

# **Japan's Policy Measures for phasing down HFCs**

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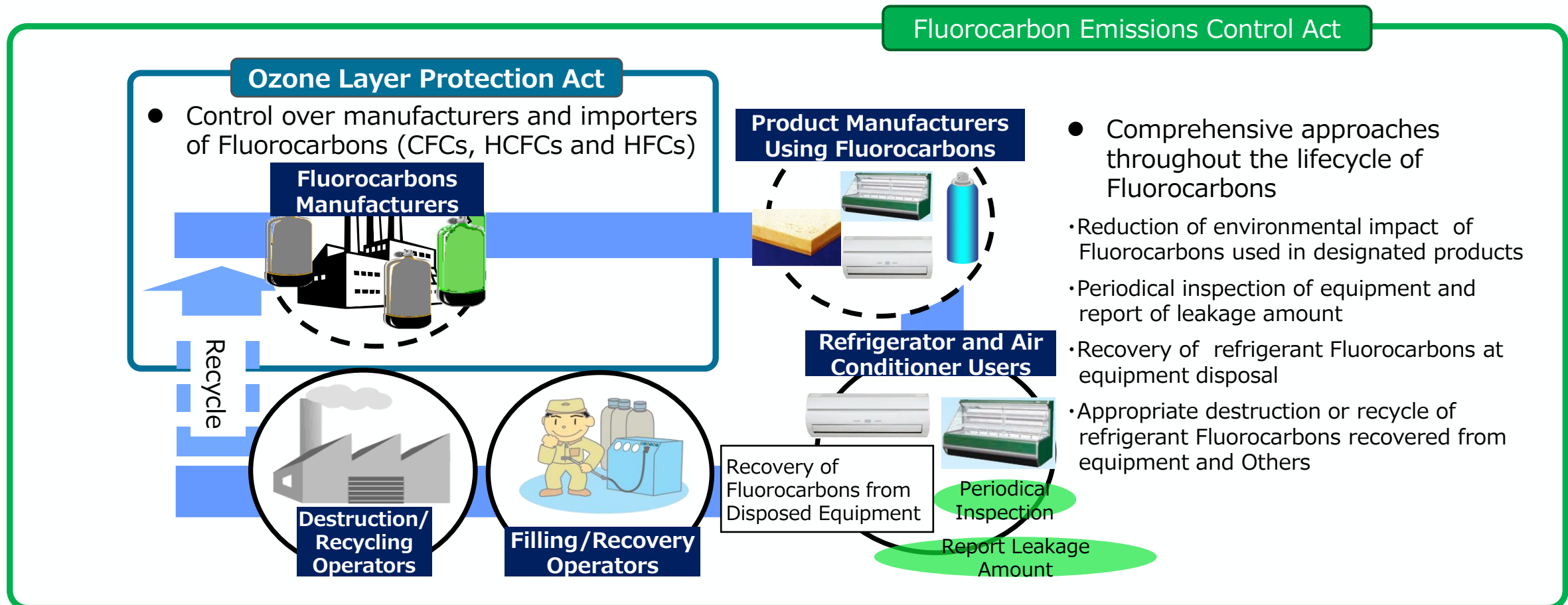
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# Two Regulatory Measures for Reducing HFCs Emission

**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.

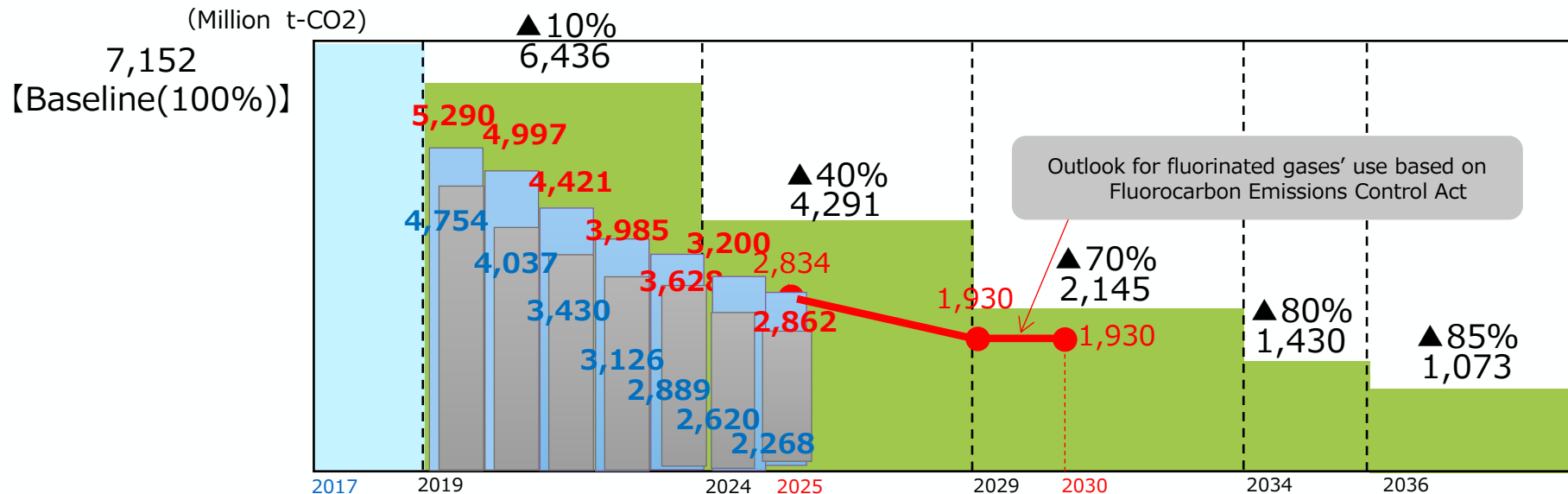
### Details of Introduced Policy Measures

- 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 on consumption volume from 2019 to 2025

- 2025 quota on consumption was allocated to 28.62 million tons of CO2 equivalent for basic and special uses. This value is far below the target consumption by 33%. The actual consumption is also under the quota in 2025 . We have achieved the target affordably.
- Basic quota : **28.29**million tons of CO2 equivalent (producers eight businesses 23 importers)
- Special quota : **0.33** million tons of CO2 equivalent (producers three businesses nine businesses)

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



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

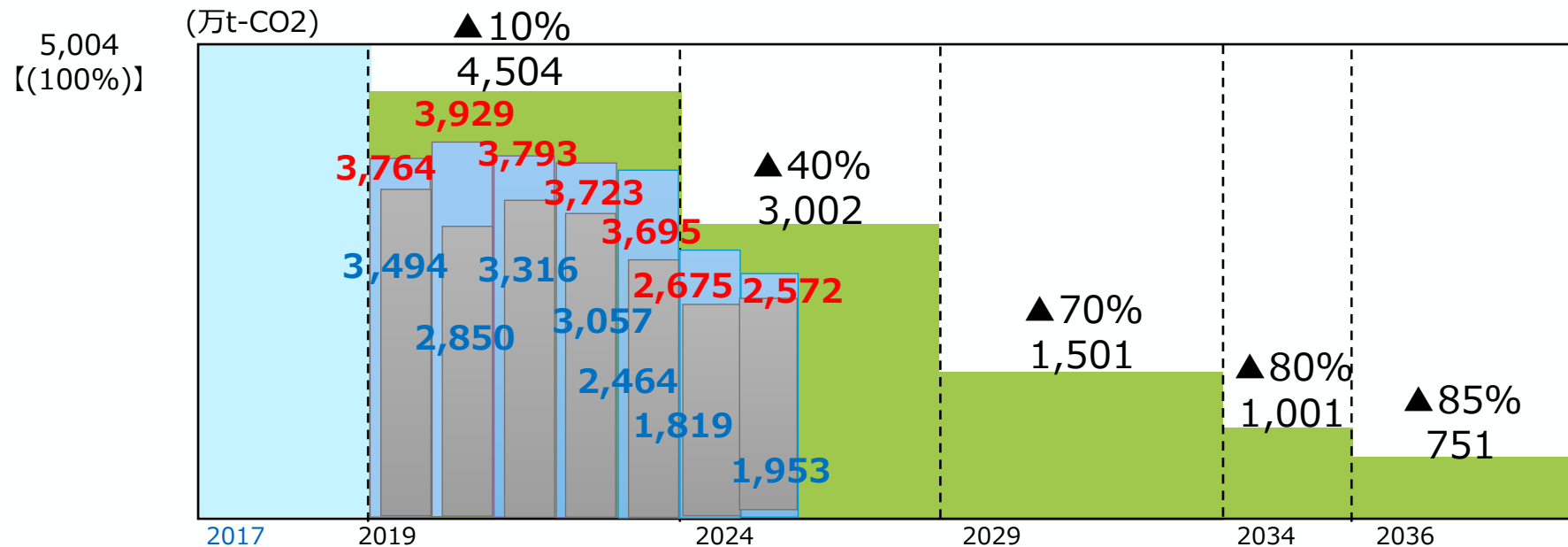
# Results on production volume from 2019 to 2025

- 2025 quota on production was allocated way below the national cap of Kigali amendment. **25.72** million CO2 equivalent tones were allocated to basic use and special use in total. This value is **14%** lower than that of the reduction target 30.02 million CO2 equivalent.

- Basic allocation : **25.60** million CO2 equivalent tons (eight producers )

- Special allocation : **0.12** million CO2 equivalent tons (three producers)

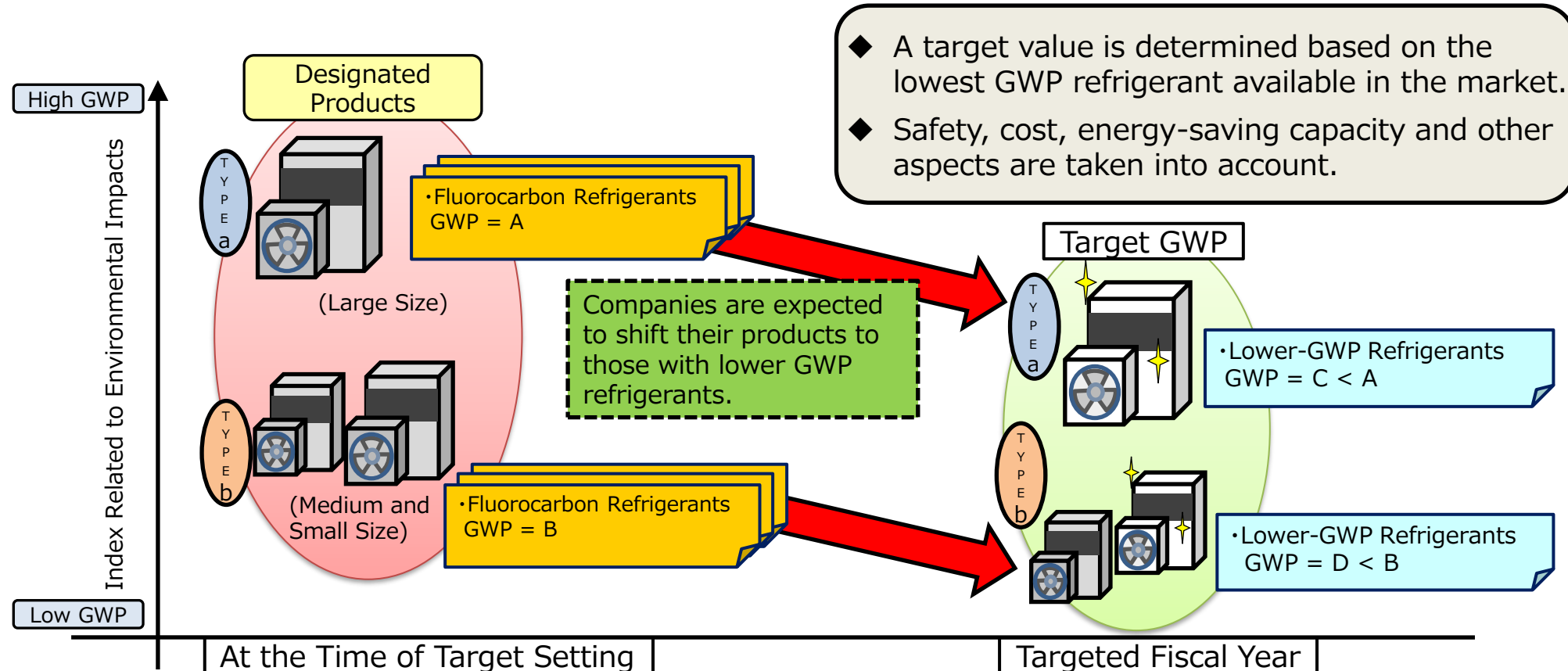
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# Up stream: Promoting Low-GWP Top-runner Products

- **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.

| Specified Product Categories                                                                    |                                            | Refrigerant Currently Used (GWP)              | Target GWP | Target Year | Enforcement date             |
|-------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|------------|-------------|------------------------------|
| <b>Residential Air-Conditioners</b>                                                             |                                            | R410A(2090), R32(675)                         | 750        | 2018        |                              |
| <b>Commercial Air-Conditioners</b>                                                              |                                            |                                               |            |             |                              |
| Air-Conditioners for stores and offices                                                         |                                            | R410A(2090), R32(675)                         | 750        | 2025        | 2025.4 Enforcement (revised) |
| Central Air-Conditioners                                                                        | Centrifugal Compression Refrigeration Unit | R134a(1430), R245fa(1030)                     | 100        | 2025        |                              |
|                                                                                                 | Others                                     | R410A(2090)                                   | 750        | 2029        | 2029.4 Enforcement (revised) |
| Multiple-type Air-Conditioners for building use                                                 |                                            | R410A(2090)                                   | 750        | 2027        | 2027.4 Enforcement (revised) |
| Air-Conditioners for facilities                                                                 |                                            | R410A(2090)                                   | 750        | 2029        | 2029.4 Enforcement (revised) |
| Gas engine heat pump Air-conditioner                                                            |                                            | R410A(2090)                                   | 750        | 2029        | 2029.4 Enforcement (revised) |
| <b>Auto-motive Air Conditioners</b>                                                             |                                            |                                               |            |             |                              |
| for cars                                                                                        |                                            | R134a(1430)                                   | 150        | 2023        |                              |
| for buses and trucks                                                                            |                                            | R134a(1430)                                   | 150        | 2029        |                              |
| <b>Condensing Units/Stationary Refrigeration Units</b>                                          |                                            |                                               |            |             |                              |
| excluding those compressor with rated output of 1.5KW                                           |                                            | R404A(3920), R410A(2090),                     | 750        | 2029        | 2029.4 Enforcement (revised) |
| others                                                                                          |                                            | R407C(1770), CO2(1)                           | 150        | 2029        | 2029.4 Enforcement (added)   |
| <b>Refrigerate and freeze equipment combined unit for commercial use</b>                        |                                            |                                               |            |             |                              |
| Commercial refrigerator and freezer for commercial use                                          |                                            | R404A(3920) , R410A(2090),                    | 150        | 2029        |                              |
| Show cases                                                                                      |                                            | R407C(1770) , R134a(1430), CO2(1)             | 150        | 2029        |                              |
| <b>Centralized Refrigerators</b>                                                                |                                            |                                               |            |             |                              |
| Only for new refrigerated warehouses having effective volume of at least 50,000m <sup>3</sup> ※ |                                            | R404A(3920), Ammonia(1 digit value)           | 100        | 2019        |                              |
| Centrifugal Compression Refrigeration Unit (Others ※)                                           |                                            | R134a(1430), R245fa(1030)                     | 100        | 2029        | 2025.4 Enforcement (added)   |
| Screw type compressor (Others ※)                                                                |                                            | R407c(1770), R448A(1386)                      | 150        | 2031        | 2025.4 Enforcement (added)   |
| Other than Centrifugal Compression Refrigeration Unit and Screw type compressor (Others ※)      |                                            | R410A(2090)                                   | 750        | 2029        | 2025.4 Enforcement (added)   |
| <b>Refrigerate and freeze equipment using rigid polyurethane foam</b>                           |                                            |                                               | 100        | 2024        |                              |
| <b>Vending machine with a Refrigerating or Freezing Function using rigid polyurethane foam</b>  |                                            |                                               | 100        | 2024        |                              |
| <b>Rigid Polyurethane Form Stock Solution for residential use</b>                               |                                            | HFC-245fa(1030), HFC-365mfc(795)              | 100        | 2020        |                              |
| <b>Rigid Polyurethane Form Stock Solution for use other than residential use</b>                |                                            |                                               | 100        | 2024        |                              |
| <b>Heat Insulating Materials (Using rigid polyurethane foam)</b>                                |                                            |                                               | 100        | 2024        |                              |
| <b>Aerosol Spray Cans (except those requiring non-flammability)</b>                             |                                            | HFC-134a(1430), HFC-152a(124), CO2(1), DME(1) | 10         | 2019        |                              |

## Achievement Status of Designated Products that Have Reached the Target Year

- For the products that have already reached their target year, the goals have generally been achieved.
- In the future, we will continue to monitor the achievement status of products that are approaching their target year and respond appropriately.
- For products that have already met their targets, we are also considering new top-runner products that are expected to be on the market, with a focus on setting even lower GWP target values and target years.

| Product Categories                                                                | Target GWP VALUE | Target year | Achievement                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Residential Air-Conditioners                                                      | 750              | 2018        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 685. Refrigerant has been replaced by HFC-32 (GWP675).</li> <li>○ All 11 manufacturers have achieved the target value.</li> </ul>                                                                                    |
| Centralized Refrigerators                                                         | 100              | 2019        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 1.62. Refrigerant has been replaced by CO2 (1) or combination of CO2/NH3 (2).</li> <li>○ All four manufactures have achieved the target value.</li> </ul>                                                            |
| Aerosol Spray Cans (Dust Blower)                                                  | 10               | 2019        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 2.7.</li> <li>○ Propellants have been Replaced by HFO (GWP1) or DME (GWP1)</li> <li>○ Nineteen out of 20 manufactures have achieved the target. Remaining one has also achieved it after the target year.</li> </ul> |
| Refrigeration Capacity less than 3 tons                                           | 750              | 2020        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 687.7. Refrigerant has been replaced by HFC-32 (GWP675).</li> <li>○ All 11 manufacturers have achieved the target value.</li> </ul>                                                                                  |
| Rigid Polyurethane Foam Undiluted Liquid in Residential building                  | 100              | 2020        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 17.3. Stock solution has been replaced by HFO (GWP&lt;2) or H2O/CO2 (GWP1)</li> <li>○ Seven out of eight manufactures have achieved the target. Remaining one has also achieved it after the target year.</li> </ul> |
| Air-Conditioners for stores and offices (Refrigeration Capacity more than 3 tons) | 750              | 2023        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 683. Refrigerant has been replaced by HFC-32 (GWP675).</li> <li>○ All 11 manufacturers have achieved the target value.</li> </ul>                                                                                    |
| Auto-motive Air Conditioners for cars                                             | 150              | 2023        | <ul style="list-style-type: none"> <li>○ Weighted average GWP value for total category is 33. Refrigerant has been replaced by HFO.</li> <li>○ Eight out of 12 manufactures have achieved the target. Remaining four manufacturers have also achieved it after the target year</li> </ul>                      |

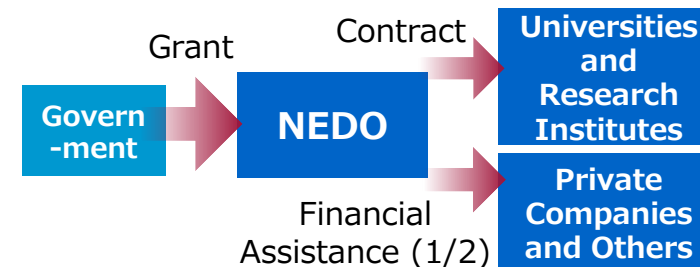
# Government Supports for Low GWP Refrigerants

- 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: 660 Million Yen in FY2026 Time Period: Five Years (2023-2027)

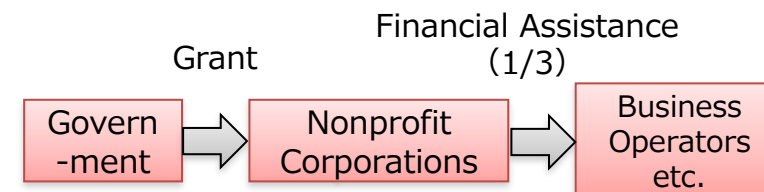
- The goal is to **establish risk assessment methods on candidate alternative refrigerants** under industrial-academic cooperation. The results of the assessment are expected to be utilized for development of air-conditioners.
- Financial assistance is provided to private companies for **developing low-GWP 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 FY2026 Time Period: Five 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)]<br>[HFC-407C (1,770)] | CO <sub>2</sub> ,<br>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)<br>HFC-410A (2,090)     | NH <sub>3</sub> , CO <sub>2</sub>                          |
|                                                                                              | Medium-scale Commercial Freezers & Refrigerators (e.g. Stand-alone Showcases) |                                          | CO <sub>2</sub>                                            |
| Low-GWP alternatives are still under development                                             | Small-scale Commercial Freezers & Refrigerators                               | HFC-404A (3,920)<br>HFC-410A (2,090)     | <i><u>Candidate alternatives are under development</u></i> |
|                                                                                              | Commercial Air Conditioners                                                   | HFC-410A (2,090)<br>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<sub>2</sub> 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)



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Ministry of Economy, Trade and Industry

**Thank you for your attention!**