

Technical consideration of feasibility of low GWP alternatives: performance, cost, et.al.

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EQUIPMENT

Energy Saving

Emission control on CO2 basis

Top Runner Program
(Law Concerning the Rational Use of Energy)

REFRIGERANTS

Direct Emission Control

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

Fluorocarbons Recovery and Destruction Law
⇒ **“Act on Rational Use & Proper Management of Fluorocarbons”** to address issues throughout the lifecycle of fluorocarbons (entry into force from April 2015)

Home Appliances Recycling Law

End-of-Life Vehicle Recycling Law

ALTERNATE REFRIGERANTS

Acceleration to shift to new refrigerants

- Research of low GWP refrigerants
- Risk assessment

2. Conditions to be considered for the next generation refrigerants

• Actions to switch refrigerants have been started sector by sector in Japan by considering not only GWP but also safety, Economic feasibility and efficiency.

Safety (precondition)

- Low Toxicity
- Low Risk of Flammability

Environment Performance

- Ozone Depletion Potential =0
- Low Global Warming Potential

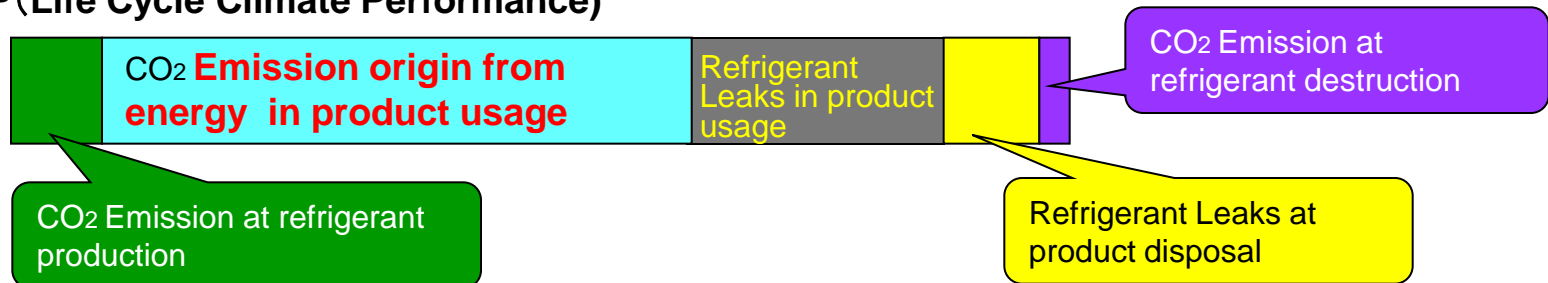
Energy Efficiency

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

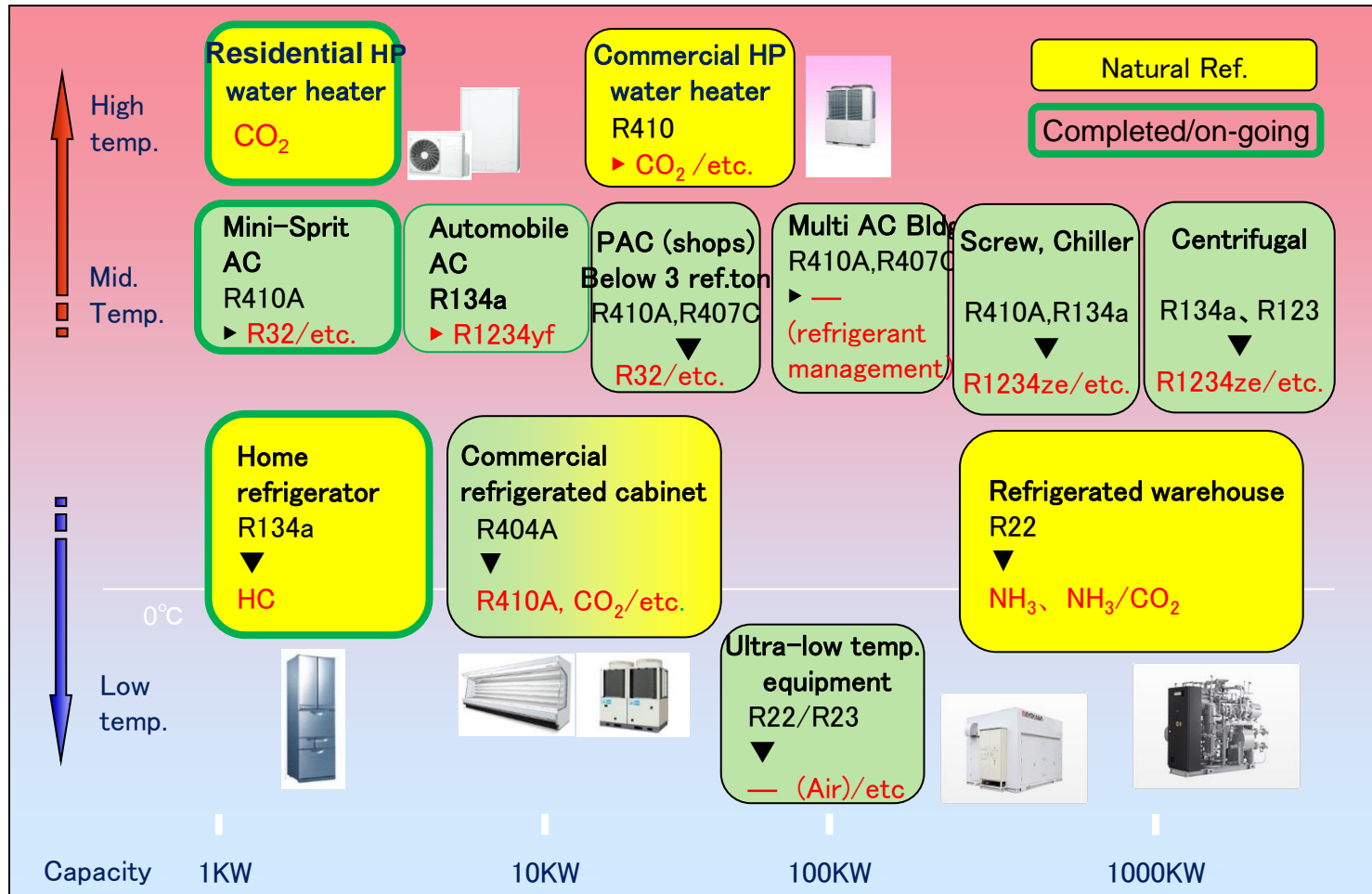
Economic Feasibility

- Reasonable Cost
- Acceptable level in Developing Countries

LCCP (Life Cycle Climate Performance)



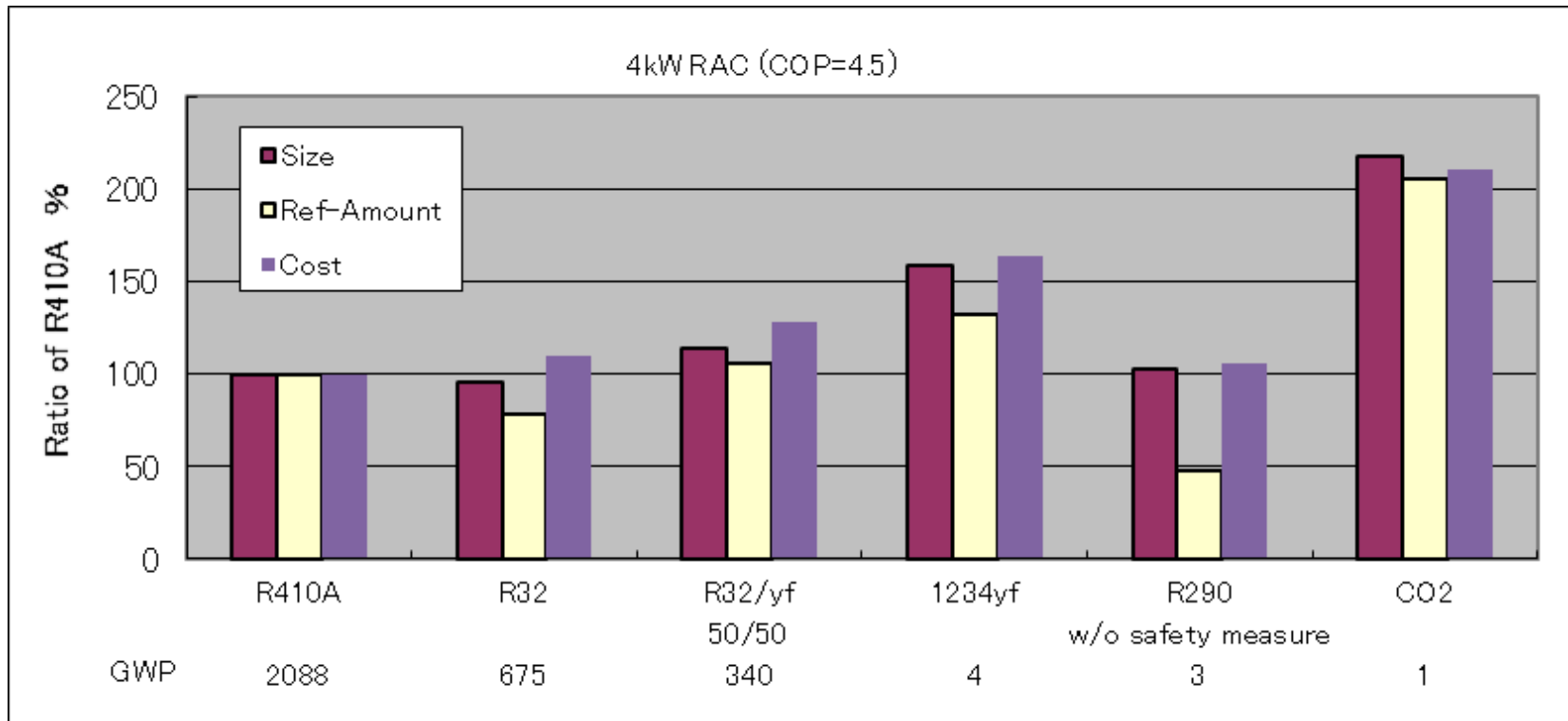
3. Refrigerants : current situation and candidates for the next generation in Japan



Natural refrigerants are also applied in some sectors.

Appropriate refrigerants are selected by considering the application of products in Japan.

4. Feasibility study: Mini-split ACs with alternatives



Not R290 but R32 was selected from safety point of view for mini-split ACs and has been widely spread out in Japanese market.

Risk assessment of mild flammable refrigerants such as R32, R1234yf, R1234ze(E), et.al. are also being carried out for large capacity ACs.

Standardisation and legislation to secure safety will be completed before their placement into market.

Thank you for your kind attention.
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