Japan's National Greenhouse Gas Emissions in Fiscal Year 2012 (Preliminary Figures) <Executive Summary>

Concerning the estimation of the preliminary figures: this estimation of greenhouse gas emissions is based on annual data compiled from statistics from a variety of sources - however, some of these data are not yet available. For such data – for which FY2012 values are not available - the FY2011 values were used to estimate the preliminary figures. Therefore, there may be some differences in the preliminary figures reported here when compared to the final figures to be reported in April 2014.

- Japan's total greenhouse gas emissions in FY2012 were 1,341 million tonnes of carbon dioxide equivalents (Mt CO_2 eq.).
- Total emissions increased by 6.3% (79.8 Mt CO_2 eq.) compared to those of the base year under the Kyoto Protocol (FY1990 for CO_2, CH_4, N_2O, and calendar year (CY) 1995 for HFCs, PFCs, SF_6).
- Total emissions increased by 2.5% (33.2 Mt CO_2 eq.) when compared to those of FY2011 (1,308 Mt CO2 eq.), mainly due to an increase in CO_2 emissions from power generation.

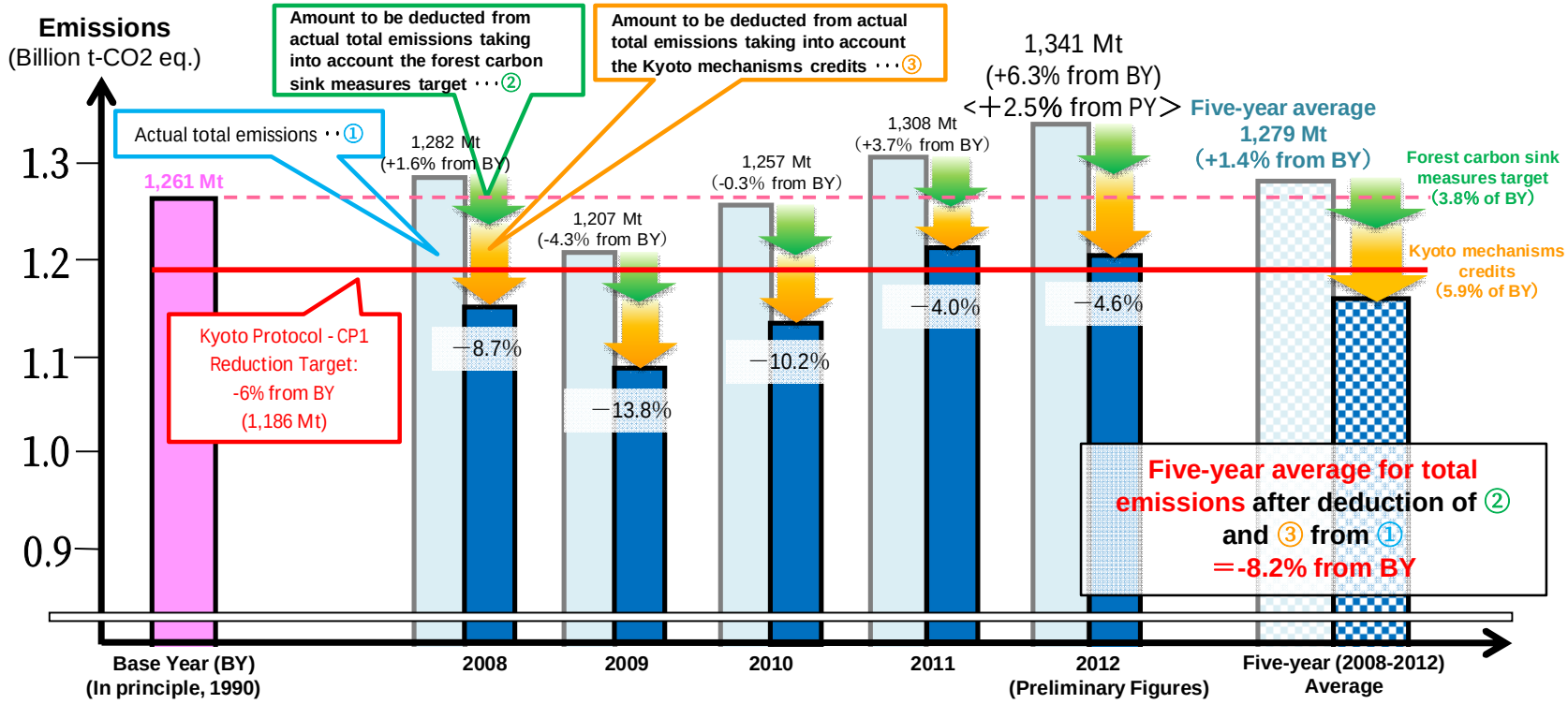
(Reference)

- The main driver for the rise in emissions in FY2012 as compared to FY2011 is the increased fossil fuel consumption in response to the expansion of thermal power generation since the Great East Japan Earthquake, despite the decrease in manufacturing production and the widespread implementation of power saving measures across each sector.

Japan's Greenhouse Gas Emissions and Achievements Status for Emission Targets under the Kyoto Protocol

○ Japan's total greenhouse gas emissions (preliminary figures) in FY2012 were **1,341 Mt CO2 eq.** (an increase of 6.3% compared to the base year (BY) and 2.5% compared to the previous year (PY))

○ If the **forest carbon sink measures target**[1] is achieved and **Kyoto mechanisms credits**[2] are taken into account, the five-year average for total emissions during the first commitment period (CP1) of the Kyoto Protocol (FY2008-FY2012) shows an 8.2%[3] decrease compared to the total emissions of the base year; therefore, it is estimated that Japan will have achieved its target for the CP1 of the Kyoto Protocol (-6 % below base year level).



1: Forest carbon sink measures target: About 3.8% (47.67 Mt CO2/yr.) of the base year emissions according to the Kyoto Protocol Target Achievement Plan.
2: Kyoto mechanisms credits:
Acquired by the government: Total credits that were contracted as of FY2012 year-end through the Kyoto Mechanisms Credit Acquisition Program (97.528 Mt) divided by 5 (yrs.)
Acquired by the private sector: The amount of credits that were acquired by the Federation of Electric Power Companies of Japan (According to the Environmental Action Plan by the Japanese Electric Utility Industry [FY2009 to FY2013])
3:Total emissions and removals for the Kyoto Protocol target will be finalized after the technical review process under the Kyoto Protocol and the Convention to be conducted in FY2014. Also, the Kyoto mechanisms credits will be finalized after the true-up period for the first commitment period (expected to be completed in the second half of 2015 or later).

Figure 1 Japan's national greenhouse gas emissions

Achievements status for emission targets for the first commitment period (FY2008 – FY2012) of the Kyoto Protocol

Greenhouse gas emissions by gas and sector during the first commitment period

(Unit: Mt-CO2)

	Base year	**Five-year average for total emissions** (compared to the total emissions of the base year)
Total (Total emissions) : ①	1,261	**1,279 (+1.4%)**
Energy-origin CO_2	1,059	**1,143 (+6.7%)**
Industries	482	**416 (-5.2%)**
Transport	217	**231 (+1.1%)**
Commercial and other	164	**234 (+5.5%)**
Residential	127	**179 (+4.1%)**
Energy industries	68	**83 (+1.2%)**
Non energy-origin CO_2, CH_4, N_2O	151	**112 (-3.1%)**
Non energy-origin CO_2 emissions	85	**69 (-1.3%)**
CH_4	33	**21 (-1.0%)**
N_2O	33	**22 (-0.8%)**
F-gases	51	**24 (-2.2%)**
HFCs	20	**18 (-0.1%)**
PFCs	14	**3 (-0.8%)**
SF_6	17	**2 (-1.2%)**

Amount to be deducted from actual total emissions

Forest carbon sink measures target[1] : ②		48 (-3.8%) [4]
Kyoto mechanisms credits : ③		74 (-5.9%) [4]
Acquired by the government[2]		20 (-1.5%) [4]
Acquired by the private sector[3]		55 (-4.3%) [4]

				6% Emissions reduction commitment
①-(②+③)		**1,157 (-8.2%)**	<	1,186 (-6.0%)

1: About 3.8% of the base year emissions according to the Kyoto Protocol Target Achievement Plan (47.67 Mt CO2/yr.)
2: The amount of credits that were contracted as of FY2012 year-end through the Kyoto Mechanisms Credit Acquisition Program (97.528 Mt) divided by 5 (yrs.)
3: The amount of credits that were acquired by the Federation of Electric Power Companies of Japan (According to the Environmental Action Plan by the Japanese Electric Utility Industry [FY2009 to FY2013])
4: Percentage compared to the total emissions of the base year for the "Amount to be deducted from actual total emissions" is indicated with negative sign.

The five-year average of total emissions during the first commitment period was 1,279 Mt CO_2 eq. which is an increase of 1.4 % compared to the total emissions of the base year under the Kyoto Protocol (1,261 Mt CO_2 eq.).

The reason for this increase is that although the total emissions in FY2008 and FY2009 decreased as an influence of the financial crisis in the second half of FY2008, the total emissions for three consecutive years after FY2010 increased due to economic recovery from the financial crisis and an increase in thermal power generation driven by the Great East Japan Earthquake.

Consequently, if the forest carbon sink measures target is achieved and Kyoto mechanisms credits are taken into account, the five-year average for total emissions shows an 8.2% decrease compared to the total emissions of the base year; therefore, it is estimated that Japan will have achieved its target for the first commitment period of the Kyoto Protocol (-6 % below base year level).

Furthermore, the evaluation and verification of individual measures including the achievements status for the targets will be performed at the "Global Warming Prevention Headquarters" within the current fiscal year.

[Energy-origin CO_2 emissions by sector]

○ Industries (Factories, etc.)
The five-year average emissions were 416 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in manufacturing production as an influence of the financial crisis in the second half of FY2008.

○ Transport (Cars, etc.)
The five-year average emissions were 231 Mt CO_2 eq. The main factor for the decrease in emissions is an improvement in transport efficiency.

○ Commercial and other (Commerce, service, office, etc.)
The five-year average emissions were 234 Mt CO_2 eq. The main factor for the increase in emissions is a significant increase in energy consumption compared to FY1990 due to an increase in the total floor areas for office and retail; furthermore, CO_2 emissions intensity deteriorated due to an increase in thermal power generation since the Great East Japan Earthquake.

○ Residential
The five-year average emissions were 179 Mt CO_2 eq. The main factor for the increase in emissions is a significant increase in energy consumption compared to FY1990 due to an increase in the number of households; furthermore, CO_2 emissions intensity deteriorated due to an increase in thermal power generation since the Great East Japan Earthquake.

○ Energy industries (Power plants, etc.)
The five-year average emissions were 83 Mt CO_2 eq. The main factor for the increase in

emissions is the increase in energy demand mainly for electricity.

[Greenhouse gas emissions other than those of energy-origin CO_2 emissions by sector]

○ Non-energy origin CO_2 emissions
The five-year average emissions were 69 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in emissions from cement production in the Industrial Processes sector.

○ Methane (CH_4) emissions
The five-year average emissions were 21 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in emissions from solid waste disposal on land in the Waste sector.

○ Nitrous Oxide (N_2O) emissions
The five-year average emissions were 22 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in emissions from adipic acid production in the Industrial Processes sector.

○ Hydrofluorocarbons (HFCs)
Substituting specific values of the previous year for emissions in CY2012, the five-year average emissions were 18 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in HFC-23 produced as a by-product of HCFC-22 manufacture.

○ Perfluorocarbons (PFCs)
Substituting specific values of the previous year for emissions in CY2012, the five-year average emissions were 3 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in emissions from cleaning agents and solvents due to the use of alternative cleaning agents.

○ Sulfur Hexafluoride (SF_6)
Substituting specific values of the previous year for emissions in CY2012, the five-year average emissions were 2 Mt CO_2 eq. The main factor for the decrease in emissions is the decrease in emissions from electrical equipment due to an enhancement of gas management systems centered on electric power companies.

Table 1　Japan's national greenhouse gas emissions, comparison with the base year and the previous year

	Base year under Kyoto Protocol [Share]	FY2011 (Compared to base year)	Changes from FY2011	FY2012 (Preliminary figure) (Compared to base year) [Share]
Total	1,261 〔100%〕	1,308 (+3.7%)	→ <+2.5%> →	1,341 (+6.3%) 〔100%〕
Carbon Dioxide (CO_2)	1,144 〔90.7%〕	1,241 (+8.5%)	→ <+2.7%> →	1,275 (+11.4%) 〔95.0%〕
Energy-origin Carbon Dioxide	1,059 〔84.0%〕	1,173 (+10.8%)	→ <+2.8%> →	1,207 (+13.9%) 〔90.0%〕
Non-Energy-origin Carbon Dioxide	85.1 〔6.7%〕	67.7 (-20.4%)	→ <+0.5%> →	68.1 (-20.0%) 〔5.1%〕
Methane (CH_4)	33.4 〔2.6%〕	20.3 (-39.3%)	→ <-1.3%> →	20.0 (-40.1%) 〔1.5%〕
Nitrous Oxide (N_2O)	32.6 〔2.6%〕	21.7 (-33.6%)	→ <-1.0%> →	21.4 (-34.3%) 〔1.6%〕
F-gases	51.2 〔4.1%〕	25.1 (-50.9%)	→ <+0.0%> →	25.1 (-50.9%) 〔1.9%〕
Hydrofluorocarbons (HFCs)	20.2 〔1.6%〕	20.5 (+1.3%)	→ <+0.0%> →	20.5 (+1.3%) 〔1.5%〕
Perfluorocarbons (PFCs)	14.0 〔1.1%〕	3.0 (-78.5%)	→ <+0.1%> →	3.0 (-78.5%) 〔0.2%〕
Sulfur Hexafluoride (SF_6)	16.9 〔1.3%〕	1.6 (-90.3%)	→ <+0.0%> →	1.6 (-90.3%) 〔0.1%〕

(Unit: Mt-CO_2 eq.)

Table 2　Energy-origin CO_2 emissions within each sector

(With allocation of CO_2 emissions from power generation and steam generation to each final demand sector)

	Base year under Kyoto Protocol [Share]	FY2011 (Compared to base year)	Changes from FY2011	FY2012 (Preliminary figure) (Compared to base year) [Share]
Total	**1,059 〔100%〕**	**1,173 (+10.8%)**	→ <+2.8%> →	**1,207 (+13.9%) 〔100%〕**
Industries (factories, etc)	482 〔45.5%〕	422 (-12.4%)	→ <+2.0%> →	**431 (-10.7%) 〔35.7%〕**
Transport (cars, etc)	217 〔20.5%〕	230 (+5.6%)	→ <-1.1%> →	**227 (+4.5%) 〔18.8%〕**
Commercial and other (commerce, service, office, etc)	164 〔15.5%〕	245 (+49.0%)	→ <+6.0%> →	**259 (+57.9%) 〔21.5%〕**
Residential	127 〔12.0%〕	189 (+48.2%)	→ <+7.6%> →	**203 (+59.5%) 〔16.8%〕**
Energy Industries (power plants, etc)	67.9 〔6.4%〕	87.7 (+29.2%)	→ <-1.6%> →	**86.3 (+27.1%) 〔7.1%〕**

(Unit: Mt-CO_2)

【Details of increase/decrease in energy-origin CO_2 emissions compared to FY2011】

○ Industries sector (factories, etc.): 8.3 million tonnes (2.0%) increase
  ・While the amount of manufacturing production decreased, emissions increased due to deteriorated CO_2 emissions intensity with an increase in thermal power generation.

○ Transport sector (cars, ships, etc.): 2.5 million tonnes (1.1%) decrease
  ・Emissions from passenger vehicles and trucks/lorries decreased.

○ Commercial and Other sectors (commerce, service, office, etc.): 14.6 million tonnes (6.0%) increase
  ・While the electricity consumption decreased due to the effect of power-saving measures, total emissions from electricity consumption increased due to deteriorated CO_2 emissions intensity.

○ Residential sector: 14.4 million tonnes (7.6%) increase
  ・While the electricity consumption decreased due to the effect of power-saving measures, total emissions from electricity consumption increased due to deteriorated CO_2 emissions intensity.

○ Energy Industries sector (power plants, etc.): 1.4 million tonnes (1.6%) decrease
  ・Emissions from the processes of petroleum refining decreased.

【Details of increase/decrease in greenhouse gas emissions other than those of energy-origin CO_2 emissions compared to FY2011 (CO_2 equivalents)】

○ Non-energy origin CO_2 emissions: 0.3 million tonnes (0.5%) increase
  ・Emissions from the Industrial Processes sector (e.g., cement production) increased.

○ Methane (CH_4) emissions: 0.3 million tonnes (1.3%) decrease
  ・Emissions from the Waste sector (e.g., solid waste disposal on land) decreased.

○ Nitrous Oxide (N_2O) emissions: 0.2 million tonnes (1.0%) decrease
  ・Emissions from the Industrial Processes sector (e.g., adipic acid production) decreased.

○ Hydrofluorocarbons (HFCs)
  ・The 2011 data is used with exceptions.

○ Perfluorocarbons (PFCs)
  ・The 2011 data is used with exceptions.

○ Sulfur Hexafluoride (SF_6)
  ・The 2011 data is used.