

JCM Model Project

Installation of High Efficiency Air Conditioning System and Chillers in
Semiconductor Factory

Sony Device Technology (Thailand) Co., Ltd.

1 March 2017

Sony Corporate Services (Japan) Corporation

□ About Sony

□ Company Name: Sony Corporation

□ Founded: May 7, 1946

□ Headquarters: 1-7-1 Konan Minato-ku, Tokyo, Japan

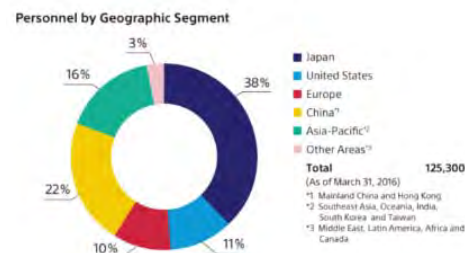
□ Representative Corporate Executive Officers:

President and CEO Kazuo Hirai 、 Executive Deputy President and CFO Kenichiro Yoshida

□ Common stock: 858,867million yen (As of March 31, 2016)

□ Major Products: Sony consists of the following segments: Mobile Communications, Game & Network Services, Imaging Products & Solutions, Home Entertainment & Sound, Semiconductors, Components, Pictures, Music, Financial Services, and All Other businesses

□ Headcount (Consolidated):125,300 (as of March 31, 2016)



□ Consolidated Sales and Operating revenue (Fiscal year ended March 31, 2016): 8,105,712 million yen

□ Curbing Climate Change : Sony's global environmental plan

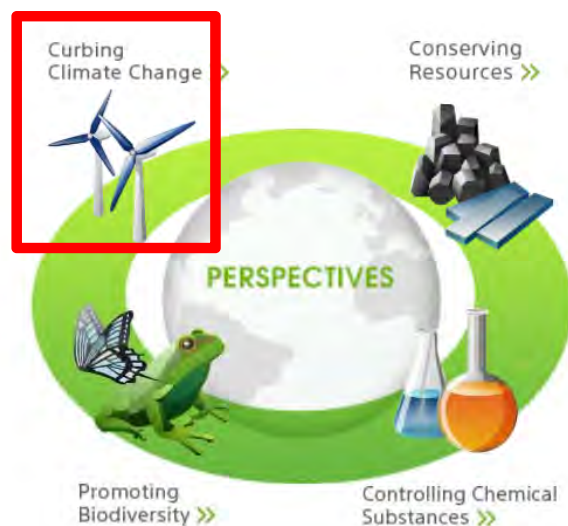
Sony's global environmental plan

Road to ZERO

Road to Zero is Sony's global environmental plan,
striving to achieve a zero environmental
footprint throughout the life cycle of our products and business activities by 2050.
Road to Zero sets a series of specific goals based on four environmental PERSPECTIVES,
and six product LIFE CYCLE stages.

« PERSPECTIVES X LIFE CYCLE »

□ Curbing Climate Change : Sony's global environmental plan



PERSPECTIVES

Environmental action from four environmental perspectives

Sony business operations rely on a healthy natural environment. To help promote fulfilling lifestyles today and tomorrow, and achieve a zero environmental footprint by the year 2050, we have set goals from four environmental perspectives: curbing climate change, conserving resources, controlling chemical substances and promoting biodiversity.

Road to
ZERO

LIFE CYCLE »

□ Curbing Climate Change : The intermediate target set for the FY2020

“Road to Zero”

Road to Zero is Sony's global environmental plan, striving to achieve a zero environmental footprint throughout the life cycle of our products and business activities by 2050.

Green Management 2020



FY2050 has been set as the year for achieving a zero environmental footprint. Green Management 2020 has been established as the intermediate target set for the FY2020, and we have now entered the next stage of Sony Group's environmental activities.

Focus Topics toward FY2020

- ◇ Sony will reduce the annual energy consumption of its products by an average of 30% by FY2020.
- ◇ Efficient Production with a Smaller Environmental Footprint
- ◇ Tapping the power of entertainment to raise awareness and inspire action
- ◇ Business Partners Becoming Environmental Partners
- ◇ Accelerating the Use of Renewable Energy

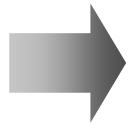
In addition to ensuring the thorough implementation of energy-saving measures in Sony sites, we are also accelerating the use of renewable energy.

Our aim is to increase the amount of renewable energy that we use in order to contribute to CO² reductions equivalent to 300,000 tons by FY2020 through the use of certificates and credits.

□ Curbing Climate Change : Accelerating the Use of Renewable Energy

GHG reduction

1. Reduce energy usage



Improve efficiency, fuel, process and operation etc.
Reduction energy usage from every angle

2. Utilize Renewable energy



For a part of energy usage that difficult to reduce because of company activity, promote the use of renewable energy



Wind Power



Solar Power



Biomass

□ Curbing Climate Change : Accelerating the Use of Renewable Energy

The significance of the renewable energy introduction

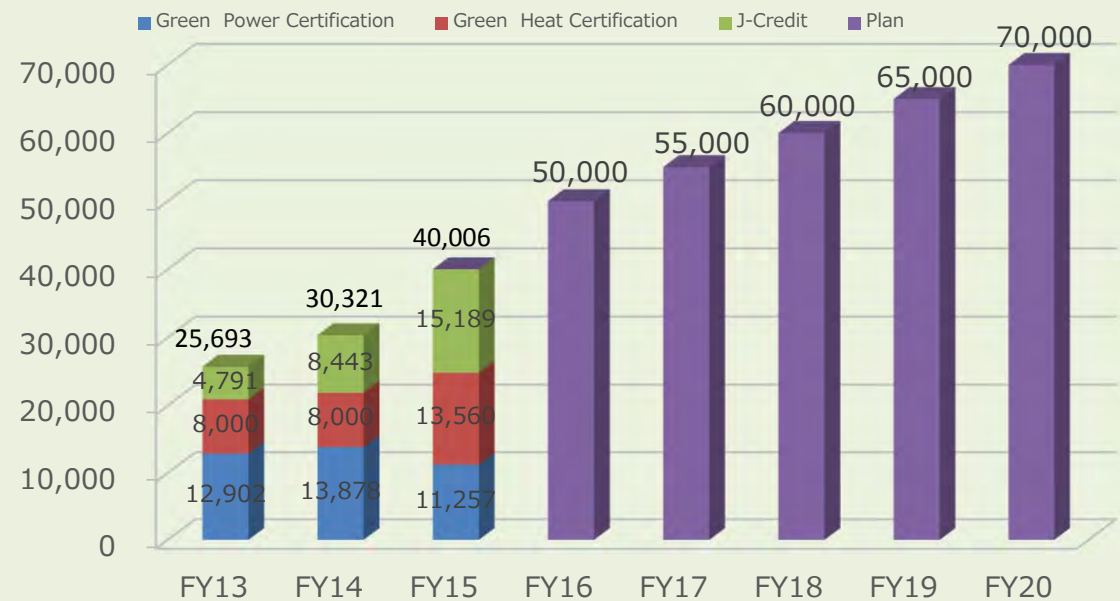
1. For renewable energy spread expansion

2. Greenhousegas reduction by Sony group

Focus Topics toward FY2020

CO² reductions equivalent to 300,000 tons by FY2020 through the use of certificates and credits.

The renewable energy introduction amount



Green Management 2020

□ Curbing Climate Change : Accelerating the Use of Renewable Energy

Supplier of Certification & Credit

Certification

Noshiro Biomass Power Plant
Green Power Certification :
1,600 Million kWh/year
Green Heat Certification :
8,000 t-CO₂/year



Certification

Noshiro Wind Power Plant
Green Power Certification :
220 Million kWh/year



Credit

25 national involved In
renewable energy sources
nationwide
J-Credit: 8,000 t-CO₂ /year



Credit

Tshubetsu Municipal Forest Project
J-Credit: 600 t-CO₂/year

Certification

Eurs Tashiroadaira Wind Farm
Green Power Certification :
150 Million kWh/year



Certification

Choshi Byobugaura Wind Power Plant
Green Power Certification :
30 Million kWh/year



Credit

Tokamachi municipal government and local small-
and medium-size companies Pellet boiler project
and other projects
J-Credit: 1,000 t-CO₂/year



□ The Joint Crediting Mechanism(JCM) : Feasibility Study (Thailand/ Bangladesh)

Support Program by Government of Japan (SONY)



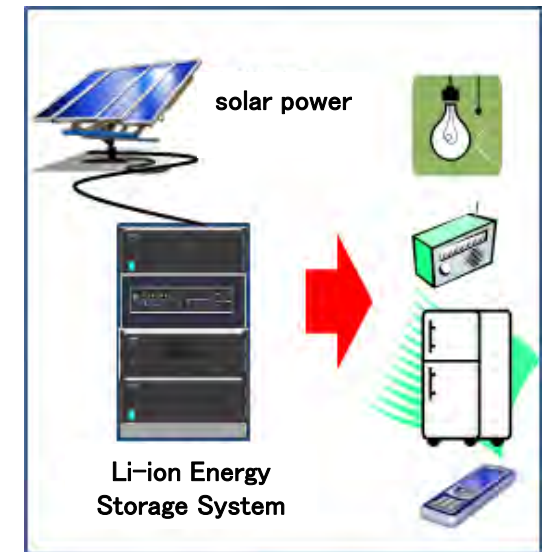
METI/NEDO JCM Feasibility Study (FS) 2011

Program organization research of green house gas emission reduction project through next-generation (zero-emission) air conditioning system utilizing solar heat in the Kingdom of Thailand – SONY plant model
http://www.nedo.go.jp/library/seika/shosai_201206/2012000000480.html



MOE/GEC JCM Feasibility Study (FS) 2013

Electrification of off-grid area using solar power and long-life battery system
http://gec.jp/jcm/jp/projects/13fs_ban_02.html



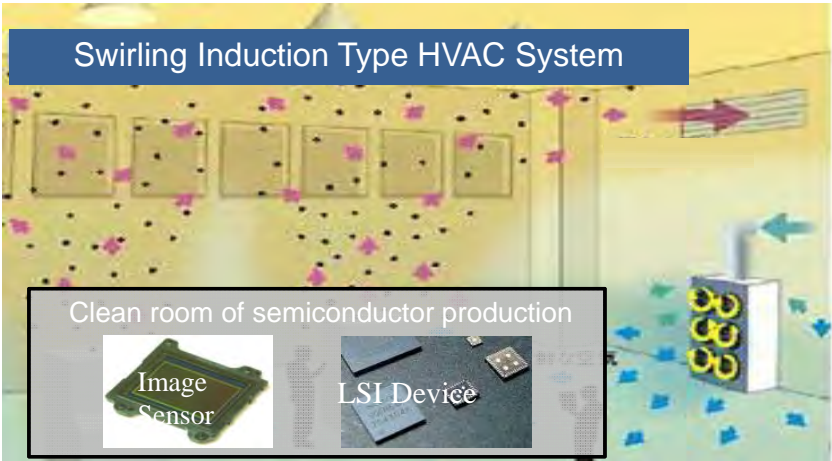
Installation of High Efficiency Air Conditioning System and Chillers in Semiconductor Factory

PP(Japan) : Sony Semiconductor Corporation / PP(Thailand) : Sony Device Technology (Thailand) Co., Ltd.

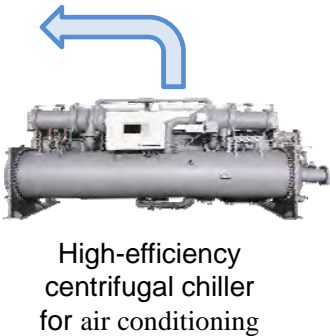
Outline of GHG Mitigation Activity

This project introduces high efficiency Centrifugal Chiller and Swirling Induction type air-conditioning system in the newly constructed clean room -(6,250m²), which is a part of refurbishment of LSI and image sensor manufacturing plant affected by floods crisis in 2011.

The air-conditioning system is composed of both replacement air conditioning and Swirling Induction Type air diffuser. This system's target is occupied zone only. Air temperature blown from the fan unit can be closer to the room temperature, which reduces refrigeration load of a chiller. Air flow can also be less than standard system, reducing power consumption. In addition, the chiller is equipped with inverter which contributes to the energy-saving.



Reference : Takasago Thermal Engineering Co.,Ltd. Website



Expected GHG Emission Reductions

2,588tCO₂/year

- GHG emission reductions
= Reference emissions - Project emissions
- GHG emission (tCO₂/y) = Electricity consumption (MWh) x Emission factor(MWh/y)
- CO₂ Emission factor = 0.5(tCO₂/MWh)

	Estimated Energy Saving	Estimated GHG Reductions
Centifugal chiller	1,164MWh/y	582tCO ₂ /y
Air-Con. system	3,653MWh/y	2,006tCO ₂ /y
total	4,817MWh/y	2,588tCO ₂ /y

Sites of JCM Model Project

Sony Device Technology(Thailand)
Bangkadi Plant(Bangkadi Industrial Park)



Manufacturing Plant of LSI and Image Sensor

Planned major products are image sensor for digital single-lens reflex camera and LSI device for smartphone.

□ About JCM Project : Location Thailand bangkadi



Sony Device Technology Bangkadi Factory

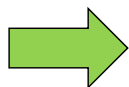
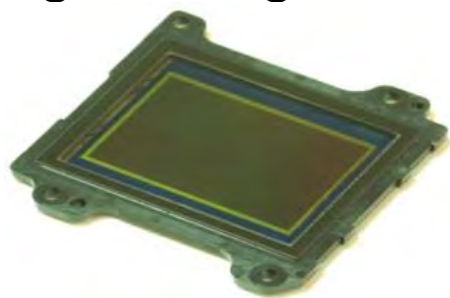


□ About JCM Project : Products

Image Sensor Device

Further commanding a leading position in Image sensor device market.

■ Digital-Single lens reflex camera < DSLR >



Total pixel: 24M
Cell size: 3.91μm
Optical system: APS type Device type:
IMX210



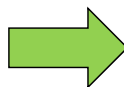
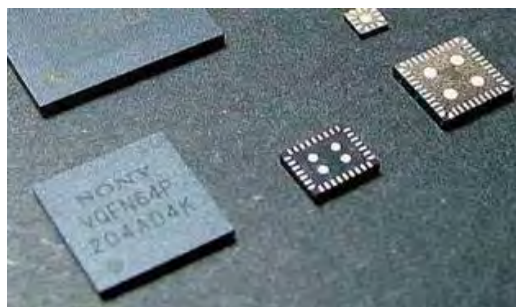
SONY: *NEX series*

SONY: *Alpha series*

LSI Device For Sony Product

SDT produce the Large Scale Integrated Circuit for small and thin package size.

Which is application for electronic consumer product as mobile phone.



Product Package : VQFN & UQFN

❑ Flood of Thailand : Damage of SDT

Our Situation at the time of the Flood on 21.10.2011

Main Entrance



Before Flood



Flood

□ Flood of Thailand : Flood Control Measures

Measures against the great flood such as the flood in 2011 that called a 100-year flood are progressing.

Measures of the Thai government

- Unification of the water management, Compensation for farmers
- Dam enlargement, Flood control channel expansion, Tree planting, Monitoring system reinforcement

Measures of BKD Industrial Park

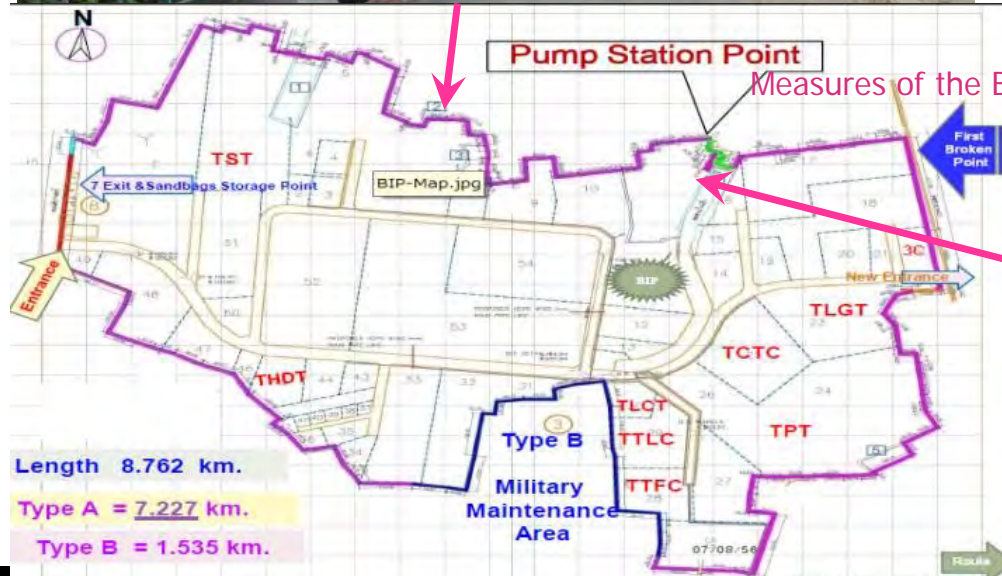
- Reinforcement of the dike (height 5m, width 6m), Drainage pump expansion : drainage capacity 3.5times
- Raise up the level of the highway which leads to the expressway (4m+1m Water stop board)

* 80% of the companies that suffered from the disaster in BKD Industrial Park reopen their business.

Measures of SDT

- Raise up the level of the floor where we have to install machines and facilities
- Develop BCP scenario and training by using our experience in 2011 as a case study

□ Flood of Thailand : Flood Control Measures by BKD Industrial Park



□ About JCM Project : Target equipment

Air Conditioning System

SWIT

Swirling Induction Type HVAC System

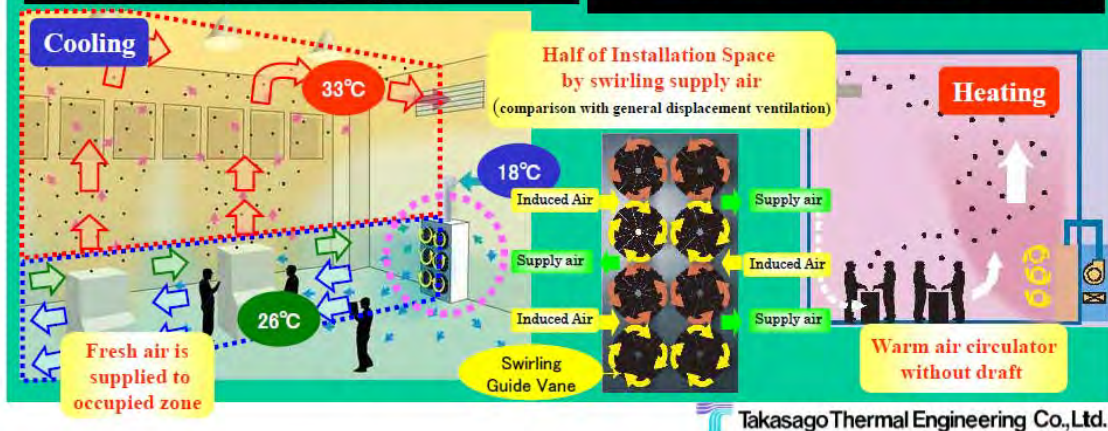
New HVAC system for the large-scale enclosure

Merits of the SWIT

Merits

- Comfort and Clean Environment
- Flexibility and Reduction of Installation Space
- Reduction of Installation Cost and Energy Consumption

Mixing System



Chillers

ETI-50 500RT



□ Major features

Capacity 500 USRt

COP(Coefficient Of Performance)

6.76(AHRI)、6.2 (JIS)

MaxCOP.at part load 24.4

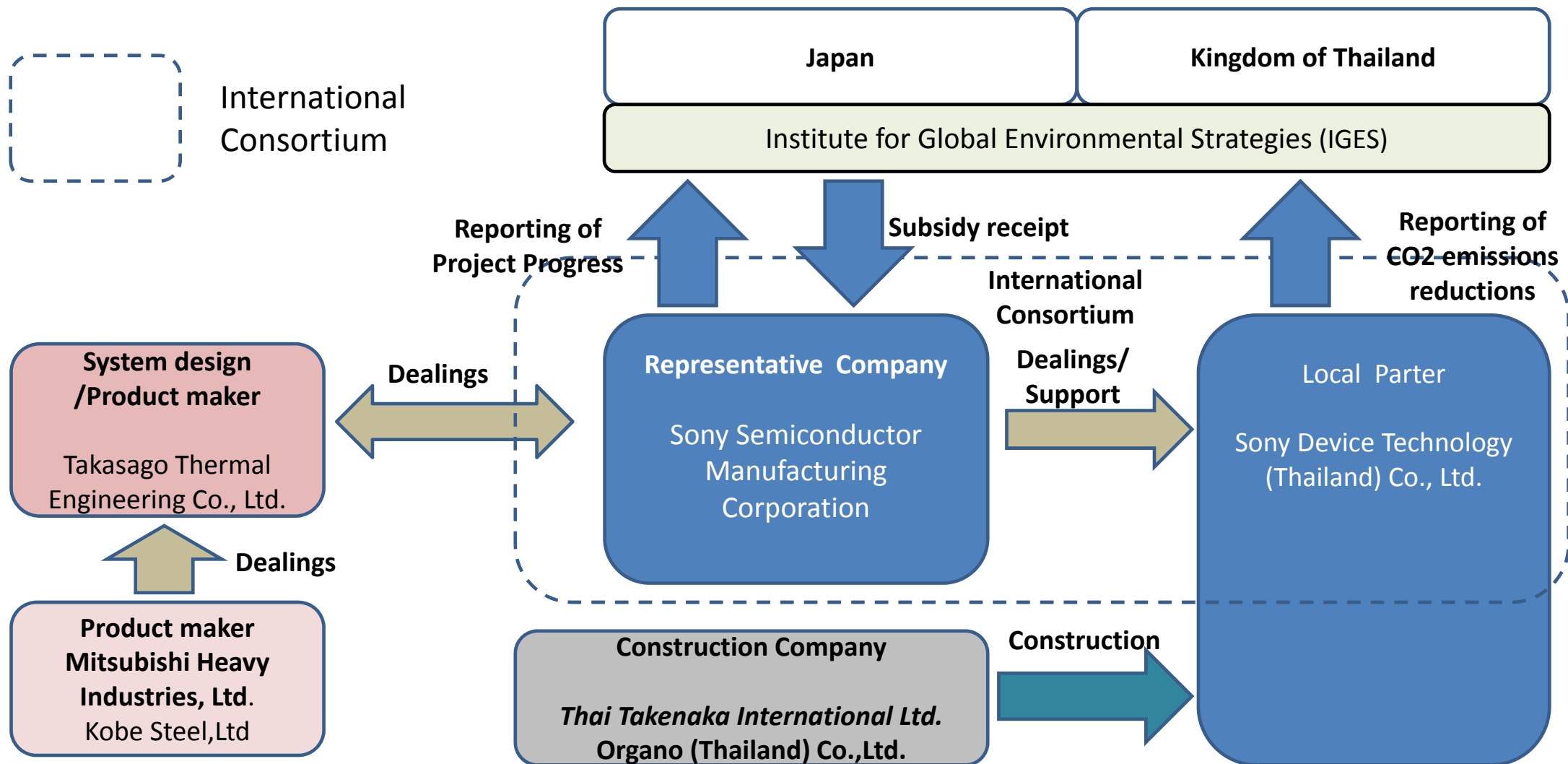
※IPLV 11.2 (AHRI Standard 550/590-2003)

IPLV 9.0 (JIS B8621:2011)



□ About JCM Project : International Consortium

< Project Implementation Structure >



□ About JCM Project : Plant tour



Chiller & Facility personnel



Plant tour (Government of Thailand & Government of Japan)



Air Conditioning System (SWIT)

□ Utilization of JCM and points to consider

■ Benefits of utilizing the JCM financial support project

High efficiency energy saving equipment can be introduced to the host country

- Reduction of greenhouse gases and energy costs

■ Cautionary points

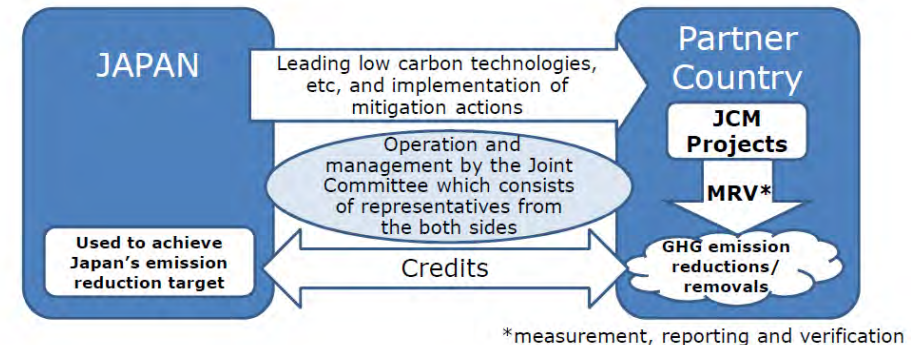
- Partner company selection in the host country
- Recognition of the Japanese corporation's obligations
- Commercial flow / exclusion of profits within the international consortium

- Allotment of credits to be created

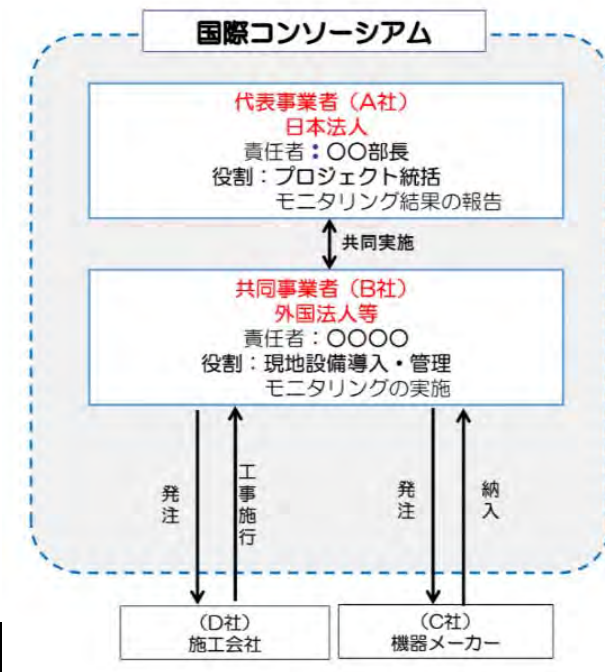
■ Points to consider

- Import and export procedures, customs duties
- Utilization of credits by the company
- Promotion of the export of small and medium enterprise technologies using JCM

- Creation of credits in projects that do not utilize the JCM financial support project



■ Project Implementation Structure (Example)



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