



Japan: Green Building Technology

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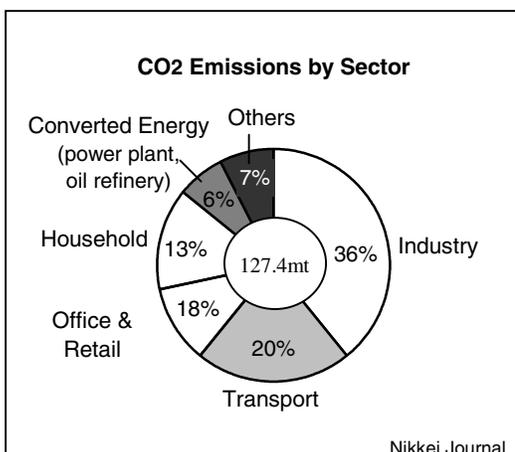
Summary

Green building technology refers not only to eco-friendly materials but also to equipment and energy systems that allow healthful and earth-friendly living. Any technology to promote 'sustainability' in society and reduce environmental burdens is considered green building technology. The term applies most directly, however, to the field of new energy technologies seen as one of the key factors in reducing overall CO₂ emissions. In June 2008, Prime Minister Fukuda announced a Japanese national plan (known as the Fukuda Vision) to reduce CO₂ emissions by 60 to 80% by 2050. In accordance with this plan, several Japanese Ministries have released plans, policies, and projects to achieve this target, which will require huge investments in new energy development. Commercial entities are of course attracted by the money being put into this market as the expected financial 'burden' on society to shift its energy structure is estimated to exceed US\$100 billion by 2020. Leading Japanese manufacturers such as Toshiba are entering the expanding photovoltaic market and Panasonic is partnering with utility companies to sell its new energy technology in the near future. Large Japanese oil companies are also developing photovoltaic technologies and Japanese power companies also plan to build solar power plants in Japan.

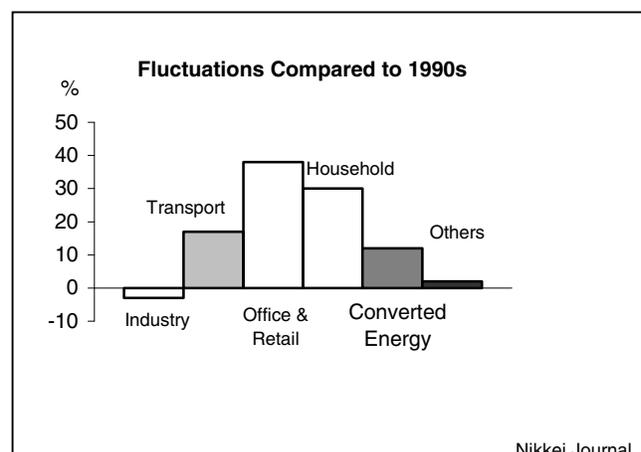
Market Demand

The Measures Against Global Warming or "Fukuda Vision" that Prime Minister Fukuda recently announced reflects Japan's aspirations to become a world leader in environmental protection and related technologies. The Fukuda Vision sets a national target of 60 to 80% reduction in CO₂ emissions by 2050. Chart 1 illustrates the shares of CO₂ emissions by sector as of 2006 and Graph 1 shows the percentage change compared to 1990 figures. The industrial sector emits the most CO₂, accounting for 36% of the total and this comes primarily from factories and industrial plants. However, as Graph 1 shows, the industrial sector has succeeded in reducing emissions by 4% since 1990. What's notable is the office/retail sector: despite the fact that its share is only 18% (2.2 million tons), emissions have increased by 39% since 1990. The Japanese central government, therefore, in its Kyoto Protocol action plan of March 2008, decided to focus on reducing office/retail sector emissions by 8 to 9% by 2010. Accordingly, the Tokyo Metropolitan Government has passed an environmental protection code mandating that large corporate entities reduce CO₂ emissions and report to the government how much reduction they actually achieved. Approximately 1300 entities fall under this mandate, most of them housed in office buildings.

Chart 1.



Graph 1.



To reduce CO₂ emissions from the commercial sector, the Ministry of Land, Infrastructure, and Transportation (MLIT) is now strongly promoting the Comprehensive Assessment System for Building Environmental Efficiency (CASBEE). It is a building project tool and rating system that began in 2002, and has been developed with four variations to cover different stages and types of construction, from design to remodeling. Japan's CASBEE is made to function in almost the same way as LEED in the U.S., BREEAM in England, and GBtool in Canada. It applies to buildings larger than 2000 square meters, either residential or office. Furthermore, certain large real estate corporations are making their own effort to reduce emissions. For example, Mitsubishi-jisho is attempting to reduce CO₂ emissions by 30-35% by installing energy saving systems, and Mori Building is also adopting its own air-conditioning system to reduce energy consumption in its buildings by 30 to 35%.

There has also been remarkable development in the housing sector in terms of new energy technologies. An ordinary household emits approximately 5,600 kilograms of CO₂ per year, most of which comes from fossil fuel for vehicles and electricity used for lighting and appliances. Although the household sector only accounts for 13% of total CO₂ emissions, emissions in this sector have increased by more than 30% since 1990 (see Chart 1 and Graph 1).

For residential housing as well, switching energy systems is a key trend for the adoption of green building technologies. For example, the government has set in the Fukuda Vision a target of increasing the adoption of photovoltaic cells by 10 times by 2010 and 40 times by 2030. Currently domestic production is only 200 megawatts with a penetration rate of only 1%. In the Fukuda Vision, the Ministry of Economics, Trade, and Industry (METI) announced the New Energy Policy summarized in Table 1. METI is introducing, or resuming to be precise, its subsidy for photovoltaic energy in residential houses, which was initially halted a few years ago. The subsidy this time would be enough to reduce the price of a 3kilowatt residential solar system from the current US\$22,000 to US\$10,000 within 3 to 5 years. In the Fukuda Vision, more than 70% of houses to be built by 2020 must be equipped with solar energy systems.

Table 1.

	Basic Idea
	-Aim at becoming a "Model Nation of New Energy," a pioneer in establishing a solar-power-energized society, using advanced technologies, such as Photovoltaic energy sources
METI's Basic Policies on New Energy	Solar Power Generation
	-Reduce by 50% of the cost of solar power generation systems for residences within the next 3-5 years
	-Provide tax breaks and subsidies to support installation of solar power generation systems in residences
	-Establish solar power generation as an energy conservation standard for houses
	-Support and promote mega-watt solar power systems throughout the nation
	-Establish a global institution for basic research on innovative Photo Voltaic technologies
	Structural Changes of Energy Supply System
	-Examine the proper share of introductory costs of new energy to electric power
	-Review new law and establish new system requiring oil and gas suppliers use new energy sources

Nikkei Journal

Currently, oil and gas account for 60% of Japan's energy consumption. Japan is heavily dependent on fossil fuel as seen in Table 2. The global warming issue and ever-increasing oil prices are pushing the country to shift its energy structure. METI, in addition to the subsidy mentioned above, has initiated another policy requiring oil and gas suppliers use new energies such as bio fuel or photovoltaic cells, and this is actually accelerating oil companies' efforts to shift their profit structure.

Table 2.

Japanese Energy Sources:

Oil	45%
Coal	23%
Natural Gas	15%
Nuclear Production	13%
Hydraulic	4%

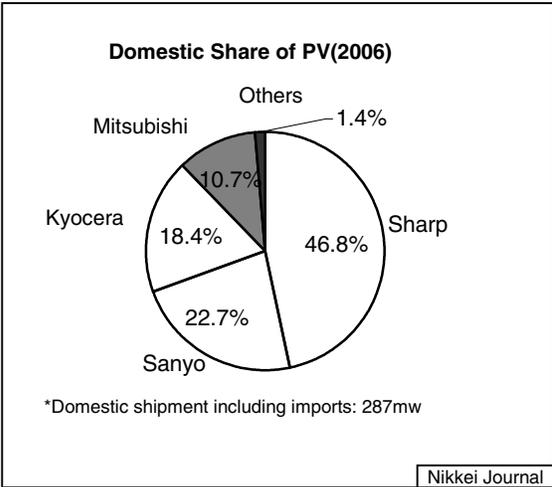
BP Statistics 2007

Market Data

With the government's new "use of new energy" requirement, to be implemented as early as 2010, Showa Shell Oil recently announced its intention to build a world-class manufacturing plant for photovoltaic panels in 2011, investing US\$1 billion. The total output of the panels to be manufactured annually is expected to exceed 1000 megawatts, equivalent to what a nuclear power plant would generate in a year. These changes are taking place as the market expands thanks to increasing government subsidies which supplement anticipated profit declines due to reduced gasoline consumption and help companies prepare for a future society less dependent on fossil fuel sources. Showa Shell actually possesses original technology in manufacturing new age photovoltaic panels: i.e., using metallic compounds such as copper and indium as opposed to silicon. Since the cost competitiveness of cells with metallic compounds is becoming stronger as silicon becomes more expensive due to increasing demand, Showa Shell decided to build a new plant that will be bigger than Sharp's, currently the largest in the world.

The speed of growth in this sector can also be illustrated by the fact that Toshiba is now entering into the photovoltaic market. As seen in Chart 2, the current domestic market for photovoltaic cells is dominated by such big names as Sharp, Sanyo, Kyocera, and Mitsubishi. Despite this, Toshiba has decided to enter this crowded market. Toshiba decided to import photovoltaic cells from Sunpower, a California-based U.S. manufacturer, and assemble them into power generating units for households with their "power conditioner" device which Toshiba developed that converts generated direct current electricity to alternating current. With this relatively small but efficient equipment (25% lighter, requires 30% less area to install than existing units with the same output), Toshiba aims to win 10 percent market share by 2010. Toshiba estimates the photovoltaic market reached US\$1billion in 2007 and will double by 2010. Sunpower's cell has a world-class energy conversion efficiency of 21.5 %.

Chart 2.



Existing power companies in Japan are also taking action: Mr. Shosuke Mori, Chairman of the Federation of Electric Power Companies, announced on July 18, 2008 that his Federation is compiling a plan to build photovoltaic power generating plants within 6 months. Again, this action is a response to the Fukuda Vision, and industry sources indicate that there will be a series of construction projects in the near future for solar power plants of 20,000 to 30,000 kilowatts each, which would create demand for more photovoltaic-related products.

In the area of household fuel cells, Panasonic has reached agreement with three gas suppliers. In anticipation of a mass production launch in 2009, Panasonic secured gas company sales channels and supplies for their fuel cell equipment. This was a strategic decision to support Panasonic's new energy business since gas companies are also pursuing the household electricity market currently dominated by electric power companies. The government subsidy also applies to household fuel cells, and according to Panasonic, it takes 16 - 17 years to get a full return on the initial investment as opposed to more than 20 years in case of photovoltaic cells. Shin-Nisseki Oil also has been developing a "new-generation" hybrid fuel/photovoltaic energy system for households with NEC and Misawa Home Research Institute. This system "can supply all the electricity a household needs" whereas a fuel cell system alone can only supply 60% of these needs.

To implement the new "use of new energy" requirements, industry sources estimate costs will exceed US\$100 billion by 2020, a figure that can be regarded as the size of the whole market for this sector. In addition, the public sector will require US\$5.7billion to shift its energy systems to more efficient, eco-friendly ones, (e.g., air conditioning and hot water), according to the Ministry of Environment and, combined with implementation costs mentioned above, the government will need US \$11 billion annually between 2009 and 2011.

The Nikkei Journal also reports in its August 8, 2008, issue, that METI will launch a US\$6 billion-dollar nationwide infrastructure project for storage and transmission of the electricity generated from solar power plants and residential houses with photovoltaic cells, which will account for 80% of housing starts in 2030 in line with the Fukuda Vision. Electricity generated is expected to be equivalent to 13 million kiloliters of crude oil.

Best Prospects

Any materials, parts, equipment, and technology in the following areas have potential in the Japanese market as energy saving, new energy, efficient use of water including rainfall, ecology, recycling:

- Photovoltaic technologies
- Solar-thermal
- Heat pumps
- Ventilation systems
- Insulation materials, glass and other building materials
- Consulting services
- CO2 Emission calculation software
- Green design
- Hydrogen engines

Market Entry Strategies

Short of establishing a presence in Japan, in order to market products in Japan, partnering with a local company is essential. Especially in the field of new energy, finding a Japanese company who incorporates your technology into end-user products would be key to entering this growing market. The local company would also help you get any necessary certifications required to sell the products. Japanese partners play a key role in providing customers with maintenance and other services as well.

Market Access Issues & Obstacles

There are no apparent obstacles in market access.

Trade Events

Nikkei Housing Reform Exhibition : <http://sumai.nikkei.co.jp/reform/reformhaku/event/gaiyou2008.html>
Nov 20-23, 2008 at Tokyo Big Sight

Eco-Products 2008: <http://www.eco-pro.info/eco2008/english/index.html>
Japan's largest environment trade events to be held Dec 11-13, 2008 at Tokyo Big Sight

ENEX2008 : <http://www.enex.info/language/index.html>
Trade event for energy saving and new/renewable energy organized by ENEX Organizing Office in Energy Center
TEL:03-5543-3013 / FAX:03-5543-3887 E-mail enex2007@eccj.or.jp

PV Japan 2008: <http://www.pvjapan2008.org/PVJAPAN-JP/index.htm>
Photovoltaic expo with a technical symposium, seminars and receptions

Energy Solution, and Thermal Storage Fair 2008: <http://www.tepco.co.jp/solution/fair/>
Trade fair for heat pump and other thermal storage system

Nice Wakuwaku Fair 2008 2008: <http://www.e-house.co.jp/kenpaku/whats/index.html>
Housing and housing equipment trade fair in Sendai, Miyagi Prefecture

Comfortable Living Creation Fair: <http://www.emiya.com/company/network.htm>
Largest trade fair for electric equipment and eco-products in Hokkaido organized by Emiya Co., Ltd.
TEL+81(11)890-0838
FAX+81(11)893-8006

References & Key Contacts

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Revised Construction Standards: http://www.mlit.go.jp/jutakukentiku/build/h18_kaisei.html
CASBEE <http://www.ibec.or.jp/CASBEE/english/index.htm>
The Building Center of Japan: <http://www.bcj.or.jp/en/index.html>
Architectural Institute of Japan: <http://www.aij.or.jp/>
Japan Photovoltaic Energy Association: <http://www.jpea.gr.jp/08eng.html>
FY 2007 Annual Energy Report (outline) (May 2008): http://www.enecho.meti.go.jp/english/report/19fy_outline.pdf

For More Information

The U.S. Commercial Service in Sapporo, Japan can be contacted via e-mail at: misa.shimizu@mail.doc.gov; Phone: 81-11-641-1115 ext.5, Fax: 81-11-643-1283 or visit our website: <http://www.buyusa.gov/japan/ja/>

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