

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

Concerning the estimation of the final figures: "final figures" means the figures officially submitted to the UNFCCC Secretariat as Japan's GHG emissions and removals in a national GHG inventory. The final figures compiled at this time will be revised when annual values in statistical data are updated, and/or estimation methods are revised.

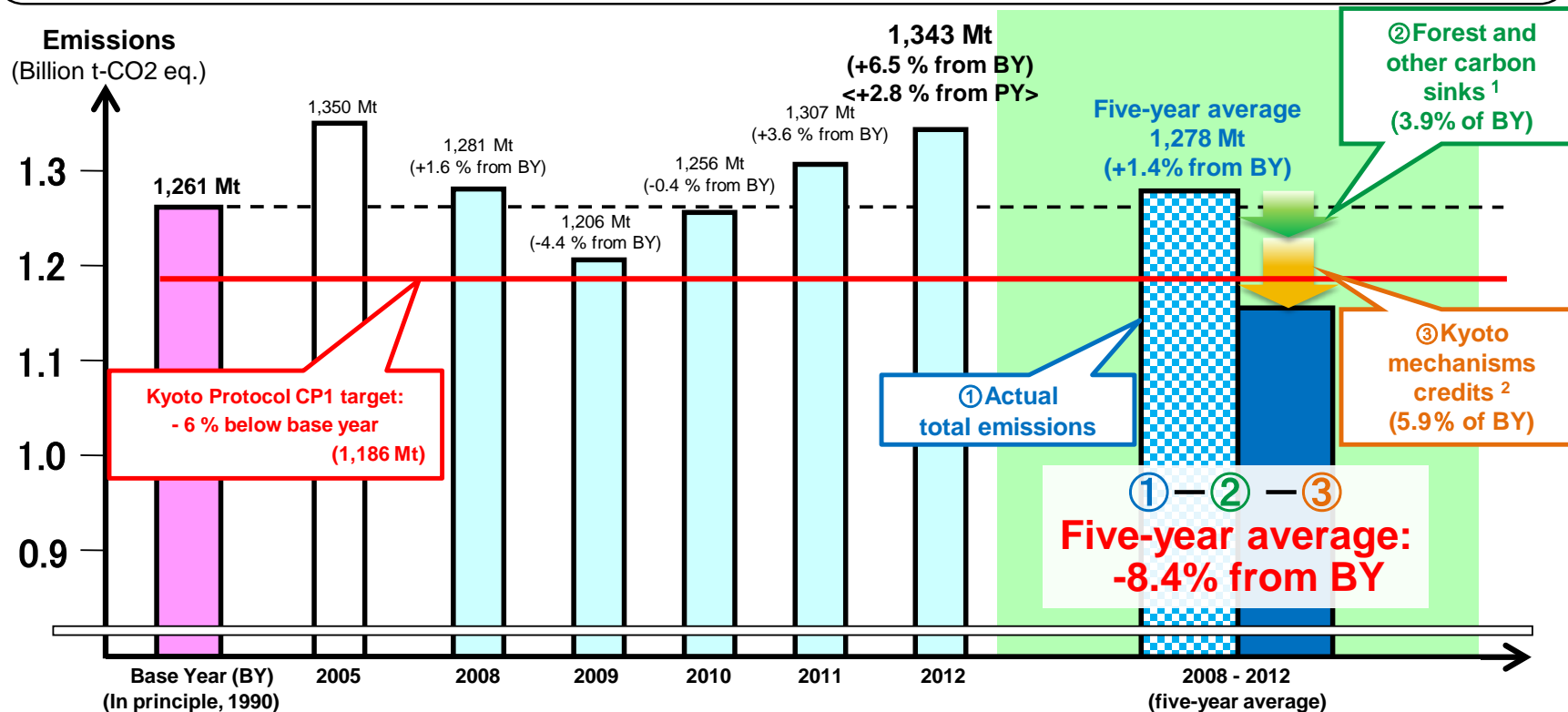
- Japan's total greenhouse gas emissions in FY2012 were 1,343 million tonnes of carbon dioxide equivalents (Mt CO<sub>2</sub> eq.). Total emissions increased by 6.5% (81.8 Mt CO<sub>2</sub> eq.) compared to those of the base year under the Kyoto Protocol (FY1990 for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and calendar year (CY) 1995 for HFCs, PFCs, SF<sub>6</sub>). Total emissions increased by 2.8% (36.6 Mt CO<sub>2</sub> eq.) when compared to those of FY2011. The five-year average for total emissions during the first commitment period of the Kyoto Protocol (FY2008-FY2012) was 1,278 Mt CO<sub>2</sub> eq. (1.4% increase from base year).
- Removals by forest and other carbon sinks under the Kyoto Protocol in FY 2012 were 52.8 Mt CO<sub>2</sub> eq. (consisting of 51.7 Mt CO<sub>2</sub> eq. by forest carbon sink measures and 1.1 Mt CO<sub>2</sub> eq. by urban revegetation). The five-year average for removals by forest and other carbon sinks that can be used toward achieving the target for the first commitment period of the Kyoto Protocol was 48.7 Mt CO<sub>2</sub> eq. (consisting of 47.7 Mt CO<sub>2</sub> eq. by forest carbon sink measures and 1.0 Mt CO<sub>2</sub> eq. by urban revegetation). The removals corresponded to 3.9% of the total emissions in the base year (of which 3.8% are from removals by forest carbon sink measures).
- Consequently, if the Kyoto mechanisms credits are taken into account, the five-year average shows an 8.4% decrease compared to the base year; therefore, Japan will have achieved its target for the first commitment period of the Kyoto Protocol (-6 % below base year level).

### (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 triggered by the Great East Japan Earthquake, despite the decrease in manufacturing production and the further implementation of power saving measures in the residential sector.

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

- Japan's total greenhouse gas emissions (final figures) in FY2012 were **1,343 Mt CO<sub>2</sub> eq.** (an increase of 6.5% compared to the base year (BY) and 2.8% compared to the previous year (PY))
- If the **forest and other carbon sinks<sup>1</sup>** and **Kyoto mechanisms credits<sup>2</sup>** 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 8.4%<sup>3</sup> decrease compared to the total emissions of the base year; therefore **Japan will have achieved its target for the CP1 of the Kyoto Protocol (-6% below base year level).**



- 1: Forest and other carbon sinks: Removals by forest and other carbon sinks (forest carbon sink measures and urban revegetation etc) that can be used toward achieving the target. The removals by forest carbon sink measures exceeded the upper limit (238.3 Mt-CO<sub>2</sub> for the five years) set for Japan for use toward achieving the target, therefore the value is the upper limit per year.
- 2: Kyoto mechanisms credits: Acquired by the government: Total credits that were acquired as of FY2013 year-end through the Kyoto Mechanisms Credit Acquisition Program (97.493 Mt)  
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 [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

Actual emissions (Unit: Mt-CO<sub>2</sub> eq.)

	Base year	Five-year average for total emissions (compared to the total emissions of the base year)
Total (Total emissions): ①	1,261	<b>1,278</b> (+1.4%)
Energy-origin CO <sub>2</sub>	1,059	<b>1,144</b> (+6.7%)
Industries	482	<b>413</b> (-5.5%)
Transport	217	<b>231</b> (+1.1%)
Commercial and other	164	<b>238</b> (+5.8%)
Residential	127	<b>179</b> (+4.1%)
Energy industries	68	<b>83</b> (+1.2%)
Non energy-origin CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	151	<b>111</b> (-3.2%)
Non energy-origin CO <sub>2</sub>	85	<b>69</b> (-1.3%)
CH <sub>4</sub>	33	<b>21</b> (-1.0%)
N <sub>2</sub> O	33	<b>21</b> (-0.9%)
F-gases	51	<b>24</b> (-2.1%)
HFCs	20	<b>19</b> (-0.1%)
PFCs	14	<b>3</b> (-0.8%)
SF <sub>6</sub>	17	<b>2</b> (-1.2%)

**Amount to be deducted from actual total emissions**

Forest and other carbon sinks <sup>1</sup> : ②		<b>49</b> (-3.9%) <sup>5</sup>
Forest carbon sink measures (actual)		
Forest carbon sink measures (Removals that can be used toward achieving the target) <sup>2</sup>		<b>48</b> (-3.8%) <sup>5</sup>
Urban revegetation		<b>1</b> (-0.1%) <sup>5</sup>
Kyoto mechanisms credits: ③		<b>74</b> (-5.9%) <sup>5</sup>
Acquired by the government <sup>3</sup>		<b>19</b> (-1.5%) <sup>5</sup>
Acquired by the private sector <sup>4</sup>		<b>55</b> (-4.3%) <sup>5</sup>

**6% Emissions reduction  
commitment**

①-(②+③)		<b>1,156</b> (-8.4%) <sup>6</sup>	<	1,186 (-6.0%)
---------	--	--------------------------------------	---	------------------

- 1: Removals by forest and other carbon sinks (forest carbon sink measures and urban revegetation etc) that can be used toward achieving the target
- 2: The removals by forest carbon sink measures exceeded the upper limit (238.3 Mt-CO<sub>2</sub> for the five years) set for Japan for use toward achieving the target, therefore the value is the upper limit per year.
- 3: The amount of credits that were contracted as of FY2013 year-end through the Kyoto Mechanisms Credit Acquisition Program (97.493 Mt) divided by 5 (yrs.)
- 4: 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 [FY2013]) divided by 5 (yrs.)
- 5: 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.
- 6: 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).

The five-year average of total emissions during the first commitment period was 1,278 Mt CO<sub>2</sub> 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<sub>2</sub> 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 triggered by the Great East Japan Earthquake.

Consequently, if the Kyoto mechanisms credits are taken into account, the five-year average shows an 8.4% decrease compared to the base year; therefore, 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".

[Energy-origin CO<sub>2</sub> emissions by sector]

○ Industries (Factories, etc.)

The five-year average for emissions was 413 Mt CO<sub>2</sub> 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 for emissions was 231 Mt CO<sub>2</sub> eq. Compared to FY1990, emissions increased due to the increase in transportation demand, however there is a decreasing trend in emissions since FY2000 due to an improvement in transport efficiency.

○ Commercial and other (Commerce, service, office, etc.)

The five-year average for emissions was 238 Mt CO<sub>2</sub> 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<sub>2</sub> emissions intensity worsened due to an increase in thermal power generation since the

## Great East Japan Earthquake.

### ○ Residential

The five-year average for emissions was 179 Mt CO<sub>2</sub> 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<sub>2</sub> emissions intensity worsened due to an increase in thermal power generation triggered by the Great East Japan Earthquake.

### ○ Energy industries (Power plants, etc.)

The five-year average for emissions was 83 Mt CO<sub>2</sub> 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<sub>2</sub> emissions by sector]

#### ○ Non-energy origin CO<sub>2</sub> emissions

The five-year average for emissions was 69 Mt CO<sub>2</sub> eq. The main factor for the decrease in emissions is the decrease in emissions from cement production in the Industrial Processes sector.

#### ○ Methane (CH<sub>4</sub>) emissions

The five-year average for emissions was 21 Mt CO<sub>2</sub> 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<sub>2</sub>O) emissions

The five-year average for emissions was 21 Mt CO<sub>2</sub> 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)

The five-year average for emissions was 19 Mt CO<sub>2</sub> eq. The main factor for the decrease in emissions is the decrease in by-product HFC-23 from HCFC-22 production.

#### ○ Perfluorocarbons (PFCs)

The five-year average for emissions was 3 Mt CO<sub>2</sub> 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<sub>6</sub>)

The five-year average for emissions was 2 Mt CO<sub>2</sub> eq. The main factor for the decrease in emissions is the decrease in emissions from electrical equipment due to an enhancement of the management of gas, such as gas recovery, mainly by 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 (Compared to base year) [Share]
<b>Total</b>	<b>1,261</b> [100%]	<b>1,307</b> (+3.6%)	→ <+2.8%> →	<b>1,343</b> (+6.5%) [100%]
<b>Carbon Dioxide (CO<sub>2</sub>)</b>	<b>1,144</b> [90.7%]	<b>1,241</b> (+8.4%)	→ <+2.8%> →	<b>1,276</b> (+11.5%) [95.0%]
Energy-origin Carbon Dioxide	<b>1,059</b> [84.0%]	<b>1,173</b> (+10.8%)	→ <+2.9%> →	<b>1,208</b> (+14.0%) [89.9%]
Non-Energy-origin Carbon Dioxide	<b>85.1</b> [6.7%]	<b>67.5</b> (-20.6%)	→ <+0.8%> →	<b>68.1</b> (-20.0%) [5.1%]
<b>Methane (CH<sub>4</sub>)</b>	<b>33.4</b> [2.6%]	<b>20.3</b> (-39.2%)	→ <-1.4%> →	<b>20.0</b> (-40.1%) [1.5%]
<b>Nitrous Oxide (N<sub>2</sub>O)</b>	<b>32.6</b> [2.6%]	<b>20.5</b> (-37.2%)	→ <-1.3%> →	<b>20.2</b> (-38.0%) [1.5%]
<b>F-gases</b>	<b>51.2</b> [4.1%]	<b>25.1</b> (-51.0%)	→ <+8.6%> →	<b>27.3</b> (-46.7%) [2.0%]
Hydrofluorocarbons (HFCs)	<b>20.2</b> [1.6%]	<b>20.5</b> (+1.2%)	→ <+12.1%> →	<b>22.9</b> (+13.4%) [1.7%]
Perfluorocarbons (PFCs)	<b>14.0</b> [1.1%]	<b>3.0</b> (-78.5%)	→ <-8.6%> →	<b>2.8</b> (-80.4%) [0.2%]
Sulfur Hexafluoride (SF <sub>6</sub> )	<b>16.9</b> [1.3%]	<b>1.6</b> (-90.3%)	→ <-3.2%> →	<b>1.6</b> (-90.6%) [0.1%]

(Unit: Mt-CO<sub>2</sub> eq.)

Table 2 Energy-origin CO<sub>2</sub> emissions from each sector

(With allocation of CO<sub>2</sub> 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 (Compared to base year) [Share]
<b>Total</b>	<b>1,059</b> [100%]	<b>1,173</b> (+10.8%)	→ <+2.9%> →	<b>1,208</b> (+14.0%) [100%]
Industries (factories, etc)	<b>482</b> [45.5%]	<b>417</b> (-13.5%)	→ <+0.1%> →	<b>418</b> (-13.4%) [34.6%]
Transport (cars, etc)	<b>217</b> [20.5%]	<b>230</b> (+5.6%)	→ <-1.4%> →	<b>226</b> (+4.1%) [18.7%]
Commercial and other (commerce, service, office, etc)	<b>164</b> [15.5%]	<b>250</b> (+52.2%)	→ <+8.9%> →	<b>272</b> (+65.8%) [22.6%]
Residential	<b>127</b> [12.0%]	<b>189</b> (+48.1%)	→ <+7.8%> →	<b>203</b> (+59.7%) [16.9%]
Energy Industries (power plants, etc)	<b>67.9</b> [6.4%]	<b>87.6</b> (+29.1%)	→ <+0.2%> →	<b>87.8</b> (+29.4%) [7.3%]

(Unit: Mt-CO<sub>2</sub>)

## 【Details of increase/decrease in energy-origin CO<sub>2</sub> emissions compared to FY2011】

- Industries sector (factories, etc.): 0.4 million tonnes (0.1%) increase
  - While emissions from manufacturing decreased due to the decrease in the amount of manufacturing production, emissions from non-manufacturing increased.
- Transport sector (cars, ships, etc.): 3.2 million tonnes (1.4%) decrease
  - Emissions from trucks/lorries and passenger vehicles decreased.
- Commercial and Other sectors (commerce, service, office, etc.): 22.4 million tonnes (8.9%) increase
  - Total emissions from electricity consumption increased due to worsened CO<sub>2</sub> emissions intensity.
- Residential sector: 14.7 million tonnes (7.8%) increase
  - While the electricity consumption decreased due to the effect of power-saving measures, total emissions from electricity consumption increased due to worsened CO<sub>2</sub> emissions intensity.
- Energy Industries sector (power plants, etc.): 0.2 million tonnes (0.2%) increase

## 【Details of increase/decrease in greenhouse gas emissions other than those of energy-origin CO<sub>2</sub> emissions compared to FY2011 (CO<sub>2</sub> equivalents)】

- Non-energy origin CO<sub>2</sub> emissions: 0.5 million tonnes (0.8%) increase
  - Emissions from the Industrial Processes sector (e.g., cement production) and the Waste sector (e.g., incineration) increased.
- Methane (CH<sub>4</sub>) emissions: 0.3 million tonnes (1.4%) decrease
  - Emissions from the Waste sector (e.g., solid waste disposal on land) decreased.
- Nitrous Oxide (N<sub>2</sub>O) emissions: 0.3 million tonnes (1.3%) decrease
  - Emissions from the Industrial Processes sector (e.g., adipic acid production) decreased.
- Hydrofluorocarbons (HFCs): 2.5 million tonnes (12.1%) increase
  - Emissions from refrigerants increased as a result of increased use of HFCs as substitutes for ozone depleting substances, HCFCs.
- Perfluorocarbons (PFCs): 0.3 million tonnes (8.6%) decrease
  - Emissions from semiconductor manufacturing, etc. decreased.
- Sulfur Hexafluoride (SF<sub>6</sub>): 0.05 million tonnes (3.2%) decrease
  - Emissions from semiconductor manufacturing, etc. decreased.