

Daikin's Effort towards Carbon Neutrality through High-efficiency AC systems



Shu Kawasaki
Daikin Industries, Ltd.

Goal: Carbon Neutrality by 2050

→ Through high-efficiency AC systems using:

1 Low GWP refrigerants

- Reducing GHG emissions
by transitioning to lower GWP refrigerants (**R32**)

2 Inverter technology

- Energy efficiency (EE) for consumers
(Environmental & economic benefits)
- Can **avoid** developing new power plants (social benefit)

Introduction & Daikin's Environmental Vision for 2050

Who we are



Key words that Express
Daikin: →

Founded in
1924
96 Years of History

**Comprehensive
AC Manufacturer**
handling both AC equipment
and refrigerants

Business
Development in
160+
Countries

77%
of Daikin Sales are
from outside Japan

84,000+
Employees

100+
Production Bases
In the World

¥2 trillion
Overall Sales

**People-Centered
Management**

Air conditioning



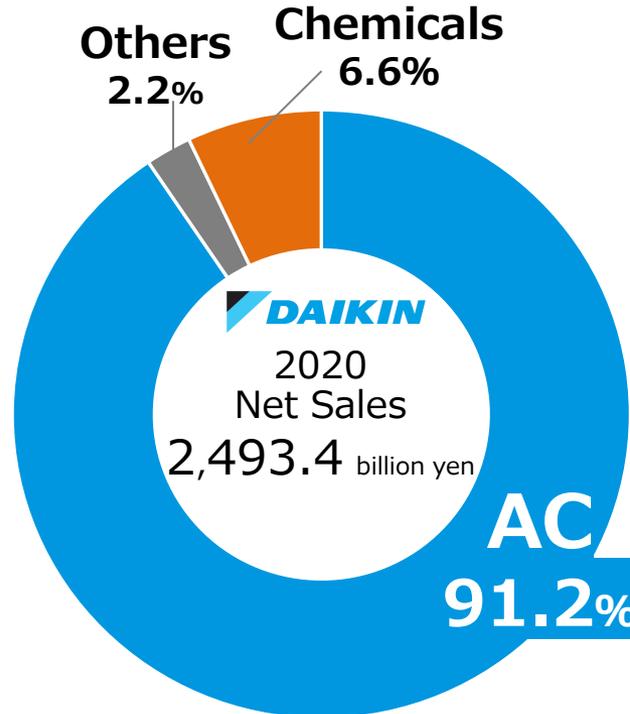
Residential



Commercial



After Sales Service



Other businesses



Oil Hydraulic Equipment

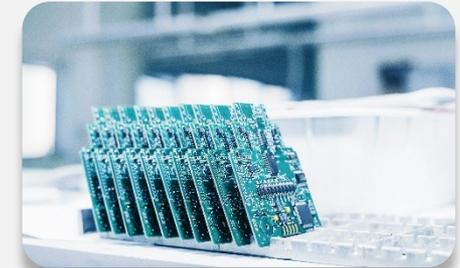


Oxygen concentrators

Chemicals



Refrigerant



Semiconductor Applications



Automotive Applications

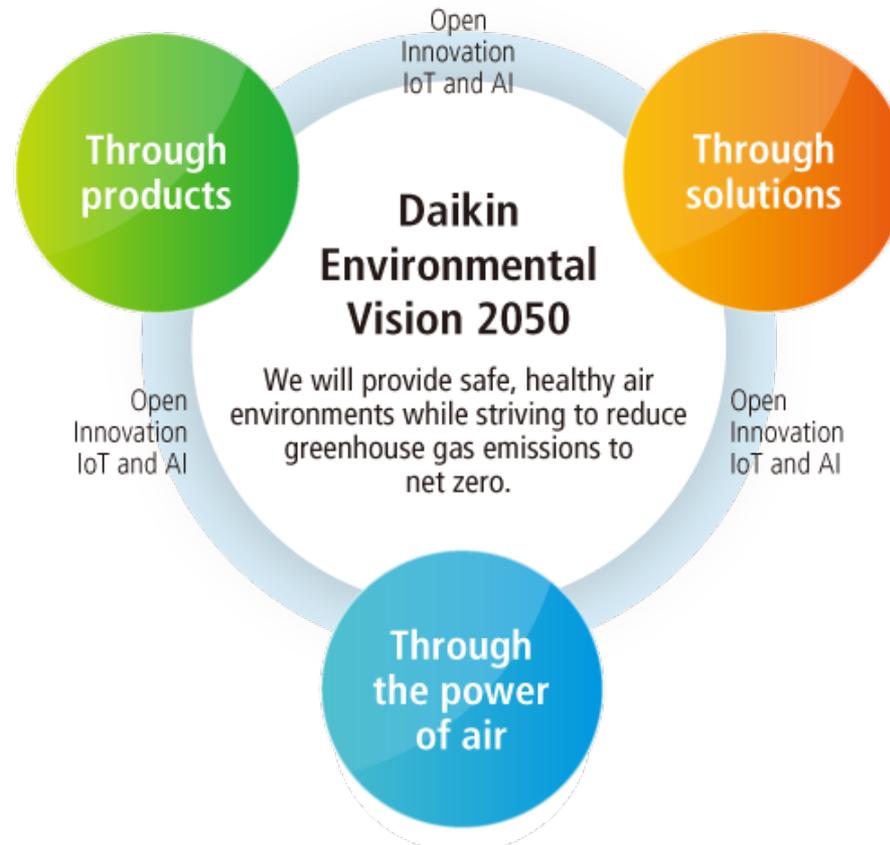
Reduce GHG emissions from our products through the entire product life cycle

→ In cooperation with stake-holders by using IoT, AI, & open innovation

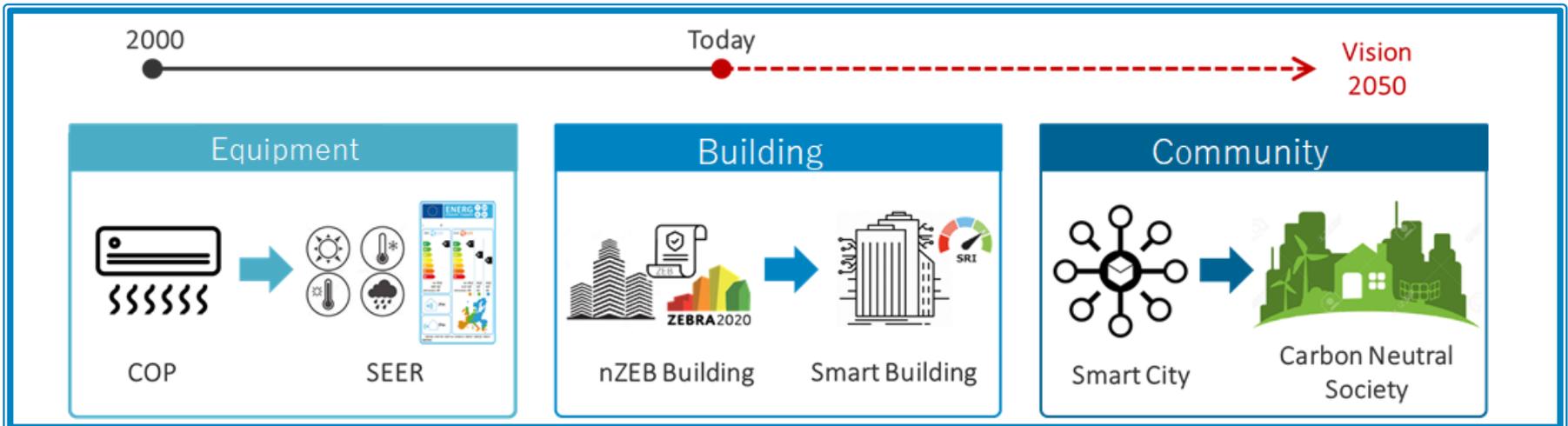
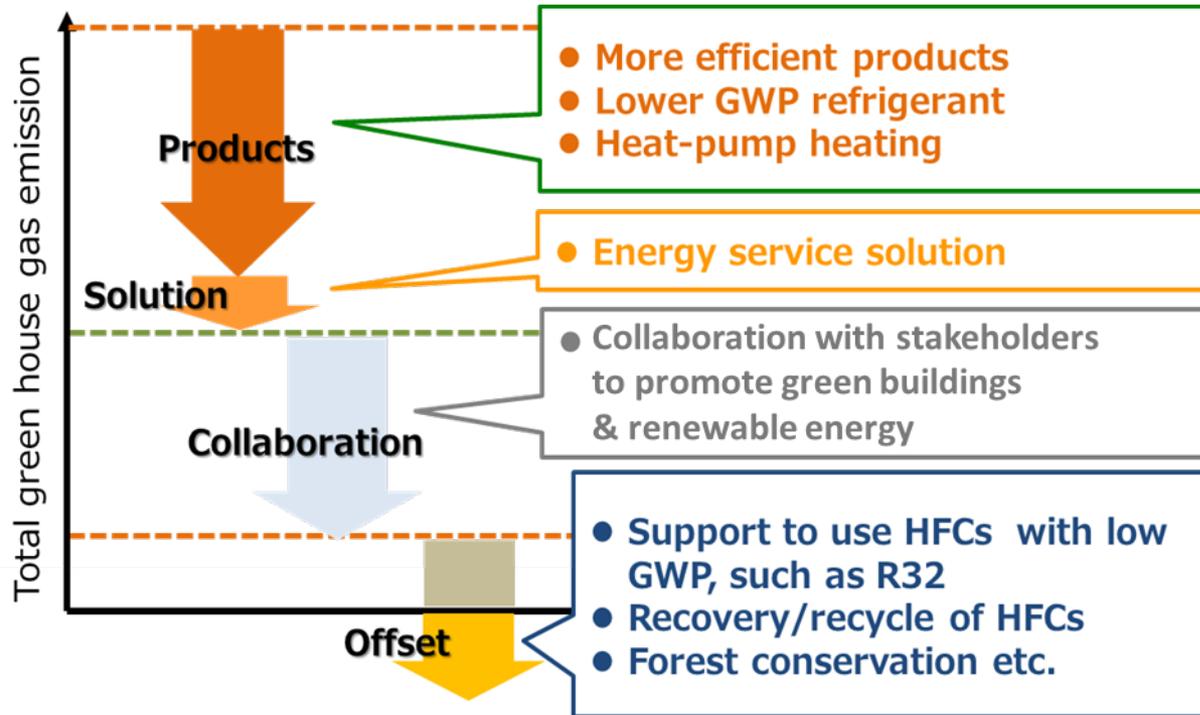
Providing safe and healthy air: Indoor environmental quality (IEQ)

→ Reduced health risks (infectious diseases, pollen, heatstroke, etc)

→ Improved working environment & sleep quality



Roadmap to achieve Carbon Neutrality



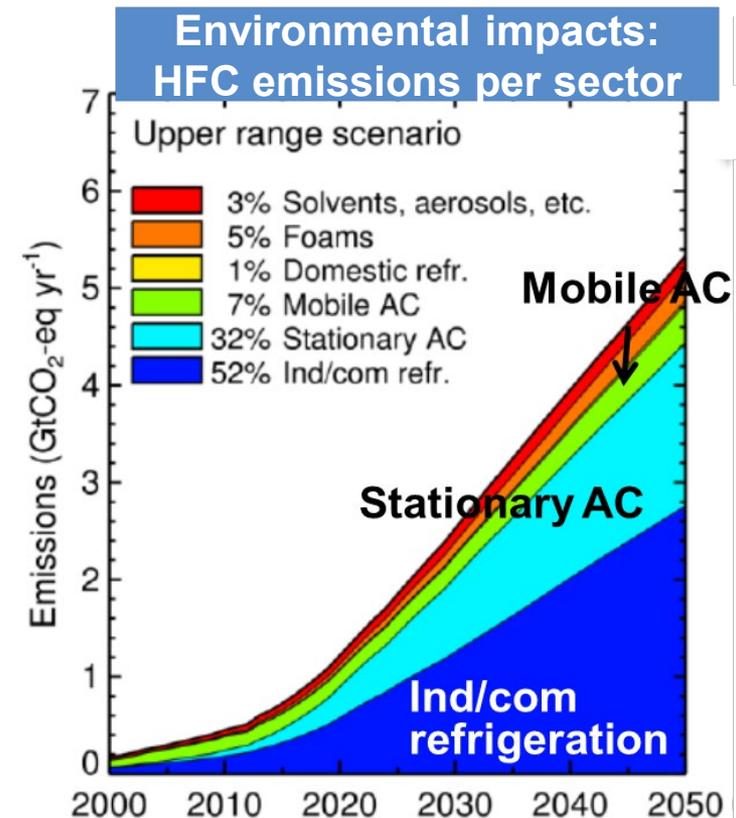
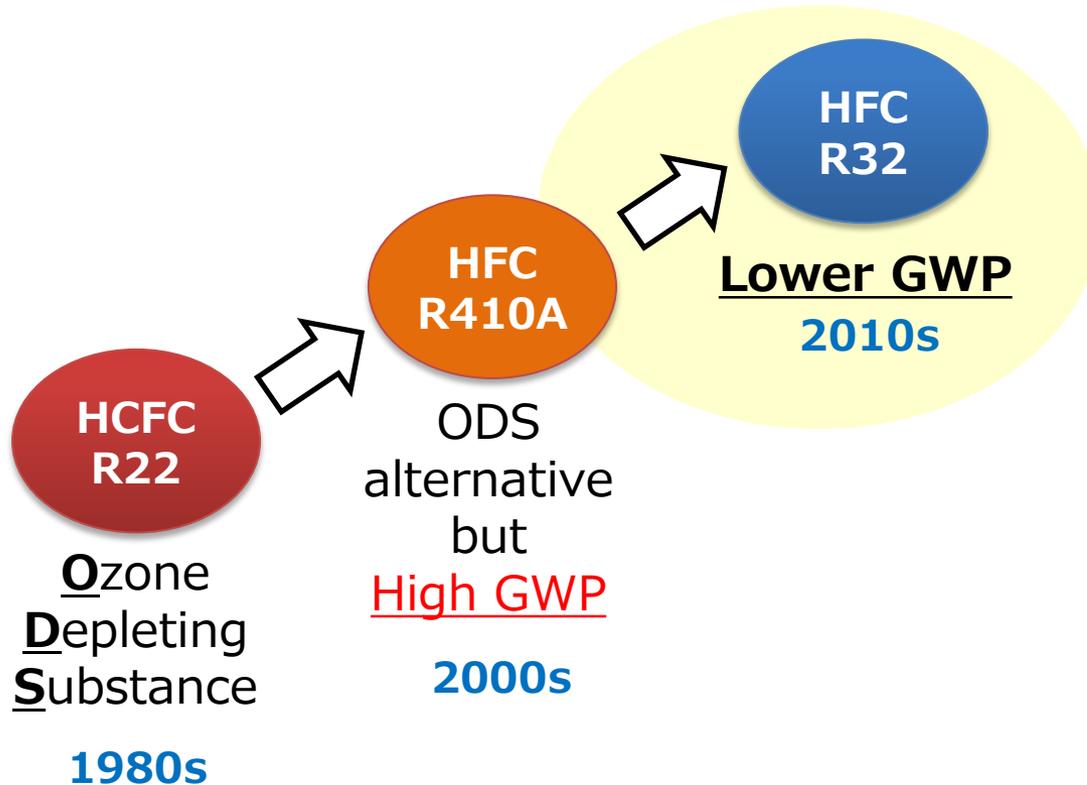
① Low GWP Refrigerants

1 Climate impact of refrigerants

R32: Transitioning to low GWP refrigerants to reduce environmental impacts

the Sooner, the Better Approach

→ Adapting new technologies as soon as they are discovered

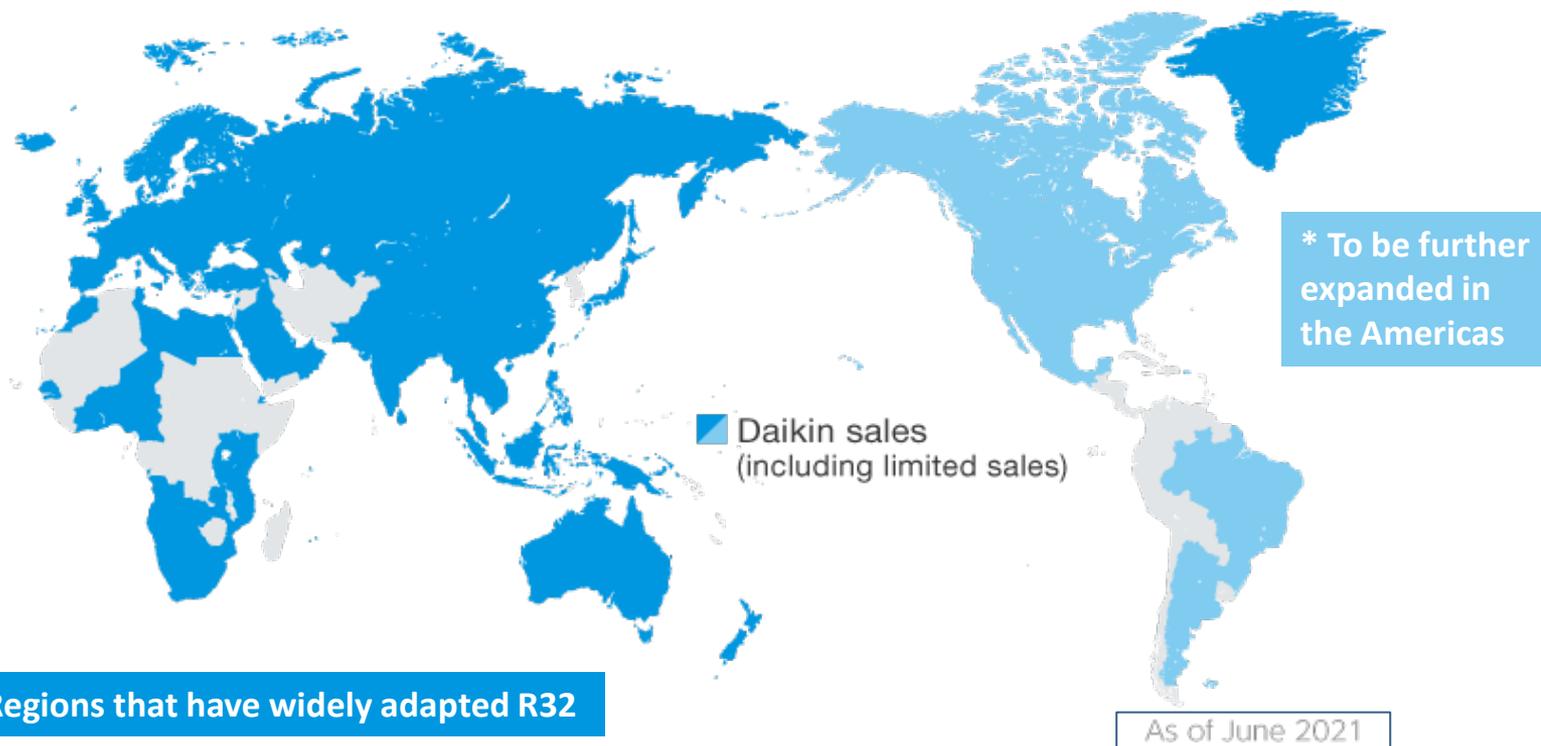


1 Dissemination of R32 in residential AC



Daikin is promoting lower GWP refrigerant R32 since 2010

- R32 has over 50% market penetration around the world today.
- Approx. 260 MM tons of CO₂ *2 is estimated to be reduced(2021)



- Daikin has sold approx. 33 million units in more than 100 countries & regions*1
- Global total approx. 160 million R32 RA units has been sold (estimation)

*1 Cumulative total since 2012

*2 In case of 1.3kg (including extra charging when installation) of refrigerant charge.

Refrigerant charge volume reduction and improvement of Energy Efficiency derived from R32 use are not considered.

2

Inverter Technology

2 Social impact of AC on energy demand

Key elements are . . .

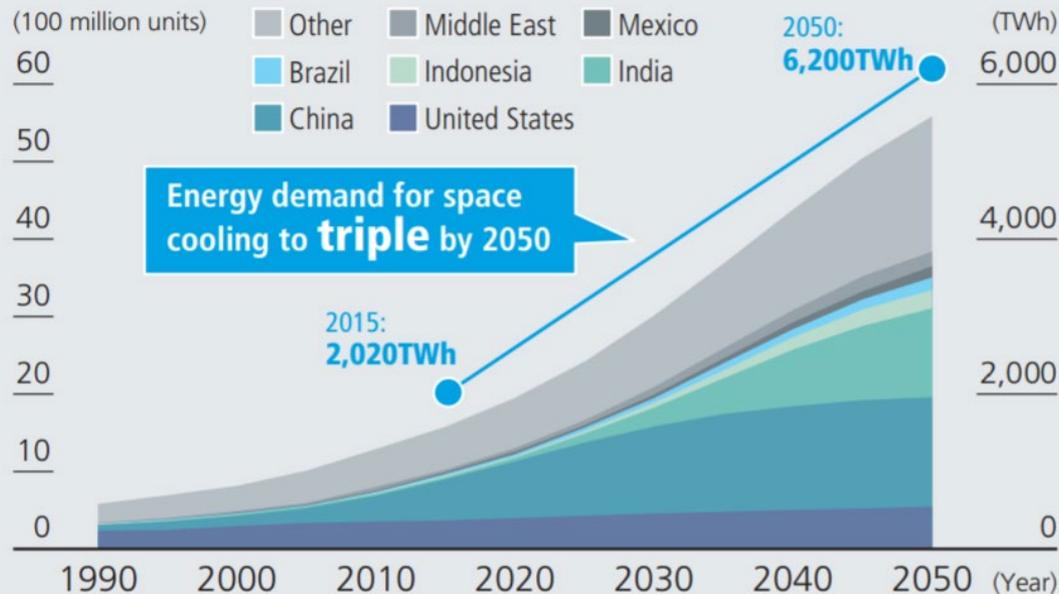
ACCESS TO AC

Essential for:
Human development, health,
well-being, & economic productivity

ACCESS TO ELECTRICITY

Increased **AC demand**
= **increased energy demand**
→ *Critical to expand/maintain renewable energy*

Worldwide AC stock and electricity demand



Note: Graph figures compiled by Daikin based on IEA *The Future of Cooling*

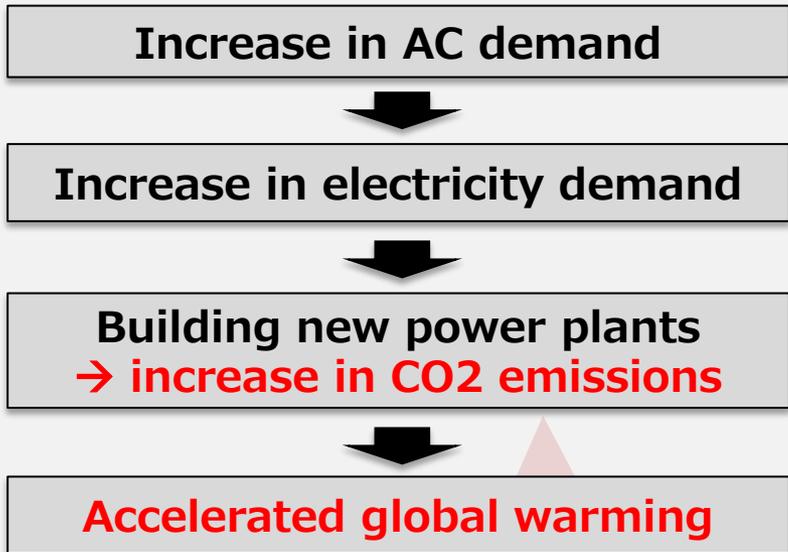


2 Energy challenge → Inverter solution



We are promoting **inverter technology** to drastically reduce energy demand issues and **avoid new power plant development**

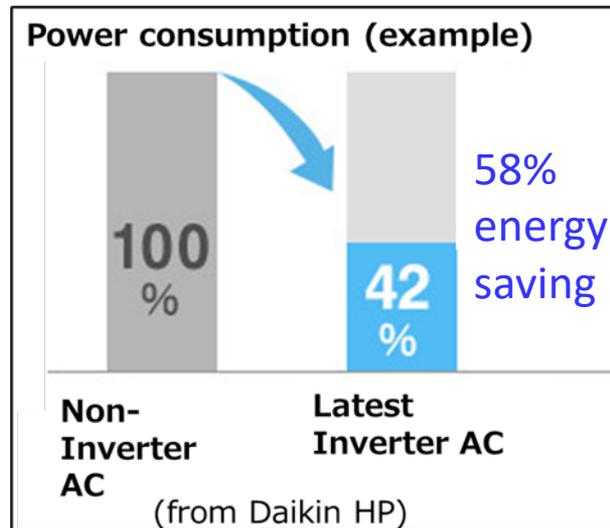
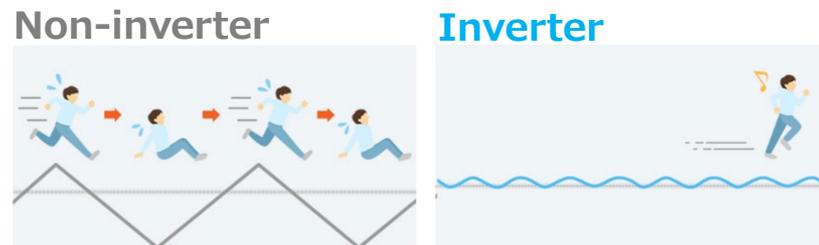
Worst-case Scenario



How can we avoid this situation?
What is a technological solution?

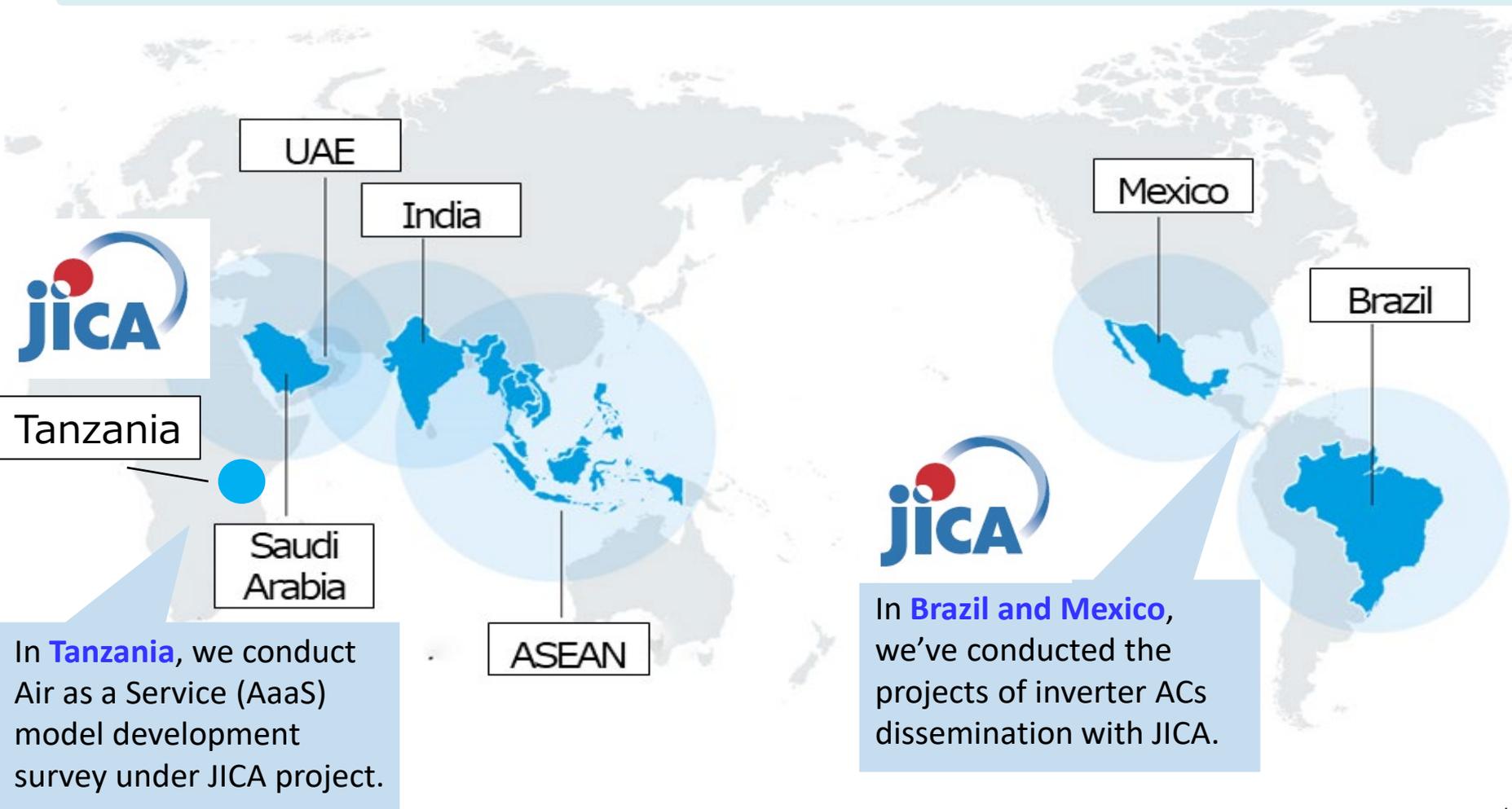
Inverter AC:

Efficiently controls motor speed within the compressor
→ **Reduces energy consumption by about 60%** compared to non-inverter (on-off) systems



2 Intl cooperation to promote inverter

Knowledge transfer: spreading technology & policy development
Promotion of carbon neutral technology to emerging markets to mitigate climate change



Tanzania

Saudi Arabia

UAE

India

ASEAN

Mexico

Brazil

In **Tanzania**, we conduct Air as a Service (AaaS) model development survey under JICA project.

In **Brazil and Mexico**, we've conducted the projects of inverter ACs dissemination with JICA.

2 AC demonstration project in Brazil (JICA)



Objective

1. Comparison of electricity consumption:

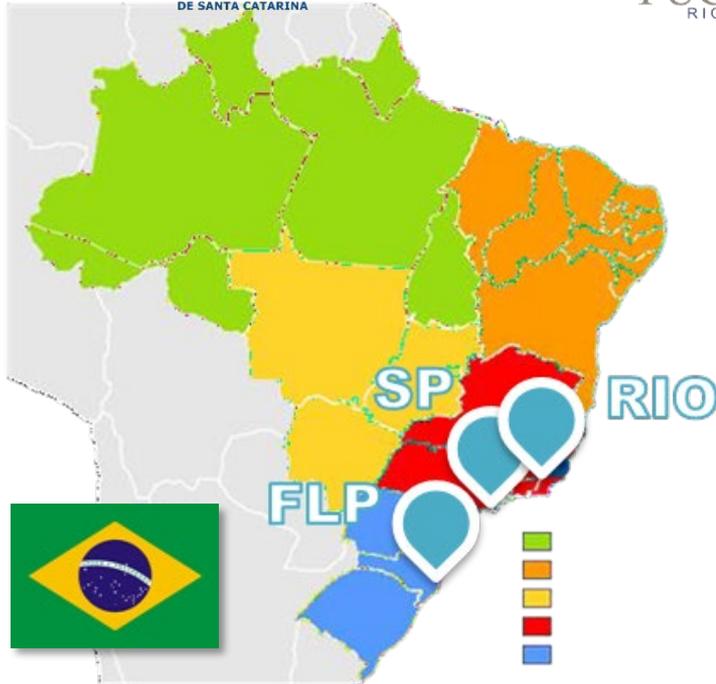
R32 inverter vs. R410A non-inverter RAC

Climate and economic impacts in 3 cities:

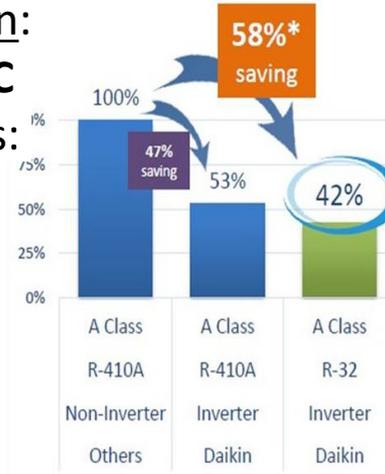
Sao Paulo, Florianopolis, Rio de Janeiro

2. EE Policy Development

Project Players



Project Results



UFSC
FLORIANÓPOLIS/SC
JAN ~ FEB/2018



MAUÁ
SÃO CAETANO/SP
MAR ~ MAY/2018



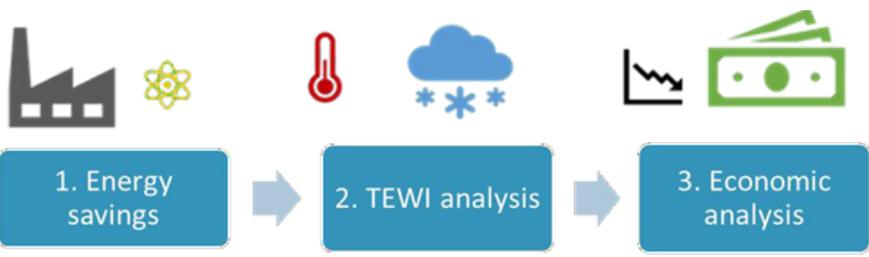
PUC-RJ
RIO DE JANEIRO/RJ
APR ~ JUN/2018



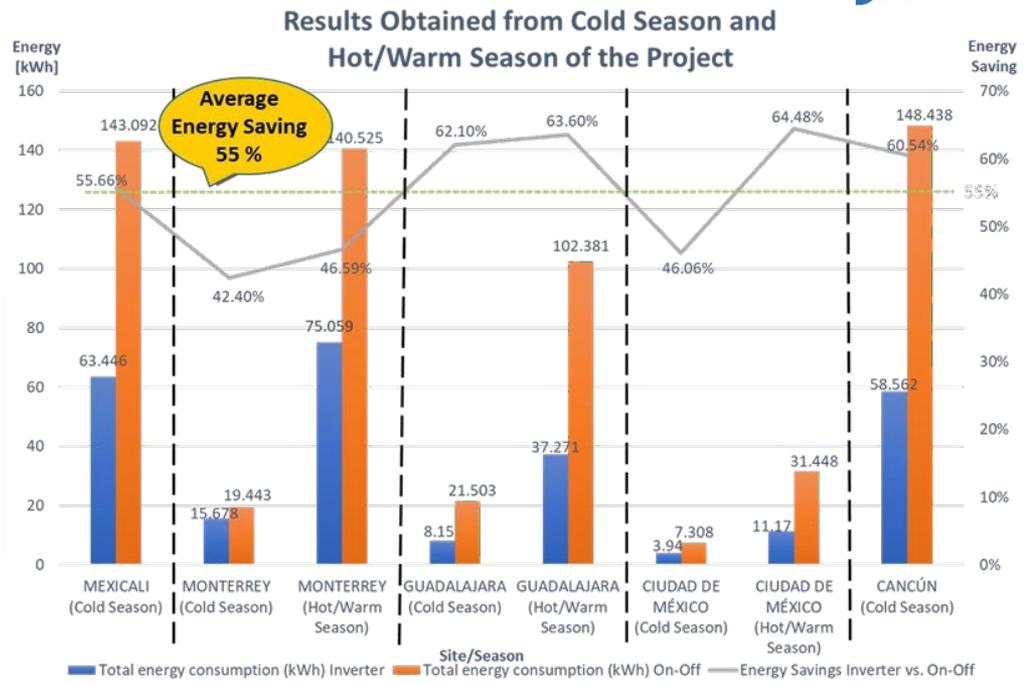
2 AC demonstration project in Mexico (JICA)

Objective

Comparison of electricity consumption:
R32 inverter vs. R410A non-inverter RAC
 Climate and economic impacts in 5 cities:
Cancun, CDMX, Guadalajara, Monterrey, and Mexicali



Project Results



2 AaaS business development in Tanzania (JICA)



How the Air as a Service (AaaS) model works

Daily, weekly and monthly plans with free after-sales service

Energy-saving AC by Daikin



Payment system with mobile money



1. Co-development between WASSHA x DAIKIN

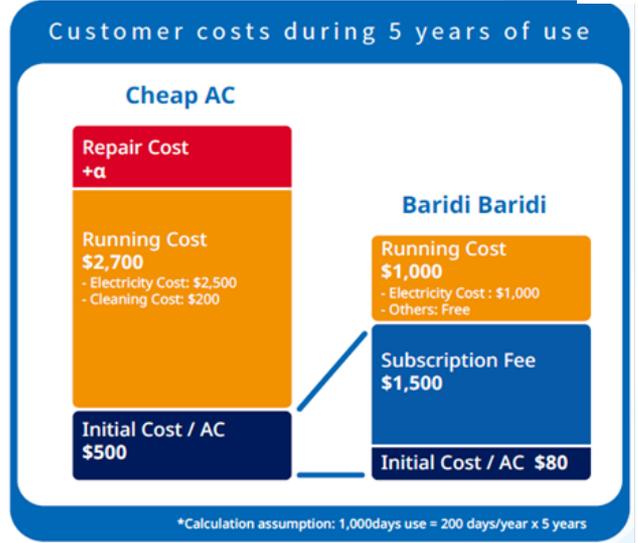


2. Local payment infrastructure



Advantage

Lower lifecycle cost for consumers



Members of Baridi Baridi Inc. in Dar es Salaam



Our contribution to a sustainable society

Daikin will continue to provide innovative solutions to contribute towards building more sustainable, safe, & healthy communities.



- 1 Residences
- 2 Shops
- 3 Buildings (individual spaces)
- 4 Buildings (large spaces)
- 5 Refrigeration (Cold chain)

**Thank you very much
for your kind attention**

**Shu Kawasaki
Daikin Industries, Ltd.
shusaku.kawasaki@daikin.co.jp**