

NEDO Projects Related to Fluorocarbon Countermeasures

Nov 5, 2019

Mika Suzawa

**New Energy and Industrial Technology
Development Organization (NEDO)**

Agenda

- 1. Introduction of NEDO**
- 2. Background and policy trends**
- 3. R&D direction of NEDO**
- 4. NEDO projects**
 - 4-1. completed project**
 - 4-2. ongoing project**

1. Introduction of NEDO

2. Background and policy trends

3. R&D direction of NEDO

4. NEDO projects

4-1. completed project

4-2. ongoing project

NEDO plays an important role in Japan's economic and industrial policies as one of the largest public R&D management organizations.

NEDO has two missions:

- Addressing energy and global environmental problems
- Enhancing industrial technology

Chairman: Mr. Hiroaki Ishizuka

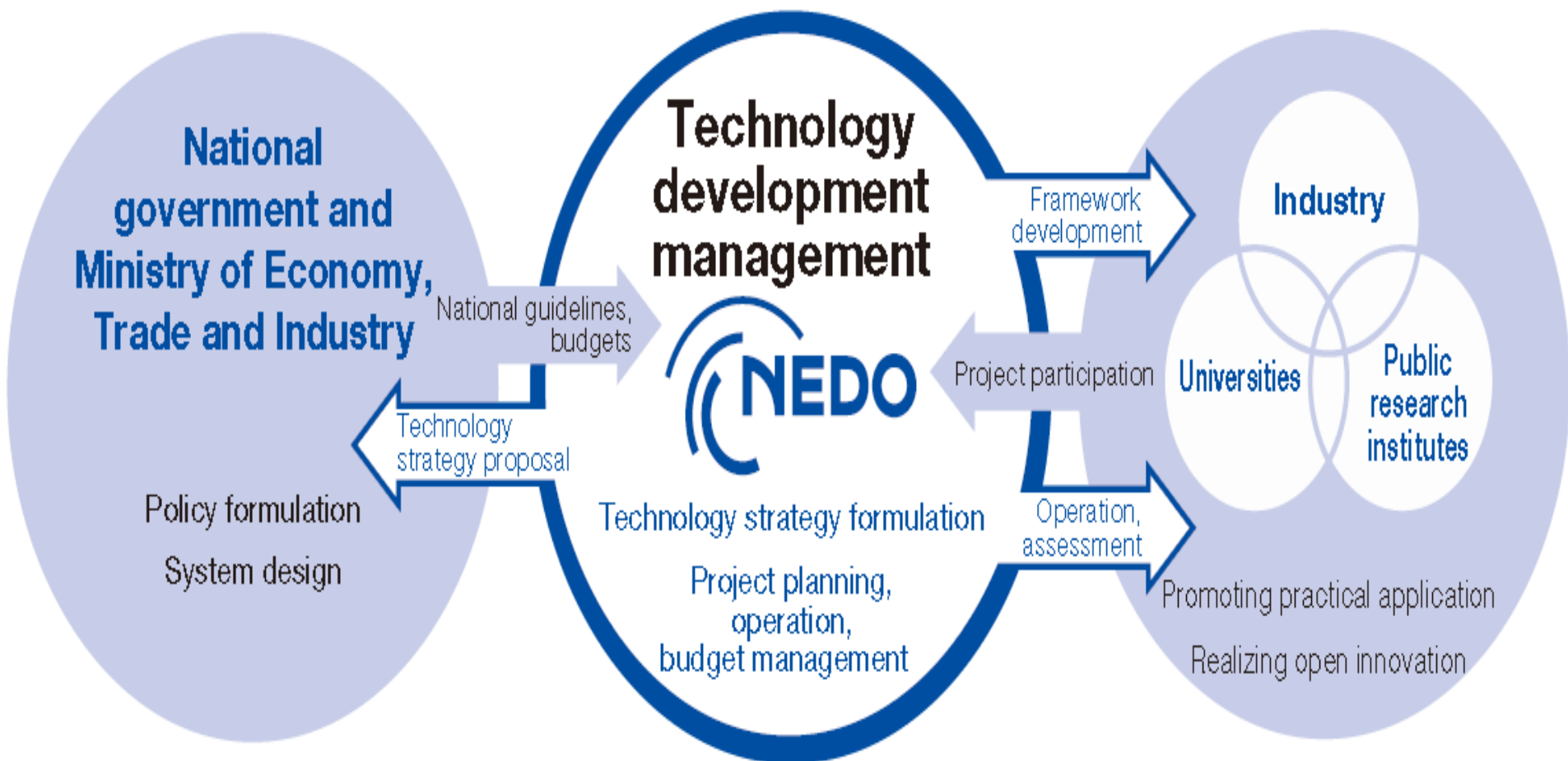
Organization: - Established in 1980
- Incorporated administrative agency under Japan's Ministry of Economy, Trade and Industry (METI)

Budget : 1.43 billion US dollars (fiscal year 2019)

Personnel : 1,000



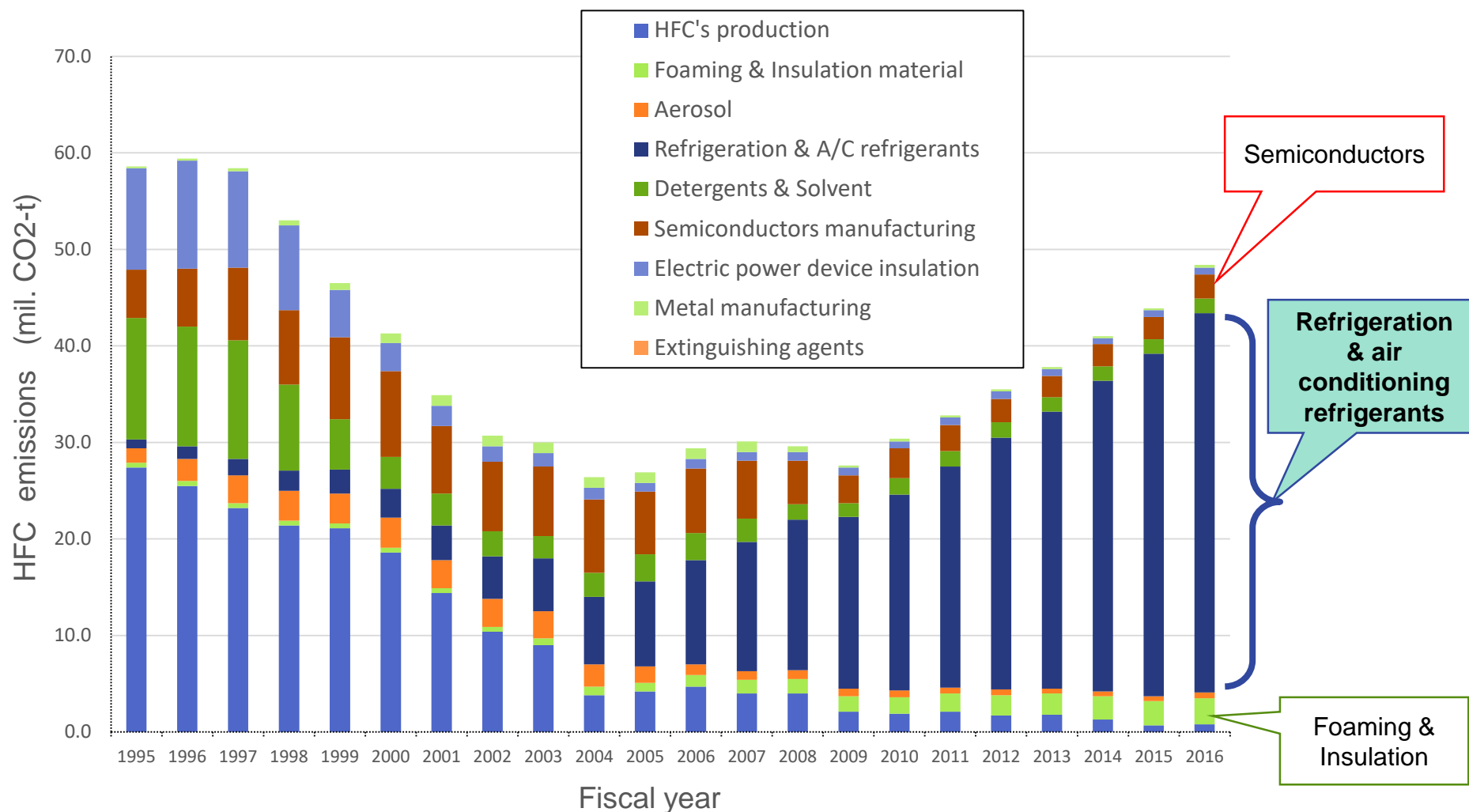
Positioning of NEDO



1. Introduction of NEDO
- 2. Background and policy trends**
3. R&D direction of NEDO
4. NEDO projects
 - 4-1. completed project
 - 4-2. ongoing project

HFC emission sources and trends in Japan

HFC emission sources and trends in Japan



Source: Report of METI Industrial Structure Council WG, Dec. 2017

Obligations under Kigali Amendment in Japan

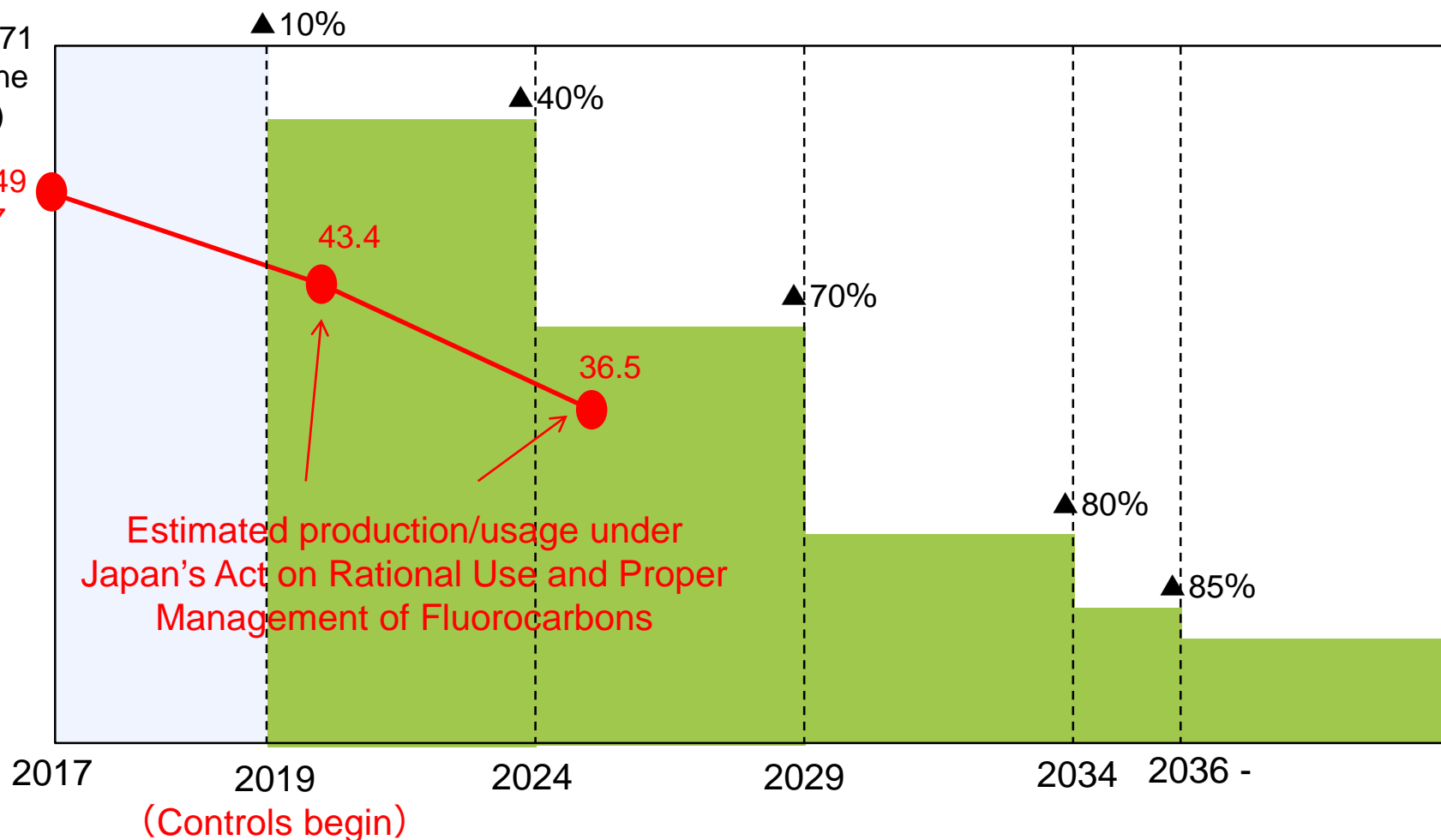


Reductions in production/usage of HFCs in Japan

(mil.CO₂-t)

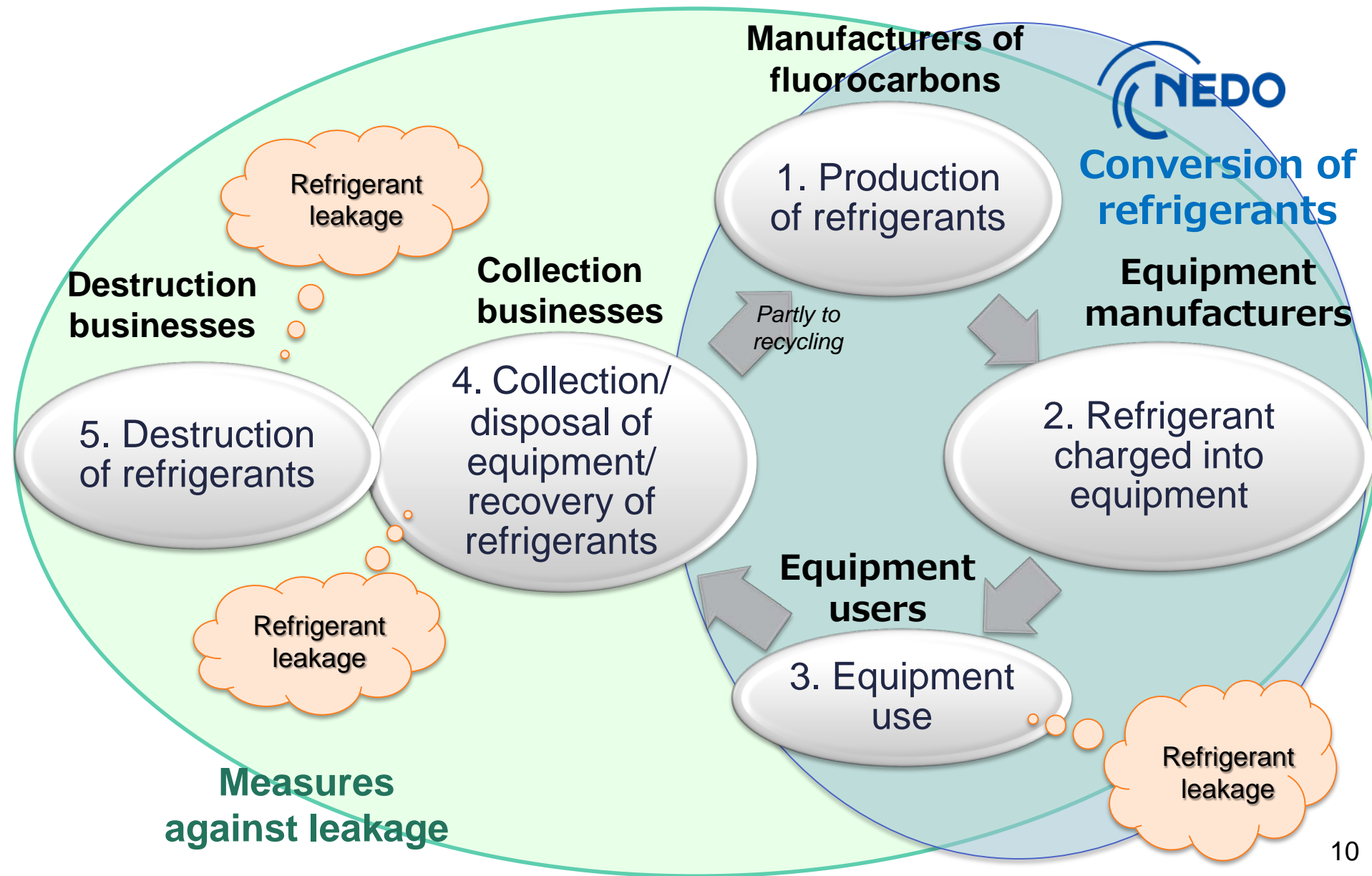
Approx.71
(Baseline
value)

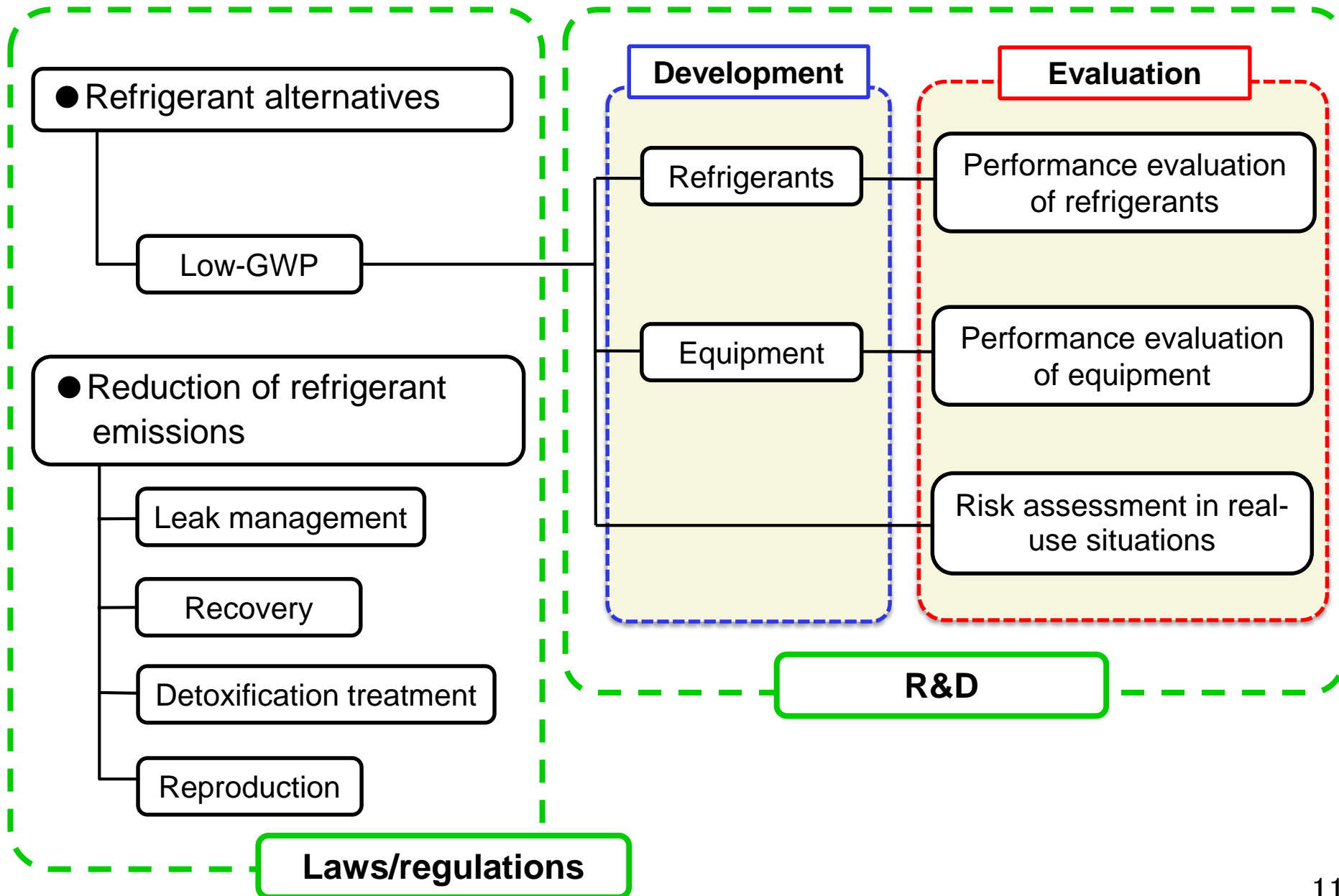
Approx.49
in 2017



1. Introduction of NEDO
2. Background and policy trends
- 3. R&D direction of NEDO**
4. NEDO projects
 - 4-1. completed project
 - 4-2. ongoing project

Refrigerant emissions and the life cycle for refrigerants and equipment





- ✓ In Japan, to achieve the HFC reduction target of the Kigali Amendment, development of low GWP refrigerant and applicable equipment are required.
- ✓ On the other hand, when the GWP is lowered, many refrigerants have characteristic properties such as increased flammability.
In order to spread low GWP refrigerants, **it is extremely important to assess the risk and to establish the evaluation methods for safety of applying flammable refrigerants to equipment.**

1. Introduction of NEDO
2. Background and policy trends
3. R&D direction of NEDO
- 4. NEDO projects**
 - 4-1. completed project**
 - 4-2. ongoing project**

4-1. **completed project;**

Development of Non-Fluorinated Energy- Saving Refrigeration and Air-Conditioning Equipment Systems

- Project period : FY2011-FY2015
- Project budget: 1.8 billion yen
- Target : Commercial air-conditioning
- Themes:

1. Development of equipment capable of high-efficiency operations when using low-GWP refrigerants

2. Development of low-GWP refrigerants

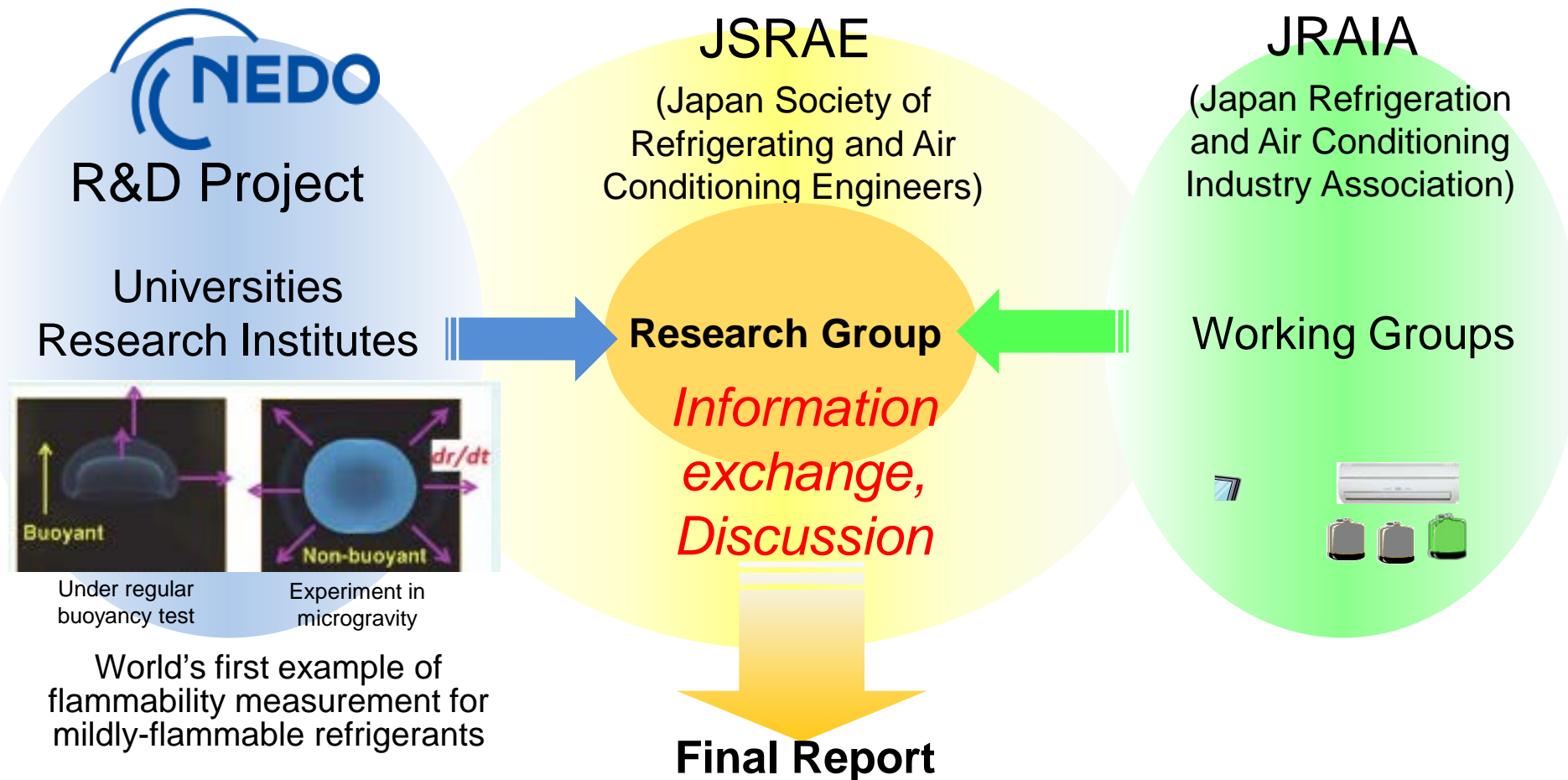
3. Evaluation of performance and safety of low-GWP refrigerants

Especially, **mildly flammable (lower flammable; A2L)** refrigerants

4-1. completed project;

Corporation in evaluation of the safety of mildly flammable refrigerants

- ✓ NEDO organized Research Group to evaluate the safety of mild flammable refrigerants.



4-1. completed project; Project achievements-1 (Domestic)

- ✓ Final report contributed to **the amendment of Japan's High Pressure Gas Safety Act**, which led the new provision for the use of mildly flammable refrigerants .
- ✓ Based on this amendment, **the commercialization of large-capacity centrifugal chillers** using mildly flammable refrigerant was realized.

Result of NEDO Project

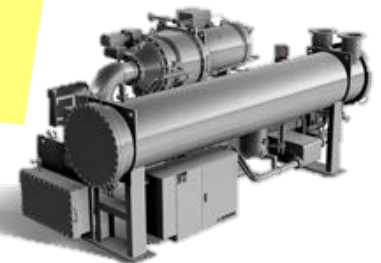
Safety assessment of mildly flammable refrigerants

Final Report of Research Group
https://www.jsrae.or.jp/committee/binensei/final_report_2016r1_en.pdf

Amendment of High Pressure Gas Safety Act

The use of mildly-flammable refrigerants was newly stipulated

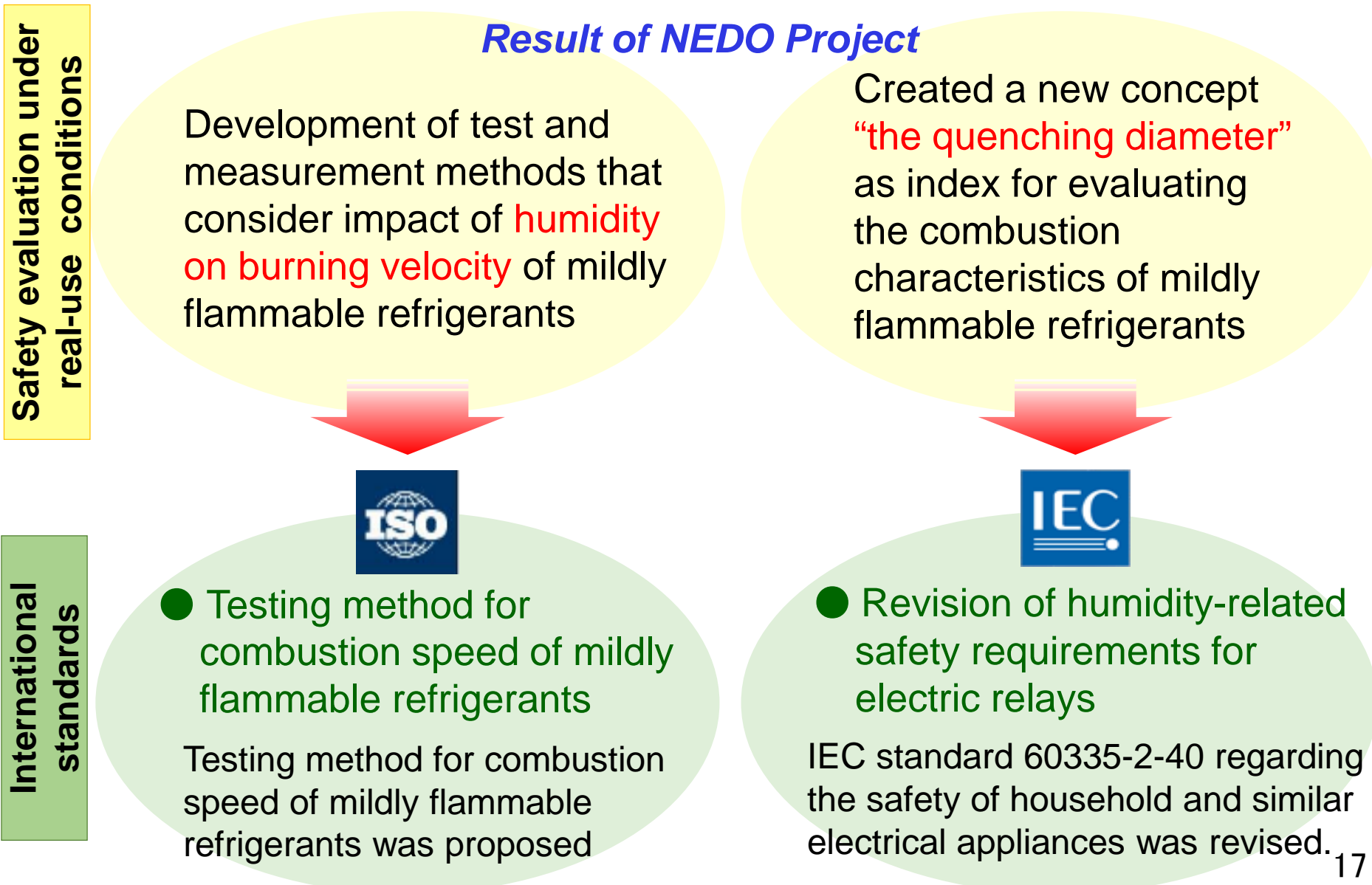
Commercialization of devices using low-GWP refrigerants (HFO-1234ze(E))



Source: Mitsubishi Heavy Industries Thermal Systems, Ltd.
 Press Information no. 5840 dated February 16, 2017

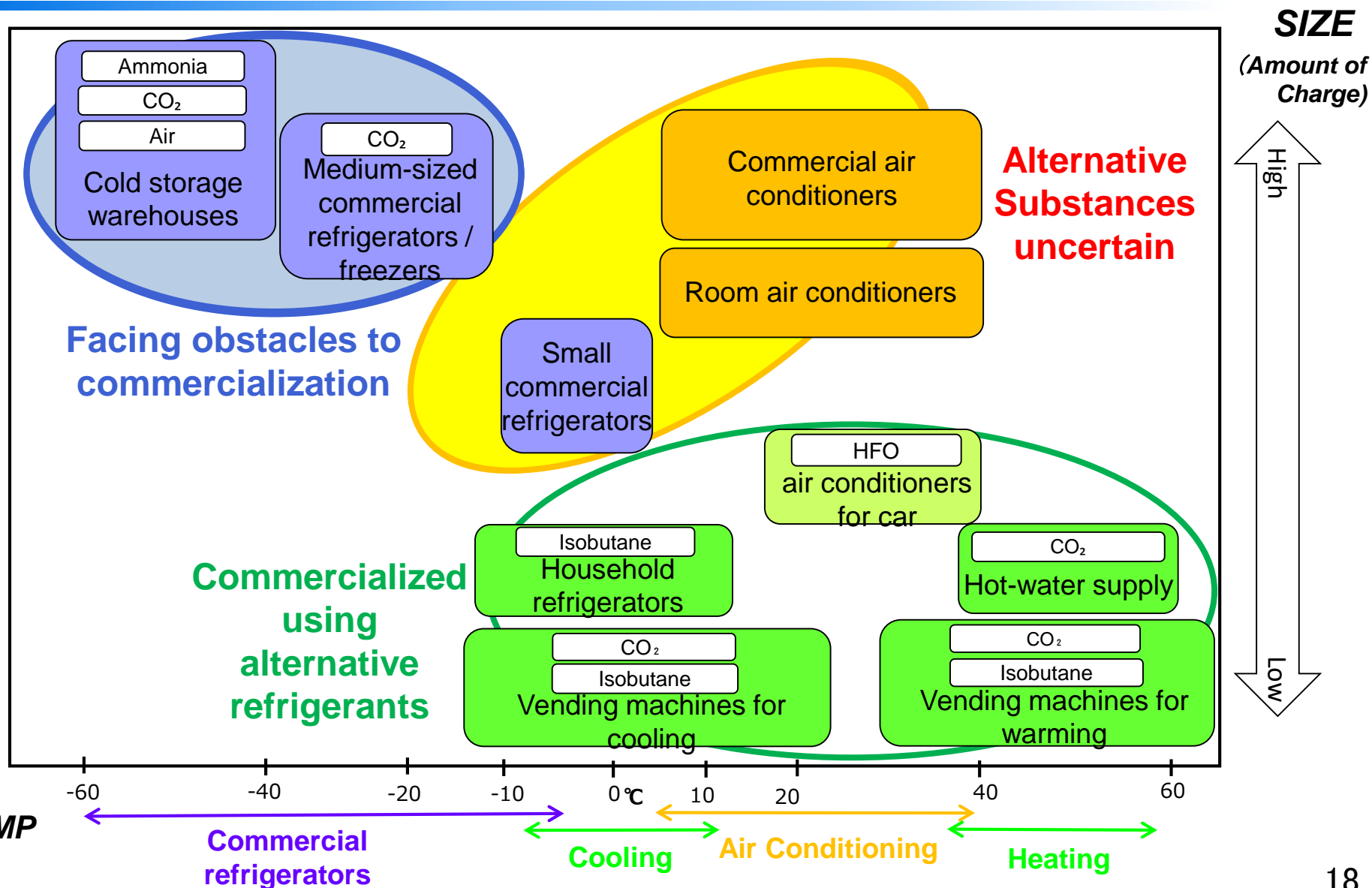
4-1. completed project;

Project achievements-2 (Internationally)



4-2. ongoing project:

Status of equipment with low-GWP refrigerants in Japan



4-2. ongoing project:

Development of Technology and Assessment Techniques for Next-Generation Refrigerants with a Low GWP Value



- Target refrigerants:
Next-generation low-GWP refrigerants such as HCs, HFOs and HFO hybrids
- Project period: FY2018-FY2022
- Project budget: 6.5 billion yen (FY2019)

- Themes:

1. Acquisition and evaluation of data regarding **basic characteristics** of next-generation refrigerants

2. Development of **safety measures methods and risk assessment** for next-generation refrigerants

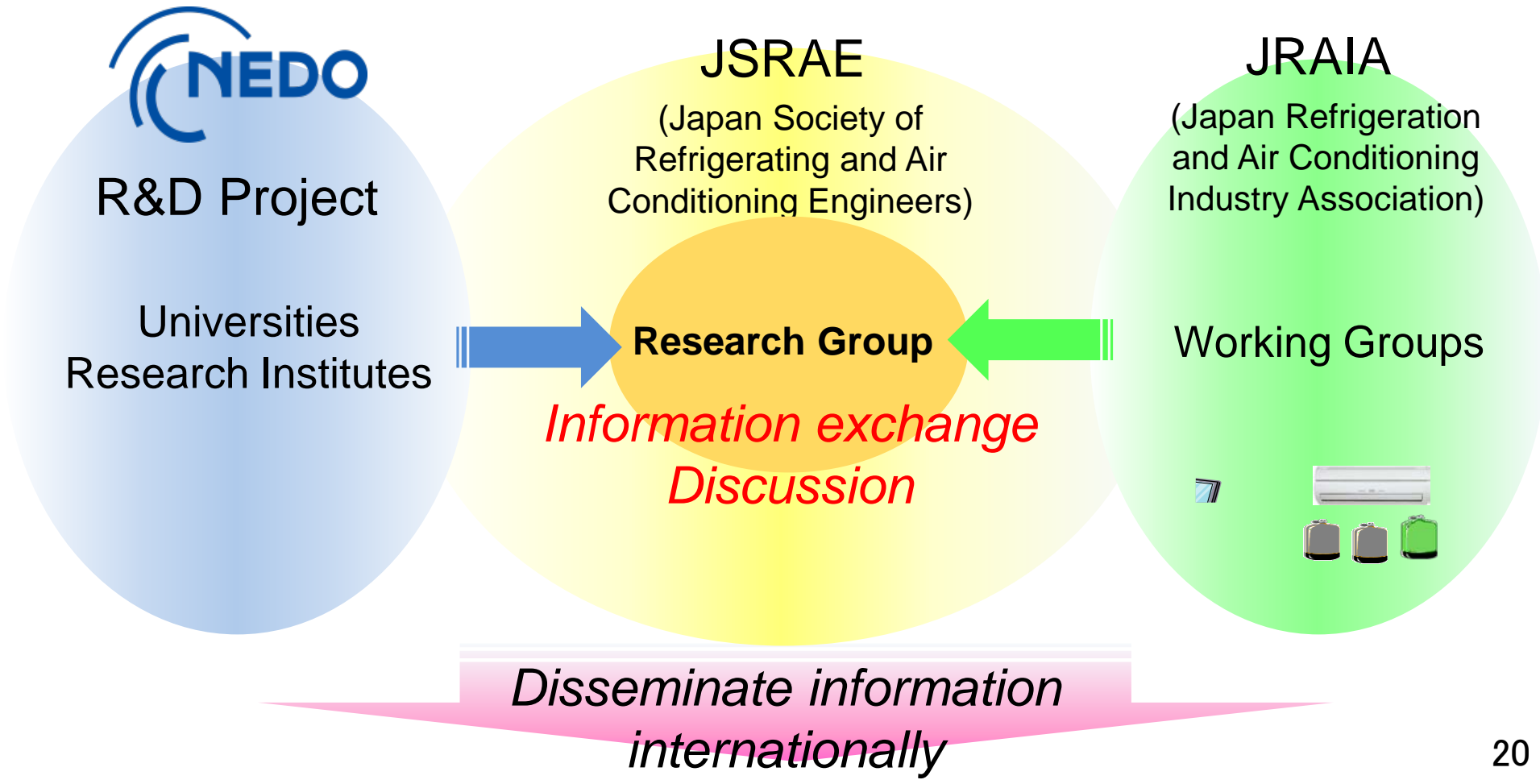
3. Development of new refrigerant and equipment

4-2. ongoing project;

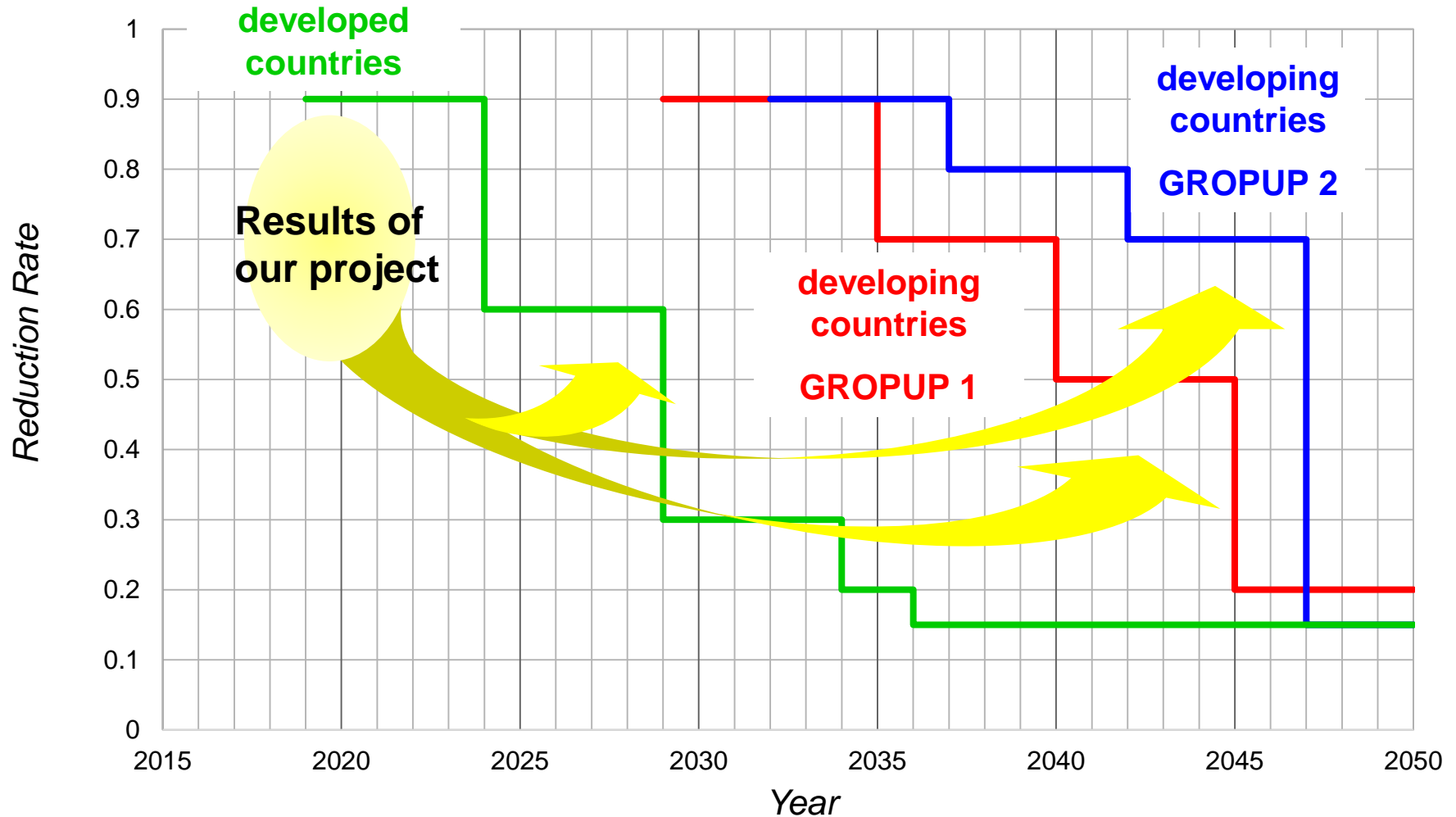
Corporation in evaluation of the safety Next-generation low-GWP refrigerants



- ✓ NEDO constructed **the same structure** to evaluate the safety of Next-generation low-GWP refrigerants.



HFC Phase-down Schedule Under Kigali Amendment



Thank you for your attention !



<https://www.nedo.go.jp/english/index.html>