

Environmental policy in Japan and issues and countermeasures in the refrigeration and air conditioning industry.

The Japan Refrigeration and Air Conditioning Industries Association
Tetsuji Okada



Today's Topics :

1.Who is JRAIA?

2.Market Trends

3.Laws and regulations in Japan(HVAC sector)

4.Industry's commitment to environmental issues



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- Established in Feb. 1949.
- Chair person: Mr. So Suzuki (from Mitsubishi Electric Co.)
- The number of the members:
 - 167 companies incl. associate members as of June 1 2022
- Business Fields:
 - Air Conditioner (for domestic, commercial and industries)
 - Refrigeration (for commercial, industries and mobile)
 - ventilation
 - Heat Pump hot water systems
 - Refrigerants - Recovery tools
 - Parts (ex. Bulbs, Sensors, Piping etc.)



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2. Market trend

0) Impact of COVID-19 on the refrigeration and air conditioning industry

① **Impact on sales (see the next page)**

- As for home air conditioners, the reaction to the highest sales volume in history last year.
- Telework, benefit effect calmed down.
- Signs of demodulation for commercial equipment
- Recovery from last year's decline, but not before COVID.

② **Impact on industry association activities**

- Committee activities (including overseas support) and external activities are mainly remote by utilizing the web.
- Refrain from overseas and domestic business trips.
- Promote remote style for witnessing in the certification system.

③ **Impact on industry association related events**

- "Environment and New Refrigerant International Symposium"
(originally scheduled for Dec. 2020)
postponed to Oct. 2021 on the web.

2. Market trend

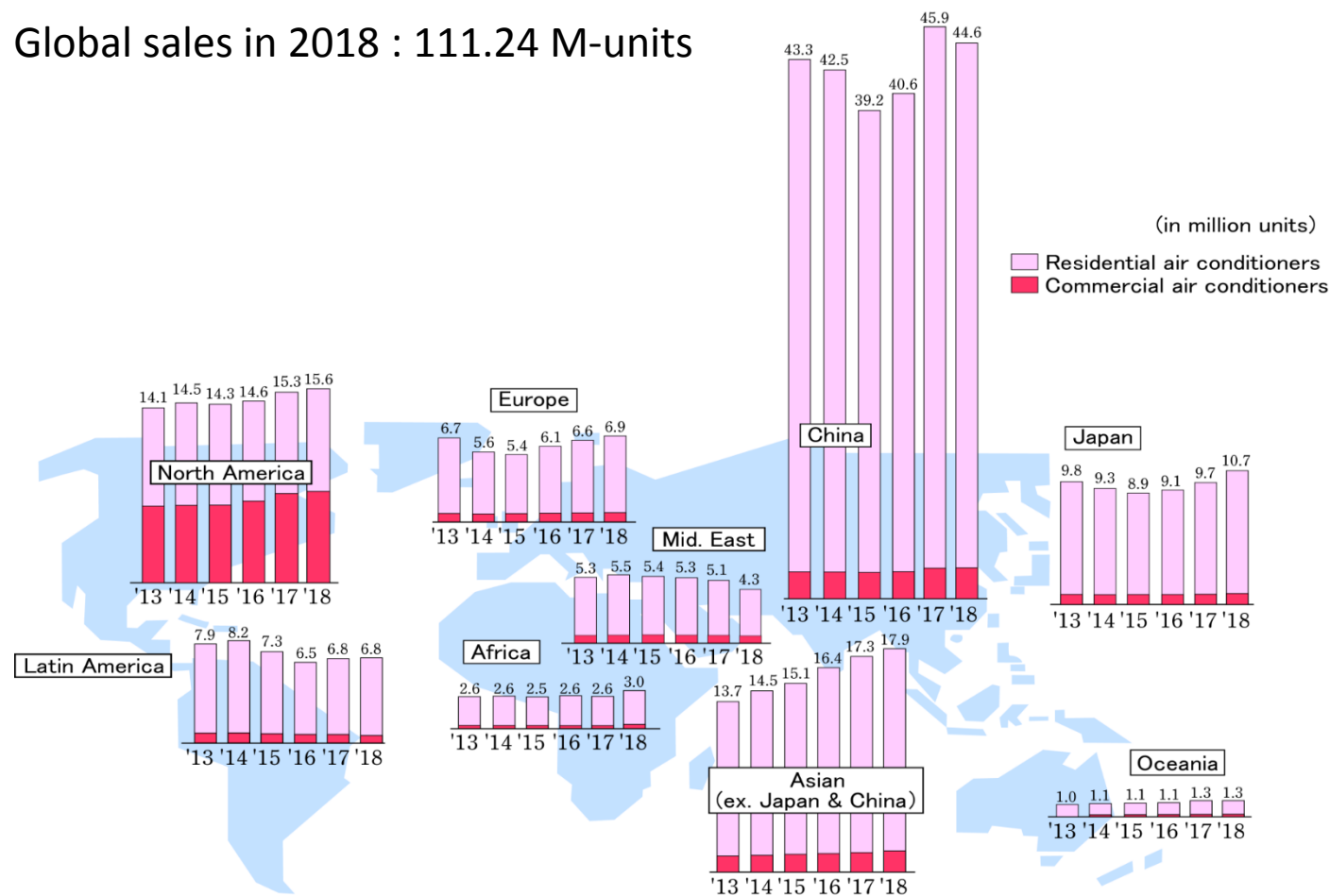
1) Latest sales volume and refrigerant conversion status for each product

Product Category	Number of Units (): Y/Y Ratio(%)		Refrigerants
	2020FY	2021FY	
Residential A/Cs	10,097.0 (105.5)	9,291.8 (92.0)	R32(almost 100%)
Commercial A/Cs	808.8 (85.1)	818.8 (101.2)	R410A, R32(small size)
Residential H/P water heaters	540.0 (103.1)	607.6 (112.5)	CO ₂ (almost 100%)
Gas engine-driven A/Cs	28.3 (71.7)	26.8 (94.9)	R410A
Water chilling units	12.6 (88.3)	13.0 (103.1)	R32, R410A, R134A
Air to air heat exchangers	126.9 (107.9)	143.6 (113.2)	NA
Commercial ref. cabinets	242.1 (87.0)	272.5 (112.5)	R404A→R410A, CO ₂ (separate type) R290, R1234yf(self contained)
Condensing units	74.2 (88.0)	79.9 (107.7)	R448A, R410A, CO ₂
Refrigeration units	27.1 (98.0)	27.2 (100.4)	R22→R404A, R410A

2. Market trend

2) Trends in sales of air conditioners in the global market

Global sales in 2018 : 111.24 M-units





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3. Laws and regulations in Japan(HVAC sector)

1) The latest Japanese government's environmental policy

① Cabinet decision on the "Plan for Global Warming Countermeasures" (2021.10.22)

	Fiscal year 2013	Targets and estimates in fiscal year 2030	Reduction Ratio	conventional Target (Reduction Ratio)
(Unit: Million t-CO ₂)				
Greenhouse gas emissions and removals	14.08	7.60	▲ 46%	▲ 26%
Energy-related CO ₂	12.35	6.77	▲ 45%	▲ 25%
Industry	4.63	2.89	▲ 38%	▲ 7%
Commercial and others	2.38	1.16	▲ 51%	▲ 40%
Residential	2.08	0.70	▲ 66%	▲ 39%
Transport	2.24	1.46	▲ 35%	▲ 27%
Energy conversion	1.06	0.56	▲ 47%	▲ 27%
Non-energy-related CO ₂ (CH ₄ , N ₂ O)	1.34	1.15	▲ 14%	▲ 8%
Four gases incl. HFC etc.	0.39	0.22	▲ 44%	▲ 25%
Greenhouse gas removals	-	▲0.48	-	-

※ Expansion of renewable energy and expansion of mandatory compliance with energy saving standards for houses and buildings

3. Laws and regulations in Japan(HVAC sector)

1) The latest Japanese government's environmental policy

② Cabinet decision for "the 6th Basic Energy Plan" (2021.10.22)

- The 10th anniversary of the Great East Japan Earthquake
- Confirmation of basic policy of S + 3E
(Safety, Energy Security, Economic Efficiency, Environment)
- Important theme:
 - I) Shows the energy policy path toward the realization of the "2050 Carbon Neutral" and the new greenhouse gas emission reduction targets announced in April this year.
 - II) To overcome the issues facing Japan's energy supply and demand structure while advancing climate change measures, we will show efforts to secure a stable supply and reduce energy costs on the premise of ensuring safety.
- Business / housing sector
 - "Further pursuit of thorough energy conservation"
 - Working on mandatory compliance with energy conservation standards under the Building Energy Conservation Law, raising standards, and raising top runners in building materials and equipment.
 - Of the greenhouse gas reduction targets, the reduction rate of energy-derived CO2
⇒ about 45%

3. Laws and regulations in Japan(HVAC sector)

2) Laws and regulations in the sector of refrigeration and air conditioning

The latest movement regarding the Fluorocarbons Recovery and destruction Law (Joint Conference by METI and MOE (held on Nov. 29 2021))

➤ Main agenda:

Discussions on status reports and future issues in the five years since the enforcement of the Direction of the Fluorocarbons R & D Law toward 2050 carbon neutral confirmed.

● Faucet:

Steady implementation of Kigali amendment Strict operation of allocation under the Ozone Law Protection Law

● Upstream:

Widespread use of green refrigerant equipment Mainstreaming natural refrigerant equipment, development of ultra-low GWP refrigerant, Further development of equipment compatible with green refrigerant

● Midstream:

To zero leakage during operation Improved accuracy of leak detection using IoT technology, etc.

● Downstream:

Recovery rate to 100% Proper operation of regeneration / destruction system and preparation for expected shortage of replenishment refrigerant Construction of a closed circulation system for refrigerant recovery / regeneration / reuse

3. Laws and regulations in Japan(HVAC sector)

3) List of "designated products" under the Fluorocarbon Recovery and Destruction Law (HVAC sector only)

Designated Products	Targeted GWP	Targeted Year
Residential A/Cs	750	2018
Commercial A/Cs		
①Floor type excluding less than 3 ref. ton	750	2020
②Floor type excluding more than 3 ref. ton & ③, ④	750	2023
③Central A/C (turbo refrigeration)	100	2025
④VRF (newly built only)	750	2025
Mobile A/Cs	150	2023
Condensing Units & Fixed Refrigeration Units	1500	2025
Refrigeration Bending machine using hard polyurethane form	100	2024
Central Refrigeration Systems	100	2019

3. Laws and regulations in Japan(HVAC sector)

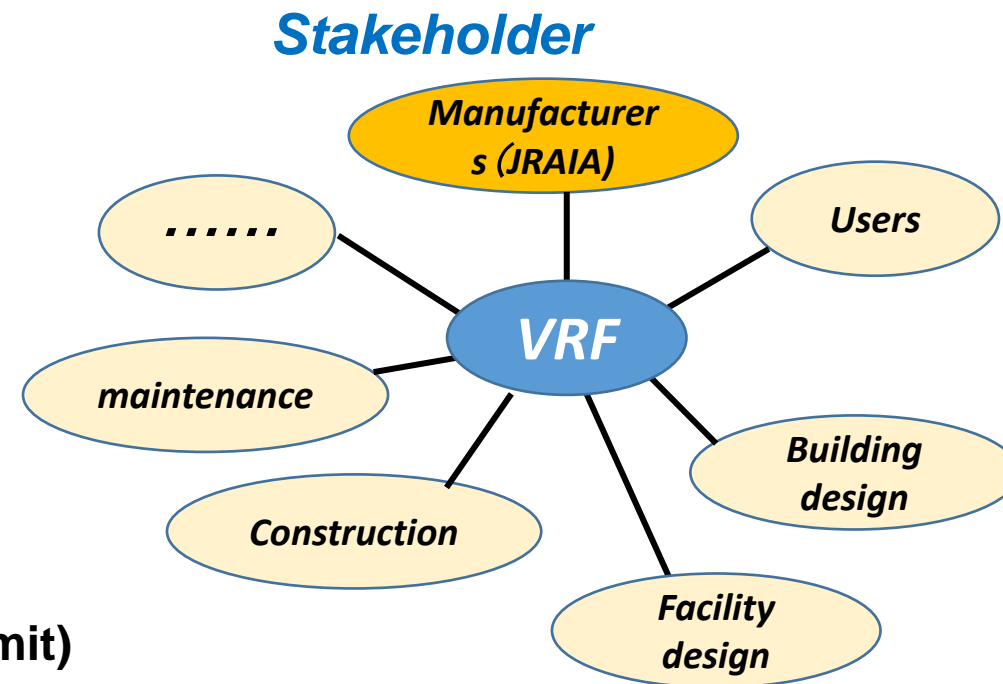
4) Example about multi air conditioner for building (VRF)

Related regulations and standards :

1. High Pressure Gas Safety Act
2. Product Standards of JRAIA(JRA 4070)
3. Guideline of JRAIA(JRA GL16)

Safety measures:

1. Regulation of refrigerant filling amount (upper limit)
 2. Installation of mechanical ventilation equipment
 3. Installation of shut-off device
- ※ (2 or 3)+ Installation of detection and alarm device





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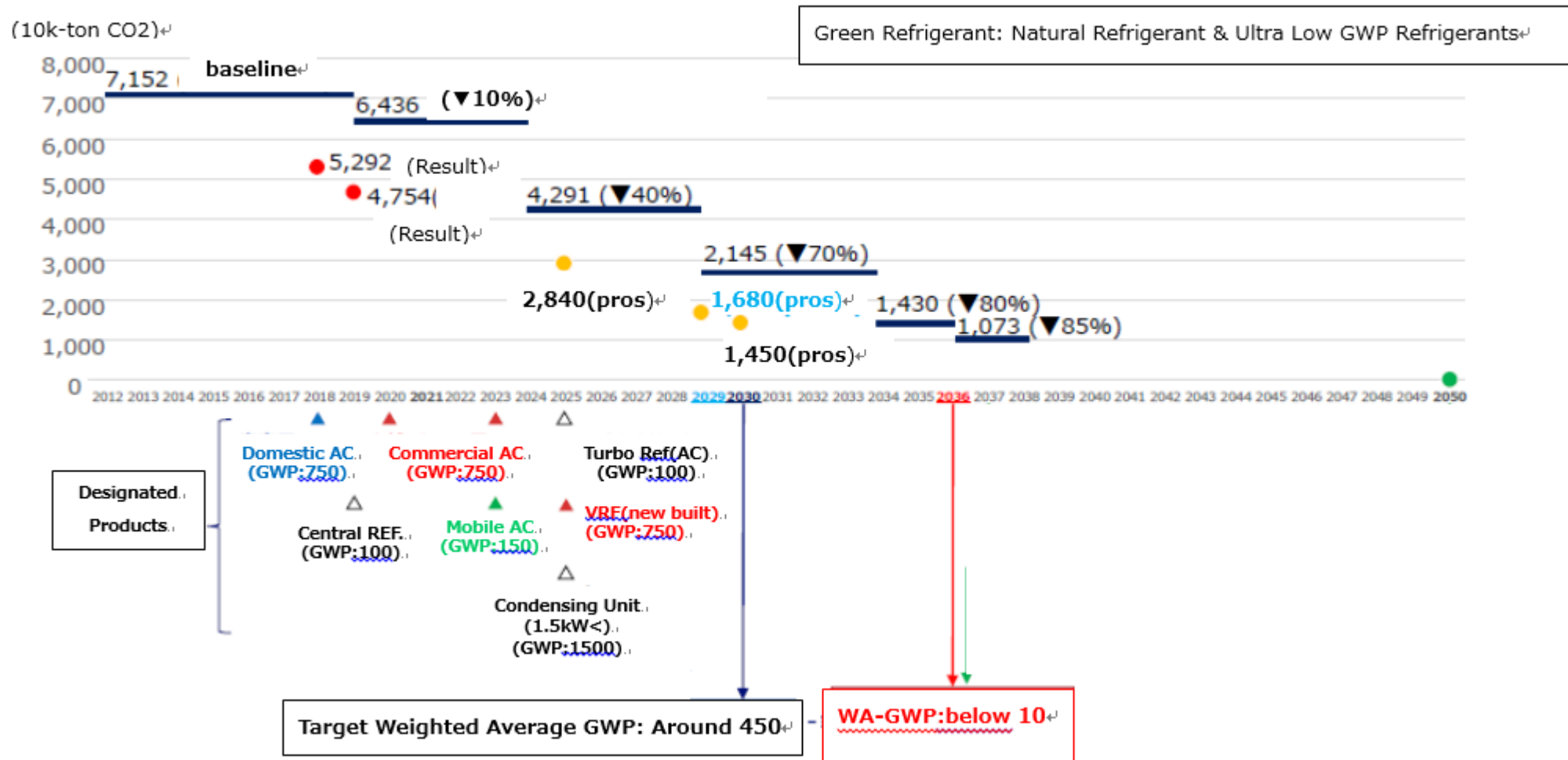
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1) Outlook for future HFC refrigerant consumption



2021-11-29 by materials of Government of Japan Joint Council

4. Industry's commitment to environmental issues

2) Basic concept

① HVAC&R industry's basic stance towards CN2050 :

- Aim to expand the use of heat pump technology and products that are also highly efficient from the perspective of utilizing renewable energy.
- Use the designated product system to reduce HFCs as much as possible and aim for lower GWP, e.g. "Green refrigerants" such as natural refrigerants and ultra low-GWP refrigerants.

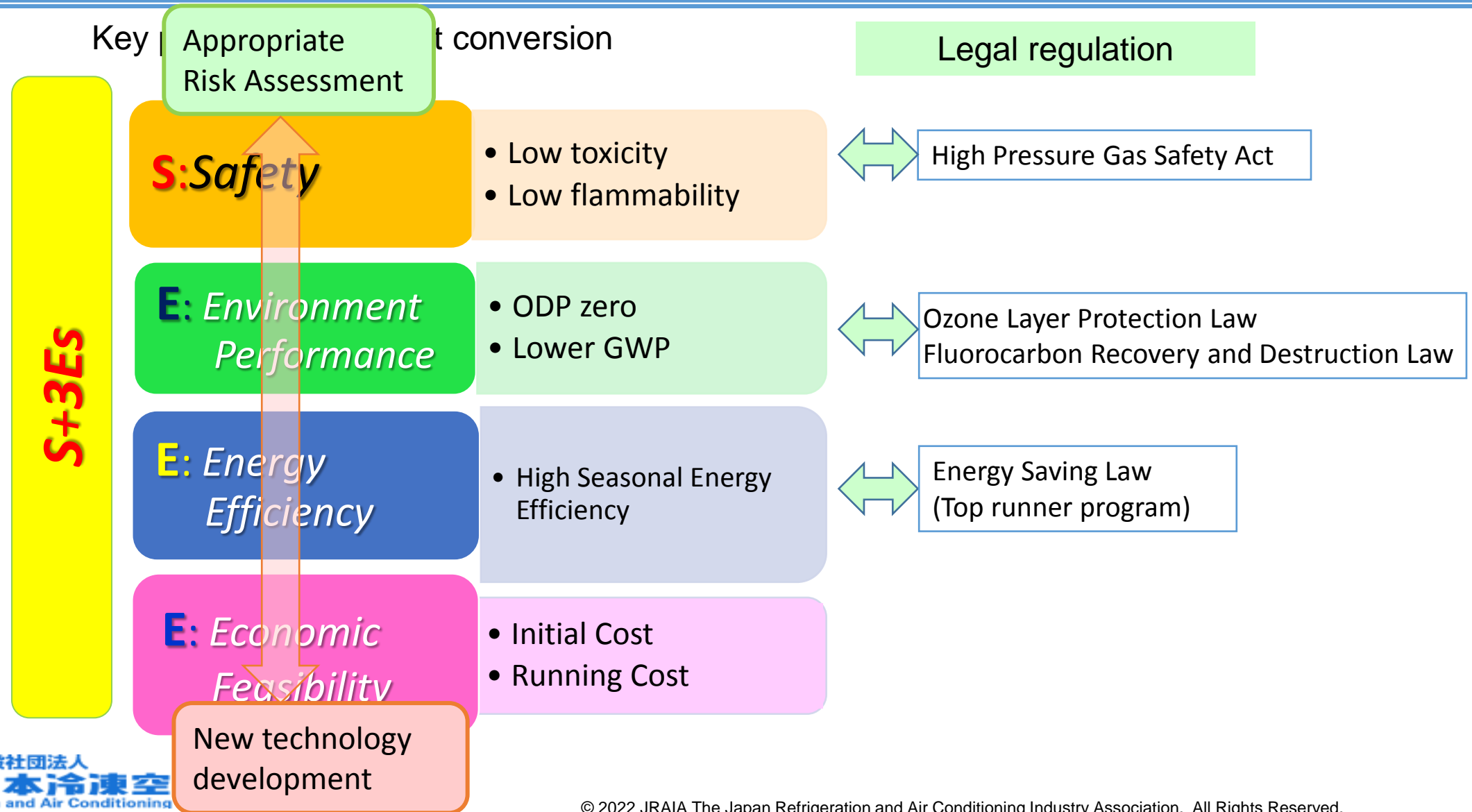
② Direction of response to CN2050 in HVAC&R sector: **Basic principle : S+3Es**

Balanced target setting and target-driven activities on **Safety plus Environment performance, Energy efficiency and Economic feasibility** are important.

- **Safety(S)** : Ensure safety together with users(consumers), installers and other relevant stakeholders
- **Environment performance(E)** : Convert to lower GWP refrigerants from an environmental point of view.
- **Energy efficiency(E)** : Improve the efficiency of equipment systems from the perspective of improving energy efficiency (directly linked to the reduction of CO₂ emissions).
- **Economic feasibility(E)** : A reasonable price (cost) that balances the above three items is essential to promote market diffusion.

4. Industry's commitment to environmental issues

2) Basic concept



4. Industry's commitment to environmental issues

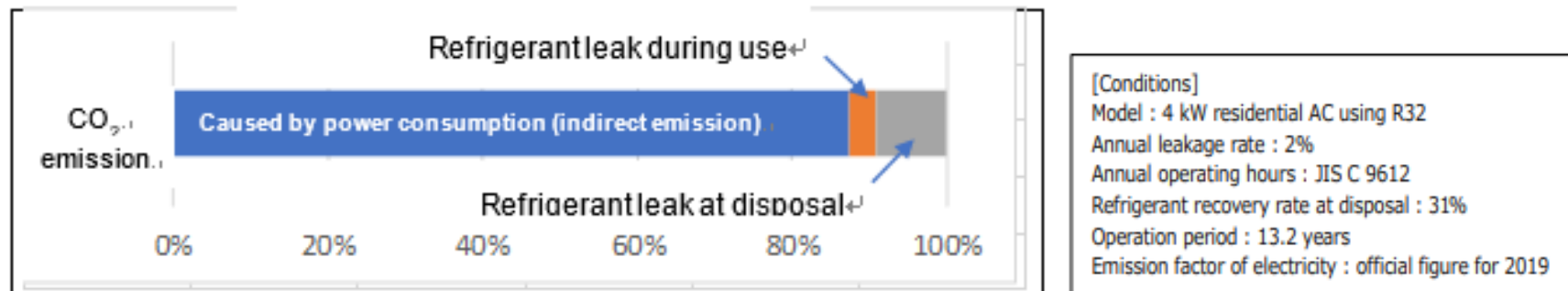
2) Basic concept

① Challenges and responses in refrigerant conversion :

Type of refrigerant [↵] (for air-conditioners)	GWP ₁ (E) ₁	Working pressure ₁ (S) ₁	Flammability ₁ (S) ₁	Energy efficiency (E) ₁
Natural refrigerants [↵] (CO ₂) ^{※↵}	1 ₁	High [↵] (4 times or more compared to HFC) ₁	Non flammable ₁	Low [↵] (▲20~▲50%) ₁
Natural refrigerants (propane) ^{※↵}	3 ₁	Medium ₁ (same level as HFC) ₁	Highly flammable ₁	slightly Lower [↵] to Even [↵]
HFO etc. ^{※↵}	1 digit ₁	Low to Medium [↵] (same level as HFC) ₁	Lower flammable ₁	Low [↵] (▲20~▲50%) ₁
HFC [↵]	Over ₁ 3 digits ₁	Medium ₁	none to [↵] Lower flammable ₁	Even ₁

Note : Negative impacts are marked in **Orange** , "Green refrigerants" as marked ※[↵]

② Estimation example of the direct and indirect CO₂ emission:



4. Industry's commitment to environmental issues

2) Basic concept

- ③ Specific equipment-based energy conservation regulations:
 - Matters approved by METI Air Conditioner & Electric Water Heater Judgment Criteria WG (Oct.18 2021):
 - **The next target year for air conditioners is 2027**
 - As a policy for formulating the next target standard value for wall-mounted type, consider social and economic circumstances and formulate the next target standard value based on economic efficiency.
 - Concept of classification (**abolition of classification by dimensions, formulation of classification in cold regions**)
 - The Judgment Criteria WG was held at the beginning of the year (Jan.13), and the final summary including specific target values.
 - The next target year for heat pump water heaters is 2025**
(The water heater will be discussed at the WG in March)
 - Direction of increasing the target value while integrating the categories.
 - Review of energy-saving label display (same as gas appliances)

The End

Thank you for your kind attention!