

## Efforts of the Electric Power Companies of Japan to Create a Low Carbon Society

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The Federation of Electric Power Companies of Japan

In view of the recent intense discussions in Japan and worldwide on the need to combat global warming, the Federation has drawn up the plan of the electric power companies of Japan toward achieving the goals set forth in the Kyoto Protocol and to *create a low carbon society* in the post-Kyoto period:

### 1. Direction of Efforts

- The electric power companies of Japan are committed to solving environmental issues, particularly reducing CO<sub>2</sub> emissions as a major cause of global warming. We have achieved the level of 0.4kg-CO<sub>2</sub>/kWh, which is the CO<sub>2</sub> emission per kilowatt of generated electricity (generation-end CO<sub>2</sub> emission intensity), among the lowest in the world, and are striving to achieve the goals of the electric power industry's environmental action plan based on the optimal combination of power sources, to simultaneously achieve supply stability, economy and environmental compatibility.
- To *create a low carbon society* in the post-Kyoto period, we combine the following efforts on both the supply and demand sides: (1) decarbonization of energy supply (lowering the CO<sub>2</sub> emission intensity) and (2) improvement of the energy consumption efficiency (promoting energy saving and the use of more energy-efficient equipment in the industrial, transport, commercial and residential sectors). We will contribute to creating an energy efficient, low carbon society by encouraging the use of non-fossil energy sources, such as nuclear power and renewables, improving the efficiency of fossil-fired generation as the first line of activities, and promoting a shift to electricity and the use of efficient electrical appliances as the second line of activities.

### 2. Efforts toward the Decarbonization of Energy Supply

#### (1) Further utilization of nuclear power

- To simultaneously achieve a stable supply, economy and environmental compatibility, we have been promoting the use of nuclear power and the establishment of the nuclear fuel cycle. General Electric Utilities in Japan seek to achieve the goals in Japan's Framework for Nuclear Energy Policy <sup>(Note)</sup> by building and expanding nuclear power stations, to increase the share of non-fossil energy supply to 50% by fiscal 2020 based mainly on nuclear power.

Note: The Framework for Nuclear Energy Policy (Cabinet decision in October 2005) established the policy target of *ensuring that nuclear power should maintain at least a 30-40% share in the total generation mix in 2030 and beyond.* To attain this target, Japan's Nuclear Energy National Plan (established in June 2006) formulated the short-term goal of *building 13 additional nuclear power plants at new or existing sites.*

- Since nuclear power could provide low-carbon energy supply at minimum cost, we must urgently improve the capacity factor of existing nuclear power plants while placing top priority on safety. As governmental regulations are expected to be revised to make them more rational, the electric power companies of Japan aim to improve quality control to make operations even more stable.

## (2) Expanding the use of renewable energy sources

- Renewables presently account for about 10% of Japan's power output, a level comparable to Germany. To increase this ratio in spite of the cost, we are promoting the use of green power funds and certificates, purchasing surplus power from residential photovoltaic power systems at retail price, and steadily fulfilling the purchase obligations established by the Renewables Portfolio Standard (RPS) Law.
- Renewable power is not stable due to its dependence on the weather, so it must be interconnected with power system. According to our analysis of cumulative data on the introduction of renewables, the power system allows, without sacrificing stability of power system, the interconnection of up to about 5 million kilowatts of wind power and up to about 10 million kilowatts of photovoltaic power except in cases such as local congestion. Higher penetration of renewables requires major renovation of the power system infrastructure; this will require careful discussions on who should pay for this and how.
- With its high population density and geographical and climate restrictions, Japan has limited potential for wind power and domestic bio-energy resources. The most

promising would be to expand photovoltaic power from solar panels, which can be installed on rooftops. Until the cost of solar panels comes down significantly, which is expected in the early 2010s we shall continue the present scheme for purchasing price of surplus power from solar panels.

### (3) Higher efficiency fossil-fired generation and international cooperation

- Fossil fuels will remain an indispensable source of energy in terms of supply stability and convenience. With few domestic energy resources, Japan will not abandon the use of particular fossil fuels, but rather seeks to improve the thermal efficiency of fossil-fired generation by introducing and expanding efficient generation facilities such as LNG combined cycle generation, and making efficient use of coal by developing highly efficient generation technologies like the integrated coal gasification combined cycle (IGCC), continuing to lead the world by high energy efficiency.
- On the global scale, we provide cooperation in the field of coal-fired power generation, particularly through the Asia-Pacific Partnership (APP) for Clean Development and Climate, and actively pursue a sectoral approach to a variety of technical cooperation and support from advanced to developing nations.

### 3. Efforts for Higher Energy Consumption Efficiency

- To create a low carbon society, the electric power companies of Japan are working to raise energy consumption efficiency in the industrial, transport, commercial and residential sectors by encouraging a shift to electricity and the use of efficient electric apparatuses including heat pumps, which are examples of advanced technologies produced by Japan. Specifically, we are promoting the installation of “Eco-Cute” water heating systems (which have a heat pump that uses CO<sub>2</sub> as a refrigerant) under public-private cooperation because these will significantly reduce CO<sub>2</sub> emissions by replacing conventional water heating systems. We are aiming at ten million installations by the end of fiscal 2020. Combined with additional efforts to encourage *a shift to electricity*, including the use of electric vehicles, we seek to improve the energy efficiency of society as a whole and the reduction of CO<sub>2</sub> emissions.
- Global warming cannot be solved by governments and major industries alone.

Everyone has to be aware of the issue and take actions against global warming by taking responsibility for their own CO<sub>2</sub> emissions. Making use of extensive contacts with customers, the electric power companies of Japan are heightening public awareness on energy saving using such tools as the “CO<sub>2</sub> Housekeeping Book.”

#### 4. Technological Innovations for Further Advancement

- The energy-efficient low carbon society of the future will require innovative next-generation technologies. To address this important issue cooperatively with the government, the electric power companies of Japan are committed to making long-term efforts in the Cool Earth Project (innovative energy technologies development project), covering various technologies including next-generation light water reactors and fast reactors, integrated coal gasification combined cycle (IGCC), highly-efficient LNG-fired generation, super-conducting highly-efficient power transmission, and super-efficient heat pumps.