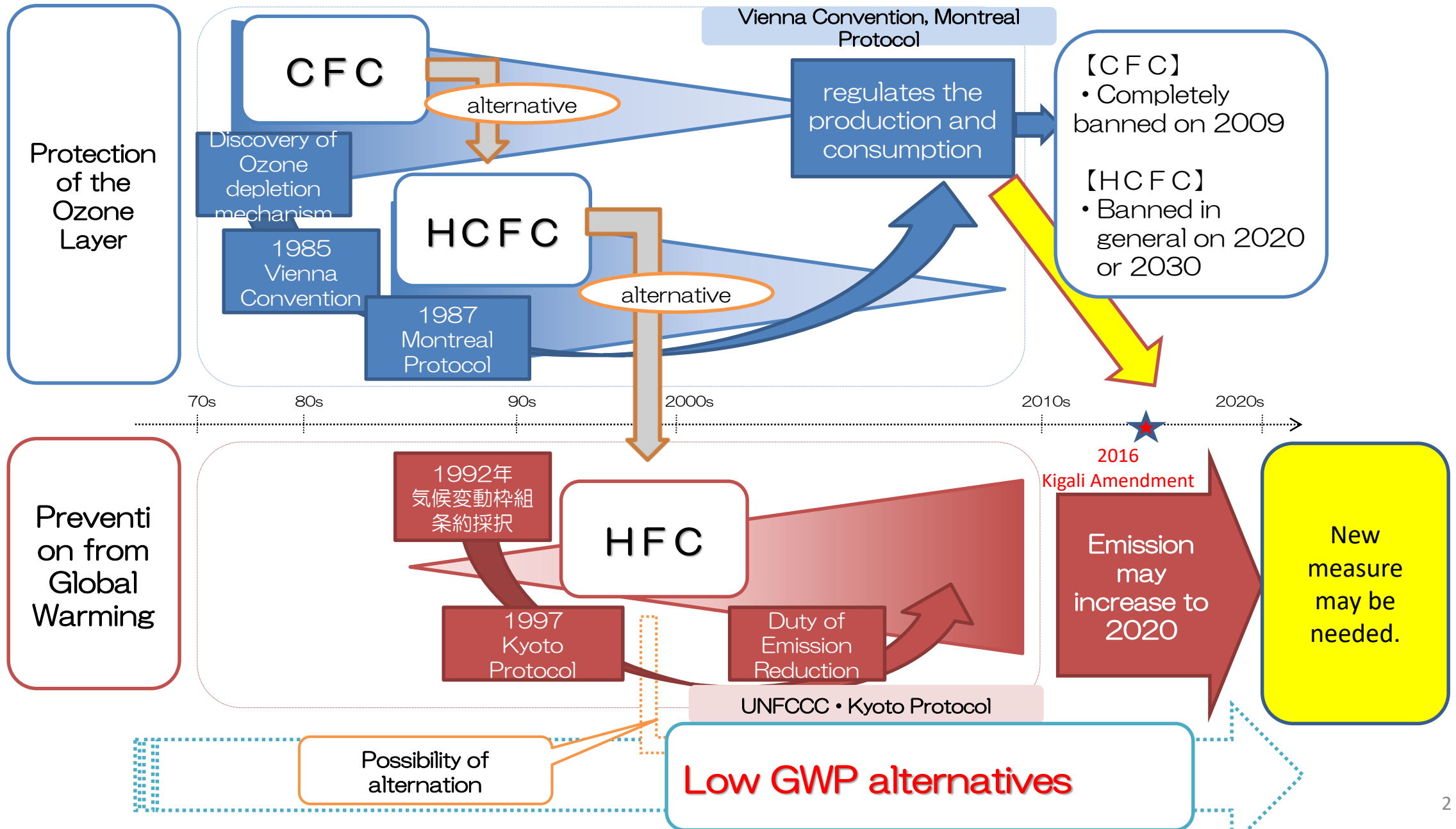


# Current Situation of F-gas emission reduction in Japan

Feb. 13<sup>th</sup> 2018

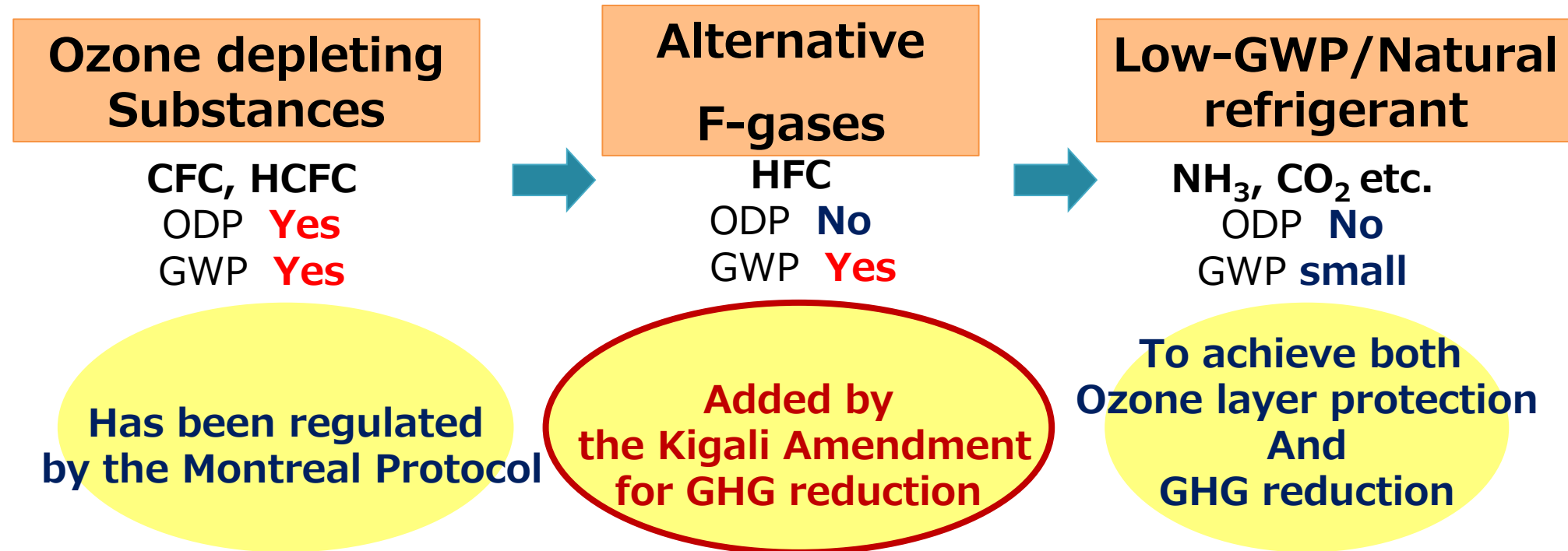
Office of Fluorocarbons Control Policy,  
MOEJ

# International situation about F-gas Measures



# Kigali Amendment to the Montreal Protocol

- ◆ Kigali Amendment, which is to include HFCs as a controlled substances under the Montreal Protocol, is adopted on Oct. 2016.
- ◆ The amended protocol will enter into force on January 1<sup>st</sup>, 2019, since 25 countries has ratified the amendment.
- ◆ A report for the basic idea of the domestic action according to the Kigali Amendenment was constructed by the Joint meeting of Central Environment Council and Industrial Structure Council.



# Schedule for reduction

- Developed countries: 2011–2013 as baseline year, reduction starts from 2019, 85% reduction will be achieved on 2036.
- Developing countries Group 1 (China, Southeast Asia, Latin America, Africa, Island countries, etc. Parties other than Group 2) 2020–2022 as baseline year, freeze on 2024, 80% reduction will be achieved on 2045.
- Developing countries Group 2 (India, Pakistan, Iran, Iraq and gulf countries): 2024–2026 as baseline year, freeze on 2028, 85% reduction will be achieved on 2047.

|                                     | Group 1<br>(*1)   | Group 2<br>(*2)   | Developed Countries<br>(*3)   |
|-------------------------------------|---|---|---|
| <b>Baseline year</b>                | 2020–2022年  | 2024–2026年  | 2011–2013年  |
| <b>Baseline value<br/>(CO2 eq.)</b> | Average of HFC for the baseline period + the baseline of HCFC x 65% | Average of HFC for the baseline period + the baseline of HCFC x 65% | Average of HFC for the baseline period + the baseline of HCFC x 15% |
| <b>Freeze year</b>                  | 2024  | 2028(*4)  | None  |
| <b>1<sup>st</sup> stage</b>         | 2029 ▲10%   | 2032 ▲10%   | 2019 ▲10%   |
| <b>2<sup>nd</sup> stage</b>         | 2035 ▲30%   | 2037 ▲20%   | 2024 ▲40%   |
| <b>3<sup>rd</sup> stage</b>         | 2040 ▲50%   | 2042 ▲30%   | 2029 ▲70%   |
| <b>4<sup>th</sup> stage</b>         |   |   | 2034 ▲80%   |
| <b>最終削減</b>                         | 2045年 ▲80%  | 2047年 ▲85%  | 2036 ▲85%   |

(\*1) Group 1: Developing countries other than Group 1

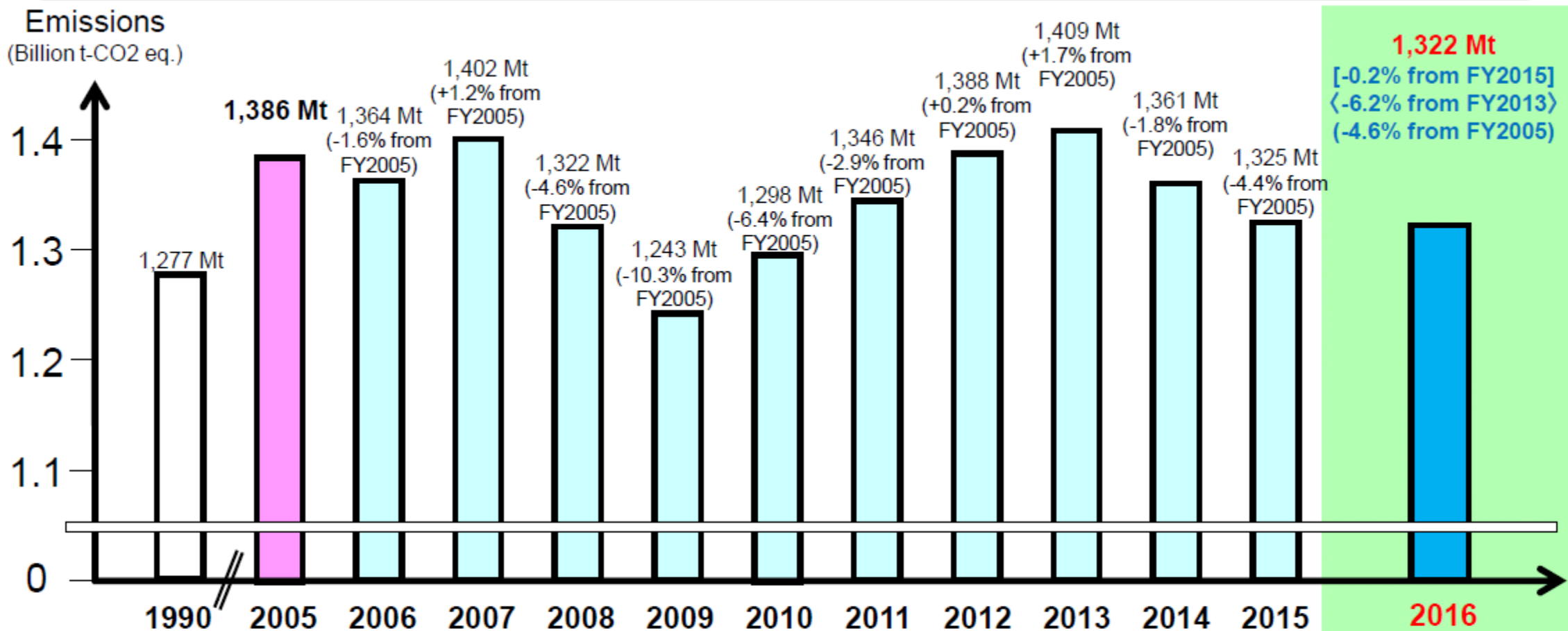
(\*2) Group 2: India, Pakistan, Iran, Iraq, and gulf countries

(\*3) Belarus, Russia, Kazakhstan, Tajikistan, Uzbekistan has different schedule.

(baseline value: same HFC + HCFCx25%, 1<sup>st</sup> stage ▲5% on 2020, 2<sup>nd</sup> stage ▲35% on 2025.

(\*4) Group 2 : technical assessment will be performed 4 to 5 years before frozen year (2028) and two year postponement of frozen year may be considered by the assessment.

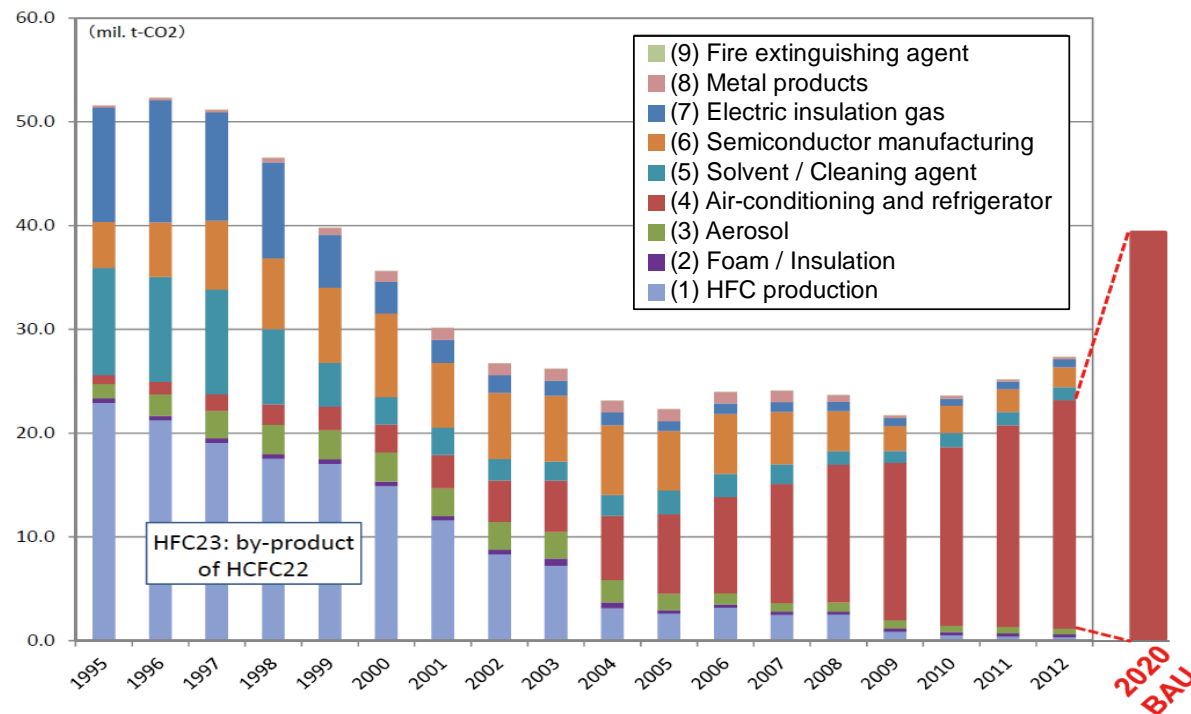
- Japan's total greenhouse gas (GHG) emissions in FY2016 (preliminary figures) were **1,322 Mt CO<sub>2</sub> eq.** (0.2% decrease as compared to FY2015; 6.2% decrease from FY2013; and 4.6% decrease from FY2005 levels).
- The main factor for the lower emissions in FY2016 as compared to FY2015 and FY2013 is the decrease in energy-related CO<sub>2</sub> emissions due to wider adoption of renewable energy and resumption of nuclear power plant operation, despite the increase in hydrofluorocarbon emissions from refrigerants that substitute for ozone-depleting substances.
- The main factor for the drop in emissions in FY2016 as compared to FY2005 is the decrease in energy-related CO<sub>2</sub> emissions in the industrial and transport sectors, despite the increase in hydrofluorocarbon emissions from refrigerants that substitute for ozone-depleting substances.



1. Emissions are estimated based on annual figures in various statistics. As for the preliminary figures in FY2016, some annual figures from FY2015 were temporarily used in place of FY2016 figures that have yet to be released. Moreover, some estimation methodologies are currently being reconsidered in order to make more accurate estimations of emissions. As such, the final figures to be released in April 2018 are likely to differ from the preliminary figures in this summary. Removals by forest and other carbon sinks will also be estimated and announced at the time of the final figures.

# HFCs emissions have been increasing

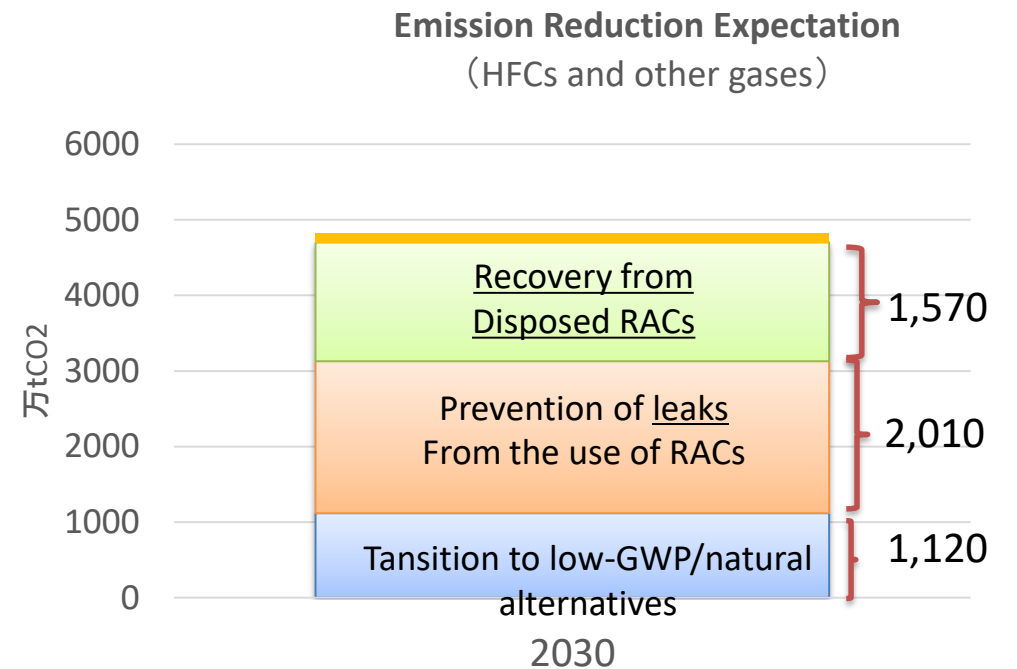
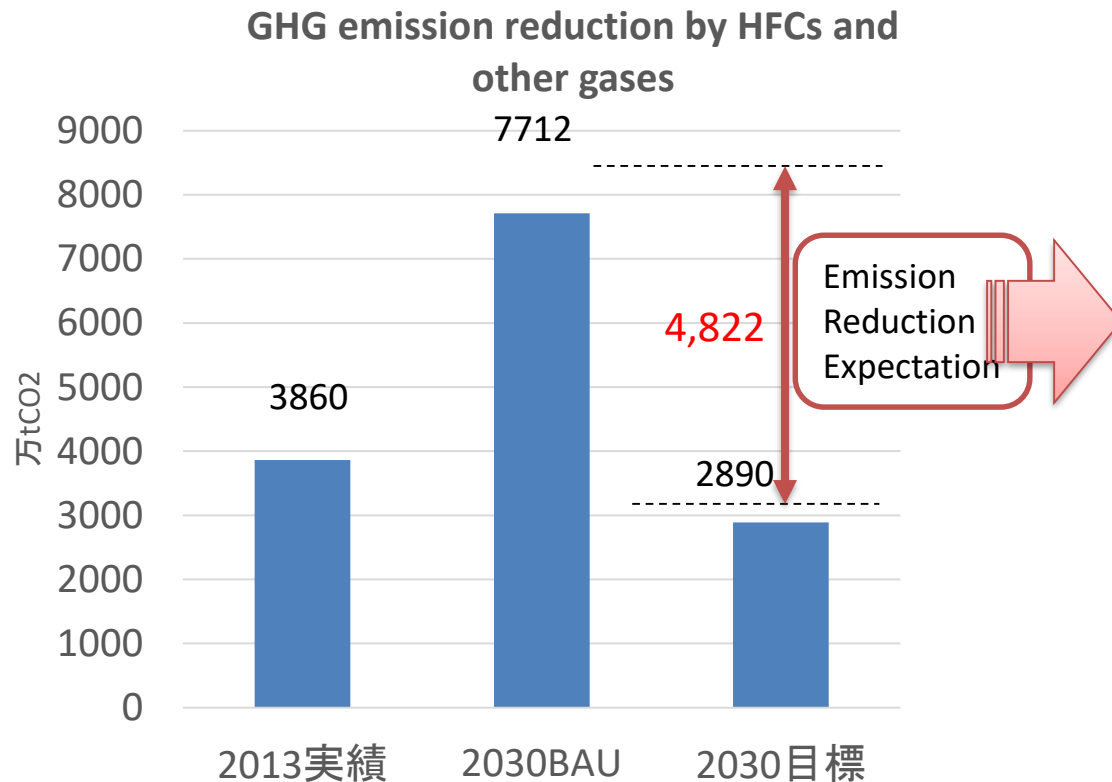
- In Japan, since 2001 under the “Law concerning the Recovery and Destruction of Fluorocarbons”, CFCs, HCFCs and HFCs have been recovered from commercial RAC equipment at the time of maintenance and disposal of equipment and have been recycled or destroyed.
- However, HFCs emissions have been increasing rapidly and are expected to double in 2020 as compared to the emissions in 2011 from RAC equipment.



Estimated fluorocarbon emissions from RAC equipment in 2020

# Target on Plan for Global Warming Countermeasures ①

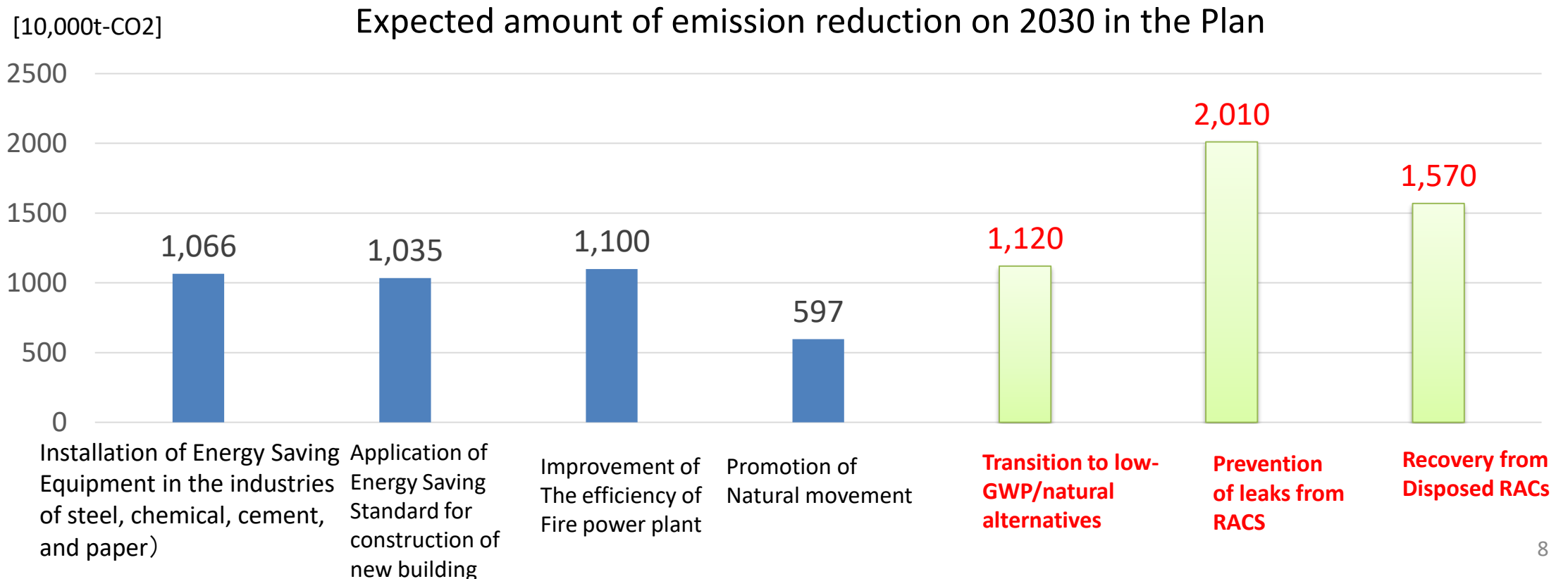
- ◆ About 4822万tCO<sub>2</sub> is expected as the target on 2030 under the Plan for Global Warming Countermeasures ( Cabinet Decision on May 2016)
- ◆ 1,120万tCO<sub>2</sub> emission reduction is expected by the promotion of the transition from F-gas to low GWP/Natural alternatives.



## Target on Plan for Global Warming Countermeasures ②

◆ Contribution of the measures for HFCs to the emission reduction target is very high in the Plan.

Achievement of the target of HFCs is a key to the achievement of the total goal of the emission reduction on 2030.





# F-gas measures in Japan

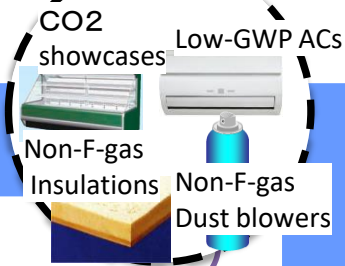
## Law Concerning the Protection of the Ozone Layer

- Regulation of production and consumption

F-gas producers



Designated product manufacturers



Fluorocarbon

Users

- Promotion of Energy Saving Natural Refrigerant Equipment

【Budget】

**6.3billion JPY (FY2017)**

→ **1 billion JPY (FY 2017 suppl. Budget)**

**+ 6.5billion JPY (FY2018 budget plan)**

Funding Rate: ½ or less, or 1/3 or less

- Measures to control whole lifecycle of Fluorocarbons (generation, use, recovery, and destruction/recycle)

- Inspection of RACs
- Report of leakage
- Recovery and destruction of Fluorocarbons when discharging RACs

Recycled

Proper recycling /  
destruction of F-  
gases

Approved  
Recycling /  
Destruction  
Operators

Registered filling /  
Recovery Operators

Duty of  
F-gas  
Recovery

Fluorocarbon Emission  
Control Law

# Support of the transition of the refrigerant

- ◆ For the achievement of the transition of the refrigerant, budgetary support to install the energy saving natural refrigerant equipment is extended.



脱フロン・低炭素社会の早期実現のための省エネ型自然冷媒機器導入加速化事業  
(一部農林水産省、経済産業省、国土交通省連携事業)

平成29年度補正予算(案)  
1,000百万円  
平成30年度予算(案)  
6,500百万円(6,300百万円)

## 背景・目的

- 現在、業務用冷凍空調機器の冷媒には、主に特定フロン(HCFC)や代替フロン(HFC)が使用されているが、機器の使用時・廃棄時の排出量が大幅に増加しており、地球温暖化対策計画の目標達成のためには大幅削減が必要。
- また、HCFCは2020年に製造が全廃予定であり、HCFC機器からの早期転換が必要。さらに、平成28年10月にモントリオール議定書が改正され規制対象にHFCが追加され、2036年までに85%分のHFCの生産及び消費の段階的削減が必要。
- そのような中、HCFCやHFCを代替する技術として省エネ型自然冷媒機器の技術があるものの、イニシャルコストが高いことから導入は限定的。
- 国内外の規制動向を受け、HCFC、HFCから自然冷媒への直接の転換が望まれる。仮に、自然冷媒への直接の転換が十分に行われない場合、将来的に脱フロン・低炭素化が遅滞するとともに、民間資金の二重投資になる恐れ。
- そのため、この機を捉え、省エネ性能の高い自然冷媒機器の導入を支援・加速化し、一足飛びで脱フロン化・低炭素化を進めることが極めて重要。併せて、省エネ型自然冷媒機器の一定の需要を生み出すことで、機器メーカーの低価格化の努力を促進。

## 事業概要

### ①先進技術を利用した省エネ型自然冷媒機器の導入補助

(H29補正:10億円、H30:64億円)平成30年度~平成34年度

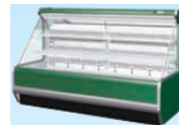
冷凍冷蔵倉庫に加えて、新たに食品製造工場、食品小売店舗において、省エネ型自然冷媒機器の導入を補助する。



<中央方式冷凍冷蔵機器>



<冷凍冷蔵ショーケース>



### ②再エネ電力活用推進のための冷凍冷蔵機器によるDR対応調査検討事業

(H30:1億円)平成30年度~平成31年度

2020年度の電力完全自由化に向けて、再エネ余剰電力の効率的活用が求められる中、倉庫業等で設置されている冷凍冷蔵機器を活用したDR(デマンド・レスポンス)導入のためのポテンシャル調査、課題整理をし、DR対応ガイドラインを策定する。

## 事業スキーム

### ①【国からの補助】

補助事業者:非営利法人

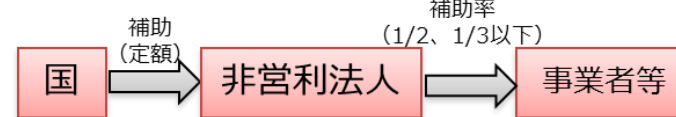
補助率:定額

【非営利法人から事業実施者への補助】

間接補助事業者:民間事業者等

補助率:冷凍冷蔵倉庫...中小企業1/2以下、大企業1/3以下  
食品製造工場、食品小売店舗...1/3以下

### ②委託対象:民間団体



### (注) 省エネ型自然冷媒機器

フロン類(クロロフルオロカーボン(CFC)、ハイドロクロロフルオロカーボン(HCFC)及びハイドロフルオロカーボン(HFC)をいう。)ではなく、**アンモニア、空気、二酸化炭素、水、炭化水素**等、自然界に存在する物質を冷媒として使用した冷凍・冷蔵機器であって、同等の冷凍・冷蔵の能力を有するフロン類を冷媒として使用した冷凍・冷蔵機器と比較して**エネルギー起源二酸化炭素の排出が少ない**もの

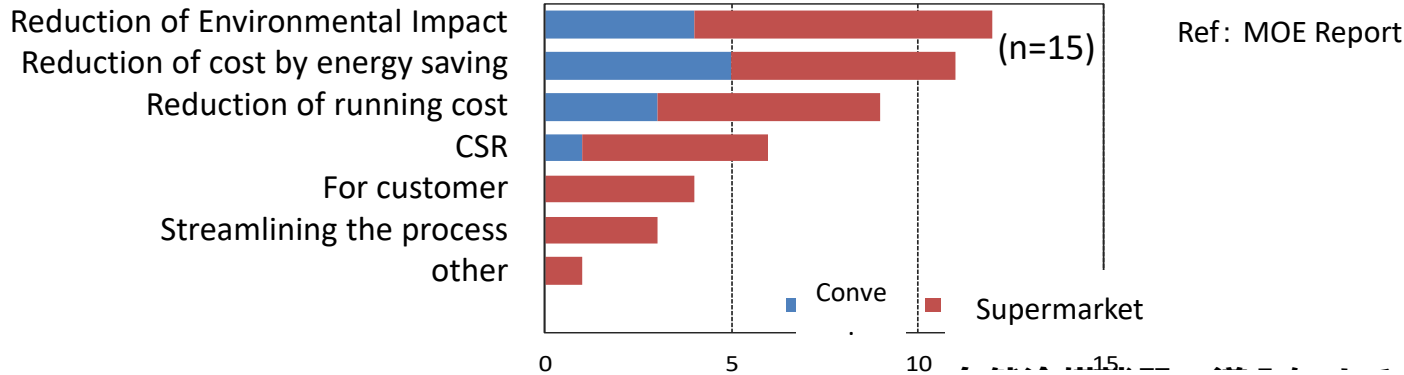
## 期待される効果

- 省エネに取り組む事業者への積極的な支援により、物流分野全体のコールドチェーンの省エネ化及び脱フロン化を推進し、足腰の強い冷凍冷蔵物流を構築する。
- 省エネ型自然冷媒機器に一定の需要を生み出すことで、機器の低価格化がなされ、将来的な自立的導入につながる。今後、世界的に普及が見込まれる省エネ型自然冷媒機器の分野を我が国メーカーが牽引し、地球規模での環境対策に寄与するとともに、世界経済を牽引することが期待される。
- フロン排出抑制法の取組強化と相まって、フロン排出の大幅削減に寄与。
- 冷凍冷蔵倉庫を有する倉庫業等における再エネ余剰電力の有効活用に大きく寄与。

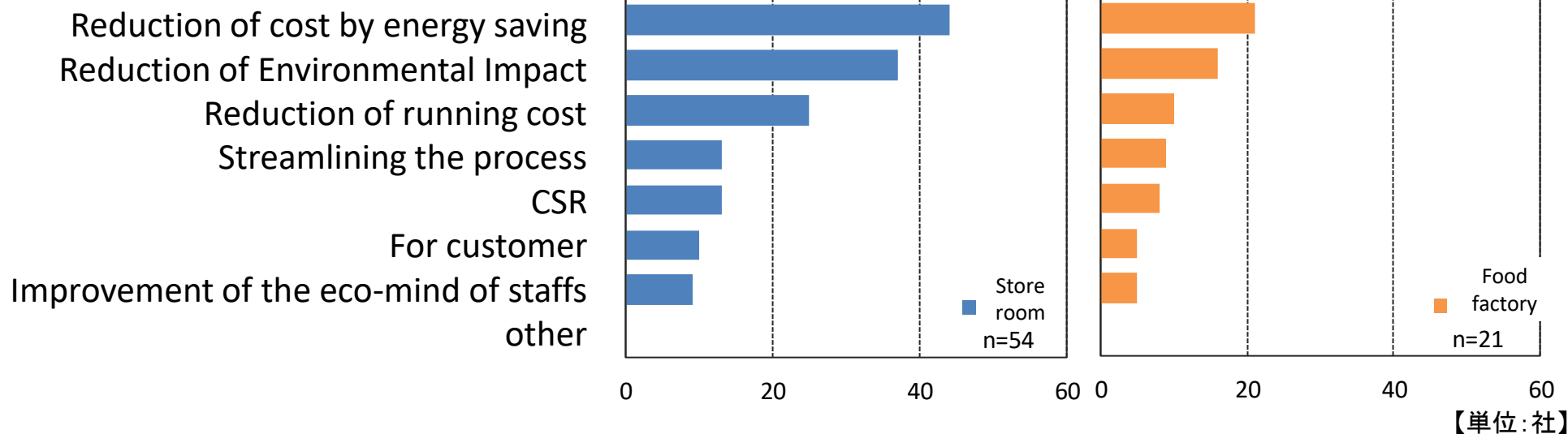
# What is the good point to install the energy saving natural refrigerant equipment?

Based on the questionnaire to the users who installed the natural refrigerant equipment, such as convenience store, supermarket, storeroom, food factory, merit of the installation may be from the effect of the reduction of environmental impact and the reduction of the cost by the energy saving.

Merit of installation



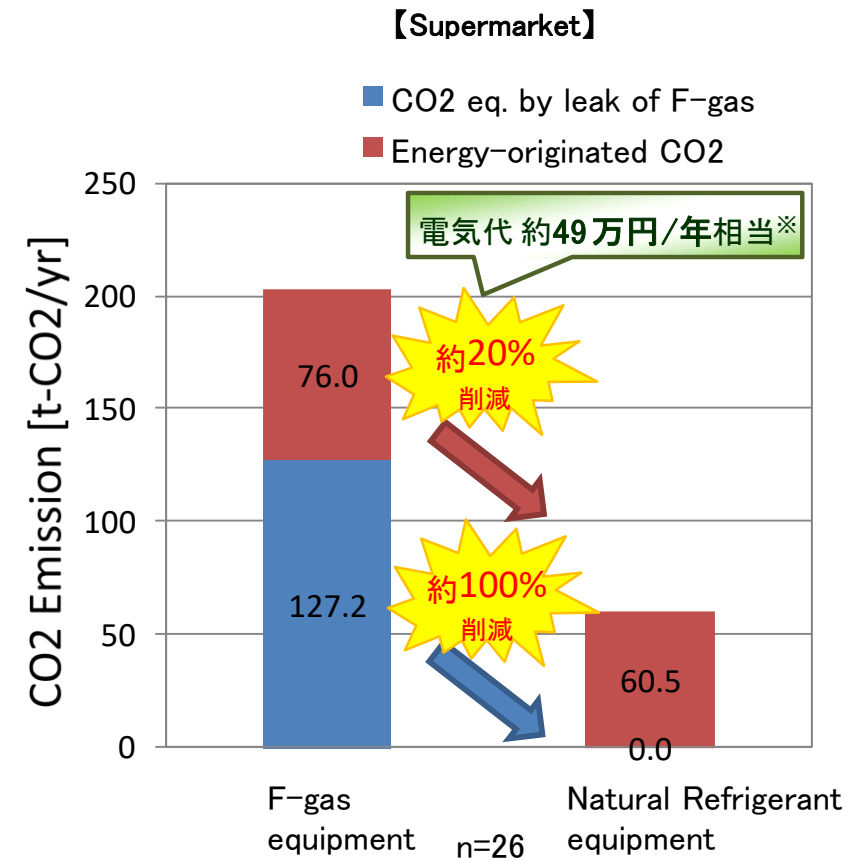
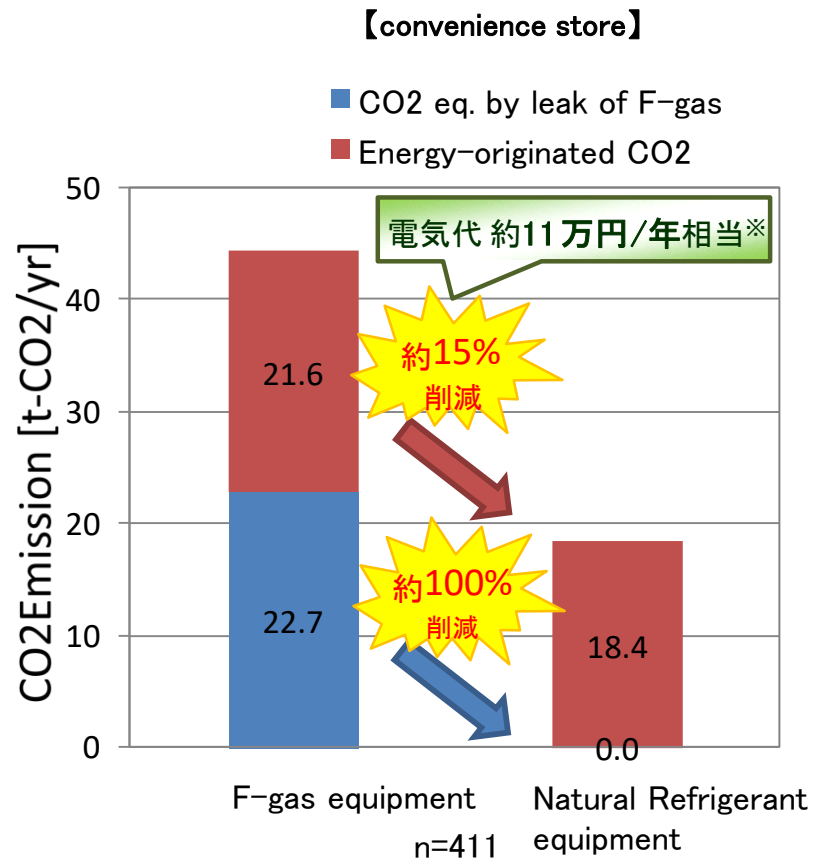
Merit of installation



# Effect of Installation: Convenience Store, Supermarket

- Emission amount is greatly reduced by the transition to natural refrigerant
- Energy saving is achieved at the same time, and resulted to 16% reduction of energy-originated CO2s.

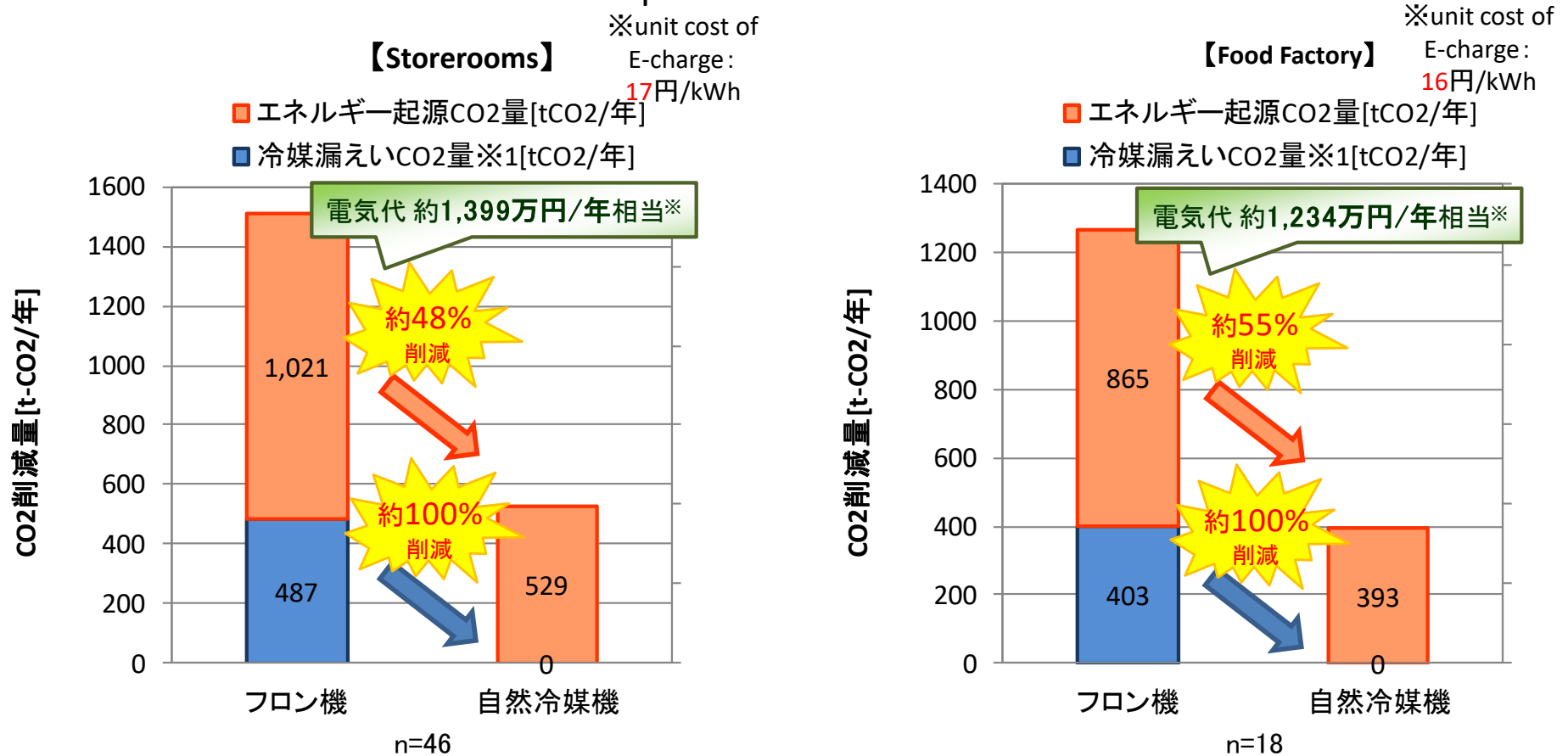
## Example of GHG reduction



# Effect of Installation: Storerooms, Food Factory

- Emission amount is greatly reduced by the transition to natural refrigerant
- Energy saving is achieved at the same time, and resulted to 48~55% reduction of energy-originated CO2s.

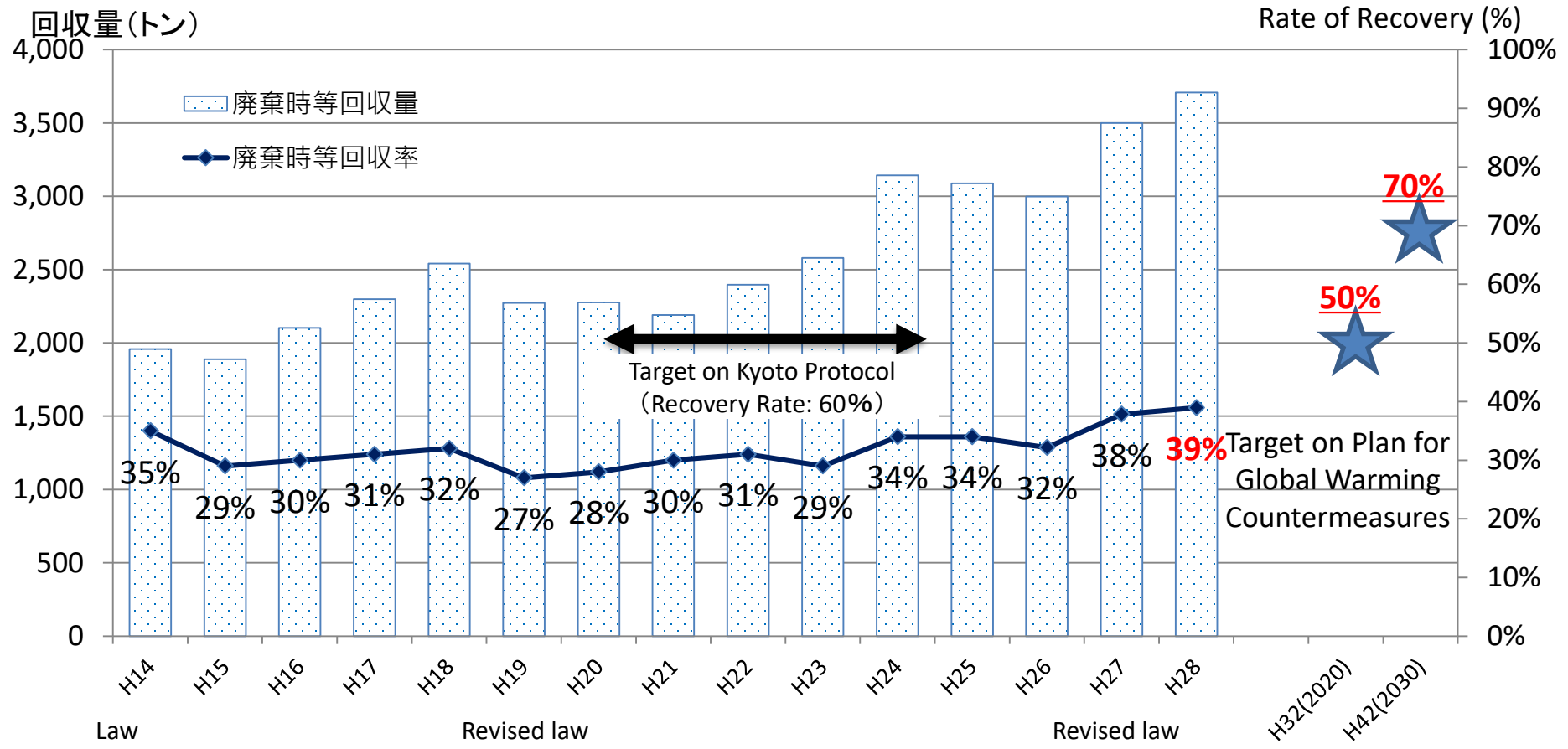
## Example of GHG reduction



(比較対象フロン機の想定排出量と自然冷媒機の実績排出量を施設や導入機器の規模、導入形態等が異なる事業ごとに単純平均)

# The recovery rate should be improved.

- ◆ Even with the Fluorocarbon Emission Control Law, the recovery rate of the F-gas stays at the very low rate (27%–39%) for 10 years.
- ◆ Expected target on the Plan: 50% on 2020, 70% on 2030.
- ◆ The discussion is performed under the council, to investigate the reason of the low recovery rate and possible measures.



Thank you for your attention.

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

