

# 《ATMOsphere network Tokyo event》

## Lawson's Natural Refrigerant(CO<sub>2</sub>) Technology



As of end-February 2014

Company name	Lawson, Inc.
Head office	East Tower, Gate City Ohsaki 11-2, Osaki 1-chome, Shinagawa-ku, Tokyo, Japan
President and CEO, Representative Director	Genichi Tamatsuka
Date established	April 15, 1975
Capital	58,506.644 million Yen
Employees	6,336
Business activities	Franchise chain development of "Lawson", "Lawson Mart", "Lawson Store 100" and "Natural Lawson"
Total net sales	1,945 billion yen
Number of stores	11,606 (Japan)
Operating regions	47 prefectures of Japan, cities of Shanghai (joint venture), Chongqing, Dalian and Beijing in China, Indonesia, Hawaii in USA, Thailand

\* The total number of stores refers to the number of convenience stores operated by the consolidated group and includes stores operated by Lawson Mart, Inc., Lawson Okinawa, Inc., Lawson Minamikyushu, Inc. and Lawson Kumamoto, Inc.

<Group Companies> ■ Consolidated Subsidiary ◆ Affiliated Company

■ Lawson Mart, Inc. ■ Lawson HMV Entertainment, inc.

■ Lawson ATM Networks, Inc ■ Best Practice Inc. ■ Smart Kitchen, Inc.

■ Shanghai Hualian Lawson, Inc. ■ Chongqing Lawson, Inc. ■ Dalian Lawson, Inc.

◆ Lawson Okinawa, Inc.

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# ***Natural Refrigerant (CO<sub>2</sub>) Technology***

## Mid-term Energy Conservation Target (FY2020)

“Electricity Consumption Reduction by **20%**  
per Store Compared with FY2010”

### <Action Plan>

- ① LED Lighting to ALL Stores
- ② CO<sub>2</sub> Freezer-Refrigerator System to New Stores, As Standard System from Sep. 2014
- ③ Eco-Friendly Pilot Stores: For the Validation of Energy Conservation, Developing the Knowledge for Energy Saving Stores
- ④ Energy Efficient Package: Developing Store Model for 30% Energy Saving (in Validation)
- ⑤ “10 Rules for Energy Conservation” for Store Operation Management
- ⑥ High Performance, Quick Built and Low Cost Prefabricated Structure
- ⑦ Model Project in Indonesia: Expansion to South East Asia, Others

Driving “CO<sub>2</sub> Refrigeration System” to Achieve Mid-term Target

## 【Advantages of CO<sub>2</sub> System】

- ① Low GWP Refrigerant  
Minimum 1/4000 Compared with HFCs
- ② High Energy Efficiency from Superior Thermal Properties

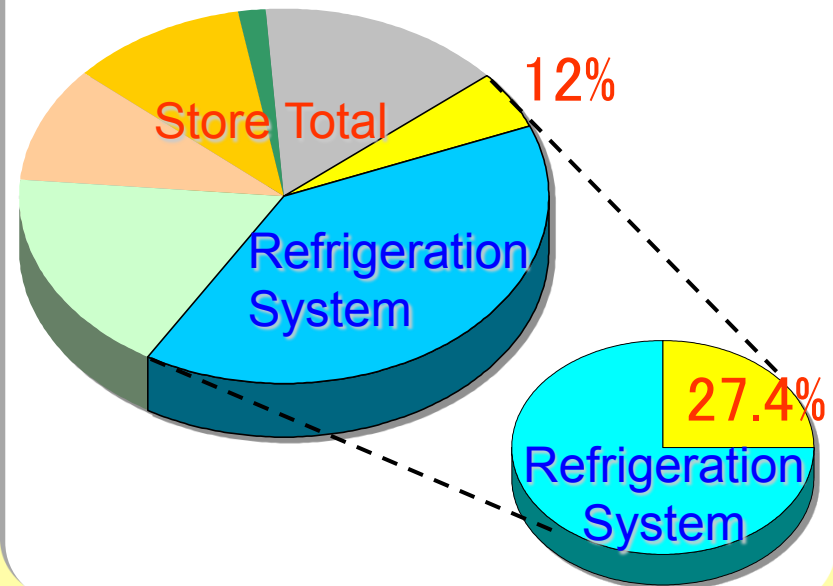
## 【Impact by CO<sub>2</sub> System】

- ① HFC Refrigerant Emission Reduction (CO<sub>2</sub> Equivalent)  
19.38ton-CO<sub>2</sub>/Store/Year
- ② Energy Saving from High Efficiency  
Electricity Consumption Reduction:  
22,920kWh/Store/Year  
(12% in Store Total, 27.4% in Refrigeration System)

### ① GWP(Global Warming Potential)

Natural Refrigerant (CO <sub>2</sub> )	: 1
HFC (R404A)	: 3,920
HFC (R410A)	: 1,730

### ② Electricity Reduction Ratio from Efficiency Improvement



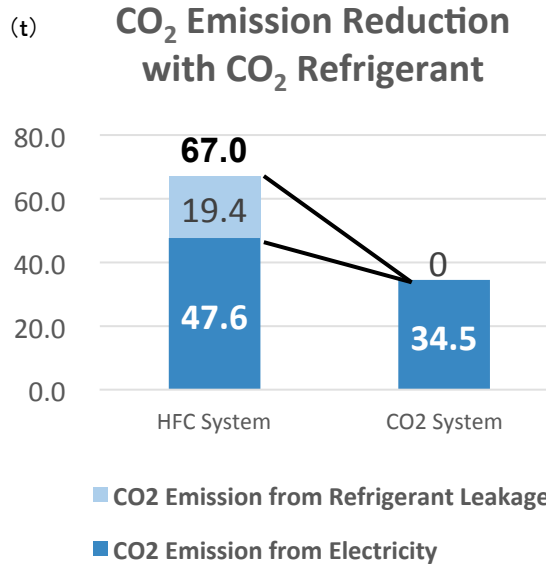


## ● Global Warming Impact

- Reduction of HFC Leakage
- High Energy Efficiency

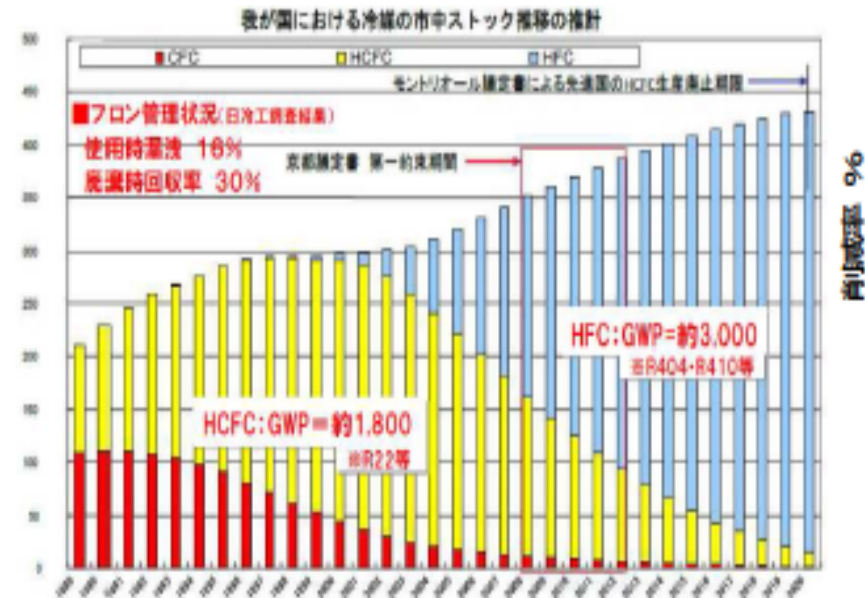


**CO<sub>2</sub> Emission Reduction by Half** Compared with HFC Systems



## ● Regulations Reducing HFCs Emission

- HCFC ⇒ Montreal Protocol: Phase-out in 2020 (Developed Countries)
- HFC ⇒ Necessary to be controlled: High GWP



# Japanese proven CO<sub>2</sub> technology for CVS (Lawson&Panasonic)

LAWSON

Outdoor units for Refrigerators and Freezers were replaced by Panasonic CO<sub>2</sub> Units (10HP and 2HP)



The Total Energy Save: **27%**



## ■ 324 stores installation of CO2 System

FY 2010 ⇒ 1      FY 2011 ⇒ 50

FY 2012 ⇒ 24      FY 2013 ⇒ 62

FY 2014 ⇒ 187 (As of end-October 2014)



Eco-Friendly, Cold Area Specialized Pilot Store:  
Yuri-Honjo Yamamoto Store  
(Opened in Nov. 2013)



※NEDO funded project  
Kyo-Tanabe Yamate Nishi Store  
(Opened in Dec. 2010)



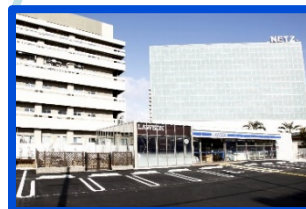
※JICOP funded project  
Minami-Sanriku Iriya Store  
(Opened in Dec. 2011)



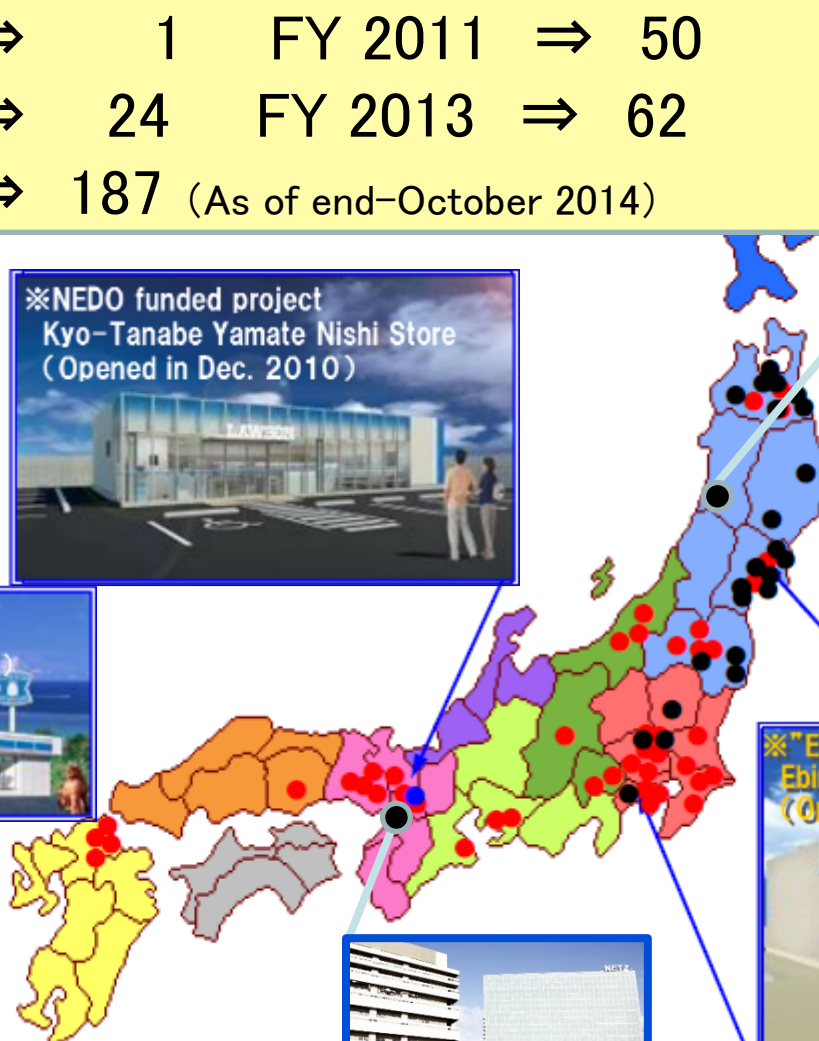
※JICOP funded project  
Okinwa Kamichi Store  
(Opened in Dec. 2012)



※"Energy Efficient Package" Pilot Store:  
Ebina Kami-Imazumi Nichome Store  
(Opened in Dec. 2012)



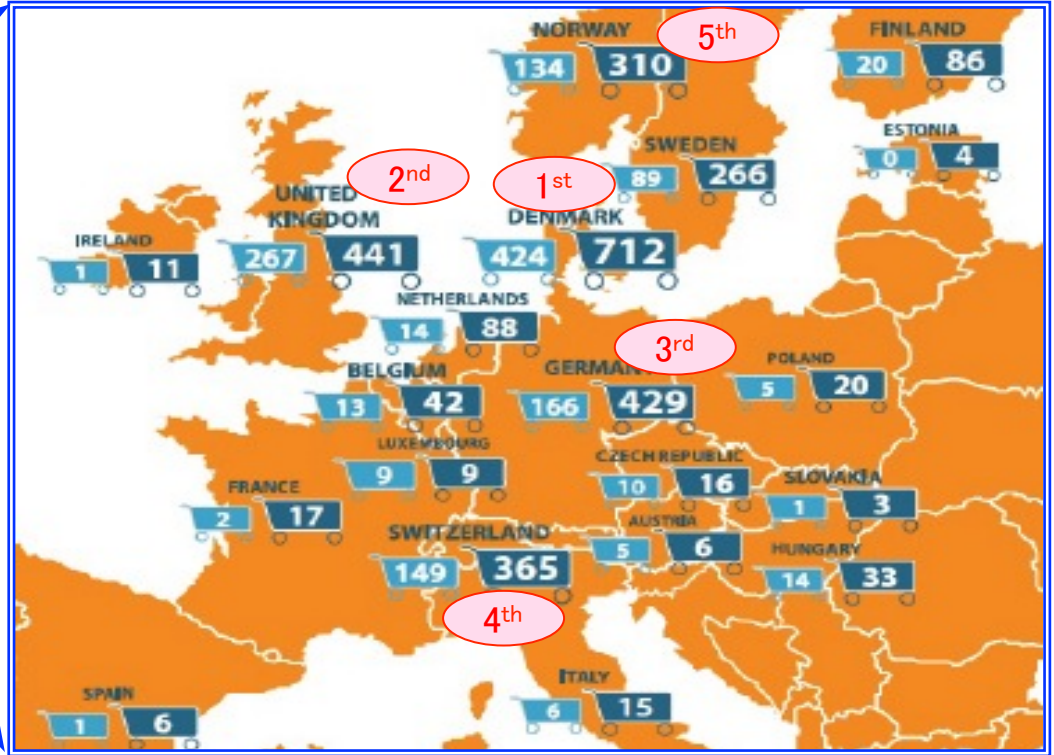
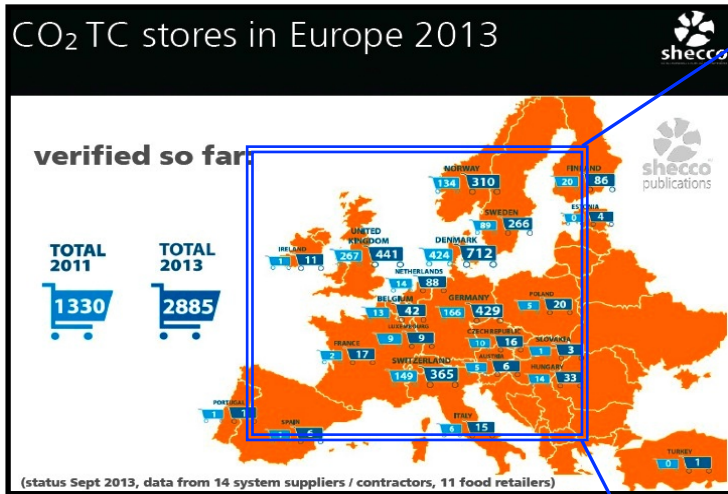
Next-Generation Pilot Store:  
Panasonic-Mae Store  
(Opened in Feb. 2014)





# Comparison with Other Countries

## Number of Stores with CO<sub>2</sub> Refrigeration (EU Region)



Rank	Country	Stores
1	Denmark	712
2	UK	441
3	Germany	429
4	Switzerland	365
5	Norway	310

➔ Total 2,881 Stores

※FY2011 +116%

※shecco: ATMOSphere Network Tokyo presentation

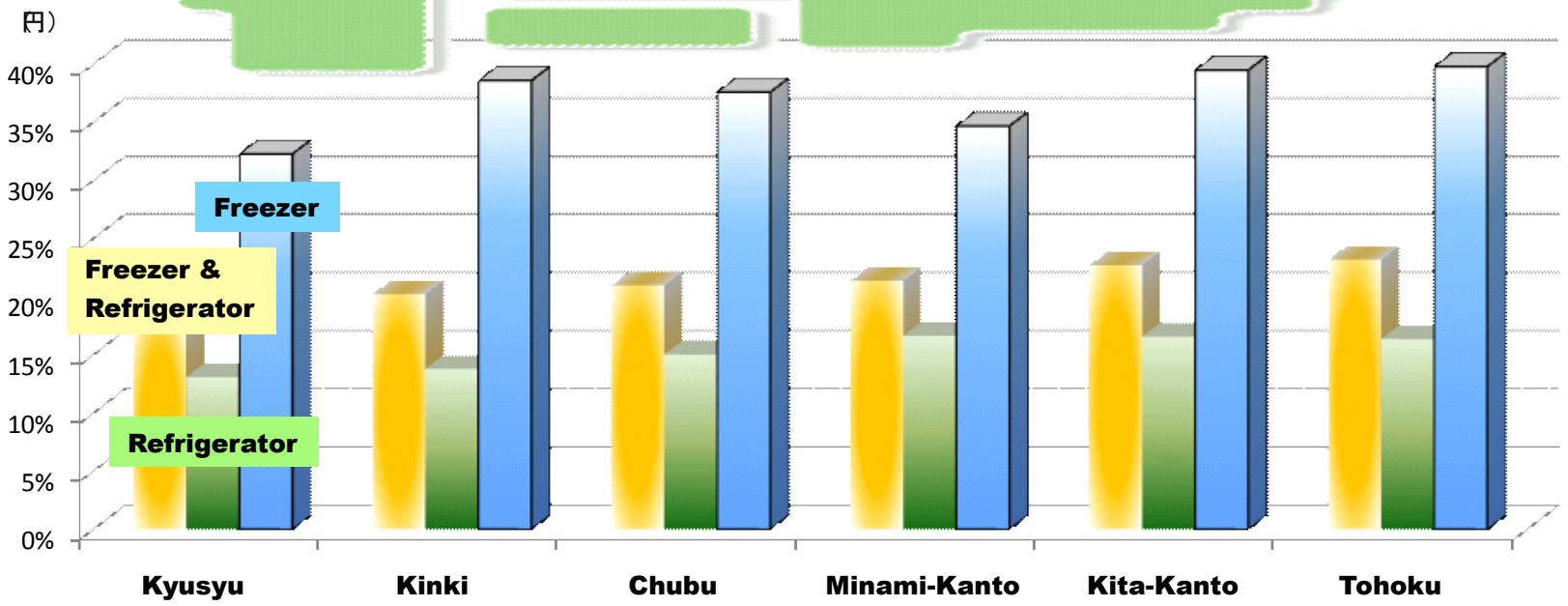
Japan is behind EU countries in natural refrigeration. But CO<sub>2</sub> technology has been proven and the number of stores almost reach to **550** by Lawson.(As of end-February 2015)

⇒ **Lawson aims “No.1 Natural Refrigeration Retailer” in the world.**

# Energy Saving of Outdoor Unit

	Annual Electricity ( Refrigerator )			Annual Electricity ( Freezer )			Annual Saving ( Total )	
	CO2 System	HFC System	Saving	CO2 System	HFC System	Saving	kWh	%
	kWh	kWh	%	kWh	kWh	%		
Kyusyu	23,116	26,598	13	6,143	9,072	32	6,412	18
Kinki	22,014	25,534	14	5,493	8,945	39	6,973	20
Chubu	21,276	25,040	15	5,567	8,924	38	7,120	21
Minami-Kanto	20,966	25,153	17	5,820	8,910	35	7,278	21
Kita-Kanto	19,812	23,743	17	5,258	8,693	40	7,366	23
Tohoku	16,491	19,718	16	4,866	8,084	40	6,444	23
Average	20,612	24,298	15	5,524	8,771	37	6,932	21

※Measurement Period: Jan. 2013 – Dec. 2013



## 【Electricity Measured with Systems Using Different Refrigerant】

Refrigerant	Number of Stores	Annual Electricity (averaged)	Ratio to R404A
R404A	135	168,593kWh	1
R410A	220	164,264kWh	0.97
R744(CO <sub>2</sub> )	25	147,782kWh	0.88

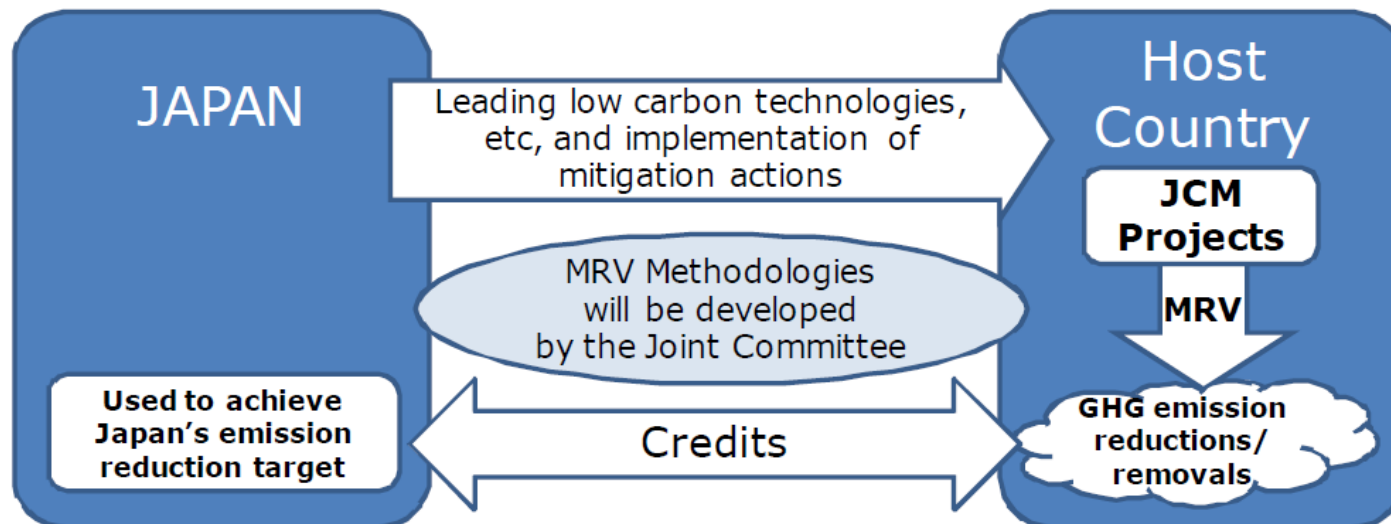
※Comparison Based on Measurement in FY2012 Period, of Stores Opened FY2011 and FY2012

# **Indonesian Eco Project with Japanese government**



## Basic Concept of the JCM

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions to GHG emission reductions or removals from Japan in a quantitative manner, by applying measurement, reporting and verification (MRV) methodologies, and use them to achieve Japan's emission reduction target.
- Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals, complementing the CDM.



## ① *FS experiment for METI*

### 1. PETA BARAT

Already opened on 7th/FEB

✂ Designated equipment: CO2 refrigerant system

## ② *JCM grant project by MOE*

### 1. RADEN SALEH

Already opened on 21th/FEB

### 2. KEBAGUSAN

Planned to open on 10th/MAR

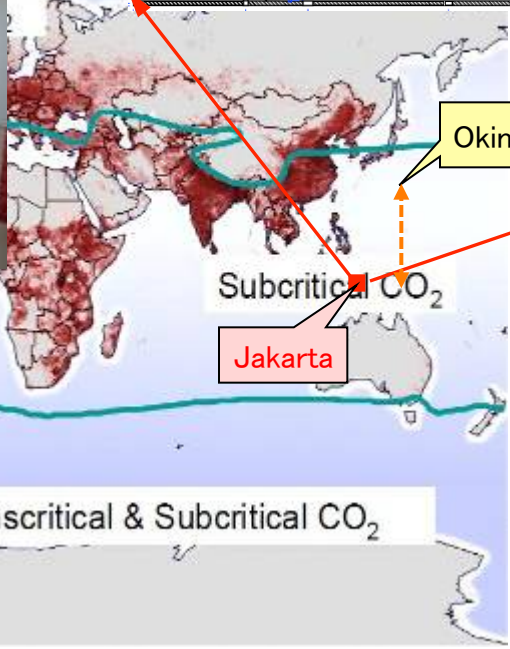
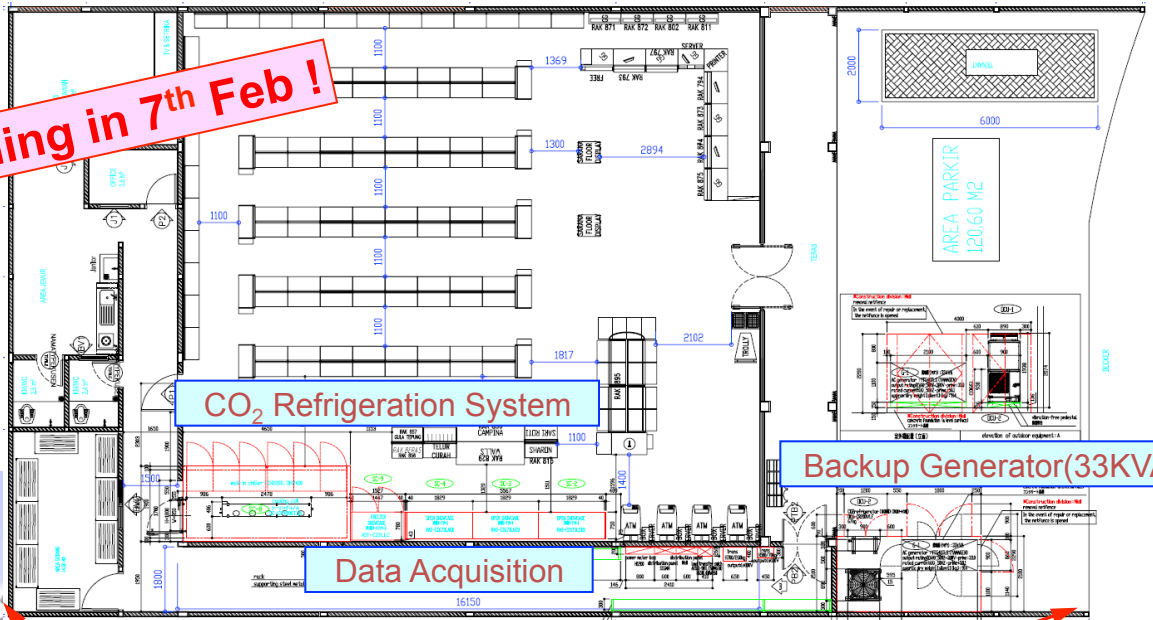
✂ Designated equipment: CO2 refrigerant system, AC, LED lighting

# 1st Pilot Store of JCM FS Project in Jakarta LAWSON

## ■ PETA BARAT (Alfamidi)

- Location: Jakarta
- Sales Floor: 236m<sup>2</sup>
- Equipment:
  - CO<sub>2</sub> Refrigeration System
  - Data Acquisition
  - Backup Generator (33KVA)

Opening in 7th Feb!



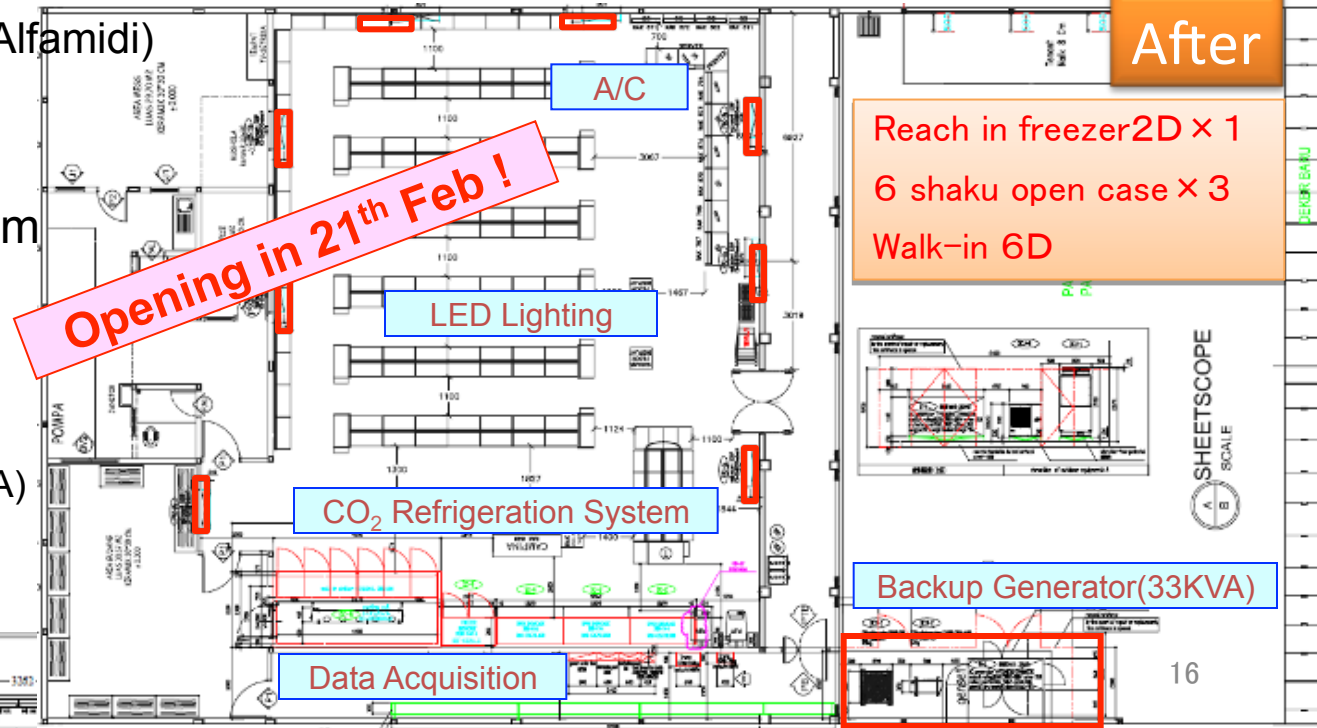
Map from Globalis.gvu.unu.edu

# 1st Pilot Store of JCM Grant Project in Jakarta



## ■ RADEN SALEH (Alfamidi)

- Location: Jakarta
- Equipment:
  - CO<sub>2</sub> Refrigeration System
  - A/C(Inverter)
  - LED lighting
  - Data Acquisition
  - Backup Generator (33KVA)

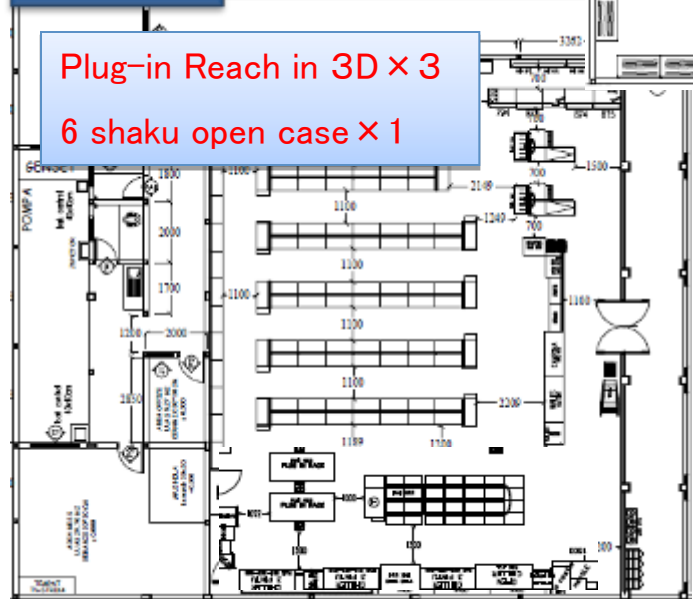


**After**

Reach in freezer 2D × 1  
 6 shaku open case × 3  
 Walk-in 6D

## Before

Plug-in Reach in 3D × 3  
 6 shaku open case × 1





# 2nd Pilot Store of JCM Grant Project in Jakarta LAWSON

## KEBAGUSAN (Alfamidi)

- Location: Jakarta
- Equipment:
  - CO<sub>2</sub> Refrigeration System
  - A/C(Inverter)
  - LED lighting
  - Data Acquisition
  - Backup Generator (33KVA)

Opening in 10th Mar!

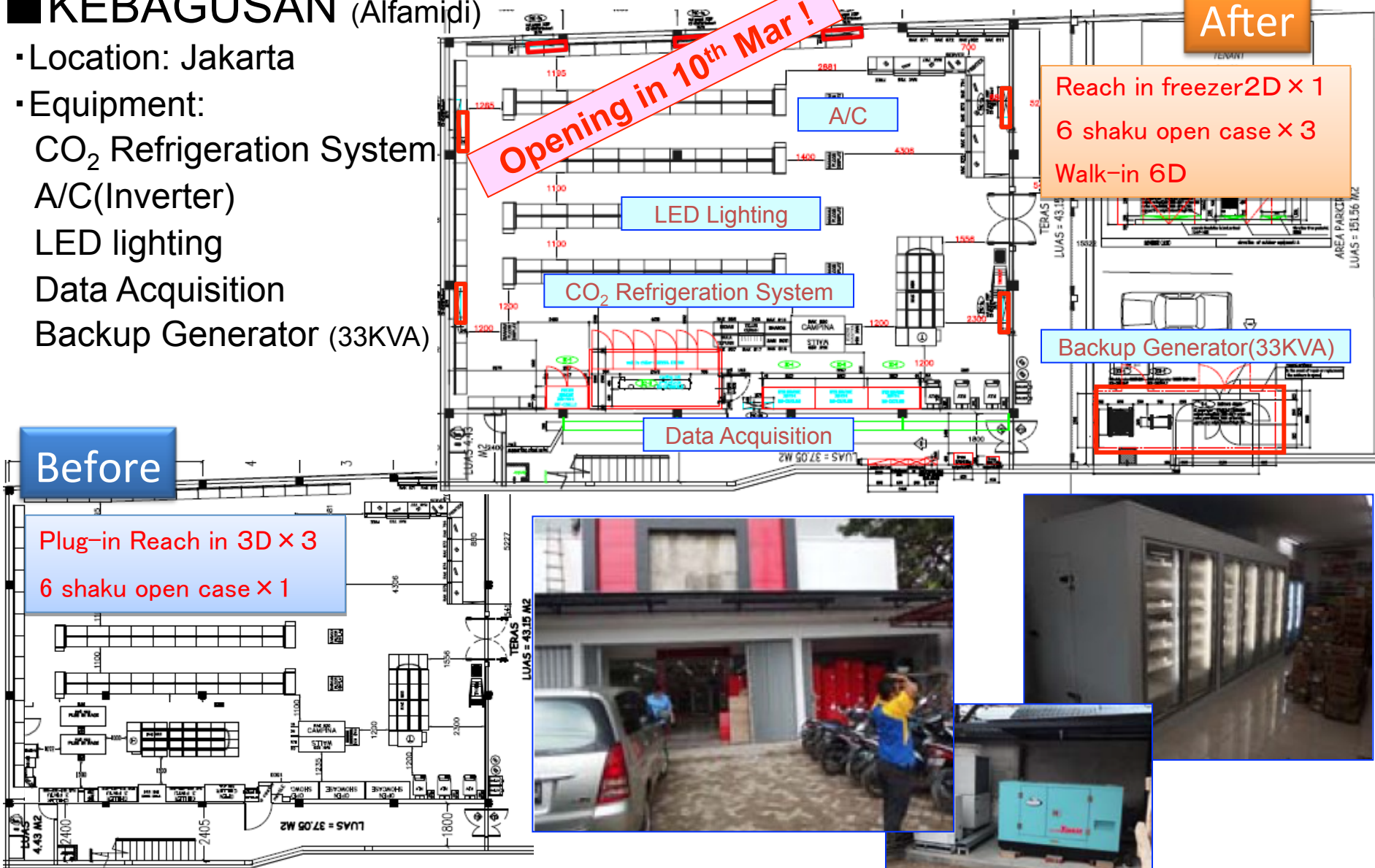
After

Reach in freezer 2D × 1  
6 shaku open case × 3  
Walk-in 6D

Backup Generator(33KVA)

Before

Plug-in Reach in 3D × 3  
6 shaku open case × 1



# Quick Report on Energy-Saving

- ① Not only Raden Saleh and Kebagusan, but also Peta Barat (AC/D company, LED/Philips) will achieve a project target
  - ② Energy consumption of Refrigerator of Peta Barat has been improved by changing the setting of Walk-in showcase (July 1st).
    - Humidity setting of Defroster has been optimized.
    - Before (last report): 44,611kWh  $\Rightarrow$  After (this report) 42,314kWh ( $\blacktriangle$ 2,297kWh)
- The setting of Raden Saleh and Kebagusan have been changed on July 13th and 12th.

