

WS7-Th-2

Current global status of transition to lower
GWP alternatives by laws and regulations



Laws and Regulation for Fluorocarbons in Japan

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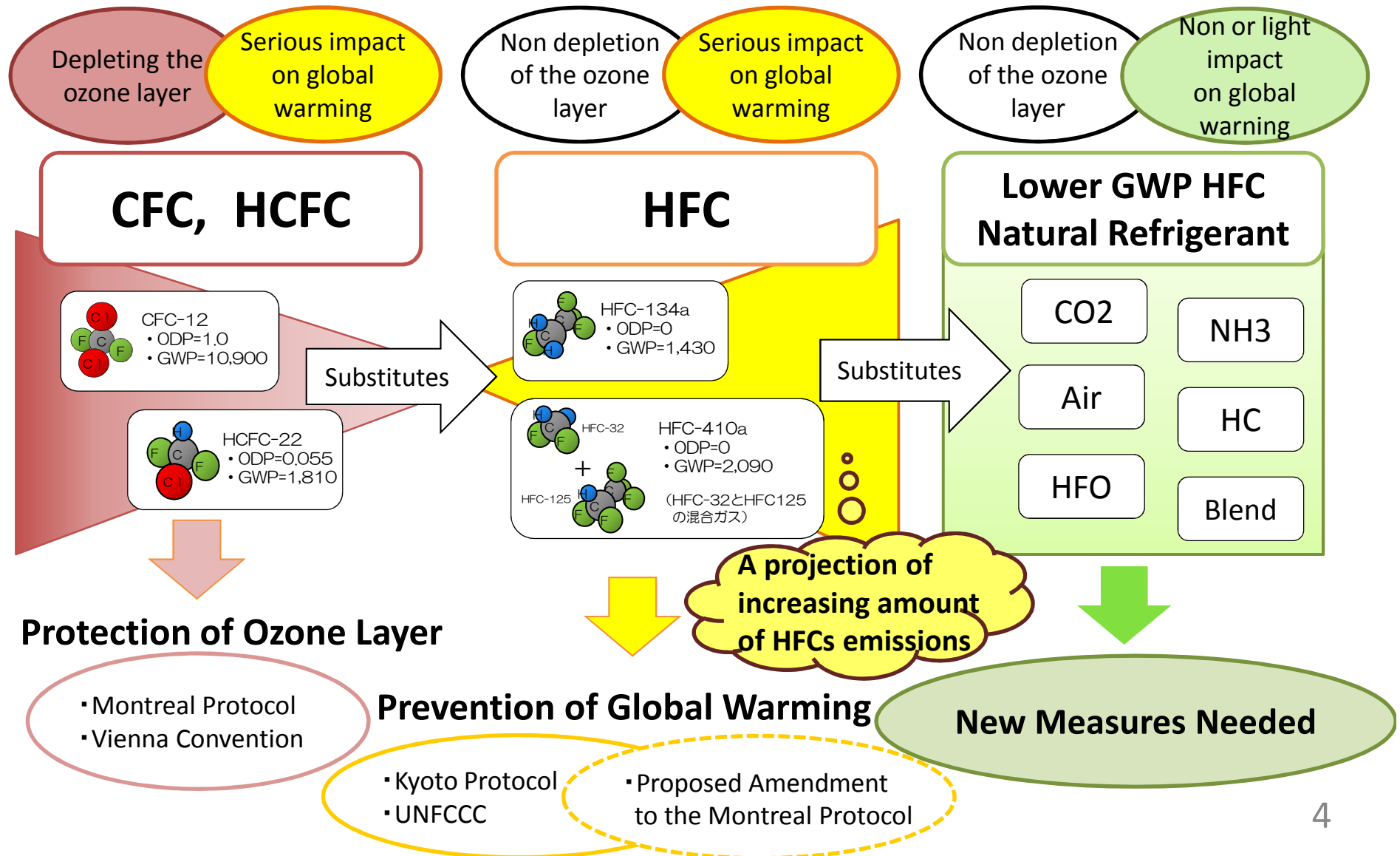
CONTENTS

1. Current situation of Fluorocarbons
2. Necessary measures to reduce emission of HFCs
3. Comprehensive measures for reducing high GWP HFCs in newly revised law
4. Labelling and voluntary plan
5. Developing technologies
6. More

1. Current situation of Fluorocarbons

The universal issues to be addressed proactively

Progress of international regulations and measures over F-gases



Ozone Layer Protection Law and its achievements

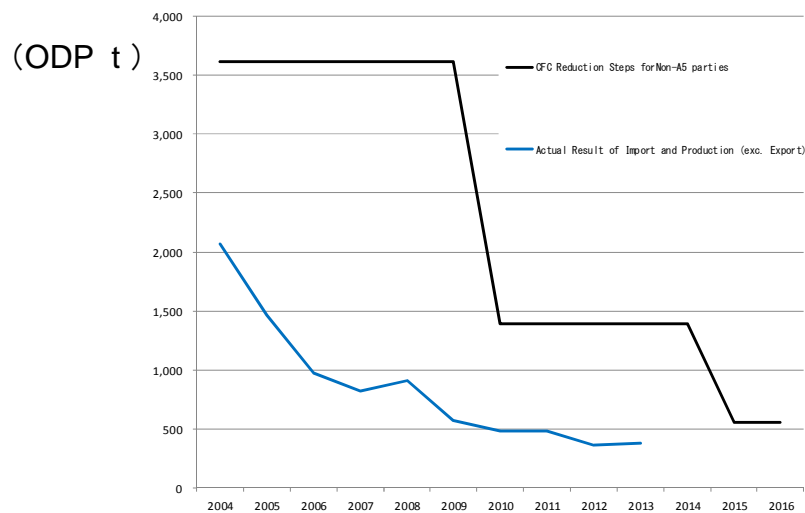
Scheme of the Law

- Regulated substances
All ODSs under the Montreal Protocol
- Production control
Production License
- Trade control (Foreign Exchange and Foreign Trade Law)
(1) Export license - preventing export to non-parties
(2) Import license (Import Quota System)

CFC Phase-out accomplished in 1996.

HCFC Phase-out will be accomplished in 2020.

The progress to reduce consumption of HCFC.



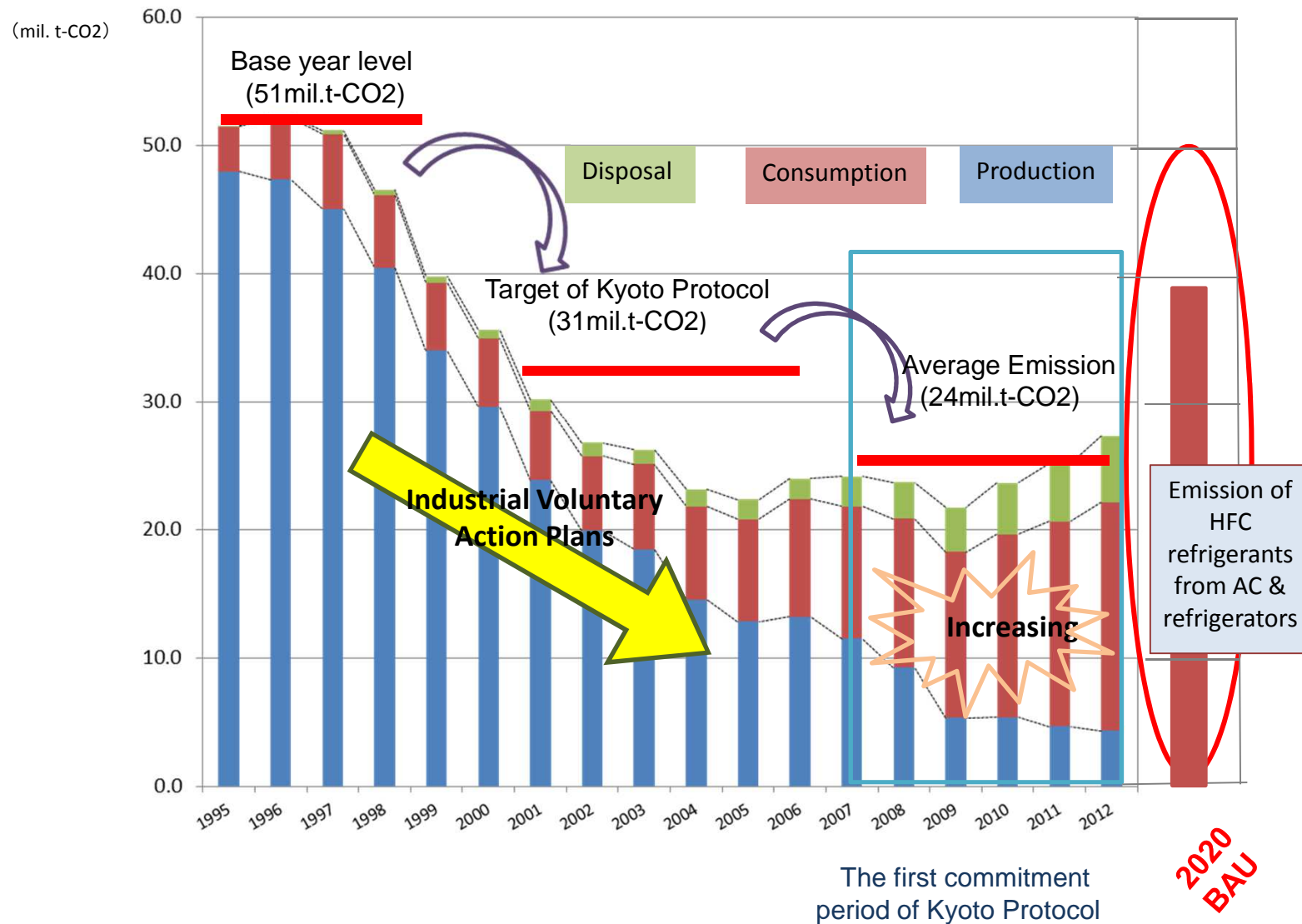
➔ 「Scientific Assessment of Ozone Depletion 2014」 Published by the UNEP & WMO

“The Earth’s protective ozone layer is on track to recover by the middle of the century”
(10.Sep.2014)

2. Necessary measures to reduce emission of HFCs

Status of emissions (HFC, PFC, SF6) per sector through Industrial Voluntary Action Plans and their achievements

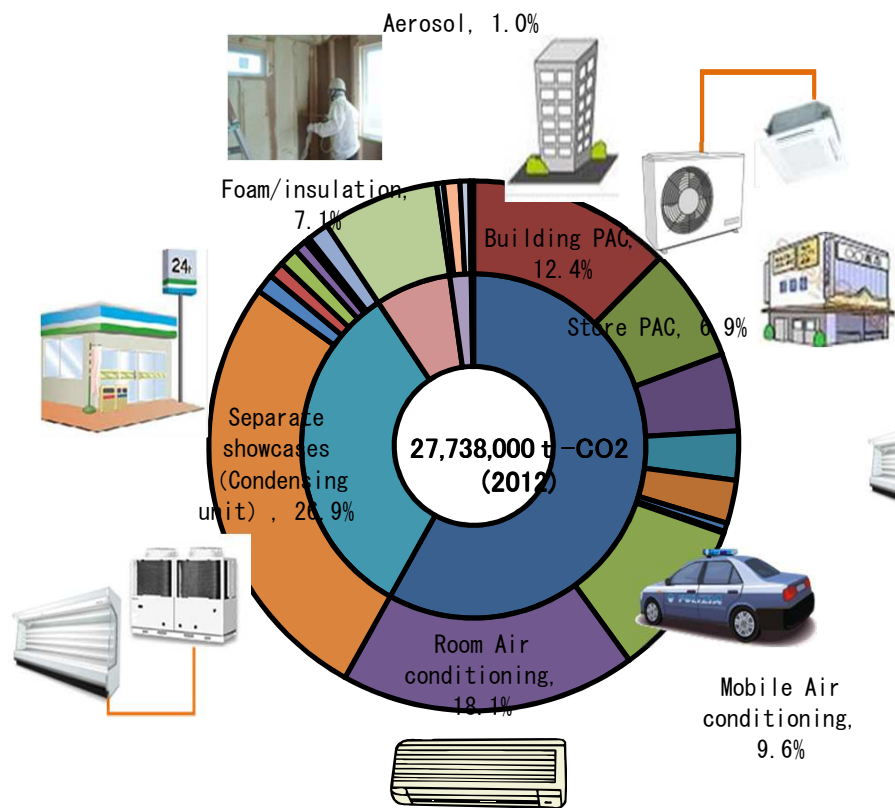
Projected increase of Fluorocarbons emissions in refrigeration & air conditioning sector



Possible target of designated products and equipment using fluorocarbons

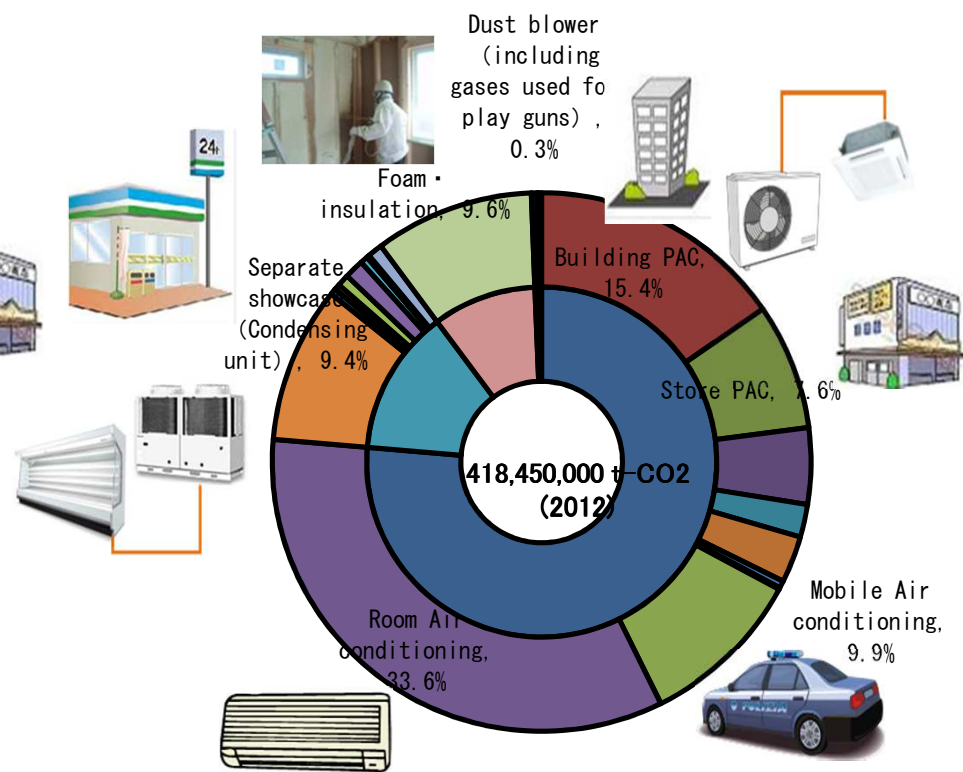
(HFC emission)

Ratio of fluorocarbon emissions from whole products life cycle including manufacturing, usage and destruction (2012)



(HFC stock amount)

Ratio of fluorocarbon amount used in products under operation (2012)



Source: inventory report of green house gases by METI

※Based on GWP values for the second commitment period - Kyoto Protocol

※Subject to change depending on considered categories of designated products.

3. Comprehensive measures for reducing high GWP HFCs in newly revised law

Direction of the measures on fluorocarbons (HFCs)

Concerns

1. Prospective rapid increase of HFC emission

2. Significant leakage during operation

3. Low rate of recovery

4. Technical development and commercialization of low-GWP/non-fluorocarbon products

5. Global movement of strengthening the regulations on high-GWP fluorocarbons

Measures

Comprehensive measures required over the life cycle from production of fluorocarbons to disposal in addition to recovery/disposal under current law

1. Phase-down of fluorocarbons (measures by gas makers)

2. Promotion of low-GWP/non-fluorocarbon products or equipment (conversion by manufacturers)

3. Preventing fluorocarbons from leaking out of commercial air-conditioning and refrigeration in use (management by users)

4. Filling by registered operators and recycling by licensed operators etc.

Revised law enforcement (April 2015)

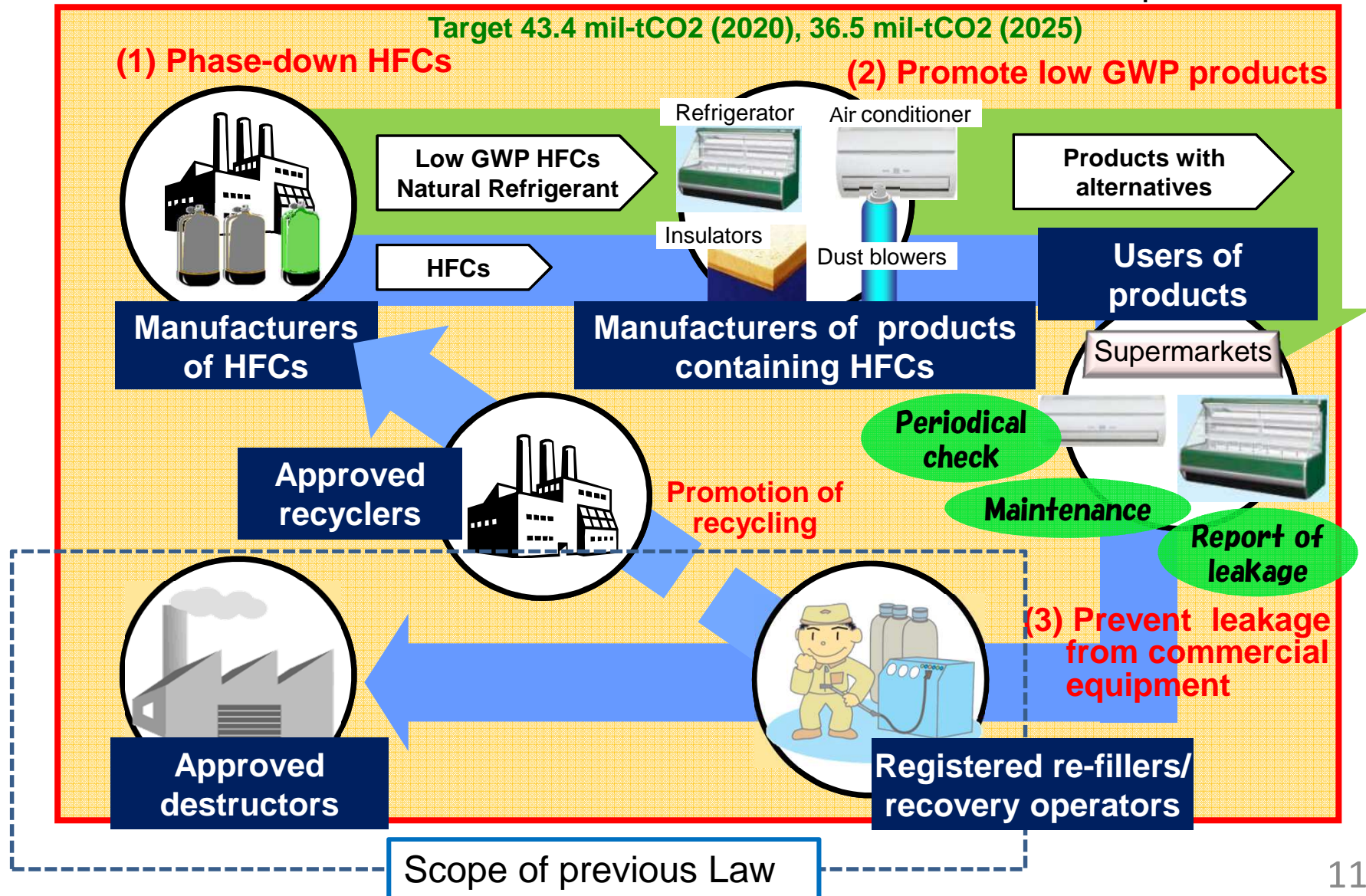
Newly Revised Law Covers whole Life Cycle

Launched from April 2015

Target 43.4 mil-tCO₂ (2020), 36.5 mil-tCO₂ (2025)

(1) Phase-down HFCs

(2) Promote low GWP products

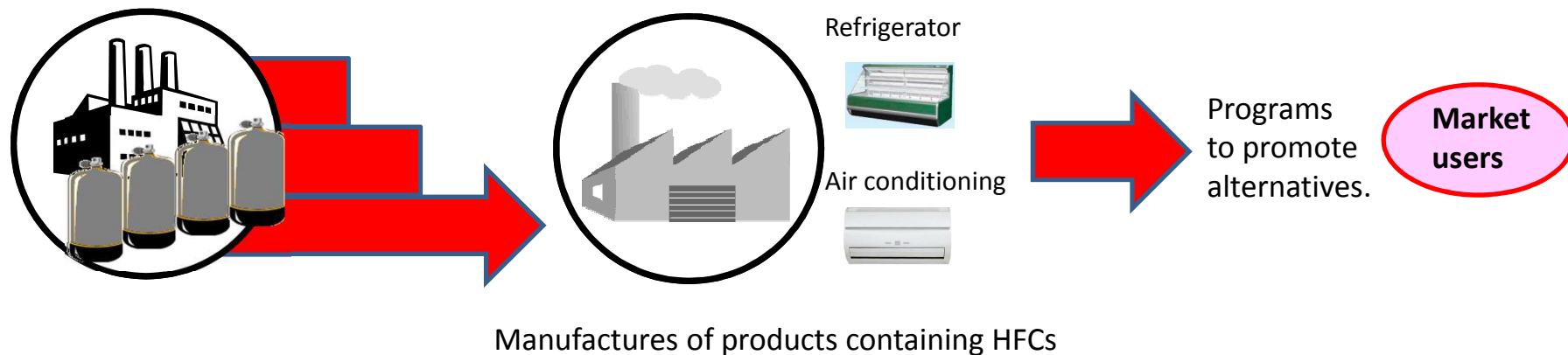


Measures for conducting HFCs phase-down

The government published a “target ” with a guideline for manufacturers and importers of fluorocarbon gases on preparing and implementing an “HFCs phase-down program” reflecting the national target. Target ; 43.4 mil-tCO2 (2020), 36.5 mil-tCO2 (2025)

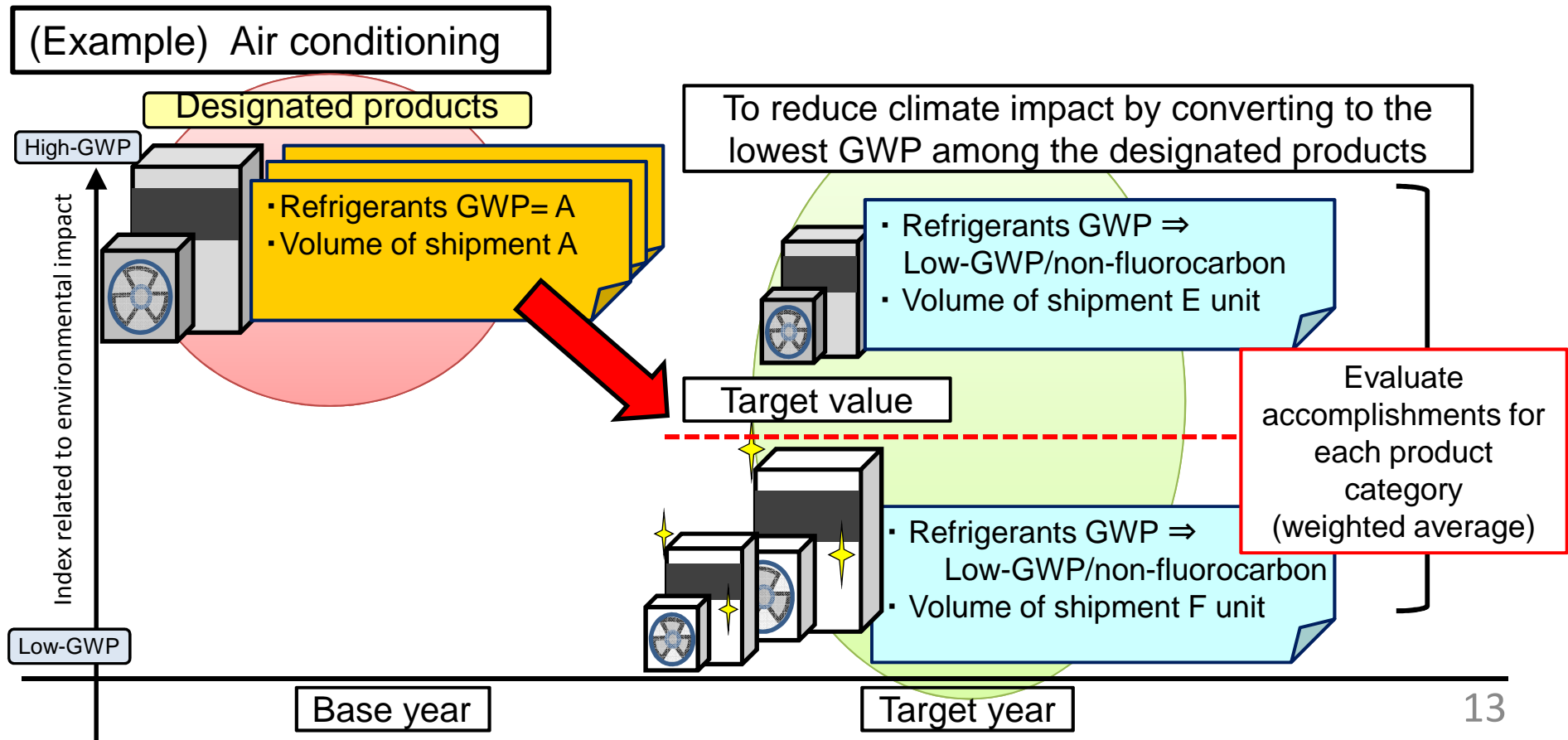
Manufacturers and Importers are required to conduct “HFCs phase-down programs” and report to the government on the development and production of lower GWP gases considering safety, energy efficiency, economic affordability etc.

The government will evaluate the reports from manufacturers and importers with support of a council and publish an annual report. If necessary, the government will require them to amend/ improve their programs.










Measures to promote low-GWP/non-fluorocarbons in designated products and equipment

Manufacturers and importers of products and equipment will be required to replace high-GWP products with low-GWP or non-fluorocarbons for shipping, considering safety, energy efficiency, economic affordability etc.



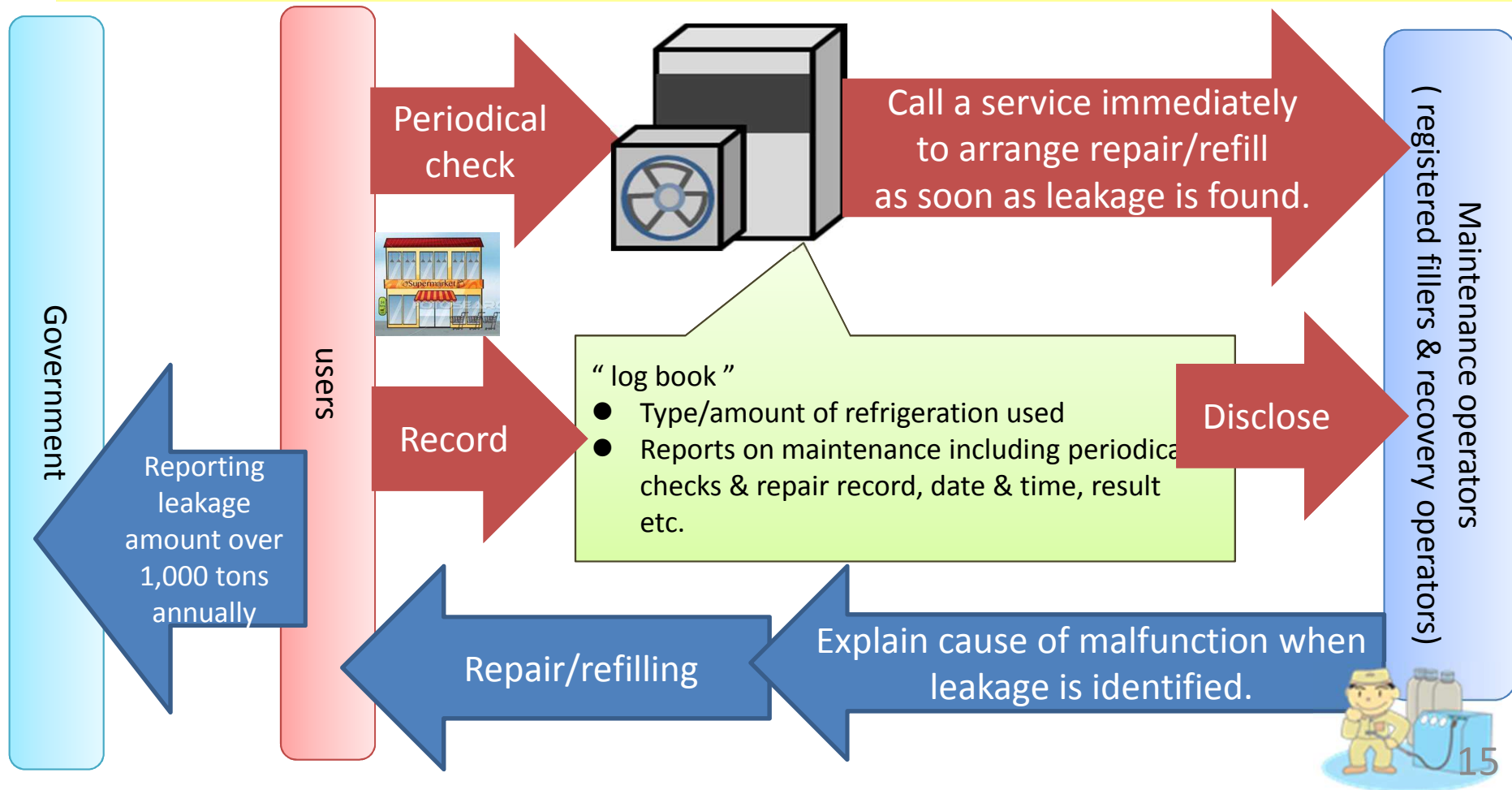
Target value and year for each designated product

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 m ³) 	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

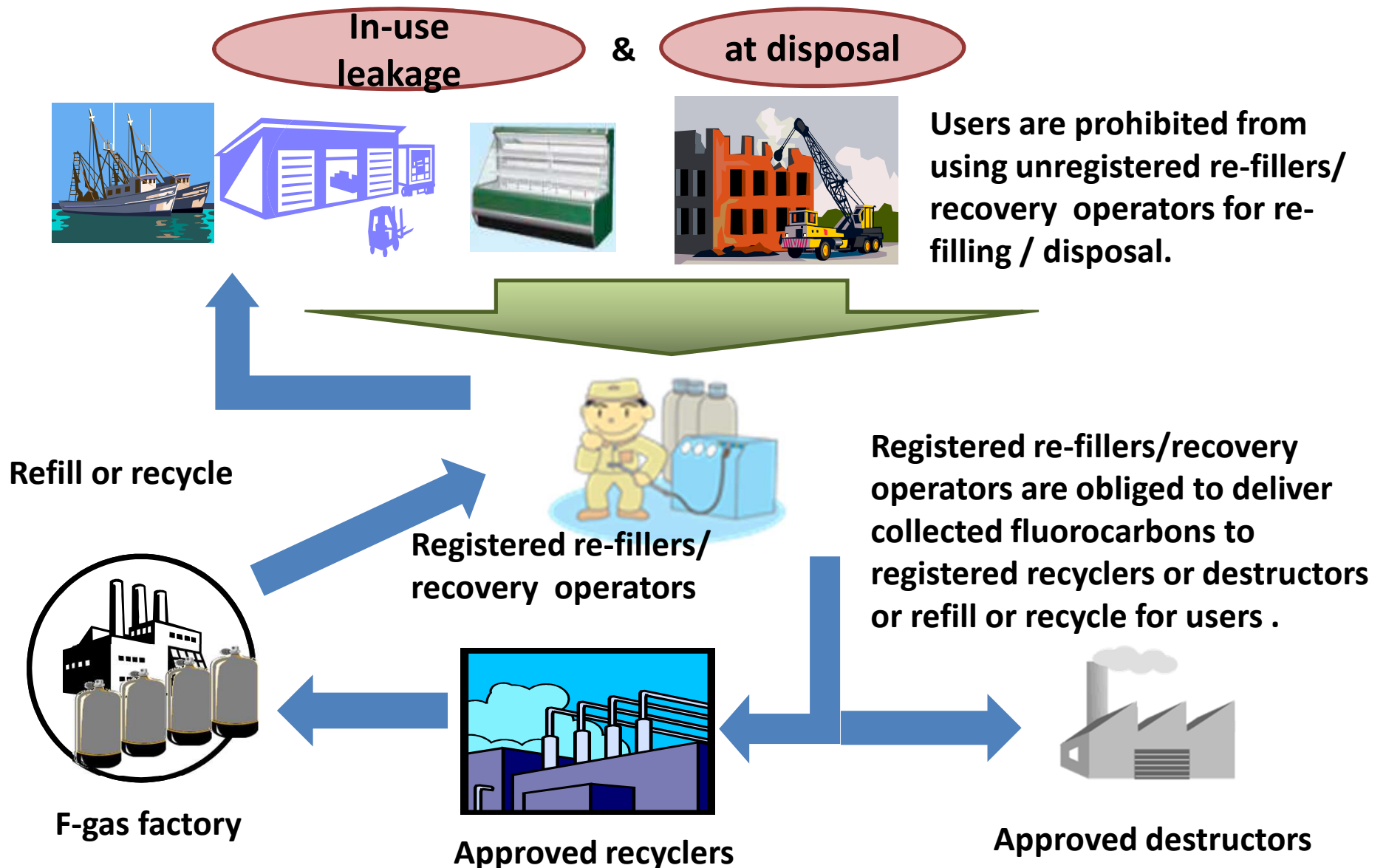
※ With some exceptions.

Proper management by users with periodical checks and professional repair/refilling

To prevent leakage, users are required to conduct periodical checks, 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 massive leakage



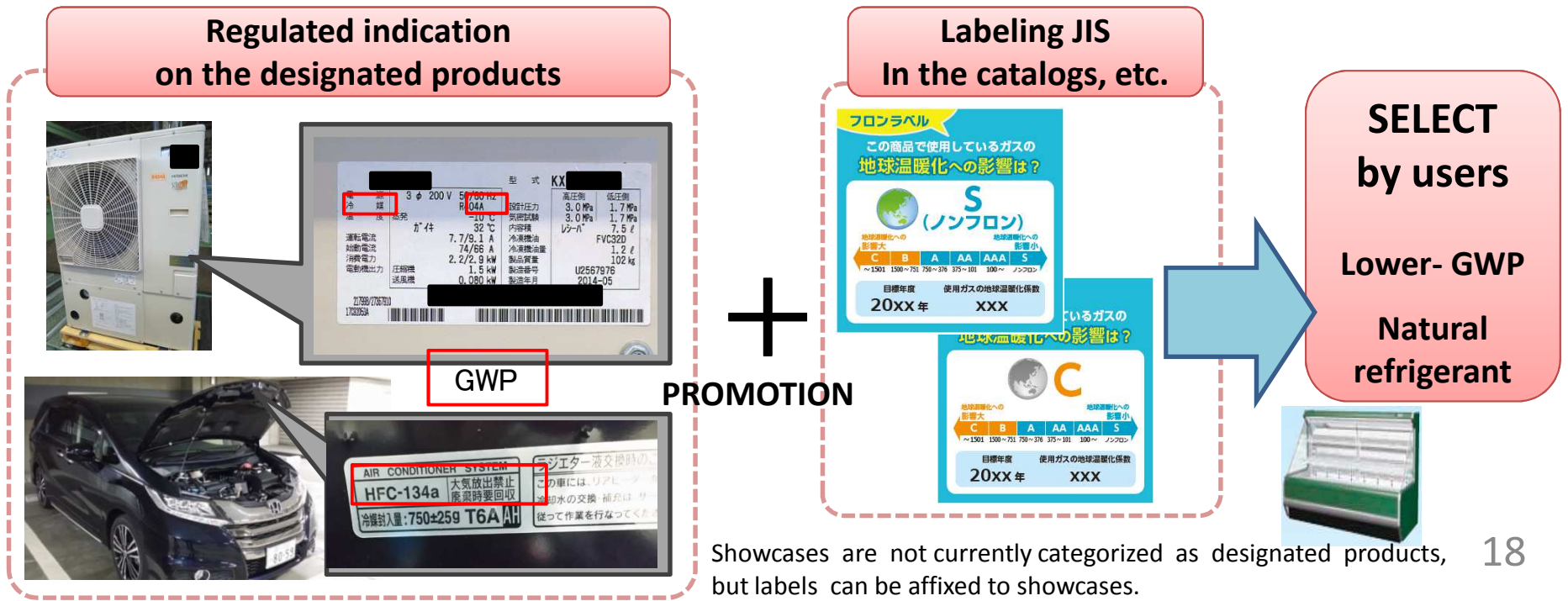
Promoting adequate use and recycling



4. Labeling and voluntary plan

Indications and labeling for the designated products, etc.

Purpose	To promote designated products using lower-GWP/ natural refrigerants Labeling JIS can help users to understand environmental impact of the refrigerants in the products easily
Objective	Besides designated products, labeling showcase itself, so that consumers can recognize labeling in supermarkets , etc.
Included Items	①Display “non-F- gas using” or degree of achievement in relation to the target GWP value ②target year and target GWP value ③GWP value of the refrigerant used in the products
Location of labeling	On the products themselves and catalogs, etc.



Showcases are not currently categorized as designated products, but labels can be affixed to showcases.

Industrial Voluntary Action Plan for F-gases

Previous Plan (1995~2012)

18 industrial organizations strove and succeeded in achieving the first commitment period of the Kyoto Protocol.



New Plan (2013~2030)

14 industrial organizations are working on new measures to achieve the new targets for 2020, 2025 & 2030.

10 industrial organizations have voluntarily set more ambitious targets than their previous plans for the Kyoto Protocol.

New Measures

- ◆ Prevention of emissions in the manufacturing process
- ◆ Conversion from F-gases to natural refrigerants
- ◆ Technology transfers, etc.

14 organizations

- Japan Fluorocarbon Manufacturers Association (JFMA)
- Japan Chemical Industry Association (JCIA)
- Japan Urethane Foam Association (JUFA)
- Aerosol Industry Association of Japan (AIAJ)
- The Federation of Pharmaceutical Manufacturers' Association of Japan (FPMAJ)
- Air Soft Gun Kyoukai (ASGK)
- The Japan Refrigeration and Air conditioning Industry Association (JRAIA)
- Japan Association of Refrigeration and Air-Conditioning Contractors (JARAC)
- Japan Vending Machine Manufacturers Association (JVMA)
- Japan Automobile Manufacturers Association, Inc. (JAMA)
- Japan Electronics and Information Technology Industries Association (JEITA)
- The Japan Electrical Manufacturers' Association (JEMA)
- The Federation of Electric Power Companies of Japan
- The Japan Magnesium Association

(In no particular order)

5. Developing technologies

Funding scheme for promoting Lower GWP alternatives including Natural Refrigerant Products.

Accelerating R&D (by NEDO)

'97 '98 '99 '00 '01 '02 '03 '04 '05 '06 '07 '08 '09 '10 '11 '12 '13 '14

1. R&D of new alternative materials

- Alternative CFC cleaning agent
- Alternative refrigerant, blowing agent, CFC cleaning agent
- Electronic device cleaning system using SF6 substitute gas
- Electronic device etching systems and processes using alternative gas
- SF6-free micro-structural control of magnesium alloy

2. R&D of recovery and destruction technologies

- Recovery and recycling technologies for heat insulation materials
- Resolution and destruction technologies for fluorinated gas

Technologies to reduce F-gas emissions in the factory process

Industrial Voluntary Action Plans. (main factor to decrease in emissions)

- decrease in HFC-23 produced as a by-product of HCFC-22 manufacturers
- decrease in PFCs emission from cleaning agents and solvents due to the use of alternatives
- decrease in SF6 emission from electric equipment due to gas management systems, etc.

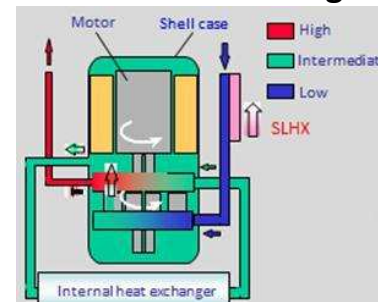
Technology Development of High-Efficiency Non-Fluorinated Air Conditioning Systems (2011-2015)
(Government budget in 2015: 280million JPY)

3. R&D of fluorocarbon-free technologies

- Small-scale air-conditioning systems and freezing and refrigeration systems
- High-efficiency and large-scale air-conditioning systems

Technologies for non-F-gas products

New Lower GWP Refrigerant



Two-stage rotary CO₂ compressor

Company: Panasonic

6. More

The way forward

- **Continuous adjustment reflecting circumstances;**
 - 1) **Technology development**
 - 2) **Market trends**
 - 3) **Multilateral agreements (amendment)**
 - 4) **International information (regulation)**
- **Encouraging awareness and capacity building**

Any questions?

Thank you for your attention