National Report by Japan
2017

Enhanced Black Carbon and Methane Emissions Reductions – Arctic Council Framework for Action

Japan's National Report
on Black Carbon and Methane Emissions

December 15th, 2017

The Arctic is particularly sensitive to climate change. Reducing black carbon and methane emissions can reduce projected Arctic warming. Japan, therefore, welcomes and supports the Arctic Council's initiatives on black carbon and methane emission reductions. We are pleased to share our data with the Arctic Council through the submission of this report. This report is drafted and submitted by Ministry of Foreign Affairs in cooperation with Ministry of Agriculture, Forestry and Fisheries, Ministry of Education, Culture, Sports, Science and Technology, and Ministry of the Environment.

1. Summary of current black carbon emissions to CLRTAP and, if available, future projections

In Japan, Black Carbon (BC) emissions are calculated by multiplying the PM emissions by the BC ratio in the PM component composition. Figure 1 shows that $PM_{2.5}$ emissions and BC emissions by major source categories in Japan, which are currently understood. The BC emissions are respectively estimated to be 22,000 tons/year in 2010 and 17,500 tons/year in 2012.

Japan is not a member of CLRTAP (Convention on Long-Range Trans-boundary Air Pollution), but a member of CCAC (Climate and Clean Air Coalition). Japan submitted its BC emissions data to CCAC in September 2017.

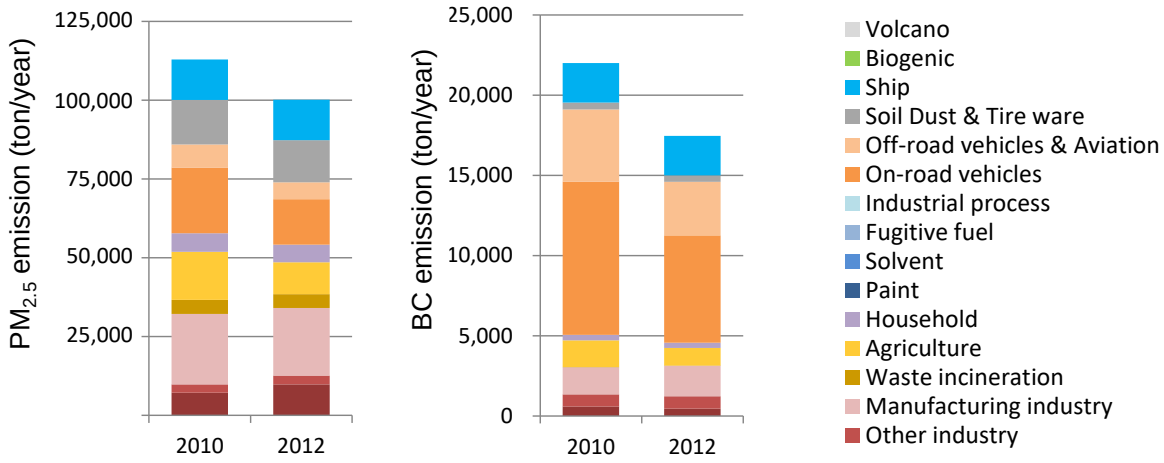

Figure 1. $PM_{2.5}$ and BC emissions in Japan [1] [1]

2. Summary of current methane emissions to UNFCCC and, if available, future projections

Methane emissions are estimated to be 31.3 million t-CO2eq. in FY 2015.

The target is set to reduce methane emissions in FY 2030 by 12.3%, compared to the FY 2013 level (18.8% reduction, compared to the FY 2005 level).

Methane emissions in FY 2013 were initially estimated to be 36.0 million t-CO2eq. in the NDC (The FY2030

[1] Each year means from April 1 to March 31

target is approximately 31.6 million t-CO2eq.). This value is, however, replaced to 32.7 million t-CO2eq., based on the latest calculation.

Regardless of the recalculation of methane emissions, Japan will continue to reduce methane emissions in accordance with the Plan for Global Warming Countermeasures.

Table 1. Estimated emissions of methane in million t-CO2eq.

	FY 2030	FY 2015	FY 2013 （FY 2005）
methane （CH4）	31.6	31.3	32.7 “36.0” （35.3 “39.0”）

Note that a value in “ ” stands for the one in the NDC.

3. Summary of National Actions, National Action Plans, or Mitigation Strategies by Sector

3.1 Black Carbon

1) Automobile exhaust gas regulations

PM regulation for diesel vehicles started in 1994 and has been gradually strengthened since then. (Fig.2).

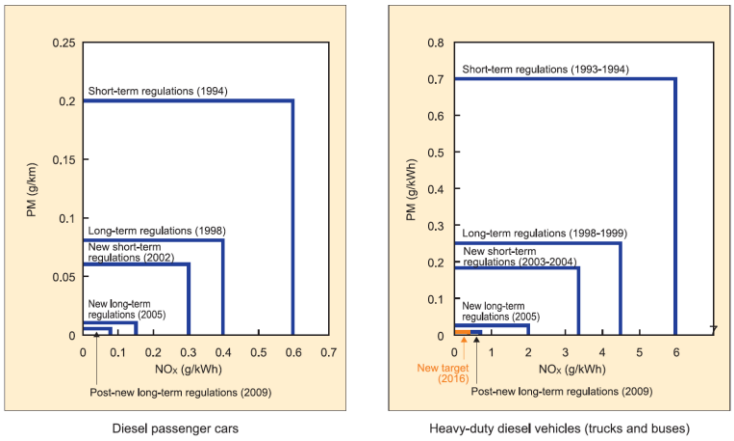

Figure 2. Trends in NO_x and PM regulation values for diesel vehicles since 1993 [2]

As a new initiative, not only for diesel vehicles, but PM emission control is applied for all in-cylinder direct injection gasoline engine-equipped vehicles, including stoichiometric direct injection vehicles.

In addition, as a future study subject, introducing a PM particle number (PN) regulation will be considered in order to solve the problem of measurement accuracy in the current PM weight regulation.

2) Fuel quality

Regulation on sulfur content of diesel fuel for automobiles has been gradually strengthened. Voluntary reductions have been made in the petroleum industry ahead of laws and regulations. The current sulfur content in light oil is less than 10 ppm (Fig.3).

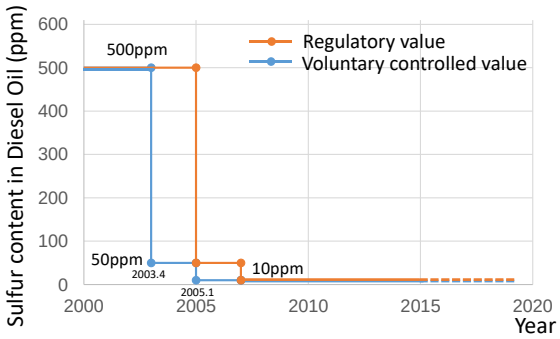

Figure 3. Transition of ratio of sulfur content in diesel fuel [3]

3) Measures taken in large metropolitan areas

In large metropolitan areas where automobile traffic is concentrated, a regulation was established so that cars which do not conform to emission standards cannot be registered. In addition, when using automobiles for business, business operators of a certain size or larger are obliged to formulate an automobile use management plan. In each target prefecture, a "total amount reduction plan" has been formulated. Moreover, measures to reduce emissions of NO_x and PM from automobiles are pursued in a systematic manner.

4) Promotion of low emission vehicles

In order to improve air quality and the climate, realizing energy conservation etc., since 2002, promotion has been assisting the introduction of next generation cars.

3.2 Methane

The following are the measures to reduce CH4 emissions:

- Reduction of CH4 emissions from agricultural soils (reduction of CH4 emissions from paddy rice fields);
- Reduction of municipal solid waste disposed of by direct landfill; and
- Introduction of semi-aerobic landfill system for final disposal site of municipal solid waste.

4. Highlights of best practices or lessons learned for key sectors

4.1 Black Carbon

As it is showed above, Japan have strengthened our regulations step by step which have contributed to reduce black carbon emissions in Japan.

5. Projects relevant for the Arctic

As the Ministry of Education, Culture, Sports, Science and Technology (MEXT) attaches its importance to the Arctic, it launched a new project, called "Arctic Challenge for Sustainability" (ArCS) in FY 2015.

In one theme of this project (named "Atmospheric climate forcers in the Arctic"), researchers have been measuring atmospheric BC in the Arctic, and evaluating contributions of individual BC sources (region and

source types).

As one of the achievements of ArCS, advanced measurement technologies for airborne BC particles developed by Japanese scientists have been providing very accurate BC data in the Arctic. They also developed methods of accurate measurements of BC in snow and made first reliable measurements of BC in falling snow and snowpack in the Arctic. These data are critically important in assessing the impacts of BC on the climate in the Arctic.

6. Other information (climate, health, environmental, economic effects of emissions and mitigation)

The annual average value of $PM_{2.5}$ concentrations across the country in the ambient air pollution monitoring stations in FY2015[2] was 13.1 μg/m^3, and suspended particulate matter (SPM)[3] concentration was 0.019 mg/m^3. In the roadside air pollution monitoring stations the annual average value of nationwide $PM_{2.5}$ concentration in FY2015 was 13.9 μg/m^3, and SPM concentration was 0.020 mg/m^3.

References

[1] Fukui, T., Kokuryo, K., Baba, T., Kannari, A., " Updating EAGrid2000-Japan emissions inventory based on the recent emission trends", Journal of Japan Society of Atmospheric Environment, vol.49(2), p.117-125 (in Japanese) (2014)

[2] Japan Automobile Manufacturers Association, Inc., “PM2.5 in Ambient Air & related Activities in Japan”, (2013)
http://www.jama-english.jp/publications/PM2.5_english_140108.pdf
(As of December 11th, 2017)

[3] Japan Automobile Manufacturers Association, Inc., “2016 REPORT ON ENVIRONMENTAL PROTECTION EFFORTS, Promoting Sustainability in Road Transport in Japan”
http://www.jama-english.jp/publications/env_prot_report_2016.pdf
(As of December 11th, 2017)

[2] From April 1, 2015 to March 31, 2016.
[3] Suspended particulate matter (SPM) is defined as airborne particles with aerodynamic diameters less than or equal to 10 μm.