Panasonic

ATMO sphere network
natural refrigerants

CO2(R744)TC Refrigeration For Supermarkets

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Panasonic Eco Solutions Commercial Equipment Systems Co.,Ltd

Commercial Food Retailer Equipment Sales Dept.

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How shall we react for Environmental Burdens as a Manufacturer?

Panasonic Show-case Manufacturer

+

Panasonic Refrigeration Unit Manufacturer

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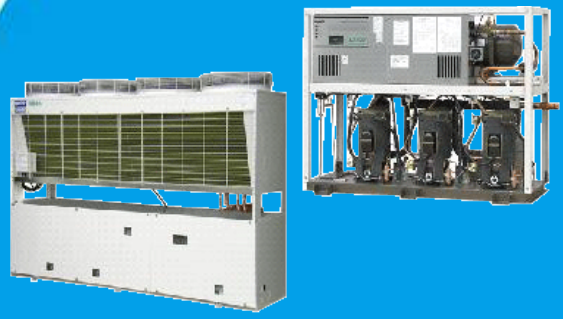
Contribute to the prevention of Global Warming by utilizing natural refrigerant.

Natural Refrigerant CO2（R744） being introduced globally!

Best refrigerant with no impact on Ozone Depletion or Global Warming!

→ → Environmentally friendly, Energy efficiently → →

R22
GWP：1,900
ODP：0.055
2020 totally banned



R404A
GWP：3,920

R410A
GWP：2,090

CO_2 GWP：1

Move to Inverter technology

2006 2007 2008 2009 2010 2011 2012

※：GWP（Global Warming Potential）＝ The rate of Global warming impact with CO2 (Carbon Dioxide) as 1.

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Montreal Protocol(Y1987)

Specific Freon to be discussed.

CFC：R11, R12
(Y1996 ban)
HCFC：R22, R123
(Y2020 ban)

CHC, HCFC Includes Chlorine, which deplete **Ozone Layer**

Kyoto Protocol (Y1997)

Freon Alternatives to be discussed.

HFC： R32, R125
R134a、R404A
R410A = R32+R125

HFCs turned out to have strong impact on **Global Warming.**

What is required for Refrigerant

1. No Toxicity
2. No Explosive
3. Less GWP
4. Zero ODP

	Next generation (Natural Refrigerant)			Currently used (HFC, Freon Alternatives)		Used (HCFC)
	CO2	Ammonia	Isobutane	R410A	R404A	R22
Ozone Depletion Potential (ODP)	0	0	0	0	0	0.055
Global Warming Potential (GWP)	1	0	3	2,090	3,920	1,810
Flammability	No	Weak	Strong	No	No	No
Toxicity	No	Toxic	No	No	No	No

Freon Alternative (HFC) has been widely used to alternate specific Freon (CFC), but found to have strong impact on global warming and was specified to be controlled under UNFCC (Kyoto Protocol). CO2 gas is expected to be next generation refrigerant as it has zero ODP and negligible global warming impact

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CO2 Refrigeration System

CO2（R744） has negligible small impact on Global Warming

Master Controller

modem

VPN router

Optic fiber or ADSL line

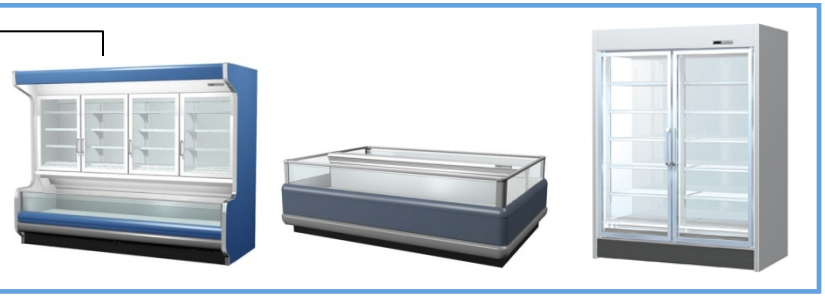
Communication line

Pipes / Communication Lines

Mid-temp.
CO2 Show-cases

Pipes / Communication Lines

Low-temp.
CO2 Show-cases

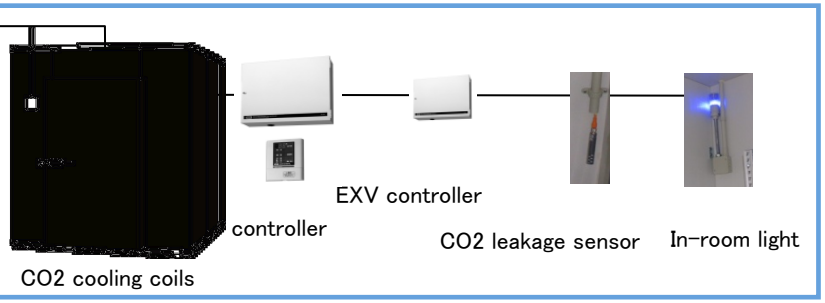


Pipes / Communication Lines

CO2 Outdoor Refrigeration Unit for refrigerator/freezer

Walk-in Cooler

Walk-in Freezer



Equipment to monitor energy consumption
(for the financial incentive program)

Energy usage （SECT-S301W）
Temp. monitor(SECTS411THV)
Temp. monitor （SECT-S311TV）

DVD

Natural Refrigerant CO2（R744） being introduced globally!

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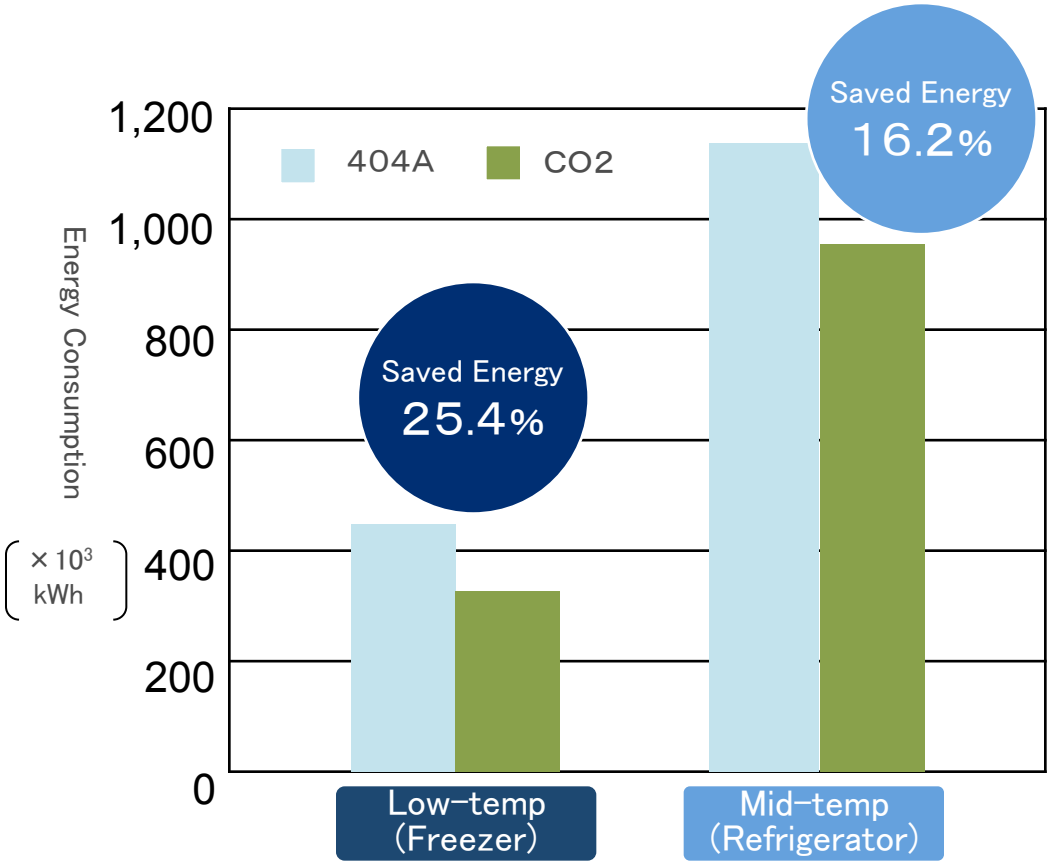
Accomplished better Energy Savings than R404A system!

based on actually monitored data



※6 店舗を平均した省エネ率を示す

Low-temp. (Freezer)				
	404A	CO2	difference	Savings
Store A	85,866	65,674	20,192	23.5%
Store B	90,232	74,509	15,723	17.4%
Store C	134,362	91,592	42,770	31.8%
Store D	140,396	104,633	35,763	25.5%
Store E	8,369	5,673	2,696	32.2%
Store F	31,298	23,814	7,484	23.9%
Total	490,523	365,895	124,628	25.4%

Mid-temp. (Refrigerator)				
	404A	CO2	difference	Savings
Store A	250,131	208,463	41,668	16.7%
Store B	304,982	250,052	54,930	18.0%
Store C	250,529	204,895	45,634	18.2%
Store D	318,938	277,688	41,250	12.9%
Store E	23,452	20,413	3,039	13.0%
Store F	45,626	39,108	6,518	14.3%
Total	1,193,658	1,000,619	193,039	16.2%

※ Comparison of annual energy consumption (kWh) at each store.
Condition: R404A calculated, CO2 measured.

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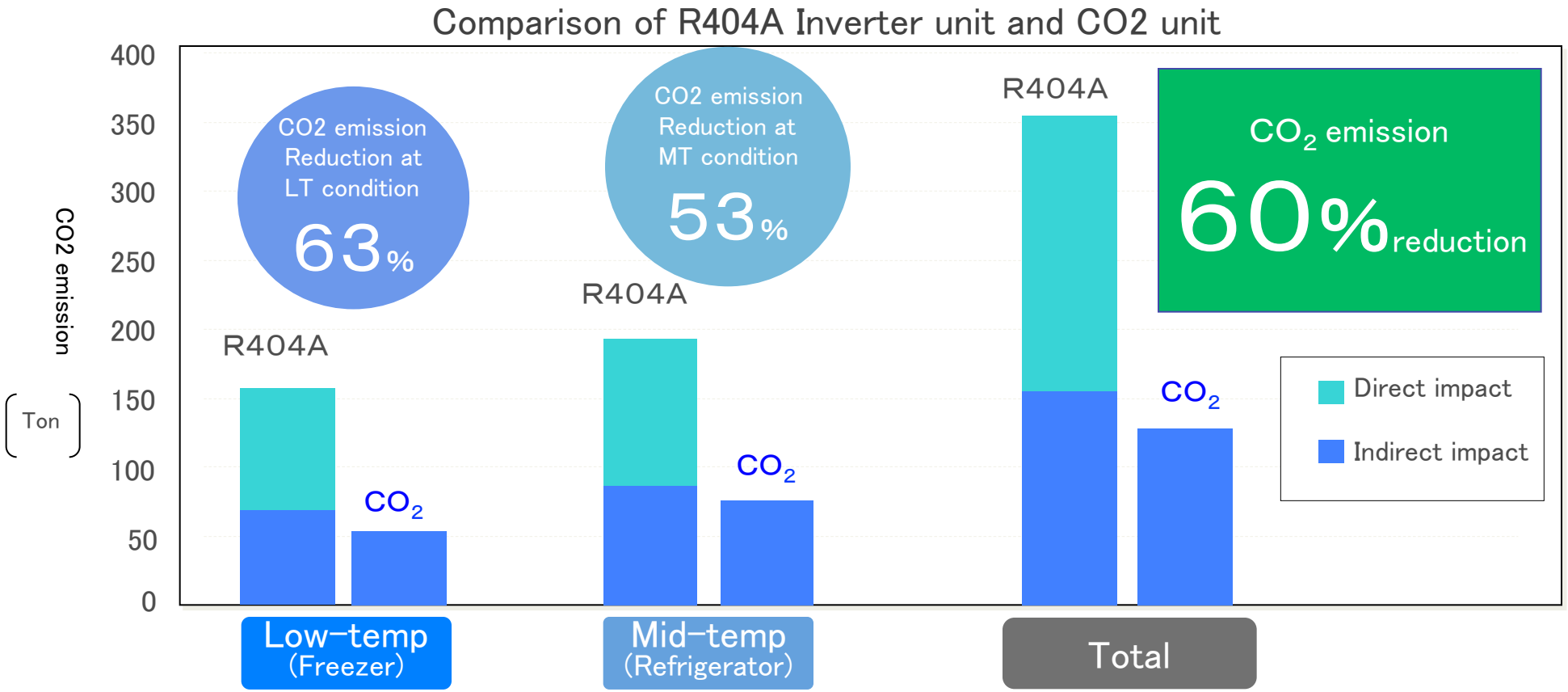
Direct impact on Global Warming by refrigerant is almost 『zero』.
Annual CO2 emission was reduced by 60%

※Direct impact: Global warming impact by refrigerant leakage



【Condition for calculation】
Store space：1200㎡, Refrigeration Unit capacity: 90kW. R404A: Inverter multi-unit. "Direct impact" corresponds to GWP weighted refrigerant leakage from pipes.
Refrigerant Leakage rate：16%(quoted from METI report "review of refrigerant leakage during operation of HVAC&R equipments" issued 7th March 2009.)

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