経済産業省
Ministry of Economy, Trade and Industry

Japan's Policy Measures for phasing down HFCs

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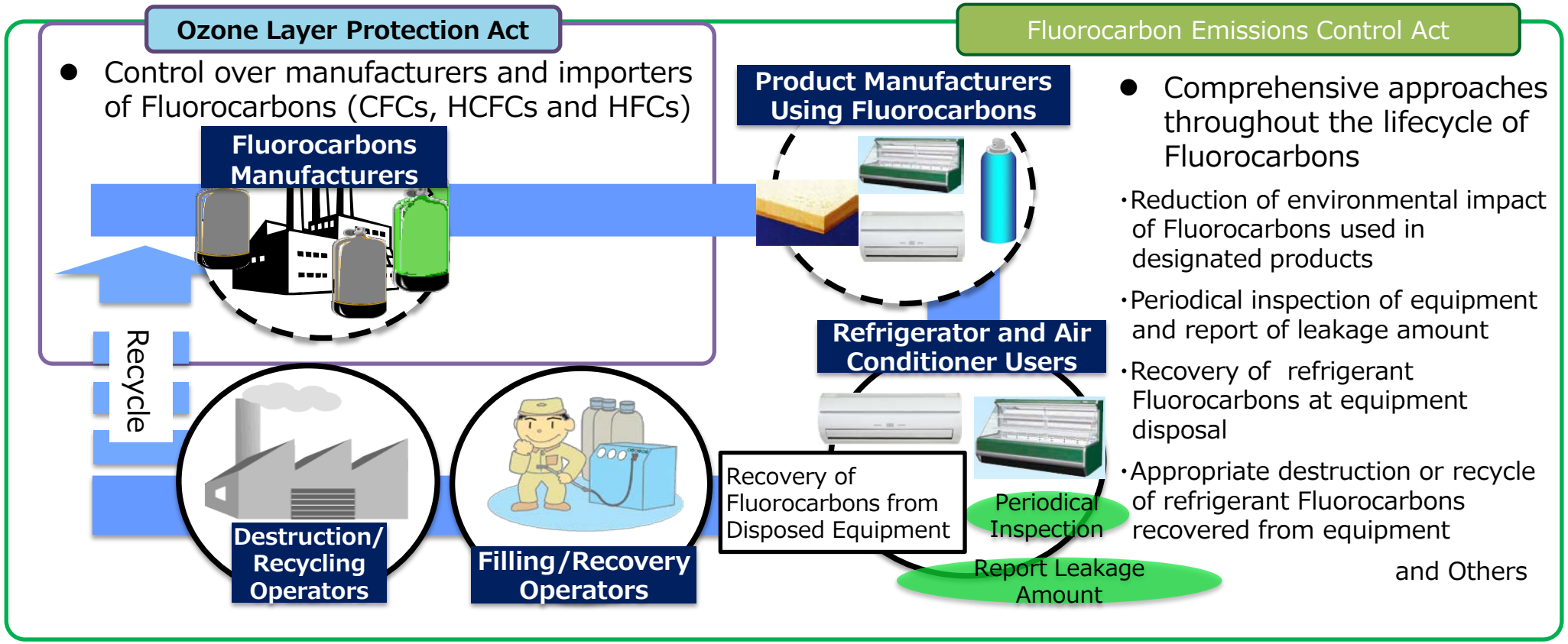
Two Regulatory Measures for Reducing HFCs Emission

- **Ozone Layer Protection Act : To comply with the Montreal Protocol, this Act aims to control consumption and production of controlled substances by regulating their productions and imports.**
- Fluorocarbon Emissions Control Act : This Act aims to control emissions over the lifecycle of Fluorocarbons from up-stream to down-stream.



Kigali Amendment to Ozone Layer Protection Act

- **Kigali Amendment of the Montreal Protocol was adopted in October 2016.**
  - The amendment obliges Parties to reduce (phase-down) production and consumption of HFCs.
- **Japan amended the Ozone Layer Protection Act in June 2018** for reflecting the Kigali Amendment.
  - Introduced regulatory measures such as controlling manufactures and imports of HFCs.
  - **The amended Act was enacted in December 2018 and came into force on 1 January 2019.**
- **Japan accepted the Kigali Amendment in December 2018**.

Details of Introduced Policy Measures

○ The Ministry of Economy, Trade and Industry (METI) along with the Ministry of the Environment (MOE) **determines and publishes the limit of production as well as consumption of HFCs** which Japan should comply with in accordance with the Protocol.

○ **Manufacturers and importers** of HFCs obliged to **request METI's permission as a quota** for manufacture/import of HFCs.

- Import is subject to the provisions and procedure of the Foreign Exchange and Foreign Trade Act.

○ Manufacture and import of **HFCs as feedstock** in the manufacture of other chemicals are **exempted from the quota** after the check and confirmation conducted by METI.

Results from 2019 to 2023（consumption）

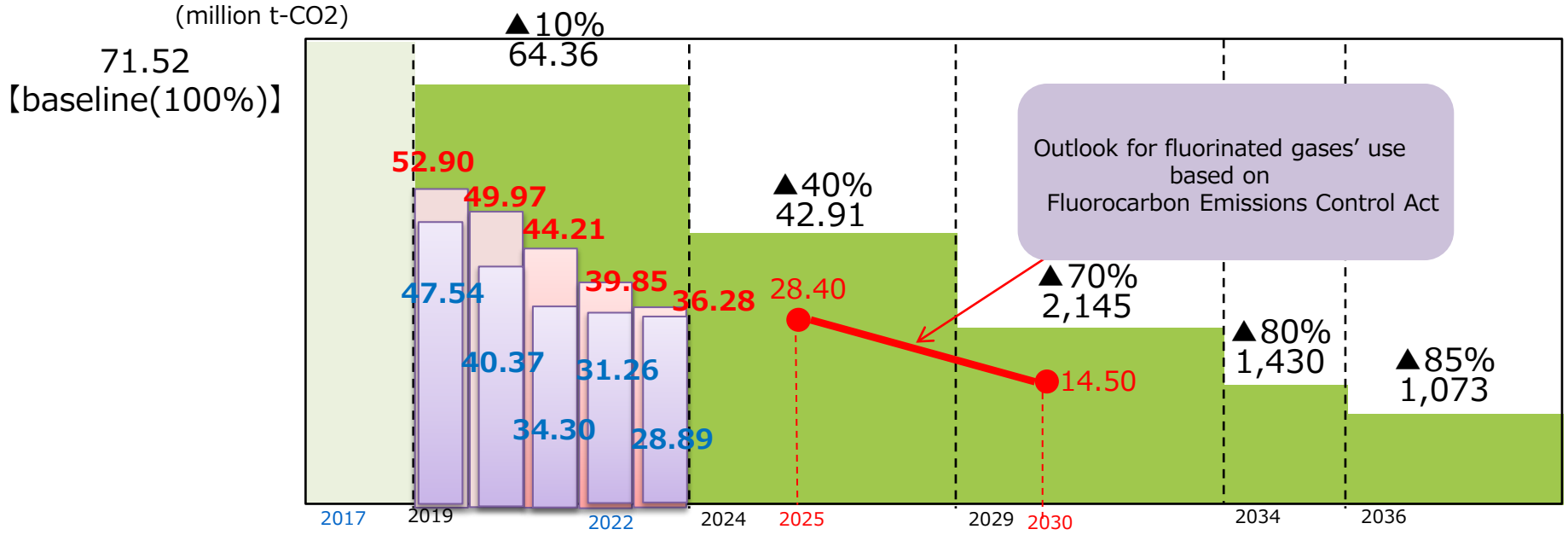
2023 quota on consumption was allocated to 36.28 million tones of CO2 equivalent for basic and special uses. This value is far below the target consumption by 44%. The actual consumption is also under the quota in 2023. We have achieved the target affordably.

-basic quota: 35.32 million tons of CO2 equivalent(producers 8 businesses 24 importers)

-special quota:0.96 million tons of CO2 equivalent(producers 3 businesses 10 businesses)

※Special quota are allocated for fire extinguishing agents, inhalers and use in test and research

Upper limit, allocated value and actual value of consumption in Japan



※ Baseline is calculated based on the average of actual value 2011-2013

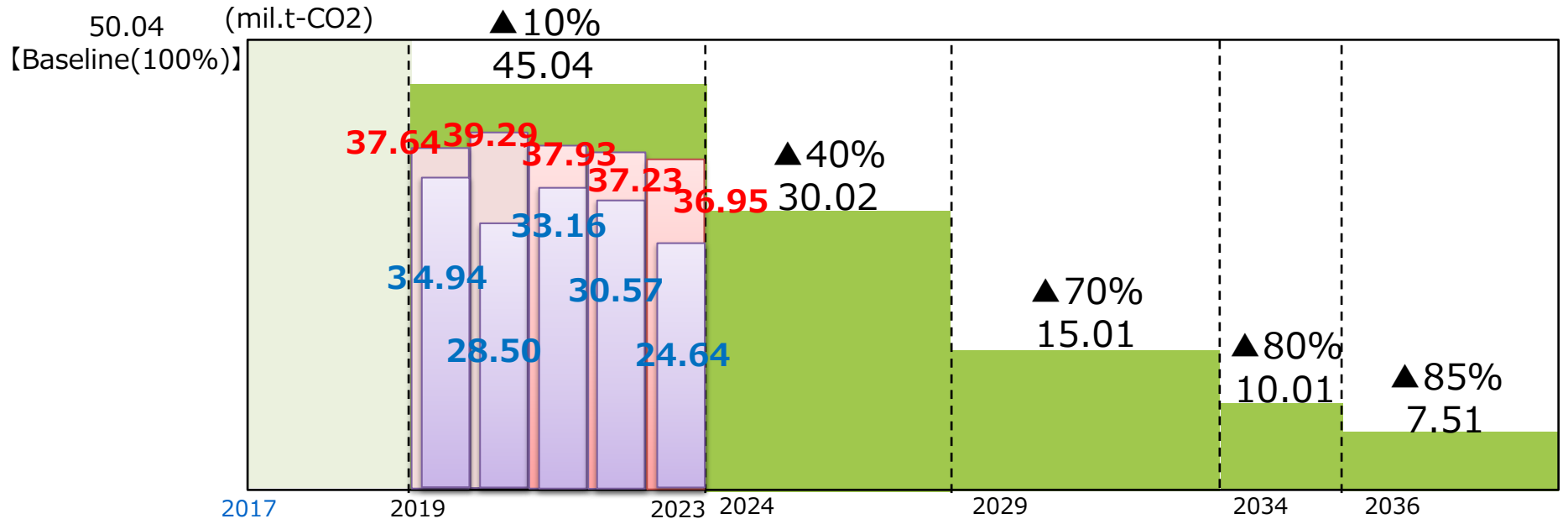
Results from 2019 to 2023 （production）

- 2023 quota on production was allocated way below the national cap of Kigali amendment. 36.95 million CO2 equivalent tones were allocated to basic use and special use in total. This value is 18% lower than that of the reduction target 45.04 million CO2 equivalent.

  Basic allocation ：36.63 million CO2 equivalent tons (8 producers)

  Special allocation: 0.32 million CO2 equivalent tons (3 producers 10 importers)

Upper limit, allocated value and actual value in Japan



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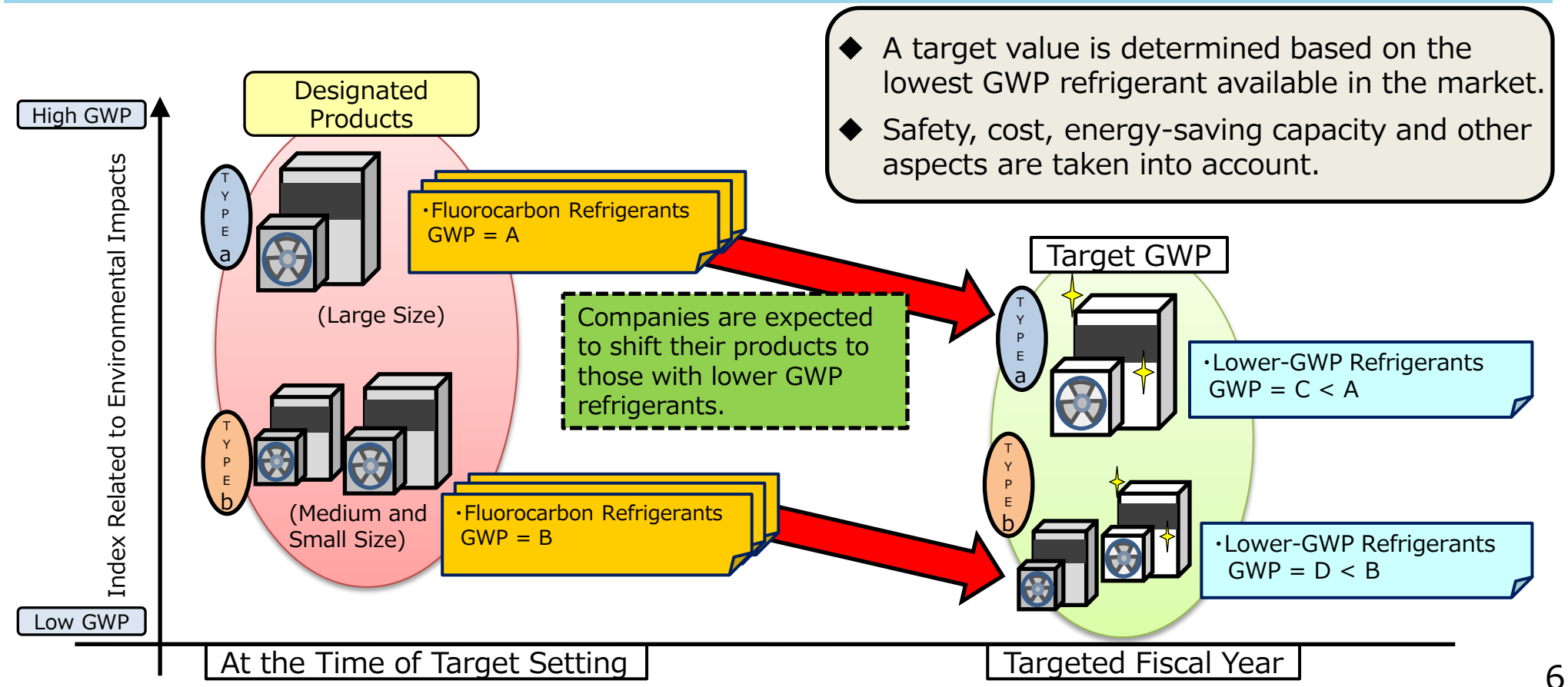
Up stream:Promoting Low-GWP Top-runner Products

- **Fluorocarbon Emissions Control Act** designates product categories, for which lower-GWP refrigerants are available in the market.
- Based on the **best available product (called "top-runner")**, the **target value (GWP)** is determined in that product category with the **target year** for achieving that target value.
- **Manufacturers and importers** are required to **meet the target GWP value** for their products **by the target year**.



Promoting Low-GWP Top-runner Products (as of this July)

- Target GWP values and target year have been determined for each product category.
- Taking into account the technological progress and safety assessment, product categories will be added with target GWP and target year in the future.

Specified Product Categories	Refrigerant Currently Used (GWPs)	Target GWP	Target Year
Residential Air-conditioners	R410A (2090), R32 (675)	750	2018
Commercial Air-conditioners			
(a) Refrigeration Capacity less than 3 Tonnes (except Floor-types)	R410A (2090), R32 (675)	750	2020
(b) Refrigeration Capacity more than 3 Tonnes (except Floor-types)	R410A(2090)	750	2023
(c) Central Air-conditioners (Centrifugal Chillers)	R134a (1430), R245fa (1030)	100	2025
(d) Multiple-type air-conditioner for building use (those installed in new buildings or those with replacement of all refrigerant piping, excluding those for use of cooling and heating at the same time and those for use in cold district)	R410A (2090)	750	2025
(e)Reciprocating liquid chiller for air conditioning	R410A(2090)	750	2027
(f)Gas engine heat pump air conditioners (those installed in new buildings or those with replacement of all refrigerant piping, excluding those for use of cooling and heating at the same time and those for use in cold district)	R410A(2090)	750	2027
(g)Air conditioners for facilities (those installed in new buildings or those with replacement of all refrigerant piping, excluding those for specific use such as for those computers, those for use at medium temperature range, and all-in-one air conditioners)	R410A(2090)	750	2027
Automotive Air-conditioners - Passenger cars only (except those for 11 or more passengers)	R134a(1430)	150	2023
Automotive air conditioners ・Automobile air conditioner for buses and trucks (automobiles that carries 11 people or more) and trucks (automobiles	R134a(1430)	150	2029
Condensing Units / Stationary Refrigeration Units (excluding those compressor with rated output of 1.5kW or less)	(3920), R410A (2090), R407C (1770), CO2 (1)	1500	2025
Refrigerator and Freezer using rigid polyurethane foam	HFC-245fa (1030),HFC-365mfc (795)	100	2024
Refrigerate and freeze equipment combined unit for commercial use (those that have refrigerator and freezer within housing) ・Commercial refrigerator and freezer for commercial kitchen (Those where the refrigerant evaporates at above -45 degrees Celsius)	R134a(1430) R404A(3920) R410A(2090) R407C(1770) CO2(1)	150	2029
Vending Machine with a Refrigerating or Freezing Function using rigid polyurethane foam	HFC-245fa (1030),HFC-365mfc (795)	100	2024
Centralised Refrigerators (only for new refrigerated warehouses having effective volume of at least 50,000m3)	R404A (3920), Ammonia (1 digit value)	100	2019
Rigid Polyurethane Foam Stock Solution for residential use	HFC-245fa (1030),HFC-365mfc (795)	100	2020
Rigid Polyurethane Foam Stock Solution for use other than residential us	HFC-245fa (1030),HFC-365mfc (795)	100	2024
Heat Insulating Materials (using rigid polyurethane foam)	HFC-245fa (1030),HFC-365mfc (795)	100	2024
Aerosol Spray Cans (except those requiring non-flammability)	HFC-134a (1430), HFC-152a (124), CO2 (1), DME (1)	10	2019

Achievement of Top-Runners

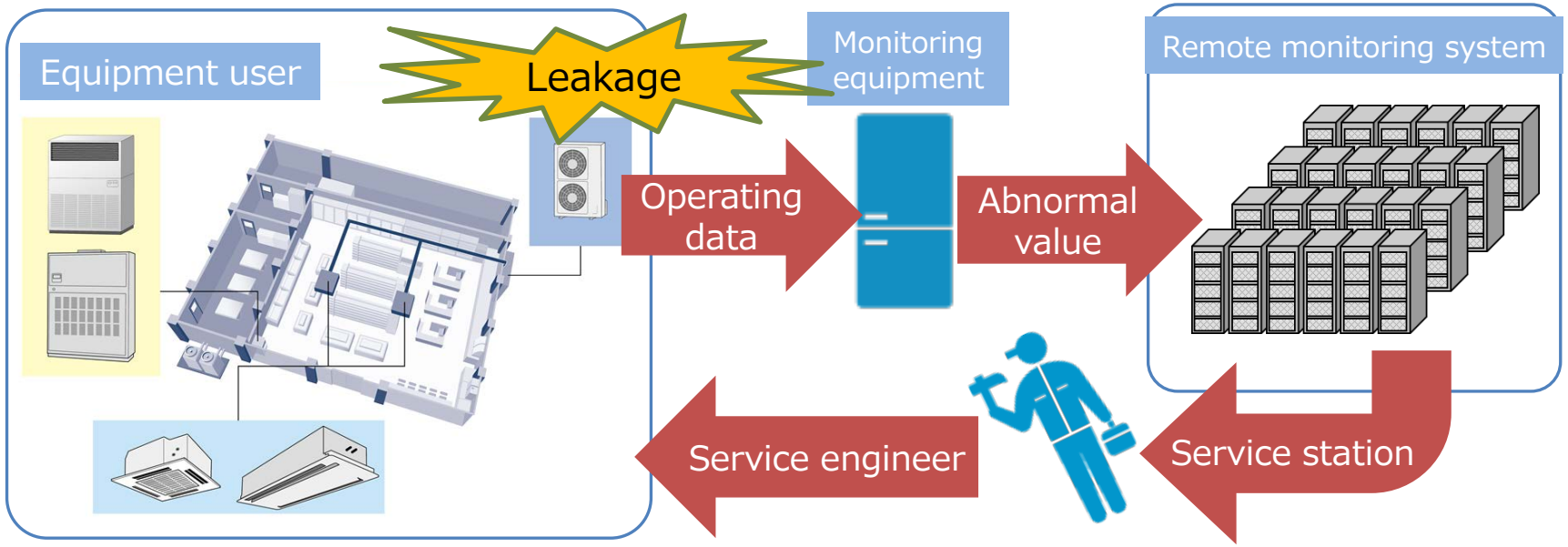
- All product categories which reached the target year have achieved the target GWP value.
- METI checked the achievement in other product categories in each target year.
- Lower target GWP value will be re-designated for already achieved product categories after newly developed top-runner product becomes available in the market.

Product Categories	Target GWP Value	Target Year	Achievement
Residential Air-conditioners	750	2018	• Weighted average GWP value for total category is 685. • All 11 manufacturers have achieved the target value. • Refrigerant has been replaced by HFC-32 (GWP675).
Centralised Refrigerators	100	2019	• Weighted average GWP value for total category is 1.62. • All 4 manufactures have achieved the target value. • Replaced by CO2 (1) or combination of CO2/NH3 (2).
Aerosol Spray Cans (Dust Blower)	10	2019	• Weighted average GWP value for total category is 2.7. • 19 out of 20 manufactures have achieved the target. Remaining one has also achieved after the target year. • Replaced by HFO (GWP1) or DME (GWP1)
Refrigeration Capacity less than 3 Tonnes	750	2020	• Weighted average GWP value for total category is 687.7. • All 6 manufactures have achieved the target value. • Refrigerant has been replaced by HFC-32 (GWP650).
Rigid Polyurethane Foam Undiluted Liquid in Residential building	100	2020	• Weighted average GWP value for total category is 17.3. • 7 out 8 manufactures have achieved the target. Remaining one has also achieved after the target year. • Replaced by HFO (GWP<2) or H2O/CO2 (GWP1).

Middle-stream: Inspection Obliged to Equipment Users

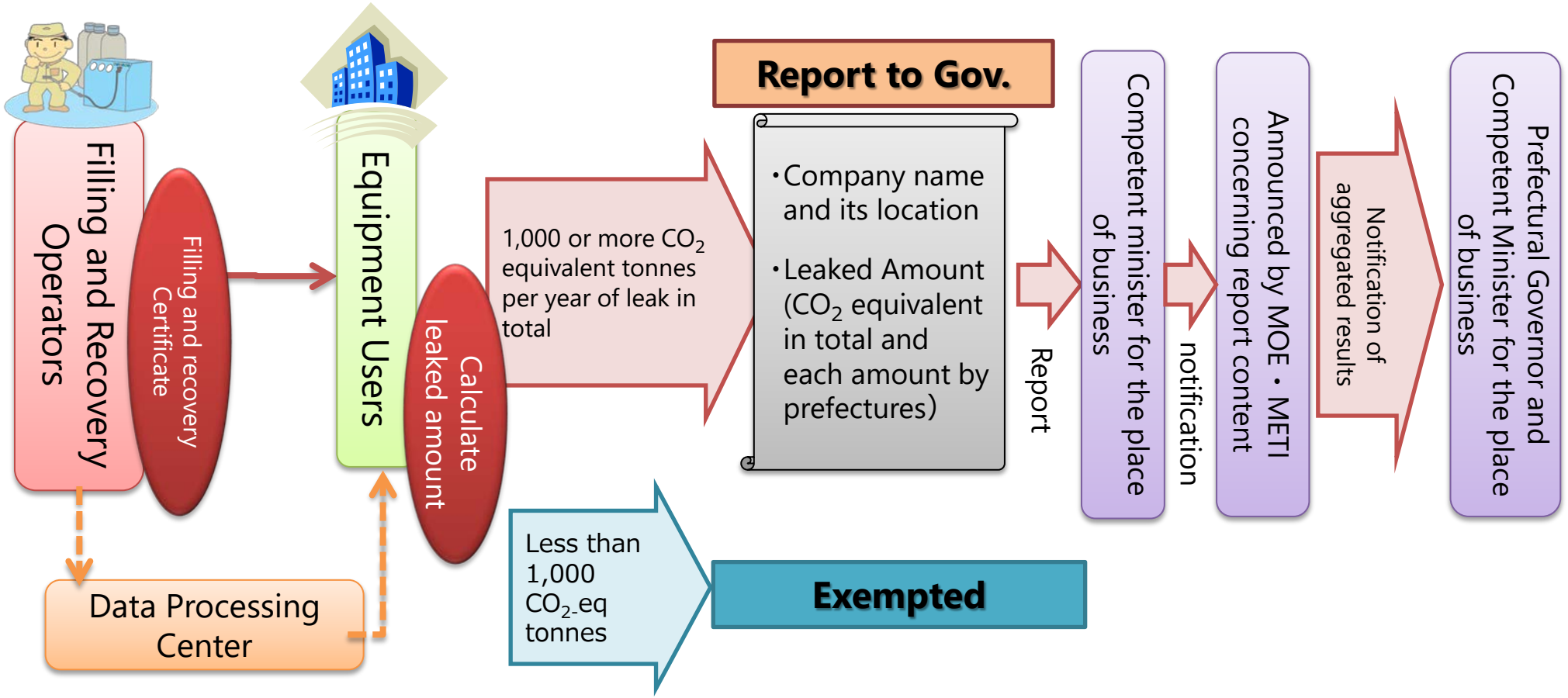
- Equipment users are required to perform simple inspections for equipment at least once every 3 months. Periodic inspections by experts should be performed for certain types of equipment as shown in the following table.
- Remote monitoring systems, which can find leakage of fluorocarbons or its possibility by detecting state value of temperature and pressure, etc. on a constant basis, have become common. In the light of this circumstances, the systems could be used as a replacement for simple inspections under the revised announcement of Fluorocarbon Emissions Control Act since August 2022.

Equipment category	Rated output of motor used by compressor, or output of engine driving compressor	Inspection frequency
Refrigeration equipment and freezer equipment	Equipment of 7.5 kW or more	At least once per year
Air conditioners	Equipment of 50 kW or more	A least once per year
	Equipment of at least 7.5 kW but less than 50 kW	At least once every 3 months



Middle-stream: Report on calculated amount of leaked fluorocarbons

- Equipment users are required to report the leaked amounts of fluorocarbons to the government. Such requirement is subject to users who leaked 1,000 or more CO_2 equivalent tonnes per year.
- The reported information is disclosed by the government so that such users can self-manage the fluorocarbon leakage properly while the disclosure raises their awareness.



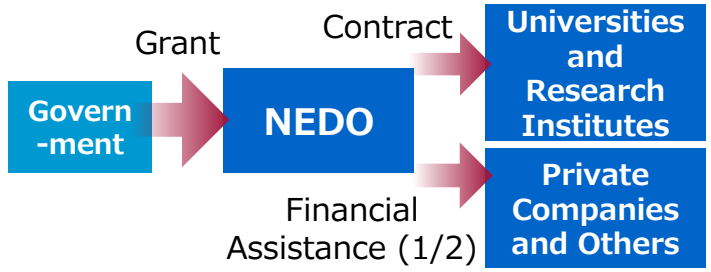
Government Supports for Low GWP Refrigerants

- METI and MOE respectively support development and introduction of low-GWP refrigerants as follows:
  - METI: Research and development on the next-generation low-GWP refrigerants.
  - MOE: Financial support to low-GWP equipment for its introduction into the market.

Development Project on the Next Generation Refrigeration and Air-Conditioning Technologies, and Assessment Methods (METI)

Budget: 500 Million Yen in FY2023 Time Period: 5 Years (2023-2027)

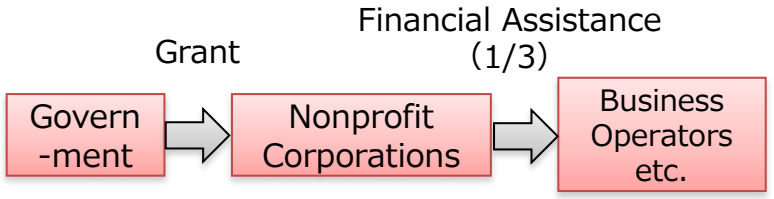
- The goal is to **establish risk assessment methods on candidate alternative refrigerants** under industrial-academic cooperation. The results of the assessment are expected to be utilized for development of air-conditioners.
- Financial assistance is provided to private companies for **developing low-GWP refrigerants and equipment technologies**, which satisfy the balance among low greenhouse effects, energy conservation and safety of products.



Project to Accelerate Introduction of Energy Saving-Type Natural Refrigerant Equipment for Realising Fluorocarbon-Free and Low Carbon Society (MOE)

Budget: 7.0 Billion Yen in FY2023 Time Period: 5 Years (2023-2027)

- Although technologies of an energy saving-type natural refrigerant to replace fluorocarbons are available in some uses, **introduction of those technologies is limited due to high initial costs**.
- The government supports **introduction of natural refrigerant equipment with high energy-saving capacity** to realise fluorocarbon-free and low carbon society.



Alternative Refrigerants – High GWP to Low GWP

Stage	Sector	Present Alternative Refrigerants (GWPs)	Low-GWP Alternatives Available or will be Available
Low-GWP alternatives are available or will be available soon	Home Freezers & Refrigerators	[HFC-134a (1,430)]	Isobutane
	Vending Machines	[HFC-134a (1,430)] [HFC-407C (1,770)]	CO_2, Isobutane, HFO-1234yf
	Automotive Air Conditioners	HFC-134a（1,430）	HFO-1234yf
Low-GWP alternatives with some challenges on its further dissemination (e.g. cost reduction)	Ultra-Cold Freezers	HFC-23（14,800）	Air
	Large-scale Commercial Freezers & Refrigerators	HFC-404A（3,920） HFC-410A（2,090）	NH_3, CO_2
	Medium-scale Commercial Freezers & Refrigerators (e.g. Stand-alone Showcases)		CO_2
Low-GWP alternatives are still under development	Small-scale Commercial Freezers & Refrigerators	HFC-404A（3,920） HFC-410A（2,090）	*Candidate alternatives are under development*
	Commercial Air Conditioners	HFC-410A（2,090） HFC-32（675）	
	Home Air Conditioners	HFC-32（675）	

※GWP: Global Warming Potential (A value indicating intensity of global warming impact, with reference to CO_2 as 1)
※HFC-407C: Mixed refrigerant of HFC-32, 125, and 134a (23:25:52)
HFC-404A: Mixed refrigerant of HFC-125, 143a, and 134a (44:52:4)
HFC-410A: Mixed refrigerant of HFC-32 and 125 (1:1)

Thank you for your attention!