
Branson, MO 65616  
417-336-2869  
Steam gensets, boilers.

Rappahannock Boat Works  
4403 Dyes Lane  
Bealeton, VA 22712  
540-439-4050

[www.tinypower.com](http://www.tinypower.com)

Now carries venerable line of Tiny Power steam engines.

Robert Green Steam Engines  
2337B Avenida Sevilla  
Laguna Woods, CA 92637  
949-581-2529

[www.greensteamengine.com](http://www.greensteamengine.com)

Very interesting assortment of steam engines. Some plans and parts available.

## EXTERNAL COMBUSTION ENGINES

Grizzly Industrial  
Outlets in WA, PA and MO.  
1-800-523-4777  
[www.grizzly.com](http://www.grizzly.com)  
Several Stirling engine kits.

P.M. Research  
4110 Nikes Hill Rd.  
Wellsville, NY 14895  
1-800-724-3801  
[www.pmresearchinc.com](http://www.pmresearchinc.com)  
Sun Runner solar Stirling engine (\$250), model steam engines, books.

## BIOFUELS

### ALCOHOL

Alcohol Can Be A Gas- David Blume (2007) 596 pages. Complete coverage from growing your stock, building equipment and converting your car to ethanol. [www.alcoholcanbeagas.com](http://www.alcoholcanbeagas.com)

GASIFIERS (Wood gas, producer gas, syngas: H<sub>2</sub>+CO)

All Power Labs  
1010 Murray St.  
Berkeley, CA 94710  
510-845-1500  
[www.gekgasifier.com](http://www.gekgasifier.com)

Gasifier Experimenters Kit(GEK). Convert your junk mail into fuel or biochar. Plans, parts, forum and seminars.

### ALGAE

Making Algae Biodiesel At Home- David Seig (2008). A \$100 ebook that will get you started if you don't have time to search the Internet. <http://www.making-biodiesel-books.com/algae-biodiesel.html>

<http://www.oilgae.com/forum/viewtopic.php?f=2&t=38&p=1846>  
Home algae production forum, mentions strains for hydrogen.

### BIODIESEL

Biodiesel: Basics and Beyond, A Comprehensive Guide to Production and Use for the Home and Farm- William Kemp (2006) 588 pages.

From the Fryer to the Fuel Tank- Joshua Tickell (2003) 162 pages.  
Read either one of these books.

#### METHANE

Methane Digesters for Fuel Gas and Fertilizer- John Fry (1973).  
Hundreds of sustainable technology articles on this website.  
[http://journeytoforever.org/biofuel\\_library/MethaneDigesters/MDToC.html](http://journeytoforever.org/biofuel_library/MethaneDigesters/MDToC.html)

#### WIND

Applied Magnets

[www.magnets4less.com](http://www.magnets4less.com)

Magnets, coil wire, blades, books, charge controllers and kits for wind turbines.

Wind Power: Renewable Energy for Home, Farm and Business- Paul Gipe (2004), 504 pages. The one book you'll need if you're serious about wind power.

How To Build A Wind Turbine- Hugh Piggot (2005), 64 pages. Almost complete guide to building 4' to 12' wind turbines.

[www.scoraigwind.com](http://www.scoraigwind.com)

Windworks 30 Foot Octahedron Tower. Old plans for Buckminster Fuller tower built out of EMT. Available for \$15 from Don Gardner. Contact [lodoga@yahoo.com](mailto:lodoga@yahoo.com) Lost dimension is 9½ inches.

#### PUBLICATIONS

Lindsay Publications Inc.

P.O. Box 538

Bradley, IL 60915

815-935-5353

[www.lindsaybks.com](http://www.lindsaybks.com)

Catalog is mostly reprints of old technical books, but plenty of titles on alternate energy, home machining and weird DIY stuff.

#### BOOKS

Advanced Engine Performance Diagnosis- James Halderman (2002) 508 pages. Very nice detailed explanation of how car computer systems work and how to diagnose problems.

Auto Engine Performance & Driveability- Chris Johanson (1998) 576 pages. Another excellent text on car computer systems.

The Doctor's Step-By-Step Guide To Optimizing Your Ignition- Dr. Christopher Jacobs (1996) 154 pages. Theory and how-to on building strong ignitions required for alt fuels.

Fuel From Water: Energy Independence With Hydrogen- Michael Peavey (1998) 251 pages. Basics of hydrogen fuel.

The Philosopher Mechanic: Notes for Converting Your Car To A Renewable Energy Vehicle- Roy McAlister (1996) 220 pages.

Propane Fuel Conversions- Jay Storer (1986). Superb book, but hard to find these days.

The Solar Hydrogen Civilization- Roy McAlister (2005) 238 pages. Explains in clear English how the solar hydrogen economy is going to work.

Solar Hot Water Systems: Lessons Learned- Tom Lane (2004) 198 pages. Detailed explanation of various solar hot water designs.

#### PERIODICALS

Home Power: The Hands-On Journal of Home-Made Power  
P.O. Box 520  
Ashland, OR 97520  
800-707-6585

[www.homepower.com/index.cfm](http://www.homepower.com/index.cfm)

A must-read magazine. Series on hydrogen available as the Hydrogen Chronicles (see H-Ion Solar). On-line subscription available.

[http://www.sciencedirect.com/science?\\_ob=JournalURL&\\_cdi=5729&\\_auth=y&\\_acct=C000050221&\\_version=1&\\_urlVersion=0&\\_userid=10&md5=5b44471bf00448177b7b9e096d672246](http://www.sciencedirect.com/science?_ob=JournalURL&_cdi=5729&_auth=y&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=5b44471bf00448177b7b9e096d672246)

International Journal of Hydrogen Energy index. State of the art research on hydrogen. Find on-line at your local university unless you want to spend \$30 per article.

## ORGANIZATIONS

American Hydrogen Association  
2350 West Shangri La  
Phoenix, AZ 85029  
602-328-4238

[www.clean-air.org](http://www.clean-air.org) and  
[www.americanhydrogenassociation.org](http://www.americanhydrogenassociation.org)

This is Roy McAlister, author of *Philosopher Mechanic and the Solar Hydrogen Civilization*. Hydrogen classes and AHA Hydrogen Today newsletter. \$39/year. Meetings on the second Thursday of the month in Tempe.

American Hydrogen Association, NW Chapter  
Portland, OR  
[www.ahanw.org](http://www.ahanw.org)  
Long running hydrogen forum.

American Hydrogen Association, Silicon Valley chapter  
Palo Alto, CA  
[www.ahasvc.org](http://www.ahasvc.org)  
Meetings on the third Saturday of the month.

Clean Air Now  
6960 Magnolia Ave. #200  
Riverside, CA 92506  
310-472-8633

[www.cleanairnow.us](http://www.cleanairnow.us)

Founded by Dr. Robert Zweig in 1969 when he saw children's lungs damaged by California air pollution. He sponsored hydrogen powered vehicles in the '70s. Although Dr. Zweig died in 2002, Clean Air Now is still building hydrogen vehicles in collaboration with UC Riverside CERT.

International Clearinghouse for Hydrogen Commerce  
[www.hydrogencommerce.com](http://www.hydrogencommerce.com)  
Huge site of material on hydrogen vs. Big Oil/Washington.

National Fire Protection Association (NFPA)  
1 Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269  
800-344-3555

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

Publishes NFPA2- Hydrogen Technology Code, NFPA52- Vehicular Gaseous Fuel Code, NFPA54- Natural Gas Fuel Code and NFPA55- Compressed Gases Code.

Natural Gas Vehicle Institute (NGVI)  
6771 West Charleston Blvd. Suite C  
Las Vega, NV 89146  
702-254-4180  
[www.ngvi.com](http://www.ngvi.com)

Short courses in natural gas safety & emergencies, fueling operations & maintenance, cylinder inspection, fuel contamination and NG codes & standards.

San Juan College  
4601 College Blvd.  
Farmington, NM  
<http://sanjuancollege.edu>  
Renewable energy courses leading to AAS in photovoltaics.

Schatz Energy Research Center (SERC)  
Humboldt State University  
Arcata, CA 95521  
707-826-4345  
[http://www.schatzlab.org/projects/real\\_world/schatz\\_solar.html](http://www.schatzlab.org/projects/real_world/schatz_solar.html) Small to medium scale H2 power R&D.

#### ENERGY EFFICIENCY

[www.superbrightLEDs.com/leds.htm](http://www.superbrightLEDs.com/leds.htm)  
Never mind the compact fluorescents. Check out these high output LED's (Light Emitting Diodes). Think milliwatts. They last for 10 years and use a \$1 worth of electricity a year.

P3 International  
<http://www.p3international.com/products/special/P4400/P4400-CE.html>  
Kill-A-Watt electrical energy monitor.

#### SOLAR FURNACES

<http://www.ida.net/users/tetonsl/solar/solarhom.htm>  
Tracking concentrator using mirrors.

Mother Earth News  
[www.motherearthnews.com](http://www.motherearthnews.com)  
Four project articles, uses 100 mirrors- #52(Jul/Aug '78), #55(Jan/Feb '79), #56(Mar/Apr '79) and #57(May/Jun '79).

## HYDROGEN SAFETY

<http://www.hq.nasa.gov/office/codeq/doctree/canceled/871916.pdf>

[www.h2bestpractices.org](http://www.h2bestpractices.org)

Hydrogen 2000

[www.hydrogen2000.com](http://www.hydrogen2000.com)

Hydrogen safety DVD's.

Read every word you can about safety. A comprehensive AHA hydrogen safety handbook is planned for 2011.

## FUEL CELLS

Build Your Own Fuel Cell- by Phillip Hurley. E-book available only by downloading. 267 pages. \$12.95. Covers two 1 watt cells made from carbon blocks. Good list of resources.

[www.buildafuelcell.com](http://www.buildafuelcell.com)

The Fuel Cell Store

P.O. Box 4038

Boulder, CO 80306

866-327-3835

[www.fuelcellstore.com](http://www.fuelcellstore.com)

Full range of education fuel cell products.

Ion Power, Inc.

720 Governor Lea Rd.

New Castle, DE 19720

302-832-9550

[www.ion-power.com](http://www.ion-power.com)

Dupont Nafion membranes.

Sigma-Aldrich Chemical Co. Inc.

800-325-3010

[www.sigma-aldrich.com](http://www.sigma-aldrich.com)

PEM membranes. Be prepared to spend \$300 for a square foot of Nafion.

UTC Power

195 Governor's Highway

South Windsor, CT 06074

866-900-POWER

[www.utcpower.com](http://www.utcpower.com)

MISC.

[www.timeanddate.com](http://www.timeanddate.com)

A website you'll need if you conduct business beyond city limits.

[www.unitjuggler.com](http://www.unitjuggler.com)

Units conversion program.

Don Lancaster's Hydrogen Library

[www.tinaja.com/h2gas01.asp](http://www.tinaja.com/h2gas01.asp)

Also read his "Incredible Secret Money Machine" about starting your own craft/tech business.

Renewable Energy Access

[www.renewableenergyaccess.com](http://www.renewableenergyaccess.com)

Sign up for interesting general renewable news twice a week by email.

Also help wanted section.

Smartflix (former Technical Video Rental)

39 Evergreen Lane

Arlington, MA 02474

[www.smartflix.com](http://www.smartflix.com)

Rent 6600 expensive technical DVD's by mail for about \$10.

**\*\* SAFETY FIRST \*\***

## AHA Membership Form

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_

Telephone \_\_\_\_\_ email \_\_\_\_\_

- Regular Membership- \$39.00/year
  - New members receive a free copy of Roy McAlister's "Solar Hydrogen Civilization".
- Family Membership- \$49.00/year
- Student & Senior (60 and over) Membership- \$25.00/year
- Sustaining Membership- \$100.00/year
- Corporation/Institutional Membership- \$2500/year
- "Solar Hydrogen Civilization" book only- \$24.95

Print this form and mail with your check or money order to:

American Hydrogen Association  
2350 W. Shangri La  
Phoenix, Arizona 85028  
USA

Or email payment to:

americanhydrogenassociation@gmail.com through [www.PayPal.com](http://www.PayPal.com)

AHA publishes *Hydrogen Today* to help educate the public about new developments in renewable energy and the science and people behind them. Join us in making a better world. You can help too by writing for *Hydrogen Today*. Tell others about your grassroots alternative energy projects, either scientific or social. Review a book, product, service or event. A picture is still worth a thousand words. The range should be approximately 300-1000 words. Send to the above address or to the *Hydrogen Today* editor at [bikesintl@netzero.com](mailto:bikesintl@netzero.com).