Actual situation and Challenges regarding Air Conditioners in ASEAN from Industrial Perspective

The Japan Refrigeration and Air Conditioning Industries Association (JRAIA)

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JRAIA The Japan Refrigeration and Air Conditioning Industry Association

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1. Who is JRAIA?

JRAIA(Japan Refrigeration and Air Conditioning Industries Association)

- **Established in Feb. 1949**
- Minato city, Tokyo (located in front of Tokyo Tower)
- Chairman: Yasumichi Tazunoki (from Mitsubishi Electric Co.)
- The number of the members: **169 companies** incl. associate members as of October 2023
- **Business Fields:**
  - Air conditioning (residential, commercial, automotive)
  - Refrigeration (commercial, industrial, transport)
  - Ventilation
  - Heat pump system (HP water heaters)
  - Refrigerants
  - Parts
- https://www.jraia.or.jp/english

2. Situation surrounding Air Conditioners in ASEAN

Air Conditioners are essential in ASEAN

- To improve the QOL (Quality of Life) of people in ASEAN, expansion of penetration is expected.

Efficiency improvement is important in terms of energy supply and reduction of CO_2 emissions

- Unification of performance evaluation method (CSPF), and MEPS projects in ASEAN led by ACE.

Efforts based on the actual situation in ASEAN are also important and effective, from a broader perspective of energy conservation, e.g.;

- Reduction of heat loss in buildings (improvement of building insulation, and airtightness)
- Changing the mindset of overcooling habits
- **Development of technology that maintains comfort even at high temperature settings**

3. Environmental issues of Air Conditioners

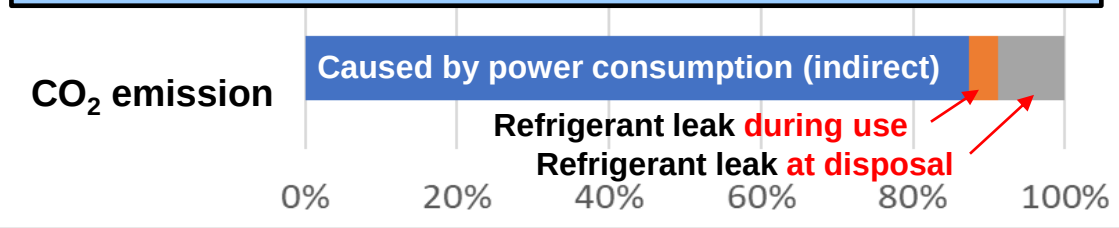
AC uses refrigerant

- Refrigerant changed from CFCs/HCFCs to HFCs to prevent ozone depletion.
- Furthermore, the HCFs phase down is required by to the Kigali amendment for global warming countermeasures. ➔ **The movement to lower GWP is accelerating**
- Low GWP alternative candidate refrigerants have **safety-related characteristics** such as; flammability, toxicity, and operating pressure, and **refrigerant efficiency** affects equipment. ➔ **There is no uniform solution.**

Characteristics of Alternative candidate refrigerants for ACs

Refrigerant	GWP	Pressure	Flammability	Efficiency
CO_2	1	High	A1	Low
Propane	3	Med	A3	Even (6kW or less)
				Low (over 6kW)
HFO	1 digit	Low to Med	A1 - A2L	Even to Low
HFC	Over 3 digit	Med	A1 - A2L	Even

Estimation example of the direct and indirect CO_2 emission



[Conditions]
Model : 4 kW residential AC using R32
Annual leakage rate : 2%
Annual operating hours : JIS C 9612
Refrigerant recovery rate at disposal : 31%
Operation period : 13.2 years
Emission factor of electricity : official figure for 2019

4. JRAIA's Stance and Efforts

- Multifaceted and comprehensive approach is necessary to broadly grasp environmental issues
- JRAIA's basic principle: To promote the spread of HP and the development of "green refrigerants" while balancing S+3Es

S+3Es

S: *Safety*	• Low Toxicity • Low Flammability
E: *Environment Performance*	• Zero Ozone Depletion Potential (ODP) • Low Global Warming Potential (GWP)
E: *Energy Efficiency*	• High Seasonal Energy Efficiency
E: *Economic Feasibility*	• Low Initial Cost • Low Operational Cost

4. JRAIA's Stance and Efforts

Energy Efficiency	• Operation of the equipment performance industry self-test scheme co-operated with JATL. • Active involvement in the WG of ISO for next generation performance evaluation method.
Refrigerants	• Conducting Risk Assessment for equipment using A2L / A3 refrigerants. • Publish the Industrial standards / guidelines to assure the safety, Some adopted into national law
Environment	• Consideration of LCCP (Life Cycle Climate Performance), as a new initiative for the future. • Action for environment related regulations especially in the EU; Ecodesign, F-Gas, PFAS, etc.
International	• ICARHMA meeting, and Three Industry Association Meeting (China – Korea - Japan) .
ASEAN	• Promote CSPF evaluation method, and capacity building of testing laboratory. IS-INOTEK pro.(2014 - 2016) / ASEAN SHINE pro.(2017 – 2019) / ACE CSPF project phase I (2020-2022) • ASEAN5 + J Workshop: Exchange information on energy saving and refrigerant conversion, etc. [Next actions] ➢ Promotion of high efficiency ACs (Labelling, Consumer awareness and MEPS pulling up) ➢ Implementation of appropriate market verification (market sampling test system) ➢ Realization of a single market through the MRA scheme

5. Summary and Conclusion

- Air conditioning is essential for improving people's QOL
- From the perspective of energy supply, energy saving in air conditioning is important
- At the same time, it is also effective to reduce the thermal load on buildings and reduce inefficiency such as overcooling, and looking forward to the technology development in these areas.
- Air conditioning equipment requires refrigerant conversion, but there is no simple solution, and a balanced consideration of S+3Es is important.

JRAIA would like to contribute to;
✓ the improvement of the wellbeing of the people in ASEAN
✓ the sound market formation and growth of ASEAN
by continuing to provide high efficiency RACHP products,
while engaging in responsible activities to challenge the global environmental issues.

Thank you for your attention