

### Media Briefing: The Energy [R]evolution Scenario for Japan

Two scenarios up to the year 2050 are outlined in this report. The Reference Scenario is based on the regional reference scenario for OECD Pacific published by the International Energy Agency in the World Energy Outlook 2007, extrapolated forward from 2030. While the global Energy [R]evolution Scenario has a target for the reduction of worldwide emissions to be reduced by 50% below 1990 levels by 2050, with per capita carbon dioxide emissions reduced to about 1 tonne per year in order for the increase in global temperature to remain under +2°C. The Energy [R]evolution scenario for Japan aims to reduce national CO<sub>2</sub> emissions by 26% by 2020 and up to 76% by 2050.

To achieve these targets, the scenario is characterised by significant efforts to fully exploit the large potential for energy efficiency. At the same time, all cost-effective renewable energy sources are accessed for process heat and electricity generation, as well as the production of sustainable bio fuels. Today, renewable energy sources account for 3.2% of Japan's primary energy demand. Biomass used almost entirely for heating and co-generation as well as geothermal and hydropower, both mainly used for electricity production, are the currently used renewable energy sources. The share of renewable energy in electricity generation is 9.6%. The contribution of renewables to primary energy demand for heat supply is around 2.6%. About 96.8% of Japan's primary energy supply still comes from fossil fuels.

The Energy [R]evolution Scenario describes a development pathway which turns the present situation into a sustainable energy supply:

- Exploitation of the existing large energy efficiency potential will reduce the growth of primary energy demand from the current 22,235 PJ/a (2005) to 10,459 PJ/a in 2050. This compares with a demand of 23,940 PJ/a in the Reference Scenario. This significant reduction in energy demand is a crucial prerequisite for achieving a significant share of renewable energy sources, compensating for reducing the consumption of fossil fuels.
- The increased use of combined heat and power generation (CHP) in the industrial sector will improve the supply system's energy conversion efficiency. Fossil fuels – mainly gas - will be used increasingly in CHP and will be steadily supported by biomass and geothermal energy. In other sectors the limited possibilities for district heating/cooling systems restrict the further expansion of CHP.
- The electricity sector will have the strongest growth in renewable energy utilisation. By 2050, more than 60% of electricity will be produced from renewable energy sources. A capacity of 205 GW will produce 523 TWh/a of electricity.
- In the heat supply sector, the contribution of renewables will continue to grow, reaching more than 47% by 2050. In particular, biomass, solar collectors and geothermal energy will replace conventional systems for direct heating and cooling, with traditional biomass being replaced by more efficient modern technologies.
- In the transport sector bio fuels are currently the only available technology which could provide a major share of renewable energy. However, the rapid development of the biofuels market over the last few years has raised questions about its sustainability. From the sustainability point of view - a major driving factor for the development of the whole Energy [R]evolution scenario - biomass use must not threaten food security or increase

CO<sub>2</sub> emissions, for example by encouraging deforestation for biofuel plantations. The Energy [R]evolution scenario for Japan involves an increase in biofuel use and a higher use of electricity for vehicles from 2020 onwards when efficiency potentials are fully exploited.

- By 2050 over 40% of primary energy demand will be covered by renewable energy sources.

To achieve an economically attractive growth of renewable energy sources, a balanced and timely mobilisation of all renewable technologies is of great importance. Such a mobilisation depends on technical potentials, actual costs, cost reduction potentials and technological maturity.

### **Development of energy related CO<sub>2</sub> emissions**

While energy related CO<sub>2</sub> emissions in Japan will decrease under the Reference Scenario by 8% by 2050 - far removed from a sustainable development path - under the Energy [R]evolution Scenario they drop significantly, decreasing from 1,135 million tonnes in 2005 to 275 million tonnes in 2050. Annual per capita emissions will drop from 8.9 to 2.7 t. While the power sector today is the largest source of energy related CO<sub>2</sub> emissions in Japan, it will contribute about 39% of the total in 2050.

### **Costs**

Under the Reference Scenario, Japan is facing a significant increase in society's expenditure on electricity supply. The continuing growth in demand, the increase in fossil fuel prices and the costs of CO<sub>2</sub> emissions will result in electricity supply costs nearly doubling from \$92 billion per year today to \$138 billion per year in 2050. The Energy [R]evolution scenario, on the other hand, not only complies with global CO<sub>2</sub> reduction targets but also helps to stabilise energy costs and thus relieve the economic pressure on society. Increasing energy efficiency and shifting energy supply to renewable energy resources in the long term even lead to decreasing costs for electricity supply. It becomes obvious that following stringent environmental targets in the energy sector also pays off in terms of economics.

To make the energy revolution real and avoid dangerous climate change, Greenpeace demands for Japan's energy sector:

- The phasing out of all subsidies for fossil fuels and nuclear energy and the internalisation of external costs.
- The setting out of legally-binding targets for renewable energy and new laws to implement those targets.
- The provision of defined and stable returns for investors.
- Guaranteed priority access to the grid for renewables.