# Briefing on Sustainability

## Daikin R&D

Initiatives in R&D and product development
supporting value creation

Daikin Industries, Ltd.

December 8, 2020 (Tuesday)

# [Fourth] Daikin R&D

"Initiatives in R&D and product development supporting value creation"

1. Basic approach to R&D

2. R&D initiatives looking 10 years in the future

3. Product development initiatives for the short term

## Presenters

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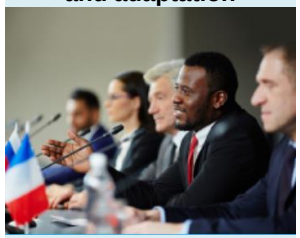
# International Frameworks for Taking on Society's Challenges on a Global Scale

## Society's Challenges
### with the highest risk

Extreme weather events and temperatures

Natural disasters

Failures of climate change mitigation and adaptation



Water crises

Loss of biodiversity

Pandemics

## International Frameworks

**UN Global Compact**

United Nations Global Compact

**UN Sustainable Development Goals (SDGs)**

**UN Framework Convention on Climate change (Paris Agreement)**

**UN Kigali Amendment to the Montreal Protocol**

# Response to Global Frameworks for Resolving Social Issues

## Participation in the UN Global Compact

United Nations Global Compact


## Formulization of Long-term Environmental Vision

Support of the Paris Agreement in aiming for net zero greenhouse gas emissions in 2050

2008 2018 2019 2050

## Announcement of Endorsement of the TCFD Recommendations

Analyze risks and opportunities that climate change poses to our businesses with the aim of reflecting them in management strategies and further enhancement of information disclosure

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

※See page 15 of the Sustainability Report 2020 for information disclosure based on the TCFD framework.

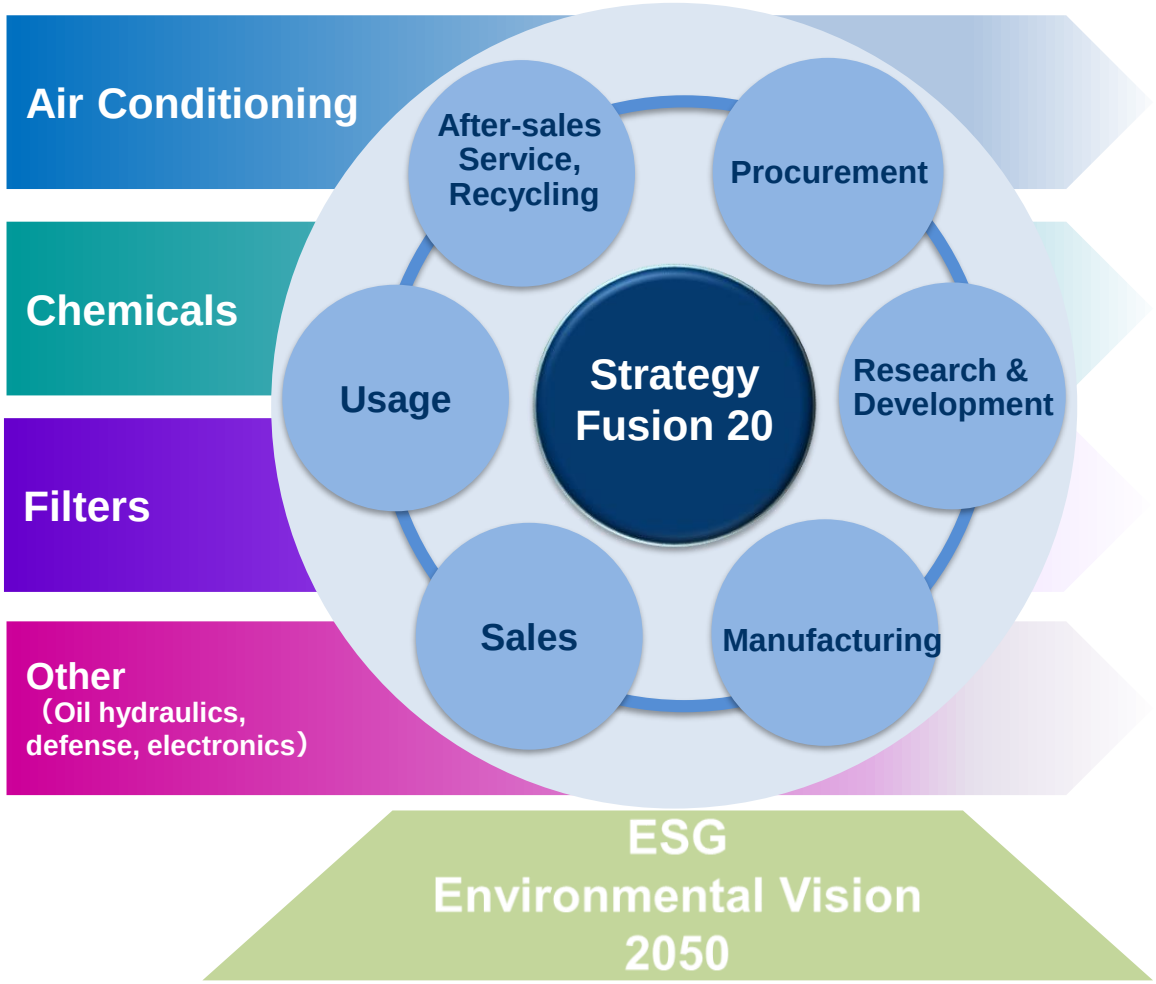

**Contribution to the UN Sustainable Development Goals (SDGs)**

# Process of Daikin Value Creation

## Through efforts to find solutions to social problems through our business, Daikin provides new value, and aims for sustainable growth.

**Social problems we can help solve**

- Intensification of climate change
- Expansion and concentration of energy and power demand
- Worsening of air pollution




**Value creation provided to society**

**Three Areas of Value Creation**

- Value Creation for the Earth
- Value Creation for Cities
- Value Creation for People

**HR Development Supports Value Creation**

Contribute to the growth of employees and local citizens

# Provide new value that makes people and space healthier and more comfortable while at the same time reducing environmental impact.

## Value Creation for the Earth

Reduce environmental impact through all business activities and contribute to alleviating climate change

Sustainable Development Goals (SDGs) targets

## Value Creation for Cities

Contributing to solving energy-related issues arising from urbanization and contribute to the creation of sustainable cities

Sustainable Development Goals (SDGs) targets

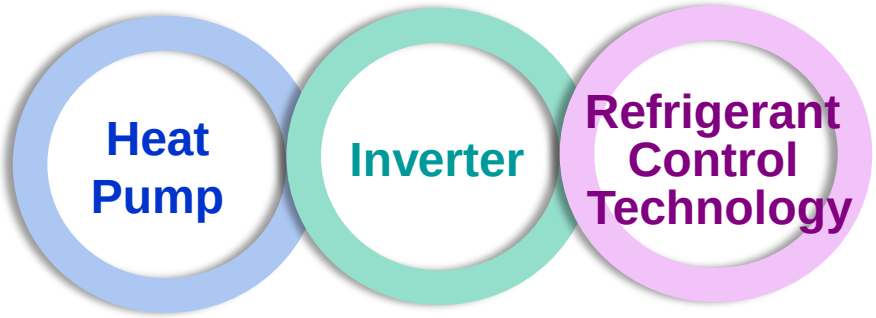
## Value Creation for People

Pursue new possibilities for air and contribute to healthy, comfortable lifestyles

Sustainable Development Goals (SDGs) targets

# R&D Supporting Resolution of Social Issues and Business Growth

**Create environmentally conscious and differentiated products while laying the foundation for next-generation technologies**




## Three Core Technologies

**Research and Development**

### Next-generation Technologies

### Environmentally Conscious Products

- High energy saving
- Low GWP refrigerant

### Differentiated Products

- Comfort
- Ventilation function
- Design
- Air purification

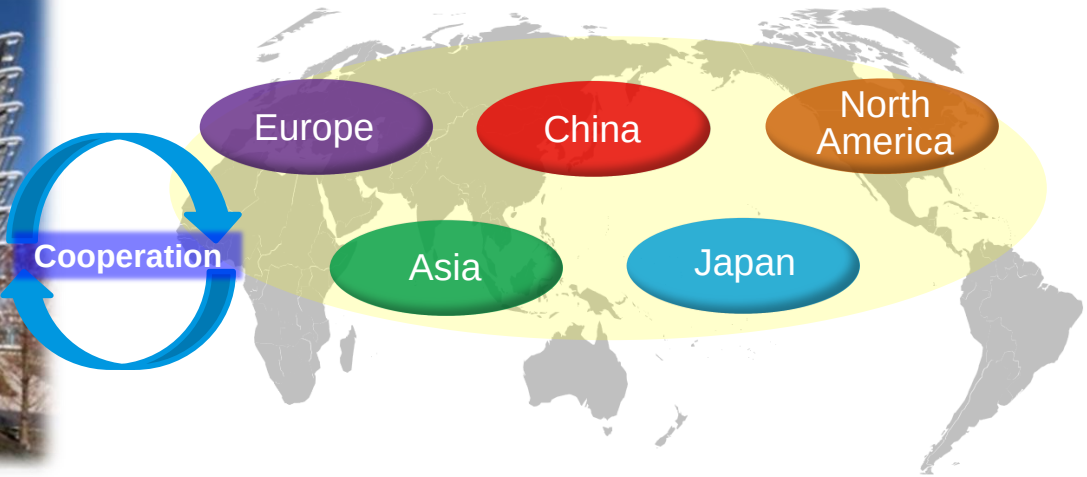
# 1．Basic approach to R&D

(1) R&D system
(2) Technology development policy at TIC
(3) Examples of external collaborative innovation initiatives

# (1) R&D System -Positioning of development bases

The Technology and Innovation Center (TIC) was established as a research institute and core facility for technology development integrating functions for advance development

**Cooperation between TIC and product development bases contributes to sustainable growth and development through the creation of new value.**




## TIC <Japan (Settsu City)>

TIC **executes open innovation through external collaboration for technology development** that contributes to regional businesses.

- Plans **technology strategy from a medium- to long-term perspective** and develops **differentiation technology**.
- **Quickly provides differentiated technology** corresponding to the needs of each development base by increasing technology stock.

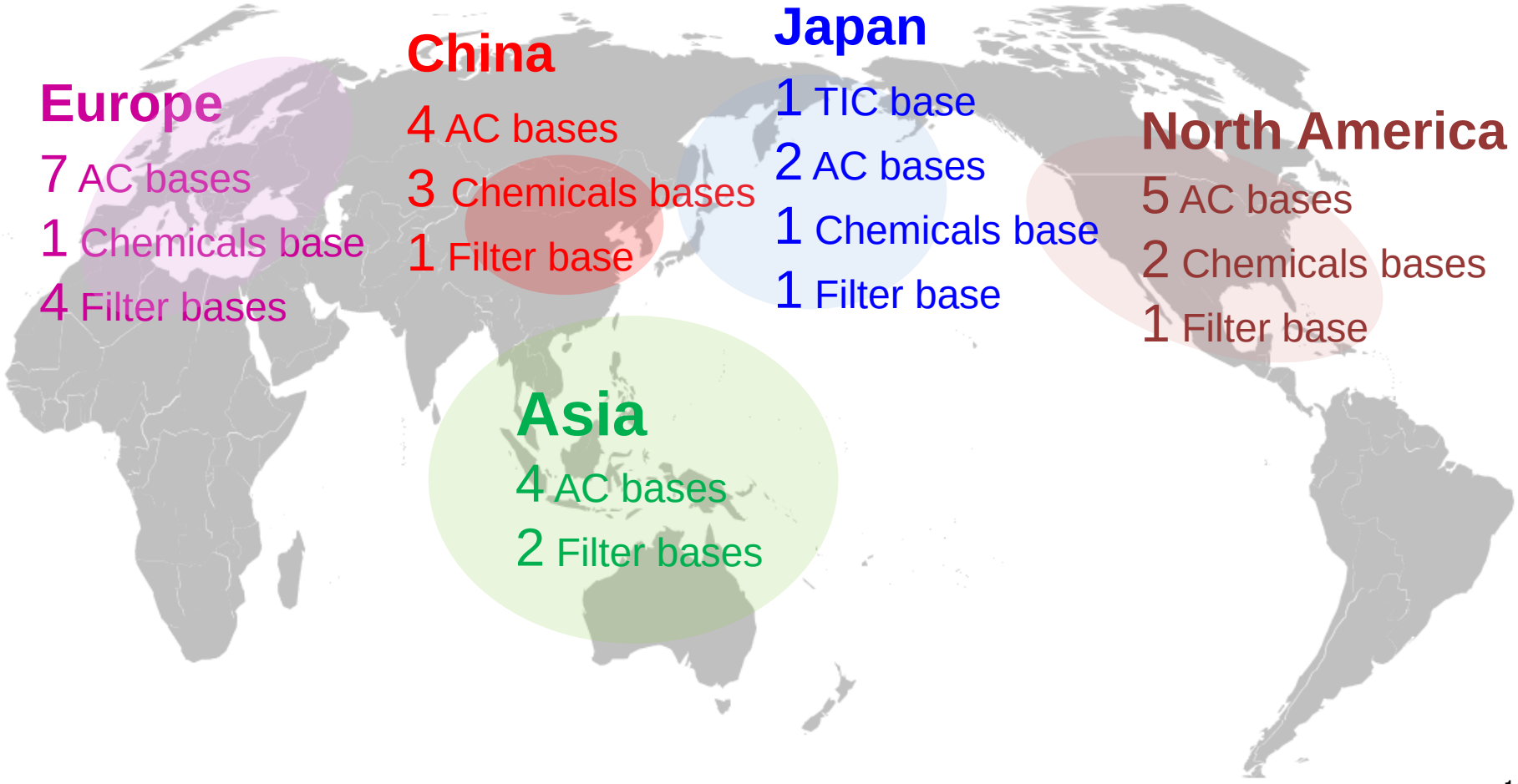
## Product Development Bases <5 global regions>

A development base has been established in each global region to quickly execute **product development corresponding to its region**.

- Identifies needs and **executes activities ranging from marketing to product development**.
- **Develops products from a short-term perspective** to support businesses in each region.

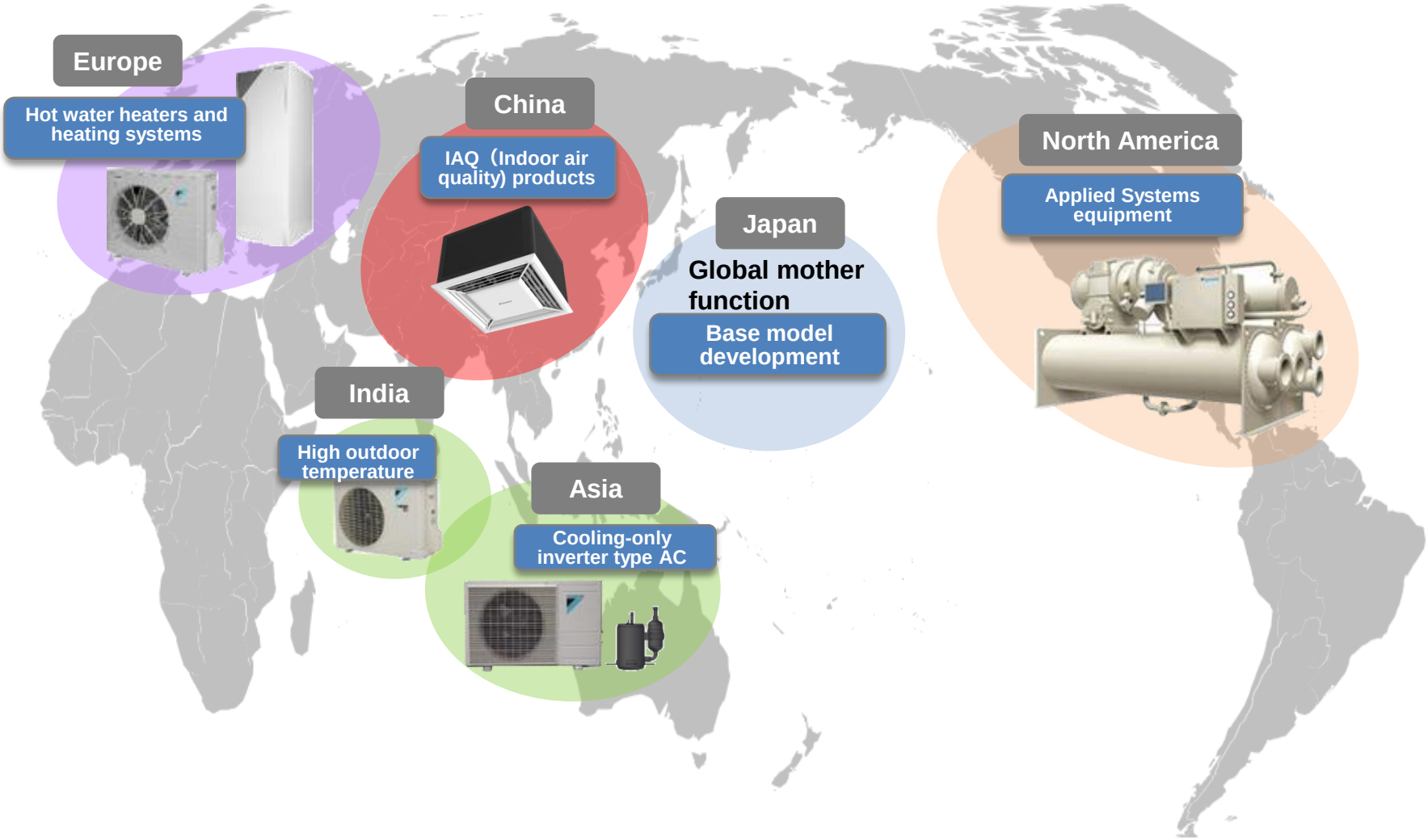
# (1) R&D System -Global expansion of development bases

## Total of 39 global bases



# (1) R&D System -Roles of global product development bases (AC)

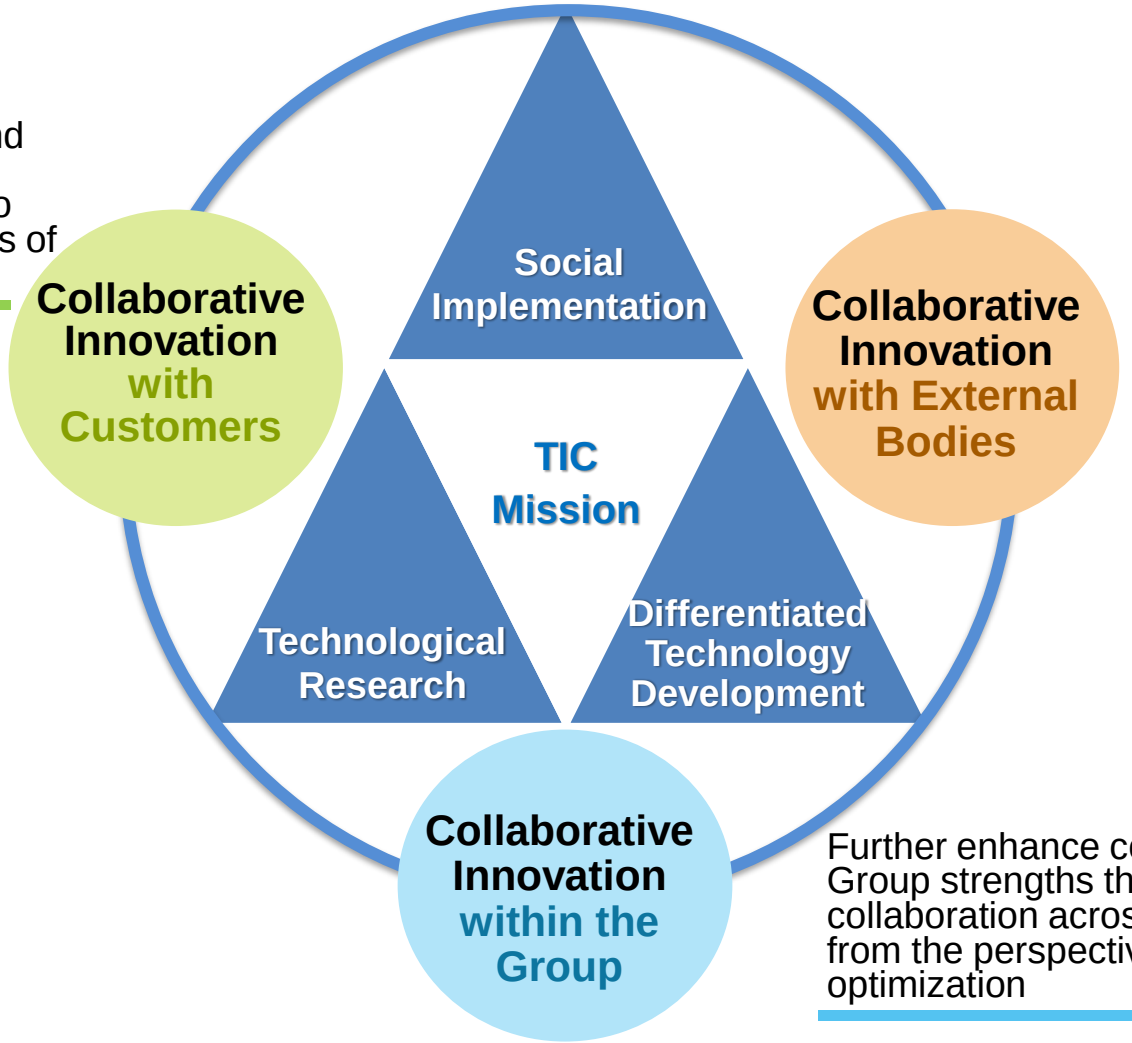
In addition to the **product development base in Japan (global mother function)**, **each regional product development base (secondary mother function)** mutually supplies products to **speedily enhance the global product lineup overall.**



# (2) Technology Development Policy at TIC

To accelerate **“differentiated technology development”** that contributes to business, **“advanced technological research”** that supports it, and **“early social implementation”** to create new customer value, we implement **three structures of collaborative innovation.**

Provide products and services that meet needs by listening to the genuine opinions of the customers




Accelerate commercialization by sharing and acquiring differentiated technology and know-how

Further enhance comprehensive Group strengths through horizontal collaboration across organizations from the perspective of overall optimization

# (2) Technology Development Policy at TIC -Major collaborative innovation initiatives

## ■ Industry-Industry

・Short-term acquisition of advanced technology
・Market confirmation of value by early social implementation

February 2018
**CRESNECT**
Opening of a collaborative platform to create new value and services related to air and space

**・Opening of point 0 marunouchi, which uses CRESNECT**
A demonstration is performed for creation of healthy and comfortable offices (July 2019)

November 2019
**Opening of CVC Office**
Promotion of collaboration with startup companies

**・WASSHA**
Subscription of air conditioners in immature AC market

**・Fairy Devices**
Service business for connected workers

November 2015
**Opening of TIC**

2018 **Opening of Open Innovation Lab (Silicon Valley)**
2019 **Opening on Open Innovation Lab (Shenzhen)**
Collaborative innovation with local startup companies is accelerated

2015 2020

## ■ Industry-Government / Industry-Academia

・Medium- to long-term technology development
・Ensuring of personnel exchanges
・Venue for technical verification
・Lobbying activities

2015
**Comprehensive Collaboration with AIST**

2016
**Comprehensive Collaboration with Tsinghua University**

2017
**Comprehensive Collaboration with Osaka University**
**・Opening of Daikin Information and Communications Technology College**
Fostering HR with AI skills

2018
**Comprehensive Collaboration with The University of Tokyo**

2020
**Comprehensive Collaboration with Doshisha University**

# (3) Examples of External Collaborative Innovation Initiatives -Fairy Devices*

## Innovation in field work with connected workers

*a venture company with links to The University of Tokyo

### Background

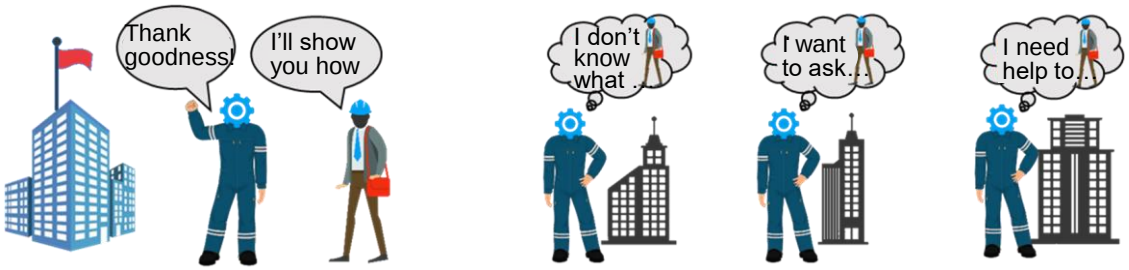
<Social background>

・To ensure the performance and quality of air conditioning, which has become an important part of infrastructure supporting society, it is necessary to not only ensure equipment performance, but it is also necessary to ensure the **quality of service operations, such as maintenance and repairs**.

<Daikin's issue>

・With the expansion of the air conditioning market, there is a **shortage of service engineers** involved in field work.

・The company aims for realization of **rapid development of service engineers** around the world in order to **improve the work quality of global after sales service**.




### Collaboration details

・An initiative to **improve work efficiency and work quality in our service operations** is underway that combines the linking of **digital technologies such as voice recognition, Edge AI, and data analysis** that Fairy Devices possesses with the **frontline knowledge that Daikin has been cultivating on a global scale**.

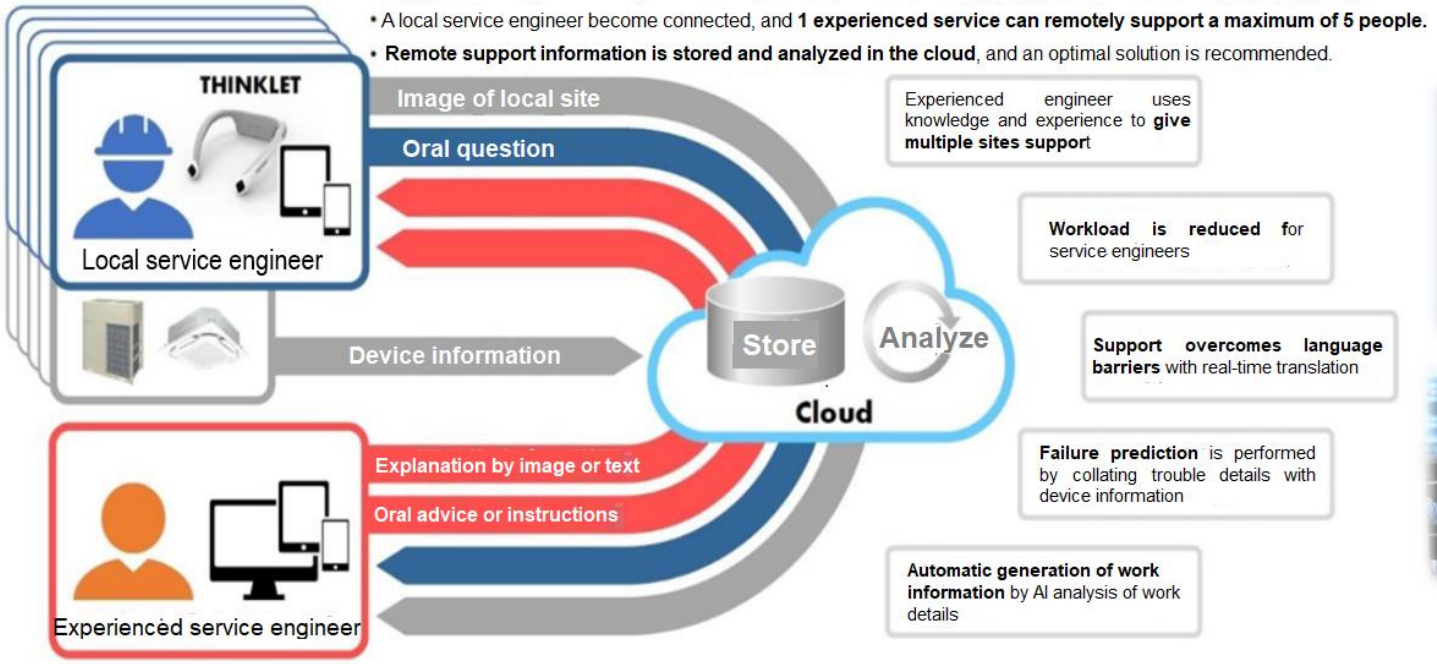
# (3) Examples of External Collaborative Innovation Initiatives -Fairy Devices

<Initiative>

- The collaboration utilizes the wearable smart device THINKLET ™ developed by Fairy Devices.
- The goal for Fairy Devices is **to develop a remote work support solution in which workers in remote locations can be assisted and trained by a skilled service engineer**.

<Future development>

Starting with Japan, we will steadily expand globally to address the service engineer shortage.




# (3) Examples of External Collaborative Innovation Initiatives -Osaka University

## Initiative for Daikin Information and Communications Technology College

### Background

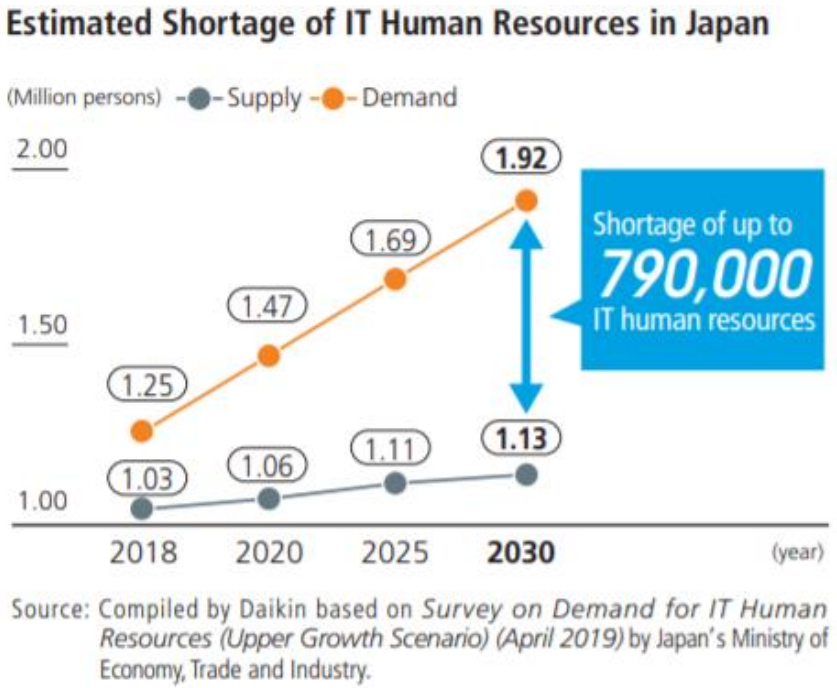
<Social background>

・Use of AI is expected in various fields since recent years have seen a **dramatic increase in analytical technology development based on AI**.

<Daikin's issue>

・It is necessary to utilize AI to **create new air conditioning solutions businesses, improve *monozukuri* technology, and promote business reforms**.

・**There is a shortage of human resources to promote AI / IoT utilization.** (Mechanical and electrical personnel are numerous.)




Source: Compiled by Daikin based on *Survey on Demand for IT Human Resources (Upper Growth Scenario) (April 2019)* by Japan's Ministry of Economy, Trade and Industry.

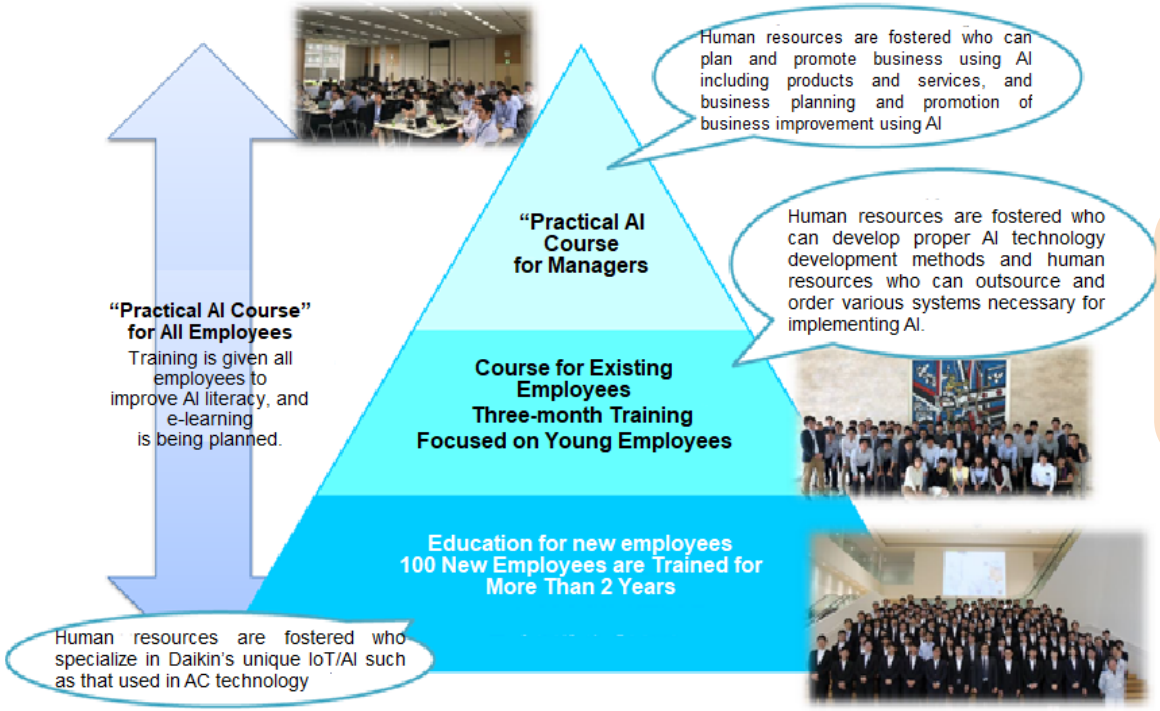
### Collaboration details

・With the aim of developing human resources to be responsible for technology and business development using AI, we have established a course that unites the Osaka University's **knowledge in the field of advanced information science** with **Daikin's wide range of know-how in air conditioning and industrial technologies**.

# (3) Examples of External Collaborative Innovation Initiatives -Osaka University

<Initiative>

In addition to courses to **learning a basic knowledge of AI and methods for using AI**, the program fosters experts who **utilize AI/IoT in business and technology development** are fostered by the **incorporation of project-based exercise based on actual issues of each division and department**.




Main efforts
- Shifting to smart production processes
- Predicting equipment failures
- Improving business efficiency
- Solving energy and environmental problems

<Future development>

Acceleration is underway for training managers along with existing and new employees, and **development is planned for 700 human resources skilled in AI/IoT by the end of 2020 and 1,000 human resources by the end of 2021**.

# 2. R&D initiatives looking 10 years in the future

-Priority areas of research and development / initiative themes-

# Priority Areas of Research and Development / Initiative Themes

Until 2025 | Until 2030

| Social Problems | Value Creation | Priority Areas | Initiative Themes |
|---|---|---|---|
| Intensification of climate change | Earth   | Reduction of Environmental Impact<br>Reduce environmental impact through all business activities and contribute to alleviating climate change | (1) CO2 Reduction<br>Expanding use of refrigerant R32<br>Refrigerant-related technology<br>– Low GWP refrigerant<br>– Refrigerant recovery<br>Expansion of heat pumps |
| Expansion and concentration of energy and power demand | Cities   | Energy<br>Contribute to solving energy-related issues arising from urbanization and contribute to the creation of sustainable cities | (2) Energy Conservation<br>Improving equipment efficiency<br>Energy management<br>**External collaborative innovation**<br>● Industry-Industry<br>● Industry-Academia<br>● Industry-Government |
| Worsening of air pollution | People   | Air Quality<br>Pursue new possibilities for air and contribute to healthy, comfortable lifestyles | (3) Safety and Security<br>Protecting people from heat stroke and infectious diseases<br>Increasing value for air environments<br>– Healthcare<br>– Productivity improvement |

**Needs accelerated due to COVID-19**

Building a research and development system that realizes value creation

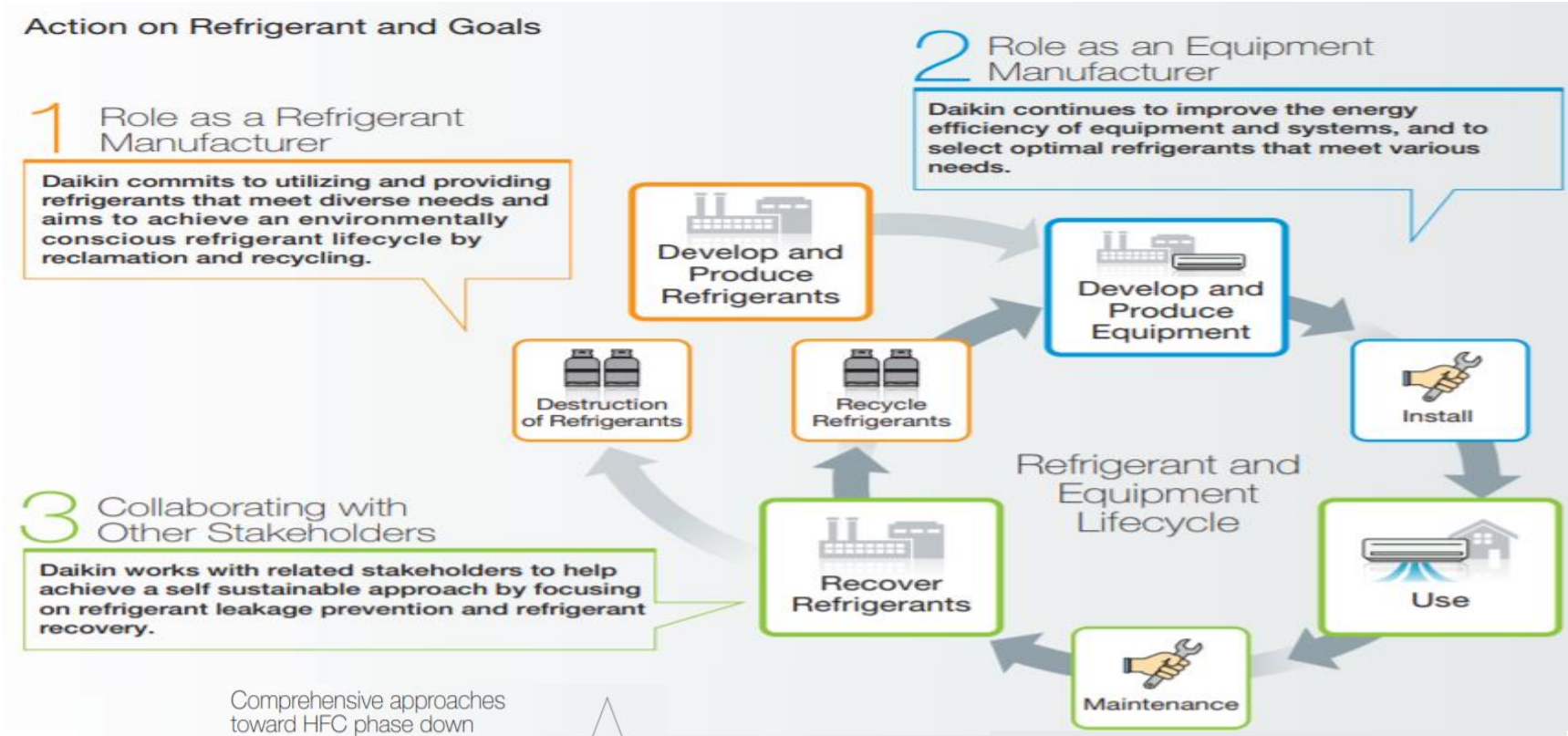
# (1) CO2 Reduction -Refrigerant-related technology

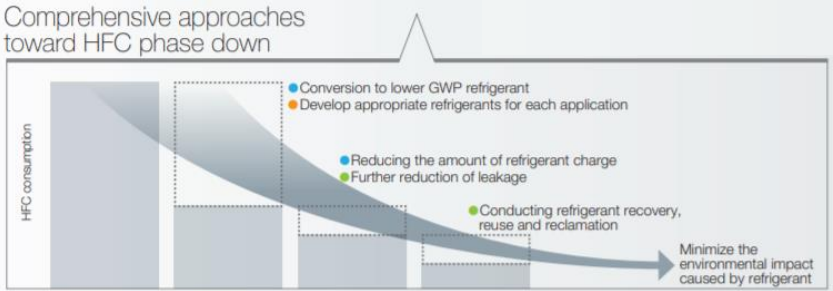
- Air conditioning demand is expected to expand accompanying economic growth in emerging countries, further increasing the effects of global warming.
- Initiatives are accelerating among countries and advanced companies for setting medium- to long-term reduction targets for CO2 emissions that are linked to climate change.
  - More than 120 countries have declared a target to reach net zero CO2 emissions, and Japan has also declared its pledge for net zero emissions by year 2050.
  - Companies have also established their 2050 visions for CO2 emissions, medium-term targets (targeting 2030) and action plans.

- Daikin strives toward net zero greenhouse gas emissions based on its Environmental Vision 2050 set forth in FY2018.
- We contribute to curtailing greenhouse gas emissions in society through our products and services that promote energy conservation and mitigate the effects of global warming.


# (1) CO2 Reduction -Refrigerant-related technology

- As a manufacturer that develops and manufactures refrigerants and air conditioners, we contribute to the lessening of the environmental burden through energy-saving equipment and **technology development for low GWP refrigerants** and respond in compliance with the regulations of each country.
- We promote **technology development involving the recovery and recycling** of refrigerant in order to maximally reduce environmental burden and execute initiatives through the product lifecycle.



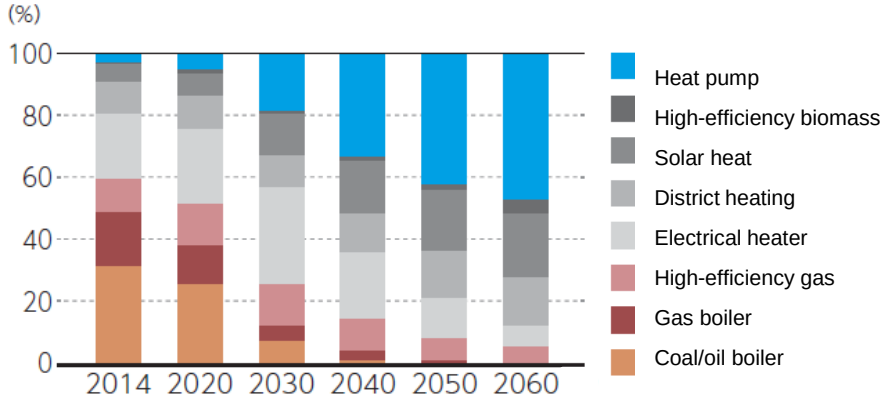



# (1) CO2 Reduction -Expansion of heat pumps

- The trend of moving away from combustion-type equipment is accelerating under the backdrop of global warming and the increase in abnormal weather.
- In Europe, where a large percentage of CO2 emissions derive from heating equipment, a shift is progressing from combustion-type heating using gas or kerosene to heat pump heating, which has a low environmental impact.

The percentage of heat pump type heating that occupies the heating market in Europe is still low, and it is necessary to improve performance of heat pump type heating in order to change a culture in which people have been accustomed to combustion type heating for many years.

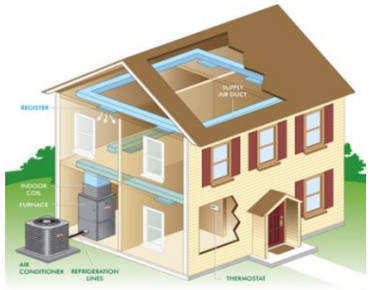
Changes in heat source for heating and hot water heaters to achieve the Paris Agreement




Note: Projections are based on Beyond 2°C Scenario (B2DS), a scenario to keep the temperature rise below 2 °C from IEA, Energy Technology Perspectives 2017.

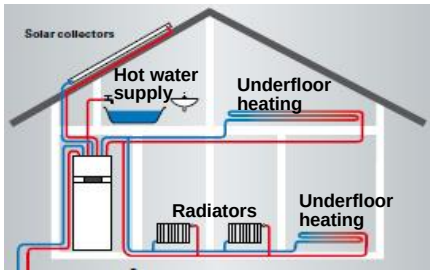
## ■ Main heating methods

North America**: Warm air type** central air conditioning



**Warm air** is created by the heat of combustion gas, and that **warm air is sent by ducts** to each room.

Europe: **Warm water type** central air conditioning

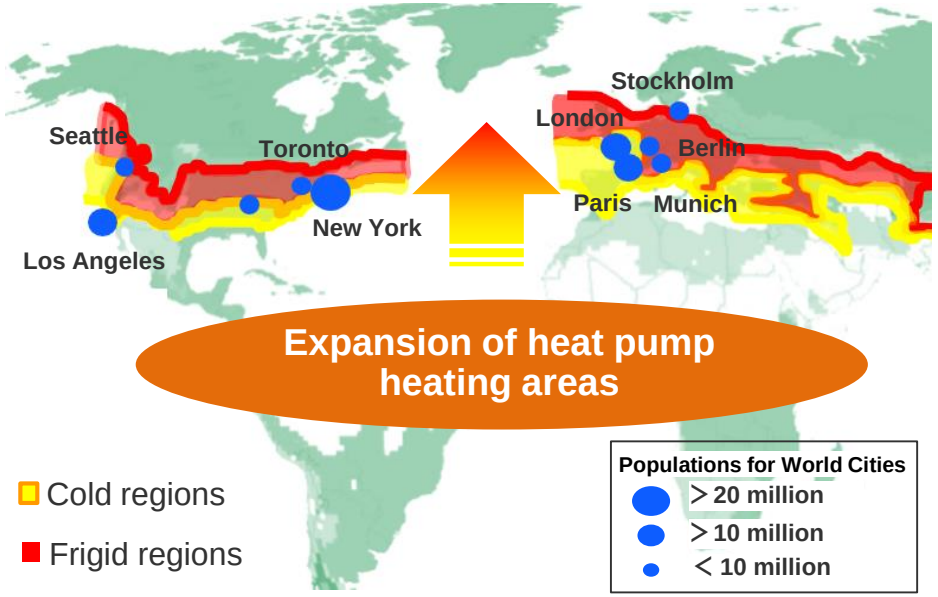



**Warm water** is created by the heat of combustion gas, and **hot water is supplied** to each room **such as for underfloor heating**.

# (1) CO2 Reduction -Expansion of heat pump areas

● To promote conversion to heat pump heating in cold region markets, we have made improvements in heating capacity and efficiency for low outdoor air temperatures.

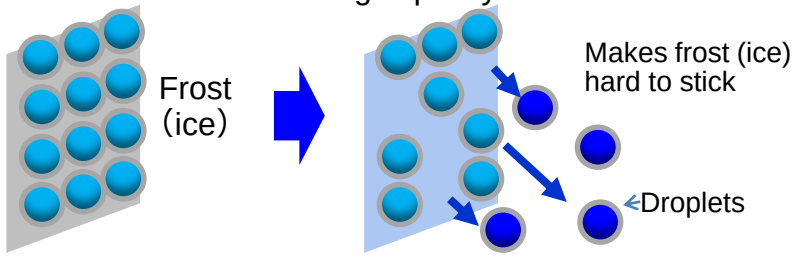

Development of a heat pump heater specialized for the cold region market



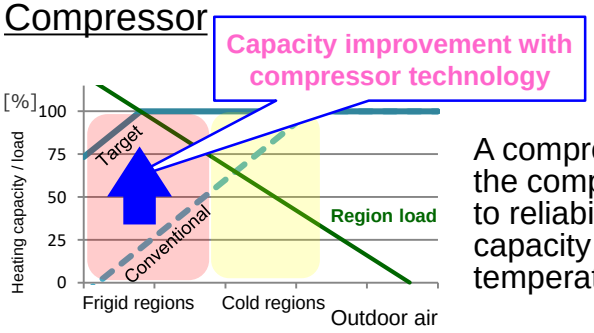

● Initiatives to develop technology specializing in heating functions

## Heat Exchanger

Fins preventing frost formation on outdoor heat exchangers were developed to reduce the defrosting operation time that causes a decrease in heating capacity.




## Compressor




A comprehensive review of the compressor structure led to reliability and high heating capacity under low outdoor air temperatures.

# (2) Energy Conservation -Energy management

- Renewable energy, which can generate electricity without emitting greenhouse gases, is an important technology for realizing a low-carbon society.
- It requires adjustment capacity to absorb fluctuations in solar and wind power generation and consumes a large amount of energy. Technology development is needed energy management for air conditioners.

- Demonstration project in Portugal (2016-2020)

**Automatic Demand Response (ADR) System**

Demand response (DR) is performed in response to a request for power supply and demand adjustment issued by the power system operator based on the power situation and the forecast of the amount of renewable energy power generation.

**Virtual Power Plant (VPP) System**

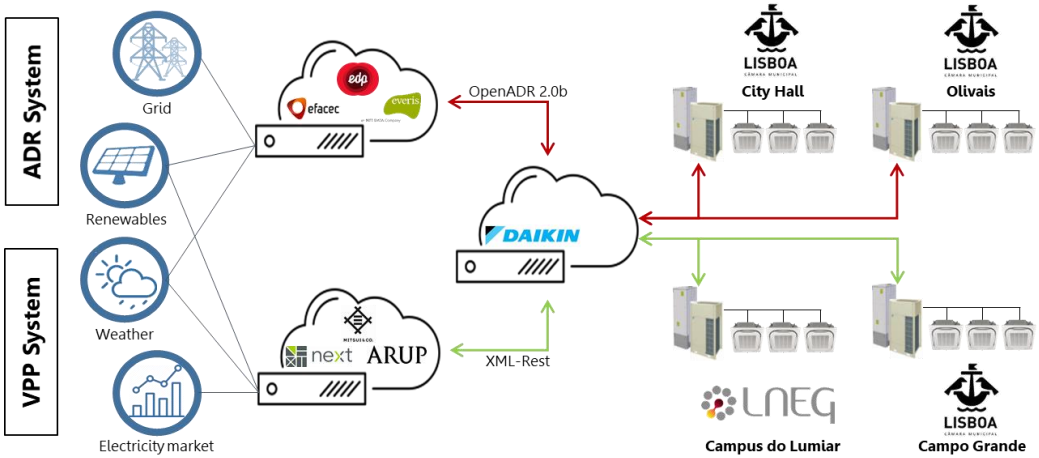
Demand response (DR) is performed based on the market price forecast of kW transactions in the electricity market (supply and demand adjustment market) by VPP operators.

**Demonstration Results**

・It was shown **possible to control for demand forecast with a high DR response success rate**.

・Further gains in effectiveness are expected from improvements in the accuracy of demand forecasting by utilizing AI / machine learning.

・**Calculation logic of the power conditioning amount was constructed** from the high correlation with building load, and the **possibility for adjustment capacity by the air conditioner** was shown.

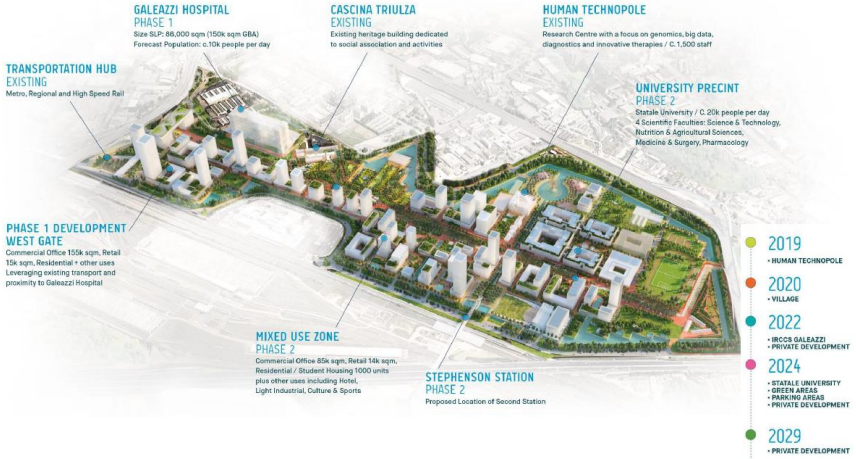


# (2) Energy Conservation -Energy management

## ■Participation in smart city utilizing energy management

● Participation in the innovation ecosystem established in Milan (from December 2020)

Centering on **electrical power cooperation in energy service solutions**, Daikin will enact the PDCA cycle for the **demonstration by planning and specifying themes that it should undertake and actual PoC** from the planning of data coordination for mobility, infrastructure, and sensors as well as for service coordination including finance and insurance.


● Large Housing Development in Singapore (Tengah Project)

A large residential city is being developed in the West Region of Singapore in the area of Tengah (700 hectares) to support 42,000 homes.

・It is a national project that is the embodiment of the government policy for smart cities that include advanced technology, energy-saving facilities and equipment, greenery, transportation with no reliance on automobiles.

・Possessing high-efficiency air conditioning systems that protect the environment and provide energy savings, Daikin is participating in the project and performing a **demonstration for its solutions business, which includes energy management**.

# (3) Safety and Security -Increasing value for air environments

## Needs for safety and security in air quality are growing worldwide


Various filters

Eradicate

Capture

**Creating safe and secure air environments**

Visualize

Remove

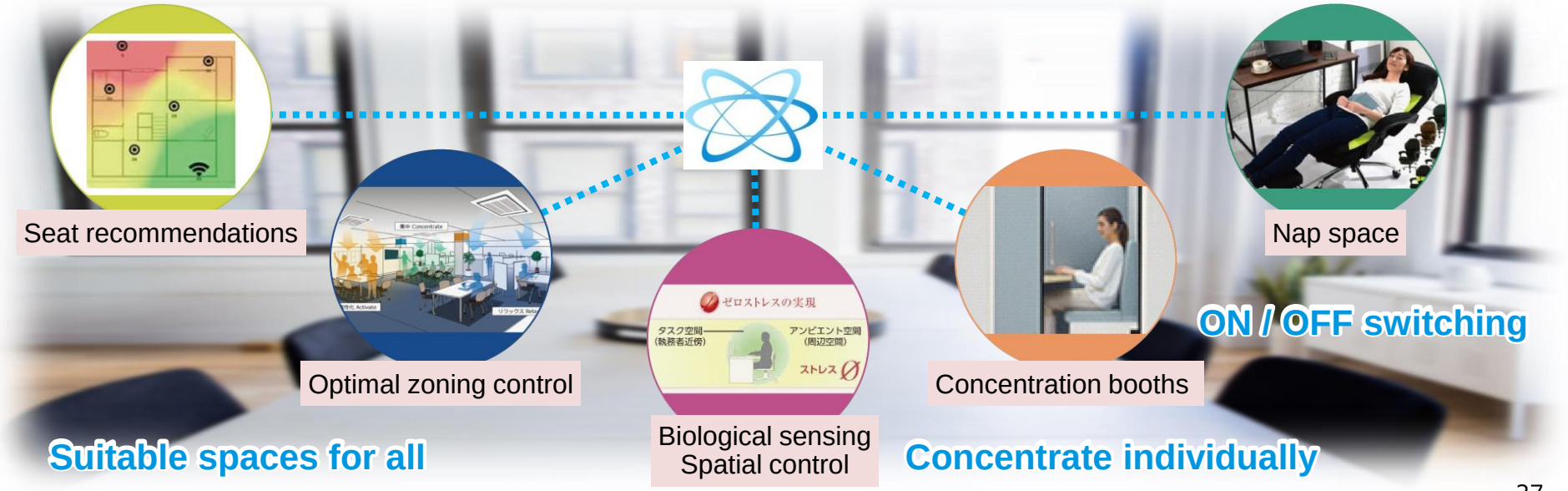

Ventilation equipment

# (3) Safety and Security -Increasing value for air environments

- As the labor force population is decreasing due to the declining birthrate and ageing population, concepts for “work style reform” and “health management” in companies are attracting attention, and these trends are accelerating due to the effects of the COVID-19.
- Office spaces are needed where people can improve their productivity and creativity while spending their work time in good physical and mental health.

point 0
marunouchi

**Demonstration to create a healthy and comfortable office spaces at “point 0 marunouchi”**



# Initiatives for Resolving Social Issues

## Earth

**$CO_2$ Reduction**
- **Refrigerant-related technology**
- **Expansion of heat pumps**

## Cities

**Energy Conservation**
- **Energy management**

## People

**Safety and Security**
- **Increasing value for air environments**

**Challenging ourselves in technology development to solve the fundamental causes of social issues**

$CO_2$ Recovery, Decomposition, and Reuse

Materials of the Three R's

Heat Pump Alternative, Magnetic Refrigeration Technology

**Continue to work to reduce environmental impact for sustainable growth**

# 3. Product development initiatives for the short term

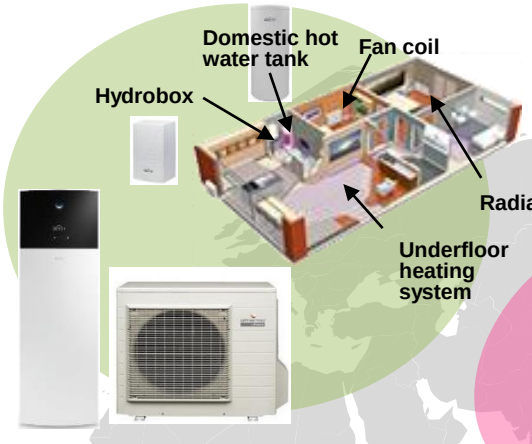
(1) Global AC market diversity
(2) Close market proximity and base model concept
(3) Specific examples of base model and modular concept
(4) Ideal development team for the future

# (1) Global AC Market Diversity -Preferences

■ Customer preferences for air conditioners vary according to country and region because of different climates and housing styles. For this reason, Daikin has developed products that meet the local needs of customers around the world.

**Europe**

Hot water heaters and heating systems

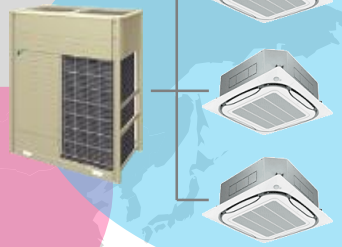




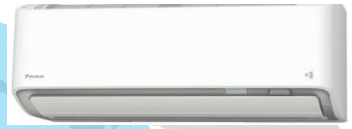

"Daikin Altherma" water heater

**Japan**

Ductless AC system



**Urusara X** equipped with ventilation function




Launch X, **Carrime**

**North America**

Ducted AC for the entire building and Applied Systems (commercial use)

**China**

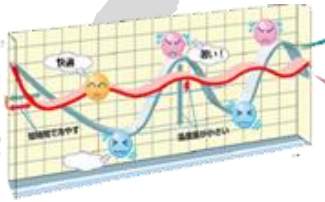
High-end, multi-split AC for residences


**7th Daikin Residential Central AC**

Indoor units can be freely selected according to the room and usage

**Asia**

Cooling-only inverter type AC and high outdoor temperature specifications

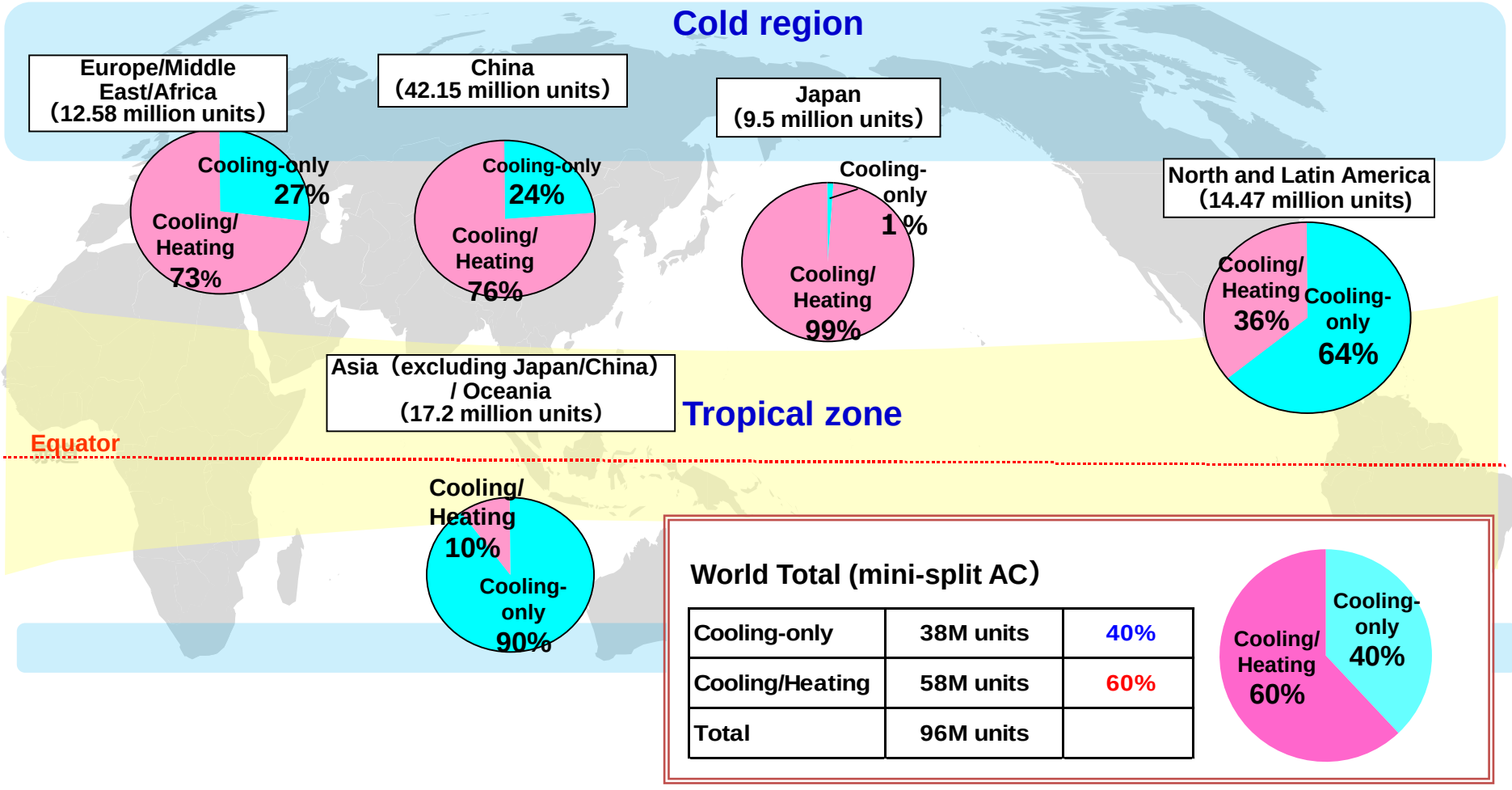


# (1) Global AC Market Diversity -Climate

■ Development is divided into three regions: cooling-only, cooling/heating, and heating.

The number of cooling-only regions is estimated to significantly increase in the future.

Combustion heating is being replaced by heat pump heating in the heating region.




**World Total (mini-split AC)**

| | | |
|---|---|---|
| Cooling-only | 38M units | 40% |
| Cooling/Heating | 58M units | 60% |
| Total | 96M units | |




Source) Survey by Japan Refrigeration and Air Conditioning Industry Association

# (1) Global AC Market Diversity -Regulations and standards

■ Some laws and regulations will vary by country and region (energy-saving regulations, harmonics [EMC] regulations, etc.) In particular, trends in energy-saving regulations are greatly related to product development.

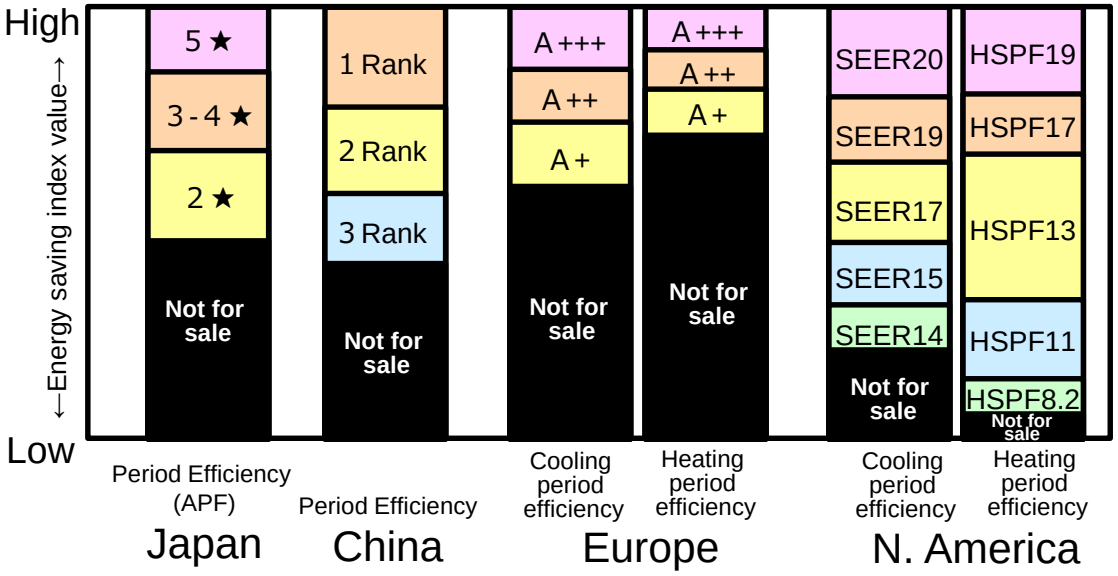
○**Laws and regulations related to the environment:**
Energy-saving, ozone protection, refrigerant, 3 R's, and chemical substance regulations

○**Laws and regulations related to product safety:**
The International Electrotechnical Commission (IEC) proposes international standards for some areas such as high-pressure gas regulations, electrical safety, electromagnetic wave / harmonic regulations, but some laws and regulations vary according to country and region

**Examples of regulations set for each country:**

■ Energy-saving regulations (global)
In cooling and heating regions, regulations are tightening every year based on period efficiency (APF, SEER, etc.)

Energy-saving Regulations by Country (mini-splits 3.5kW)




■ EMC regulations (partial)
Regulations against electromagnetic interference with other equipment

| | Laws citing standards, Standard issuer |
|---|---|
| Japan | Electrical Appliance and Material Safety |
| EU | EMC Directive |
| U.K. | Energy Network Association |
| U.S. | FCC Rules/IEEE Standards |
| China | China Nationals Standards |
| Taiwan | CNS Standard |

## (1) Global AC Market Diversity -Close market proximity

■ By responding flexibly and quickly to **changes in a diversity of needs** and **unpredictable risks** such as natural disasters and COVID-19, we have realized **manufacturing that delivers safety and security** to our customers.

Quickly identifying the diverse needs of each region, increasing cost competitiveness, and creating products that are needed in the market

Continuing stable operations even under unpredictable conditions that occur on a global scale during the COVID-19 pandemic

**Close market proximity** refers to the development and production of products in the regions where they are to be sold in order to quickly deliver products to customers in times of uncertainty

## (2) Close Market Proximity and Base Model Concept -Close market proximity

■ By being in close proximity to the market, we **build systems that can quickly respond to local needs**. However, there is a risk of inefficiency overall due to the advance in individual optimization and lack of standardization of equipment and parts.

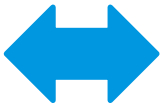
### Close Market Proximity

(1) Develop products that meet local needs in each region
(2) In principle, locally sell the products produced locally.

- ■ Product development that captures the ever-changing needs of each region
- ■ Shortening of lead time from development to production to supply
- ■ Response to BCP and geopolitical risks

As a result,

・Self-sufficiency and individual optimization advance.
・Speed is fast for investment decisions such as from marketing to product planning and development, production preparation, and production.



However,…

・Management concentrates on themes at hand.
・Equipment and parts are not standardized.
・Overall operations may be inefficient. (There is no overall optimization.)

## (2) Close Market Proximity and Base Model Concept -Base model concept

■ We move forward with a "base model concept" that enables the regional development bases to quickly develop products that meet the needs of their region, enabling products to be efficiently deployed worldwide.

### Base Model Concept

A new **“base model”** is developed that allows **easy rearrangement of its various components** at the global development bases.

#### Japan’s role

Focus is on basic technology development and development of components to be equipped on the base model

**Improvement in cost competitiveness and a strengthening of energy-saving and differentiated technologies**

#### Role of global base

Each regional development center designs an arrangement of the product that meet the needs of its region

**Quick development for overall global deployment**

# (3) Specific Examples of Base Model and Modular Concept

**-Base model development concept**

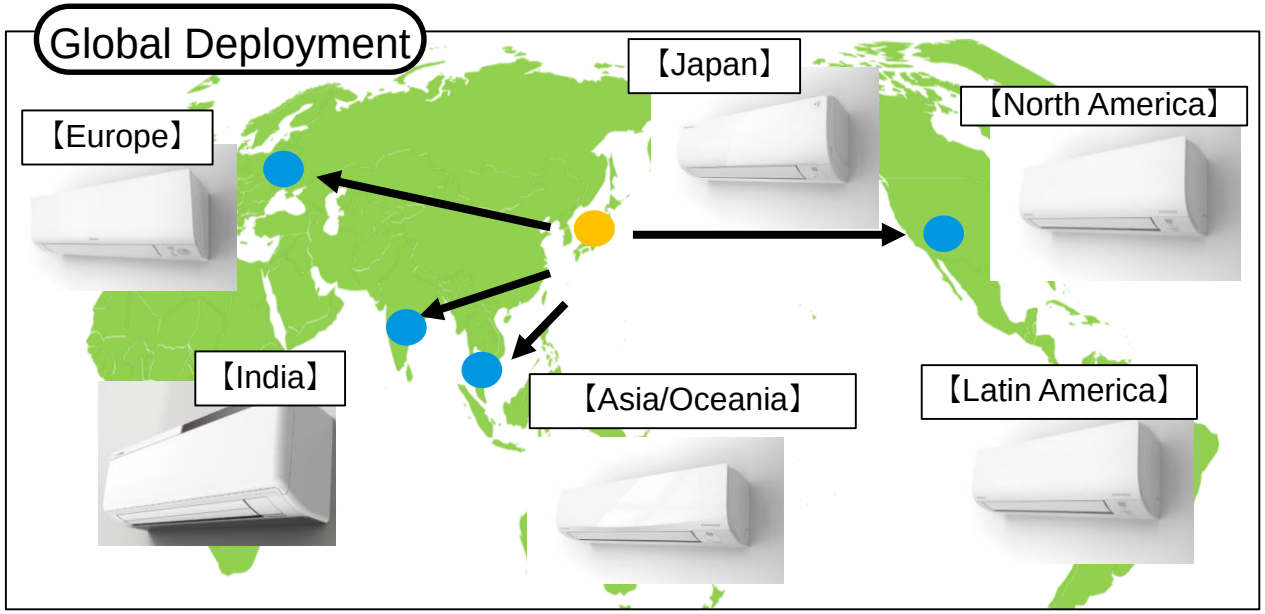
■ Targeting the volume zone for residential use, we are meticulous in standardization and will introduce a wall-mounted base model with high basic performance and cost competitiveness that has excellent product appeal as we continue to work on development to meet a wide variety of needs.

## Base model development concept

**1** **Specifications standardized for parts and materials** to equip and **cost reductions are maximized** further by **adopting the lowest priced materials and parts**.

**2** **Blower technologies are enhanced** to **reduce the cost of core parts with high cost weight**.

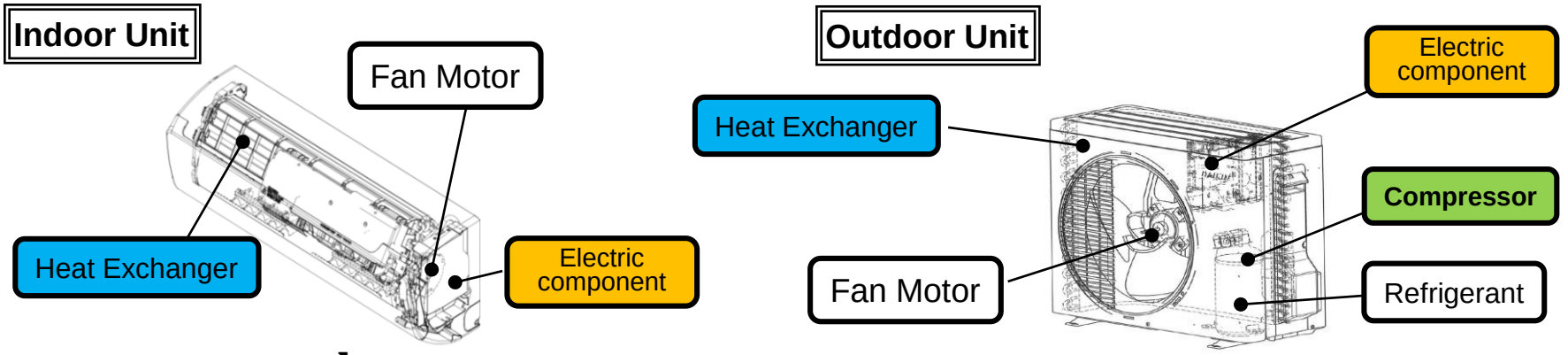
**3** A **modular concept with customizable functions** is incorporated to speedily respond to diversified needs.



# (3) Specific Examples of Base Model and Modular Concept

**-Examples of base model initiatives (cost reductions)**

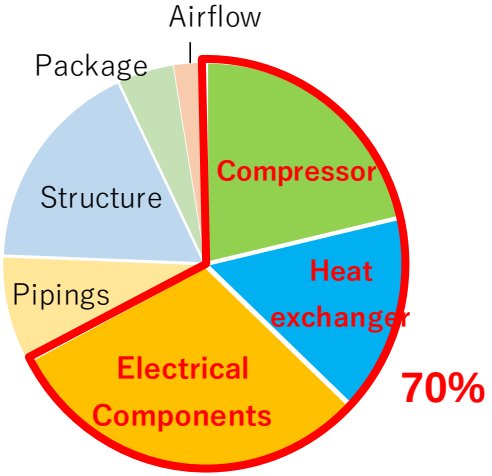
■ For both indoor and outdoor units, we strive to lower costs by reducing the cost weight of components using blower technologies that can generate a large amount of airflow with low sound.

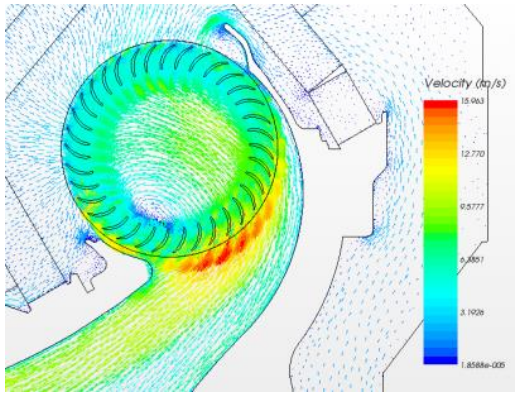


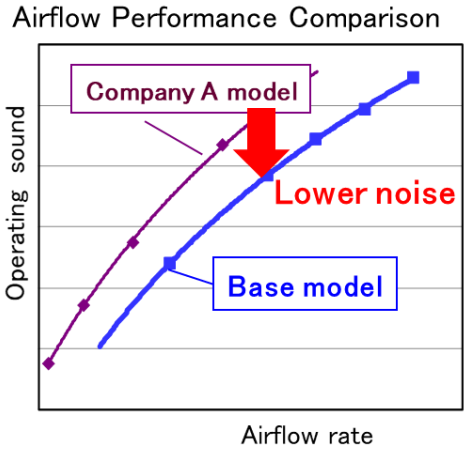

【Cost Distribution Ratio】

○Compressors, heat exchangers, and electrical components account for 70% of costs
⇒ **Cost reduction from consolidation**

○Airflow performance is improved by analyzing blower noise, and **components with high cost-weight are reduced** by **increasing the air volume** with equivalent level of operating sound





# (3) Specific Examples of Base Model and Modular Concept

-Approach to modular concept

■A new wall-mounted base model has been developed that is modularized for **each function so that functions** can be **customized according to local needs** from the conventional mother development that is individually optimized.

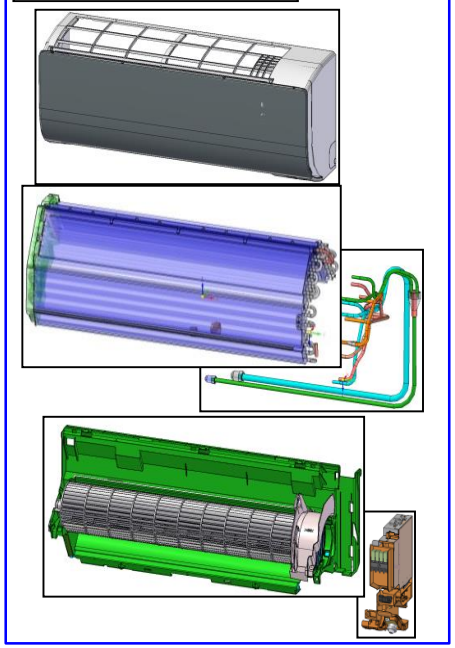
**Fast development is realized to meet a wide range of needs.**

## Indoor Unit Modular Concept

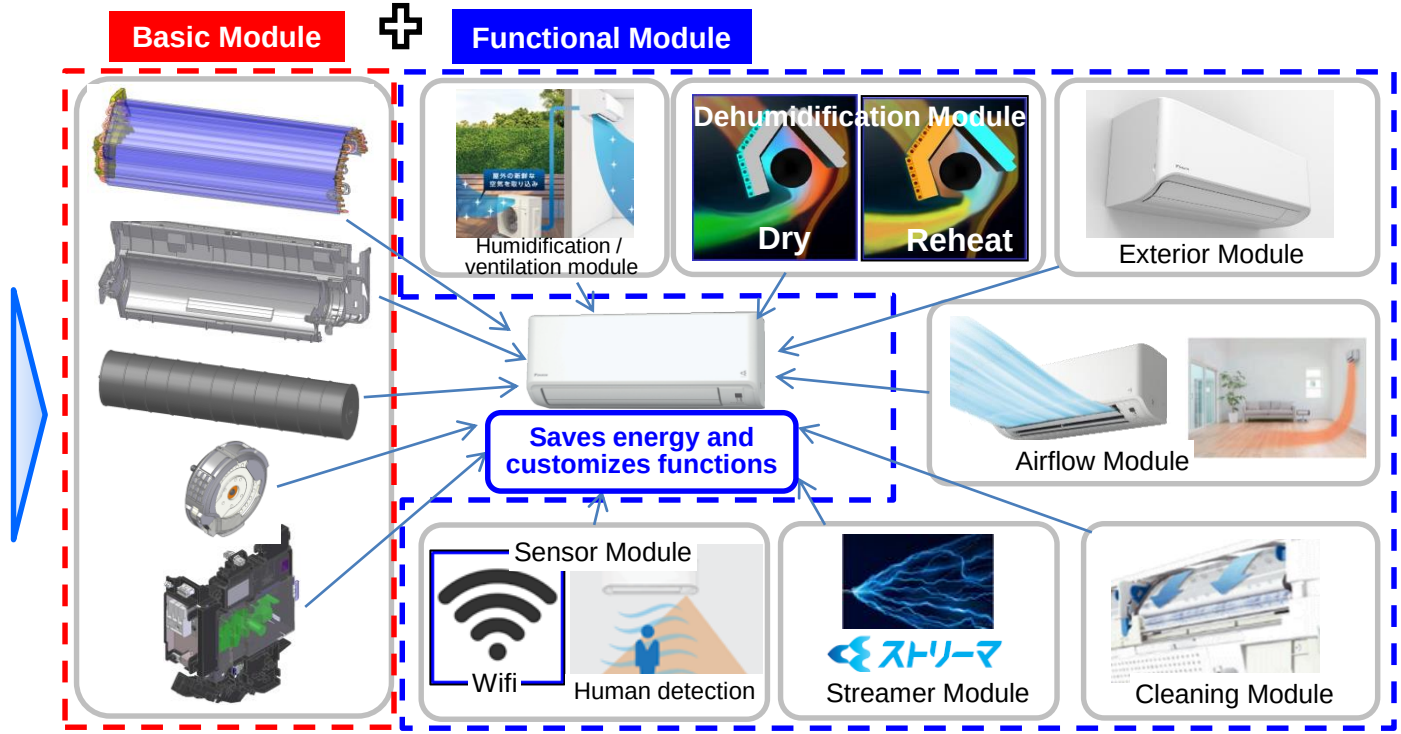
**<Conventional base model>**

○Limited capability to add functions and required substantial man-hours for customized development

Conventional base



○The air conditioner concept has been updated to a modular assembly and changed to development that is divided into **basic modules that operate products** and **functional modules that create added value**.




○Functional modules developed at bases are **quickly deployed to each global region** including China, Asia/Oceania, Europe, North America, and India.

# (3) Specific Examples of Base Model and Modular Concept

## -Specific examples of modular concept (Short-term development of RA equipped with ventilation functions)

■ **Short-term product development** has been realized by making maximum use of indoor unit base models that incorporate the modular concept. A **ventilation function that provides safe and secure air environments to customers** will be **fully deployed in mini-split air conditioners**.

## ■ Ventilation product improvement

As with ventilation function added to the flagship model **Urusara X**, **standard model of mini-split air conditioners will be equipped with a ventilation function** during this fiscal year.

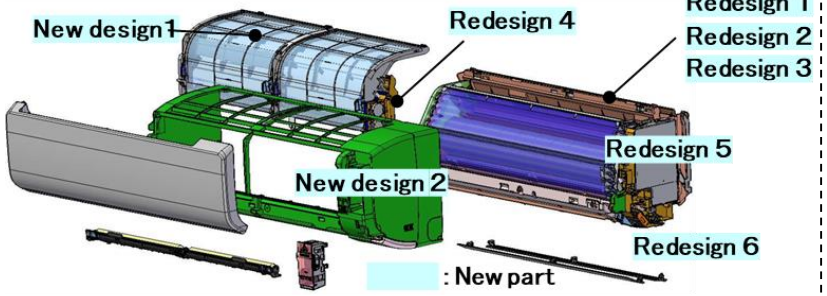
By interlocking with CO2 sensor equipped to **Beside**, interlocked ventilation and air conditioning operations are performed based on CO2 concentrations.
(compatible with all models)


+

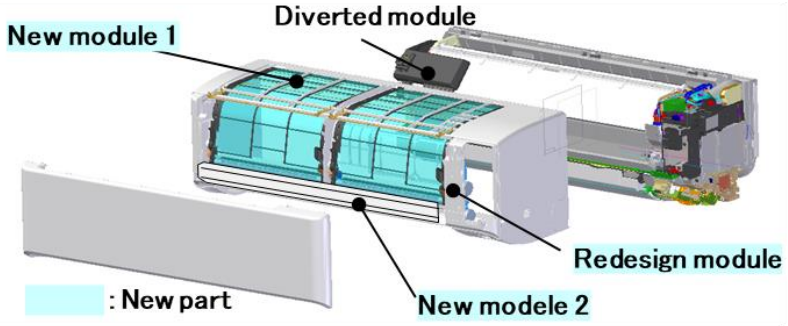

## ■ Example of modular development

A **ventilation model was realized in a short timespan** by **utilizing a modular indoor unit** and specializing in ventilation for function.(Compared to conventional development, development time and man-hours were reduced by half and development investment was less than half.)

**Conventional Development**




**Modular Development**



## (4) Social Issues That Daikin Can Help Solve

**Daikin contributes to the sustainable development of society by solving all social issues related to air and the environment**

### Social Issues That Daikin Can Help Solve

**Intensifying atmospheric pollution and pandemics**

- Providing of safe and secure ventilation and air quality
- Pursuit of adding value to air

**Intensifying climate change**

- Support for low GWP refrigerants
- Expansion of 3 R's adoption
- Further reduction in environmental load of products
- Improvements in energy-saving technologies

**Increase and concentration of demands for electricity and other energy forms**

- Expansion of support for renewable energy
- Efficient energy use in buildings and cities overall

**There are many development issues to be solved**

**Daikin aims for a development team that actively implements technological development by fully utilizing the technologies, products, and services that the company has cultivated until now**

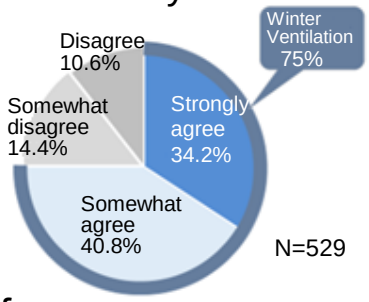
# (4) Initiative Example [1]: Providing a Secure Indoor Environments

**(expansion of ventilation products)**

■ **Implementing speedy development** is necessary to **quickly capture the growing demand for ventilation and cleaning around the world**.
■ Daikin will respond quickly with **close market proximity along with base models and a modular concept**.

## ■ Ventilation issue in winter

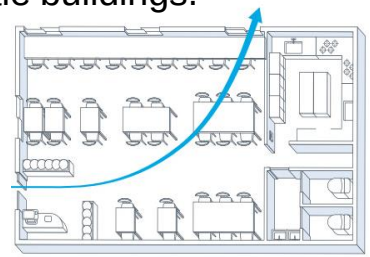
In Hokkaido and Tohoku, **infection clusters repeatedly occurred due to lack of ventilation** at restaurants.
The Hokkaido government took measures by establishing its own alert level system.


According to the "Ventilation Awareness Survey," the number of **people who ventilate during winter** is high at **75%**.

## ■ Changes in awareness with COVID

**Even for small stores, awareness has increased for ventilation**, which was once only common for large-scale buildings.



**Being able to properly ventilate** in a store is a prerequisite for **being chosen by a customer**.

**Expectations are high for safe and secure ventilation and air quality.**
**Daikin will respond flexibly and quickly in** development for all need products and services **by utilizing close market proximity, base models, and the modular concept.**


Residential-use products


Solutions & After Sales Service

Heat exchanger unit-exposed type

Venti-air

Ventilation recovers and release "comfortable humidity"
Flexible equipment patterns make retrofits easy


Commercial-use products

# (4) Initiative Example [2]: Contributing to the Global Environment

**(circular use of refrigerants )**

■ **Aiming for net zero greenhouse gas emissions in 2050**, Daikin added this target to its Fusion 20 latter-half three-year plan from last year and has started efforts. As a company that handles both air conditioners and refrigerants, we will **take the lead in solving environmental and energy problems.**

## ■ Previous "Environmental Action Plan 2020" initiatives

Having focused on the worldwide adoption of environmentally conscious products such as air conditioners that use inverter technology and low GWP refrigerants, we will achieve our targets ahead of schedule.

| Environmental Action Plan 2020 | 2020 Targets | 2019 Results |
|---|---|---|
| Contribution to greenhouse gas emission reductions | 60 million tons CO2 | 68 million tons CO2 |

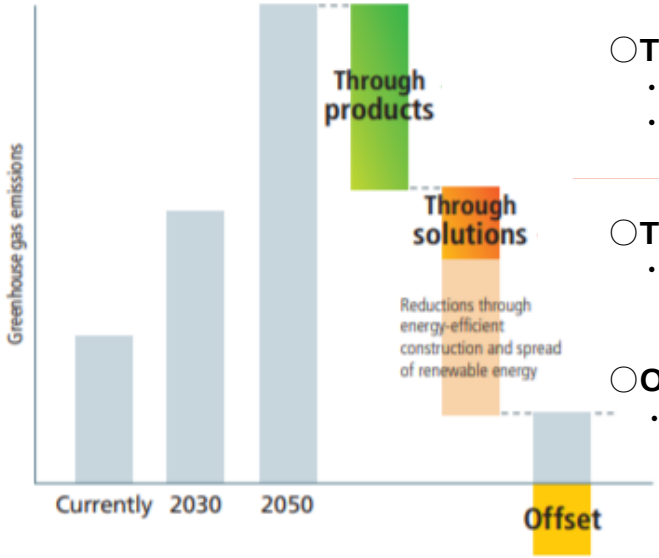
## ■ Total sales of R32 air conditioners

**Over 25 million unit in over 100 countries**

Current to June 2020


## ■ Aim for net zero greenhouse gas emissions in 2050

Together with reflecting net zero in F20 latter-half three-year plan, we are also promoting a medium- to long-term strategy targeting 2030.




### ○Through products

- Higher energy-efficient products
- Development and adoption of refrigerants with lower GWP

### ○Through solutions

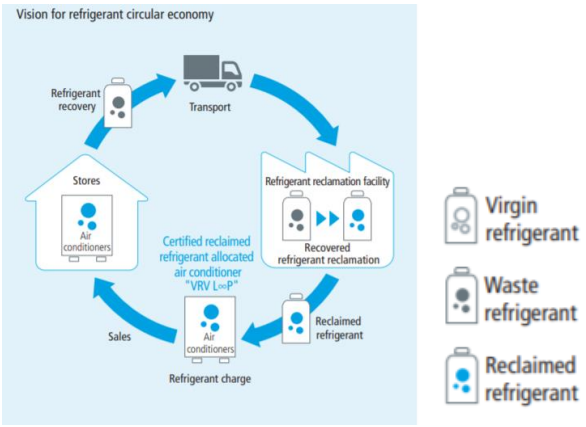
- Provision of energy services throughout the value chain

### ○Offset

- Switching, recovering, and recycling refrigerants in the market.

## ■ Example of offset: Circular use of refrigerants in Europe

Daikin aims to build an economically viable system and quickly promote the circular use of refrigerants

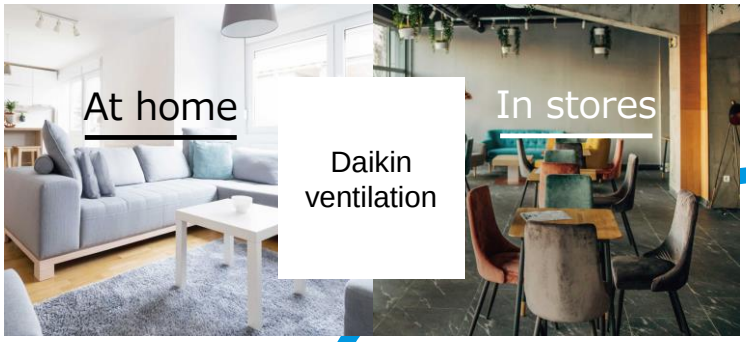



Vision for refrigerant circular economy

## (4) Ideal Development Team for the Future

# Celebrating the 100th anniversary of Daikin in 2024

Daikin intends to quickly meet diverse customer needs with its unique products and services while taking on a leadership role for harmony of the global society as an advanced environmental company.





We wish to be a development team that creates secure and abundant air environments

## Notes on forecast

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