ENERGY ALTERNATIVES REPORT
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BUSINESS NEWS

Nanosolar selected manufacturing in California and Germany and now has the capability to utilize up to 647,000 square feet for its cell and panel manufacturing as well as R&D and regional company headquarters. Nanosolar selected a former Cisco manufacturing facility in San Jose, California, as its U.S. site and a facility in the Berlin capital region as its European site. With its proprietary nanoparticle ink and fast roll-printing technology, Nanosolar has the processes and designs to make solar electricity fundamentally less expensive. Nanosolar is presently building manufacturing operations for its breakthrough solar electricity technology and is on schedule to commence commercial production in 2007.

New Mosel Solar Cell Line - Mosel Vitelic first solar cell production line will reach full utilization rate in Q3-2007. The company is likely to equip its second line in early 2008. Production will be started in small volume in the second quarter. Since going from pilot run to mass production does not take much time, the company said its first solar cell production line should reach full utilization rate in the third quarter after securing validation from customers. Mosel is also considering an additional line and it is likely to have it established in early 2008 at the earliest, she said. Industry watchers commented that Mosel's aggressive expansion plan is motivated by its optimism over the solar application market amid requests for tighter quality. Although there are many smaller scale solar cell makers in China, customers are shifting to have their orders mainly placed at Taiwan-based vendors due to concerns over quality. Some are still warning about the impact of a tight silicon supply on end products makers, but Mosel has inked long-term supply agreements with several suppliers and is not concerned about material supply.

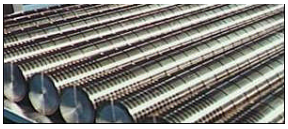
BIO-FULES

Algae makes oil naturally. Raw algae can be processed to make biocrude, the renewable equivalent of petroleum, and refined to make gasoline, diesel, jet fuel, and chemical feedstocks for plastics and drugs. Indeed, it can be processed at existing oil refineries to make just about anything that can be made from crude oil. This is the approach being taken by startups Solix Biofuels, based in Fort Collins, CO, and LiveFuels, based in Menlo Park, CA. Alternatively, strains of algae that produce more carbohydrates and less oil can be processed and fermented to make ethanol, with leftover proteins used for animal feed. This is one of the potential uses of algae produced by startup GreenFuel Technologies Corporation, based in Cambridge, MA. Algae can be grown in open ponds or sealed in clear containers and it can produce far more oil per acre than soybeans. Algae

can also clean up waste by processing nitrogen from wastewater and carbon dioxide from power plants. What's more, it can be grown on marginal lands useless for ordinary crops, and it can use water from salt aquifers that is not useful for drinking or agriculture. Thus, algae have the potential to produce a huge amount of oil, according to Sandia National Laboratories. New genomic and proteomic technologies make it much easier to understand the mechanisms involved in algae-oil production. One of the challenges researchers have faced is that while some types of algae can produce large amounts of oil, as much as 60% of their weight, they only do this when they're starved for nutrients. But starving reduces the ability to grow quickly. Researchers hope to understand the molecular switches that cause increased oil production, with the added hope of triggering it without starving the algae. This could dramatically increase oil production and drive down prices. Recent tests of an algae-based system developed by GreenFuel, which, unlike LiveFuels, is developing closed bioreactors, showed that it could capture about 80% of the CO_2 emitted from a power plant during the day when sunlight is available. Although this carbon dioxide will later be released when the fuel is burned in vehicles, the carbon dioxide would have entered the atmosphere anyway. Reusing it in renewable liquid fuels makes it possible to prevent the release of carbon dioxide from fossil fuels, thereby decreasing total emissions.

NUCLEAR

Nuclear Comeback - The first reactor section of China's Tianwan nuclear power plant, being built by Russia's nuclear export monopoly, became fully operational in January 2007. Atomstroyexport is building the Tianwan neclear Power Reactor in eastern China's port city of Lianyungang. The plant, built under a 1992 bilateral agreement, features improved VVER-1000 reactors and K-100-6/3000 turbo-generators.



And the Fuel - Australia and China ratified a nuclear agreement for the export of uranium to feed Beijing's giant nuclear power program. The agreement providing a legal framework for shipments of the nuclear fuel to China. The timing and quantities of exports will be a matter for commercial negotiation. Australia, which has the ***world's largest known reserves of uranium***, expects to earn $190-million a year from the deal. China has announced plans to build 28 new nuclear reactors and by 2020 the annual uranium requirement would be about 8,000 tonnes a year. The commits China to abide by the rules of the International Atomic Energy Agency and the principles of the Nuclear Non-Proliferation Treaty. China has already moved to guarantee supplies for its program, with a Chinese government-owned company agreeing last September to buy a controlling stake in two Australian uranium ventures. Australian mining company PepinNini said it had signed a memorandum of understanding with China's Sinosteel Corporation for the joint development of the Crocker Well and Mount Victoria uranium deposits in South Australia State. After reaching the agreement with China, Australia came under pressure from rival Asian giant India to supply uranium for its own nuclear power needs. [Agence France-Presse]

SOLAR

Solar Future - Demand for photovoltaic modules is expected to more than triple from 2005 levels by 2010 to 531 megawatts; $1.3-billion value (per he Freedonia Group). Advances will be driven by the falling price of solar power, which stems from technological innovations, growing economies of scale and a rising level of government tax incentives and rebates at both the state and federal levels. Gains will also be spurred by consumer interest in renewable energy sources and concern about the volatility of oil and other conventional energy prices and supplies. The widespread implementation of net metering programs will also drive growth, as consumers are compensated at retail prices for any excess energy generated that flows onto the grid. In the near term, advances will be slowed by a shortage of polysilicon. This trend is slowing price declines and limiting the ability of manufacturers to produce enough cells to accommodate demand. However, this shortage is likely to fade by 2010 as silicon producers complete planned expansions and as newer photovoltaic technologies that use little or no silicon become more widely used. In 2005, U.S. shipments of photovoltaic cells were dominated by crystalline silicon cells which accounted for 76% of shipments in terms of generation capacity. However, thin films (e.g., amorphous silicon, cadmium telluride, gallium arsenide, and copper indium diselenide or copper indium gallium diselenide) will post stronger growth, advancing to more than eleven times their 2005 level by 2010 as more manufacturers begin large-scale production. Gains will be driven by the cost advantages involved in using little or no silicon, and the ability to use thin films in building integrated photovoltaic applications within roofing shingles and other building materials. In 2005, the key market for photovoltaic modules (which are composed of a series of cells) was power generation, accounting for 85% of demand. The on-grid segment represented the largest share of demand, benefiting from net metering programs implemented by state governments and local utilities, and a system which does not require batteries and supplemental generators.

Hoku Materials (polysilicon supplier for solar cells) plans to build a plant capable of producing 2,000 metric tons of polysilicon per year at a cost of approximately $260 million. This follows Hoku's announcement of the signing of a 7-year supply contract with **Sanyo Electric** that begins in January 2009. Sanyo is already an established supplier of solar cells and this is a major step forward in their plan to expand with an assured materials supply when semiconductor production is strongly competing for silicon. Hoku will receive payments of up to approximately $370 million during the 7-year period. The contract provides for the delivery of predetermined volumes of polysilicon each year at set prices from January 2009 through December 2015. [Electronics Weekly].

Solar is Hot in Japan - Sharp plans to further expand both its silicon and solar cell capacity and aims to house a total capacity of 710 MW power annually. Sharp is already

considered the as the top solar cell maker. Sharp is opening a new site for its solar systems group in Toyama City in Japan. The company plans to have an annual silicon capacity of a thousand tons; production started January 2007. In addition to the expansion of silicon supply, Sharp will increase annual solar cells production capacity at Katsuragi by 110 MW starting in March 2007 to have the world's highest capacity of 710 MW per year. The solar industry estimates that a thousand tons of silicon could produce about 100 MW of solar cells but this amount is relatively less than average polysilicon suppliers. Sharp has been cautious about expanding capacity and the company's announcement may be interpreted that the company has secured sufficient raw material. Sharp is a leading solar-related products vendor and produces products ranging from ingots, wafers, cells, modules and systems. Sharp had 24% of the global solar cell market in 2005 with a shipment amount of 428 MW. Sharp currently has three solar application production bases in Japan. It already houses a solar cell/module production base at Katsuragi and it also produces solar modules at Tochigi and Yao, Osaka Prefecture. The global photovoltaic market should enjoy a compound annual growth rate (CAGR) of 44% during 2005 to 2010. According to a JP Morgan, extrapolation of government targets for solar installations will enjoy a compound annual growth rate (CAGR) of 28% from 2005 to 2010 to reach 6,000 MW in 2010. JP Morgan, however, also noted that price pressure from new entrants, including Delta Electronics, Semiconductor Manufacturing International Corporation (SMIC), Neo Solar Power and smaller players in China, should become fiercer. The investment bank also noted that solar cell/module makers from Asia should see a tougher challenge overall than their European peers.

Solar + Display Panels Combine - NEC Display Solutions announced the introduction of a solar-powered system for use with all its monitors by partnering with the Canada-based solar application maker Carmanah Technologies. NEC Display Solutions claims that saved solar energy can last for days of normal usage when running a typical LCD monitor. Multiple monitors can be run simultaneously but the run time of a battery would vary depending on the usage and the number of devices drawing on the power. The package will include solar panels from Evergreen Solar, solar batteries from Extreme, digital charge controllers, inverters and battery chargers from Go! The solar-powered system is designed to produce approximately 293 KW hours of electricity per year, or 800 watts per day. Carmanah said working in the LCD industry is a new project for the company. While valuing the potential cost reduction on electricity, NEC notes that batteries of the solutions have a life expectancy of over 20 years and a panel life of 50 or more years.

FUEL CELLS

Ford: fuel cells + plug-in hybrid - Ford has a special version of its recently introduced Edge. The Ford Edge with HySeries Drive concept features a flexible vehicle architecture to accept a wide variety of power-train options. The technology allows the Edge to accept gasoline engines,

diesel engines or fuel cells in conjunction with an electric motor and battery pack. Ford can produce a gasoline-electric hybrid version for North America and a diesel-electric hybrid version for Europe. The current Edge with HySeries Drive uses a 350-bar **hydrogen fuel cell** (4.5 kg of useable H_2) in addition to electric motors fed by a 336-volt lithium-ion battery pack. The HySeries is always powered by its battery pack. The HySeries Drive has the equivalent combined city/highway economy rating of 41MPG. The vehicle is able to operate for the first 25 miles on battery power alone given a fully topped off battery. After that point, the fuel cell kicks in to replenish the batteries giving an additional 200 miles of range. The equivalent economy rating could jump to 80MPG for drivers who travel less than 50 miles per day.

WIND

USA Wind Power - Wind power generating capacity in the United States increased by

27 % in 2006 and is expected to increase another 26% in 2007 per American Wind Energy Association (AWEA). The U.S. wind energy industry installed 2,454 megawatts (MW) of new generating capacity in 2006, an investment of approximately $4-billion, making wind one of the largest sources of new power generation in the country, 2nd only to natural gas, for the second year in a row. New wind farms boosted cumulative U. S. installed wind energy capacity by 27% to 11,603 MW, well above the 10,000-MW milestone reached in August 2006. One megawatt of wind power produces enough electricity to serve 250 to 300 homes on average each day. Texas accounted for nearly a third of the new wind power installed in 2006, taking over the lead from California in cumulative installed capacity. Texas hosts the world's single largest operating wind farm, the 735-MW Horse Hollow Wind Energy Center, located in Nolan and Taylor counties. Much of the new wind equipment in 2006 was produced in new manufacturing facilities in Iowa, Minnesota, and Pennsylvania. Additional announcements are expected in 2007. Investment in manufacturing capability signals confidence in the market and lays the groundwork for expanded growth. Wind energy facilities currently installed in the United States will produce an estimated 31 billion kilowatt-hours annually or enough electricity to serve 2.9 million American homes. This 100% clean source of electricity will displace approximately 23-million tons of CO_2 each year. Wind power has also attracted the support of state and federal government legislatures. The U.S. Congress recently extended the federal production tax credit (PTC) through December 2008 to further expand the number of wind farms throughout the country.