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## G.E. Signals a Growing Interest in Solar

By BARNABY J. FEDER

**G**eneral Electric will acquire the major assets of the largest American-owned maker of solar equipment, in a move the solar power industry sees as a major vote of confidence in the business.

A federal bankruptcy court judge in Delaware yesterday approved G.E.'s plan to buy the bulk of AstroPower for \$15 million in cash and an estimated \$3.5 million in debt, along with other liabilities to be settled when the deal closes at the end of the month. It would be the most decisive step yet by G.E. into the so-far unprofitable business of generating electricity from sunlight, a technology that G.E. researchers have dabbled in for nearly half a century.

Previously, G.E. confined its growing interest in this field, known as photovoltaics, to modest increases in research spending and the quiet acquisition 18 months ago of Railway Technology Inc. for an undisclosed sum. Railway makes a line of solar-powered railroad switches.

G.E. declined yesterday to discuss its plans for AstroPower. By G.E. standards, the acquisition is a modest bet. The cost will be but a half-day's earnings for the company, which had net income last year of \$15 billion on revenue of more than \$134 billion. But if the investment looks minuscule from a Wall Street perspective, it is still enough to excite many people involved with solar energy.

"It shows we are a mainstream industry, or moving that way," said Bob Kenedi, general manager of the solar systems division of Sharp Electronics, an American subsidiary of the [Sharp Corporation](#) of Japan. Sharp has emerged as the clear market leader in solar power equipment with a sixfold increase in production since 1999, and it opened its first American assembly plant, in Memphis, last year.

Worldwide, annual revenue from solar power equipment and installation, which reached \$4.7 billion last year, will climb to \$30.8 billion in 2013, according to a recent forecast from Clean Edge, a market research firm in San Francisco.

Solar energy is profitable in numerous niche markets, including powering satellites and providing electricity for oil rigs and devices like rural water pumps, road signs and emergency telephones that cannot be conveniently linked to power grids. But it is still regarded as too expensive to be widely adopted for powering homes and businesses now supplied by utilities. That has left even deep-pocketed manufacturers like Sharp, Sanyo Electric, the [Kyocera Corporation](#) and the solar subsidiaries of [BP](#) and Shell Oil dependent on governments and power companies to subsidize sales.

None of the big solar players claim to be profitable and some former participants remain dismissive about the potential. "Even if it grows at 20 percent annually, it will contribute less than 1.5 percent to global energy needs by 2020," said Tom Cirigliano, a spokesman for [Exxon Mobil](#), which has estimated that it invested more than half a billion dollars in solar energy, going back to the 1970's, before withdrawing.

But analysts and solar manufacturers figure G.E. is responding to signs that rising prices for hydrocarbon-based fuels and improvements in solar products and manufacturing technology have laid the foundation for large-scale producers to finally start making steady profits - even as major supporters like the Japanese government and California reduce subsidies to consumers.

"We're in line for our best year yet," said Steven Westwell, president and chief executive of BP Solar, which entered the industry 30 years ago and hopes to turn profitable this year. Demand in California, the leading United States market, is so strong that state subsidies for solar equipment purchases could be used up by September, he said.

Still, in an industry that has frequently disappointed its advocates, Mr. Westwell and analysts have no trouble imagining ways that trouble could strike again. By the end of the year, they said, the industry could be hurt from overcapacity because so many new solar cell manufacturing projects are under way. The industry also could be hit by rising prices for silicon - the basic ingredient in most photovoltaic cells - because manufacturers of raw materials have been slow to add capacity. Most of them view supplying the solar industry as a sideline to making more expensive products for the computer and consumer electronics industry.

G.E.'s long-term goals for solar energy would make such concerns irrelevant. Its recent attention to photovoltaics grew out of research on light-emitting plastics. Feeding electricity into such plastics creates light, but researchers knew that they could also do the reverse - use light to create electricity. A plastic that was efficient enough at creating electric current from sunlight might serve as a much cheaper and more flexible photovoltaic material than silicon, and become a monster product for G.E.'s huge plastics business.

As they began to look more closely at developments in the photovoltaics market, G.E. researchers also realized that they had expertise to apply to silicon designs that could pay off even if the plastics project ultimately failed. And pursuing the technology supported the goal of Jeffrey R. Immelt, G.E.'s chairman and chief executive, to become a leader in markets based on renewable-energy technology and energy efficiency, including wind power, fuel cells, hydrogen storage and microturbines.

"If you say you are doing renewables, and you are not doing photovoltaics, you are missing a huge part of it," said Anil R. Duggal, head of the light-energy conversion research program at G.E.'s corporate research center in Schenectady, N.Y.

Renewables have become one of the fastest-growing pieces of the G.E. portfolio of energy-related businesses, which is dominated by the company's gas turbine sales and generated \$20 billion in revenue last year. Wind energy in particular has been a smashing success for G.E., which is based in Fairfield, Conn. The company won a court auction for [Enron's](#) wind energy subsidiary two years ago, with a \$358 million bid; G.E. is forecasting revenue of \$1.3 billion and profit of \$100 million from the unit this year.

But compared with the Enron unit, AstroPower, which ran out of cash after a still unresolved accounting scandal emerged last year, represents a far flimsier platform for diving into a new line of business.

As recently as 2001, AstroPower ranked fifth globally in the production of solar cells and the modules into which they are assembled, but its rank tumbled to 11th last year, according to PC News, a trade publication. The company, based in Newark, Del., lost about \$100 million from the last quarter of 2001 through the end of last year, according to J. Scott Victor, a partner at SSG Capital Advisors, the

investment bank that helped AstroPower find a buyer.

"We've been able to sell everything we could make, but we ran out of money to buy raw materials," Carl H. Young III, a turnaround specialist who was appointed interim chief executive last year, said yesterday.

Industry experts are uncertain what G.E. intends to do with the company. It is unclear how much interest G.E. has in an advanced thin-film project for making solar cells that AstroPower had been pursuing but had shut to save cash. Presumably, that project would be moved to Schenectady if the company wanted to continue research on it.

Many analysts assume that G.E.'s principal interest is to keep AstroPower's main production line operating and use it to gain more solar experience. AstroPower followed the industry practice of selling most of its products through solar contractors but it also developed modules sold at [Home Depot](#) and had direct sales relationships with builders.

"G.E. called us to say they might do this," said Michael V. McGee, chief executive of Pardee Homes, a company based in Los Angeles that has built about 100 solar-powered homes in partnership with AstroPower since 2001. "We're very excited about it, because we have a great relationship with G.E. on the appliance side, and we would expect them to bring a better product to AstroPower."

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