Panasonic

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Introduction of energy savings by CO2 refrigeration systems in SM/CVS

Feb. 3rd 2014
Panasonic Corporation
Air-Conditioner Division
Gaku Shimada

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AGENDA

1. **CO2 Compressor and Application Roadmap**
2. Introduction of CO2 system for CVS and SM
3. Actual Installation and Monitored Energy Saving Data
4. Issues and Future action

1. CO_2 Compressor and Application Road Map

From 300W to 7,500W(10HP) Compressor and Heating / Cooling applications

Heating

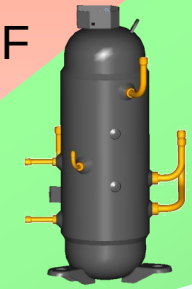
Commercial Water Heater

Heat Pump for Space Heating

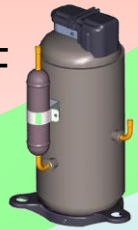
Heating and Cooling Combined Products

Domestic Heat Pump Water Heater

33F



20F



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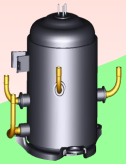
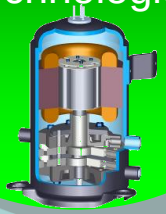


Commercial Refrigerators and Freezers

CO_2 Compressor Technologies



Light Commercial Bottle Coolers

Refrigeration

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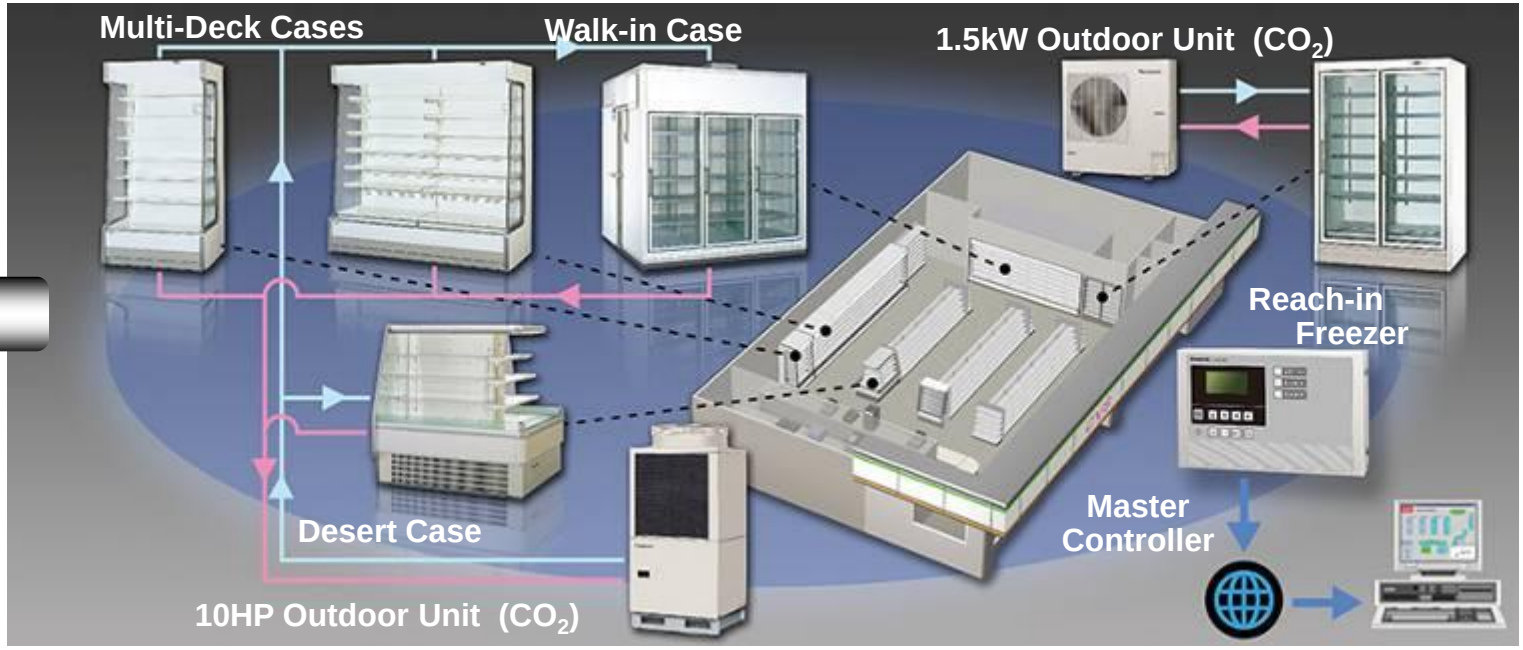
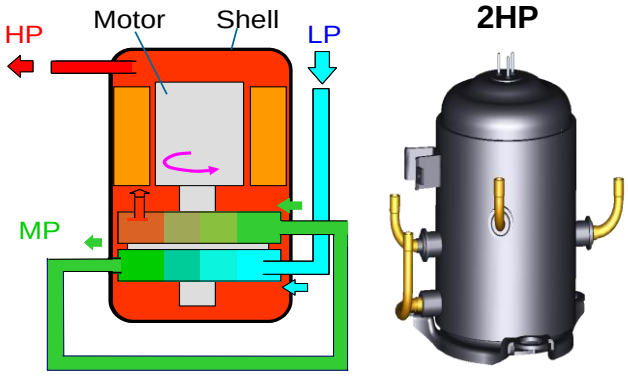
2-1. CO2 System for Convenience Store (CVS)

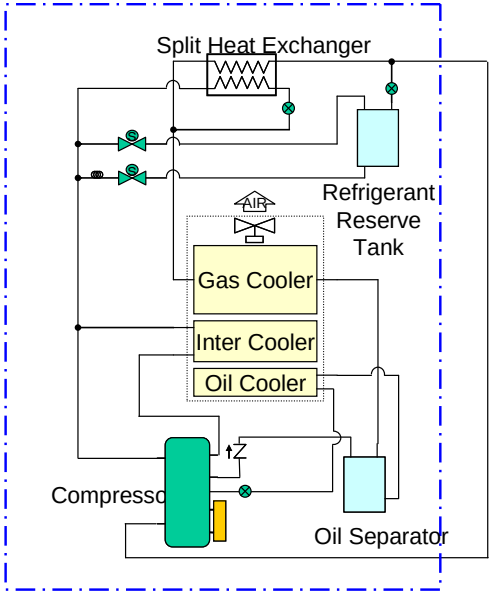
◆ Layout image



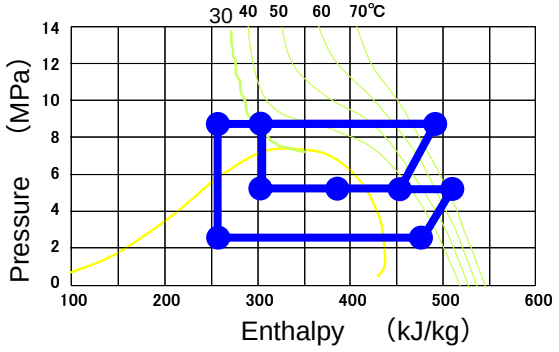
◆ Key Technologies

Compressor Mechanism (HP Shell type)



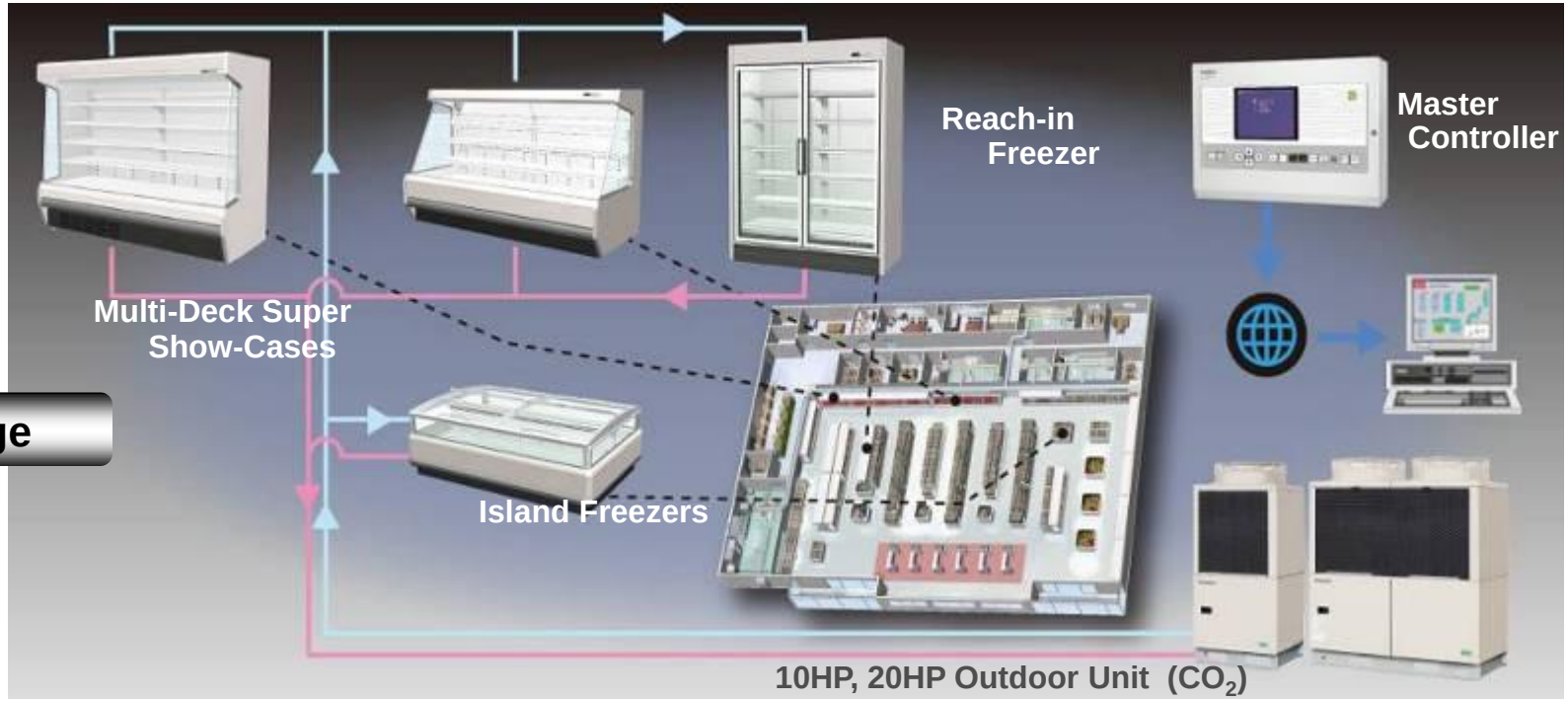


Split Cycle



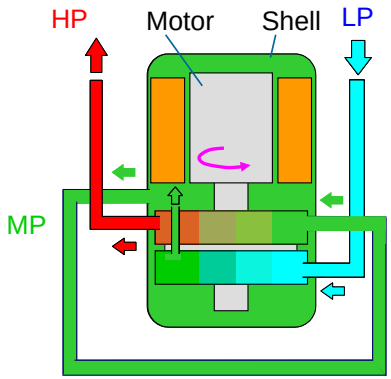
2-2. CO2 System for Supermarket (SM)

◆ Layout image

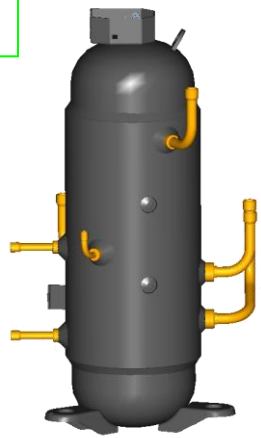


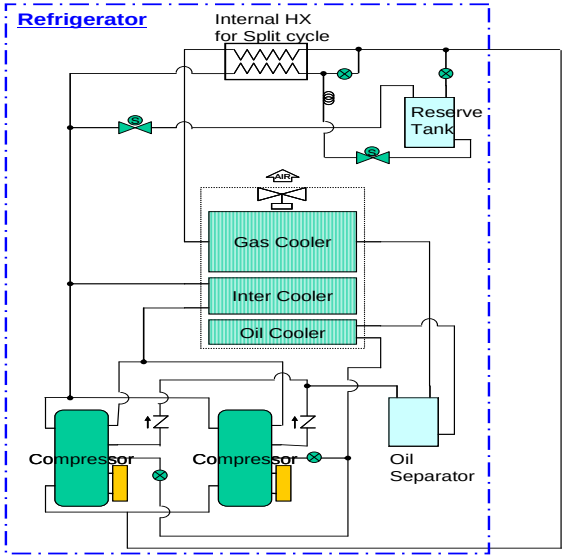
◆ Key Technologies

Compressor Mechanism
(MP Shell type)

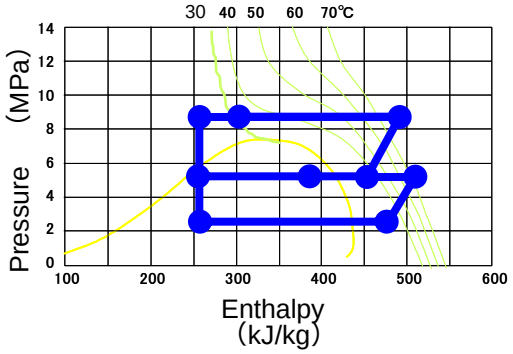


10HP





Split Cycle



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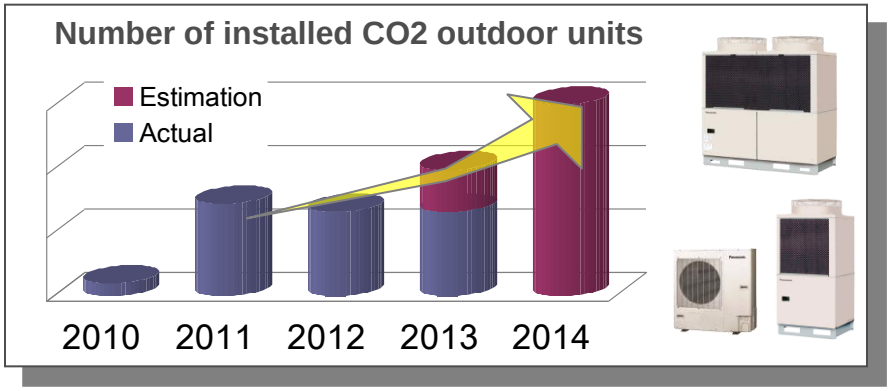
3-1. Actual Installation in Japan (Dec. 2013)

- After the collaborative verification of system performance with key accounts and government, mass production started in 2010.

- As of today, **４５０** CO2 units were installed in **１４５** locations,

  From subarctic **Hokkaido** (北海道) to subtropics **Okinawa** (沖縄),

  From **CVS** to **Hypermarket** including **Distribution Center**.

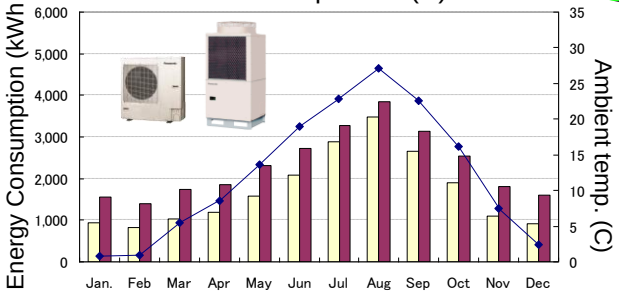


3-2. Monitored Energy Consumption Data (CVS and SM)

CVS

Annual Energy Saving 26%

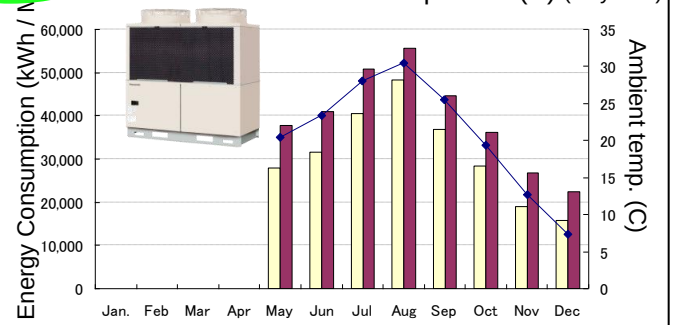
Miyagi
Annual Ave. Temp.: 12.2 (C)



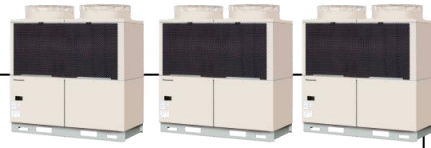
Annual Energy Saving 21%

SM

Chiba
Annual Ave. Temp.: 20.9 (C) (May-Dec)

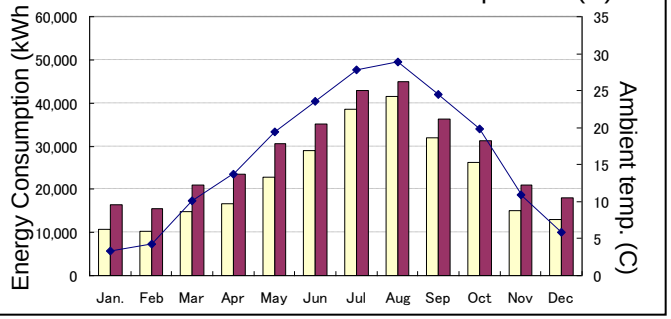


Annual Energy Saving 19%



SM

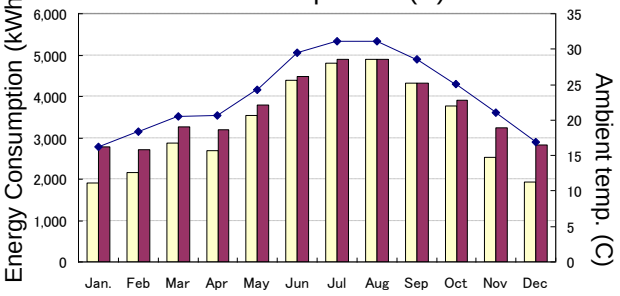
Aichi
Annual Ave. Temp.: 16.0 (C)

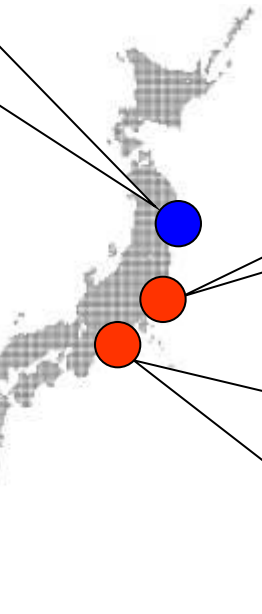


Annual Energy Saving 10%

CVS

Okinawa
Annual Ave. Temp.: 23.6 (C)





CO2 unit energy consumption is fairly compared with simulated data of Panasonic HFC unit.

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4-1. Issues of CO2 units and our Future Action

1. Acquisition Cost Reduction

→ **System Design simplification, Piping materials (tube and fittings) standardization and availability / access improvement.**
The reduction of cycles per store will also reduce the total cost.
(High Pressure Gas Safety Law need to be amended for CO2.)

2. Product Improvement

→ Efficiency, Noise, and Vibration can be further improved.
Product Line-up need to be improved.
Indoor units to be diversified and Outdoor units to be standardized.

3. Training of Installers

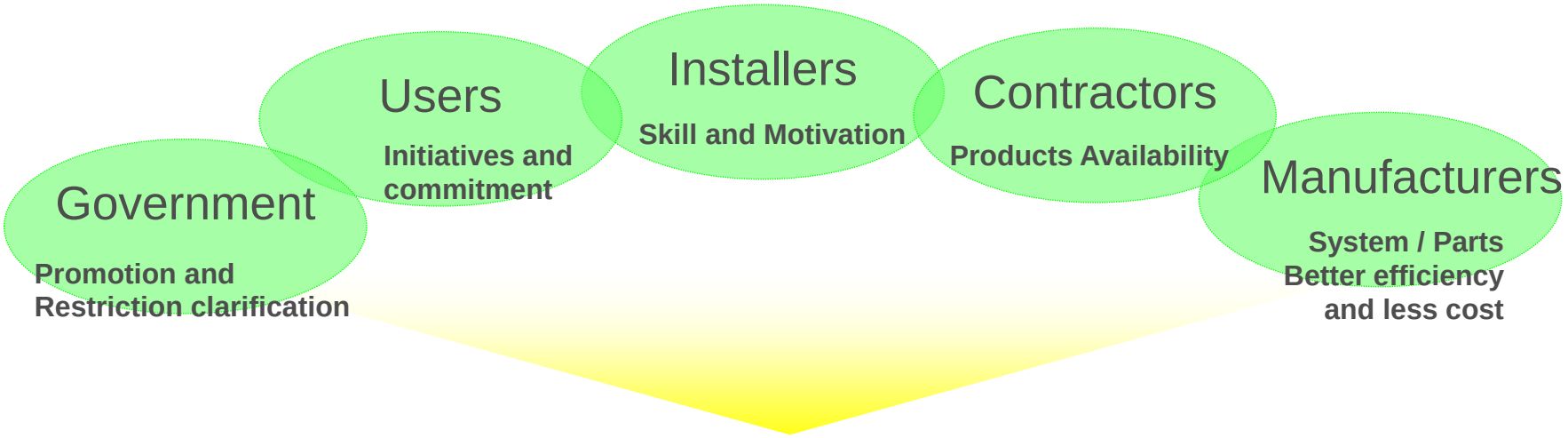
→ Trainings for CO2 are indispensable. (Installation, Operation check, and Service Maintenance)
Original Manual was prepared and Training courses were held.

	FY2010	FY2011	FY2012	FY2013
# of Trainee	46	200	211	(250)

More than 650 people already took CO2 training course as of Dec. 2013

4-2. Issues of CO2 units and our Future Action

In order to expand the use of CO2 refrigerant for Commercial Refrigeration Sector in Japan, Cooperative actions in different levels of industry Stake holders are required.



Contribute to the prevention of Global Warming by utilizing CO2

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Thank you very much!