

# ACADEMY STREET NETWORK

The monthly newsletter of the  
National Solar Power Research Institute, Inc.

Volume 1, Issue 4

• April 1994

## DOE FORMS ALLIANCES TO RESEARCH POSSIBLE PHOTOVOLTAIC COST BREAKTHROUGHS

The Department of Energy's National Renewable Energy Laboratory (NREL) has recently formed alliances with five U.S. companies to find faster, cheaper ways of manufacturing photovoltaic devices: Astropower, Inc. (Newark, DE), Texas Instruments (Dallas, TX), Solarex Corp. (Rockville, MD), Solar Cells, Inc. (Toledo, OH) and Golden Photon (Golden, CO).

Texas Instruments is trying to improve its "spherical" cells which consist of thousands of tiny silicon balls bonded to a thin, flexible sheet of aluminum. This application would save on costs by allowing photovoltaic cells to utilize less expensive, metallurgical-grade silicon. Likewise, Astropower, Inc. also attempting to use a low-cost substrate, upon which layers of silicon would be deposited.

NREL also reports that its partnership with United Solar Systems Corp. "reached its zenith recently when the company announced plans to build one of the world's largest photovoltaic production facilities." The plant, to be located at Newport News, VA, is scheduled for completion in late 1995. NREL reports that "high efficiencies plus the economies of scale attainable with a large production facility are expected to reduce the cost of solar electricity from today's 25¢-40¢ per kilowatt-hour to 16¢/kWh.

NREL contact information: Anthony Catalano, Director, Photovoltaics Division, National Renewable Energy Laboratory, 1617 Cole Blvd., Golden, CO 80401-3393, #(303) 384-6446.

## PERSPECTIVE:

### CREATIVITY

Who are Darwin, Einstein and Newton? They are geniuses. Why are they geniuses? Because they are creative and solve problems, problems that we and many other scientists have only wondered at. Nevertheless, creativity is more than problem-solving. It is problem finding. Einstein (Einstein and Infeld, 1938) reminds us:

The formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or

experimental skill. To raise new questions, new problems, to regard old problems from a new angle, requires creative imagination and marks real advances in science (p.92).

Creativity is the ability to formulate problems and create new problem-solving processes (such as the comparative method which was invented by Darwin). Therefore, don't be ashamed of asking simple questions; it can be a sign of your creativity. Remember, rather than reaching the correct answer, the hallmark of discovery is prompting the right answer. — A. To

## REPORTS

**Technical Concepts Division:** The Solar Battery Charger Group is engaged in testing its Phase One battery charger for durability and utility. If it is found, using presently-known materials, that there is a clear cost-durability trade-off, which will need to be addressed in Phase II's focus on reliability factors. An initial literature search continues to be undertaken to determine the state of the technology of photovoltaic cell technology (David Lewak). A preliminary directory of solar energy-related resources available on the Internet has been compiled and will be made available next month (Peter Spangler). **Educational Programs Division:** Initial drafts of physical science term translation sheets are being reviewed by student users (Jean Wu - Chinese/English; Ri-Xi Liang - Spanish/English). The University Programs Group continues to study possible liaison activities. **Policy Division:** An initial study of domestic energy policy decision-making concerning both terrestrial and space-based solar power is continuing. (M. Ciotola). Initial information-gathering has been completed for a qualitative survey of the domestic solar energy industry and retail system and a draft report is being developed (A. To). **World Studies Division:** Initial literature studies are presently being undertaken for the following areas of the world: Africa (Abdoulaye Yansane); North America (Olivia Mah); and Belize (Karla Gottlieb). Other areas will be studied later.

### Volunteer of the Month

*Peter William Spangler*

for his work on our internet guide

## ACADEMY STREET REVIEW

### Book review (Part I): *The Work of Nations*

by Robert B. Reich © 1992 by McGraw-Hill. Pub. by John Wiley & Sons, Inc.

**The Work of Nations** describes the future economy of the world, particularly as it regards the ascendancy of the symbolic-analyst in the U.S. labor force. While the book does not discuss solar energy, and it is about two years old, it is now finding its way into college classrooms as required reading. Its message has such profound implications for our society and the way resources are allocated that we feel compelled to bring it to your attention and are reviewing it in two parts. Our comments will follow Part II in May's issue.

Robert B. Reich in his **The Work of Nations**, asserts that, in the labor market of the near future, what will be much more valuable than a professional credential or the memorization of an established body of knowledge is the capacity to effectively and creatively use knowledge and that is because the jobs of the future are segregating into three categories, corresponding to the three different competitive positions in which Americans find themselves: routine production services, in-person services, and symbolic-analytic services.

Reich observes that traditional categories of work are becoming irrelevant because they assume the continued existence of an American economy in which jobs associated with a particular firm, industry, or sector are somehow connected within the borders of the nation, so that American workers face a common fate; and a common enemy as well: the battlefields of world trade pit our corporations and our workers unambiguously against theirs. Reich asserts, however, that in the emerging international economy, few American companies and industries compete against those foreign — if only by American we mean where the work is done and the value is added.

Such implies that workers whose training is limited to preparation for traditional categories of work will soon find their present jobs disappearing and their adaptability to the new categories of work limited. In part, this is one of the factors that leads to the next point. These emerging job categories in part explain why the working poor in America are getting poorer due to increased wage competition from all corners of the world. In part, this is because, as Reich tells it: "twelve thousand people are added to the world's population every hour, most of whom, eventually, will happily work for a small fraction of the wages of routine producers in America."

At Midcentury, when America was a national market dominated by core pyramid-shaped corporations, there were constraints on the earnings of people at the highest rungs. First and most obviously, the market for

their services was largely limited to the borders of the nation. By the 1990s, in contrast, the earnings of symbolic analysts were limited neither by the size of the national market nor by the volume of production of the firms with which they were affiliated. The marketplace was worldwide, and conceptual value was high relative to value added from scale efficiencies. There had been another constraint on high earnings, which also gave way by the 1990s. At midcentury, the compensation awarded to top executives and advisers of the largest of America's core corporations could not be grossly out of proportion to that of low-level production workers. It would be unseemly for executives who engaged in highly visible rounds of bargaining with labor unions, and who routinely responded to government requests to moderate prices, to take home wages and benefits wildly in excess of what other Americans earned. Unless white-collar executives restrained themselves, moreover, blue-collar production workers could not be expected to restrain their own demands for high wages. Unless both groups exercised restraint, the government could not be expected to forbear from imposing direct controls and regulations.

At the same time, the wages of production workers could not be allowed to sink too low, lest there be insufficient purchasing power in the economy. After all, who would buy all the goods flowing out of American factories if not American workers? This, too, was part of the tacit bargain struck between American managers and their workers.

By the 1990s informal norms that kept white-collar incomes somewhat in line with blue-collar income were evaporating, just as (and largely because) the core American corporation was vanishing. Symbolic analysts at the top are in such great demand worldwide that they have difficulty keeping track of all their earnings. Never before in history has opulence on such a scale been gained by people who have earned it, and done so legally." (pg 219)

Reich argues that a new community is emerging. "The pattern is familiar. With each sought-after reduction in their taxes, symbolic analysts in effect withdraw their dollars from the support of public spaces shared by all and dedicate the savings to private spaces they share with other symbolic analysts. As public parks and playgrounds deteriorate, there is a proliferation of private health clubs, golf clubs, tennis clubs, and every other type of recreational association in which costs are divided up among members. So also with condominiums, cooperatives, and the omnipresent "residential communities" which due their members in order to undertake efforts that financially strapped local governments can no longer afford to do well." (pg. 268-269) — *Ri-Gui Dalia Liang*.

○ **National Solar Power Research Institute, Inc.**, © 1994. V1 I4

Editor - Mark Ciotola; Assoc. Editor - A. To; Publisher - Peter Spangler. Contributing writers: Abdoulaye Yansane, Jean Wu, Ri-Gui Dalia Liang and Zilian Tang. Officers: Ri-Gui Dalia Liang, Ann Marie Cheng and Mark Ciotola. Subscriptions: 50¢ reimbursement per issue domestic / 23¢ plus postage foreign. A matching donation is suggested, but optional. Limited number of free copies available. Mail subscriptions and correspondence to the National Solar Power Research Institute, Inc., 601 Van Ness Avenue Suite E3248, San Francisco, CA 94102.