do it—but without using farmland. This would allow existing energy infrastructure to be used.

Decades and decades of chemistry have assumed cheap oil as feedstock—why would anyone try to synthesize it? A reason would be if the government offered to buy such a synthetic fuel—say for $1 million per barrel for the first 500 barrels, and $100 per barrel for the next 50,000 barrels. There would have to be rules for composition, renewable manufacture, absence of poisonous byproducts, etc.

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Have an opinion to share? Write to Editor, 2400 Central Avenue, Suite A, Boulder, CO 80301, or editor@solartoday.org. Please limit letters to 300 words. Letters may be edited for length and clarity.

Corrections

Please note several corrections to the July/August issue. In the "ASES News" article honoring ASES Fellow Donald E. Osborn, the city in which Spectrum Energy Inc. is located was misidentified. The company is located in Elk Grove, Calif.

The "Letter to the Editor" from Robert Ukeiley contained an error introduced during editing. The NOx SIP Call emissions trading program was created to reduce nitrogen oxide emissions.

"Readers' Forum" contained an error regarding the cost to install 35.6 gigawatts of new solar capacity. At an installation cost of $5 per watt, the cost would be $178 billion.

SOLAR TODAY apologizes for the errors.

Editor's Note: We appreciate the many letters we have received both in support of and opposing Don B. Cameron's position on the role of nuclear energy in the nation's supply portfolio. Many readers commented that they appreciate SOLAR TODAY*'s publication of an alternative viewpoint, one held by a minority of ASES members. We invite thoughts from all readers on actions the renewable energy community can take to effect a speedy transition to a sustainable energy economy.*

Readers' Forum

Continued from page 62

users with flexibility to pay a premium for energy with adverse effects if they really need it. This approach to energy is long overdue.

Not All "Green" Power Is Benign

If we examine the costs associated with each energy source, it becomes clear that direct use of the sun and climate resources on site is usually the best, most low-cost option *(see table p. 62)*. Even many so-called "green" choices like hydropower would be considerably more expensive if environmental damage was included in the cost.

Proper accounting will help us shift the world economy in the direction of improved ecological and cultural sustainability.

A visible market and true cost accounting would fundamentally change the way we use and provide energy. It would allow consumers to make choices based on real costs, and would drive a rapid transition to sustainable building design and wise material and appliance choices. It is relatively easy to create structures in almost any climate that are nearly self-reliant for space conditioning. These naturally heated and cooled and naturally lit buildings are more comfortable, secure, quiet, healthy and have lower life-cycle costs than fossil fuel-supported buildings. Yet these better buildings are not built because the energy market is beset with subsidies, perverse incentives, incomplete accounting and a lack of transparency.

As a professional society and as global citizens, we need to acknowledge these destructive economic policies. It's time to eliminate subsidies for nonrenewable fuels and incentives that lead to environmental destruction, illness and decreased productivity. We must press for true cost accounting. ●

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8-12, Mexico City
Enviro-Pro/TECOMEX 2004. Contact Kara Lotto, E.J. Krause & Associates Inc., 301.493.5500, www.ejkrause.com/enviropro.

11-12, Hiawatha, Iowa
I-RENEW Energy Expo. Contact I-RENEW, 563.432.6551, www.irenew.org.

12-15, Perth, Australia
Hydrogen and Fuel Cell Futures Conference. Contact Congress West, +61 8 9322 6906, www.congresswest.com.au/hydrogen.

17-19, Los Angeles to San Diego
2004 Fuel Cell Vehicle Road Rally. Contact the California Fuel Cell Partnership, 916.371.2870, www.fuelcellpartnership.org.

18-19, Fort Collins, Colo.
Rocky Mountain Sustainable Living Fair. Contact Kellie Falbo, Rocky Mountain Sustainable Living Association, 970.224.3247, www.sustainablelivingfair.org.

18-19, Hopland, Calif.
Introduction to Straw Bale Construction. Contact the Solar Living Institute, 707.744.2017, www.solarliving.org.

22-24, Austin, Texas
World Energy Engineering Congress. Contact the Association of Energy Engineers, 770.447.5083, www.energycongress.com.

24-26, Fredericksburg, Texas
Renewable Energy Roundup and Green Living Fair. Contact the Texas Solar Energy Society, 877.3ROUNDUP (877.376.8638) or 512.326.3391, www.theroundup.org.

25-26, Albuquerque, N.M.
Solar Fiesta. Contact the New Mexico Solar Energy Association, 888.88.NMSOL (888.886.6765), www.nmsea.org.

25-28, Toronto
Hydrogen and Fuel Cells 2004 Conference and Trade Show. Contact Advance Group, 800.555.1099, ext. 2, www.hydrogenfuelcells2004.com.

29-Oct. 1, Trenton, N.J.
Mid-Atlantic Sustainability Conference. Contact the Northeast Sustainable Energy Association, 413.774.6051, www.nesea.org.

Upcoming ASES Conferences

ASES/ISES Solar World Congress 2005
Bringing Water to the World
August 8-12, Orlando, Fla.

SOLAR 2006
July 9-12, Denver

SOLAR 2007
Date to be announced, Cleveland

Contact the American Solar Energy Society, 303.443.3130, www.ases.org.

OCTOBER 2004

2, in most U.S. locations nationwide
ASES National Solar Tour. Contact the American Solar Energy Society, 303.443.3130, www.ases.org.

11-13, Livonia, Mich.
Advanced Energy & Fuel Cell Technologies. Contact the Society of Mechanical Engineers, 800.733.4763, www.sme.org/aet.

11-Nov. 19, online
Solar Home Design Online. Contact Solar Energy International, 970.963.8855, www.solarenergy.org.

16, Madison, Wis.
Vegetable Oil and Biodiesel Fuels Workshop. Contact the Midwest Renewable Energy Association, 715.592.6595, www.the-mrea.org.

18-21, San Francisco
Solar Power 2004. Contact the Solar Electric Power Association, 202.628.7745, www.solarpower2004.com.

27-28, Honolulu
2004 Efficient Electro-Technology Exposition and Conference. Contact the Hawaiian Electric Co., 808.543.4790, http://energyexpo.heco.com.

NOVEMBER 2004

9-10, Cleveland
Ohio Wind Power Conference. Contact Green Energy Ohio, 866.GREEN.OH (866.473.3664), www.greenenergyohio.org.

10-12, Portland, Ore.
Greenbuild 2004. Contact the U.S. Green Building Council, 202.828.7422, www.greenbuildexpo.org.

The Price Falls Short

Hummers and McMansions sell like hotcakes, and we have distorted markets to blame.

By David A. Bainbridge

Gasoline prices rose to over $2 per gallon in most of the United States this spring, yet SUV sales continued unabated. Natural gas bills have spiked, but sales of oversized McMansions are booming. Clearly, consumers make poor energy choices.

It's not for a lack of concern for the environment or public health, however. No, we make poor choices because the prices we pay for goods and services are not derived from complete accounting, but from dysfunctional partial accounts that neglect environmental and social costs. Now more than ever, we need to move to full-cost accounting. Proper accounting will help us shift the world economy in the direction of improved ecological and cultural sustainability.

Price Must Include All *Costs*

As English economist A.C. Pigou noted in the early 1900s, the market will fail unless it includes all costs. These costs include both internal costs (the currently counted costs of production, transport, marketing, sales and profit) and external costs (uncounted costs such as pollution, health impacts and ecosystem decline). Today most markets consider only a subset of the total transaction value and costs. When the government assumes responsibility for the problems created by external costs, it further distorts the market. The victims, compensated by taxpayer dollars, are less likely to attempt to recover reparations from the guilty parties, who often get off scot-free. These government disincentives are common and make the market ineffective and opaque.

The solution is no mystery; we must internalize the externalities. But finding and enacting mechanisms that will do this efficiently are challenging.

As a first step, we must improve our accounting practices to develop a better understanding of how large these costs are and how they are distributed. Many external costs are long-term, dispersed and uncertain. How do we account for these? How do we collect money to repair problems caused by global warming? Clearly we need a system of green fees to develop externality "insurance." In cases in which we are certain a practice is bad, but where costs are unpredictable, the fees should be related to the magnitude of potential risk.

For example, insurance companies early on recognized the low potential for accidents at nuclear power plants, but they also appreciated the potentially catastrophic costs if an accident did occur. The necessarily high insurance premiums would have prevented the plants from being built, so manufacturers and power companies persuaded Congress to transfer the risk to taxpayers. In an open market, however, nuclear power would never have been developed commercially. In contrast, owners of a wind farm that will adversely affect migratory birds would pay a modest fee for habitat protection and research intended to offset their local adverse effects.

By improving the market instead of developing prescriptive regulations, we provide incentives for innovation and replacement of energy sources with less hazardous alternatives. We avoid the costly, convoluted problem of subsidies and counter-subsidies. Two wrongs never make a right! Penalty fees also provide

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Publisher's Note: Readers' Forum is intended to provide an opportunity for SOLAR TODAY *readers to express their opinions on energy issues. These opinions do not necessarily represent the views of* SOLAR TODAY *or the American Solar Energy Society, a fact that we have been remiss in failing to state. Many times the opinions are provocative and challenge us. We were pleased to receive comments from many interested readers on the July/August article, "Don't Count Out Nuclear." A small sample of these responses is printed in the "Letters to the Editor" section of this issue. The purpose of* SOLAR TODAY *is to provide accurate, timely information on solar energy technologies and their successful deployment, and advances toward a sustainable energy economy. We appreciate all the feedback we receive on our efforts toward that purpose.*

Energy Source Costs with Full Accounting

Energy Source	Estimated Current Cost, Kilowatt-Hour Equiv. ($)	Estimated Cost Including Health and Environmental Costs ($)	Local, Regional and Global Effects†
Integral solar heating/ climatic cooling	-2.00 – 0.05‡	-2.00 – 0.05‡	P
Integral solar water heater	0.02 – 0.10	0.03 – 0.11	P
Active solar water heater	0.03 – 0.10	0.04 – 0.11	P
Wind	0.04 – 0.05	0.05 – 0.07	H, bird kills, P
Geothermal	0.06	0.09	H, P
Hydro–small	0.06	0.09	H, D, P
Hydro–large	0.04	0.08	Large H, massive D, P, fish kills, GW*
Biomass	0.08	0.10	P, N, minor GW
Solar thermal	0.08	0.10	H, bird loss, P
Natural gas	0.06	0.12	N, GW, H, D, P
Photovoltaic	0.10 – 1.00+	0.12 – 1.00+	P
Oil	0.07	0.20	N, GW, H, P, X (Gulf wars)
Coal	0.07	0.20	P, acid rain, N, GW, H, D, X
Nuclear	0.10	0.20+	H, D, P, X (risk)

† N = nitrogen pollution, GW = global warming, H = habitat loss, X = health, D = habitat destruction and degradation, P = Pollution, * = global warming effects from cement production

‡ A study by the Davis Energy Group, Davis, Calif., showed that a redesigned and built "solarized" tract home cost less to build than the nonsolar equivalent and cut seasonal energy use 70 percent. This results in a negative cost associated with solar energy in those homes.