KIKO NETWORK 気候ネットワーク 市民のチカラで、気候変動を止める。

Position Paper 2019

December 2019

De-CFCs, not recovery, are the key to CFC countermeasures

～The reality of ″Limits to CFC recovery″ in Japan

"CFCs" are the common name for ″fluorocarbons″, which are mainly chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) and hydrofluorocarbons (HFC). It is also called F-gas because it is a fluorinated gas. Among CFCs, CFCs and HCFCs contain chlorine, which destroys the ozone layer, and their production was banned under the Montreal Protocol on Substances that Deplete the Ozone Layer (hereinafter referred to as the ″Montreal Protocol″) based on the Vienna Convention for the Protection of the Ozone Layer. The production of these substances was banned by the Montreal Protocol. HFCs, which were produced as a substitute for HFCs, do not deplete the ozone layer, but like CFCs and HCFCs, they are greenhouse gases and cause global warming. HFCs were also subject to production and consumption restrictions under the Montreal Protocol in 2016. CFCs differ from other greenhouse gases in that they are man-made chemicals and are not absorbed and balanced by the natural world, such as forests, as is the case with CO

The global warming potential (GWP) of CFCs differs for each type, and the IPCC GHG table shows 20-year, 100-year, and 500-year values, while the United Nations Framework Convention on Climate Change uses the 100-year value. However, as shown in the table below, the 20-year value is higher than the 100-year value for many CFCs. For example, HFC32, which has been converted to a refrigerant in the air conditioning field in recent years, the 100-year value is 675, but the 20-year value is 2430, which has a very large short-term impact. The short-term impact of climate change in the next 20 years is as follows.

It is also essential to take into account the 20-year value of CFCs.

Currently, only HFCs are rapidly increasing in Japan while GHG emissions continue to decrease. In addition, conversion to CFCs with higher GWP, such as HFC32 , is recommended without considering the short-term impact of HFCs. On the other hand, Japan has a legal system that mandates CFC recovery, but CFC recovery has been sluggish. This paper is intended to discuss the current status and issues of CFC countermeasures in Japan, to evaluate them, and to deepen the discussion on the future measures to be taken.

Major CFC Types and Global Warming Potential (GWP)

Classification.	Main chlorofluorocarbons	ozone depletion factor	GWP 20-year value (CO2 as 1)	GWP 100-year value (CO2 as 1)
Common Fund for Commodities	CFC11	one	6900.	4750
	CFC12	one	10800	10900
hydrochloro	HCFC22	0. 055	5280	1810
	HCFC141b	0.11	2550	630

fluorocarbon				
hydrofluorocarbon	HFC32	0	2430	675
	HFC125	0	6090	3170
	HFC-134	0	3580	1120
	HFC134a	0	3710	1300
	HFC143a	0	6940	4800
	R410A (32/125 mixed)	0		2088
	R404A (125/134/143a mixed)	0		3922

Source: IPCC Fifth Assessment Report https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf

Kigali Amendment to the Montreal Protocol

The Montreal Protocol has been a key instrument for the protection of the ozone layer.

The conversion to HFCs as an alternative to ozone-depleting substances has been promoted for the purpose of the production and consumption (production volume) of HFCs, and 18 HFCs were added as target substances in the 2016 Kigali Amendment.

＋(+ imports minus exports) in a phased manner. Under the Amended Protocol, developed countries are required to reduce their HCFC emissions to the average of the HCFC production volume from 2011 to 2013, in line with the HCFC standard.

The base value is set at 15% plus a 10% reduction in 2019 and a 10% reduction in

40% reduction in 2024, 70% reduction in 2029, and 70% reduction in 2034

The treaty mandates an 80% reduction by 2036 and an 85% reduction by 2036. Developing countries are required to phase out emissions about 10 years later than developed countries. However, both phase-out

(The pathway for the phase-out (phase-out) has not been decided, with developed countries aiming for an 85% reduction by 2036, and developing countries aiming for a reduction of between 2045 and 2047.

The phase-down will remain at 80-85%, with a maximum reduction of 80-85%. However, given that the Paris Agreement aims for a "decarbonized society," it goes without saying that HFCs will also need to be revised and strengthened in light of phase-out.

HFC production and consumption regulation of the Kigali Amendment to the Montreal Protocol

	Non-Article 5 countries (developed countries)	Article 5 countries (developing countries) Group 1	Article 5 countries (developing countries) Group 2
HFC Standards	Average for 2011-2013	Average for 2020-2022	Average for 2024-2026
HCFC Standards	15% of standard value	65% of standard value	65% of standard value
frozen year		Year 2024	Year 2028
Reduction Schedule	2019 -10% (-10%) 2024: -40% (-40%) 2029: -70%. 2034: -80% (-80%) 2036: -85% (-85%)	2029 -10% (-10%) 2035: -30% in 2035 2040: -50%. 2045: -80% (-80%)	2032 -10% in2032 2037: -20% (-20%) 2042 -30% in 2042 2047: -85% in 2047

CFC-Related Laws and Issues in Japan (in Japanese)

(1) Inadequate response to the Kigali Amendment

In Japan, in order to ratify the Kigali Amendment, the "Law Concerning the Protection of the Ozone Layer through Control of Specified Substances and Other Measures" (hereinafter referred to as "Ozone Layer Protection Law") was amended in June 2018. In June 2018, Japan amended the Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures (hereinafter referred to as "Ozone Layer Protection Law") in order to ratify the Kigali Amendment, and mandated a phased reduction of HFC production and consumption in accordance with the contents of the Kigali

Amendment.

On the other hand, the Law Concerning the Rational Use and Proper Management of Refrigerants (hereinafter referred to as "the Law for CFC Emission Control") was enacted in 2013 as a comprehensive revision of the Law for CFC Recovery and Destruction. The Law Concerning the Rational Use and Proper Management of Refrigerants (hereinafter referred to as the "Law for the Control of Refrigerant Emissions") was enacted in 2013 as a comprehensive revision of the Law for the Rational Use and Proper Management of Refrigerants. The future outlook of the amount equivalent to the amount of CFCs used in Japan (hereinafter referred to as "the outlook of use") is one of the criteria for judging the rationalization of use of CFCs.

(referred to as "through"). The Kigali Revision is a

below, it is essential to set a mid- to long-term target year for designated products and substance conversions.

Source: Ministry of the Environment and Ministry of Economy, Trade and Industry

(2) GWP targets for designated products are very lenient

As shown in the table below, the Law for CFC Emission Control sets weighted average GWP targets for manufacturers and importers of CFC-using products (designated products) for each product category shipped by each manufacturer and importer. However, these target values are very lenient, and no target for long-term elimination has been set.

For example, frozen and refrigerated showcases are currently being used to reduce CO2 emissions.
(GWP=1), the designated product system set a lenient target of GWP 1500 or less by 2025, despite the commercialization and widespread use of equipment using R448A (GWP=1) as refrigerant. Subsequently, some equipment manufacturers have been working to reduce the GWP of R448A (GWP = 1).
＝ The development of showcase products for mixed refrigerants (e.g., 1273), which are now being commercialized, has had the effect of hindering the expansion of natural refrigerants.

In the air conditioning sector, GWP is set at 750 by 2018 for residential air conditioners and by 2020 for store and office air conditioners, which is a target that will encourage "new refrigerant" air conditioners, which were originally promoted by air conditioner manufacturers as a new product. Air conditioner manufacturers in other countries have already set a GWP of 750 by 2020. Air conditioner manufacturers in other countries are already working hard to develop air conditioners with natural refrigerants such as hydrocarbons, which have extremely low GWP. In order to encourage such technological development and innovation, it is essential to set a long-term target such as reducing GWP to 10 or below by 2030 at the latest.

Refrigerant CFCs in equipment leak during use. In Europe, the F-gas regulation prohibits the use of CFCs with high GWP in some products, but this system in Japan has not taken any measures to prohibit them.

Designated Products and Environmental Impact (GWP) Targets for Fluorocarbons Emission Control

Classification of designated products	environmental impact Target value of	target year
Air conditioner for home use (excluding floor-standing type, etc.)	750	2018
Air conditioners for stores and offices (excluding floor-standing type, etc.)	750	2020
Condensing units and stationary freezing and refrigeration units (excluding those with a compressor rated output of 1.5 kW or less, etc.)	1500	2025
Central refrigeration equipment (Items to be shipped to newly constructed frozen/refrigerated warehouses, etc. of 50,000 m3 or	100	2019

more)		
Automotive air conditioning equipment (Only passenger vehicles, excluding those with a seating capacity of 11 or more)	150	2023
Rigid urethane foam (limited to on-site foaming for housing construction materials)	100	2020
dust blower (except for applications requiring noncombustibility)	10	2019

(2) Rapidly increasing emissions of HFCs due to increased use

In terms of GHG emissions in Japan, only HFCs have increased by about three times in 2017 compared to 2005; emissions have started to increase since 2004 and have expanded rapidly as CFCs and HCFCs æ regulated by the Montreal Protocol and conversion to HFCs has progressed.

HFC emissions amounted to 44.9 million tonnes-CO2 in 2017, of which more than 90% was accounted for by refrigerants. However, on the other hand, aerosols, for which alternative measures have been established, also emit 600,000 t-CO2 , which is equivalent to the annual CO2 emissions of a small coal-fired power plant. emissions from aerosols, for which CFC-free technology has been established, should be banned.

Actual condition of fluorocarbon recovery

In the 1990s, the recovery of refrigerant chlorofluorocarbons (CFC) was introduced by an environmental group.

In 2001, the Law Concerning the Recovery and Destruction of Fluorocarbons from Specified Products (hereinafter referred to as the "Law Concerning the Recovery and Destruction of Fluorocarbons") was enacted, and in 2013, the Law Concerning the Promotion of Effective Utilization of Resources (hereinafter referred to as the "Law for Promotion of Effective Utilization of Resources") was substantially revised and strengthened. In 2001, the Law Concerning the Recovery and Destruction of Fluorocarbons in Specified Products (hereinafter referred to as the "Law for the Recovery and Destruction of Fluorocarbons") was enacted, and in 2013, it was substantially revised into the Law for CFC Emission Control, strengthening the system. Despite these efforts to mandate recovery, in reality, the recovery rate of fluorocarbons has hardly improved so far.

(2) CFC recovery rate that cannot achieve the target for more than 20 years

Before the legislation was enacted, the Chemicals Council at that time in 1994 set a target of increasing the CFC recovery rate from the current level of around 20% to around 50% by 1996. However, the recovery

There was no obligation and no economic incentive to recover the waste, so the rate did not rise from around 20% and the project ended up not achieving its goal.

In 1998, the Keidanren Voluntary Action Plan was formulated and the target of HFC recovery rate of 80% or more was set, but this target was not achieved. In 2001, the Law Concerning the Recovery and Destruction of Fluorocarbons was enacted, but the recovery rate remained at around 30%.

The Kyoto Protocol Target Achievement Plan for 2008

In the plan, the target was set to achieve a CFC recovery rate of around 60% in 2010, but this target was not achieved either. However, the latest announced CFC recovery rate in 2019 is 39%, which is still below 40%.

Achieving the 2020 target of 50% is also extremely difficult.

(2) Factors behind sluggish collections

The Ministry of the Environment and the Ministry of Economy, Trade and Industry compiled the "Current Status of Factor Analysis for Improving the Collection Rate at Disposal" in June 2019.

The analysis shows that the following three points may be the cause of the difference: (1) the number of recovery of small equipment has increased, while the number of recovery of medium and large equipment has not increased, which may not lead to the increase of the refrigerant recovery rate, (2) the recovery rate per unit may have decreased due to insufficient work, and (3) the recovery rate per unit may have decreased due to technical restrictions. (2) The recovery rate per unit may have decreased due to insufficient work, etc., and (3) The recovery rate may have decreased due to technical limitations.

In addition to the above, the reason why the recovery rate does not improve is that there is no economic incentive. The Law for CFC Emission Control lacks a mechanism such as a deposit system, whereby the cost is paid after recovery. Incidentally, the Automobile Recycling Law includes the cost of CFC recovery in the recycling cost to be collected in advance, so the recovery rate of car air-conditioners is said to be higher than that of other fields.

(3) Equipment using chlorofluorocarbons that is supposed to leak

Furthermore, equipment using CFCs is basically structured in such a way that it can leak CFCs. The CFC Emission Control Law requires the calculation, management, and reporting of the amount of CFC replenished in equipment as "CFC leakage amount" on the assumption that leakage occurs during use, but this does not stop the release of CFC into the atmosphere. Again, it can be pointed out that conversion to CFC-free is the most effective and rational method.

Thus, in Japan, the recovery of fluorocarbons has been regulated by law for nearly 20 years. Despite the mandate, the recovery rate could not be improved, and the measure failed to be substantially effective. The first thing that Japan should do in terms of measures against CFCs is to stop the policy of promoting the conversion to HFCs with high GWP, such as HFC32 and R448A, as mentioned above, and to encourage an early shift to CFC-free products. To this end, new measures to strengthen the CFC Emission Control Law, such as re-setting of designated products and GWP targets in line with the Paris Agreement, which sets a 1.5° C target, and a system to ban the use of CFCs for each product, should be proposed, and messages for CFC-free market should be sent to the market. It is essential to convey the message to the public. It is also urgent to establish a system that meets the goal of eliminating chlorofluorocarbons in the medium to long term, as set out in the Law for CFC Emission Control.

There is a movement to internationally deploy Japan's CFC recovery case studies, but it is necessary to first overcome the issues that Japan has not achieved and strengthen its measures, and then to share internationally why it has not achieved them and confirm that the shortest and best way is to hasten the shift away from CFC emissions.

Published by: Climate Network, a certified non-profit organization
Ichibancho Murakami Building 6F, 9-7 Ichibancho, Chiyoda-ku, Tokyo 102-0082, Japan

TEL. 03-3263-9210FAX 03-3263-9463E-mail.org