TEPCO's View on Japan's Measures for Solving Global Warming Issues
(i.e., Creation of a Low-carbon Society)

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April 22, 2008

Achieving Japan's target as laid out in the Kyoto Protocol must be the top priority if we are to find a solution to global warming issues and therefore to create a "low-carbon society." In addition, Prime Minister Yasuo Fukuda has designated the "Cool Earth Promotion Programme" as the directional guide in the future. Based on these premises, I would like to convey my views on the issues.

1. Premise: Global warming issues cannot be treated separately from energy issues.

○ Achievement should be well balanced among a "stable supply," "environmental soundness," and "economic efficiency."

- We may put more weight on "environmental soundness," but the issues of "stable supply" and "economic efficiency" should not be downplayed.
- While securing a stable supply of energy resources remains one of the top priorities regarding security issues, it should be noted that the rise of Asian nations, namely China and India, has put Japan in a very difficult situation.

2. International Negotiations: Equitable setting of emission targets for each nation is most important.

i Participation of all major emitters, including the U.S., China, and India, is essential. The participation of the U.S. is a key prerequisite.

- Flexible treatment may be given to rapidly growing developing nations regarding their participation.

ii Japan's total emission targets must be presented in a timely manner to respond to the progress of international negotiations.

- While working on the rapid progress of the discussion within Japan, specific numerical targets on a national basis must be shown in a timely and appropriate manner.

iii The target year should be set with a long-term perspective.

- Consideration should be given to the current setting of the "base year", including its necessity.
- Progress after 2013 must be thoroughly assessed at several phases toward achievement of the mid- and long-term targets. (In Japan, the Joint Committee of Central Environmental Council and Industrial Structure Council should be reorganized into a

more practical arena of discussion with fewer participants.)

iv Fair and transparent indices (energy efficiency levels and sum of reduction potentials for each sector) must be reflected.

- Indices that developing countries have already adopted (e.g., consumption rate of coal per kWh as China adopted for an environmental index) must be strategically included.

v The first step to encourage China and India to join the framework in the next term is to boldly promote the Cooperative Sectoral Approach through united efforts of the government and private sector.

- We should continue generating ways to convince developing countries that joining the framework is a more beneficial choice for them.
- In the electricity sector, improved operation and new technology of coal power generation has the potential to reduce 1.87 billion tons of CO_2 worldwide (by 2030). Support and cooperation to make this achievement work out should be carried out mainly through the activity of the Asia Pacific Partnership (APP).

3. The three major means of achievement: "Nuclear power generation," "energy conservation," and "renewable energy"

○ Japan is placed under stricter conditions than Western countries because of its already well-advanced energy conservation practices. Nevertheless, every possible effort by the whole society is essential.

○ Various issues must be solved for promoting these means of achievement.

i Energy conservation

- Since the crude oil price hit the 100-dollar mark, each industry and company has regained keen interest in energy conservation. We must recreate a scheme to support industries and corporations.
- "Electrification" not only in households but also in industrial, commercial and transportation sectors* is the most radical means for energy conservation in the future, as it attempts to increase the rate of electricity use as a power source for various equipment and systems. When heat pumps, electric vehicles, and other electricity-operated equipment and systems are used, their high rate of efficiency will offset the increase in electricity consumption, leading to a reduction in energy consumption by society as a whole.

  * Current rate of electrification (electricity as final energy consumption): industrial: 17%, commercial: 42%, transportation: 2%, household: 47%, whole society: 22% (as of 2005).

ii Renewable Energy

- The rate of renewable energy use in Japan is rather high when considering the fact that the population and industry is concentrated in 20% of the land area. Deregulation of land use may be needed to help solve the problem, since many of the best potential sites

for wind power plants and geothermal power plants are located within national parks.

- Recognizing the fact that renewable energy resources can be unstable power sources due to the volatility of sunlight and wind, the power company responsible for each grid system should give reliable support to ensure a stable power supply for the users. When large-scale renewable power sources are installed intensively in one area, for example, measures to stabilize the transmission and distribution network (e.g., installation of batteries) which is substantially expensive is essential. It is noteworthy that people in Japan are seemingly the toughest with regard to power quality.*

  * Duration of power outage occurred per household in a year: TEPCO: 3 minutes (in 2006), U.S.: 80 minutes, U.K.: 93 minutes, France: 45 minutes (in 2003).

- Technological development is the key to promote renewable energy use, but higher costs are expected in the foreseeable future. A consensus of opinions must be sought to have the cost for facility installation and backup operation be paid by the consumers.*

  * Germany, for example, has imposed renenwable energy costs on consumers at an equivalent of 500 yen/household per month. We should consider whether a similar practice can be feasible in Japan. It should be also noted that the current participation rate of the 500-yen-per-month Green Power Fund is on a slight decline by around 0.1%.

iii Nuclear Power Generation (Most effective solution)

- Increasing the capacity factor of the existing reactors based upon operational safety should present the most effective solution for the meantime. Efforts by electric power suppliers to further improve quality management, together with rationalization and streamlining of the existing regulations, will enable Japan to raise the capacity factor from current rate (approximately 75%*) to the level commonly seen in other countries (approximately 90%) in about 10 years.

  * The capacity factor of nuclear power plants in Japan is significantly lower than other countries, partially due to unexpected circumstances such as the reactor shutdown in the Kashiwazaki Kariwa Nuclear Power Plants after the 2007 Niigata-Chuetsu-oki Earthquake (Current capacity factor: 61% in Japan (fiscal 2007) compared to 89% in the U.S. (2005) and 95% in South Korea (2005)).

  *By increasing the capacity factor by 1%, about 3 million tons of CO_2 emissions can be reduced. (It would take 4GW of photovoltaic generation to gain the same level of reduction.) When the ratio is increased to 90%, it can result in approximately a 3% reduction in total CO_2 emissions of Japan.

- While nuclear power generation must be the way to gain maximum results with minimum costs,* its promotion cannot be succeeded by the efforts of the private sector alone. To this end, the remarks by Prime Minister Fukuda at the 41st Annual Conference of the Japan Atomic Industrial Forum on April 15 (i.e., “steady promotion of (nuclear

power generation) as the base load power source is crucial" and "(nuclear power generation is) the trump card for global warming countermeasures") are very encouraging. We would like to have the Ministry of Economiy, Trade and Industry and the whole national government are expected to pursue their roles to gain understanding from the public regarding the necessity and benefits of nuclear power generation.

* Expected effects from the construction of a nuclear power plant at the cost of one trillion yen is a reduction of about 17.5 million tons of CO_2 annually (about 3.5GW). When the same amount of money is spent for construction of a solar power plant, only one million tons of CO_2 can be reduced annually from about 1.5 GW of power generation. Thus, construction of a nuclear power plant is 17 times more efficient for reducing CO_2.

- In response to the "Nuclear Power Renaissance," or the trend of a higher demand for nuclear power plant construction throughout the world, Japan should take a leading role to create a comprehensive promotion scheme regarding response to developing countries which should be treated as the theme at the G8 Hokkaido Toyako Summit. Response to developing countries include issues such as (1) safety measures of nuclear power plant construction, operation and maintenance, (2) nuclear nonproliferation, and (3) nuclear security.

  * At least 20 countries, including Vietnam, Thailand, and Indonesia in Asia, as well as Saudi Arabia and the UAE in the Middle East, are planning to launch a nuclear power program.

4. Political means: Voluntary measures, emissions trading, etc.

- On the premise of setting total emission targets equitably for each country, political means to promote the measures to achieve the targets should be left to the government of each nation.
- Japan should compete with Western countries not on "policy measures", but the "results," with transparency and accountability, so as to evaluate the performance of each sector and macro indices, which is another reason why the sectoral approach is important.
- Japanese industries and corporations successfully surmounted the two oil crises in the past. Appropriate conditions should be prepared to encourage their efforts and to raise their motivation. Without rationalized systems that respect initiatives of the private sector, the Japanese economy may face a crisis.

i Technological development and the role of industry

- Technological competency is the strongest advantage of Japan's industrial sector and can be its greatest contribution to the world. Therefore, the development of technology is the fundamental role of Japan's industrial sector.

- We would like to have the government to determine the policies that can promote technological development in the most effective manner. For example, the "top runner method," an approach that may not be easily accepted in Western countries, has served as the driving force to move the Japan's energy conservation technologies into the leading position in the world.

ii Voluntary measures

- The industrial sector of Japan is to promote its social commitment to further improve Japan's energy efficiency, which is already at the highest level in the world. While it may not be readily understood by Western countries and can be criticized as being "cozy ties" even within the nation, the industrial sector of Japan is ready to fulfill its social commitment. This is because of the sector's awareness to its responsibility and its cultural background. Businesses are to continue pursuing technological innovation and commit themselves to the most effective measures, as well as increase accountability.
- Headline targets should be set for each sector (i.e., industrial, transportation, commercial, and households), and achievement (including social commitment) of each sector must be periodically checked and reviewed.

iii Emissions trading systems

- The remark, "Don't miss the bus," seems to be an indication of the desire to not miss opportunities in environment-related financial businesses. Emissions trading should remain an indirect political measure.
- CDM/JI and other CO_2 credit trading will remain essential as a complementary tool for fulfilling voluntary measures. To this end, the enhancement of market monitoring functions is desirable in order to increase the effectiveness of emissions reduction programs, avoid negative impact of market speculation, and increase the credibility of the trading system.
- A "cap" coercively imposed on the system by the government will be a problem. A critical question for Japan is whether the coercive "cap" can be successfully separated from active use of a trading system.
- If an auction system is adopted (i.e., all CO_2 emissions must be liable), we will recognize it as a coercive imposition of an environmental tax without tariff rates. For electricity companies, which must purchase emission credits necessary to ensure a stable supply of electricity, the auction system may lead to the unavoidable rise of electric rates at a substantial level.* That will negatively affect not only the international competitiveness of the industry, but also the livelihood of low-income consumers and the elderly. Given the sluggish increase of consumer income, this may not be easily accepted.

  * When calculated with a purchase of emission credit at 3,000 yen/ton CO_2, a 6 to 9% increase (4,000 yen/year for average household and 20 million yen/year for large-scale factories) is estimated. IPCC in its Third Assessment Report estimated the

marginal costs of CO_2 reduction in Japan to be about 10,000 yen/ton CO_2.

iv Measures for commercial use and households

- Political measures to be applied for the related industries, such as the housing and energy-conservation home appliance industries, must be continued. Examples of such measures include: effective use of ICT systems, subsidies, tax breaks, the top-runner method,* standardization of super-insulated houses, and labeling systems.

  * Energy consumption efficiency has improved by about 80% for refrigerators (between 1994 and 2003) and about 30% for air-conditioners (between 1995 and 2004).

- While many consumers are aware of the needs for energy conservation, their awareness has not concluded in actions or results. We need to raise their awareness further to change their attitudes.
- As a corporation that is directly related to consumers, TEPCO recognizes the important roles of the programs* that continuously try to raise the awareness of consumers.

  * Examples of consumer-awareness-raising programs by TEPCO:

    (1) Providing a "CO_2 Household Account Book" via the Internet (current participation: approx. 12,000).

    (2) Development of "PowerNavi Unit" (a home-use distribution board with a power limitation function) to prevent the overuse of electricity by households.

5. TEPCO's Vision (as an electric power company)

i The global warming measures of an electric power company are to contribute to the realization of a low-carbon, energy-conservation society through:

- Long-term efforts for the stable supply of low-carbon electricity (i.e., electricity with low CO_2 emissions intensity), and
- Promotion of electrification (rate of electricity as final energy consumption) through the diffusion and promotion of high-efficiency equipment.

to decrease the carbon level of power sources, we will keep working to realize the "best mix" by gradually increasing the ratio of nuclear power used in power generation from the approximate current rate 30% to 50%, while preparing other sources as security for contingencies.

ii We will work with the national government on long-term development of the "Cool Earth Energy Innovative Technology", a key program to realize a low-carbon, energy-conservation society in the future. Namely, we will work on "next generation light-water reactors and fast reactors for nuclear power generation", "coal-fired IGCC (Integrated Gasification Combined Cycle)", "high-efficiency natural gas thermal power generation", "Superconductive high-efficiency power transmission", and "Super high-efficiency heat pumps" among others.

iii Considering the potential increase of various costs that will come with global warming measures, rationalized discussion of global warming measures based on

reliable data should take place and consensus on sharing the burden of the costs with the Japanese public should be fostered.