The 9th Three Associations Meeting



JRAIA

The Japan Refrigeration and Air Conditioning Industry Association

June 12, 2015

Huangshan, CHINA

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0. Domestic Market Update.

1. Industrial Development Status and Future Prospect

2. Updates on relevant standards, regulations and policies.

3. Development of Alternatives.

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0. Domestic Market Update.

Products	k-Units(Apr./14-Mar./15)	Expansion Ratio (%)
Residential air conditioners	8,094.0	85.9
Commercial air conditioners	839.9	100.6
Residential heat pump water heaters(Eco-Cute)	415.0	90.3
Gas engine-driven air conditioners	29.5	100.6
Water chilling units	12.6	101.6
Air to air heat exchangers	130.4	104.7
Commercial refrigerated cabinets	226.0	107.8
Condensing units	83.7	91.9
Refrigeration units	27.3	86.4

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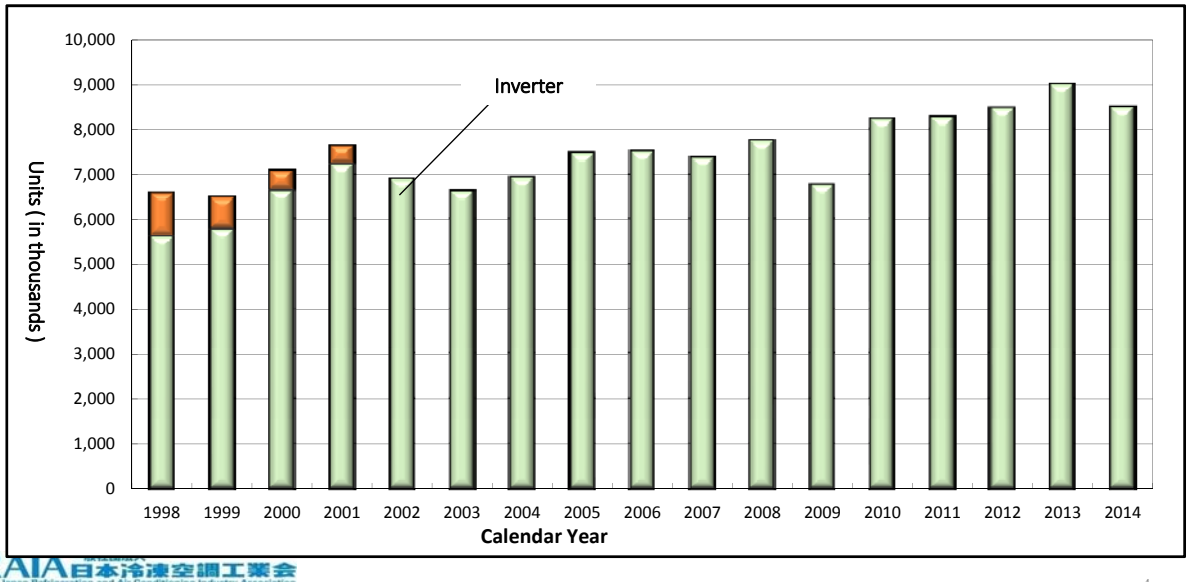
Statistics – Domestic Shipments

Transition of yearly shipments Residential Air Conditioner



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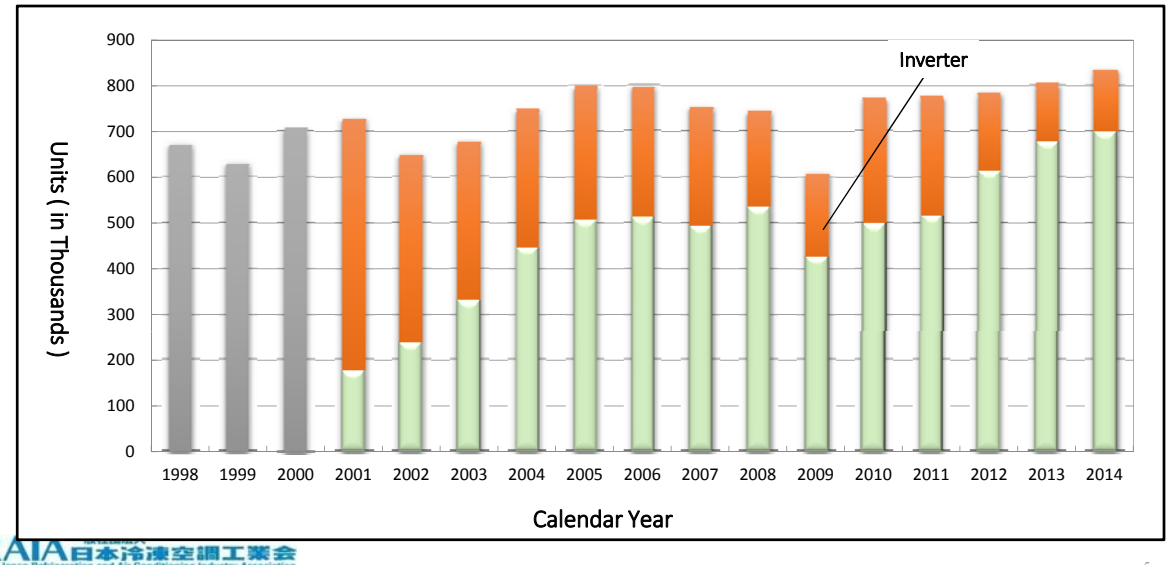
Statistics – Domestic Shipments

Transition of yearly shipments
Commercial Air Conditioner



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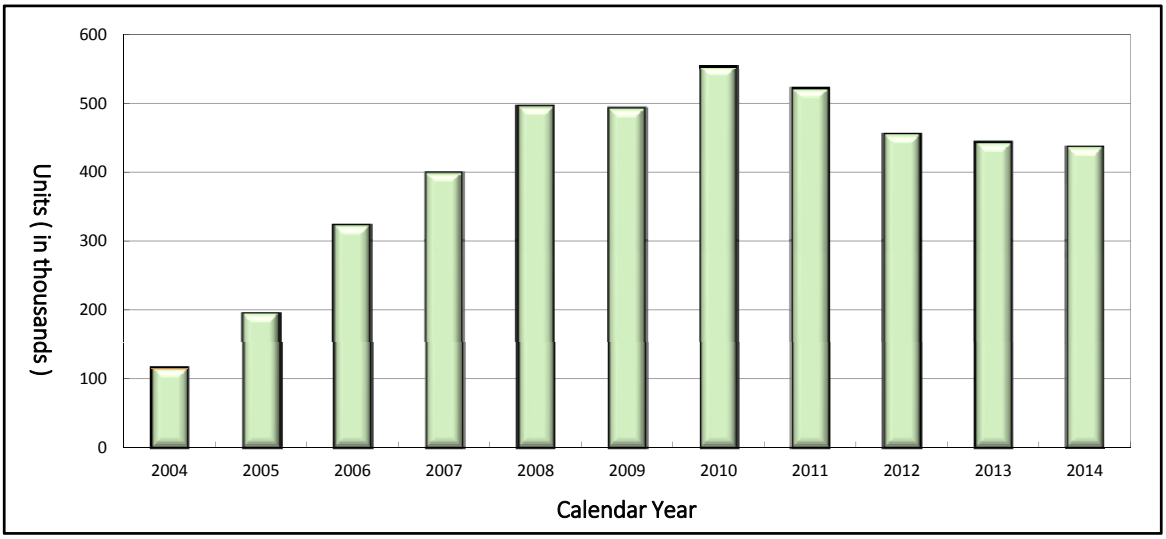
Statistics – Domestic Shipments

Transition of yearly shipments
Residential heat-pump water heater



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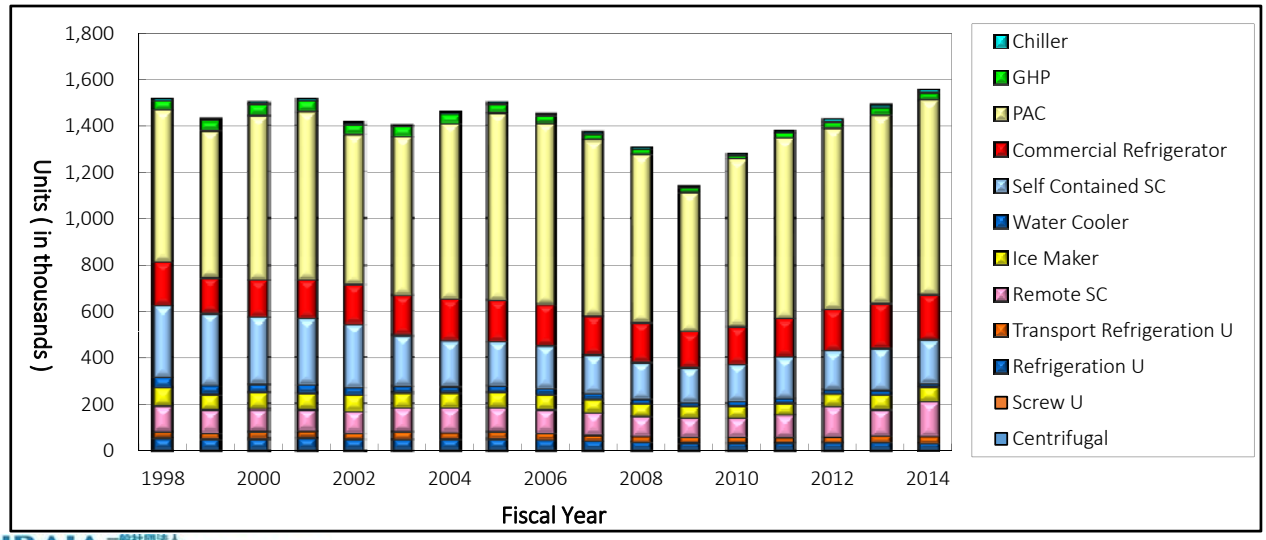
Statistics – Domestic Shipments

Transition of yearly shipments
Commercial Refrigerator & Air Conditioner



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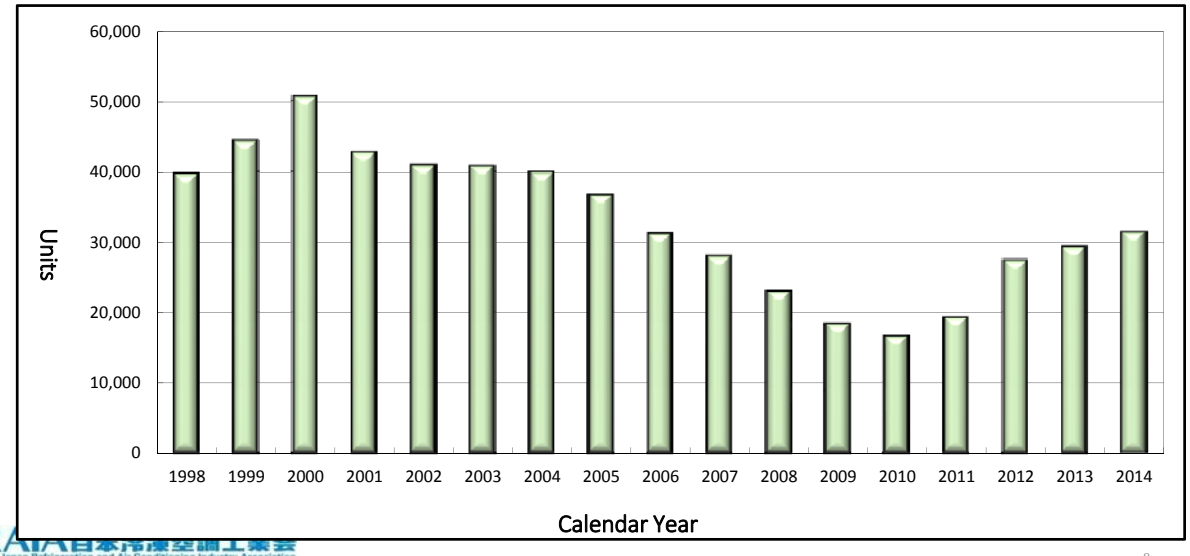
Statistics – Domestic Shipments

Transition of yearly shipments
Gas-engine driven Heat-pump Air Conditioner



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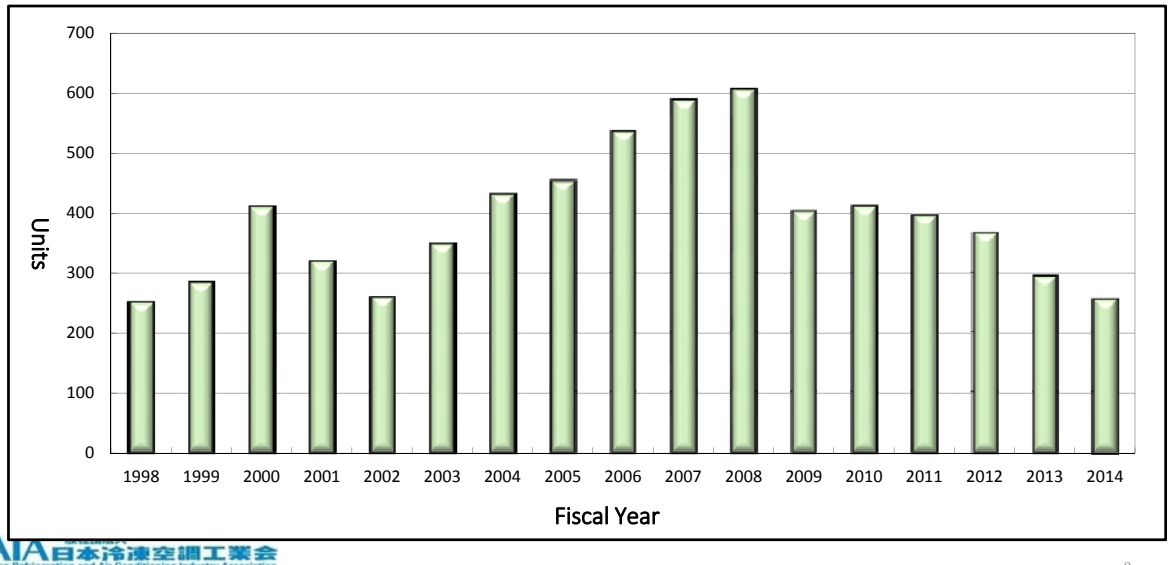
Statistics – Domestic Shipments

Transition of yearly shipments
Centrifugal Chiller



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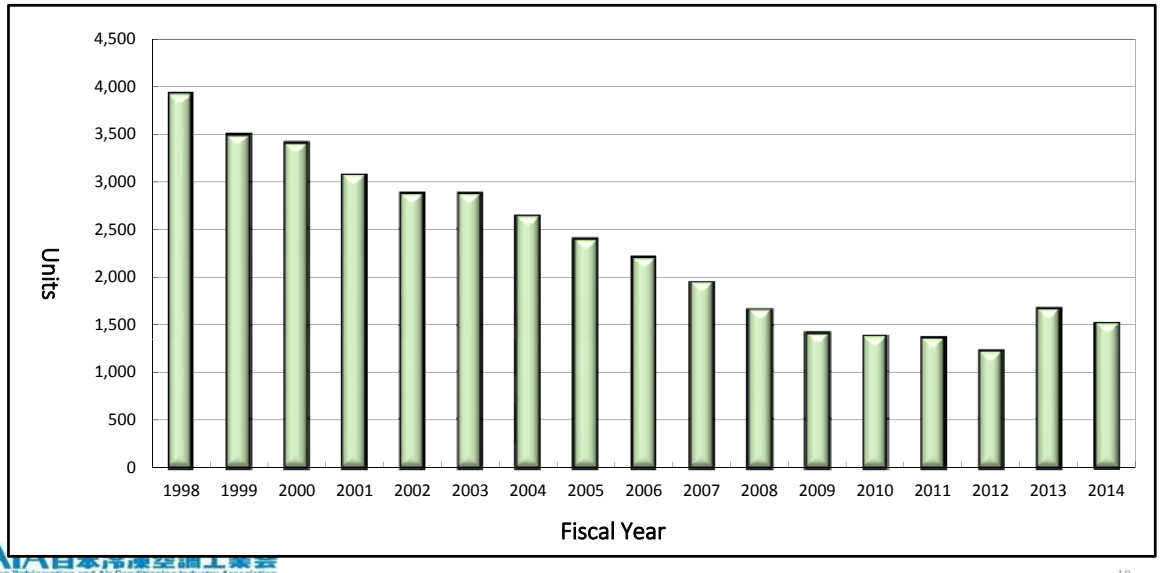
Statistics – Domestic Shipments

Transition of yearly shipments
Absorption Chiller



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1. Industrial Development Status and Future Prospect

1) JRAIA's Vision and Activities on Environmental Conservation

EQUIPMENT

Energy Saving
Emission control on a CO_2 basis

REFRIGERANTS

Direct Emission Control
- Promotion of recovery
- Measures against leakage (proper management of refrigerants)
- Reduction of amount charged into equipment

ALTERNATE REFRIGERANTS

Acceleration to shift to new refrigerants
- Use of none HFC refrigerants
- Research of low GWP refrigerants

Freon Recovery & Destruction Law ⇒ Revised Law

Top Runner Program

Home Appliances Recycling Law

End-of-Life Vehicle Recycling Law

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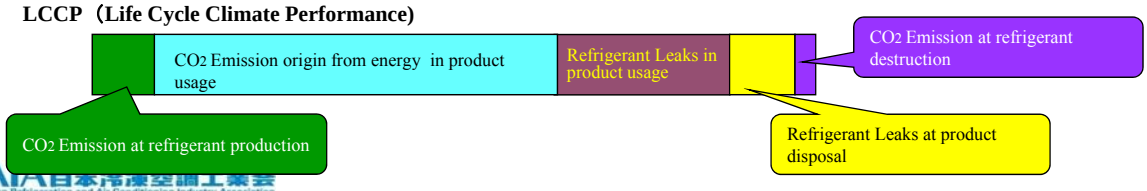
1. Industrial Development Status and Future Prospect

2. Conditions required for the alternatives

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）



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2. Updates on relevant standards, regulations and policies.

1) Energy Efficiency
- Revised the Top Runner Program
  >>Discussion of the next step
- JIS of PAC entry into force
  >>Annual Energy Efficiency(APF)

2) Revised HFC Legislation
(Entry into force on 1/4/2015)

3) Regulatory Reform(High Pressure Gas Safety Act)

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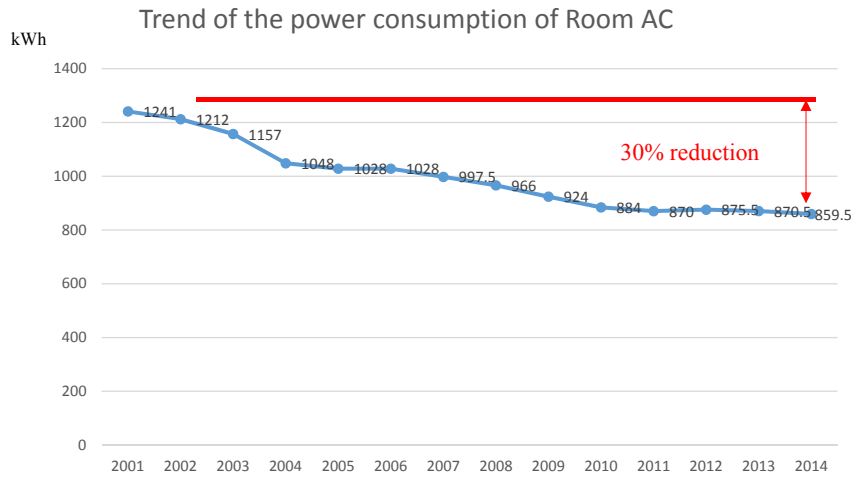
1)Trend of Energy Efficiency in Japan



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2)Direction of measures for HFCs in Japan

Issues

1. Rapid increase of HFCs emissions
2. Low recovery rate : about 30%
3. Leakage in use of equipment : 13 to 17% per year in 2009
4. Development and commercialize 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

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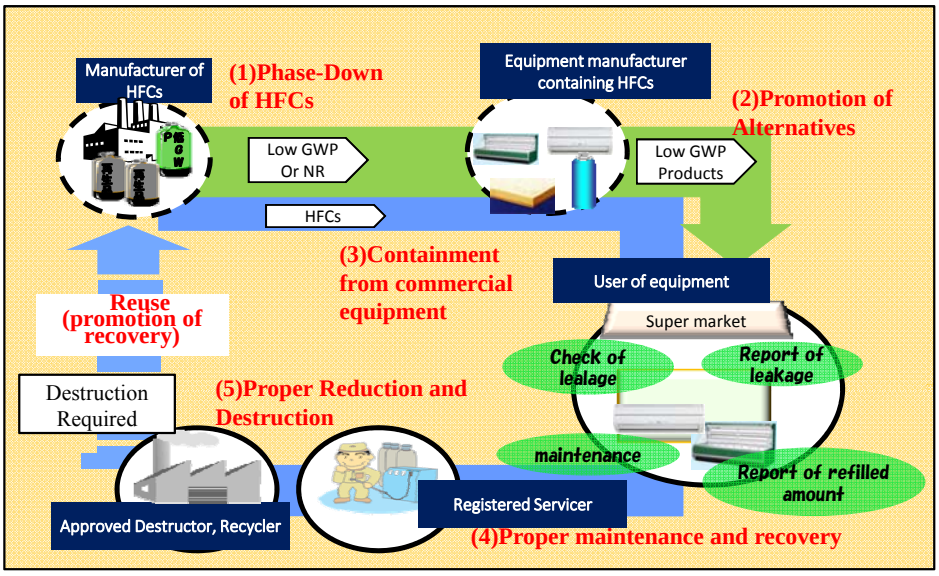
3) Scope of "Act on Rational Use & Proper Management of Fluorocarbons"

■ To address issues throughout the lifecycle of fluorocarbons



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3) Scope of “Act on Rational Use & Proper Management of Fluorocarbons”

Who	What to do
Refrigerant Manufacturer, Importer	To report the results To make a reduction plan
Equipment Manufacturer, Importer	To develop the products to fit the target index of GWP till the target year
User	To inspect his own equipment and to keep the data of the inspection
Installer, maintenance person	To get the certification, to report the record of the amount of the leakage of refrigerant
Destructor, recycler	To get the approval

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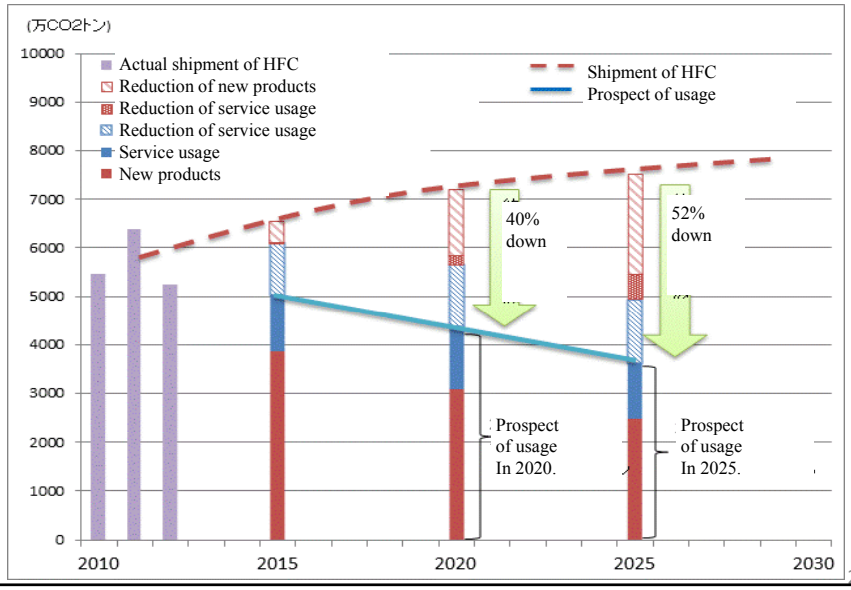
4) Revised regulation for manufacturers and importers of HFCs

＜40% Reduction of HFCs use in 2020＞
43 CO2 equivalent million tons
＜52% Reduction of HFCs use in 2025＞
36 CO2 equivalent million tons
（BAU: Business As Usual ）



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5) Revised regulation for manufacturers and importers of equipment

Specified equipment category	Current refrigerant and its GWP	Target GWP (Weighted Ave. GWP)	Target year
Residential AC	R410A(2090), R32(675)	750	2018
AC for shops & offices<<**small size only**>>	R410A(2090)	750	2020
Automotive air conditioners*	R134a(1430)	150	2023
Condensing & Stationary refrigeration units*	R404A(3920), R410A(2090) R407C(1774), CO2(1)	1500	2025
Central refrigeration equipment*	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

*: with some conditions

6) Revised regulation for equipment owners(users of products)

	Check points	Frequency	By whom
Simplified periodical check For All commercial equipment	Noise, Leakage, Cabinet Temperature etc. (Appearance check)	Every 3 months	No limitation
Periodical check For large size equipment	**Indirect method**(measurement of pressure or temperature) or Combination of **direct**(leak check) and indirect method.	Every year or every 3 years	Certified person

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3. Alternative refrigerants

1) Risk assessment of mildly flammable refrigerants Industry Research – Japan

- Objective: Risk and Performance Assessment
- Scope: A2L Refrigerants
- Timeframe: 2011 to 2015
- Research being conducted by: Japan Society of Refrigerating and Air Conditioning Engineers (JSRAE).
- Funded by: New Energy and Industrial Technology Development Organization and Ministry of Economy, Trade and Industry (NEDO/METI)
- Results Public: 2013 progress report is available on http://www.jsrae.or.jp/committee/binensei/2013PR_e.pdf
- Related reports were presented in Kobe Symposium 2014.

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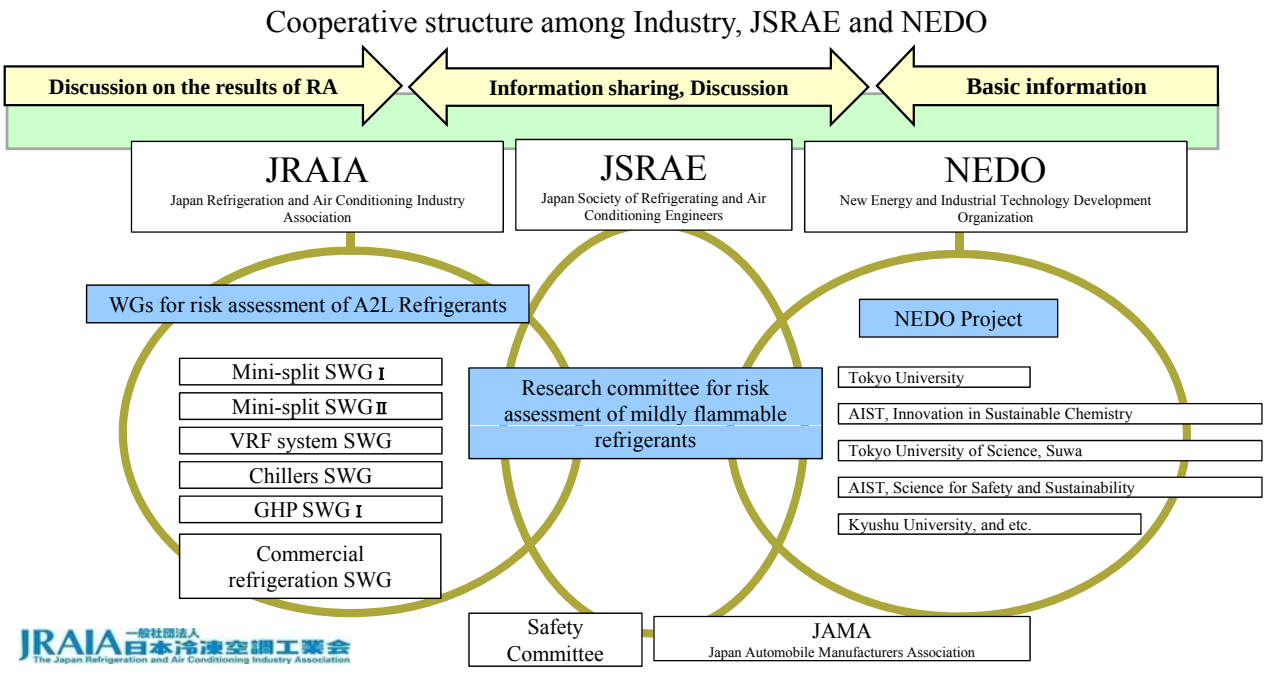
2) Framework for Risk Assessment of Mildly Flammable Refrigerants



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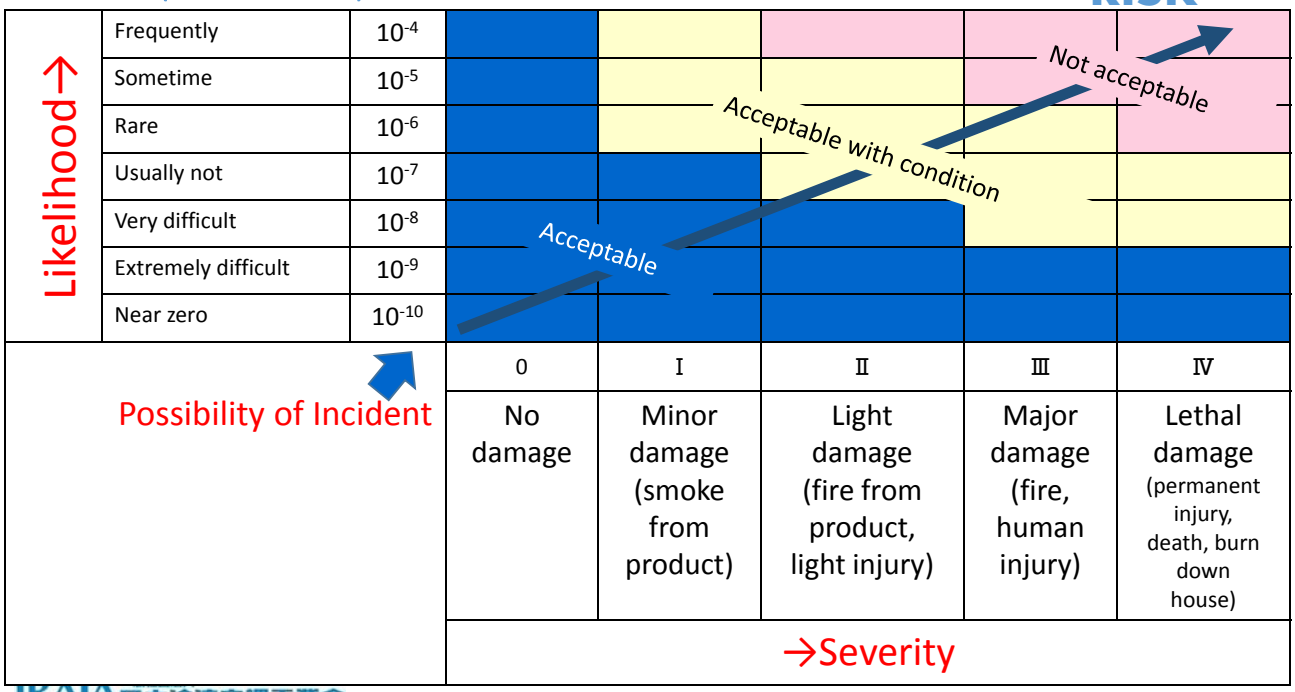
RISK MAP(ISO Guide 51)



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Resource: University of Tokyo

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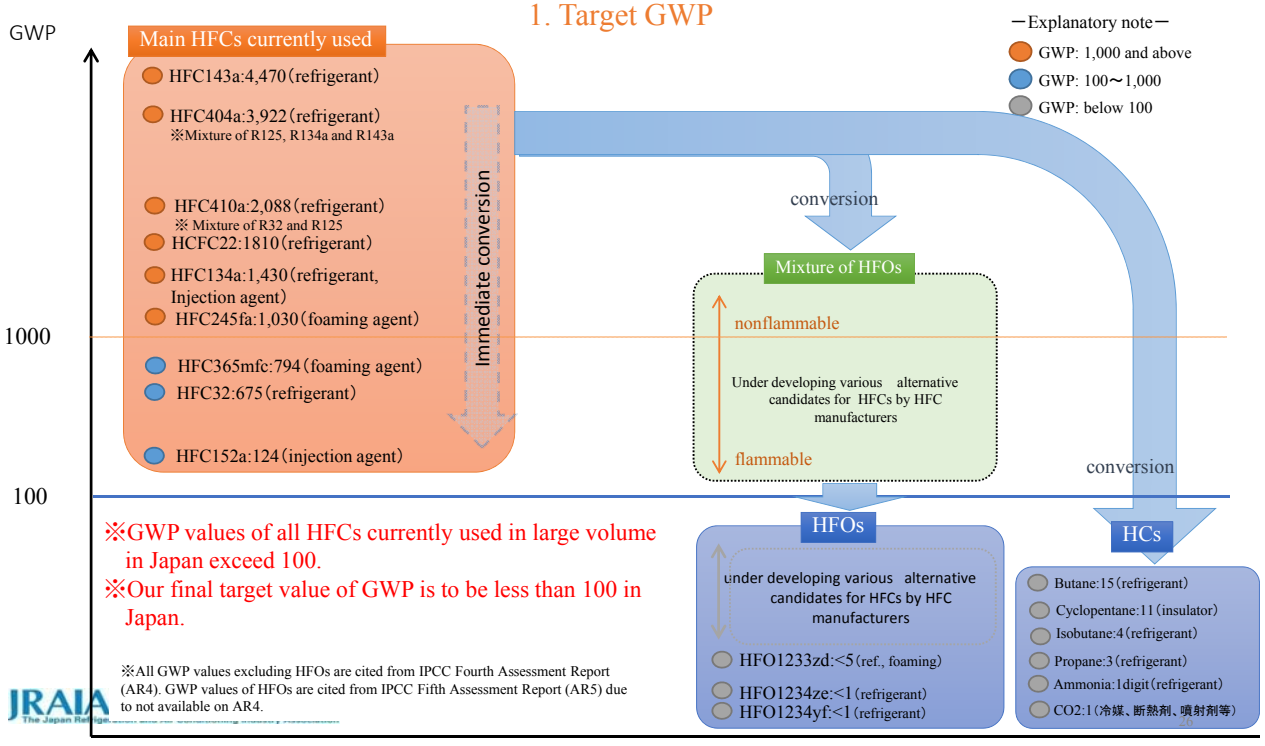
3) New refrigerants for the next generation.

1. Target GWP



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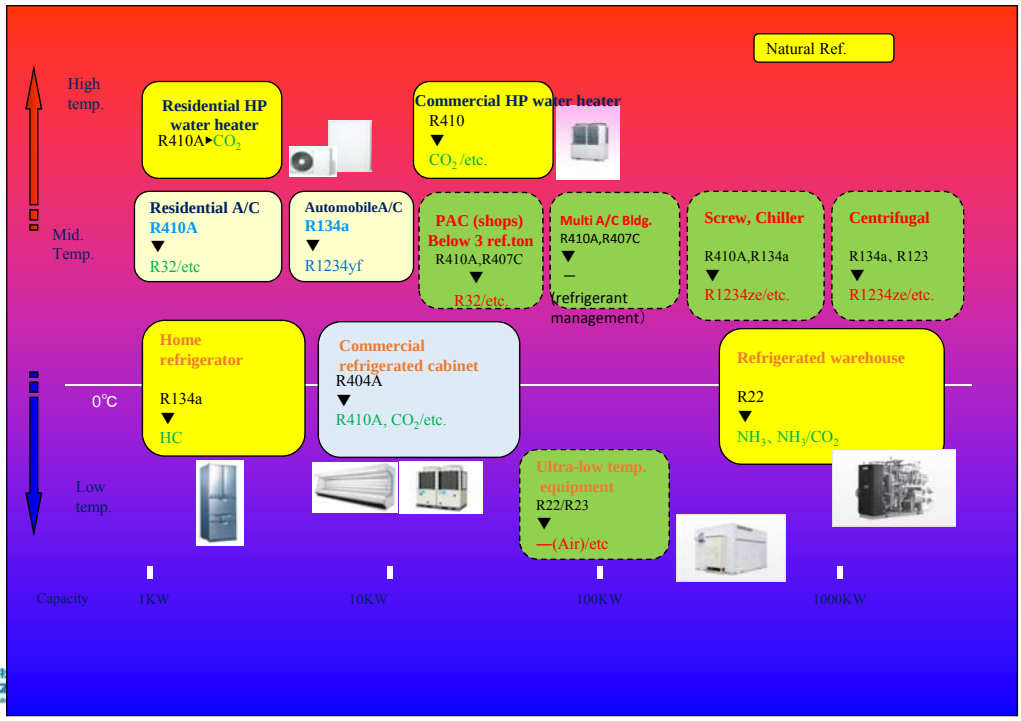
4) Candidates for the next generation refrigerants by applications



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HVAC&R 2016

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感谢您的关注!!
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ご清聴ありがとうございました!!
Thank you for your attention!!

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