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Solar Energy Products

US Industry Study with Forecasts to **2010 & 2015**

Study #2126 | December 2006 | $4300 | 274 pages

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US Industry Study with Forecasts to ***2010 & 2015***

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Widespread implementation of net metering programs will help drive growth in solar energy products, as consumers are compensated at retail prices for any excess energy generated that flows onto the grid.

US solar energy product demand to triple by 2010

Demand for photovoltaic modules is expected to more than triple from 2005 levels by 2010 to 531 megawatts, valued at $1.3 billion. 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. However, if these incentives are scaled back or withdrawn prematurely, it would negatively affect solar energy product demand.

Consumer concerns, net metering, energy credits to drive growth

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. The ongoing development of a market for renewable energy credits will also drive sales, particularly if ownership of the credits is retained by the individual generator and adequate trading mechanisms are created. The continuing development of thin film technologies will enable the development of more solar-powered products.

US Photovoltaic Module Demand

(164 megawatts, 2005)

Thin films to lead gains

In 2005, US shipments of photovoltaic cells were dominated by crystalline silicon cells that accounted for 76 percent 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 a 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.

On-grid segment is largest power generation market

In 2005, the key market for photovoltaic modules (which are composed of a series of cells) was power generation, accounting for 85 percent of demand. The on-grid segment represented the largest share of demand, benefitting from net metering programs implemented by state governments and local utilities, and a system which does not require batteries and supplemental generators. Of all US subregions, the Pacific accounted for the largest share of photovoltaic module demand in 2005, due primarily to California's state level incentives and weather conditions that are amenable to solar power generation.

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Sample Text, Table & Chart

TABLE VI-8

SOUTH POWER GENERATION
PHOTOVOLTAIC MODULE DEMAND
(peak megawatts)

Item	1995	2000	2005	2010	2015
South GDP (bil 2000$)	2640				
MW modules/tril $ GDP	0.04				
South Electric Generation PV Modules	0.1				
South Atlantic	0.1				
East South Central	neg				
West South Central	neg				
% South	2.9				
Electric Generation PV Module Dmd	3.4				

SAMPLE TABLE

PHOTOVOLTAIC MODULES

Off-Grid

Demand for photovoltaic modules in the off-grid, or ren
generation segmen percent per ye
megawatts in 201 grid segment
grid segment will pace, albeit f
smaller base, as c areas where
the grid is more o an alternative
ing to the larger e owners with
photovoltaic modu id are able to
generate electricit ules even when the elec-
trical grid is down because there is no danger of harm to utility linemen working on repairs.

SAMPLE TEXT

Off-grid photovoltaic systems have a cost advantage over on-grid versions on a per watt basis in that off-grid building owners do not have to pay the taxes, delivery fees and surcharges that utilities often charge on top of the cost for the electricity itself. However, that cost advantage is weighed against the fact that the balance of system components of an off-grid system, including storage batteries and often an alternate back-up power source, are more complicated and more expensive than those on an on-grid system. In general, however, consumers who purchase these systems for off-grid applications benefit from many of the same tax incentives and rebates from state and federal governments that are available to those who purchase the systems for on-grid applications.

By definition, photovoltaics can only be used to generate electricity during daylight hours. Therefore, off-grid users of these systems must incorporate batteries into their system so that excess power generated from the photovoltaic modules during the day can be stored for use after sunset. Additionally, the power that is generated may fluctuate through the seasons depending on the number of daylight hours and the intensity of the solar energy during those hours. As a result, many who operate

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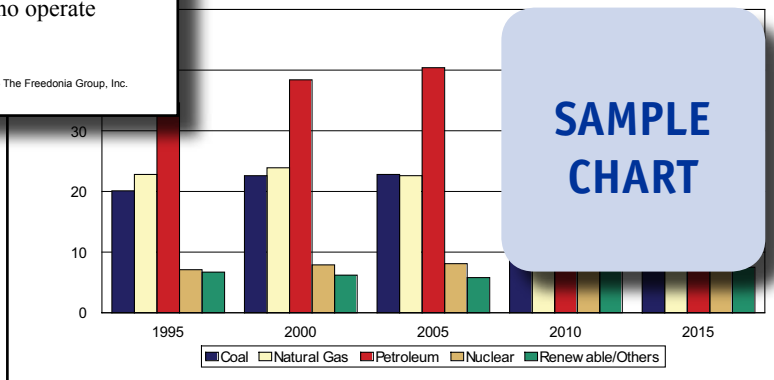
CHART II-2

GY CONSUMPTION BY FUEL TYPE, 1995-2015
(quadrillion Btu)



SAMPLE CHART

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Sample Profile, Table & Forecast

TABLE IV-7

PHOTOVOLTAIC THIN FILM SHIPMENTS
(peak megawatts)

Item	1995	2000	2005	2010	2015
Total Photovoltaic Cell Shpts (mil $)	44.9				
% thin film	5.8				
Thin Film PV Cell Shpts (mil $)	2.6				
$/watt	3.70				
Thin Film Photovoltaic Cell Shpts	0.7				
Amorphous Silicon	0.7				
Cadmium Telluride	--				
Gallium Arsenide	neg				
CIGS/CIS	--				
% thin film	4.0				
Total Photovoltaic Cell Shipments	17.7				

SAMPLE TABLE

COMPANY PROFILES

Global Solar Energy Incorporated
5575 South Houghton Road
Tucson, AZ 85
520-546-6313
http://www.glo

SAMPLE PROFILE

Annual Sales: verify, 10/0
Employment:

Key Products: photovoltaic thin-films, copper indium gallium enide-based photovoltaic modules, solar-energized power pa integrated photovoltaic systems

Global Solar Energy develops and produces thin-film photovoltaic (PV) modules for military, space, consumer and commercial applications, among others. Prior to April 2006, the Company was a subsidiary of UniSource Energy Corporation (Tucson, Arizona). In April 2006, UniSource Energy sold Global Solar Energy to SOLON AG (Germany) and a European private investor. Following the transaction, SOLON, a manufacturer of solar modules and integrated PV systems, owns a 19-percent stake in Global Solar Energy and the private investor owns the remaining 81-percent interest.

The Company is active in the solar energy industry through the production of POWERFLEX thin-film PV modules based on copper indium gallium diselenide (CIGS). Global Solar Energy's lightweight solar modules are produced with a flexible, durable material, unlike traditional solar panels made with glass. Among other applications, the Company utilizes its POWERFLEX PV modules to manufacture solar products for military, consumer and commercial use.

For military applications, Global Solar Energy makes P3 portable power packs, which are available in 15-, 30-, 48- and 55-watt (W)

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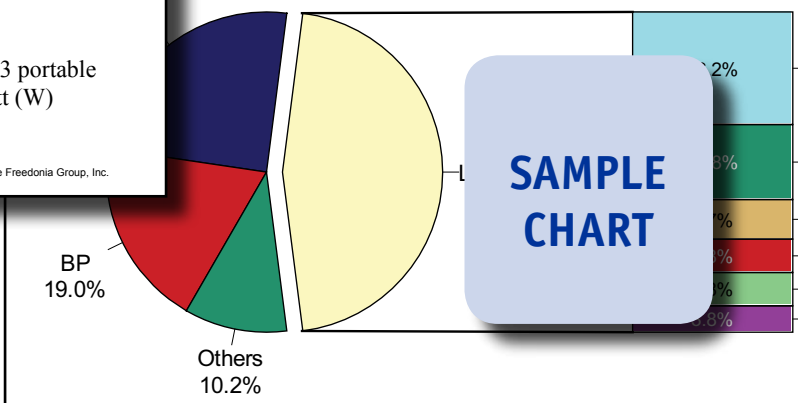
CHART VII-1

TOVOLTAIC MODULES MARKET SHARE. 2005
($526 million)



SAMPLE CHART

*including the crystalline silicon operations acquired from Shell in July 2006.

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Other Studies

World Electric Power Equipment

World electric transmission and distribution equipment demand will rise 4.4% annually through 2011. The industrial and commercial sector will see the strongest gains as cogeneration proliferates and products such as high voltage transformers become more common outside of the utility sector. This study analyzes the $85 billion world electric power equipment industry, with forecasts for 2011 and 2016 by product, market, world region and for 17 countries. It also details market share and profiles major players.

#2261 ..... 10/2007..... $5400

Circuit Breakers & Fuses

US circuit breaker and fuse demand will grow 3.7% per year through 2011, supported by stronger outlooks for construction of nonresidential buildings and electric utilities. Circuit breakers will outpace fuses, led by strong growth in power circuit breakers. High-power fuses will pace the fuse segment. This study analyzes the $3 billion US circuit breaker and fuse industry, with forecasts for 2011 and 2016 by product and market. It also evaluates company market share and profiles leading industry competitors.

#2252 ..... 10/2007..... $4400

Electric Transmission & Distribution Equipment

US electrical transmission and distribution equipment demand will rise 3.6% yearly through 2011. Growth in nonutility generation and an improved regulatory outlook supporting investment in the electric grid will aid gains. Specialty transformers and metal-clad and -enclosed switchgear will lead gains. This study covers the $17.5 billion US electrical transmission and distribution equipment market, with forecasts for 2011 and 2016 by product and market. It also details market share and profiles major firms.

#2198 ..... 07/2007..... $4400

World Fuel Cells

Global fuel cell spending (R&D, investment, sales) will grow 15% yearly through 2011. Portable electronics will be the fastest growing commercial use while electric power generation will stay the largest. Proton-exchange membrane fuel cells will remain dominant over other chemistries. This study analyzes the $5.2 billion world fuel cell industry to 2011 and 2016 by product, chemistry, application, world region and for 14 countries. It also reviews technology, evaluates market share and profiles major players.

#2194 ..... 05/2007..... $5500

Diesel Engines

US demand for diesel engines will grow 3.8% annually through 2011. Best opportunities in the dominant motor vehicle market will be found in light-duty trucks, with the much smaller passenger car segment also faring very well. Off-highway diesel engines will experience slowing but still robust demand as new emissions regulations phase in. This study analyzes the $16.6 billion US diesel engine industry to 2011 and 2016 by product, material and market. It also details market share and profiles major firms.

#2171 ..... 03/2007..... $4400

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