Challenges for Fluorinated Gases control in Japan

Reflecting The Kigali amendment to Montreal protocol

February 2017
Fluoride Gases Management Office
METI, Japan

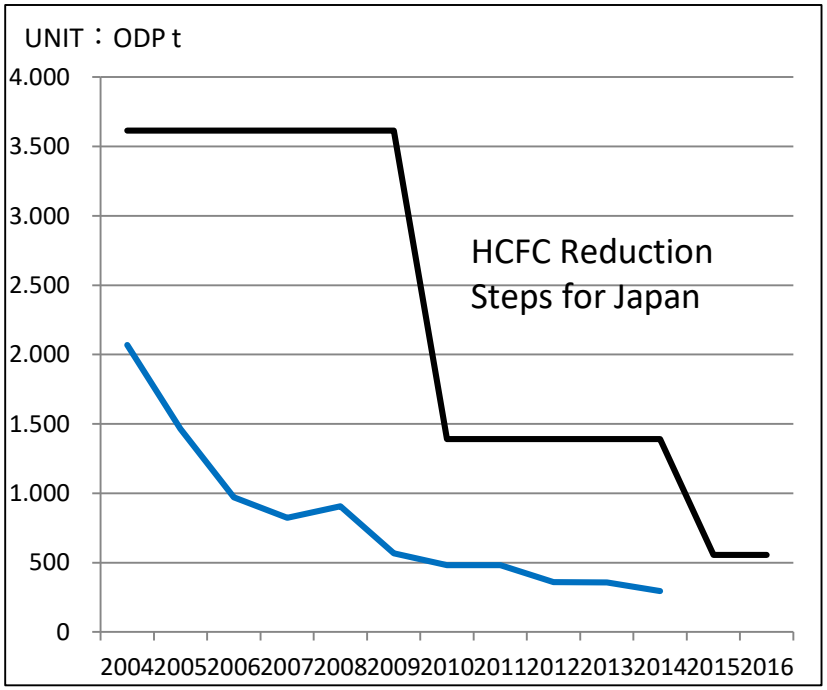
I - 1 . Control of fluorocarbons

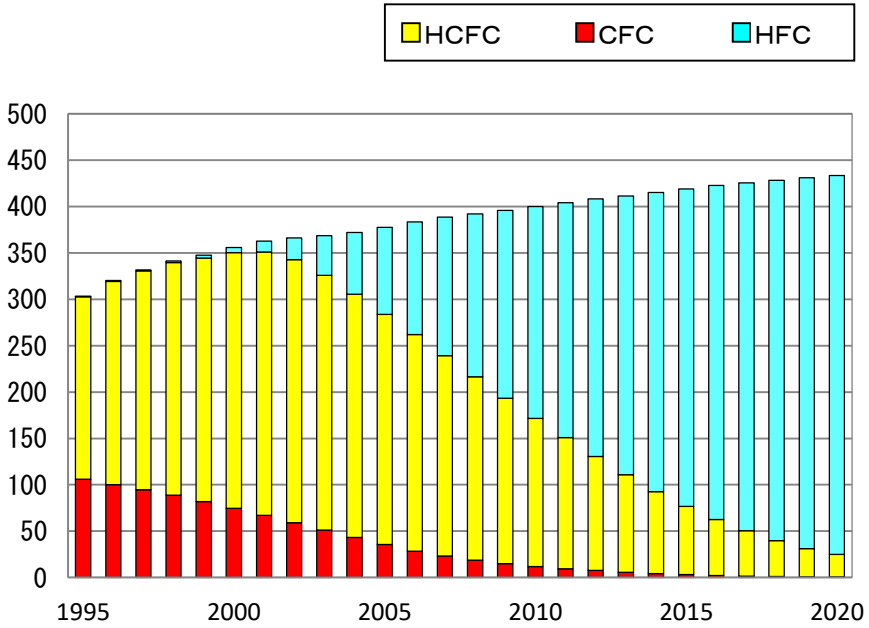
- Control of Ozone Layer Depletion Substances (ODSs)：

✓ For protecting Ozone layer and proper implementation of the Montreal Protocol, production and consumption of ODSs such as CFCs and HCFCs is controlled by Ozone layer protection law.

✓ Consumption of all ODSs including fluorocarbons under the Montreal Protocol has been/will be phased-out by production/export/import licenses.

✓ As a result, consumption of alternative fluorocarbons (HFCs), which has no ozone depletion potential, has been steadily increased recently.

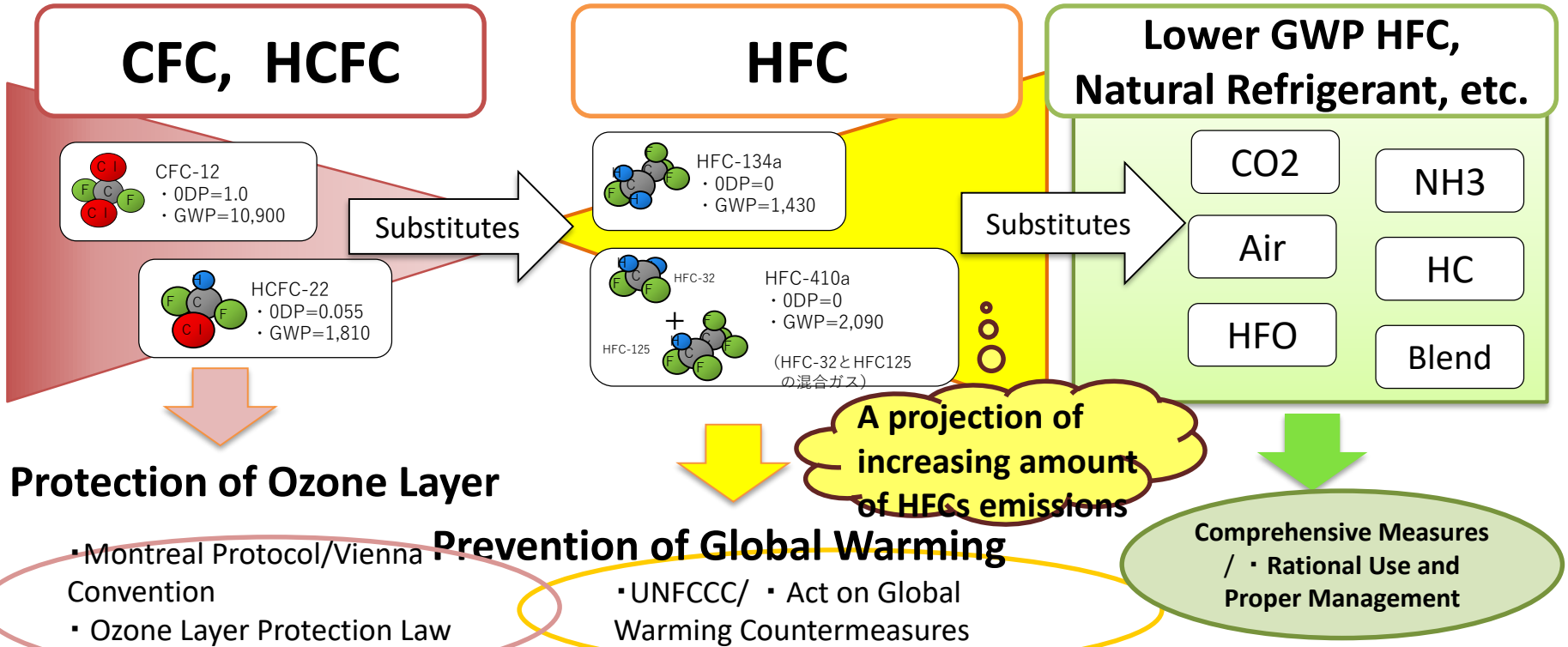




I - 2 . Control of fluorocarbons

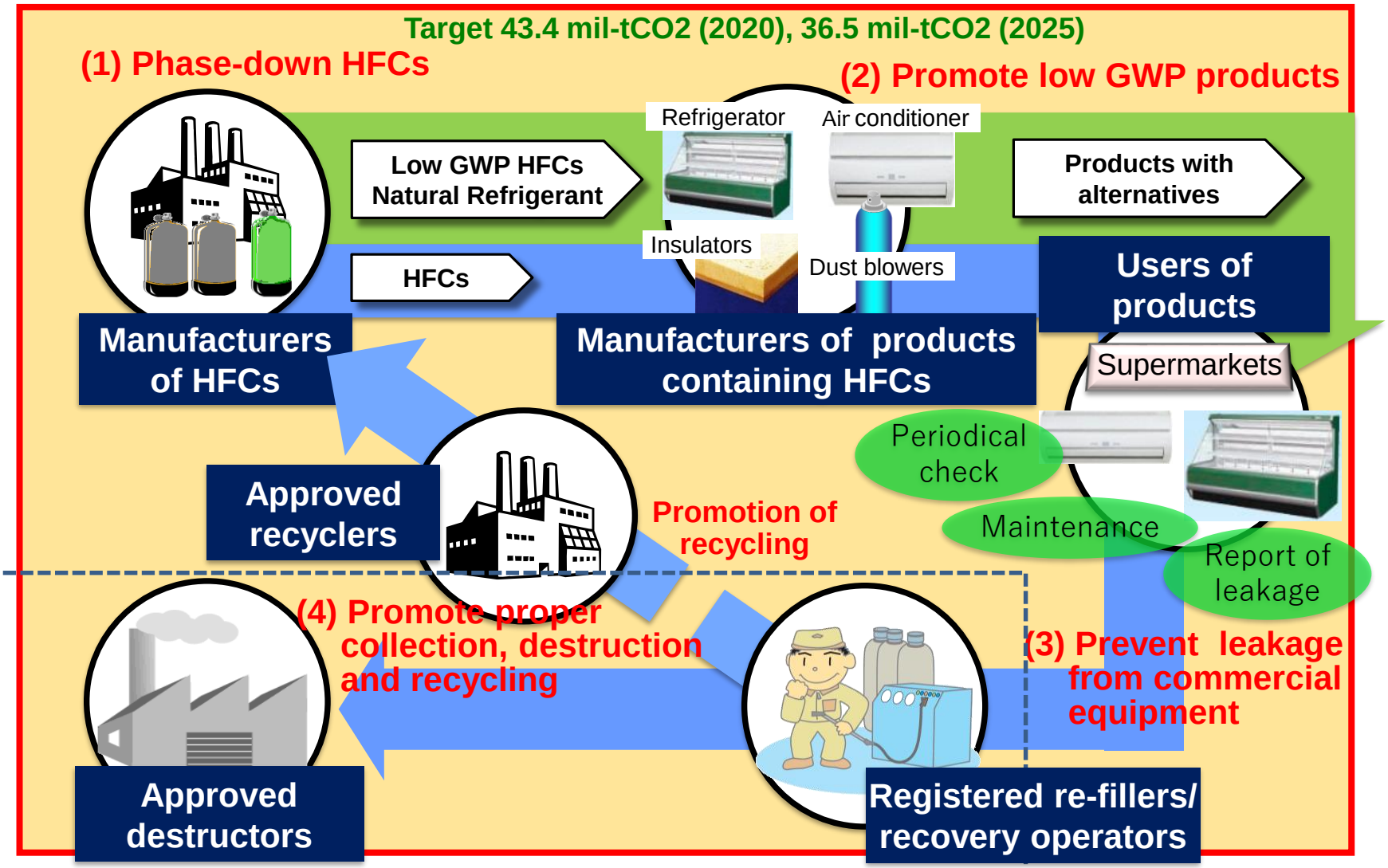
● Reducing Global Warming Potential :

Reflecting a projection of increasing HFCs emissions, which have no Ozone Depletion Potential but high Global Warming Potential (GWP), comprehensive measures have been introduced under the modified law, the Act on Rational Use and Proper Management of Fluorocarbons since 2015 as well as broader control by Act on Global Warming Countermeasures with other GHGs under the target of UNFCCC.



II -1. Overview of revised Act covering entire life cycle

- The Act has been implemented since April 2015, requests all stakeholders to make efforts to reduce emissions of HFC



II - 2 - 1 . For Producers and Importers

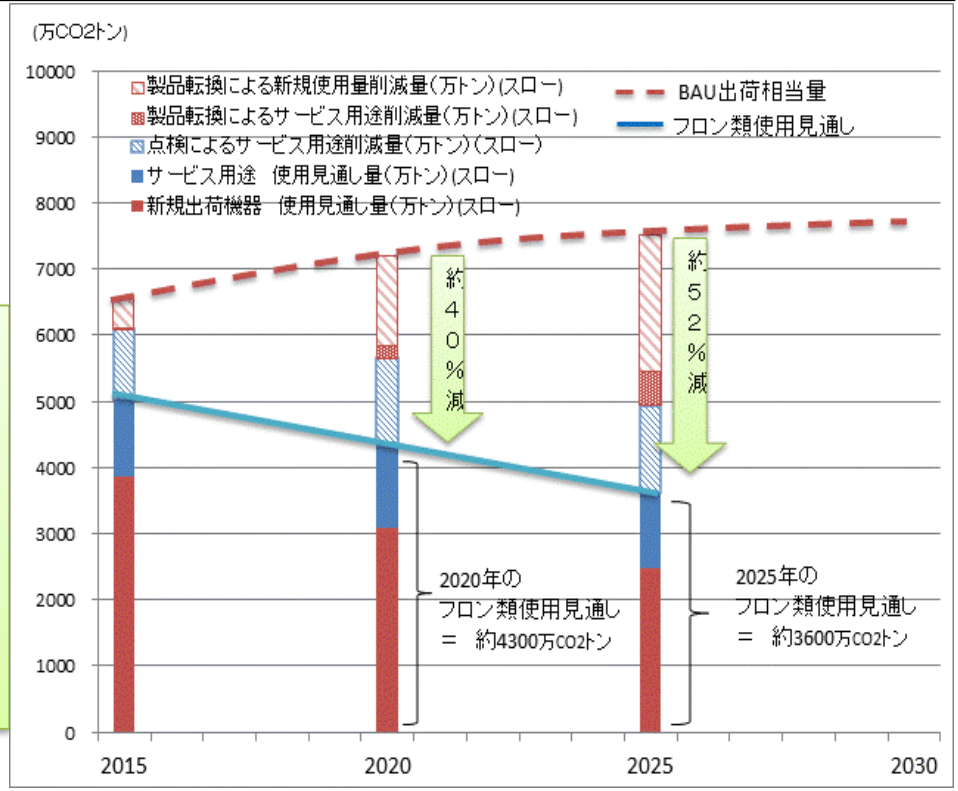
- Effort to reduce GWP of products
  ① Convert to law GWP fluorocarbons or non-fluorocarbons of their products
  ② Necessary technical development and facility investment. Enhancement of recycling and destruction

Sequence of program:

- Government publishes outlook of consumption of fluorocarbons in 2020 and 2025 (in March 2015).
- Producers and importers establish their improvement plans reflecting the outlook, and reports them to the government.
- Government follows up with producers/importers regarding implementation of their plan.

＜**2020 Outlook**＞
43.4 mil CO2t (Reduction of 40% from BAU)
＜**2025 Outlook**＞
36.5 mil CO2t (Reduction of 50% from BAU)

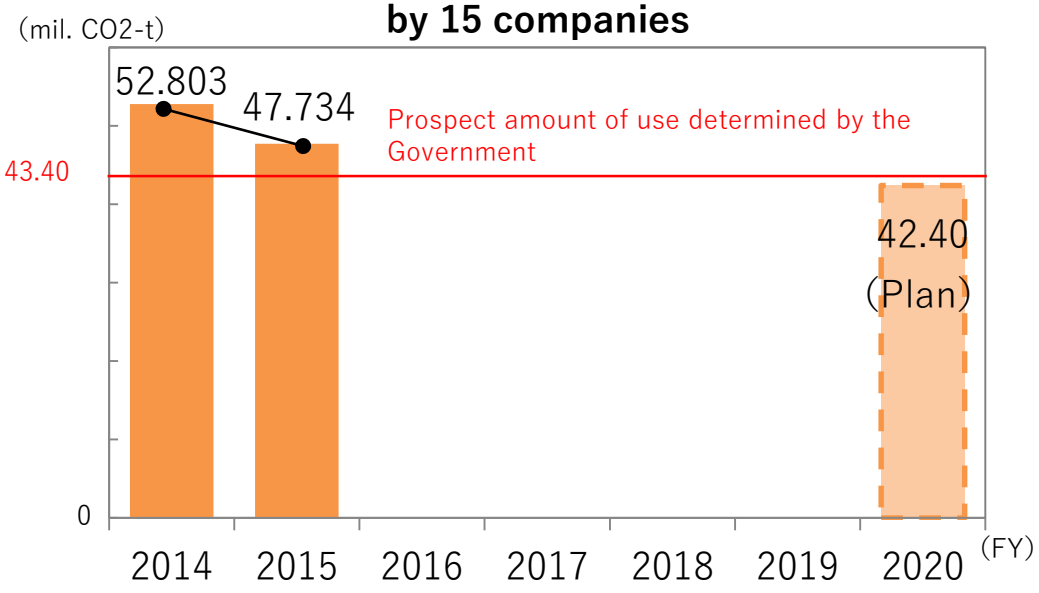
Contents of improvement plans
・Target of consumption in 2020
✓ Projected figure is below 43.2 mil
・Technical development plan, Facility investigation plan, Recycling and destruction plan
✓ All producers include their technical improvement plans for reducing their total GWP production
*consumption=production + import - export



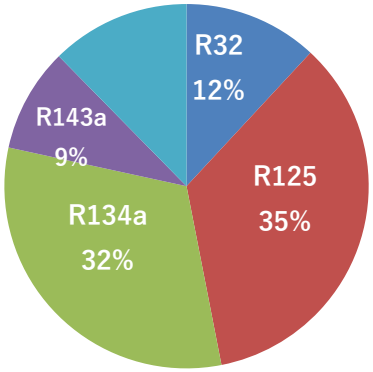
II - 2 - 2 . Current progress with the rational use of fluorocarbons

- **<u>47.73mil. CO2-t (9.6% decreased over the previous FY)</u>** of HFC consumption was reported in total by the producers and importers (beyond 0.01mil.CO2-t on the market) during FY2015. Which is approx. 10% reduction over the previous FY, before the enforcement of the law.

Fluorocarbons placed on the market by 15 companies



【Breakdown per refrigerant】



Refrigerant	mil. CO2-t
R32	5.686
R125	16.711
R134a	15.029
R143a	4.406
Other HFCs	5.898
TOTAL	**47.734***

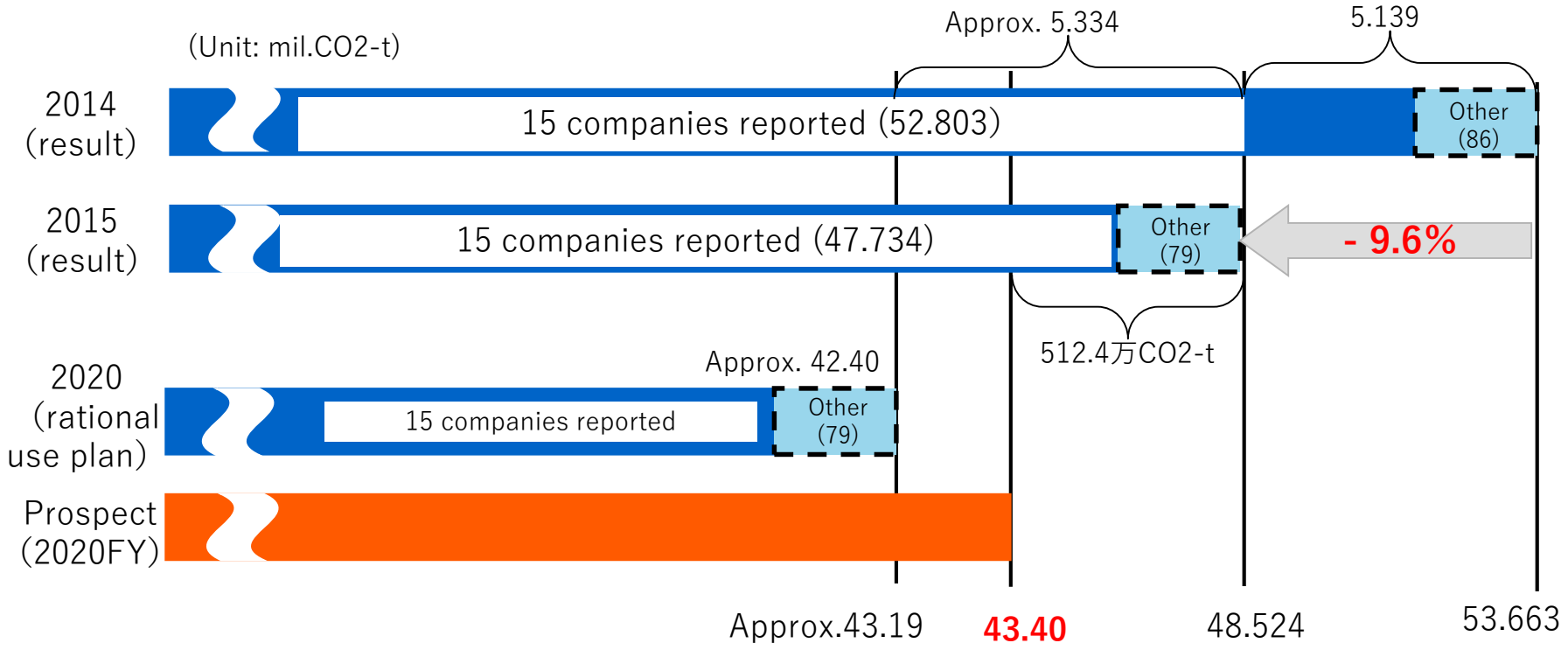
*The total of decimal point does not match due to rounding.

【Breakdown per company】

	A	B	C	D	E	F	G	H
mil.CO2-t	17.4	12.05	7.38	3.759	1.58	1.427	1.38	1.09
	I	J	K	L	M	N	O	**TOTAL**
mil.CO2-t	0.98	0.271	0.177	0.172	0.067	0	0	**47.734**

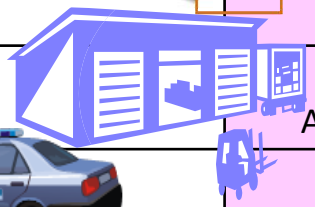
II - 2 - 3 . Relationship to rational use plan of Fluorocarbons

- Total amount placed on the market in FY2015 taking into account small business operators (less than 0.01mil.CO2-t) is estimated 48.524mil.CO2-t and 5.139mil.CO2-t reduction (9.6% decrease over the previous FY).
- Considering total reduction target (10.473mil.CO2-t) with the rational use plan by each producer or importer by FY2020, actual reduction amount over the previous FY （5.139mil.CO2-t) is corresponding to 49.6% and it shows steady progress towards the prospect amount of use for FY2020 determined by the Government.



II -3. For Manufacturers of Products using Fluorocarbons

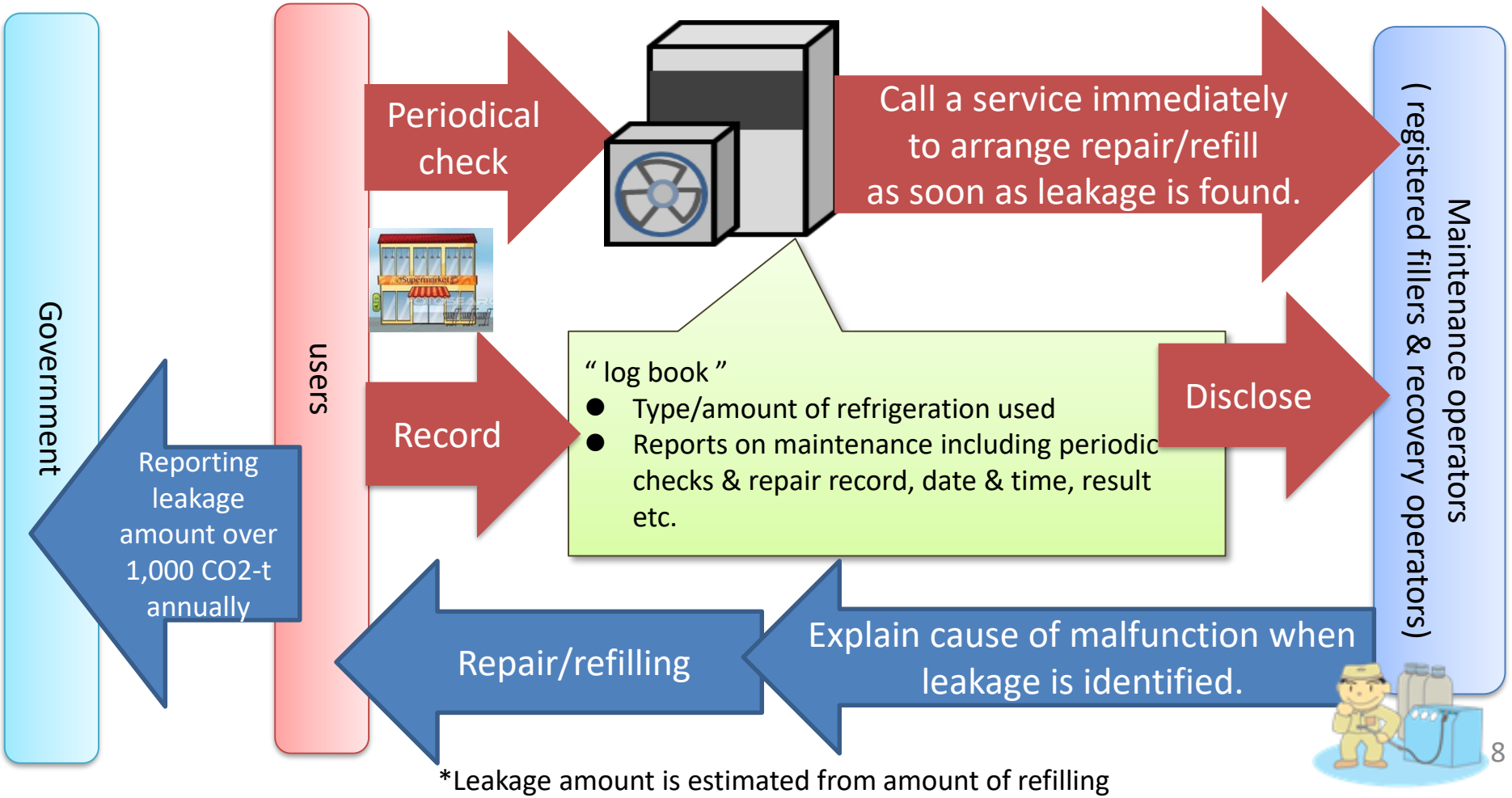
- Manufacturers and Importers of the designated products are required to replace high-GWP products with alternatives using low-GWP or non-fluorocarbons for their shipment.
- The targets are designed taking into account safety, energy efficiency, economic affordability etc. and will be reviewed as needed. Also, other products are considered when conditions are right and added to the targets.

Designated products ※	Current refrigerant (GWP)	Target value (GWP)	Target year
Room air conditioning 	R410A(2090) R32(675)	750	2018
Commercial air conditioning (for offices and stores) 	R410A(2090)	750	2020
Condensing unit and refrigerating unit (for separate type showcases, etc.) 	R404A(3920) R410A(2090) R407C(1774) CO2(1)	1500	2025
Cold storage warehouses （for more than 50,000 ㎥） 	R404A(3920) Ammonia (single digit)	100	2019
Mobile air conditioning 	R134a(1430)	150	2023
Urethane foam (house construction materials) 	HFC-245fa(1030) HFC-365mfc(795)	100	2020
Dust blowers 	HFC-134a(1430) HFC-152a(124) CO2(1), DME(1)	10	2019

※ With some exceptions.

II - 4 . For business users of products using fluorocarbons

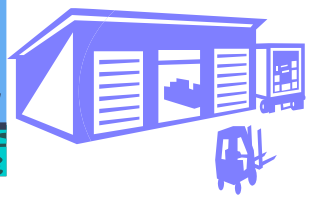
To prevent leakage, users are required to conduct periodic checks and to arrange for immediate repairs in case of leakage, and are prohibited from refilling without making repairs. Users are requested to maintain records and report cases of substantial leakage.



*Leakage amount is estimated from amount of refilling

II - 5 -1. For collectors and recyclers of fluorocarbons

In-use leakage & **at disposal**

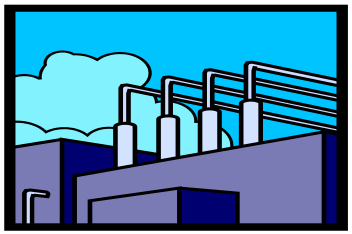
Users are prohibited from using unregistered re-fillers/ recovery operators for re-filling / disposal.

Refill or recycle

Registered re-fillers/ recovery operators

Registered re-fillers/recovery operators are obliged to deliver collected fluorocarbons to registered recyclers or destructors or refill or recycle for users .

F-gas factory



Approved recyclers

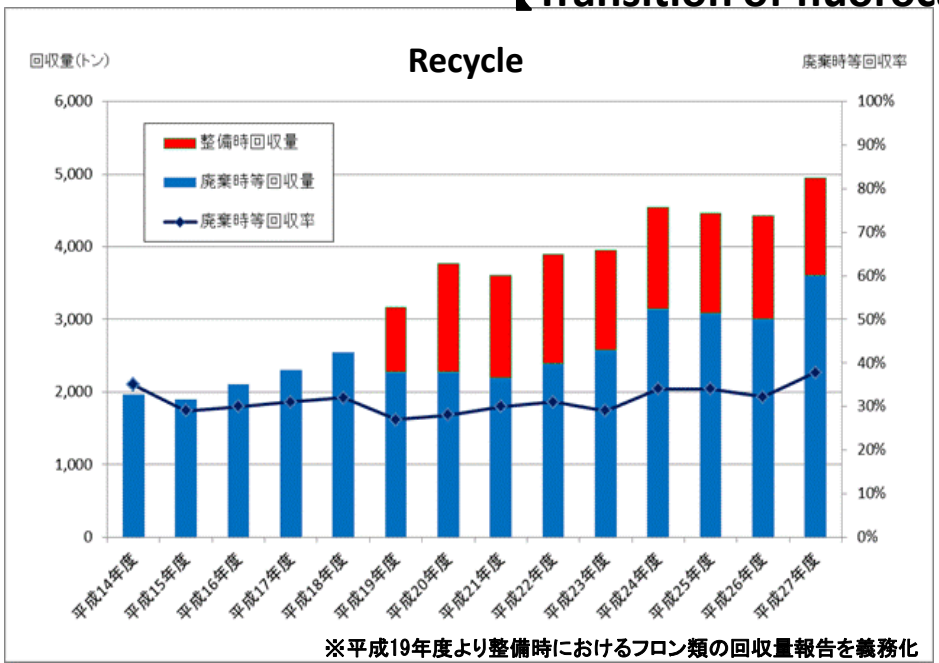
Approved destructors

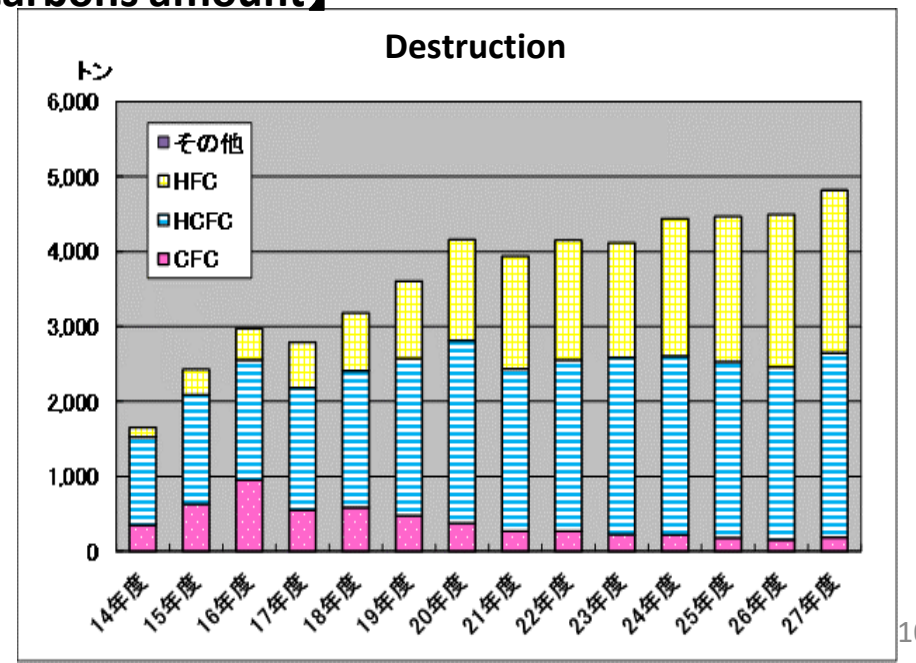
II - 5 - 2 . Result of Recovery, Recycle and Destruction

◯Fluorocarbons recovered from commercial refrigeration and air conditioning equipment by the Registered re-fillers/recovery operators in FY2015 is 4,841 ton (9.4% increase over the previous FY) in which approx.3,499 ton is collected at the final disposing stage. The amount is estimated approx. 38% of potential total disposing gases and 6% increase over the previous FY.

◯ Destructed fluorocarbons by the approved destructors is 4,819ton, approx. 7.2% increase over the previous FY and recycled ones by the approved recyclers is 965 ton.

【Transition of fluorocarbons amount】





III-1. Phase down schedule in Kigali Amendment

- The amendment proposals to add HFCs, that have global warming potentials, to the list of control substances on production and consumption under the Montreal Protocol for phasing down had been discussed between parties continuously since 2009 and **resulted in adoption of the amendment at the 28th meeting of the parties in Kigali, Rwanda in October 2016 (Kigali Amendment).**
- The phase down schedules agreed by the parties are as indicated.

HFCs phase-down schedule on Production and Consumption (*3)

	Developing countries Group 1 (*1)	Developing countries Group 2 (*2)	Developed Countries
Baseline	2020-2022	2024-2026	2011-2013
Formula	Average HFC consumption + HCFC baseline 65%	Average HFC consumption + HCFC baseline 65%	Average HFC consumption + HCFC baseline 15%
Freeze	2024	2028 (*4)	NA
Reduction Steps	2029 90% 2035 70% 2040 50% 2045 20%	2032年 90% 2037年 80% 2042年 70% 2047年 15%	2019 90% (*5) 2024 60% 2029 30% 2034 20% 2036 15%

(*1) Group 1: Article 5 parties not part of Group 2
(*2) Group 2: GCC, India, Iran, Iraq, Pakistan
(*3) Technology review in 2022 and every 5 years
(*4) Technology review 4-5 years before 2028 to consider the compliance deferral of 2 years from the freeze of 2028 of Article 5 Group 2 to address growth in relevant sectors above certain threshold.
(*5) For Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan 25% HCFC component of baseline and different initial two steps (1) 5% reduction in 2020 and (2) 35% reduction in 2025.

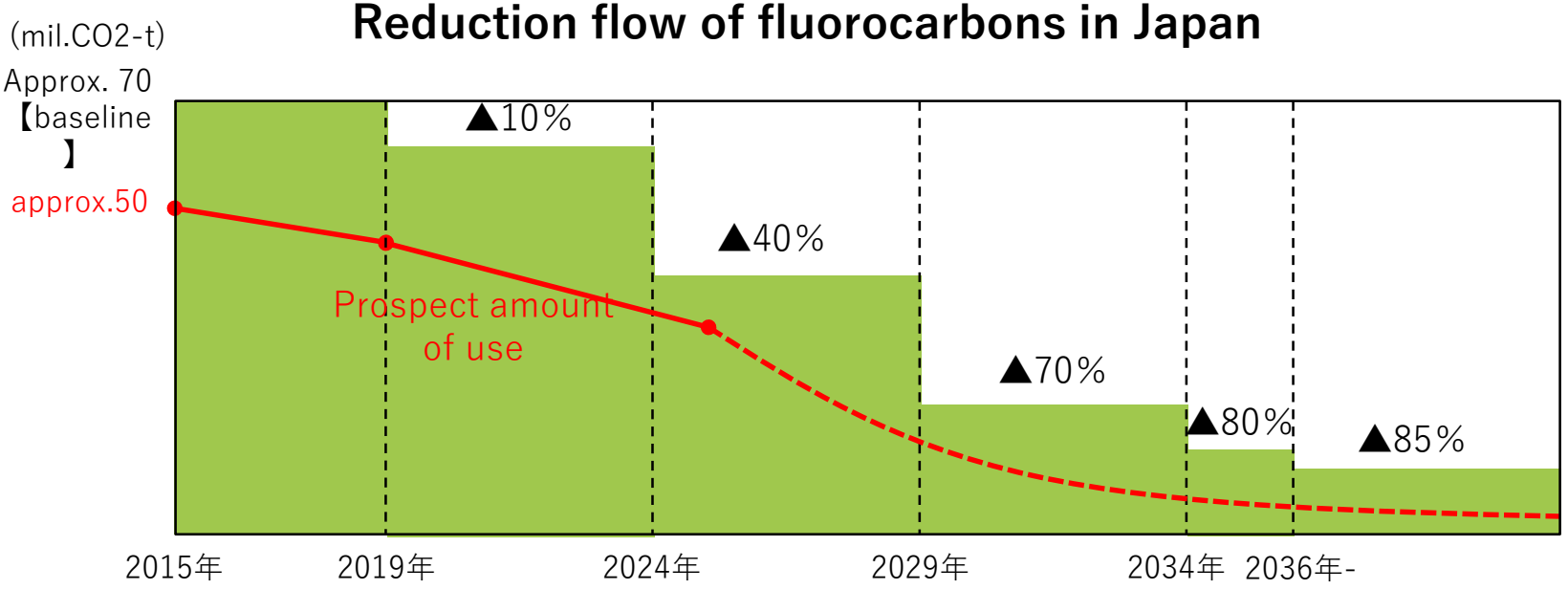
III-2. The amendment and its impact to Japan

◯The amendment to Montreal Protocol imposed **reduction on its calculated level of production and consumption (average 2011-2013) HFCs from 2019 thru 2036 down to 15%** and some other controls to the developed countries including Japan.

◯As we continue our steady engagement with the Act on Rational Use and Proper Management of Fluorocarbons, it is presumable to accomplish the reduction target by 2025 and can be achievable even beyond 2025 with continuous R&D efforts.

◯On the other hand, it would be a great opportunity on enhancement of competitiveness for refrigeration and air conditioning industry with investigated new technology such as promoting new refrigerants.

Reduction flow of fluorocarbons in Japan



III－3 .Domestic F-gas control measures and the Amendment

- The substances including CFCs and HCFCs that deplete the Ozone Layer are controlled for its production and consumption (Quota system) by the **Act on the Protection of the Ozone Layer through the Control of specified substances and other measures.** The fluorocarbons are comprehensively managed from production to destruction by the **Act on Rational Use and Proper Management of Fluorocarbons.**
- New control measures on HFCs production and consumption such as quota system will be needed in line with the Kigali Amendment.

Domestic laws and the protocol	**Protection of the Ozone Layer ※**	**Rational Use and Proper Management of Fluorocarbons**	**Kigali Amendment**
Substances	Substances that deplete the Ozone Layer (CFCs and HCFCs)	CFCs, HCFCs HFCs	HFCs
Control measures	● Allowance on production amount ● Control import and export (※ by the Export Trade Control Order and etc.	● Reduction plan by Producers (gases・equipment) ● Periodical check on equipment and report on leakage by users ● Proper charge and recovery ● Proper recycle and destruction	● Allowance on production amount ● Control import and export

経済産業省
Ministry of Economy, Trade and Industry

Thank you for your attention.