



# Ensuring Eternally Stable Supplies of Environmentally Friendly Energy

Initiatives to ensure stable supplies and respond to global environmental issues

## Long-Term Energy Prospects

Over the long term, we expect the global energy demand to keep rising, in line with population growth and the development of emerging economies. Oil, coal, and other fossil fuels currently serve the bulk of the demand for energy. However, these resources are limited and supplies will become increasingly scarce.

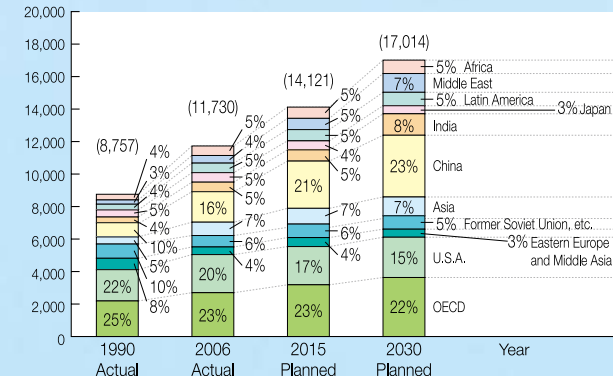
At the same time, it is imperative to slash emissions of CO<sub>2</sub> and other greenhouse gases, and we must constantly address this environmental issue.

Electricity accounted for around 25% of energy consumption in Kyushu in 2005, with Kyushu Electric Power providing 20% of the area's energy. Consumption of electricity has been rising.

Electrification will probably increase because of the convenience and economic advantages of this power source. We thus believe that our basic mission of ensuring stable electricity supplies will become more important.

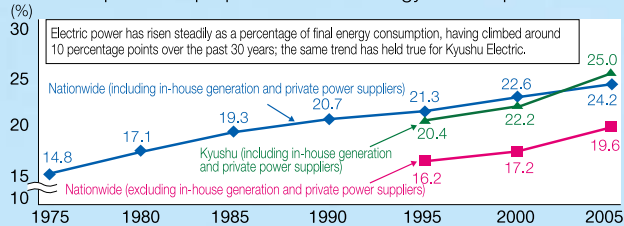
Therefore, we will continue to develop power resources, centered on nuclear power, which offers excellent supply stability, low environmental impact and it is economical. At the same time, we will harness renewable energy sources, such as solar and wind power, and enhance our thermal efficiency. We believe that it is important to take steps to alter the entire energy demand structure of Kyushu by converting to non-fossil fuel energy and working with customers and communities to conserve energy. We can thus contribute to building a sustainable society in Kyushu, with energy at its foundations.

▼ Projected world energy demand (Million metric tons of oil equivalent)



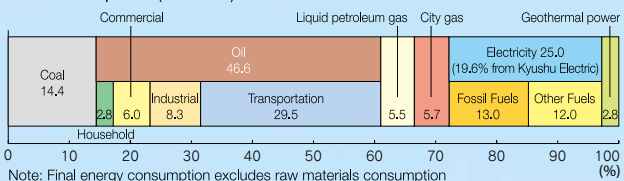
Source: International Energy Agency, World Energy Outlook 2008

▼ Electric power as proportion of final energy consumption (%)



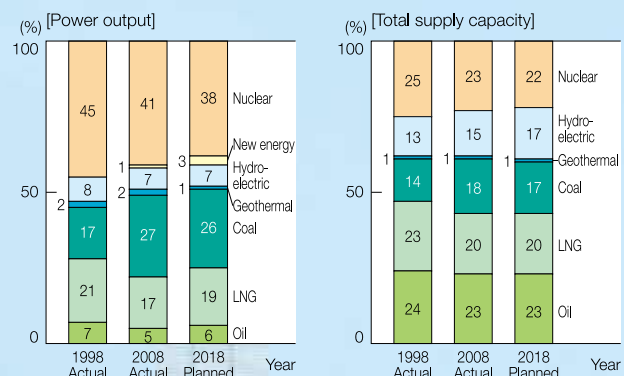
Source: Energy and Economic Statistics Handbook from New Energy and Industrial Technology Development Organization

▼ Fossil Fuel usage as proportion of Kyushu's final energy consumption (in 2005)



Note: Final energy consumption excludes raw materials consumption  
Sources: Energy Consumption Statistics by Administrative Region by Agency for Natural Resources and Development of Economy, Trade and Industry and statistics of Ministry of Land, Infrastructure and Transport

▼ Fuel source diversification plans (including power sourced from other companies)



## Harnessing Nuclear Power as a Key Energy Source

Nuclear power is our key energy source because it offers supply stability, low environmental impact and it is economical. In its Basic Energy Plan, revised in March 2007, the Japanese government declared that it will continue to promote and position nuclear power as a key, safe energy source.

While ensuring the security and safety of existing nuclear power plants, we will construct the No. 3 unit of the Sendai Nuclear Power Station and undertake pluthermal power initiatives. We will reinforce spent fuel storage facilities and consider intermediate storage sites.

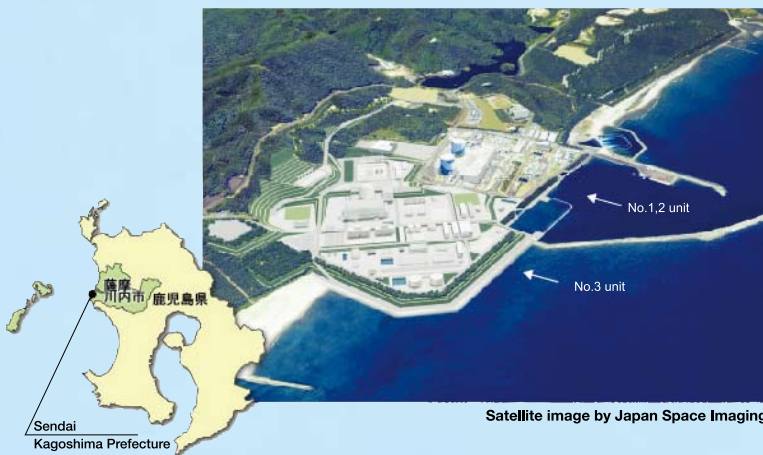
### Initiative to Build No. 3 Unit of Sendai Nuclear Power Station

We are working on plans to build the No. 3 unit of the Sendai Nuclear Power Station, which will ensure stable electricity supplies economically while reducing our overall CO<sub>2</sub> emissions. Following an environmental research effort at Sendai Nuclear Power Station that we started in October 2003, we confirmed that we can build this

new unit. In January 2009, we submitted the research results to the governor of Kagoshima Prefecture and the mayor of Satsuma-Sendai City. We then applied for a construction permit.

To proceed, it is crucial to gain the understanding and cooperation of the community, and thus we established the Sendai Nuclear Power General Office in Satsuma-Sendai in March 2009 to undertake community-based initiatives.

▼ Sendai Nuclear Power Station

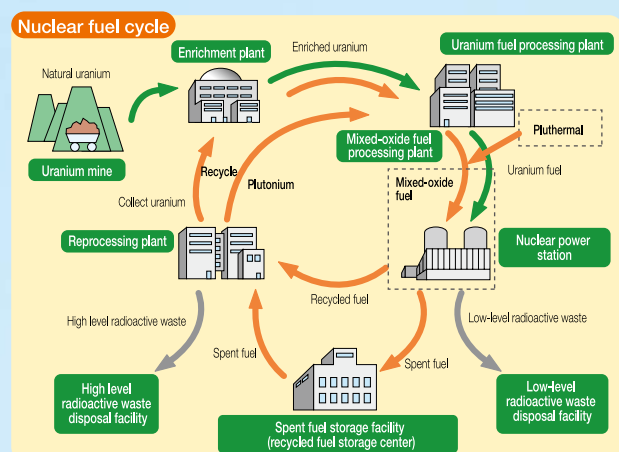


### Gradual Pluthermal Deployment

To ensure stable supplies, Japan will have to compensate for a lack of natural resources by establishing a nuclear fuel cycle that reprocesses spent fuel discharged from nuclear power plants to create new fuel.

As part of these efforts, it will be necessary to gradually deploy pluthermal generation, which uses recycled plutonium from the reprocessed spent fuel of light-water reactors.

We plan to load mixed-oxide fuel in the No.3 unit of the Genkai Nuclear Power Station under a regular inspection regimen that will begin in late August 2009.





## Initiatives to Deploy More Renewable Energy

Kyushu Electric Power has developed and deployed such renewable energy sources as wind, solar, hydroelectric and geothermal power. In this section, we present some of our initiatives.

### 1. Nagashima Windhill Starts Commercial Operations

The Nagashima Wind Power Station owned by Group company Nagashima Windhill Co., Ltd., started operating commercially in October 2008. Construction began in October 2005. The facility is located in Nagashima Town in the northwest of Kagoshima Prefecture, a perfect location for wind generation. This is because it enjoys stable wind conditions year-round, as it faces the East China Sea.

The facility is Kyushu's biggest wind power station, with a total capacity of 50,400 kilowatts. It features 21 domestically made windmills that are the largest in their class in Japan. Each windmill is 70 meters high, with blades spanning 92 meters and a rated capacity of 2,400 kilowatts. The station should generate about 100 million kilowatts of electricity per year, equivalent to reducing annual CO<sub>2</sub> emissions by 40,000 metric tons.



Nagashima Windhill site in Kagoshima Prefecture

### 2. Japan's First Geothermal Binary Power Plant

Kyushu possesses massive geothermal resources. Indeed, one of Japan's biggest geothermal facilities is our Hatchobaru Geothermal Power Station. Its total capacity is about 210,000 kilowatts, accounting for around 40% of the nation's geothermal capacity. In April 2006, the 2,000 kilowatt Hatchobaru Binary Power Station



Hatchobaru Geothermal Power Station in Kokonouecho, Oita Prefecture

started operating commercially at the site of the Hatchobaru Geothermal Power Station. A first for Japan, this recent facility uses low-temperature geothermal energy that conventional setups could not tap. In April 2009, the New Energy and Industrial Technology Development Organization ranked both the binary power station and Hatchobaru Geothermal Power Station in the Shin Ene top 100 best applications of new energy list.

Compared with other renewable energy sources, geothermal power provides stable supplies year-round. We will continue to survey and collect information for new development opportunities, assessing potential new geothermal sites.

### 3. Installing Mega Solar Power System at Idle Site of Former Minato Power Station

We are currently installing a mega solar power system with a total capacity of 3,000 kilowatts at the idle site of the former Minato Power Station in Omuta, Fukuoka Prefecture. We plan to start operations in FY2010. This facility will be Kyushu's biggest solar power station, cutting our annual CO<sub>2</sub> emissions by about 1,300 metric tons.

We are looking to install solar power systems at all our operating and idle sites. With the Japanese government introducing a feed-in tariff system for solar power, we look for solar power generation to become much more widespread in the future. We will therefore act on such technical issues as voltage and frequency fluctuations when connecting systems to the power grid.



Computer-generated image of mega solar power system

## 4. Initiatives for Biomass Power Generation

Group company Miyazaki Biomass Recycle Co., Ltd., is the biggest biomass power plant in Japan. It runs on poultry droppings, burning 130,000 tons of this material annually to generate 11,350 kilowatts per year. The burned ash then becomes an attractive fertilizer. In April 2009, that company also received a Shin Ene 100 ranking for its new energy usage.

Fukuoka Clean Energy Co., Inc., which we established together with the city of Fukuoka, generates 29,200 kilowatts from burning household waste. This company also contributes significantly to recycling.



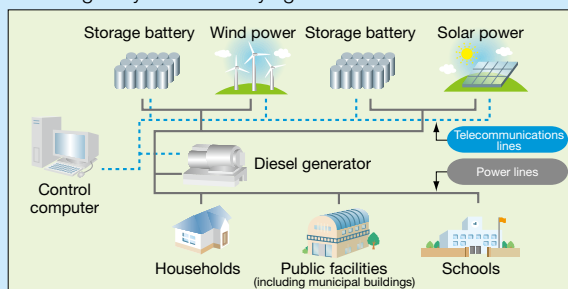
Miyazaki Biomass Recycle Co., Ltd. in Miyazaki Prefecture

## 5. Studying Microgrid System for Outlying Islands

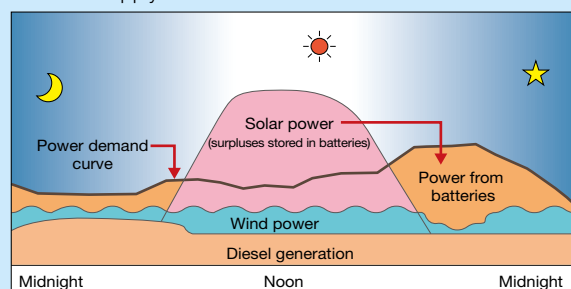
We supply electricity to outlying islands through conventional diesel generating systems. We are looking into power supply systems that match the features of these islands. As a part of this initiative, we are building a microgrid that augments diesel generation with renewable energy systems, such as solar and wind power and storage batteries.

The microgrid system stores electricity generated during the daytime from solar or wind power in storage batteries, which provide nighttime service. This testing program is running from 2009 to 2012.

### ▼ Microgrid system for outlying islands



### ▼ Power supply balance



We are also promoting renewable energy by developing a hydroelectric dam that drains fluvial residual flows.

We aim to fulfill Renewables Portfolio Standard requirements through these initiatives.

### ▼ Renewable energy production and targets

	Power output (Billions of kWh)		Total supply capacity (Thousands of kW)	
	FY2007	FY2017	FY2007	FY2017
New energy	12	28	79	224
Wind power	4	16	25	100
Solar power	2	6	30	100
Biomass, etc.	6	6	24	24
Hydroelectric power (except pumped storage)	45	58	185	186
Geothermal power	14	16	21	21
<b>Total</b>	<b>71</b>	<b>102</b>	<b>285</b>	<b>431</b>

Notes: 1. Plans reviews for geothermal, biomass and other sources. Current sources under development are those that surveys have revealed can be developed.  
2. Data includes supplies from excess power contracts with other companies.

## Making Thermal Power More Efficient

We use liquefied natural gas, coal, and other resources to ensure stable, long-term supplies of fuel for thermal power generation. We are raising generating efficiency in response to environmental issues and to use energy more efficiently.

A good example is our plan to gradually replace six turbines at the No.1 unit of Shin Oita Power Station with more efficient models between 2009 and 2012. This would lift thermal efficiency by around three percentage points. We will install four 400,000 kilowatt advanced combined cycle turbines at the No. 3 unit of Shin Oita Power Station in 2016 .



LNG-fired Shin Oita Power Station