Contrasting the Costs of "Powering the Planet"

To the Editor:

In the article "Powering the Planet" in the October 2007 issue of *MRS Bulletin* (Vol. 32, No. 10, p. 808), Nathan S. Lewis made the point that "…energy, not the dollar, is the currency of the world." He answered the question "Compared with all the other technical issues facing us in the world today, why is energy the most important?" It is the most complete and useful article on the subject I have seen.

He wrote that solar photovoltaic power costs $0.25–$0.50/kWh and solar thermal power costs $0.10–$0.15/kWh. But estimates for wind and photovoltaic power do not include the cost of maintaining stand-by power plants. They require stand-by conventional power plants because electricity cannot be stored for use when there is no wind or sunlight. By contrast, solar thermal power does not need stand-by plants. Heat can be stored. It can operate at night with stored heat or natural gas if the stored heat runs out.

Although solar thermal power is cheaper than photovoltaic power, it is still too expensive. This is due to the cost of concentrating sunlight. Today's concentrators have either parabolic mirrors or heliostats, and both are inherently expensive and inefficient. Better concentrators using flat mobile mirrors are the key to reducing the cost of solar thermal power.

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"Powering the Planet" Requires Further Considerations

To the Editor:

The article "Powering the Planet" by Nathan S. Lewis, in the October 2007 issue of *MRS Bulletin* (Vol. 32, No. 10, p. 808), was a fine summary of the energy needed now and to be needed in the near future by humans trying to live on the Earth.

Three matters, including one clarification, one perhaps "small card," and one "big card," will also have to be considered in that forthcoming experiment.

The clarification involves production of protein, or put into another way, the preservation and fixation of nitrogen for continuation of agriculture. In many places in the world, organic matter containing nitrogen needed for food production is routinely and ignorantly destroyed by burning. The results can be seen as wide and growing expanses of infertile land, in India, for instance, where dung is not conserved for use as fertilizer, but is burned for purposes of cooking and heating. Have protein needs been included in Dr. Lewis's analysis, or will their control and remediation require additional large amounts of energy not yet considered?

A "small card" that might be played in the next 50 years is fusion power. Is there some reason why this subject was not mentioned in Dr. Lewis's article? The proponents claim the potential characteristics of essentially unlimited fuel and (relatively) little pollution.

A "big card" is population control. Dr. Lewis writes about programs to develop large new sources of energy. However, any program that makes energy available for a billion more persons, but results also in a billion more persons being created, is of negative value. Practical activation of the concepts summarized by Dr. Lewis will require worldwide cooperation. If such cooperation can be accomplished peacefully to develop energy and reduce pollution for every human on Earth, cannot worldwide population control also be accomplished peacefully toward the same ends? Reduction of human population could reduce not only energy needs but also the burdens of pollution on all creatures on the planet.

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Correction

In the November 2007 issue of *MRS Bulletin* **32** (11) (2007) p. 886, "Radio Wave Cooling Offers New Twist on Laser Cooling," the correct silicon cantilever dimensions are 1.5 mm (length) × 200 μm (width) × 14 μm (thick).

In the April 2008 issue of *MRS Bulletin* **33** (4) (2008) p. 371, "Off-Grid Solar for Rural Development," W. Soboyejo and R. Taylor, Figure 5 was provided courtesy of Niyazi Serdar Sariciftci, University of Linz, Austria.

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