

Actions to Control Emission of HFCs in Japan

Implementation of “the Act on Rational Use
and Proper Management of Fluorocarbons”

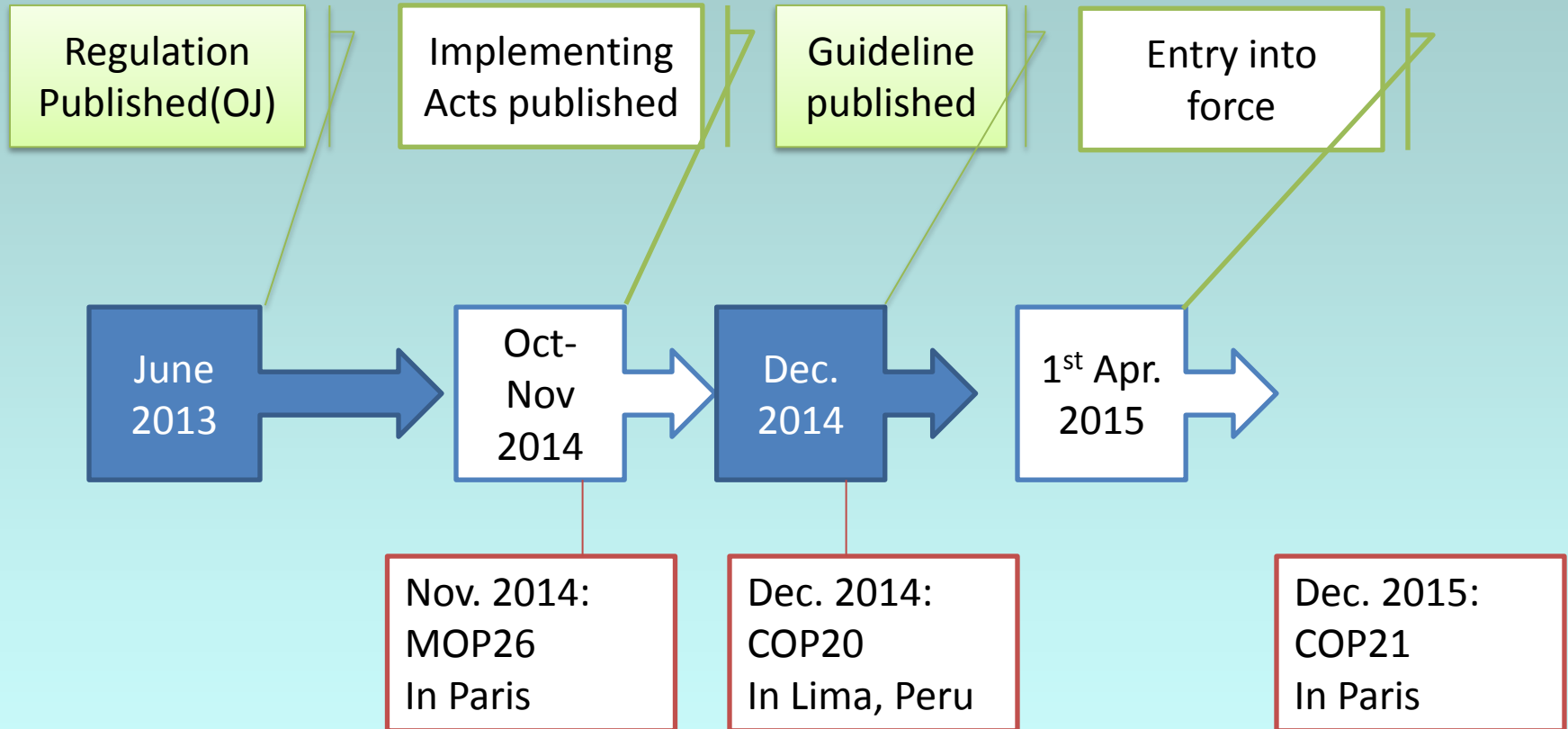
Kazuhiro Sato

JRAIA (the Japan refrigeration and Air Conditioning Industry Association)



0. Timeline

“the Act on Rational Use and Proper Management of Fluorocarbons” in Japan



1. Direction of measures for HFCs in Japan

“the Act on Rational Use and Proper Management of Fluorocarbons” in Japan

Issues

1. Rapid increase of HFCs emission

2. Low recovery rate : Approximately 30%

3. Leakage in use of equipment :
13 to 17% per year in 2009

4. Development and commercialise
equipment with low GWP or no HFC
refrigerants

5. Global movements to enhance control of
high GWP

Direction of measures

Comprehensive measures over whole life cycle from production to destruction of CFCs/HCFCs/HFCs Needed.

1. Manufacturers and Importers of HFCs
Phase-down of HFCs

2. Manufacturers and Importers of Equipment
Acceleration of equipment using low GWP or no
HFC refrigerants

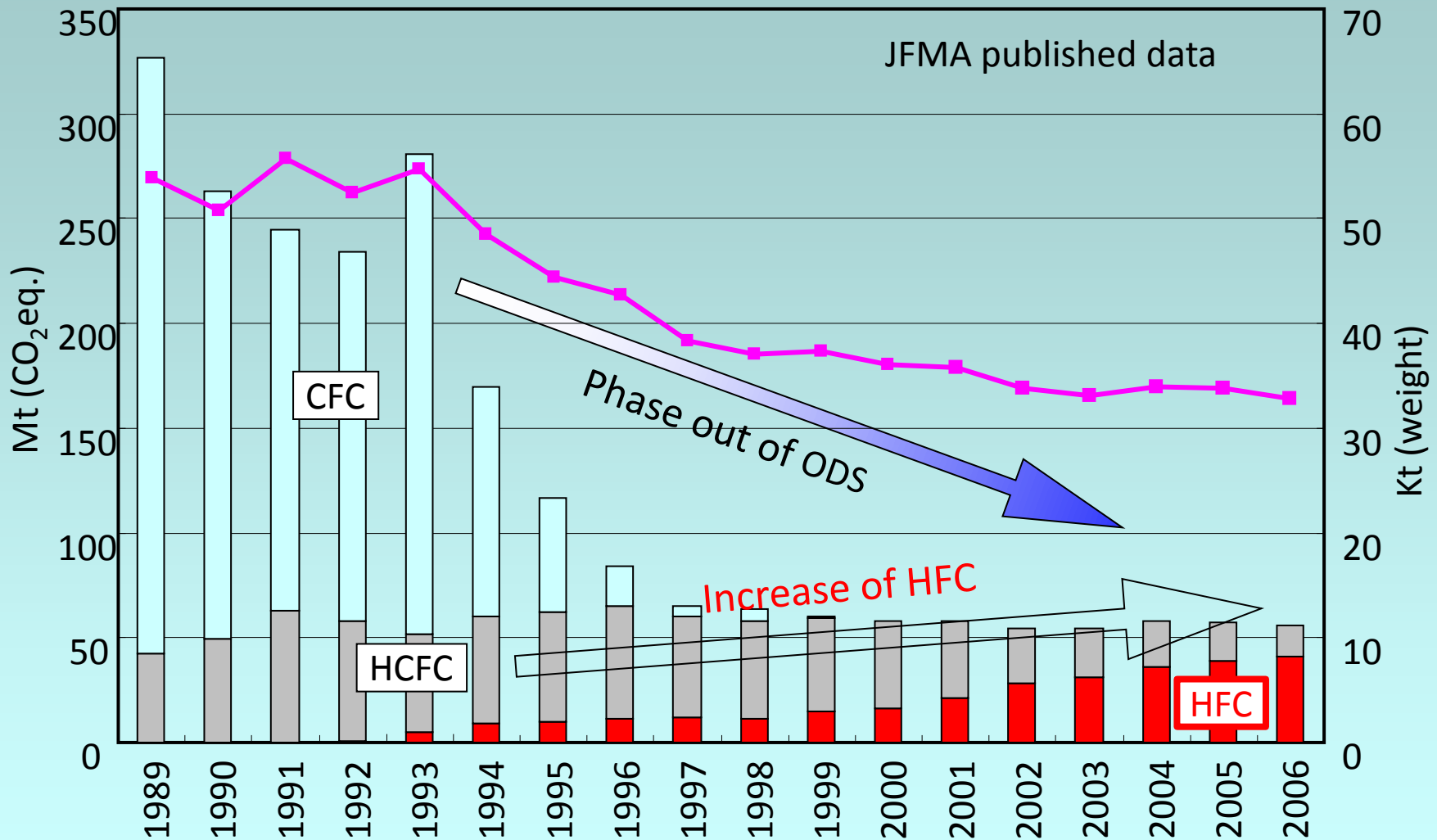
3. Owners of Equipment
Prevention of HFCs' leakage from commercial
refrigeration equipment in use

4. Refrigerant charge by registered operators,
Reclamation by approved operators

**Publication of the Revision of Fluorocarbons Recovery
& Destruction Law in Jun 2013**



1. Direction of measures for HFCs in Japan



CFC, HCFC and HFC Consumption in Japan

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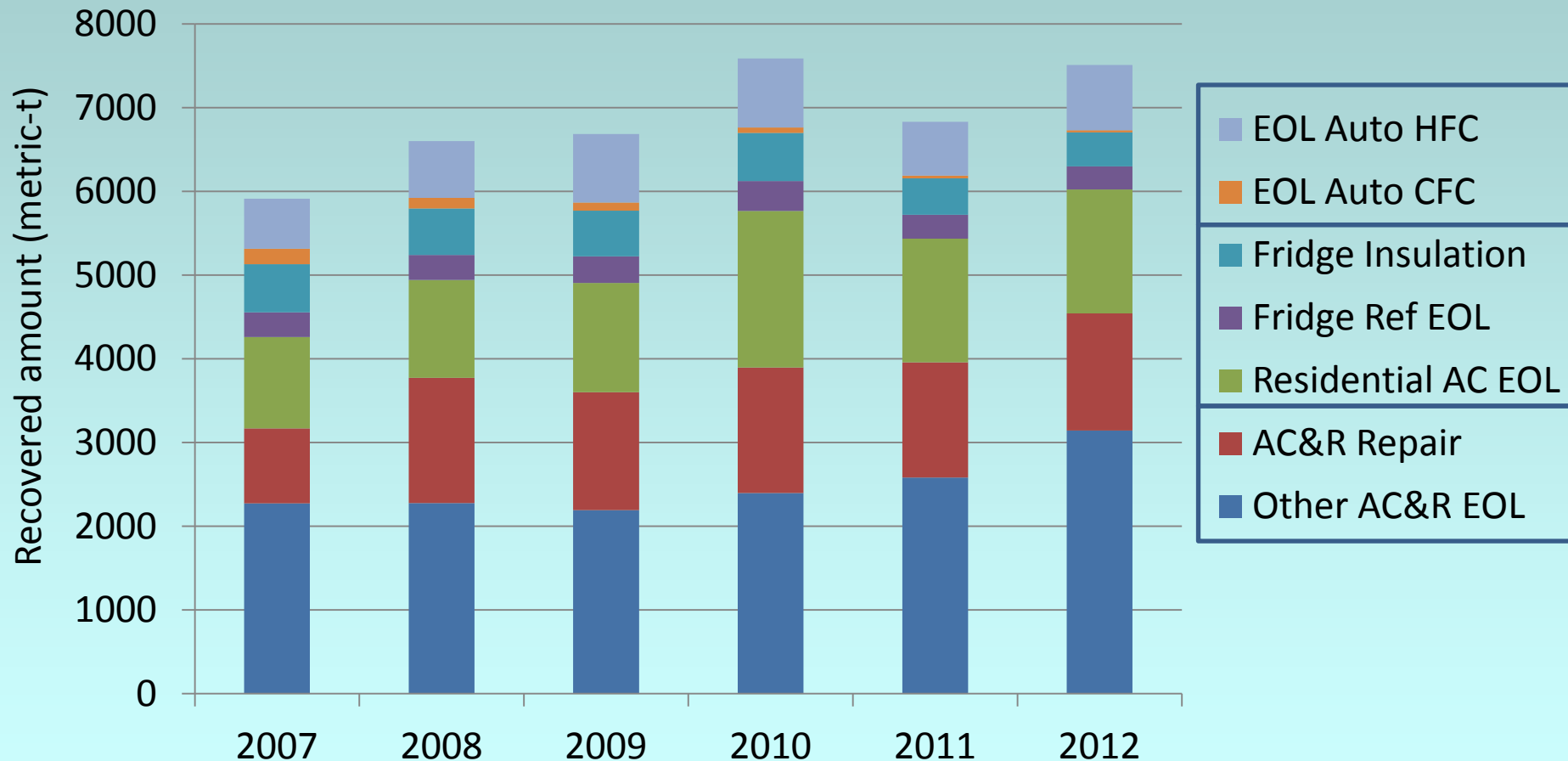
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1. Direction of measures for HFCs in Japan

Recovery under Conventional Laws



- Significant amount has been recovered, but recovery ratio is around 30%.

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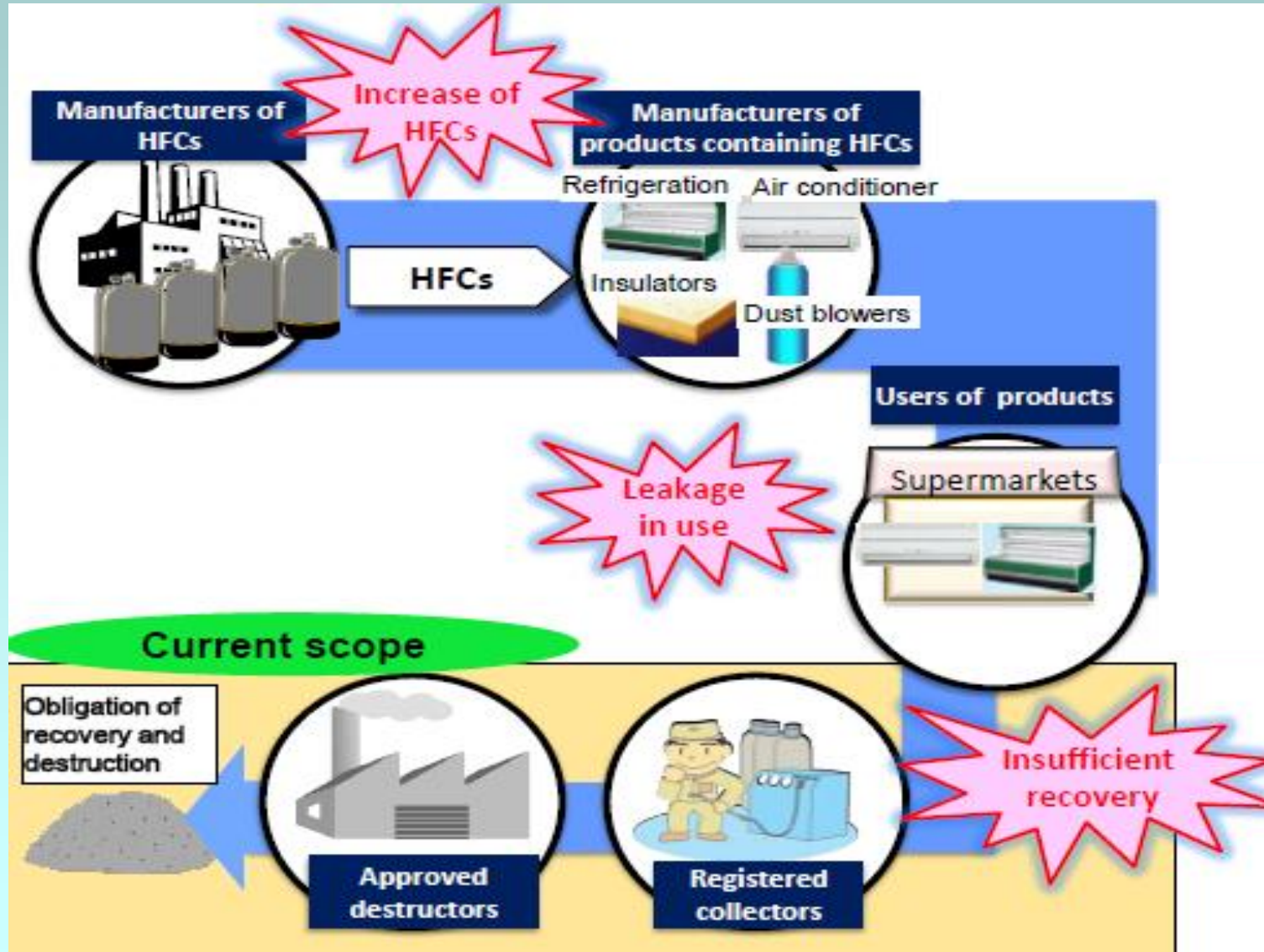
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2. Scope

“the Act on Rational Use and Proper Management of Fluorocarbons” in Japan

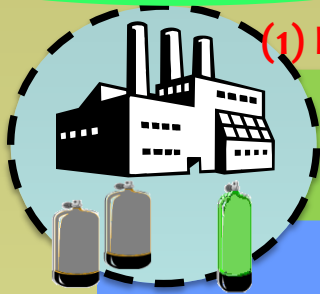


2. Scope

“the Act on Rational Use and Proper Management of Fluorocarbons” in Japan

Expand Scope

(1) HFCs Phase-down



Low GWP HFCs
Natural Refrigerant

HFCs

Manufacturers of products containing HFCs

Refrigerator

Air conditioner

Insulators

Dust blowers

(2) Promotion of low-GWP/non-fluorocarbons for designated products

Products with alternatives

Reuse

(3) Reduction of refrigerant leakage from commercial equipment in use

Users of products

Periodical check

Report of leakage

Maintenance

(5) Proper destruction and recycle

(4) Proper refill and recovery

Registered fillers/recovery operators

Approved destructors/recycle

Obligation of destruction

Revised act for manufacturers and importers of equipment

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Specified Equipment

Specified equipment category	Currently used refrigerant and its GWP	Target index of environmental impact	Target year
Residential air conditioners (excluding floor-standing type)	R410A(2090) R32(675)	750	2018
Air conditioners for shops and offices (excluding floor-standing type) <<small size only>>	R410A(2090)	750	2020
Automotive air conditioners (only for passenger car)	R134a(1430)	150	2023
Condensing units and Stationary refrigeration units (rated output > 1.5kW)	R404A(3920) R410A(2090) R407C(1774), CO2(1)	1500	2025
Central refrigeration equipment (only for new refrigeration warehouses more than 50 thousands m ³)	R404A(3920) Ammonia	100	2019
Hard urethane foam	HFC-245fa(1030), HFC-365mfc(795)	100	2020
Dust blower	HFC-134a(1430), HFC-152a(124) CO2(1), DME(1)	10	2019

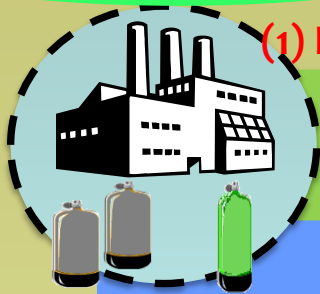
※Manufacturers and importers shall ensure that the weighted average of GWP of domestic shipments does not exceed the target index to reduce environmental impact of the specified equipment.

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Revised regulation for equipment owners (users of products)

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Details of equipment check required for equipment owners

	Check points		Frequency of check	Operator of check
Simplified periodical check All Class-1 specified equipment	(Air conditioners) ▪ Abnormal noise from air conditioner, apparent condition check and so on to judge leakage of HFCs (Refrigeration equipment) ▪ Temperature inside the cabinet ▪ Abnormal noise from equipment, apparent condition check and so on to judge leakage of HFCs		More than once a 3 months (voluntary)	No limitation on the qualification
Periodical check	Visual check by an operator having professional knowledge	In the case that rough location of leakage can be found	More than once a period determined for each equipment	Authorised certification related to equipment management is needed.
		Other cases		

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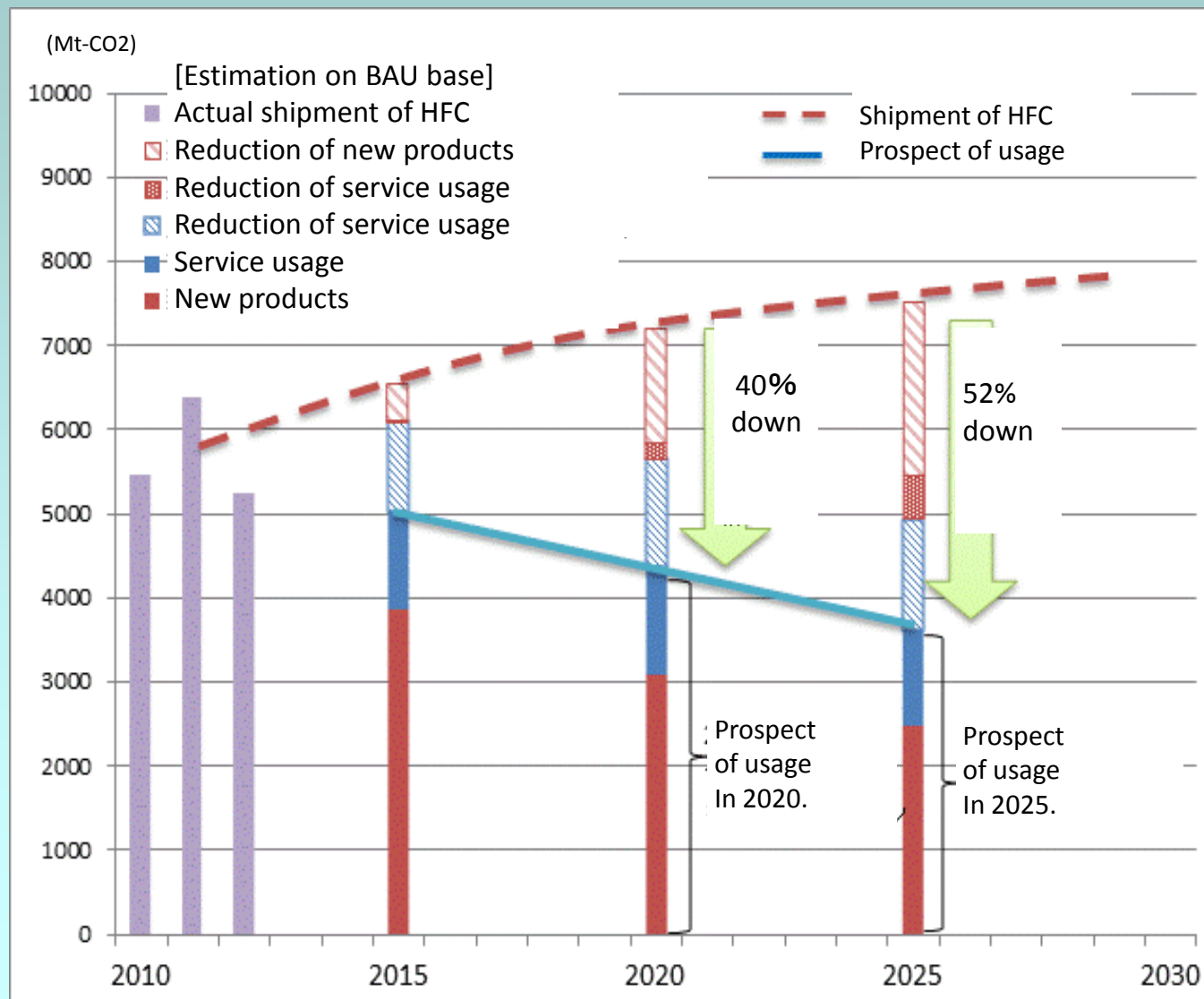
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Expected reduction by new actions

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Requirements for the alternative refrigerants

3E+S

Safety(precondition)

- Low Toxicity
- Low Risk of Flammability

Environment
Performance

- Ozone Depletion Potential =0
- Low Global Warming Potential

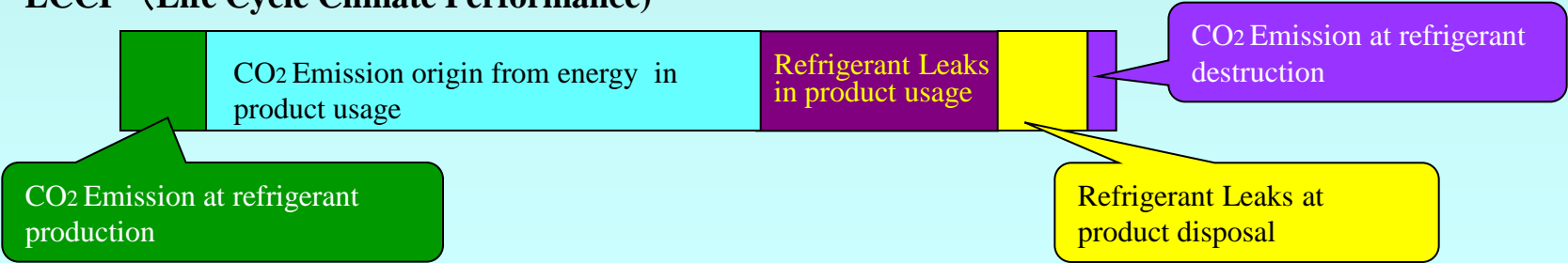
Energy
Efficient

- Superior for LCCP value
- Similar performance at high load cooling

Economic
Feasibility

- Reasonable Cost
- Acceptable level in Developing Countries

LCCP (Life Cycle Climate Performance)





Refrigerants for the next generation

HVAC&R industry has been proceeding with the development of next generation low GWP refrigerants to mitigate the impact of HFCs on global warming.

However ;

- **Ideal refrigerants have not been found yet.**
- **Every candidate of next generation refrigerants bears some sort of faults.**
- **Usable candidates, in particular, are mildly flammable.**
- **We are forced to make full use of those candidates for prevention of global warming caused by refrigerants.**



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Thank you for your kind attention.