

# JCM Model Project

## Energy Saving in Factories with Air-Conditioning Control System



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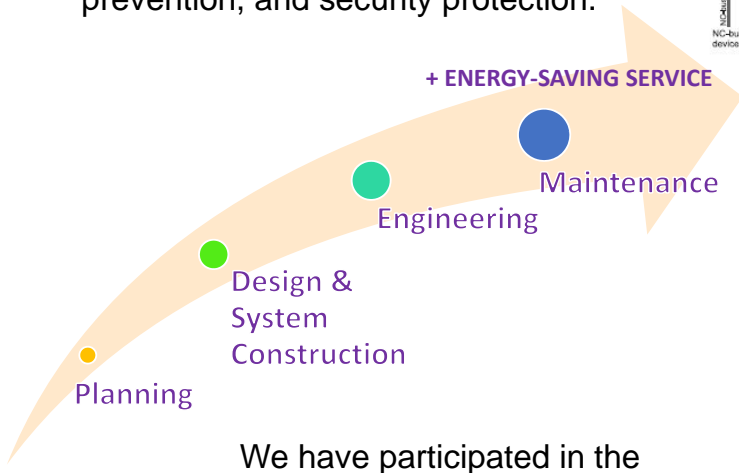
# 1. Corporate Profile and Business in Vietnam

## 1-1. Corporate Profile Overview

Company's Name	YUKO-KEISO Co.,Ltd
Founded	December, 1963
Headquarters	Tokyo
Office & Subsidiaries	Domestic (Japan) : 4 offices (Yokohama, Saitama, Tochigi, Tokyo) Overseas (Vietnam): 1 subsidiary (Hanoi)
Employees	167
Capital	100 million JPY
Annual sales	3.77 billion JPY (the term ended May, 2016)
Lines of Business	<ul style="list-style-type: none"><li>▪ Sales of instruments and automatic control equipment</li><li>▪ Engineering service for instrumentations and automatic control systems</li><li>▪ Design and installation of electric equipment, electrical communications equipment, air-conditioning systems, security systems and disaster prevention equipment, and facilities</li><li>▪ Maintenance and management of equipment and facilities related to each item listed above</li></ul>

## 1-2. Our Business in Japan

YUKO-KEISO provides total control systems based on advanced system engineering for wide-ranging building facilities such as air conditioning, electrical equipment, disaster prevention, and security protection.



We have participated in the construction of many landmark structures in the central Tokyo area .

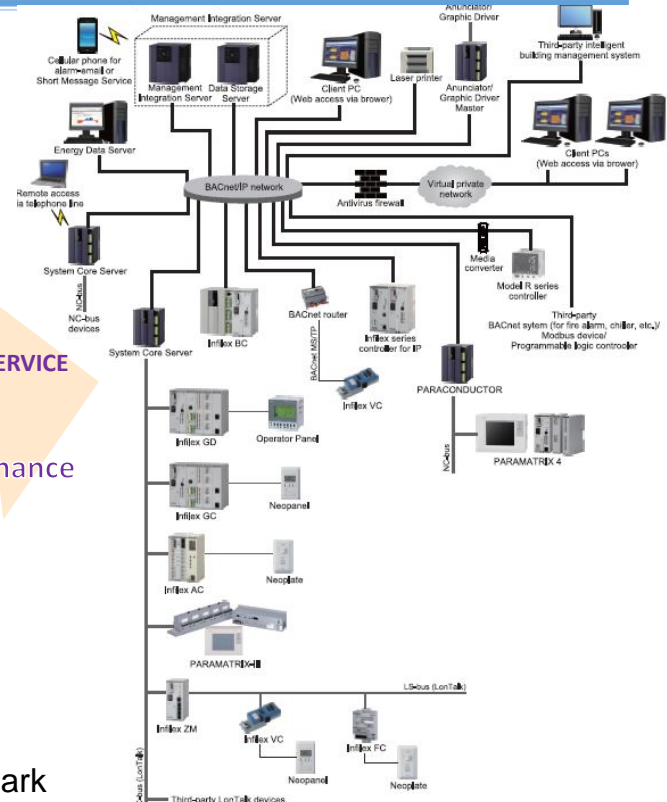


Figure: Building Automations System Configurations  
<http://www.azbil.com/products/bi/ba/index.html>

## 1-3. Our Business in Vietnam

Office in Vietnam  
 (No.32 Pham Huy Thong Str., Ba Dinh District, Hanoi, Vietnam)



<http://www.worldatlas.com/webimage/countrys/printpage/printpage.php?l=/webimage/countrys/asia/lcolor/vncolor.gif>

Founded	July, 2012
Lines of business	<ul style="list-style-type: none"> <li>• Provide consulting services, installation and maintenance related to the installation of industrial machinery and equipment, mechanical - electric – air equipment, fire protection systems.</li> <li>• Design and technical consulting, software development, assembly and installation of the control panel, integrating, commissioning, maintenance and technical support for the control systems of industrial plants, and control systems for factory automation, control systems and building management systems to save energy and protect environment.</li> <li>• Support JCM Feasibility Study (FY 2012-15)</li> <li>• Support implementation of JCM project (2015-17)</li> </ul>

## 2. Project Overview

### 2-1. Project General Information

**Introduce “Air-conditioning control system” to air conditioners in six components factories in Vietnam. Control operation of compressor equipped in the air conditioner outdoor unit. Achieve the reduction of power consumption.**

<b>Name of Project</b>	<b>“Energy Saving in Factories with Air-Conditioning Control System”</b>
Host Country	Vietnam
Project Participants	JAPAN: YUKO KEISO Co., Ltd. Vietnam: Nidec Vietnam Co., Nidec COPAL PRECISION Co. Nidec SERVO Co., Nidec TOSOK Co. Nidec SANKYO Co., Nidec COPAL Co.
Total equipment cost	Approximately 140 million JPY
Period	From end of Feb, 2016 to end of Mar, 2017
Technology	A/C Control system (Eco Power Fit) ⇒With the use of A/C Control system, it is able to realize a reduction of energy consumption and contribute to <b>Green House Gas</b> emission reduction
Scale of investment	Introduce 474 Eco Power Fit in six factories in Nidec
Finance	JCM support from Ministry of Environment of Japan
Expected GHG Reductions	4,676 tCO <sub>2</sub> /year

## 2-2. Overview of project

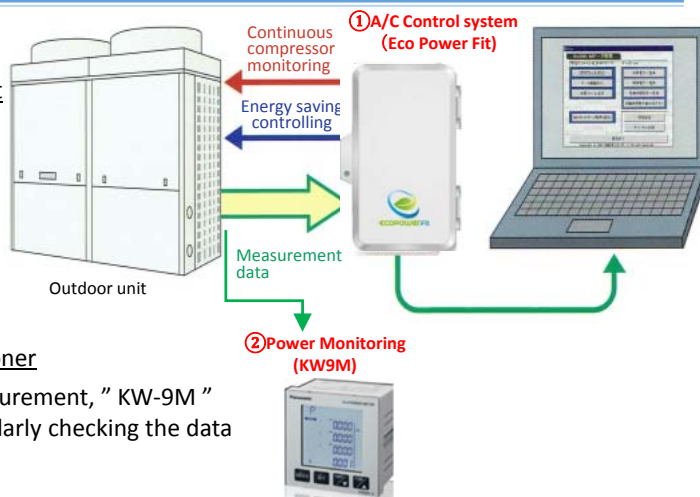
### Outline of GHG Mitigation Activity

① Install Eco Power Fit to air-conditioner outdoor unit

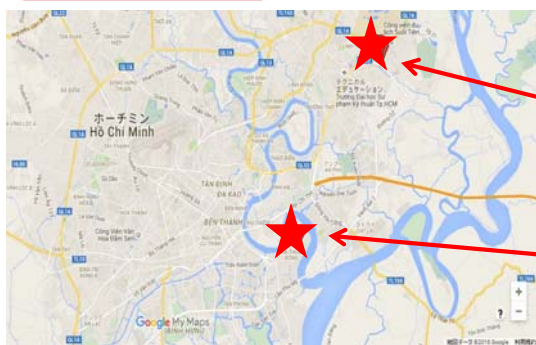
- Constantly monitor operation status of the compressor equipped in the air conditioner by measuring an electric current
- Control the compressor for 4 to 5 minutes once or twice in thirty minutes
- Prevent supercooling and realize energy savings by blast.

② Electric power measurement device for air conditioner

- Monitor voltage and current by IEC listed measurement, "KW-9M"
- Calculate CO2 emission reduction effect by regularly checking the data

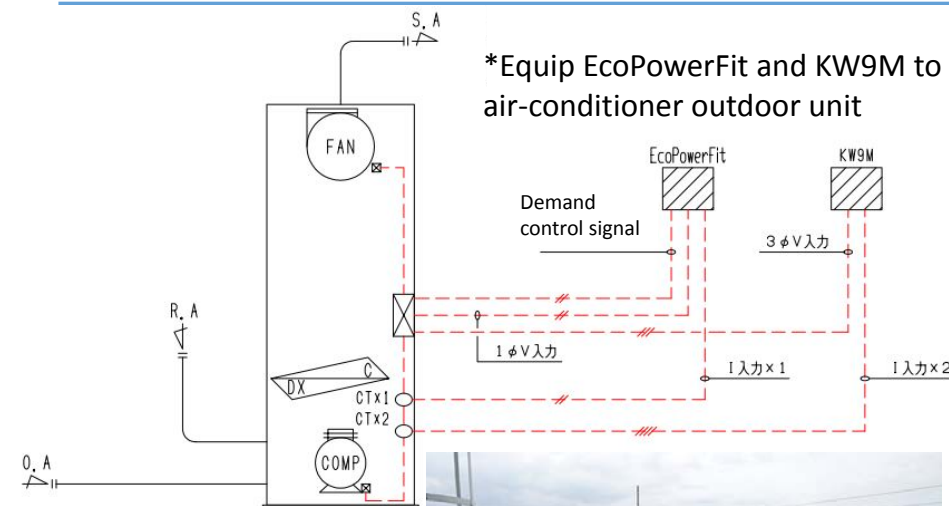


### Sites of Project

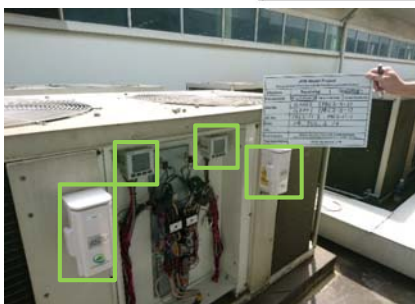


Factory Park	Company Name	The year of entering Vietnamese market
Saigon High-Tech Park at district 9 in Ho Chi Minh city	Nidec Vietnam	2005年
	Nidec COPALPRECISION	2011年
	Nidec SERVO	2009年
Tan Thuan Export Processing Zone at district 7 in Ho Chi Minh City	Nidec SANKYO	2005年
	Nidec TOSOK	1997年
	Nidec COPAL	1999年

### P & ID (piping & instrumentation drawings) of air-conditioning control system



\*Equip EcoPowerFit and KW9M to air-conditioner outdoor unit



under construction

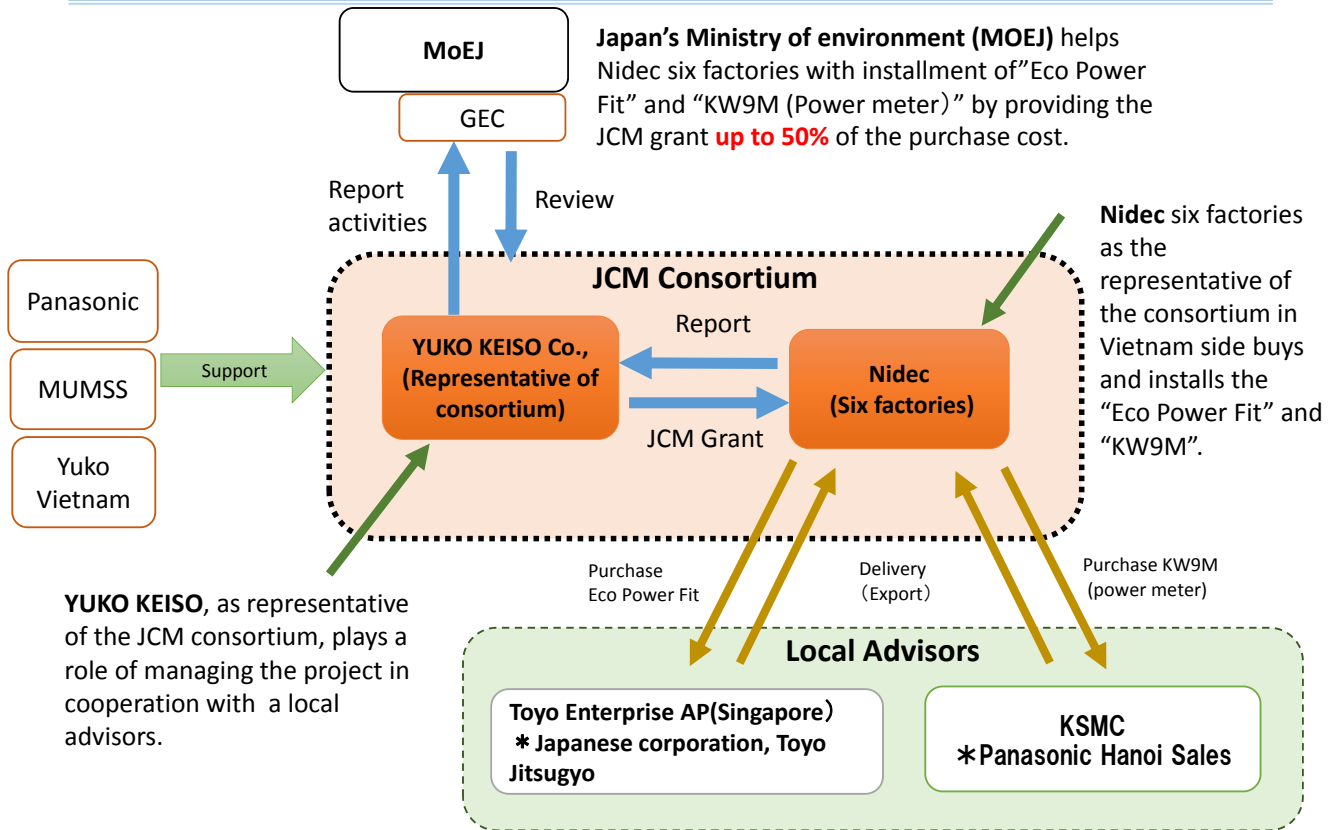


installed equipment



Indoor condition

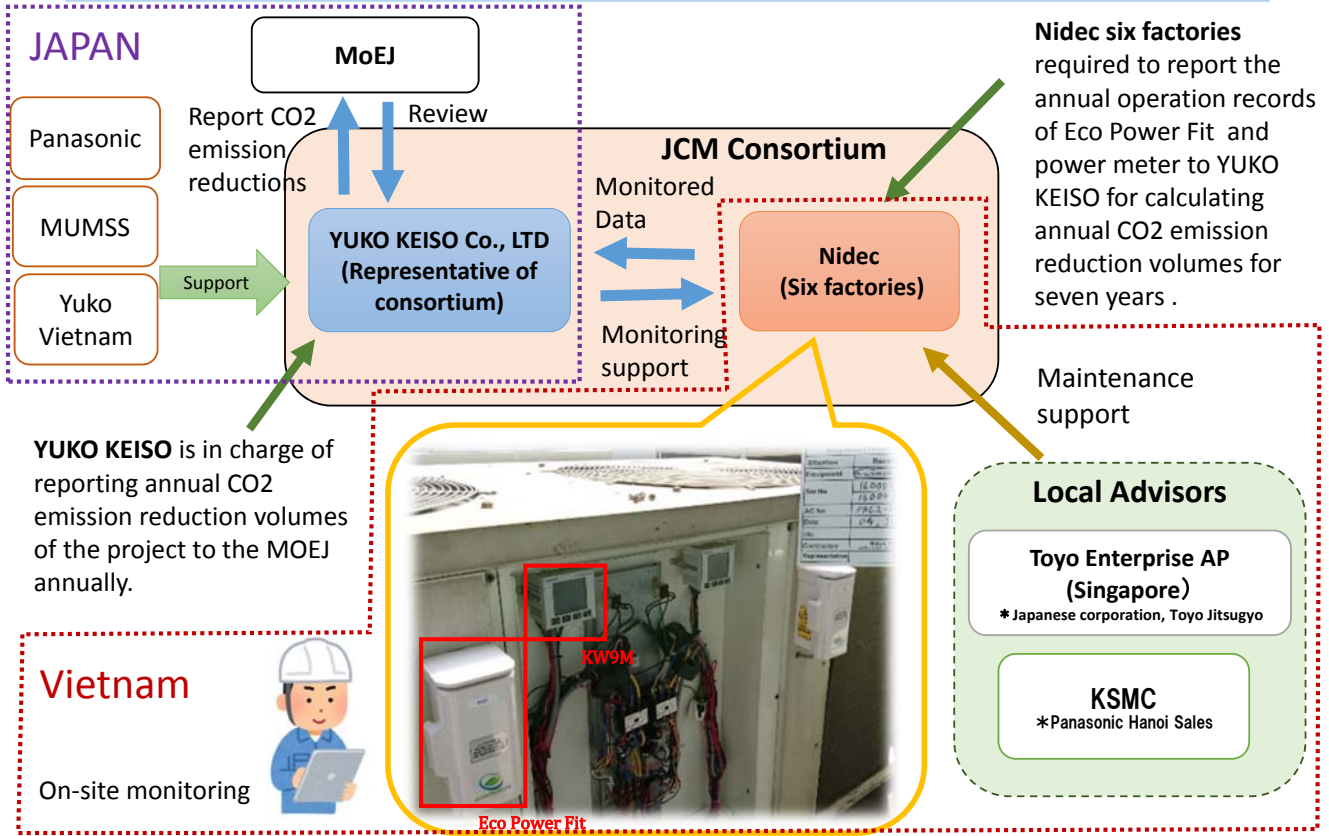
## 2-3. Consortium Structure



## 2-4. Project Schedule

JFY	2015	2016				2017~
		1Q	2Q	3Q	4Q	
<b>①JCM Model Project</b>						
Feasibility study "Feasibility study on FY 2014 JCM Large-scale project"	6/8-13 7/13-18					
Develop JCM Consortium	3/3					
JCM Grant application / notification	1/12 Preliminary notice 2/26 Grant decision notice					
Installation and Operation	Project Start		● Intermediate Inspection	● Final Inspection	Scheduled to complete project	● Deliver the JCM grant
<b>②JCM Process</b>						
Monitoring / Reporting CO2 emission reduction						
Methodologies						
Registration of JCM Project						Development PDD & Validation
Apply credit issue						Prepare Monitoring report & Verification

## 2-5. Structure of MRV (Measurement, Reporting and Verification)



## 2-6. JCM Methodology (Tentative)

### Eligibility Criteria

Criterion 1	The project installs compressor control systems for new and/or existing non-inverter multi-split type air conditioners.
Criterion 2	A sampling of electric current of compressors at the interval of 0.01 seconds or below can be conducted and the compressor control systems installed has a function to estimate the amount of electricity consumption.

### JCM Methodologies

#### Reference Emissions

$$RE_p = \sum_{i=1}^n EC_{PJ,i,p} \times (1 + \eta) \times EF_{elec}$$

Where:

- $RE_p$ : Reference emissions during the period  $p$  [tCO<sub>2</sub>/p]
- $EC_{PJ,i,p}$ : Total electricity consumption by multi-split type air conditioner with compressor control system  $i$  during the period  $p$  [MWh/p] ← Monitored
- $n$ : Number of multi-split type air conditioners groups whose aggregate electricity consumption are measured by one electricity meter [dimensionless]
- $i$ : An index variable that is used to count the number of multi-split type air conditioners with compressor control systems
- $\eta$ : Energy efficiency coefficient [dimensionless]
- $EF_{elec}$ : CO<sub>2</sub> emission factor of consumed electricity [tCO<sub>2</sub>/MWh]

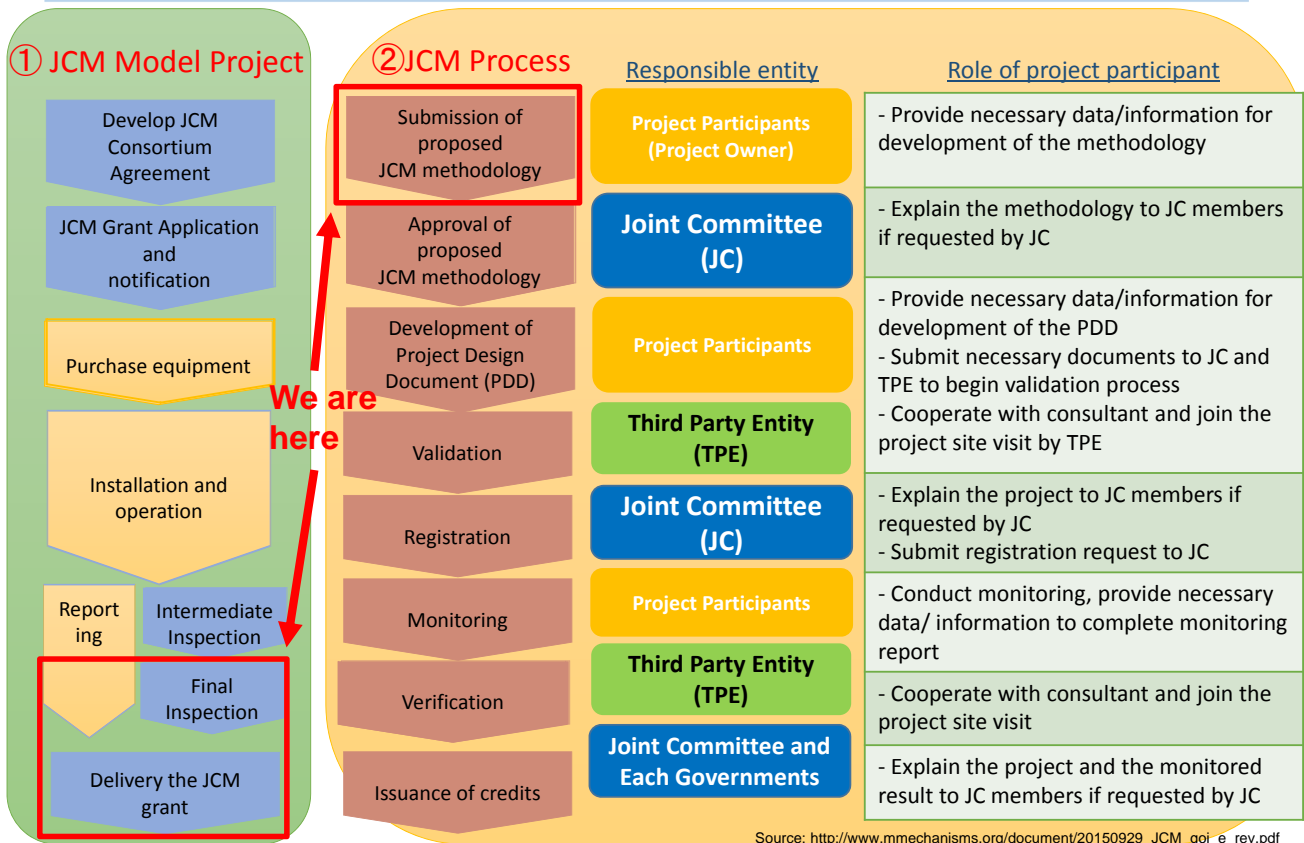
#### Project Emissions

$$PE_p = \sum_{i=1}^n EC_{PJ,i,p} \times EF_{elec}$$

Where:

- $PE_p$ : Project emissions during the period  $p$  [tCO<sub>2</sub>/p]
- $EC_{PJ,i,p}$ : Total electricity consumption by project multi-split type air conditioner with compressor control system  $i$  during the period  $p$  [MWh/p]
- $EF_{elec}$ : CO<sub>2</sub> emission factor of consumed electricity [tCO<sub>2</sub>/MWh]

## 2-7. Current Status



## 3. Advantages and Challenges



## 3-1. Advantages (1)

### 1. Contribute to CO2 emissions reduction, and support from MOEJ of facility investment

- Enable to drastically reduce power usage while utilizing existing facilities (Contribute to CO2 emission reduction)
- Enable to reduce economic burden of capital investment (Grant of 50 % of equipment cost)

【 Chart of introduction effect of Eco Power Fit in each company 】

[Basic data]

Power Bill JPY/kWh)	9.6
CO2(kg-CO2/kWh)	0.5603

Company (Nidec)	Electricity consumption	Reduced electric energy	CO2 emission reduction
	(MWh/Year)	(MWh/Year)	(t/Year)
VIETNAM	2,768	609	341.1
COPAL PRECISION	7,734	1702	953.4
SERVO	7,935	1,746	978.1
TOSOK	12,275	2,701	1513.1
SANKYO	5,774	1270	711.8
COPAL	1,450	319	178.8
<b>Total</b>	<b>37,937</b>	<b>8,346</b>	<b>4676.3</b>

CO2 emission reduction = Each air conditioner's rated power (compressor's rated power) × Operation time × Operation days × Operation rate (80%) × Power reduction rate (22%) × Power grid CO2 emission factor (0.5603)

## 3-2. Advantages (2)

### 2. Reliability of project implementation

- Implemented “ Feasibility study on FY 2014 JCM Large-scale project ” in 2015. As its result, realized JCM Model Project
- Verified CO2 emission reduction effect
- The consortium members who introduce the equipments could value the merits of JCM Model Project

### 3. Simple Scheme

- This JCM Model Project is only supported for equipment cost (Not included construction cost )
- We only need to equip existing air conditioners with some CO2 emission reduction for achieving CO2 emission reduction

### 4. A variety of potentiality

- Utilizing daily task of local equipments staff for the task of introduced equipments (Enable to monitor status of air conditioner outdoor unit)
- As a result, operation improvement of daily task can be anticipated

### 5. Cooperative relationship

- Since Yuko Keiso as representative of the JCM consortium has a local office in Vietnam , could get support of Vietnamese staff in the project conduct process
- A key person of the consortium in Vietnam advanced the coordination from commercialization to operation in Vietnam

## 3-3. Challenges

### 1. Secure project scale

- Needed time for deciding business scale and coordinating among project partners since operation cost can be covered only when the project has certain scale in order to conduct the project as a representative

### 2. Form the various common understanding in the implementation

- Joint project with seven companies as consortium members
- In addition to JCM model project (project of equipment installation and operation), credit issuing and monitoring task for the period of useful life of equipment as JCM process
- Establish a system for proceeding smooth monitoring (seven years)

### 3. Property management period

- Lifetime management of Eco Power Fit is 7 years in the Japanese Law

### 4. How to execute and perform the consortium agreement successfully



Thank you for your kind attention!