

Japan's Policies of fluorocarbons management (refrigerant transition)

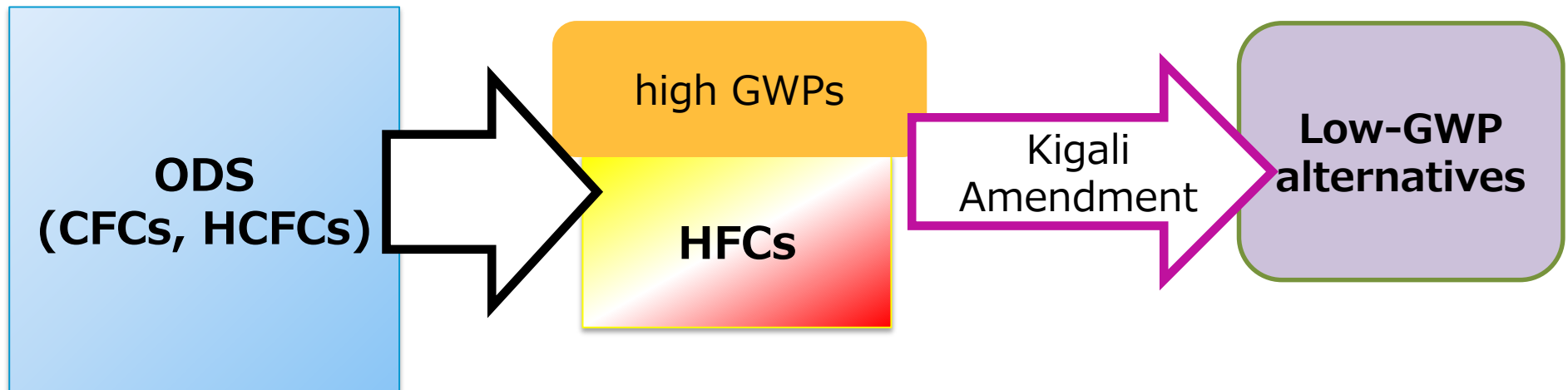
**Fluoride Gases Management Office,
Ministry of Economy, Trade and Industry**

**Office of Fluorocarbons Control Policy,
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Japan**

July 2019

Key Points in the Kigali Amendment to Montreal Protocol

- In October 2016, the Montreal Protocol was amended in Kigali, Republic of Rwanda. The amended Protocol states obligation to reducing (phase-down) production and consumption of HFCs with high greenhouse effect, which in turn have potential impact on global warming.
- Japan determined to amend the Ozone Layer Protection Law in June 2018 as a national collateral measure to reflect the Kigali Amendment, and to implement measures such as controlling manufactures and imports of HFCs.
- Japan accepted the Kigali Amendment in 2018 (more than 70 countries have ratified the Amendment as of July, 2019). The control has entered into force on January 1, 2019.



Measures for refrigerators and ACs

- Measures to improve energy efficiency of RACs
 - ⇒ Top Runner Program in Energy Saving Act: set highest possible value of EE at the time of target setting as the target value
- Measures to ensure safety:
 - ⇒ various legal systems depending on the what type of safety (toxicity, flammability, pressure control etc.)
- Measures for smooth refrigerant/material transition to low-GWP alternatives
 - ⇒ Ozone Layer Protection Law, Fluorocarbons Emission Restraining Law etc. **will be explained in detail in this presentation.**

(Regulations) The Relevancy of Ozone Layer Protection Law and Fluorocarbons Emission Restraining Law

		Ozone Layer Protection Law	Fluorocarbons Emission Restraining Law
Legal Objective		<ul style="list-style-type: none"> ● Protection of Ozone Layer ● Appropriate and Smooth Implementation of the Montreal Protocol 	<ul style="list-style-type: none"> ● Restraining Emission of Fluorocarbons into the Atmosphere ● Rationalization of Use and Optimization of Maintenance/Management of Fluorocarbons
Scope of Control	Step	<ul style="list-style-type: none"> ● Manufacture and Import 	<ul style="list-style-type: none"> ● Manufacture and Import/Use, Maintenance, and Disposal
	Gases	<ul style="list-style-type: none"> ● Fluorocarbons (CFCs, HCFCs, HFCs) 	<ul style="list-style-type: none"> ● Fluorocarbons (CFCs, HCFCs, HFCs)
	Equipment	—	<ul style="list-style-type: none"> ● Equipment Using Fluorocarbons
Minister Publication		<ul style="list-style-type: none"> ● Baseline Limitation 	<ul style="list-style-type: none"> ● Estimated Use of Fluorocarbons
Control Measures	Manufacture	<ul style="list-style-type: none"> ● Permission System 	<ul style="list-style-type: none"> ● Reduction of Domestic Shipments of Fluorocarbons 【Striving Provisions】
	Import	<ul style="list-style-type: none"> ● Approval System (According to Foreign Exchange Control Law) 	
	Manufacture of Equipment	—	<ul style="list-style-type: none"> ● Reduction of Environmental Impacts of Fluorocarbons Used in Products 【Striving Provisions】
Equipment Use, Maintenance, and Disposal of Equipment	—	—	<ul style="list-style-type: none"> ● Obligation to Equipment Inspection and Maintenance ● Obligation to Report on Leakage of Fluorocarbons ● Obligation to Recover Fluorocarbons During Equipment Disposal

Summary of 2018 Revision of Ozone Layer Protection Law

- Under the revised law, the manufactures and imports of HFCs are controlled in accordance with the Kigali Amendment to fulfill the obligation to the phase-down of production and consumption of HFCs.
 - ※The same regulatory framework have been applied to manufactures and imports of CFCs and HCFCs.
- The Law was enacted in 2018, and came into force on January 1, 2019.

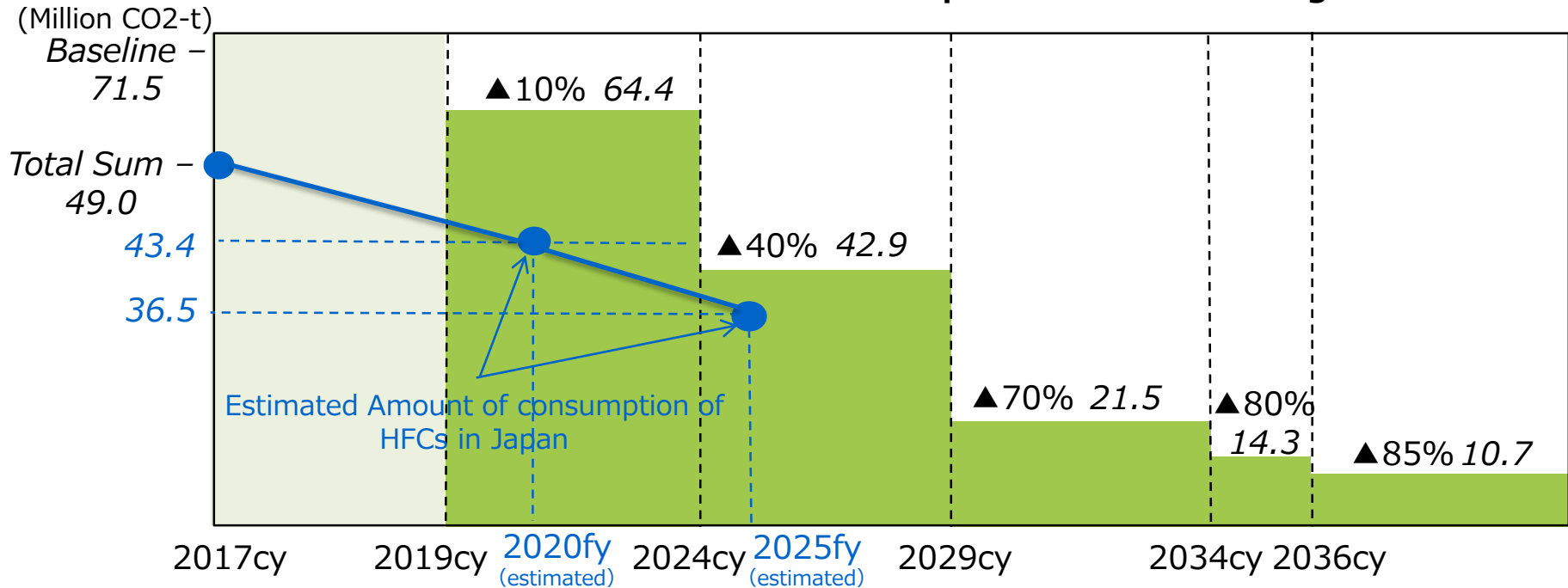
Principal Measures

- The Ministry of Economy, Trade and Industry(METI) along with the Ministry of the Environment(MOE) determine and publish the limit of production as well as consumption of HFCs which Japan should comply in accordance with the Protocol.
- Manufactures and imports of HFCs should be accorded the following:
 - Who seeks to manufacture must receive permission and be assigned a quota from the METI.
 - Who seeks to import must receive permission and be assigned a quota from METI in accordance with provisions of Foreign Exchange and Foreign Trade Act.
- ※HFCs are used mainly for refrigerants in freezers and air conditioning equipment (approximately 90%), in other cases for foam agents, cleaning agents, and so forth.

Phase-Down of HFCs in Accordance with the Revised Ozone Layer Protection Law

- After January 1, 2019, the national baselines of production and consumption of HFCs are to be **cut back step by step (phase-down)**, in accordance with the Kigali Amendment.
- By promoting **development and introduction of technologies of low-GWP or non-fluorocarbons refrigerant and equipment**, Japan is aiming to be well-prepared in advance to accomplish the target-baselines set each year, in which **2029 will be especially challenging year with (2.145 Mt-CO₂)**.
- And hoping that our commitment to develop leading low-GWP refrigerant technologies can contribute the transition of the world.

Scheduled Phase-Down of Baselines of the Consumption Based on the Kigali Amendment



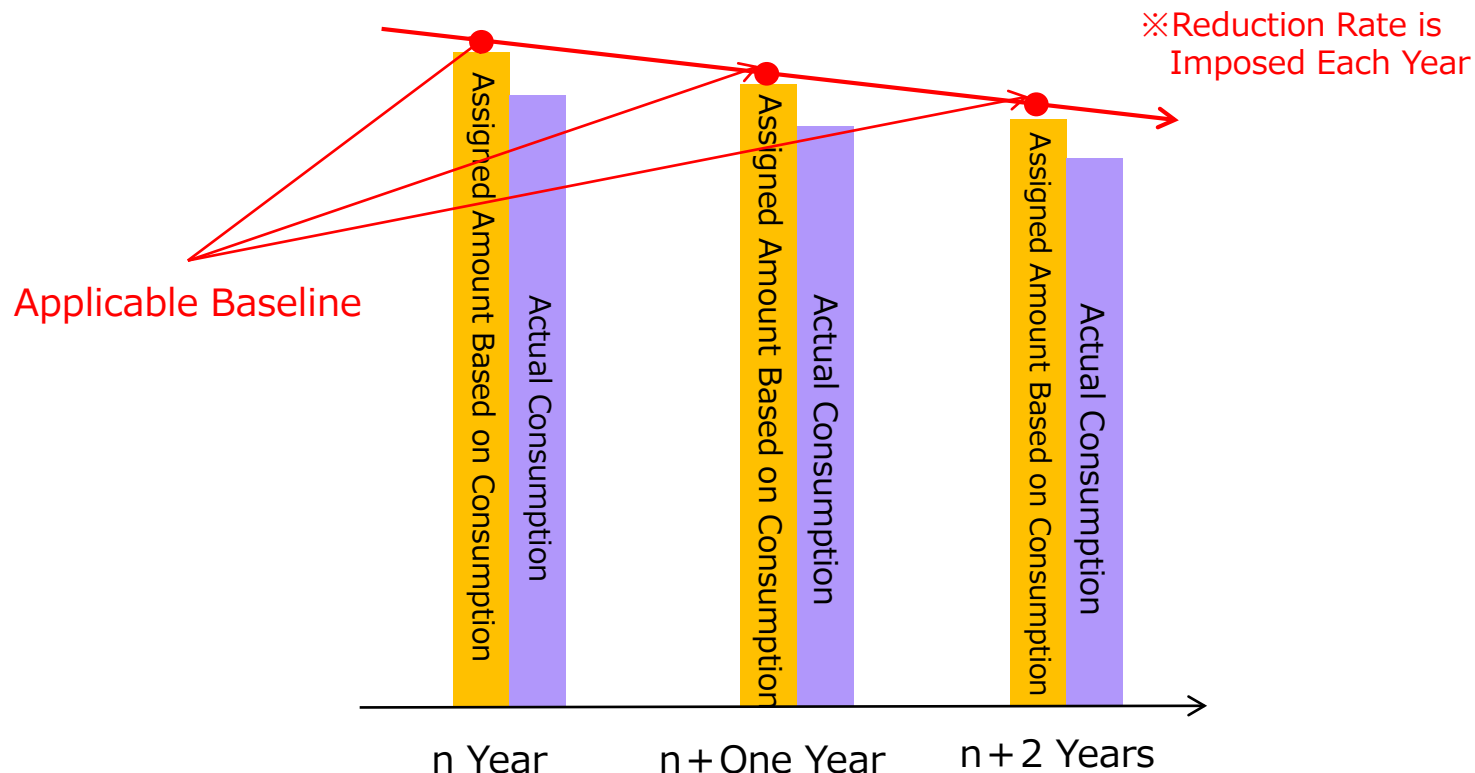
CY – Calendar Year(January to December), FY – Financial Year(April to March)

※ Baseline is extracted from average values calculated with actual results between 2011-2013.

(Note) Operational Concept of Quota System of HFCs

- To ensure progress of consumption reduction while maintaining sustainability of supply and businesses, individual business operator is to be assigned with an upper limit (hereinafter called as applicable baseline) which is based on the consumption amount (= manufacture - exports + imports; i.e., total domestic shipping).
- The applicable baseline for 2019 is was calculated and the quota was assigned based on actual results, and the level of the baseline will be reduced every year.
- The year-on-year baseline reduction rate is to be constant among all operators in principle to establish the fair system.

<A View of Applicable Baselines among Individual Business Operators>



Prospected Amount of consumption of HFCs in Japan (Fluorocarbons Emission Restraining Law)

- The government will estimate and draw up “Prospected Amount of Consumption of HFCs” at certain target year.
- Fluorocarbons manufacturers must develop their own plans to rationalize the use of fluorocarbons based on the “Prospected Amount.”

<The Prospected Amount on FY2020>

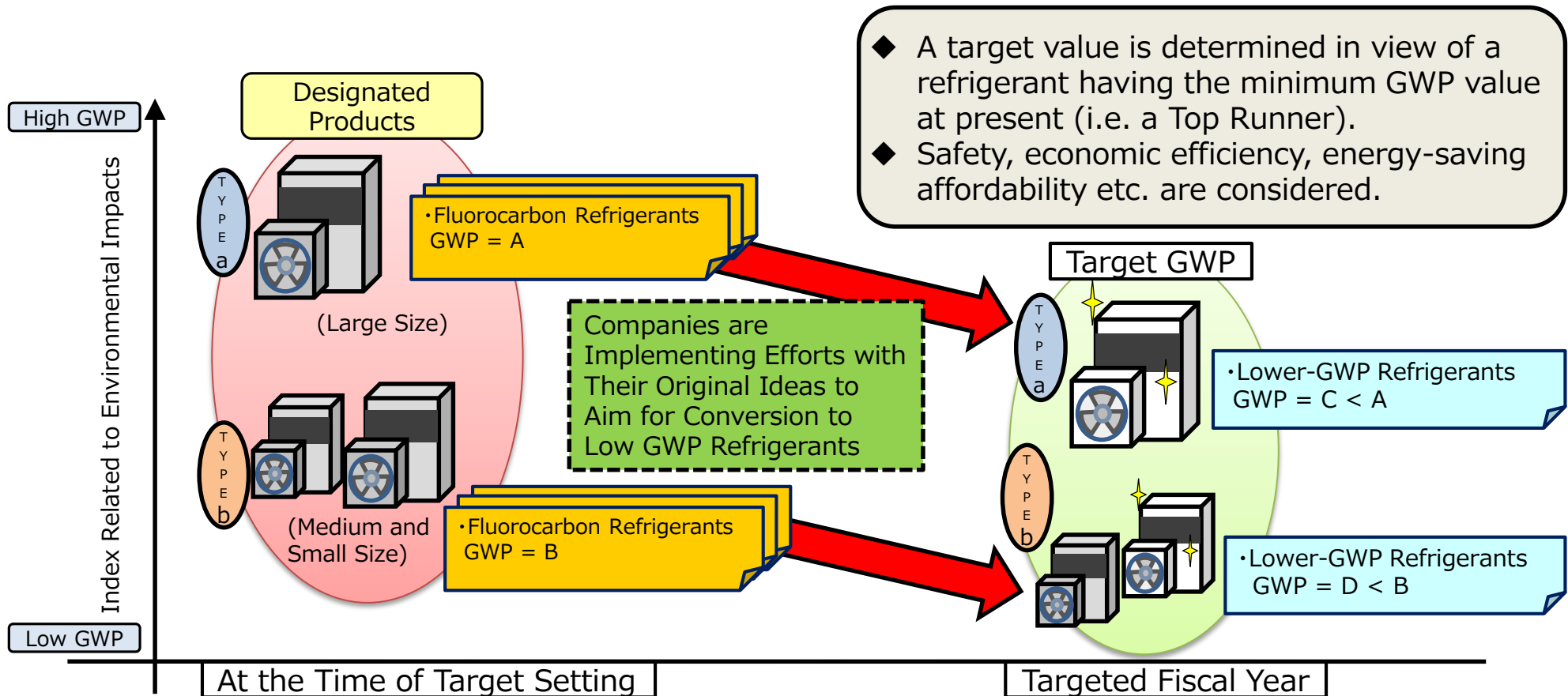
43.4 mil.t-CO₂ → About 40% reduction from BAU shipment volume

<The Prospected Amount on FY2025>

36.5 mil.t-CO₂ → About 50% reduction from BAU shipment volume

Regulation on Designated Products Based on Fluorocarbons Emission Restraining Law

- The aim of Regulation on Designated Products is promoting lower-GWP alternatives into the products containing HFCs.
- In the regulation, manufacturing and import companies are required to meet a target of GWP value to their products if specified as the designated products, such as residential air conditioners, until the specified year. The target values are calculated by the weighted average with each product type that is to be shipped by the manufacturing and import companies.



Products Designated in the Current Regulation

- The following 9 areas are subject of the designated products in consideration of the situation of technology development and safety assessment of products in response to the respective alternative nominations.
- A product that is exempt from its designation is under review to include whenever necessary as soon as the requirements are set. For those already included in the list specified, their target values and years for achievement are to be revised in a timely manner.

Sections (Types) of designated Products	Currently Used Main Refrigerants and GWPs	Target GWPs	Target Years(FY)
Residential Air Conditioners (Excluding Through-the-Wall Types)	R410A(2090), R32(675)	750	2018
Stores/Shop/Office Air Conditioners			
① Those with Legal Freezing Capacity of Less Than 3 Tons, Excluding Floor Type	R410A(2090), R32(675)	750	2020
② Those with Legal Freezing Capacity of 3 Tons or More Excluding ③ and Floor Type	R410A(2090)	750	2023
③ Those Central Air Conditioners Using Centrifugal Chillers	R134a(1430), R245fa(1030)	100	2023
Automotive Air Conditioners (Limited only to Those Listed as Passenger Vehicles (Excluding Automobiles with 11 or More Passengers))	R134a(1430)	150	2023
Condensing Units and Stationary Type Freezer Refrigerator Units (Excluding Condensing Units with Rated Output of 1.5kW or Less)	R404A(3920), R410A(2090), R407C(1770), CO2(1)	1500	2025
Central System Freezer Refrigerator Equipment (Limited to Those Shipped for Newly Installed Freezer Refrigerators with Freezing Capacity of 50,000m ³ or More)	R404A(3920), NH3(1)	100	2019
Insulating Material Using Rigid Urethane Foams (Limited to Those Used for House Building Material and Formed at Building Sites)	HFC-245fa(1030), HFC-365mfc(795)	100	2020
Sprayer Exclusively Filled with Propellants (Excluding Uses That Require Non-flammability)	HFC-134a(1430), HFC-152a(124), DME(1)	10	2019

Situation of Introducing HFCs and Low-GWP Refrigerants

※Blue Letters: Slightly Flammable

Red Letters: Flammable

Areas	Fields	Current Alternative Fluorocarbons (HFCs) Refrigerants (GWPs)	Low-GWP Refrigerants to be Used Instead of HFCs
① Conversion completed or in progress	Home Freezer 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
			※Replacement is in Progress.
② Alternative refrigerants available but with challenging issues to ensure dissemination	Ultra-Cold Freezer Refrigerators	HFC-23 (14,800)	Air
	Large Size Commercial Freezer Refrigerators		NH₃ , CO ₂
	Medium Size Commercial Freezer Refrigerators (Separately Installed Showcases etc.)	HFC-404A (3,920) HFC-410A (2,090)	CO ₂
③ Alternative refrigerants in search	Small Size Commercial Freezer Refrigerators	HFC-404A (3,920) HFC-410A (2,090)	(Replacement Candidates being Searched)
	Commercial Air Conditioners	HFC-410A (2,090) HFC-32 (675)	
	Home Air Conditioners	HFC-32 (675)	

※Refrigerants For All Newly Shipped Items are Already Converted into Low-GWP substances

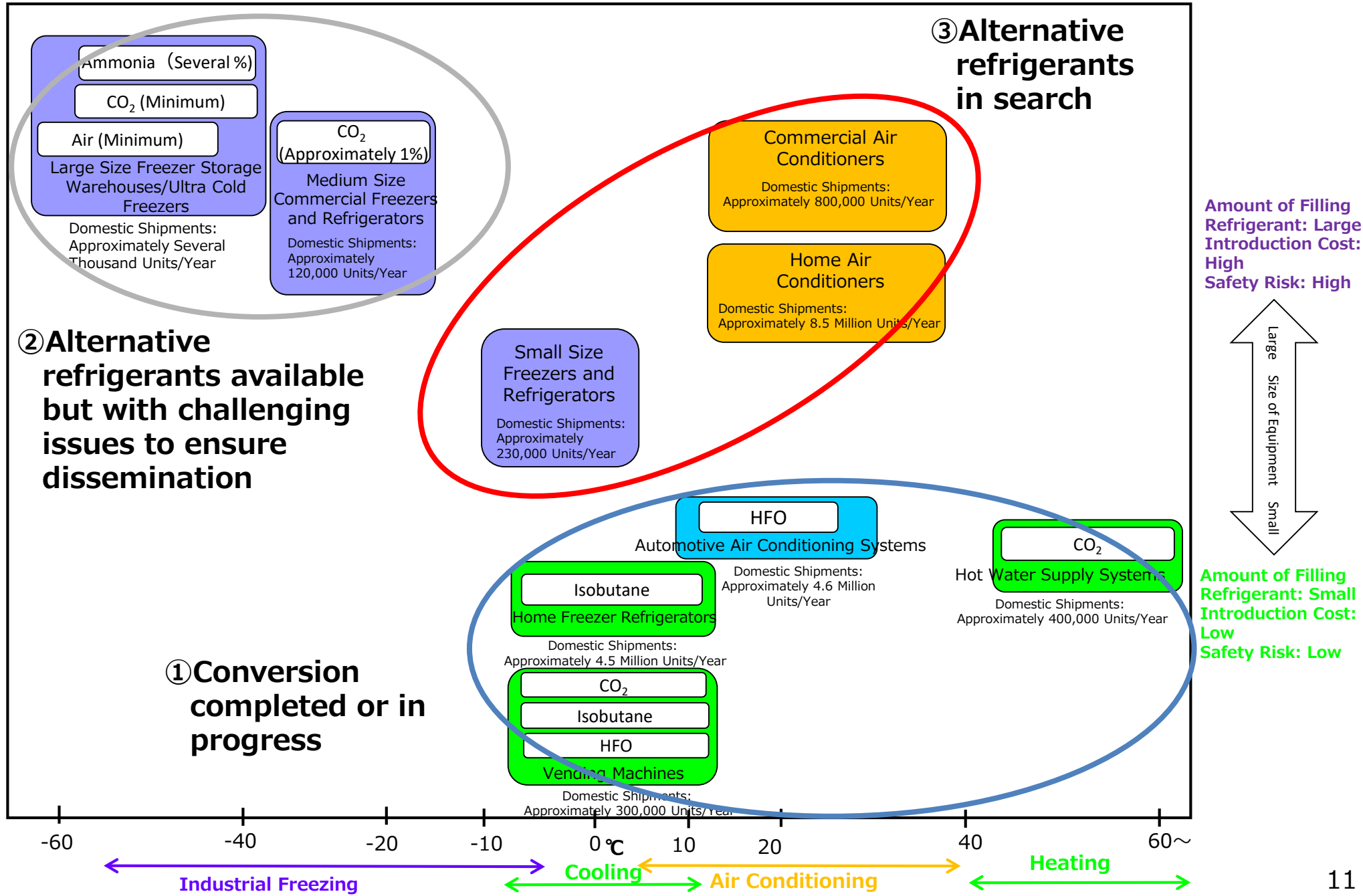
※GWP: Global Warming Potential (A Value Indicating Intensity of Global Warming Impact, with CO₂ being 1)

※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)

(Note) The Present Mapping to Depict Alternative Refrigerants



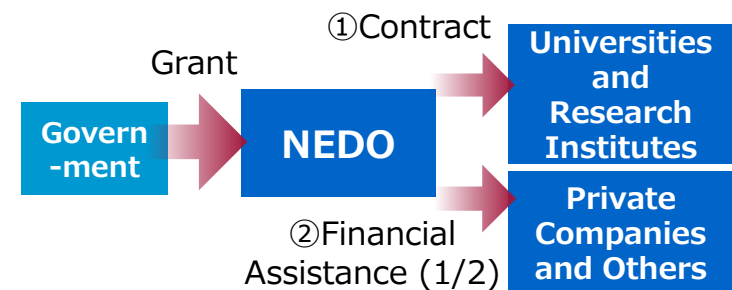
Promoting Development and Introduction of Low-GWP Refrigerants Technologies

- Japanese government is set out to promote development and introduction of low-GWP refrigerants, assigning the following task to each ministry:
 - METI** – **Research and development** pertaining to **fields in which no alternative technologies** are expected at present.
 - MOE** – **Support to introduce equipment with low-GWP technologies in fields** nearly at practical use but **with issues such as cost**.

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

Draft Budget: 650 Million Yen in FY2019 (250 Million Yen in FY2018) Time Period: 5 Years (2018-2022)

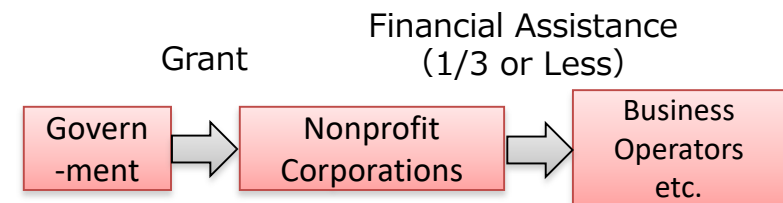
- As many of the low-GWP alternatives are classified with some level of **flammability**, their practical use should be assessed in terms of ignition risks depending on leakage.
- The goal is to **establish assessment methods on flammability** under industrial-academic cooperation. The methods are aiming for **international standardization**.
- Furthermore, **development of the low-GWP refrigerant and equipment technologies to satisfy the balance between low greenhouse effect as well as energy saving and safety**, will be assisted to thereby accelerate the process to practical use.



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

Draft Budget: 7.5 Billion Yen in the FY2019 (6.5 Billion Yen in FY2018) Time Period: 5 Years (2018-2022)

- Whereas the technologies of an energy saving-type natural refrigerant to replace fluorocarbons equipment are available in some areas, **introduction of those technologies is limited due to high initial costs**.
- For this reason, **introduction of natural refrigerant equipment with high energy-saving capacity will be assisted and accelerated**, thereby we will proceed with fluorocarbon-free and low carbon society.
- In conjunction with this project, **constant demands** on energy-saving-base equipment using natural refrigerant will be created, contributing to efforts toward **cost reduction** among equipment manufacturers.



Thank you for your attention.



経済産業省

Ministry of Economy, Trade and Industry



環境省

Ministry of the Environment

https://www.meti.go.jp/policy/chemical_management/ozone/index.html

<http://www.env.go.jp/earth/furon/>