Attractive Sectors

Future Energy Systems
High Growth of Energy Saving and Renewable Energy Related Markets is Expected

In Japan, the deployment of hybrid cars and other eco-cars aims to reduce CO₂ emissions as a countermeasure against global warming. The introduction of eco-houses equipped with photovoltaic power generation, high-efficiency hot water heaters and LED lighting is being promoted for more than just improved insulation. Moreover, the Japanese people's interest has grown in the markets concerning energy saving and renewable energy as a result of the electricity shortages caused by the Great East Japan Earthquake.

Major Environmental and Energy Strategies from the Japanese Government

In addition to countermeasures against global warming, the government has set forth "Green Innovation" as the driving force for growth in its "New Growth Strategy" by setting a target of 50 trillion yen and the creation of 1.4 million jobs within the environmental market. With the introduction of the Feed-in Tariff for renewable energy planned for July 2012, an increase of new enterprises in the renewable energy field is expected. Moreover, to combat electricity shortages, the government also launched a subsidy support scheme funded by the supplementary budget to promote the growth of future energy systems involving the improvement of electricity supply and demand, renewable energy, and energy saving.

Wide-ranging Industries such as Automotive and Housing

With the introduction and distribution of next generation energy, new demands are anticipated in relation to eco-cars and eco-houses. These industries include a wide range of related businesses. For example, with the arrival of electric vehicles (EV), new demand is expected in sectors such as the weight reduction of components and material parts, storage batteries, battery management technology, EV charging infrastructure, and other energy saving technologies. There is also a range of related businesses in the housing industry for home builders, apartment developers and renovators. This includes the installation of residential fuel-cell systems and solar-thermal systems, and refitting insulation in windows, outer walls, and floors in both new and old buildings.

Creating New Towns – Smart Community

Among various new-town-creation projects, the smart community is particularly relevant in responding to new trends in social systems. At present, advanced experiments utilizing regional resources to revitalize local areas are underway in several locations to promote these smart community projects. Through these projects, industrial promotion and employment creation are expected to develop further business opportunities.

Overview:
Future Energy Systems
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Market Overview

<Japanese Environment Business Market>

<table>
<thead>
<tr>
<th>(trillion yen)</th>
<th>2005</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>83</td>
<td></td>
</tr>
</tbody>
</table>

Source: “Survey on Environment Management and Environment Business Promotion” (Ministry of Economy, Trade and Industry)

1. Environmental Business Shifting Towards Future Energy Systems

According to statistics from the Ministry of Economy, Trade and Industry, the Japanese environmental market (*) is predicted to grow from 59 trillion yen in 2005 to 83 trillion yen by 2015.

Watching each market separately, markets related to global warming, such as energy saving and renewable energy, are estimated to experience a massive increase of 53% from 32 trillion yen in 2005 to 49 trillion yen in 2015.

In contrast, the 3R market (Reduce, Reuse, and Recycle) which includes waste disposal and recycling equipment will see more limited growth, with an expected increase from 25 trillion yen in 2005 to 30 trillion yen by 2015. This is a result of a slowdown of capital investment by manufacturers and a decrease in demand from the public sector, which in the past supported the market for waste treatment and recycling equipment.

In the 3R market, Japanese environmental equipment production decreased from its peak in FY2001, and by FY2006 it had dropped to 820 billion yen, equivalent to half of the production value in FY2001, when many environmental infrastructure improvements were made.

In the future, the environmental business market is expected to shift from conventional waste disposal to new energy systems such as those for energy saving, renewable energy and environmentally friendly products.

*Includes the following businesses related to environmental impact reduction: (1) global warming related businesses (renewable energy, energy saving, etc.); (2) 3R related businesses (waste disposal, recycling equipment, etc.); (3) anti-pollution related businesses (pollution prevention, environmental recovery, environmental creation, etc.).

2. Further Growth of Environmental Business Market is Expected

Within the renewable energy sector, it is expected that the market for photovoltaic cell systems will grow to 1,287.6 billion yen by 2020, equivalent to about 8 times that of 2008. The market for wind power generation facilities is also expected to grow by about 4 times in comparison to 2008. Within the energy storage field, secondary batteries, including lithium-ion batteries, are predicted to account for 777 billion yen in 2020, 51% greater than in 2008. In the energy saving field, it is estimated that the market for high-efficiency hot water heaters will reach 134 billion yen by 2020, 10% more than in 2008, while the home insulation market will drop to 139.6 billion yen in the same year, 26% less than in 2008. With the introduction and distribution of next generation energy, new demand is anticipated in the automotive sector (electric vehicles and hybrid-electric vehicles) as well as in the housing sector (environmentally friendly houses, called “Eco Houses”). Furthermore, the market for HEMS/BEMS and smart grids for future social systems is expected to increase with the development of smart communities. The smart grid, in particular, is predicted to grow to 340 billion yen in 2020, 850 times that of 2008.

Source: “The FY2010 Survey and Research concerning the Japanese Environment Business in 2020” (Japan Society of Industrial Machinery Manufacturers) (*)

*Since the above was issued in March 2011 as a prediction of the market scale, the influence of the Great East Japan Earthquake is not reflected. According to this report, the market related to environmental business performance is expected to grow for every product. For home insulation, demand for reform is not reflected as it is based on new housing. According to the newest data, as of February 2012 by Fuji Keizai Co., Ltd., the domestic housing insulation market is predicted to level off.

There are increased global expectations concerning the expansion of markets and employment related to the environment (renewable energy, eco-friendly vehicles, and energy saving products). The US and the EU are leading demonstration projects while implementing environmental and energy policies that align with employment and business strategies.

In order to leverage Japan’s industrial strength, the Japanese government decided in the cabinet’s New Growth Strategy in 2010 to set high targets in environment and energy through Green Innovation. The government has set performance targets of 50 trillion yen for new environmental markets and the creation of new employment for 1.4 million people by 2020.

4. National and Municipal Government Policies toward the Restoration and Recovery from the Great East Japan Earthquake

As a result of the electricity shortage due to the Great East Japan Earthquake, the necessity for measures relating to the supply and demand of electricity, energy saving, and the introduction of renewable energy has increased. In view of this, the Japanese government announced investment to promote the distribution of future energy systems in the supplementary budget. The commercial scale of the restoration and recovery from the Great East Japan Earthquake is expected to be at least 23 trillion yen over the next decade, and the government is addressing the need for the creation of stronger towns which are resistant to disasters.

Through the utilization of regional resources and the creation of new towns, the national government and municipalities are promoting projects to demonstrate next generation energy systems in order to bolster the industry, create employment, and revitalize local areas. It is anticipated that these efforts will lead to the expansion of new business opportunities for domestic and overseas enterprises.
1. Renewable Energy

<Photovoltaic Generation>

According to the International Energy Agency (IEA), the cumulative installed capacity of photovoltaic (PV) power worldwide in 2010 grew to 34,953 MW, a 68% increase over the previous year. The cumulative installed capacity in Japan amounts to 3,618 MW, corresponding to 10% of the world’s total and making Japan the third largest market behind Germany and Spain. In Japan, a support system for PV power installation was introduced for the second time in 2009, and subsidy applications for PV power surged rapidly from 20,000 in FY2008 to 140,000 in FY2009. Since then, subsidy applications have continued to grow, and further expansion of the PV market is greatly anticipated. Moreover, because of the launch of an excess electricity purchase system, the growth of the PV power market is centered on home use. In 2010, 991 MW of PV power were installed for home use, corresponding to roughly double the figure of the previous year. The deployment of medium and large PV power systems for public, industrial, and commercial use with capacities in the range of 10 kW to 1 MW are predicted to increase due to the Feed-in Tariff for renewable energy starting in July 2012. Additionally, the government has secured a supplementary budget of 87 billion yen in subsidies to support the introduction of photovoltaic generation in homes and fund-creation projects for recovery measures.

Key Sectors

<Change in Domestic PV Cell Shipments>

Source: Photovoltaic Generation Association

<Subsidy Applications for Residential PV Generation>

Source: Japan Photovoltaic Expansion Center

*FY2011 represents an accumulated total from April 2011 to February 2012
Future Energy Systems

**Case Study**

Konarka Technologies Japan K.K.
- Founded: April 2010
- Headquarters: USA

Konarka Technologies K.K. (Headquarters: USA) develops, produces, and sells organic photovoltaic, or OPV. Since its founding in 2001, Konarka Technologies (USA) has grown rapidly to nearly 100 employees, including researchers and scientists.

In 2009, Konarka started operations at a mass production factory in Massachusetts in the US. At the core of the company’s products is a light-sensitized polymer material, invented by one of the company’s co-founders and Nobel Prize in chemistry laureate, Dr. Alan Heeger. This material can be coated over flexible material in the same way that newspaper is printed on giant rolls of paper. Power Plastic® OPV produced by using this technology, can be widely applied to Building Integrated Photovoltaic (BIPV) and Building Applied Photovoltaic (BAPV) in windows, rigid plastics, membrane structures, and other construction materials due to its flexible lightweight, and semi-transparent qualities.

**Japan Office was opened after establishing partnerships with Japanese enterprises**

Konarka Technologies K.K.’s main clients are major building material manufacturers who can develop innovative applications with PowerPlastic. In 2007, Konarka entered the Japanese market through a cooperative development contract with Toppan Forms Co., Ltd. In March 2010, Konarka formed a partnership agreement with Konica Minolta Holdings, Inc. for the development, production and sales of OPV, and began a full-scale cooperative business. In April of the same year, Konarka opened its Japanese subsidiary, Konarka Technologies Japan K.K., in Tokyo.

**Domestic Wind Power Generation Capacity**

![Domestic Wind Power Generation Capacity](image)

**Wind Power Generation**

Recently, Japanese wind power generation has been steadily introduced, and the cumulative installed capacity in Japan has increased at an annual rate of roughly 10%. As of December 2011, the introduced resources had reached 1,832 wind turbines with an output of 2,501 MW (Japan Wind Power Generation Association). According to the “Global Wind Statistics 2011” from the Global Wind Energy Council (GWEC), Japanese wind power generation is the 13th largest in the world. Japanese topography is complex, with less flat land compared to other countries. This means the amount of connectable wind power is restricted, which creates obstacles to the installation of wind power generation facilities.

Therefore, the installation of wind power generation facilities with storage batteries is required to stabilize output and to reinforce the power grid. Wind power turbines with an output of 2 MW per unit consist of 20,000 parts, which come from a wide range of industries. It is expected that the Feed-in Tariff starting in July 2012 will lead an industry recovery in the Tohoku District, which is said to be the most suitable place for wind power generation. This is also expected to create a ripple effect on supporting enterprises through increased domestic demand.

*Since the output of wind power generation is variable, it is necessary for electric power companies to compensate for changes in energy output. Within the electric power system, if there is enough capacity, the grid can absorb the change in wind power. However, when capacity is exceeded, the connectivity capability is limited.*

**Wind Power Car Port, Florida, USA**

Source: Japan Wind Power Generation Association

Source: Ministry of Economy, Trade and Industry
Attractive Sectors

Key Sectors

2. Storage Batteries

Aiming at the improvement of energy security and the reduction of CO2 emissions, renewable energy such as PV power and wind power generation, as well as future vehicles such as electric vehicles, have come into focus. Storage batteries play an important role in stabilizing variable output of PV, storing wind power generation, and storing surplus energy. Furthermore, storage battery related industries (for example, electric vehicles that use storage batteries as a power source) are expected to grow inside and outside of Japan. Industries related to storage batteries are very attractive because there are a wide range of supporting businesses, such as raw material processing and importation, parts manufacturing, storage battery manufacturing, storage battery usage (electric/electronic appliances, vehicles and industrial machines, building/construction, energy, etc.), and related service suppliers. Typically in Japan, storage batteries for use in electric vehicles are developed and produced in cooperation between storage battery and automobile manufacturers. Storage batteries for use in power grids are commonly built-to-order for electric power companies and new energy generation facilities since the number of storage batteries in a power grid is limited. There are also a few cases of storage batteries being utilized in the home (demand side). The development of the supply chain business model has just begun.

According to the Ministry of Economy, Trade and Industry, the total domestic production of batteries in 2010 amounted to about 690 billion yen, and storage batteries accounted for 85% of this total. As for lithium-ion batteries, despite a decline following the global financial crisis, domestic production (largely for personal electronic devices) had recovered to 1.2 billion units worth 277.5 billion yen in 2010. It is expected that the increased demand for storage batteries, next generation vehicles and renewable energies will lead to greater demand for lithium-ion batteries and related products/systems in the coming years. The government allotted 21 billion yen from the FY2011 third supplementary budget to promote lithium-ion storage batteries and to avoid restrictions in electric power supply and demand.

Source: “Machinery Statistics” (Ministry of Economy, Trade and Industry)

Case Study

Umicore Japan K.K.

Founded: June 2002 Headquarters: Belgium

Umicore K.K. (headquarters: Belgium) is a functional material maker founded in Belgium in 1805. The company develops secondary battery materials, photovoltaic cells, fuel cells, and exhaust-gas cleaning catalysts, and recycles noble metals for the global market. It is the world’s second largest manufacturer of positive-electrode material for lithium-ion batteries. It is a global enterprise with approximately 50 subsidiaries, sales of 14.5 billion euro (2011), and 14,600 employees worldwide. After the establishment of Umicore Japan K.K. in 2002 in Tokyo, the company opened an office in Tsukuba (noble metal chemical synthesis, plating chemicals) in 2011 set up production company for positive electrodes for lithium-ion batteries and a Technical Center in Kobe. The company later established a Yokohama office to design, develop, and produce dissolution equipment for special glass.

Umicore’s appreciation of the Japanese market’s potential led the company to set up a factory in Kobe.

Umicore has positioned itself in Japan, an important market in which critical technologies closely linked to Umicore’s materials are developed. Understanding the importance of showing its commitment to the Japanese market, Umicore invested 4 billion yen to establish a new factory in Kobe to produce the positive electrode material for lithium-ion batteries. Although Umicore Japan K.K. is a newcomer to the Japanese market, the company expects significant growth by leveraging its unique battery, vehicle catalyst, and recycled material technologies.

Technical Center and manufacturing facility for positive electrode material for lithium-ion batteries
3. Energy Saving

<High-efficiency Hot Water Heaters>
The market for heat-pump hot water heaters for home use, called “EcoCute”, has grown in the context of an increase in demand for entirely electrified homes, called “All Denka.” In FY2010, domestic shipments were 565,000 units, and the cumulative total was 2.8 million units. After the Great East Japan Earthquake, when the electric power supply for electrical appliances was viewed with anxiety, the residential heat-pump hot water heater came to be appreciated for its low power consumption, leading to power savings. The market is anticipated to continue to grow in response to the demand for heat-pump hot water heaters’ environmental and economic features. Similarly, highly efficient and environmentally friendly gas water heaters, called “EcoJozu”, are increasing in number. In FY2010, domestic shipments amounted to 558,000 units, and the cumulative total was 2.1 million units.

Since water heaters account for about 30% of energy consumption in homes, the Japanese government is aiming to install high-efficiency water heaters and heat pumps in almost all households (except single-person households) by 2020, and 80%–90% of all households by 2030.

<Energy Management Systems>
Energy management systems (EMS) represent systems designed to control the energy consumption of a user’s equipment and implement energy savings based on system contribution. There are three types of Energy Management Systems: HEMS (Home Energy Management System), BEMS (Building Energy Management System), and FEMS (Factory Energy Management System). These are equipped with functions that, by indicating energy consumption volume, call the user’s attention to energy saving measures and suggest automatic control of home appliances and more effective usage. Japan’s New Energy and Industrial Technology Development Organization (NEDO) established a new policy to help introduce energy-control systems (BEMS, HEMS) aimed at high-pressure and low-quantity users (small- and medium-sized enterprises), and invested 30 billion yen in the third supplementary budget of FY2011.

While research into the most suitable control of PV energy systems, storage batteries, electric vehicles, and energy saving home appliances continues, it is expected that control will be linked to a local energy management service in cooperation with system operations in the future.
4. Automobile and Housing

<Automobile>

The full-scale market deployment of next-generation vehicles with low CO₂ emissions will become more important as a countermeasure against global warming. The government plans to promote the adoption of electric vehicles by proactively implementing an incentive policy (development and purchase support, tax breaks and infrastructure modifications). According to the Next-Generation Vehicle Promotion Center, domestic sales of electric vehicles amounted to over 7,300 units in FY2010, a remarkable increase from 1,800 units in the previous year. In the same year, total electric vehicle ownership was estimated to be 9,400 units. It is projected that 15%~20% of new vehicle sales will be electric vehicles/plug-in hybrid vehicles by 2020. Based on the assumption of the increased adoption of electric vehicles, demonstration projects are underway on infrastructure requirements for charging facilities, integral technological development of the power grid, and distributed power sources.

Further adoption of electric vehicles (EV) is expected due to the government’s investment of 300 billion yen in the FY2011 fourth supplementary budget to assist the public with purchases of new environmentally friendly vehicles.

There are a wide range of supporting businesses associated with the arrival of EVs, and new business opportunities will be created within the automobile industry. In particular, greater demand is expected in charging infrastructure and services, weight reduction of material parts and power saving technologies, and research and development for storage batteries, motors, power semiconductors, air conditioning systems, software and network technologies, security chips, and battery management technologies.

Source: Next Generation Vehicle Promotion Center

*Electric vehicles include PHV and electric vehicles (passenger car, mini car).
The government aims to set the ZEH (Zero Emission Home) as the new standard for houses, as well as to double the number of power saving refurbishments of existing houses by 2020. By 2030, the government plans to make ZEH the standard new home. As a result, 14 billion yen was proposed in the 2012 budget for the promotion of the Net Zero Energy houses and buildings.

As a residential energy saving measure, the “Energy Saving Technology Strategy 2011,” advocated high-efficiency hot water heaters and LED lighting, with an emphasis on HEMS buildings. Moreover, 15 billion yen from the FY2011 third supplementary budget was appropriated to subsidize power saving innovation as one of the electricity supply and demand measures including equipment in existing buildings.

In December 2009, the home eco-point system was created in order to promote eco-reform and the building of new eco-homes, and the first eco-points were issued in March 2010. From the same FY2011 third supplementary budget, the government re-launched reconstruction assistance and the home eco-point system.

The housing sector has a wide range of supporting businesses that include the installation of household equipment (PV power systems, high-efficiency hot water heaters, LED lighting, fuel-cell systems, stationary lithium-ion batteries, solar thermal application systems, water-saving toilets, and high insulation bathtubs) and insulation (windows, outer walls, roofs, ceilings, and floors). Major home builders, apartment developers, local builders, and renovators are all involved.

Although a declining birth rate and an aging society will result in a diminishing demand for new houses, power saving promotions aimed at existing homes will lead to an increase in demand for refurbishment businesses. This is expected to leverage new business opportunities in the housing industry in the future.

**Topics**

**Beginning of Full-scale Market Deployment of “Smart Houses” Using Next Generation Energy Systems**

The concept of a Smart House is one in which the usage of energy in the home is managed by ICT. After the Great East Japan Earthquake and the resulting power shortage, there has been a heightened awareness of renewable energy and energy management due to an increased demand for power saving measures. The Smart House was deployed in full force following the disaster in 2011, considered the “First Year of the Smart House.” Major housing manufacturers and apartment developers subsequently commercialized the Smart House, whose future development is expected to center around new single-family houses.

**Case Study**

**MAG-ISOVER K.K.**

Founded: April, 1987  Group Headquarters: France

**The Fourth Home-Insulator Production Plant in Japan**

The insulation division of Saint-Gobain (headquartered in France) has 11,000 employees in 70 offices in 45 countries. The company is doing business through its ISOVER brand, whose wide product line offers attractive features including energy efficiency (high-performance insulation) and noise countermeasures (sound absorption).

As a member of Saint-Gobain, MAG-ISOVER K.K. is developing and marketing an insulation business in Japan. With a catchphrase of "Comfortable ECO starting from insulation," the company’s aims to provide Japanese consumers with comfortable lifestyles that are gentle to the environment, and to create energy saving solutions for buildings by utilizing its unequaled core technologies.

On September 8, 2011, MAG-ISOVER reached an agreement with Mie Prefecture to build a new glass wool plant in Tsu City, its fourth production site in Japan and the largest plant of its kind for building materials in the western part of Japan.

The intended investment amount is around 15 billion yen with plans to hire approximately 100 workers. Annual production is expected to reach 150,000 tons, significantly boosting production capacity from the current levels once the new plant in Tsu City is completed.

**Source:** Ministry of Economy, Trade and Industry
5. Smart Community

The new-town-creation concept "Smart Community" is relevant where new social infrastructure is being built, uniting information networks, energy systems, and traffic systems as well as improving comfort and reducing CO2 emissions. The smart community aims to limit the cost accompanying the mass introduction of renewable energy by establishing a new energy system with central and distributed control that is resistant to disasters, improves lifestyle, and creates a new market inside and outside of Japan. There are a number of ongoing projects in Japan to demonstrate how to build energy systems that connect power systems to local areas throughout the country. For example, the "Demonstration Project of Next Generation Energy and Social System" (FY2010 to FY2014) consists of experiments implementing local EMS in four places in the country. Additionally, FY2012, the government plans to invest 15.7 billion yen in demonstration projects concerning the building of smart communities, and focus on the application fields of next-generation energy systems.

In order to make the best use of the country’s technological strengths (system controls, solar cells and storage batteries), Japan established the “Study Group on International Standardization concerning Next Generation Energy Systems” and is discussing priority sectors and international standardization. Japan’s global strategy for international standardization of smart communities will be developed in cooperation with Europe and the US.
Smart Communities in Major Cities

**<Yokohama City>**

**Local Energy Management**
- Demonstrate control over areas that are highly dependent on electric power (residential, commercial and industrial area) through means of large scale batteries and cooperation between local management systems and a large scale power system (grid).

**Home and Building Energy Management**
- Demonstrate the control systems combining EV with creative energy and storage energy appliances (homes equipped with photovoltaic generation and HEMS).
- Demonstrate the calculation of charges according to time of day rate system for CO2, electricity/heat cost per hour, and simultaneously deliver electricity and heat.
- Conduct cooperative control of energy used between buildings of different facilities and their link with local management systems (office buildings, shopping malls).
- Establishment of demand response (rental-office building).

**Traffic System**
- Purchase 2,000 units of EV and investigate the most suitable deployment of charging stations.

**<Toyota City>**

**Local Energy Management**
- Demonstrate the control system for energy supply and demand of individual homes using storage batteries of PHV/EV without depending completely on the power system (grid).

**Home and Building Energy Management**
- Conduct data mining of personal energy usage history and behavioral characteristics, and show low-carbon energy usage behavior through smart phones.
- Promote behavioral change by means of points-based incentives.

**Traffic System**
- Use ITS to maintain an orderly flow of traffic and to ease traffic congestion.
- Monitor the PHV/EV route history and present the best route.

**<Kei-Han-Na> Kansai Science Cities (Kyoto, Osaka, Nara)**

**Local Energy Management**
- Demonstrate the best way to utilize renewable energy in local areas using storage batteries for homes.

**Home and Building Energy Management**
- Demonstrate the best use of energy among the 3 combinations of ”photovoltaic cell with fuel cell,” ”photovoltaic cell with solar heat,” and ”photovoltaic cell with water heater.”

**Traffic System**
- Transmit information about charging sites, charging reservations and charging fees (points-based system) by EV Control Center.

**<Kitakyushu City>**

**Local Energy Management**
- 33MW of co-generation installed at Higashida District is positioned as a concentrated power source and rated operation is conducted covering necessary power sources by utilization of new energy and demand response.

**Home and Building Energy Management**
- Higher cost performance system is chosen from between two cases, one where automatic control of home appliances, dynamic pricings, and eco-points are controlled individually, and a more complex case.
- Based on next day’s supply and demand prediction, charges of 30 minute increments are transmitted to users.
- Information on power consumption restriction is provided 2 hours in advance.
- HEMS and BEMS control EVs, fuel battery systems, hot water appliances, and home electric appliances (air conditioner, lighting), sometimes automatically.

**Traffic System**
- Electricity supply is transmitted to the system from a storage battery attached to the vehicle (Vehicle to Grid, called “V to G”) and the effect on the system is evaluated.
- Battery attached to the vehicle (lithium-ion battery) is reserved for secondary use as a stationary storage battery.
Attractive Sectors

Policy Initiatives

Topics

The supplementary budget’s promotion of Next-Generation Energy Systems

Due to the electricity shortage caused by the Great East Japan Earthquake, next generation energy systems accompanying renewable energy, electricity saving, and power supply and demand, have come to the attention of the country. In addition to encouraging businesses through global warming countermeasures and the New Growth Strategy, the Japanese government, in the context of post-3/11 earthquake disaster countermeasures, is supporting the goal to press forward and promote next-generation energy systems through the supplementary budget.

<The third supplementary budget as of FY2011> (billion yen)

<table>
<thead>
<tr>
<th>Project</th>
<th>Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidy for expenditure on introductory projects demonstrating high-efficiency gas air-conditioning facilities</td>
<td>4.94</td>
</tr>
<tr>
<td>Subsidy for expenditure on promotion projects concerning energy management systems (IBEMS/HEMS)</td>
<td>30</td>
</tr>
<tr>
<td>Expenditure for introductory support project of stationary lithium-ion batteries</td>
<td>21</td>
</tr>
<tr>
<td>Subsidy for expenditure on introductory support for fuel cells for private use</td>
<td>5</td>
</tr>
<tr>
<td>Subsidy for expenditure on support project on buildings’ power saving innovations</td>
<td>15</td>
</tr>
<tr>
<td>Subsidy for expenditure on introductory support of PV generation for the home and fund-creation projects for recovery measures</td>
<td>86.99</td>
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<The fourth supplementary budget as of FY2011> (billion yen)

<table>
<thead>
<tr>
<th>Project</th>
<th>Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project for promotion of environmentally friendly vehicles</td>
<td>299.97</td>
</tr>
</tbody>
</table>

Government Support for Future Energy Systems as a Key Sector

With the goal of becoming the world’s No. 1 “Major Environmental and Energy Power,” the Japanese government is promoting Japanese top-level technology through the accelerated and comprehensive policy package of Green Innovation (field of innovative environmental energy).

Approaching Concrete Reform

● New Growth Strategy

In June 2010, the cabinet’s announcement of the New Growth Strategy includes 21 national projects and 7 strategies that are geared towards the achievement of a “Strong economy,” “Strong finance,” and “Strong social security.” One of the 7 strategies was Green Innovation (Environmental sector). As the driving force for growth, the government has proposed the creation of 50 trillion yen and 1.4 million new jobs in the environmental sector. As an example of a concrete approach, the “Environmental Future City” scheme incorporates the foundation of a comprehensive special zone system, a next-generation energy system, and a fixed-price renewable energy purchase system.

● Establishment of the “Comprehensive Special Zone System”

The government established the Comprehensive Special Zone System in 2011 as a solution to policy problems associated with the New Growth Strategy. This system is intended to reinforce the international competitiveness in the industry, making the best and most strategic use of private sector knowledge and funds, selecting the nation’s policy and focus, and optimizing the use of regional resources. Two types of Comprehensive Special Zone include International Strategic Comprehensive Special Zone and Local Revitalization Comprehensive Special Zone. In order to support selected projects, the government is investing 14.79 billion yen from the FY2012 budget.

● Environmental Future City Scheme

The Environmental Future City scheme is one of the nation’s strategic projects in Green Innovation as part of the New Growth Strategy. In certain cities and areas, creation of the world’s best success cases is planned through technology intended for future, social and economic systems, services, business models, and town-creation. This is intended to attain greater demand, employment creation, and the ability to resolve international problems through domestic and international development. The future city model project is being implemented in 12 cities and areas throughout the country. The government is supporting these model projects by spending 1.06 billion yen from the FY2012 budget.
Support Policy for Promotion and Expansion of Renewable Energy

In November 2009, the "Photovoltaic Generation Purchase System" (Feed-in Tariff) was implemented. This system obligates power companies to purchase excess electricity at double the normal price for electricity created from photovoltaic generation. The excess electricity purchased in 2010 was approximately 1.4 billion kWh. On July 1, 2012, the Fixed Price Purchase System for renewable energy will start. Besides PV generation, eligible energy generation sources have grown to include wind power, hydropower, geothermal, and biomass. Power companies are required to purchase electricity generated by these renewable energy sources for a certain period and price. In the same way that the demand for residential solar cells increased as a result of the Excess Electric Purchase System in 2009, it is expected that the deployment of solar cells and wind power generation in the public and industrial sectors will increase in response to the new system. The government's policy concerning renewable energy promotion is medium to long term, and it will continue to open the way for a variety of purchase prices, periods, and business objectives, supporting the rapid expansion of the market.

Outline of Feed-in Tariff for Renewable Energy

- Under this system, power companies are obliged to purchase electric power generated by renewable energy sources such as photovoltaic and wind power during certain periods at a fixed price.
- The expense of purchasing renewable energy is levied in the form of a tariff on users according to the amount of electricity used, so as to be consistent across the country.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Required Condition</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry Use</td>
<td>Photovoltaic, wind power, medium and small hydropower (less than 30,000 kW), geothermal, biomass</td>
<td>Total amount of electrical generation</td>
</tr>
<tr>
<td>Home Use</td>
<td>Photovoltaic generation for home use (less than 10kW)</td>
<td>Excess electricity</td>
</tr>
</tbody>
</table>
As a part of the New Growth Strategy, various projects (Comprehensive Special Zone, Environmental Future City schemes, etc.) are targeting a wide range of efforts in cities and areas throughout the nation. The Comprehensive Special Zone aims to drive the growth of the Japanese economy and lead to the best utilization of international competitiveness and regional resources. The Environmental Future City scheme responds to environmental and aging concerns, and it will be advanced with international cooperation.

The Comprehensive Special Zone is leveraged as a tool for creating cities within the Environmental Future City scheme. The following section highlights some particularly notable demonstration projects for next generation energy.

### Green Asia International Comprehensive Special Zone
(Fukuoka Prefecture, Kitakyushu City, and Fukuoka City)

The formation of industrial and functional clusters is planned in the International Strategic Special Zone as a driving force for economic growth towards the achievement of "Reinforcement of International Competitiveness in Industry."

In the "Green Asia International Strategy Comprehensive Special Zone," a group of industries that center on the environment are working in cooperation with Fukuoka Prefecture, Kitakyushu City, and Fukuoka City. These areas are offering their environmental infrastructure and know-how (water supply, sewage, and energy) as a package to Asian cities while pressing forward with the formation of industrial sites that lead to Green Innovation. These cities plan to lead development of this initiative in Asia and the rest of the world.

### Future City Model Project
(Kitakyushu, Environmental City of the Future)

The "Kitakyushu, Environmental City of the Future" project aims to create a "city everybody wants to live in" and a "city filled with energy" where people challenge a range of problems (environment, aging society, internationalization) and leverage manufacturing skills, achievements in international environmental cooperation, and networks inside and outside of Japan.
Environment and Energy Related Business Groupings

- **East Japan**
  - Aomori Prefecture: Rare composite energy development and supply
  - Akita Prefecture: Advanced refining and recycling

- **West Japan**
  - Ehime Prefecture: Photovoltaic
  - Kitakyushu City, Fukuoka Prefecture: Environment/energy
  - Matsuyama City, Ehime Prefecture: Environmental high-tech

- **Osaka**
  - Osaka City, Osaka Prefecture: Batteries
  - Sakai City, Osaka Prefecture: Environmental high-tech

- **Miyazaki Prefecture**
  - Solar cell

- **Akita Prefecture**
  - Advanced refining and recycling

- **Aomori Prefecture**
  - Rare composite energy development and supply

- **Iwate Prefecture**
  - Semiconductor

- **Osaka Prefecture**
  - Environment/energy (Osaka Bay Area)
  - Batteries
  - Batteries

- **Kawasaki City, Kanagawa Prefecture**
  - Environment/energy

- **Sagamihara City, Kanagawa Prefecture**
  - Fuel cells and aerospace

- **Nara Prefecture**
  - Electronic parts

- **Hiroshima Prefecture**
  - Heavy and high-tech

- **Ehime Prefecture**
  - Pulp, nonferrous metal, chemicals, and high-performance fiber

- **Miyazaki Prefecture**
  - Solar cell

- **Akita Prefecture**
  - Advanced refining and recycling