

# Refrigerants Status and Strategy in Japan

JRAIA

Tetsuji Okada

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# 1. Who is JRAIA?

## 1) Overview

70<sup>th</sup>  
Anniversary

The Japan Refrigeration and Air Conditioning Industry Association (**JRAIA**)

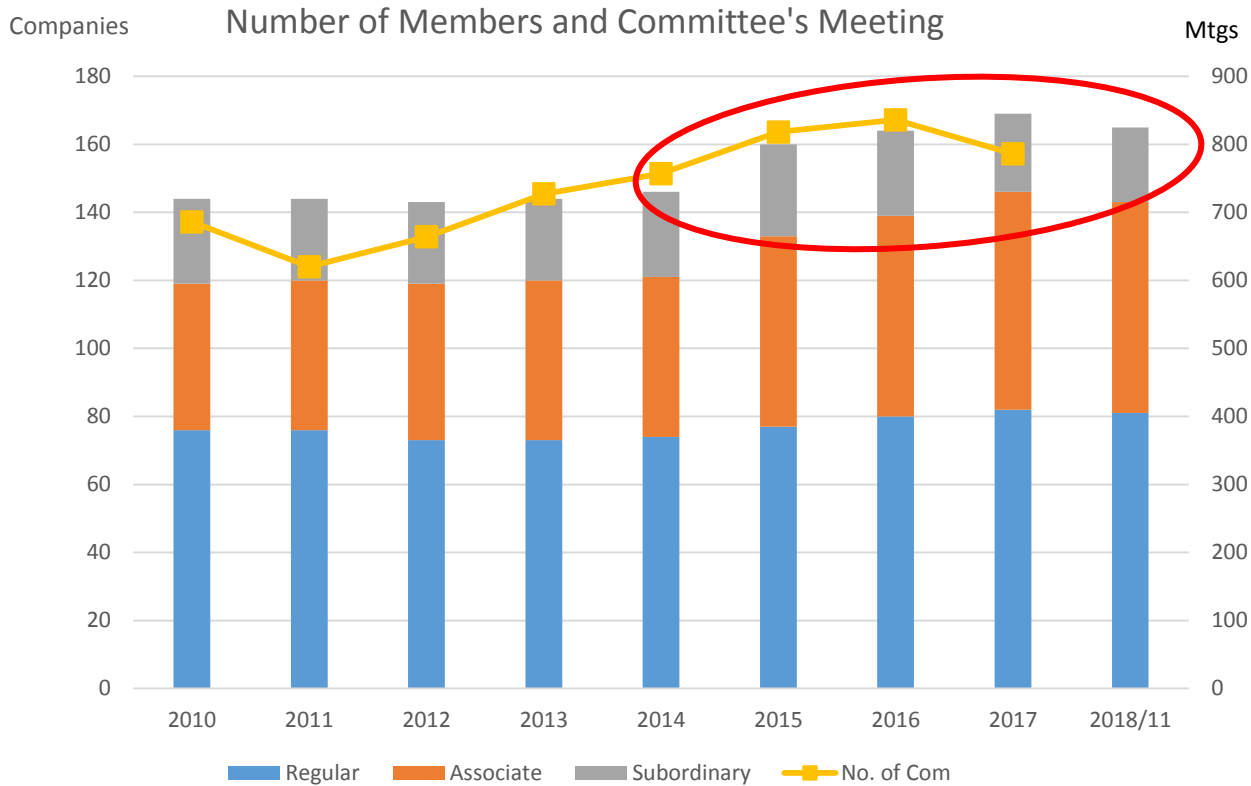
- Established in 1949.
- 165 member companies including the associate members.  
(as of 1<sup>st</sup> of November 2018)
- The business fields of the member companies are :
  - Air conditioning (residential, commercial, automotive)
  - Refrigeration (commercial, industrial, transport)
  - Ventilation
  - Heat pump system (HP water heaters)
  - Refrigerants
  - Parts

Japan Branch Office of Chinese Company

Hisense Japan  
Highly(海立) Japan  
Sanfa(三花) Japan  
Dunan Japan

# 1. Who is JRAIA?

## 2) Number of members and activities



As of 1<sup>st</sup> of November 2018

regular member	81 companies
subsidiary member	22 companies
Associate member	62 companies
Total	165 companies

## 2. Market Trend

### 1) Market Volume and Refrigerant conversion status in each product sector

Product Category	Number of Units in <u>2017FY</u> (x 1,000)	Y/Y Ratio (%)	Refrigerant
Residential A/Cs	9,054.6	106.2	R410A ⇒ <b>R32</b> (almost 100%)
Commercial A/Cs	827.1		R410A ⇒ <b>R32</b> (only Small-size; 41%)
Residential H/P water heaters	446.7		<b>CO<sub>2</sub></b> , (R32) (almost 100%)
Gas engine-driven A/Cs	28.7		R410A
Water chilling units	13.8	100.0	R410A, R134A
Air to air heat exchangers	111.3		NA
Commercial ref. cabinets	302.1		R404A ⇒ R410A, <b>CO<sub>2</sub></b>
Condensing units	93.5	102.4	R404A⇒R410A, <b>CO<sub>2</sub></b>
Refrigeration units	28.8	97.2	R404A ⇒ <b>NH<sub>3</sub></b> , (+ <b>CO<sub>2</sub></b> ) R410A

Turbo Chiller:

➤ R245fa⇒**R1233zd**

VRF:

No Alternative yet

Air cooling type:

➤ **R32**

➤ R404A⇒R410A

⇒ **R448A, 449A**

➤ **CO<sub>2</sub>(Cascade)**

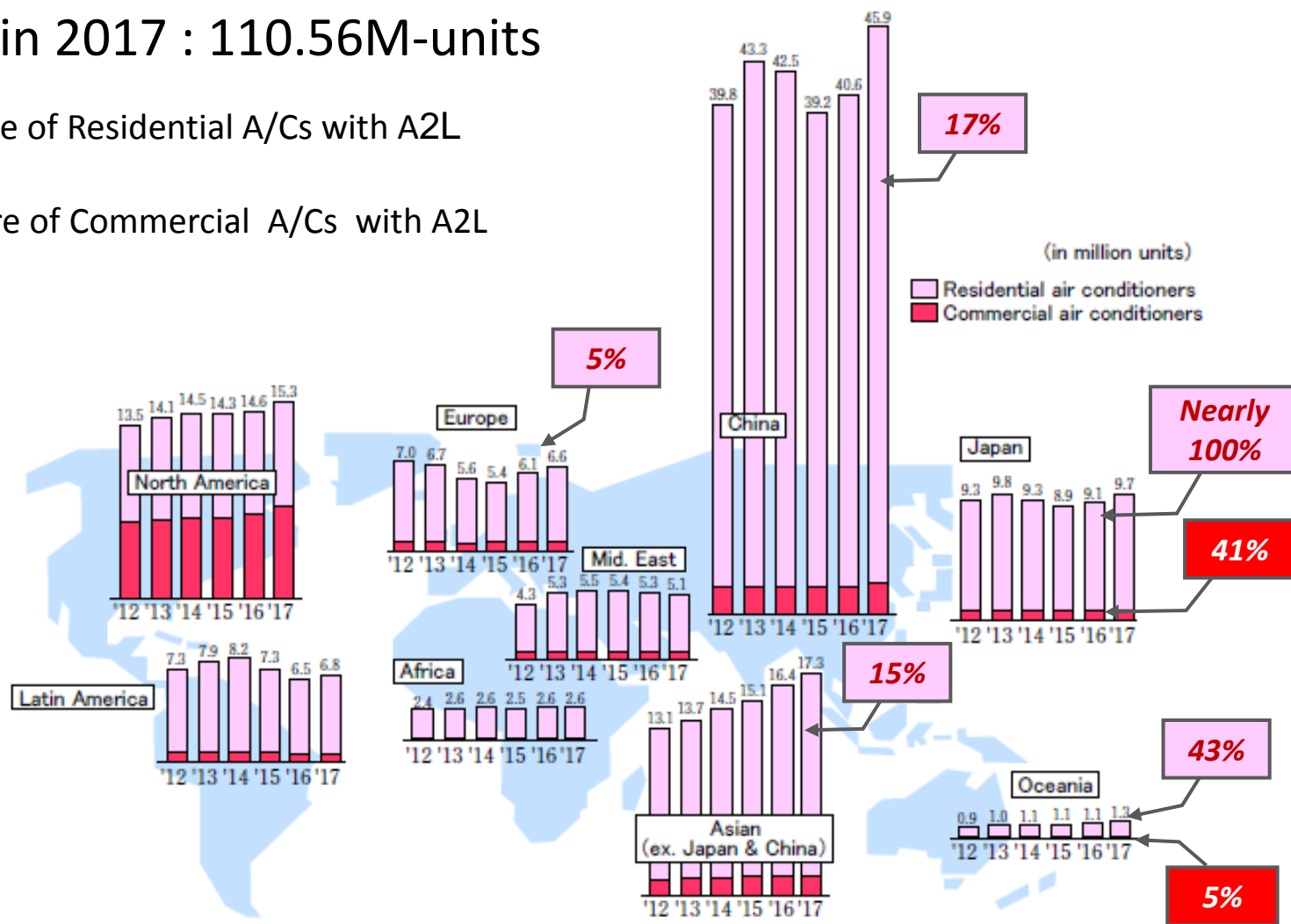
## 2. Market Trend

### 2) World market trend of Residential & Commercial A/Cs

Global sales in 2017 : 110.56M-units

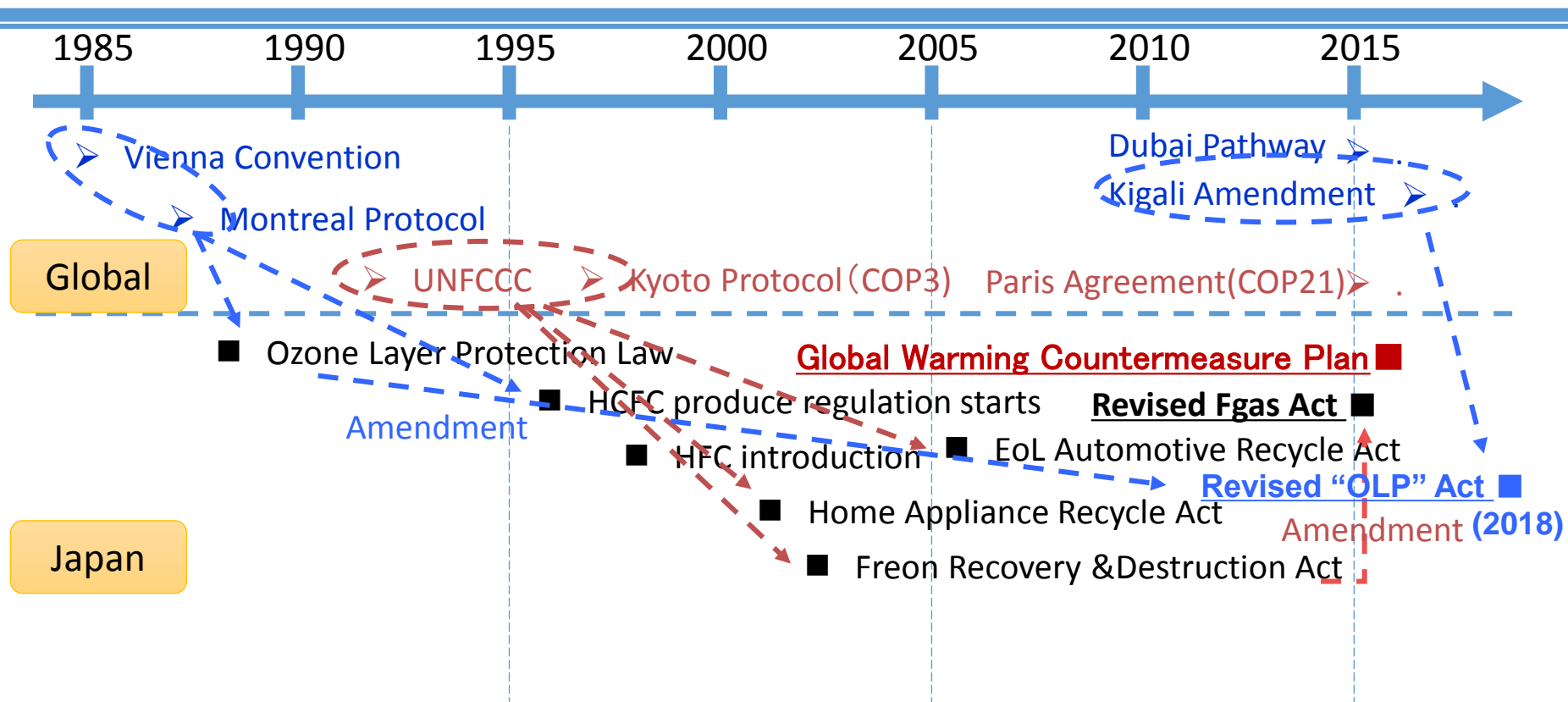
**xx%** : Share of Residential A/Cs with A2L

**yy%** : Share of Commercial A/Cs with A2L



# 3. Trend of Regulations and Protocols

## 1) Timeline



# 3. Trend of Regulations and Protocols

## 2) Regulation of refrigerant by "designated products"

Regulated by "Act on Rational Use and Proper Management of Fluorocarbons"

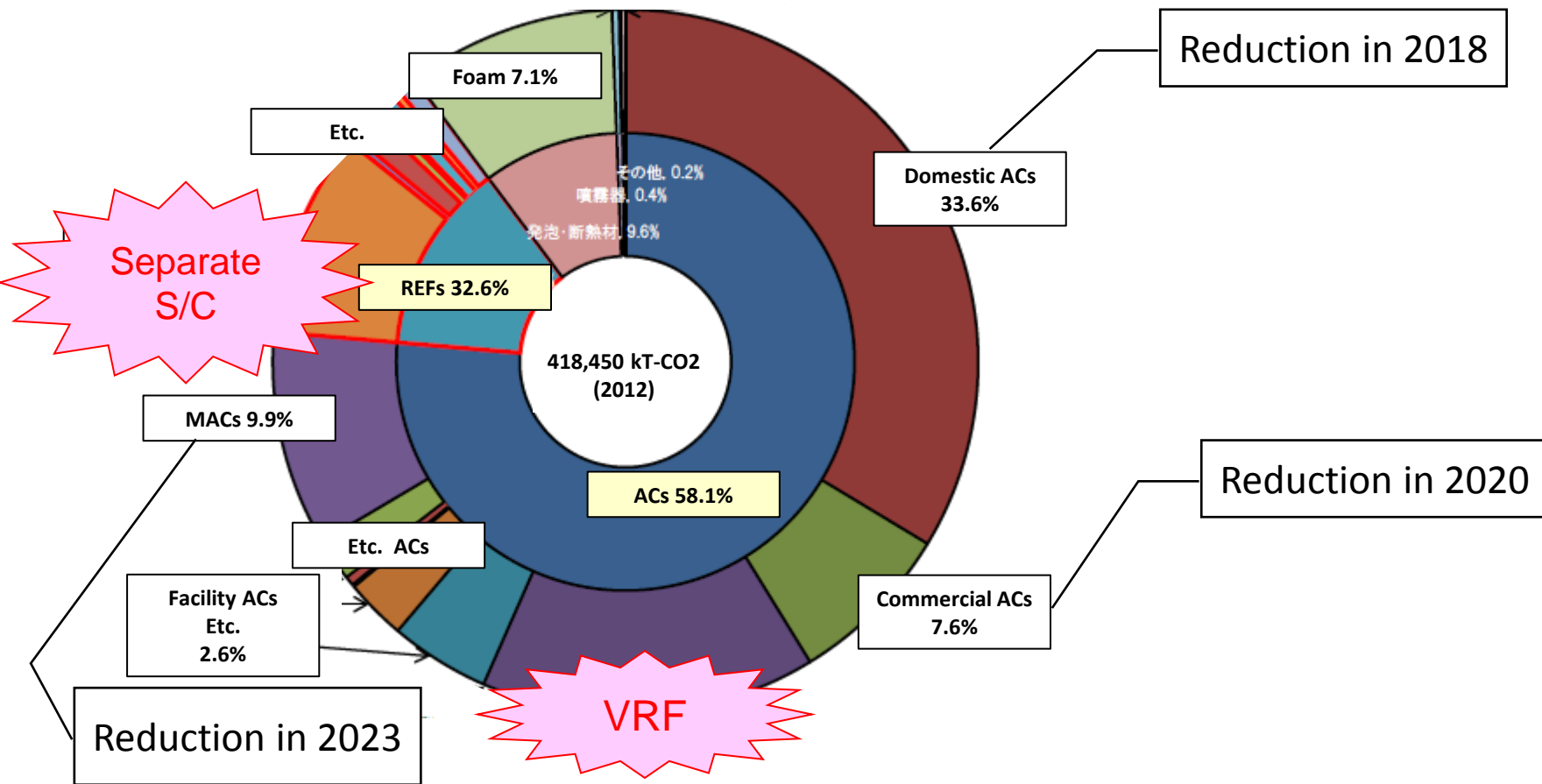
Designated Products	Target GWP (Weighted Average GWP)	Target year
Commercial A/C Large size(only single type)>> <b>GWP:750, 2023</b>		
Commercial A/C (Split)	750	2020
Centrifugal (Turbo) Refrigerators>> <b>GWP:100, 2025</b>		
Condensing unit and refrigerating unit	1500	2025
Cold storage warehouses	100	2019
Urethane foam	100	2020
Dust blowers	10	2019

**RACHP sectors**



# 3. Trend of Regulations and Protocols

## 3) HFC Consumption ( Market Stock)



# 4. Global environmental protection policy

## 1) Montreal protocol

### "Kigali Amendment" at MOP28

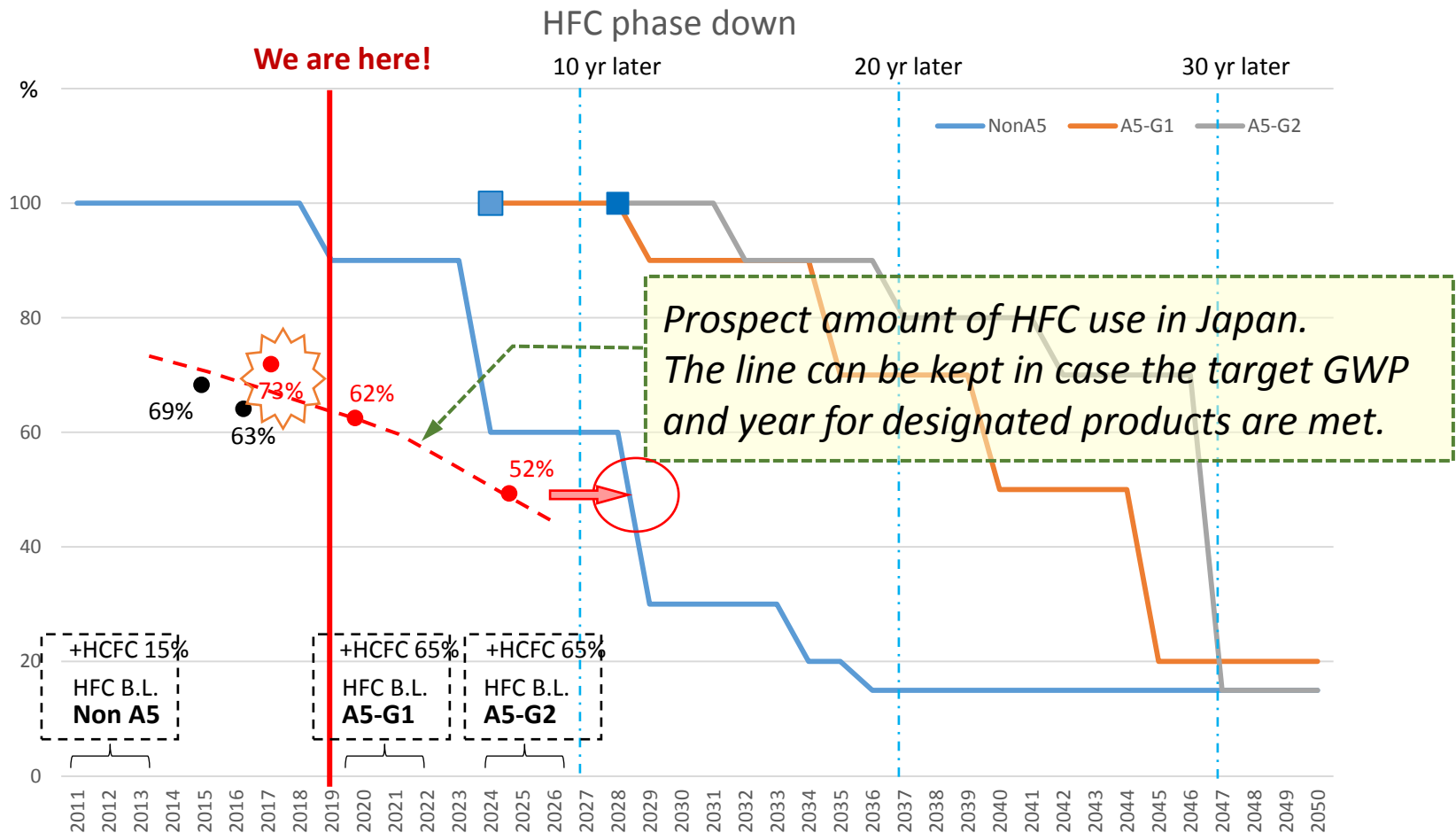
#### >>MOP 30 in Quito, Ecuador(11/2018)

(Ratified parties ; 60 at 9 Nov. 2018)

- Decided the reduction step by step of HFC (CO 2 equivalent ton)
  - Developing countries are divided into two groups.
- In order to promote review of standards concerning the safety of flammable refrigerants,
  - Establishment of TF(Task Force) in TEAP and decision to hold WS(Work Shop)
- 21 Decisions in MOP 30.
  - - Access of parties operating ....to energy-efficiency technologies in the RACH sec. (Decision XXX/5)
  - Unexpected emissions of CFC-11. (Decision XXX/3)
  - Financial Issues.(Decision XXX/4, 20)

# 4. Global environmental protection policy

## 2) Agreement at MOP 28



# 4. Global environmental protection policy

## 3) Montreal protocol

“TEAP **TASK FORCE** REPORT ON ISSUES RELATED TO **ENERGY EFFICIENCY** WHILE PHASING DOWN HCFCs”

### Outline

Ch. 1 Introduction

Ch. 2 Technology  
RACHP sectors

Ch. 3 Funding ins  
sector while

Ch. 4 References

Ch. 5 Glossary

ANNEX A: Sector-s  
technologies

ANNEX B: Example

**ANNEX C: Outcon**

**ANNEX D: Additio**  
**updated final repc**

### Lessons learned: Room AC

- Non-A5 markets initially adapted to the phase-out of HCFC-22 with R-407C, and then R-410A with better energy performance
- Currently, global markets are adapting to medium- and low-GWP options to replace HCFCs and high-GWP HFCs in air conditioners including HFC-32, HC-290, and others under development
- Room ACs performance can be optimised with improved compressor, refrigerant charge, and size of the heat exchanger
- In the absence of enabling EE policy, EE values for AC are generally lower in A5 compared to non-A5 countries



# 5. Global efforts

## 1) Global direction (discussion in MOP etc.)

1. From alternative refrigerant performance evaluation **to safety and refrigerant management.**

Example: GRMI or RDL

PRAHA II and ASEAN-SHINE

AHRI Flammable refrigerant subcommittee

**W/S on risk assessment with ASEAN countries**

2. Coexistence with energy saving (**energy efficiency**) is a challenge
3. Measures for considering **developing countries** are required (including High Ambient Temperature Countries)

# 5. Global efforts

## 2) Regulatory overview of each region

	U.S.	Europe	Japan
Legislation/ Act	Clean Air Act SNAP	F-Gas Regulation, Act	Act on Rational Use and Proper Management of Fluorocarbons <b>High pressure gas safety act</b> <b>Revised Ozone layer Protection Act</b>
National legislation	<b>Building Code</b> IMC, UMC, etc.	<b>Building Code</b>	<b>High pressure gas safety act</b>
International standards	ISO817 (refrigerant classification)		ISO5149 (safety)
Standard / regulations (define ref types)	ASHRAE34	Relevant standards based on ISO	<b>High pressure gas safety act</b>
Standard / regulations (safety)	ASHRAE15 UL60335-2-40 UL484, etc.	EN378 EN60335-2-40	<b>High pressure gas safety act</b> JIS C9335-2-40 JRA standards, etc.



# 5. Global efforts

## 3) Global industry association system <ICARHMA>

(The International Council of Air conditioning, Refrigeration and Heating Manufacturers Associations)



### ICARHMA Mtg in Japan.

26. OCT. 2018

At Odaiba, Tokyo



# 5. Global efforts

## 4) Activities from a global perspective

1. **GRMI (Global Refrigerant Management Initiative)**
  - AHRI and ABRAVA led (ICARHMA member participation)
  - Extract and respond to global issues from the viewpoint of "refrigerant management" → Installation, service, qualification, etc.
2. **RDL (Refrigerant Drivers License)**
  - Led by UNEP and AHRI
  - Establishment of global standards for training of installation workers and qualification
3. **AHRTI (Air Conditioning Heating and Refrigeration Technology Institute)**
  - AHRI, ASHRAE + US government led
  - Implemented risk assessment of A2L, A3 refrigerant.



# 5. Global efforts

## 5) High ambient temperature area (Middle East etc.) and other support activities

### 1. IEP for HAT (International Expert Panel for HAT)

- US DOE and ORNL led
- Alternative refrigerant drop-in test at room air conditioners and rooftop units  
→ Performance evaluation (capacity and COP)

### 2. PRAHA (Promoting low-GWP Refrigerants for Air-Conditioning Sectors In High Ambient Countries)

- Led by UNEP and UNIDO
- Alternative refrigerant drop-in test in 4 types of room air conditioners, business air conditioners, etc.
- JRAIA is participating in “R32 Risk Assessment” as **the 2nd step (underway)**  
(First step is completed)

### 3. ASEAN Risk Assessment Workshop in Kobe( 5<sup>th</sup> of December)

- Indonesia, Malaysia, Singapore, Thailand, Vietnam and Japan
- Regulation, Policy, Future Direction in each country are discussed

## 6. Strategies to be taken as Japan

### 1) Industry position (SWOT analysis)

S(Strengths):	W(Weaknesses):
<ul style="list-style-type: none"><li>·Technology (saving energy&lt;inverter&gt;, risk assessment)</li><li>·High quality</li><li>·Global production system</li></ul>	<ul style="list-style-type: none"><li>·Price competitiveness (especially against local manufacturers)</li><li>·Transmission ability is weak (how to tell)</li></ul>
O(Opportunities):	T(Threats):
<ul style="list-style-type: none"><li>· Risk assessment for A3 ongoing.</li><li>· Initiative an alternative refrigerant safety review, deregulation etc.</li><li>· Increasing needs of developing countries (environment-oriented)</li></ul>	<ul style="list-style-type: none"><li>· Establishment of assessment team in the United States → A3 investigation of refrigerant</li><li>· China and Europe aim to introduce A3 refrigerant active movement</li></ul>

## 6. Strategies to be taken as Japan

### 2) What is expected in the industry and issues

#### 1. Accelerate development of “innovative” technology

- Development of Innovative technology is mentioned in the COP
- As a concrete task, considerable hurdles are very high and mid or long-term perspective is indispensable
  - We will also make use of countermeasures such as collaboration among industry, government and academia, incentives etc.
- NEDO(New Energy and Industrial Technology Development Organization) supports Industries and Academia.(5 year project with 250 m\ (2.2mUS\$) /1<sup>st</sup> yr budget)

#### 2. Acceleration of dissemination of environmental-friendly products such as high-performance equipment

- Increased incentive needs for accelerating dissemination
- The cooperation of public and private efforts
- ANRE has prepared preliminary figures on the FY2017 Comprehensive Energy Statistics based on the results of studies including a variety of energy-related statistics, and generated a preliminary report of the FY2017 Energy Supply and Demand Report.

## 6. Strategies to be taken as Japan

### 2) What is expected in the industry and issues

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#### 3. Enhancement of support for developing countries

- Active support for technologies possessed in Japan is required.
- It is necessary to utilize bilateral offset credit system (JCM) etc. and make recommendations etc.
  - On the other hand, the expected effect on support is a challenge from the view point of business.
- More aggressive proposals for the policies are also necessary.

## 6. Strategies to be taken as Japan

### 3) Activity policy of JRAIA (About global countermeasures)

#### 1. Strengthen activities at the global level (international conferences etc.)

- Example: for UNEP activities for OEWG, MOP  
→ Strategy as Japan, Proposal dissemination.
  - Cooperation with ICARHMA conference
  - Cooperation with the Japan-China-Korea Liaison Committee.
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- \* Building a strategy with “Global strategy WG” internally of JRAIA
  - \* Consistent proposal, continuation of transmission
  - \* Strengthen collaboration with the government (continuous appeal of industry intention) and Academia( JSRAE etc.)

## 6. Strategies to be taken as Japan

### 3) Activity policy of JRAIA (About global countermeasures)

#### ➤ **3 Association Meeting** in Kunming, China 16 May 2018

- JRAIA, CRAA, KRAIA.
- Annual Meeting, to share the information and the issues in each country.



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Thank you for your kind attention!!