DAIKIN BRASIL

Leandro Lourenço
Product Engineering Manager
leandro.lourenco@daikin.com.br

EMAK9

High efficiency products with central management as a **key solution** to achieve lowest power consumption of **air conditioning** systems

TRANSITION FROM GOODS TO EXPERIENCE

AGENDA

1 Daikin Activities

2 Case

3 Brazilian Challenges

CORPORATE PROFILE

Inauguration: October 25, 1924

Total Sales	**20.6 billion USD**
Total of Subsidiaries	269
Number of Employees	70,263
Number of Production Bases	Over 90
Countries of Sales Activities	Over 150

Main Businesses

HVAC&R | Air conditioners, ventilation equipment, freezers, etc.
Chemicals | Fluorochemical products
Oil Hydraulics | Hydraulic equipment
Electronics

DAIKIN BRAZIL

Inauguration: Since 2011

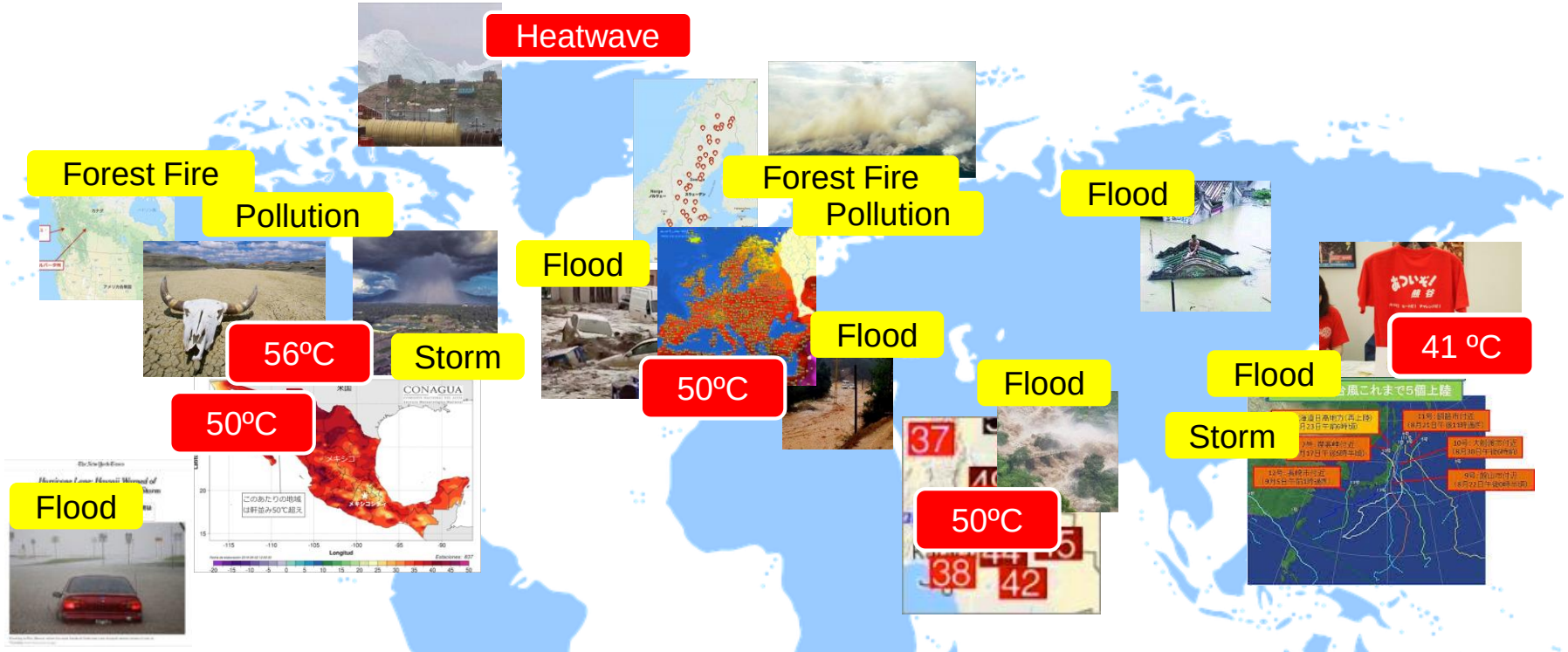
Manaus | **Factory**

São Paulo | **Office**

São Paulo | **Showroom**

EMAK9 | Daikin McQuay Ar Condicionado Brasil Ltda

Background | **What happens in the world?**



- **Heatwave**
- **Storm**
- **Flood**
- **Forest fire**
- **Pollution**
- **Infection**

Global warming is considered to be affecting

Our contribution to SDGs for sustainable growth

SDGs

Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS

Contribute to good health and well-being through the power of air

Office productivity, IAQ, prevent infection etc.

Contribute to sustainable cities and communities

ZEB, energy management, demand response, reducing CO_2,
create and use renewable energy

Ensure responsible production

Energy saving, reducing CO_2,
save resources during manufacturing

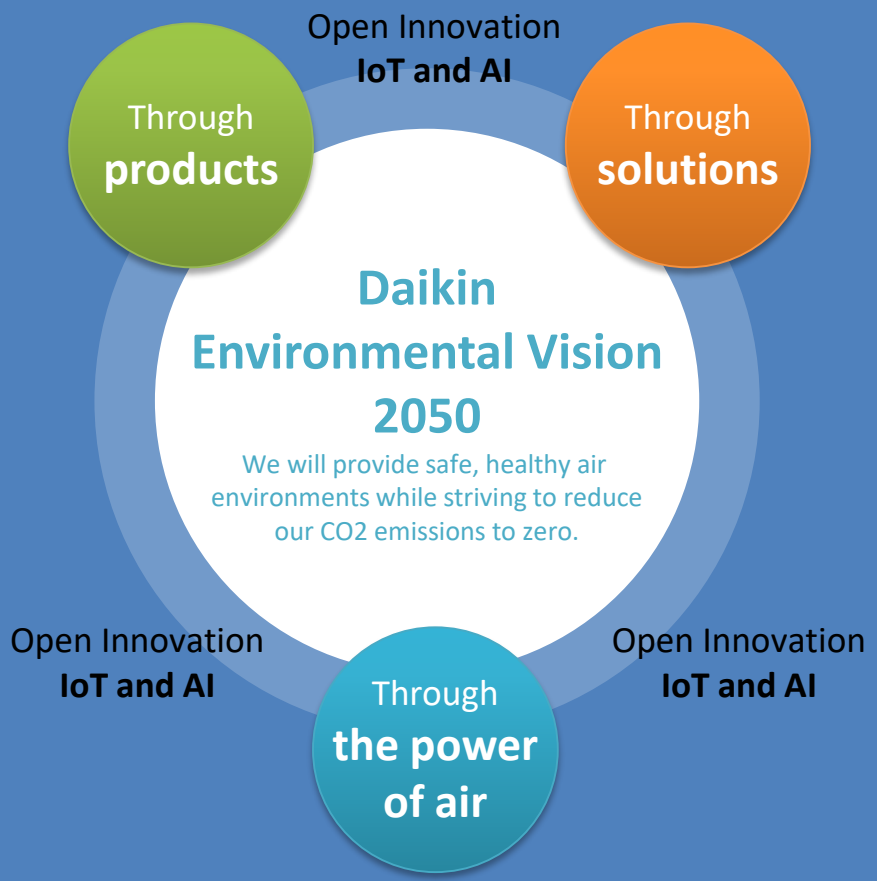
Tackle climate change as a large emitter

Highly efficient products, heat pump
lower GWP refrigerant, etc.

Source: United Nations
https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Daikin will develop while contributing to society

Long term vision



We will reduce the CO_2 emission generated throughout the entire life cycle of our products.

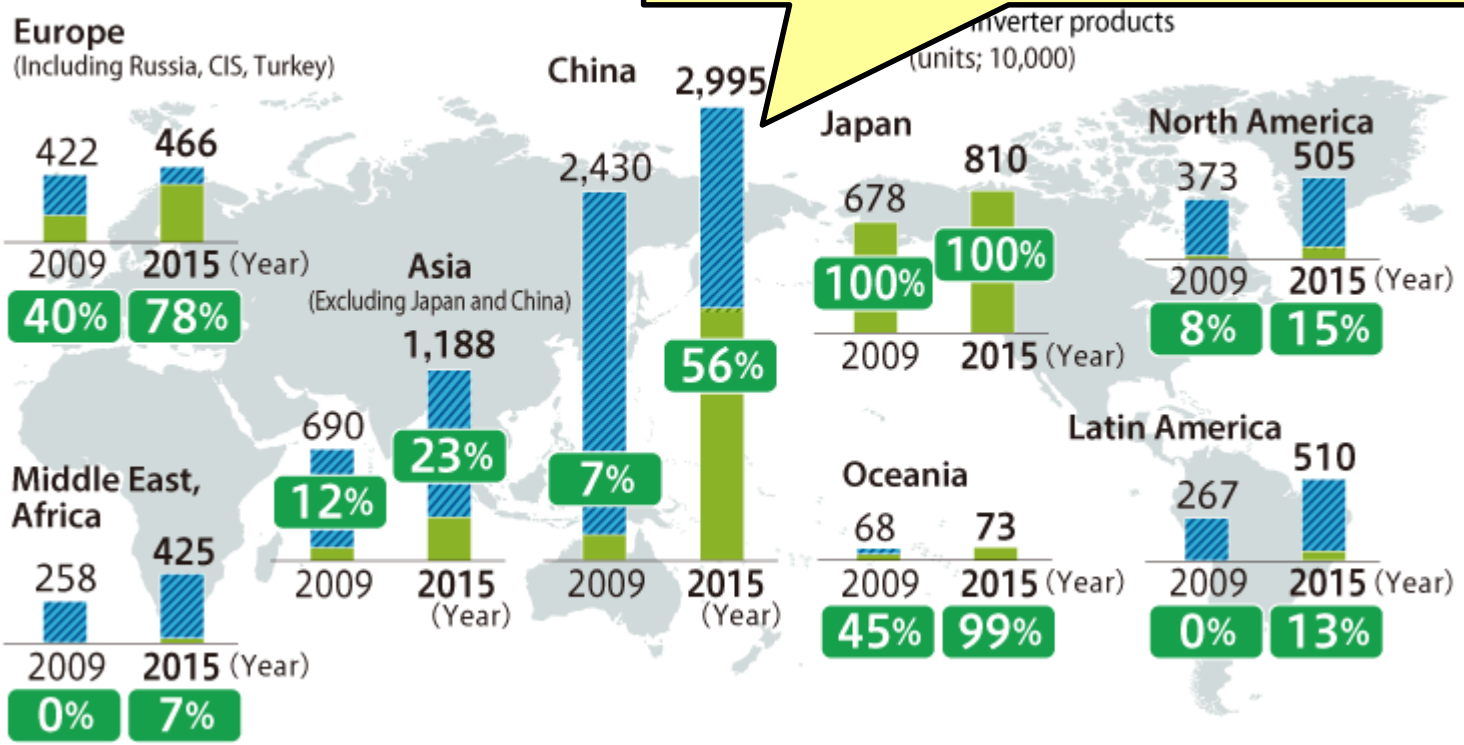
Furthermore, we will create solutions that link society and customers as we work with stakeholders to reduce CO_2 emission to zero.

Using IoT and AI, and open solutions, we will meet the world's needs for air solutions by providing safe and healthy air environments while at the same time contributing to solving global environmental problem.

Daikin has expanded Inverter A/C all over the world

Market share of Inverter A/C

In China: 7%(2008) → 67%(2017)



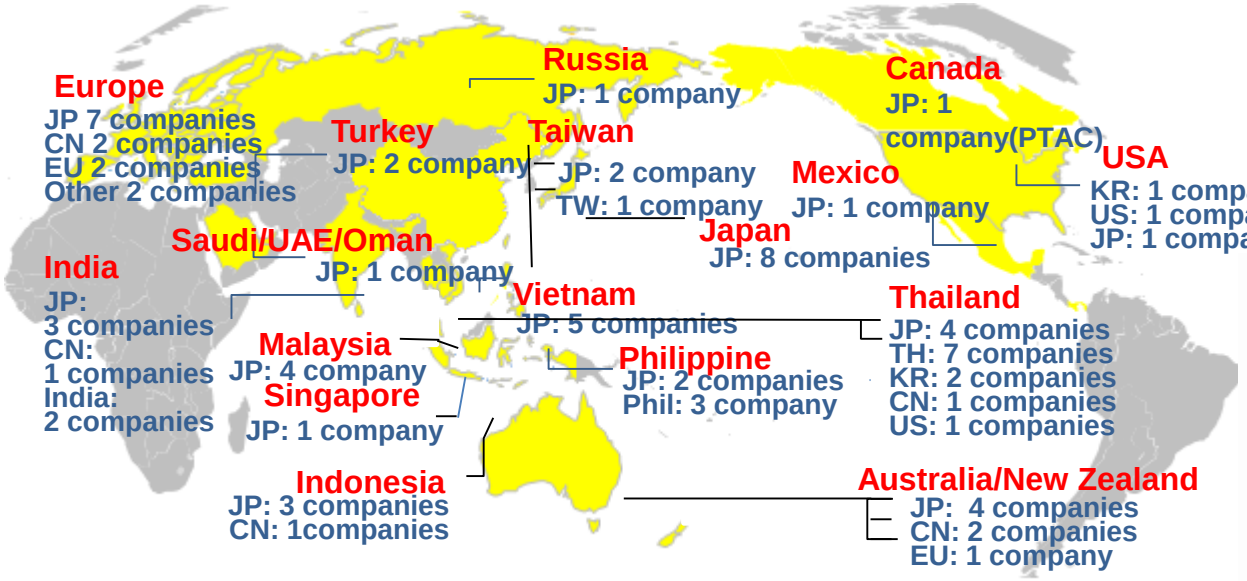
Reduced 54 million ton-CO_2 (2017)
(Only Daikin's contribution)

DAIKIN

R-32 refrigerant cuts global warming by about 70%

- **Daikin has sold more than 15 million R-32 units in over 50 countries so far**
- **55 million R-32 units were sold in the world (92 million ton-CO_2 equivalent)**

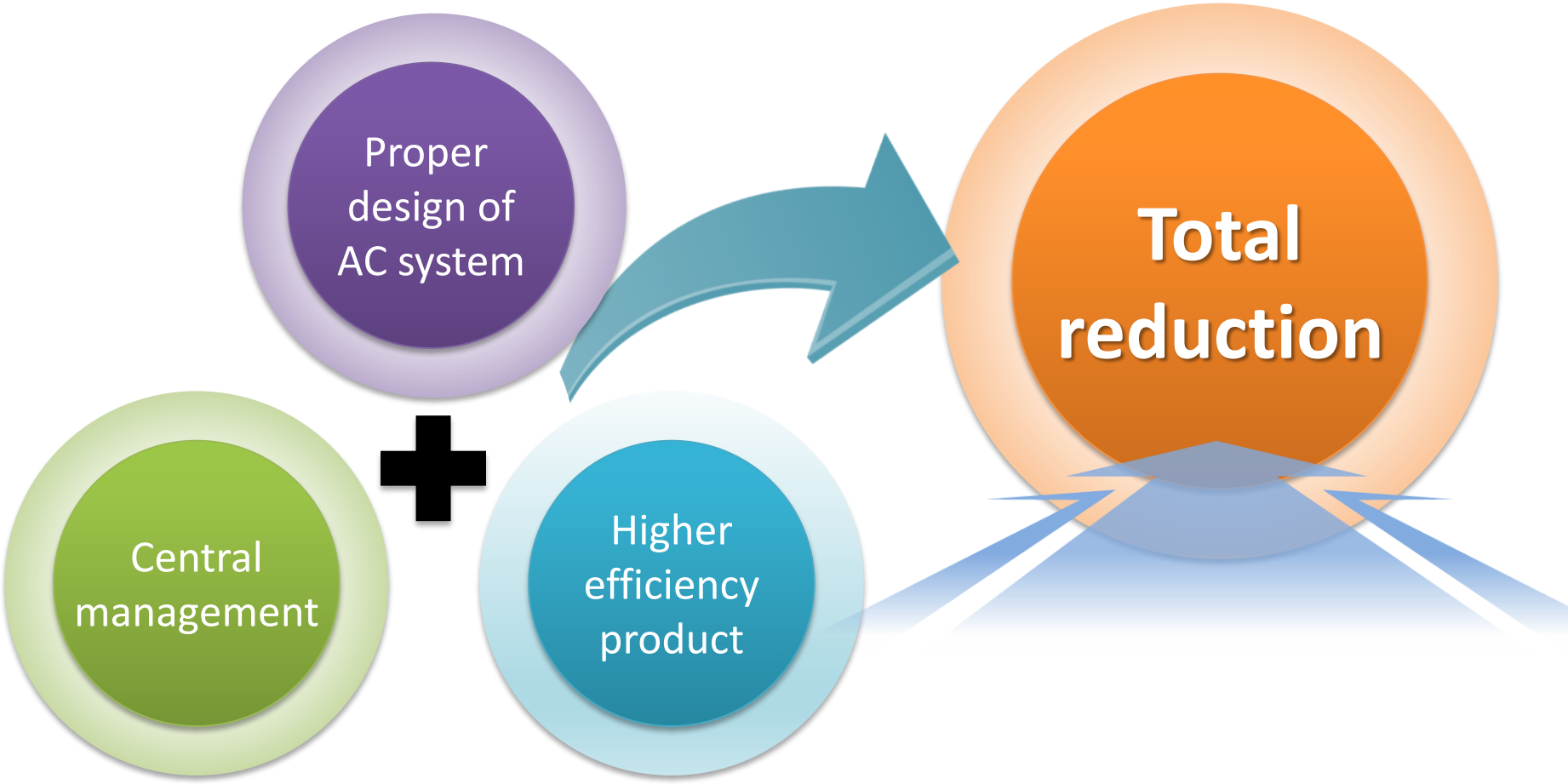
(Daikin estimation, Jun. 2018)



CASE | DAIKIN OFFICE

Dramatically reduced Daikin's office energy consumption using higher efficiency products with automation

Case | **Daikin office energy consumption reduction**



Case | **Daikin office energy consumption reduction**

New office address:
Av. Vital Brasil, 305
São Paulo/SP

				DIFF (%)
Office		Cerro Corá (Lapa)	Butantã	
Building		2 floors 1 underground	5 floors	
Area	Total	1,592 m²	2,070 m²	
	With air conditioner	677 m²	1,143 m²	↑170%
Air Conditioner System (VRV)	Type	VRV-II Multi Split	VRV Inova	
	Capacity	35 HP (14+10+8)+(3)	52 HP (22+22+8)	↑150%
	Indoor Units (QTY)	24 units	29 units	
	Automation	N/A	Central Manager iTM + SVM	

Air conditioned area → 170%
Air conditioner capacity → 150%

→ Reduction of installed A/C capacity of **12%**

DAIKIN

Case | **Daikin office energy consumption reduction**

New office address:
Av. Vital Brasil, 305
São Paulo/SP

Energy bills

		Old (2016-2017)	New (2017-2018)	DIFF
Total Consumption		kWh	kWh	kWh (%)
Energy Consumption	November	9,351.10	6,311.30	32.5%
	December	9,053.20	2,770.30	69.4%
	January	10,578.90	8,008.00	24.3%
	February	9,813.40	7,030.00	28.4%
	AVG	9,699.15	6,029.90	37.8%
Estimated as lightning and others 1/3 of energy consumption		3,233.05	3,233.05	Assuming that energy consumption hold the same level for equipment and LED lightning saves ~40% →170% x 60% = 100% (same)

		Old (2016-2017)	New (2017-2018)	DIFF
Only A/C		kWh	kWh	kWh (%)
Energy Consumption	AVG	6,466.10	2,796.85	**56.7%**

Air conditioned area = 170%
→ Thermal load = 170%
Correct comparison
→ Energy Consumption = 170%

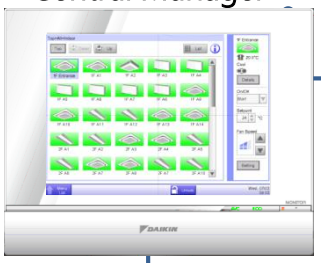
Equalizing for the same area:
2,796.85/(6,466.10 x 170%) = 25%
→ 75% of reduction

Central Management of Air Conditioning System

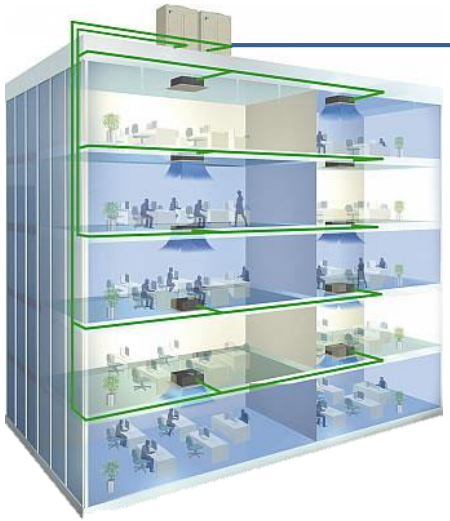
Equipment management on site

CENTRAL MANAGER FUNCTIONS
- Monitoring / Operation
- Failure viewing
- Record of operation history
- Remote access via internet
- Schedule timer
- Setpoint limit
- Function block
- Interlock of units and functions
- *Energy management*
- Etc...

Central Manager

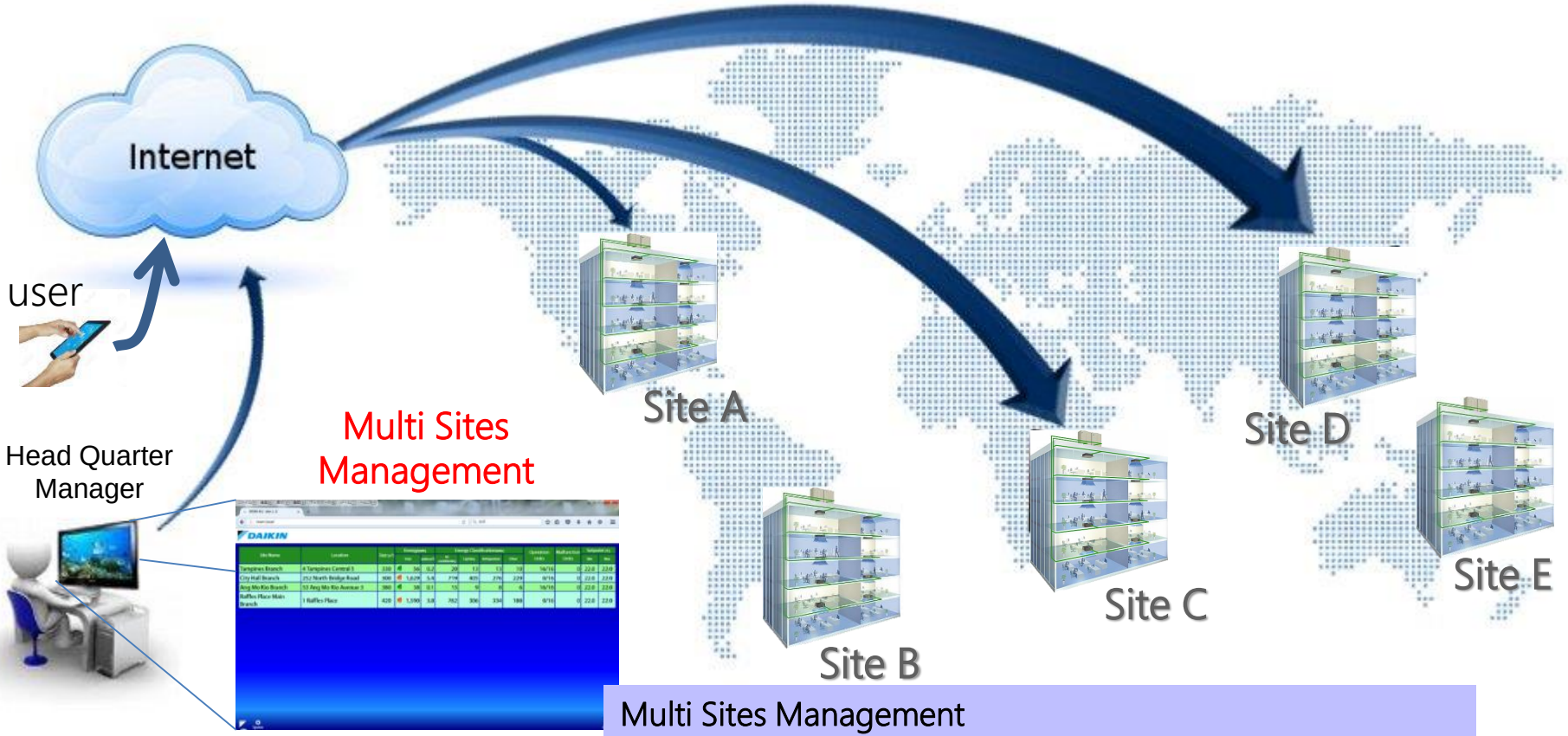


Remote access for users
- Through smartphone, tablet or PC
- Login and password to access certain units
- Adjustable access and limitations



Central Management of Air Conditioning System

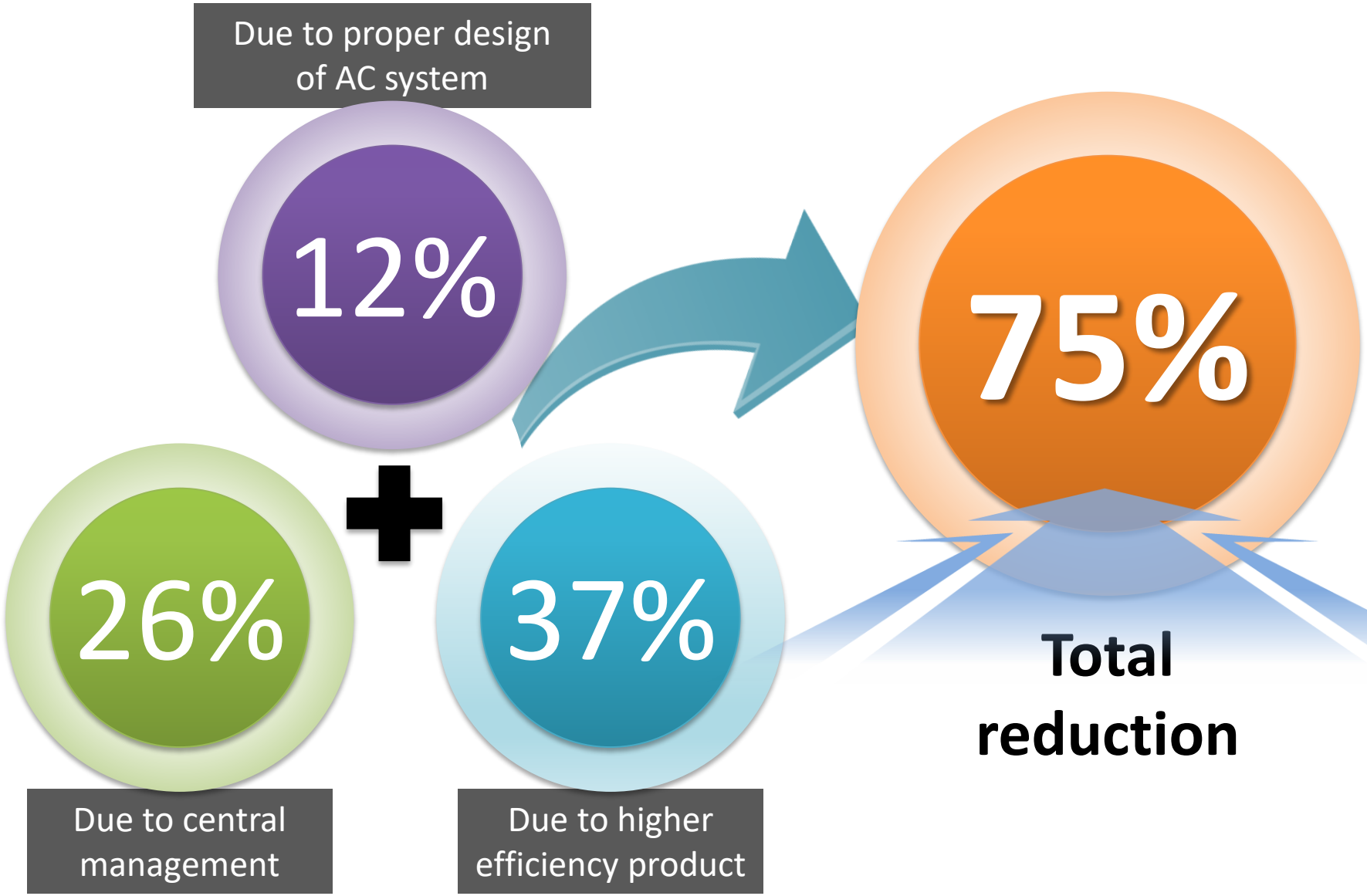
Remote management of Multi Sites



Multi Sites Management

- Performance comparison of different sites
- Detection of deficiency and improvement planning

Case | **Daikin office energy consumption reduction**



BRAZILIAN CHALLENGES | REGULATION

Brazil is far behind in terms of energy saving regulation and performance measurement compared to the world.

Daikin will contribute to the development of the Brazilian air conditioning market through actions toward the government

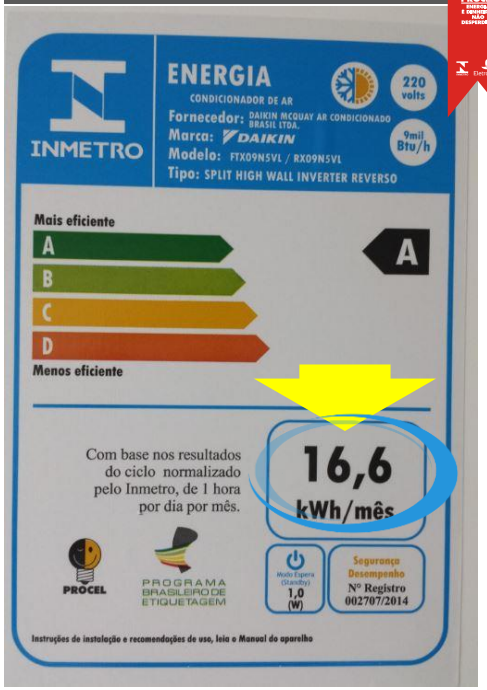
Improve labelling program is the key to increase EE

End user cannot understand the difference between non-inverter and inverter.

NON-INVERTER

COMPETITOR | Split Hi Wall 9K HP NON
A Class - Procel Label
Consumption: 16,9 kWh/month

INVERTER



DAIKIN | Split Hi Wall 9K HP INV
A Class - Procel Label
Consumption: 16,6 kWh/month

Most of the Splits registered at INMETRO are A Class with Procel. ENCE shows classification (from A to D) and energy consumption.

But the methodology is the same, so, it doesn't show the difference between both technologies.

NON-INV		INVERTER
16,9 kWh/month	VS	16,6 kWh/month

WHICH ONE SAVES MORE ENERGY?

Remarkable institutes to run field testing

WHERE	**SANTA CATARINA FEDERAL UNIVERSITY (UFSC)** **FLORIANÓPOLIS/SC**	**MAUÁ INSTITUTE** **SÃO CAETANO DO SUL/SP**	**PUC-RJ UNIVERSITY** **RIO DE JANEIRO/RJ**
WHY	Well known universities, with remarkable academic history, experienced in Energy Efficiency research, Brazilian government and United Nations Environment consultancy and climate change.		

Introduce to Brazil R-32 Inverter benefits

Evaluate energy savings of the Daikin´s Inverter Mini Split equipment operating with environmentally friendly refrigerant R-32 vs. most common Mini-Split in Brazilian market, Non-Inverter working with refrigerant R-410A and also vs Daikin's Inverter R-410A manufactured in Brazil (ZFM).

Goal:

Clarify the benefits of **high energy efficient inverter air conditioners** which adopted low GWP refrigerant R-32 in order to contribute with establishment of new Public Policies and refrigerants transition decisions in fulfillment with Kigali Amendment.

- Disseminate Inverter R-32 technology in Brazilian Market;
- Increase the Market share of Inverter technology in Brazil.

R32 INVERTER

Next-Generation Refrigerant

DAIKIN

Demonstrative tests to show field conditions

UFSC: Federal University from Santa Catarina;
1st: R-410A INV DK vs NON
2nd: R-32 INV DK VS R-410A INV DK
2 rooms

UNIVERSIDADE FEDERAL DE SANTA CATARINA

IMT: Mauá Technology Institute;
R-32 INV DK vs R-410A NON
2 rooms

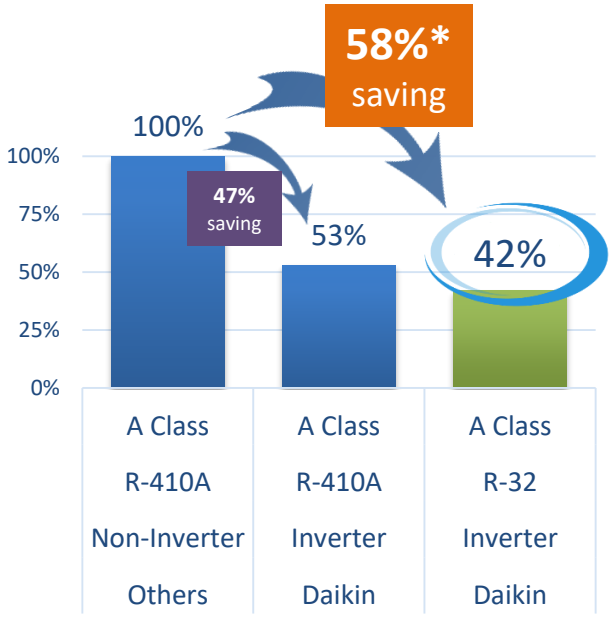
INSTITUTO MAUÁ DE TECNOLOGIA
MAUÁ

PUC-RJ: Pontifícia Catholical University Rio de Janeiro
R-32 INV DK vs R-410A NON
1 room

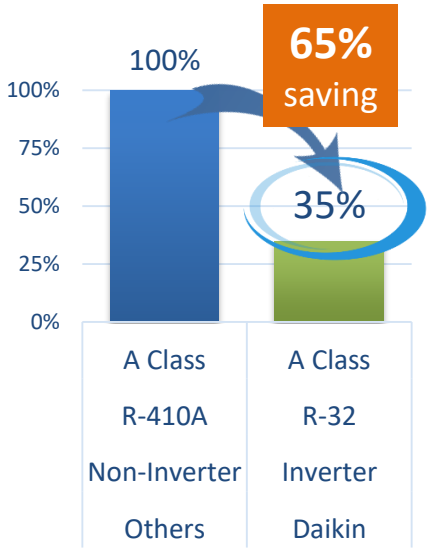
PUC RIO

Final results from field tests

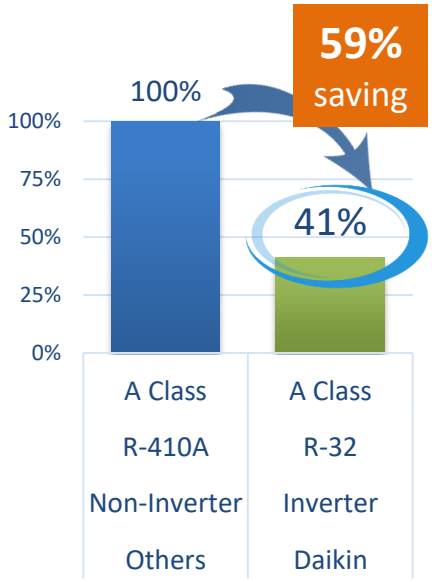
Energy consumption comparison between Non-inverter R-410A vs Inverter R-32



UFSC
FLORIANÓPOLIS/SC
JAN ~ FEB/2018



MAUÁ
SÃO CAETANO/SP
MAR ~ MAY/2018



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

*Indirect analysis

DAIKIN BRASIL

Leandro Lourenço
Product Engineering Manager
leandro.lourenco@daikin.com.br