Japan's Sixth National Communication

under the United Nations Framework Convention on

Climate Change

【Addendum】

October 9, 2014

The Government of Japan

INDEX

1. Executive Summary

Chapter 1. National Circumstances Relevant to Greenhouse Gas Emissions and Removals

Japan is a long, thin archipelago that lies approximately between latitudes 24 and 46 north, and consists of four major islands as well as more than 6,800 other islands. Japan's land area equals 37.79 million hectares, or 0.3% of the total global land area, of which nearly 80% is accounted for forests and agricultural land.

Japan's population in 2012 totaled approximately 128 million, with a population density of 343 inhabitants per square kilometer. The proportion of the elderly amongst the population is rapidly increasing at a higher rate than ever, and the population segment aged 65 or older as of 2010 reached 23%. Japan's real gross domestic product (GDP) became 520 trillion yen in 2012, and per capita real GDP was 4.02 million yen.

From the 1990s onward, passenger traffic volume, along with the share of each transportation mode, has remained almost constant. Changes in the number of motor vehicles have been flat in recent years and began to decline in 2004.

Final energy consumption in Japan almost leveled off since FY2001. Looking at trends since FY2001 by consumption sector, final energy consumption has followed the downward trend in the industrial and transportation sectors, but has been on the rise in the civilian sector.

Japan has almost no domestic fossil fuel resources. The ratio of domestic production volumes for the total fossil fuel supply volume is 0.4% for crude oil and 3.1% for natural gas (all data as of FY2011). Japan's dependence on foreign energy sources has remained at about 80% in recent years, putting the nation in a vulnerable energy supply situation.

In FY2011, oil's share of total primary energy supply stood at 46.1%, followed by 21% for coal, 21% for natural gas and 4% for nuclear power. With regard to the nuclear energy generation, despite its increase in share since FY1973, it shrank due to the impact of the Great East Japan Earthquake.

Japan's total primary energy supply per capita has been declining in recent years. Japan's total primary energy supply per unit of GDP has followed the general downward trend since FY2001 in the wake of the change in the industrial structure.

Chapter 2. Trends in GHG Emissions and Removal

Total GHG emissions in FY2011 (excluding LULUCF) amounted to 1,308 million tonnes (in CO_2 eq.). They increased by 8.5% compared to the emissions in FY1990 (excluding LULUCF). Compared to the emissions in the base year under the Kyoto Protocol, they increased by 3.7%. The main driving factor was the increase in fossil fuel consumption in response to the expansion of thermal power generation due to the suspension of nuclear power plants, although the amount of manufacturing production decreased due to the influence of the Great East Japan Earthquake, which occurred in March 2011.

Table 1 Trends in GHG Emissions and Removals in Japan

[Million tonnes CO_2 eq.]	GWP	KPBY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 (excl. LULUCF)	1	1,144.1	1,141.1	1,150.1	1,158.5	1,150.9	1,210.7	1,223.7	1,236.6	1,231.5	1,195.9	1,230.8
CO_2 (incl. LULUCF)	1	NA	1,071.5	1,073.3	1,082.1	1,072.0	1,130.3	1,143.0	1,151.4	1,146.0	1,110.6	1,145.4
CO_2 (LULUCF only)	1	NA	-69.6	-76.8	-76.5	-78.9	-80.3	-80.7	-85.2	-85.5	-85.3	-85.4
CH_4 (excl. LULUCF)	21	33.4	32.1	31.9	31.6	31.4	30.7	29.9	29.1	28.1	27.3	26.7
CH_4 (incl. LULUCF)	21	NA	32.1	31.9	31.6	31.4	30.7	29.9	29.2	28.1	27.3	26.7
N_2O (excl. LULUCF)	310	32.6	31.6	31.1	31.2	31.0	32.2	32.6	33.6	34.3	32.8	26.4
N_2O (incl. LULUCF)	310	NA	31.6	31.1	31.3	31.0	32.2	32.7	33.7	34.3	32.8	26.4
HFCs	HFC-134a: 1,300 etc.	20.2	NE	NE	NE	NE	NE	20.3	19.9	19.9	19.4	19.9
PFCs	PFC-14: 6,500 etc.	14.0	NE	NE	NE	NE	NE	14.3	14.8	16.2	13.4	10.4
SF_6	23,900	16.9	NE	NE	NE	NE	NE	17.0	17.5	15.0	13.6	9.3
Gross total (excl. LULUCF)		1,261.3	1,204.8	1,213.0	1,221.4	1,213.2	1,273.6	1,337.7	1,351.6	1,345.0	1,302.4	1,323.5
Net total (incl. LULUCF)		NA	1,135.3	1,136.3	1,145.0	1,134.4	1,193.3	1,257.1	1,266.4	1,259.5	1,217.2	1,238.2

[Million tonnes CO_2 eq.]	GWP		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CO_2 (excl. LULUCF)	1		1,251.5	1,236.3	1,273.4	1,278.5	1,277.9	1,282.1	1,262.9	1,296.2	1,213.8	1,141.5
CO_2 (incl. LULUCF)	1		1,165.4	1,150.2	1,186.2	1,182.2	1,182.1	1,193.3	1,179.8	1,213.8	1,135.7	1,067.4
CO_2 (LULUCF only)	1		-86.0	-86.1	-87.2	-96.3	-95.8	-88.9	-83.1	-82.3	-78.2	-74.1
CH_4 (excl. LULUCF)	21		26.1	25.2	24.3	23.8	23.4	23.0	22.7	22.3	21.8	21.2
CH_4 (incl. LULUCF)	21		26.1	25.2	24.3	23.8	23.4	23.0	22.7	22.3	21.8	21.2
N_2O (excl. LULUCF)	310		28.9	25.5	24.8	24.4	24.4	23.9	23.9	22.7	22.7	22.5
N_2O (incl. LULUCF)	310		29.0	25.5	24.8	24.4	24.5	24.0	23.9	22.7	22.7	22.5
HFCs	HFC-134a: 1,300 etc.		18.8	16.2	13.7	13.8	10.6	10.5	11.7	13.3	15.3	16.6
PFCs	PFC-14: 6,500 etc.		9.6	8.0	7.4	7.2	7.5	7.0	7.3	6.4	4.6	3.3
SF_6	23,900		7.2	6.0	5.6	5.3	5.1	4.8	4.9	4.4	3.8	1.9
Gross total (excl. LULUCF)			1,342.1	1,317.1	1,349.2	1,352.9	1,348.8	1,351.4	1,333.5	1,365.2	1,282.0	1,206.8
Net total (incl. LULUCF)			1,256.1	1,231.0	1,262.0	1,256.6	1,253.0	1,262.6	1,250.4	1,282.9	1,203.8	1,132.8

[Million tonnes CO_2 eq.]	GWP		2010	2011	Changes in emissions/removals (2011)			
					KPBY	1990	1995	Previous year
CO_2 (excl. LULUCF)	1		1,191.1	1,240.7	8.4%	8.7%	-	4.2%
CO_2 (incl. LULUCF)	1		1,115.3	1,165.2	-	8.7%	-	4.5%
CO_2 (LULUCF only)	1		-75.8	-75.4	-	8.4%	-	-0.4%
CH_4 (excl. LULUCF)	21		20.7	20.3	-39.2%	-36.8%	-	-2.1%
CH_4 (incl. LULUCF)	21		20.7	20.3	-	-36.8%	-	-2.1%
N_2O (excl. LULUCF)	310		22.0	21.6	-33.7%	-31.5%	-	-1.7%
N_2O (incl. LULUCF)	310		22.0	21.6	-	-31.6%	-	-1.7%
HFCs	HFC-134a: 1,300 etc.		18.3	20.5	1.3%	-	1.0%	11.8%
PFCs	PFC-14: 6,500 etc.		3.4	3.0	-78.5%	-	-78.9%	-11.5%
SF_6	23,900		1.9	1.6	-90.3%	-	-90.3%	-12.1%
Gross total (excl. LULUCF)			1,257.4	1,307.7	3.7%	8.5%	-2.2%	4.0%
Net total (incl. LULUCF)			1,181.6	1,232.3	-	8.5%	-	4.3%

* KPBY : Base year of Kyoto Protocol
* NA : Not applicable
* NE : Not estimated
* LULUCF: Land Use, Land-Use Change and Forestry
* CH_4 and N_2O emissions in Table 1 include emissions from LULUCF based on the estimation method decided by the UNFCCC. On the other hand, since emissions from LULUCF are regarded as RMUs (removal units) according to Article 3.3 of the Kyoto Protocol, they are not included in GHGs emissions based on the Kyoto Protocol (refer annex 8 table 1).

Chapter 3. Policies and Measures

1 Information Regarding Institutional Arrangements in Japan

In the Government, related ministries and agencies will closely cooperate with each other, led by the "Global Warming Prevention Headquarters" chaired by the Prime Minister and all Cabinet ministers as member, and the "Directors' Meeting of the Global Warming Prevention Headquarters" as a ministries' director-general level meeting.

The Government will strictly manage the progress of policies and measures stated in this chapter.
The Government will strictly assess and verify voluntary initiatives conducted by business operators in accordance with the "Commitment to a Low Carbon Society". As for measures and policies stated in the Japan Revitalization Strategy endorsed by the Cabinet on June 25, 2013, the Government will implement the conventional PDCA cycle.

2 Policies and Measures on Mitigation Actions and Their Effects

2.1 Policies and Measures for Greenhouse Gas Emissions Reductions and Removals

2.1.a Policies and Measures for Greenhouse Gas Emissions Reductions

a) Energy-Originated CO_2

1) Formulation of Low-carbon Urban/Regional Structures and Socioeconomic Systems

Since urban/regional structures and transportation systems will continue to influence CO_2 emissions in the mid- and long-term time frames through increases/decreases in traffic and other factors, the Government will encourage low-carbon urban/regional development in the mid- and long-term time frame by low-carbonizing urban/regional structures and socio-economic system through the promotion of non-fossil-fuel energy use such as solar power, supports for actions on GHG emissions reduction led by citizens and business operators and promotion of rearrangement and improvement of regional environment (i.e. promotion of convenience of public transportation) based on the action plans for low carbon society in the local level which are in accordance with the Act on Promotion of Global Warming Countermeasures (Act No. 117 of 1998) and such activities are expected to be associated with city plans, the Plan on Establishment of Agricultural Promotion Regions, and other countermeasures.

2) Policies and Measures by Sector (Industrial, Residential & Commercial, Transport, etc.)

A. Initiatives in the Industrial Sector (Manufacturers, etc.)

(a) Promotion and Reinforcement of Voluntary Action Plans of Industry (voluntary initiatives by business operators in accordance with the Commitment to a Low Carbon Society)

Through the formulation and publication of the Guidelines for Controlling Greenhouse Gas Emissions based on the Act on Promotion of Global Warming Countermeasures, the Government will encourage business operators to actively implement environmentally-friendly business actions on a voluntary basis.

(b) Promotion of Introduction of Highly Energy-efficient Equipment and Devices

Encouraging business operators to invest in energy saving, the Government will implement support measures including replacement with cutting-edge energy-saving equipment at the time of replacing facilities and equipment at plants and operation sites.

B. Initiatives in the Commercial and Other Sector

(a) Low-carbonization and Energy-savings in Equipment and Devices

The Government improves energy-saving performance of devices through application of the Top Runner Program that requires manufacturers and importers of products to meet criteria which is in line with standards of currently most-advanced devices and assumed technological advances in about 3 to 10 years.

(b) Improvement of the Energy-efficiency Performance and Low-carbonization of Housing and Buildings

While giving full consideration to the necessity and levels of regulations and their balance, and other matters, the Government will make it mandatory in stages to comply with energy conservation standards for newly constructed housing and buildings by 2020.

(c) Smart Consumption of Energy by Using Energy Management

The Government will improve the method for using devices by dramatically enhancing the energy consumption efficiency of equipment and utilize the developed network, while realizing the smart consumption of energy through 'Energy management' through which consumers voluntarily participate in and contribute to the demand and supply as well as management of energy with a view to create a society with optimum, efficient energy consumption.

(d) Initiatives by Public Organizations

The Government will reduce greenhouse gas emissions with regard to its own administration and undertakings at a level which is equivalent or superior to initiatives in the current national commitment plan, even during the period before the new national commitment plan is formulated in line with the new plan for global warming prevention.

C. Initiatives in the Residential Sector

(a) Low-carbonization and Energy-savings in Equipment and Devices

(b) Improvement of the Energy-efficiency Performance and Low-carbonization of Housing and Buildings

(c) Diffusion of Combined Heat and Power

Since simultaneous generation and use of electricity and heat enables effective consumption of energy, the Government promotes the diffusion of combined heat and power such as household fuel cells ("Ene-farm").

In order to accelerate the introduction of fuel cells to Japan's market ahead of the world, the Government promotes advanced research and development and strive to lower cost while promoting thorough standardization of this technology, with an eye to introducing 5.3 million household fuel cells ("Ene-farm") into the market by 2030 (1.4 million by 2020).

(d) Support for the Development and Diffusion of CO_2 saving measures

The Government will work on the "visualization" of CO_2 emissions by various product types by displaying information on emissions and other items during the product's life cycle. Moreover, the Government will work to promote innovative changes towards low-carbon lifestyle through the introduction of HEMS, which operates lighting, air conditioners and other devices to optimally adjust to interior conditions, promotion of the use of HEMS data, and promotion of "Home CO_2 advisor service."

D. Initiatives in the Transport Sector

(a) Promotion of the Use and Diffusion of Vehicles with Lower Environmental Load

For highly energy-efficient next-generation vehicles (including hybrid vehicles, electric vehicles, plug-in hybrid vehicles, fuel-cell vehicles, clean diesel vehicles and compressed natural gas vehicles), the Government will aim to increase the share of these vehicles in the new car sales from 50 percent to 70 percent by 2030 by promoting measures to create initial demand, support R&D to improve performance and build efficient infrastructure. In order to enable the release of fuel-cell vehicles to the market in 2015, the Government will review regulations on fuel-cell vehicles and hydrogen infrastructure and support the introduction of hydrogen stations (preliminary introduction in approximately 100 locations mainly in four major metropolitan areas by FY2015) with the aim to achieve the world's fastest diffusion of fuel-cell vehicles.

(b) Promotion of Traffic Flow Management and Promotion of the Environmentally-friendly Usages of Vehicles

The Government will promote the environmentally-conscious form of driving by pursuing the diffusion of Eco-drive Management Systems (EMS) for vehicle transport operators.

(c) Promotion of Public Transport Utilization

The Government will promote the use of public transport systems through various measures including improving the service and convenience of railways and buses (facilitating connections, diffusing IC travel card, making vehicles and passenger terminal facilities barrier-free, developing public transport systems such as new line of railway, Light Rail Transit (LRT) and Bus Rapid Transit (BRT) etc.), and promotion of eco-commuting.

(d) Promotion of Low-Carbonized Transportation through Railway, Vessel, and Aviation

The Government will promote the low carbonization of vessels, railways and aircraft including energy

saving in domestic vessels through manufacturing of Super Eco-Ships, alternation to the manufacturing of vessels with energy-saving equipment, energy saving in domestic aviation through efficient operating method for aircrafts and low-carbonization of airport facilities, and energy saving in railways by advancing the Eco-Rail Line project, which introduces highly energy-efficient vehicles and renewable energies in railway facilities etc.

(e) Improvement of the Efficiency of Logistics Systems and Promotion of Modal Shifts, etc.

The Government will improve the efficiency of truck transport by encouraging the use of larger trucks such as large CNG trucks and promoting cooperative transport and delivery by logistics operators etc. within regions.

E. Initiatives in the Energy Conversion Sector

(a) Power from Renewable Energy Sources

Carbon dioxide emission levels from renewable energy are smaller compared to thermal power. Thus, promoting further introduction of renewable energies is vital for conducting measures in the energy conversion sector.

In addition to the viewpoint of improving energy security through the use of domestic energy resources, promoting renewable energy also represents an important growth strategy, since it stimulates creation of a new energy-related industry and expansion of job opportunities, which supports the national developing strategy. The Government will promote the thorough use of renewable energy sources including onshore and offshore wind power, solar power, small-scale hydro power, geothermal power and biomass and expand their introduction to the maximum extent possible for the coming three years.

Other than the abovementioned energy sources, the Government will take actions for early commercialization of ocean power generation through technology development and demonstration. In addition to these activities, the Government will, among others, promote the demonstration and introduction of the independent and decentralized energy system with renewable energies as a core, in regions such as remote islands.

(b) Renewable Heat Energy

The Government will promote the use of renewable heat energy sources that are specific to particular regions, such as solar heat, biomass heat, geo-heat, hot springs heat, river heat, sewage heat and ice melt heat, and also the use of exhaust heat such as waste heat from incineration, in order to realize efficient energy supply in local regions.

(c) Persuasion of High Efficiency in Thermal Power Generation

The government will advance introduction of highly efficient thermal power generation (coal/LNG) with environmental considerations, and make efforts to improve power generation efficiency further by advancing technology development.

Specifically, the Government will promote development of framework for managing CO_2 emissions trend with participation of the whole stakeholders of power generation, which should be consistent with the national GHG emissions reduction target based on the review of energy policies and energy mix. Moreover, speeding-up and clarification of environmental assessment should be promoted and the Government will arrange environment for the private sector so that the sector can easily invest in the highly-efficient (coal or LNG) thermal power generation.

At the same time, the Government will support technological development. The Government aims to achieve practical use of advanced ultra-supercritical (A-USC) thermal power generation in 2020s (generating efficiency: around 39% at present to improve to around 46%). The Government aims to establish technology of integrated coal gasification fuel cell combined cycle (IGFC) by 2025 and achieve practical use in 2030s (generating efficiency: around 39% at present to improve to around 55%) For LNG thermal power generation, the Government aims to achieve practical use of gas turbine of 1700 °C class by around 2020 (generating efficiency: around 52% at present to improve to around 57%).

Also concerning carbon dioxide capture and storage (CCS), the Government will accelerate technological development for practical use around 2020s and conduct survey on potential CO_2 storage sites for CCS precondition in order to obtain outcomes at an early date. Also the Government will consider the possibility of coal thermal power plants being equipped with CCS by 2030 on the precondition of commercialization, make it clear what to expect on CCS Ready along with a considerations about the progress of survey on the sites and commercialization, and consider the possibility of the introduction of CCS Ready as early as possible.

(d) Utilizing Nuclear Power Generations whose Safety is Confirmed

The Government will leave judgment of the safety of nuclear power plants to the specialist of the Nuclear Regulation Authority. When the Nuclear Regulation Authority admits the compliance to regulatory standards, the government will respect the judgment and will proceed with the restart of the nuclear plant. In this case, the Government will make efforts to obtain understanding and cooperation of relevant parties including the municipality of each nuclear facility site.

b) Non Energy-originated CO_2

The Government will reduce CO_2 emissions in the cement production process by reducing the production volume of clinker through increased production proportion and expanded use of blended cement, which is made by mixing blast-furnace slag with clinker, an intermediate cement product.

c) Methane and Nitrous Oxide

1) Methane (CH_4)

The Government will promote the reduction of direct landfill of organic waste such as garbage, which will in turn reduce methane emissions associated with waste landfill.

2) Nitrous Oxide (N_2O)

Upgrading combustion technology at sewage sludge incineration facilities will help to reduce nitrous oxide emissions associated with combustion.

d) Fluorinated Gases: HFC, PFC, SF_6 and NF_3

The Fluorocarbons Recovery and Destruction Law was amended in June 2013 to take measures to encourage more rational use and more proper management of fluorocarbons among operators at all stages of the fluorocarbon life cycle. The title of the Law was also changed to "Act on Rational Use and Proper Management of Fluorocarbons (hereinafter referred to as Fluorocarbons Law)".

2.1.b Greenhouse Gas Sink Policies and Measures

(a) Measures for Managing Forest Carbon Sink

Through implementation of measures designed to achieve the objectives regarding the multiple roles of forests as well as the supply and usage of forest products outlined in the "Basic Plan for Forest and Forestry endorsed by the Cabinet in July 2011 in accordance with the Forest and Forestry Basic Act (Law No. 161, 1964)", the Government will aim to attain the forest sink target that the amount of removals by forest management for the period between FY2013 and FY2020 will be, on average, 3.5% of the total GHG emissions in FY1990 (approximately 44 million t-CO_2), which is the agreed upper limit of removals by forest management for the second commitment period of the Kyoto Protocol. The level of removals will correspond with approximately 2.8% or more of the total GHG emissions in FY2005 (approximately 38 million t-CO_2).

(b) Measurement for Sink Source in Agricultural Soil

It is proven that the carbon storage in Japanese agricultural lands and pasture soils can be increased by continuous usage of organic matter in fertilizers and green manures. By promoting these methods, it contributes to the increased carbon storage in both agricultural lands and pasture soils.

(c) Promotion of Urban Greening

For the urban greening, actions will be continuously promoted such as park maintenance, greening in roads and bays, and creation of the new greening spaces at buildings. Improvement in report and verification system for the urban greening will also be strategically carried out.

2.2 Cross-sectional Strategies

a) GHG Emissions Accounting Reporting and Disclosure Program

Based on the "Act on Promotion of Global Warming Countermeasures", Greenhouse gas emitters who

exceed the given threshold volume are obligated to measure and report their emission volumes annually to the Government, and the Government firmly administrates the monitoring and reporting system by collecting and sorting out the reported data and disclose it to the public and the Government will further enhance and strengthen this system.

b) Making the Tax System Greener

The Government will pursue greening of the entire tax system including energy and vehicle taxes.

c) Domestic Emission Trading Scheme

The Government has been considering an emission trading scheme carefully, taking into consideration the burden on domestic industry and associated impacts on employment; ongoing developments of emission trading schemes overseas; evaluation of existing major climate change policy measures such as voluntary actions implemented by the industry sector; and the progress toward the establishment of a fair and effective international framework where all major emitters participate.

d) Preliminary Studies, Forecast and Evaluation of GHG Projects

In order to encourage active efforts by business operators to reduce GHG emissions, the Government will assess environmental impact to ascertain that projects incorporate appropriate environmental conservative considerations during the construction phase and at service delivery.

e) Promotion of Environmental Considerations in Business Activities

Government will encourage business operators to implement environmentally-conscious business activities on a voluntary and active basis by formulating and publishing the Guidelines for Controlling Greenhouse Gas Emissions Based on the Act on Promotion of Global Warming Countermeasures.

f) Greening Finance

The Government will provide financial supports to mobilize private funds into low-carbon projects. More specifically, it will provide equity investment into projects where private financial resources are not sufficient and encourage leasing of low-carbon equipment to reduce the burden of up-front costs.

In addition, the Government will promote loans based on environmental responsibility ratings and socially responsible investment (SRI).

g) Promotion of a credit scheme for promoting Emission Reduction Activities in Japan (J-Credit system)

In order to actively encourage stakeholders in Japan to reduce GHGs emissions through the introduction of energy-saving equipment, the use of renewable energy and carbon sinks through appropriate forest management, the Government operates the “J-Credit scheme” established in April 2013 as a new credit certification scheme. The generated credits are used for achieving the goals of the Commitment to a Low-Carbon Society and for carbon offset, among others.

h) Development of Public Campaigns

The Government will work to enhance public and business operators' awareness and understanding of the global warming issues, by providing clear and useful information about adverse impacts of global warming on the public and society backed by the latest scientific information, through dialog and various forms of media.

i) Technology Development for Global Warming Countermeasures

Developing and verifying technologies for global warming countermeasures are initiatives to realize the future reduction of a large amount of greenhouse gas emissions by promoting the expansion of greenhouse gas emission reductions and the decrease of reduction costs and thereby widely diffusing them in society.

The Government will therefore promote the technological development and verification in order to realize the lower cost, higher efficiency and longer life etc. of renewable energy etc. and energy conservation.

3 Policies and Measures on Mitigation Actions and Their Effects

3.1 Formulating International Regulation on CO2 Emissions from Aviation and Maritime Transport Industries

In the international aviation industry, some emissions reduction policies have already practiced such as improvement of fuel efficiencies of aircrafts by 2% annually and the emissions reduction target has set as reducing or at least stabilizing CO2 emissions from the industry after 2020, which was set by ICAO.

In the international maritime vessel industry, the International Convention for the Prevention of Pollution from Ships was partly amended by IMO in 2011 so that the newly produced ships would be under regulation of fuel efficiency standards and the amendment was based on the proposal from Japan.

3.2 Actions to Minimize Adverse Impacts in Accordance with Article 3, Paragraph 14

Japan has given a priority to the efforts below, taking into consideration that these efforts are important to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention in implementing the commitments under Article 3, paragraph 1 of the Kyoto Protocol.

a) Technical Assistance in the Energy and Environmental Sectors

Based on the Japan's Cooperation Initiative for Clean Energy and Sustainable Growth presented at the 2nd East Asia Summit in January 2007 and the agreement reached at Asian Ministerial Energy Roundtable held in April 2009, we provided the cooperation in human resource development through accepting trainees and dispatching experts in the area of energy conservation and renewable energy to countries in East Asia and

Middle East.

b) Assistance to Oil Producing Countries in Diversifying Their Economies

In April 2009, the 3rd Asian Ministerial Energy Roundtable was held in Japan where we requested that regulatory agencies take more coordinated actions to strengthen surveillance on commodity futures trading markets and enhance its transparency for the stabilization of the oil market.

c) Development of Carbon Capture and Storage (CCS) Technologies

Recognizing that CCS is an innovative technology that may achieve highly efficient carbon emissions reductions, Japan has been implementing large-scale demonstration projects toward practical use of CCS by 2020, as well as researches and developments on cost reductions and safety improvements.

Chapter 4. Projections and the Total Effect of Policies and Measures

Energy-originated CO_2 covers more than 90% of Japan's GHG emission. Based on statistics, it could be broken down into 5 sectors: Industry; Commercial and other; Residential; Transport; and Energy conversion. The effects of policies and measures can be observed in each sector as well. Table 4.1 shows emission projection for each sector. This is an indicative level which is estimated to be achievable with the economic growth currently expected and where policies for each sector on energy demand accomplish expected outcomes. It is necessary to note that emission levels shown in Table 4.1 are indicative levels, estimated using emission intensity in FY2012, which is the latest results, because projection on nuclear power plant activities for FY2020 is currently unavailable and emission factor for power generation in FY2020 is unable to be set. The estimation figures may vary depending on future circumstances.

Table 2 Estimated emissions of energy-originated CO_2 in each sector

		Base year (FY2005)	FY2012 (preliminary figures)	Estimated emissions of each sector in FY2020	
		A	-	B	(B-A)/A
		Million t-CO_2	Million t-CO_2	Million t-CO_2 (Note 1)	(Increase rate of each sector compared to base year)
Energy-originated CO_2		1,203	1,207	1,208	+0.4%
	Industry	459	431	484	+5.4%
	Commercial and Other	236	259	263	+11.4%
	Residential	174	203	176	+1.1%
	Transport	254	227	190	-25.2%

	Energy conversion (Note 2)	79	86	95	+20.3%

(Note 1) Because projection on nuclear power plant activities for FY2020 is currently unavailable and emission factor for power generation in FY2020 is unable to be set, these figures were estimated using emission intensity in FY2012, which is the latest result.
(Note 2) Because power supply mix in FY2020 is currently unavailable, the future energy consumption of own use in power plants is unavailable as well. Hence, the energy consumption level for FY2020 is assumed to be the same as in FY2005.

The target for non-energy-originated CO_2 is set as -12.5% (approximately 70 million t-CO_2) compared to FY2005.The target for methane is set as -21.7% (approximately 18 million t-CO_2) compared to FY2005.The target for nitrous oxide is set as -8.3% (approximately 22 million t-CO_2) compared to FY2005.

Table 3 Estimated emission amount of non-energy-originated CO_2, methane and nitrous oxide

	Base year (FY2005)	Estimated emission amount of each gas in FY2020	
	A	B	(B-A)/A
	Million t-CO_2	Million t-CO_2	Compared to base year
Non-energy-originated CO_2	80	70	-12.5%
Methane	23	18	-21.7%
Nitrous oxide	24	22	-8.3%

(Note) The Global Warming Potentials, based on the IPCC Second Assessment Report, are used.

Since refrigerants in refrigerators and air-conditioners have shifted from HCFCs, which are ozone depleting substances, to HFCs, it is expected that the emissions of fluorinated gases (HFCs, PFCs, SF_6 and NF_3) will increase. The goal is set as no more than +109.1% (approximately 46 million t-CO_2) emissions compared to CY2005. However, since estimation for some HFCs, PFCs and NF_3 are not available at this point, the estimation of these gases are excluded.

Table 4 Estimated emissions of fluorinated gases and each gas

	Base year (FY2005)	Estimated emissions of fluorinated gases and each gas	
	Million t-CO_2	Million t-CO_2 (Note 1)	Compared to base year
Fluorinated gases	22	46	+109.1%
HFCs	11	41	+272.7%
PFCs	7	3	-57.1%
SF_6	5	2	-60.0%
NF_3 (Note 2)	-	-	-

(Note) The Global Warming Potentials, based on the IPCC Second Assessment Report, are used.

(Note 1) Expected reduction effect by "Law for Partial Amendment to Law Concerning the Recovery and Destruction of Fluorocarbons" in 2013 is not reflected in the table. The figure is planned to be reviewed after measures of the above-mentioned law are concretized.
(Note 2) Emissions of some HFCs, PFCs and NF_3, additional gases for the second commitment period of the Kyoto Protocol as agreed at the COP 17 and other conferences, are not estimated and reflected in this table.

Chapter 5. Vulnerability Assessment, Climate Change Impacts, and Adaptation Measures

Japan's average temperature has been on an upward trend over the long term. Changes in precipitation are also evident, with the number of days with rainfall of 100mm or more and the frequency of hourly heavy rains of 50mm or more are on the rise. In the future projection under the SRES (B1, A1B, A2 scenario), Japan's average temperature is projected to increase by approximately 2.1 - 4.0°C in the end of the 21st century compared to that of the end of 20th century. Furthermore, the frequency of hourly heavy rains will increase in all regions in Japan. In addition, rising of sea level, increasing sea surface temperature and decreasing snowfall in many areas in Japan are projected.

Researches to date indicate that climate change could significantly impact on water resource and water environment, coastal areas and flooding, natural ecosystems, food production, health risks etc. in Japan.

These impacts of climate change have already emerged in Japan, thus adaptive measures have been already designed in some sectors to address the problem. And many reports about monitoring and prediction have released by various ministries of Japan, which is the basic data to consider the adaptive measures. Furthermore, based on the accumulation on adaptive measures a common approach to adaptive measures has been organized. At the same time, implementing adaptive measures throughout Japan is required, thus the government will formulate a national adaptation program by the summer of 2015.

Chapter 6. Fund Source and Technology Transfer (including the information of Article 10 and 11 of the Kyoto Protocol)

In December 2009, Japan announced the assistance of approximately USD 15 billion including public and private financing, of which public finance comprises approximately USD 11 billion, for developing countries up to 2012 to address climate change (hereinafter referred to as the Fast-Start Finance). Japan has made utmost effort to play its part of the commitment made by developed countries to provide 30 billion to developing countries in

three years from 2010 to 2012 as agreed by the Cancun Agreements. Faced with the Great East Japan Earthquake occurred in 2011, Japan was determined to overcome the catastrophe and to continue to faithfully implement the commitment on the Fast-Start Finance to fulfill a positive role in the international community.

USD 17.6 billion including public and private financing has been implemented as of December 2012 about Japan's assistance to developing countries.
As for the financial support for the developing countries beyond 2013 to address climate change, in the "Proactive Diplomatic Strategy for Countering Global Warming" made in November 2013, Japan made a financial pledge 1.6 trillion yen to assist developing countries to strengthen "partnership" with various countries and stakeholders. Japan will also strengthen partnership with developing countries and will contribute to solve the climate change problem all over the globe through the development of technologies of environment and energy fields (Innovation), and taking a leadership on international diffusion of the technologies (Application). Furthermore, Japan actively conducts projects to enhance their capacity with taking advantage of our low-carbon technologies, know-how, and experiences of developing low-carbon society in Japan to leverage the progress of global climate change actions.

Chapter 7. Research and Systematic Observation

1. Research

Regarding research and studies on climate change and global warming, the Government of Japan, while taking into consideration the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, is comprehensively promoting research and studies on the observation and projection of global warming and its impact, the fixation, sequestration and reduction of greenhouse gases, global warming control policies and other countermeasures, and adaptation measures for environmental changes associated with global warming. The latest results from this endeavor contributed to the Working Group I contribution to the IPCC's Fifth Assessment Report, and some of the projection results are being provided to developing countries for their regional adaptation studies. Furthermore, as bilateral cooperation, Japan-EU workshops and Japan-US workshops on global change projection studies are held biennially, in order to exchange information and compare projection results.

2. Systematic Observation

Observation and monitoring of climate change should be implemented in accordance with the Science and Technology Basic Plan and the Earth Observation Promotion Strategy. Bearing in mind Japan's contribution to the development of GEOSS based on the 10-Year Implementation Plan, organizations that carry out such observations and monitoring should adopt methods consistent with international observation and monitoring projects. In addition, the results of their activities should be available to ensure that the data is utilized effectively.

Chapter 8. Education, Training, and Public Awareness

CO_2 emissions have been consistently increasing in recent years in the residential sector, which is closely related to public life. To mitigate global warming, everyone must shift from the "mass consumption and disposal lifestyle" to one that people engage in resource and energy conservation and recycling. At the same time, the use of non-fossil fuel energy, including renewable energy, should be considered.

To these ends, the Government of Japan provides opportunities to learn about global warming, as well as the energy issues closely involved at home education, school education and social education. Japan promotes improved awareness through advertising in the mass media, distributing pamphlets, and holding symposiums. Japan is also committed to increasing support for environmental NGOs, which promise to play a leading role as advisors in public efforts to address global warming.

The Government of Japan will actively provide and share, in as visible a manner as possible, knowledge about the increasingly serious global warming issue, the specific actions for which enormous efforts are needed in order to curb GHG emissions, and information about what each individual must do. The Government of Japan will also carry out public relations and dissemination activities on these topics in order to improve the awareness of households and businesses and rouse them to take action.

2. Supplementarity relating to the Kyoto Protocol mechanisms

Japan's five-year average emissions during the first commitment period (CP1) of the Kyoto Protocol (FY2008-FY2012) amounted to 1,278Mt CO2 eq. Taking into account the forest and other carbon sinks and Kyoto Mechanisms credits, the five-year average emissions during the CP1 are accounted as an 8.4% decrease compared to the base year emissions.

The Government of Japan acquired 98 Mt CO2 eq. of credits by the end of FY2013 through the "Kyoto Mechanisms Credit Acquisition Program". In addition, according to the "Environmental Action Plan by the Japanese Electric Utility Industry (FY2013)", the Federation of Electric Power Companies of Japan acquired 273 Mt CO2 eq. of credits. In total, the amount of the Kyoto Mechanisms credits acquired by Japan was 371 Mt CO2 eq. This corresponds to 74 Mt CO2 eq. in five-year average which represents 5.9% of the base year emissions.

In 2007, which was immediately before the CP1 commenced, the Japan's total amount of emissions reached 1,364 Mt CO2 eq, and it is accounted as an 8.2% increase compared to the base year emissions. Therefore, Japan's five-year average emissions during the CP1 are accounted as a 16.6% decrease from 2007. Since the amount of the acquired Kyoto Mechanisms credits, 5.9% of the base year emission, represents one third of 16.6%, Japan's use of the Kyoto Mechanisms credits is deemed supplemental to its domestic action.

3. Additional description related to national legislative arrangements and administrative procedures that seek to ensure implementation of activities under Article 3, paragraph 3 and 4 of the Kyoto Protocol

Chapter 3 Policies and Measures

3.1.2.1.b Greenhouse Gas Sink Policies and Measures

(a) Measures for Managing Forest Carbon Sink

Through implementation of measures designed to achieve the objectives regarding the multiple roles of forests as well as the supply and usage of forest products outlined in the "Basic Plan for Forest and Forestry endorsed by the Cabinet in July 2011 in accordance with the Forest and Forestry Basic Act (Law No. 161, 1964)", the Government will aim to attain the forest sink target that the amount of removals by forest management for the period between FY2013 and FY2020 will be, on average, 3.5% of the total GHG emissions in FY1990 (approximately 44 million t-CO_2), which is the agreed upper limit of removals by forest management for the second commitment period of the Kyoto Protocol. The level of removals will correspond with approximately 2.8% or more of the total GHG emissions in FY2005 (approximately 38 million t-CO_2).

In order to attain this target by enhancing activities under Article 3, paragraph 3 (planting on land not forested in 1990) and Article 3, paragraph 4 (proper forest management, such as thinning, and proper management and conservation, such as designation as conservation forests) the Government will, with gaining understanding by and cooperation from local governments, various stakeholders and the general public, carry out a variety of measures including thinning an annual average of 520 thousand hectares, appropriate forest development such as planting, proper management and conservation of protection forests, use of timber and woody biomass and so on. In order to fully secure contribution by forest sink in the future to meeting the target of 80% reduction of greenhouse gas emissions by 2050, the Government will promote establishment of seed orchards and scion gardens which are necessary to replace existing breeds of major forestry species with seeds and seedlings that grow well and development of appropriate forest resources through steady planting and other measures.

These measures for managing forest carbon sink to enhance activities under Article 3, paragraph 3 and 4 promote forest conservation and sustainable forest management, which

eventually contributes to the conservation of biodiversity and sustainable use of forest resources.

In addition, the Government will consider new schemes to secure financial resources for forest carbon sink management, including a fiscal policy and levying the cost of forest development on the public. The Government will also promote the public-private joint initiatives in a steady and comprehensive manner, including community afforestation programs and forest environment campaigns designed to gain the extensive understanding and support of the public.