添付資料

1. 現地調査資料

2. 低炭素アクションプラン資料

3. 招聘・セミナー関連資料

   3-1 招聘説明資料（YCDC 水環境グループ招聘受入れ）

   3-2 北九州 JCM セミナー・川崎市招聘関連資料

   3-3 COP22 発表資料

   3-4 計画財務大臣川崎招聘関連資料

   3-5 東京 JCM セミナー関連資料

4. 案件組成技術資料

   4-1 事業候補地

   4-2 導入技術カタログ

1. 現地調査資料

平成２８年度低炭素社会実現のための都市間連携に基づく JCM 案件形成可能性調査

ヤンゴン現地調査スケジュール　第１回渡航 2016 年 6 月

日程	調査予定			備考
渡航者	日本工営	日本工営	川崎市	
6 月 13 日（月）	NRT-BKK	NRT-BKK-RGN		
6 月 14 日（火）	設備補助事業幹事候補会社打合せ BKK-RGN	11:00 IHI ヤンゴン事務所面談 MKI 外注打合せ		設備補助事業幹事会社候補協議、説明
6 月 15 日（水）	9:00 JETRO 面談 15:00 AM Golden Green Energy 面談		HND-BKK-RGN	・来年度の設備補助事業に向けて協議
6 月 16 日（木）	YCDC　面談・協議 9:00　CPLA 10:00　PCCD 14:00 JICA 面談			・今年度の調査概要の説明 ・太陽光発電事業の説明及び用地の確認 ・低炭素アクションプラン作成に向けた協議
6 月 17 日（金）	13:00 JICA　面談 14:00 CPLA 面談 15:00 ラップアップミーティング			・太陽光発電事業の検討
	RGN-BKK-NRT		RGN-BKK-NRT	
6 月 18 日（土）	BKK-NRT,帰着日	設備補助事業機器導入候補会社面談 RGN-BKK-HND	BKK-NRT,帰着日	
6 月 19 日（日）		BKK-HND,帰着日		

JCM Project Formulation Study through City-to-City Collaboration in Yangon

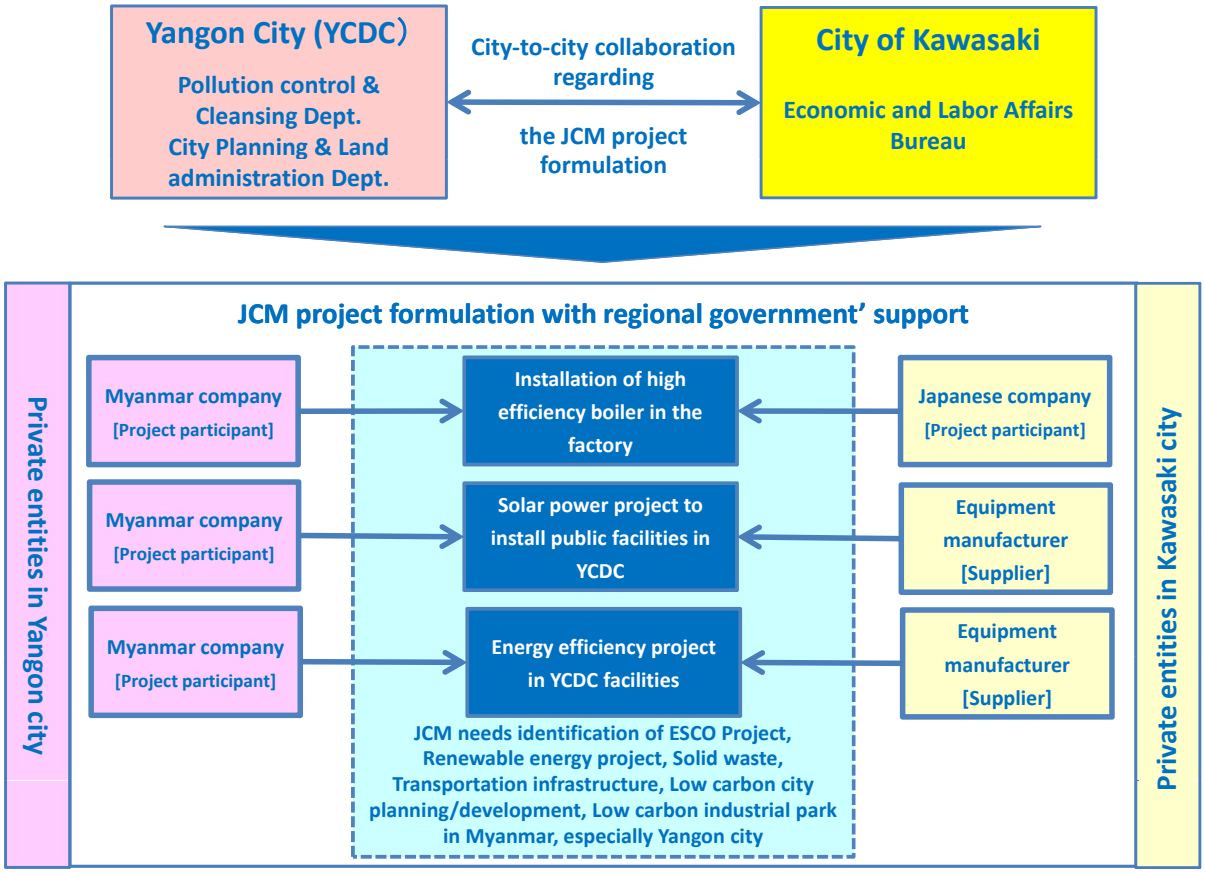
Kick-off Meeting

June, 2016

Nippon Koei Co,. Ltd.
Kawasaki City

Contents

1. Overview of the 2nd year project



2-1. Preparation of Low Carbon Action Plan supported by Kawasaki city

◇ Introduction of Kawasaki's low carbon development plan (→Separate paper)

◇ Purpose of preparation of Low Carbon Action Plan

- To promote city-to-city collaboration between YCDC and Kawasaki city and have(share) future vision of low carbon development of YCDC
- To support and promote JCM project by selecting pilot project in the Low Carbon Action Plan
- To promote sustainable development of YCDC in collaboration of Kawasaki city

◇ Steps of preparation of Low Carbon Action Plan

Step1 : **Discussion YCDC's future vision and sharing Kawasaki's existing Plan**

Step2: **Setting future vision and targeted sectors**

Step3: **Setting future targets by sectors and implementation ideas**

Step4: **Selecting pilot projects by sectors with short and mid term schedule**

By Feb 2017

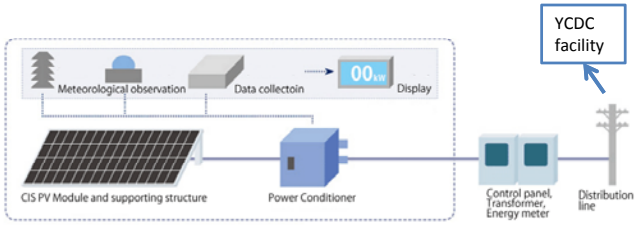
Step5: **Preparation of Draft Low Carbon Action Plan**

from 2017 to 2018

2-2-1. Solar PV Generation Pilot Project: Concept of PV system for YCDC facility

◇ Introduction of Cases of Kawasaki's Mega solar project (→separate paper)

◇ Concept of PV System for YCDC Facility



◇ Necessary Information

(1) Candidate PV sites and its area (m^2)
- if possible, more than two candidate sites
- more than 0.5 ha (more than 1.0 ha is much preferred)

(2) Candidate YCDC facility with power load that utilize PV system
- electric power load such as water pump, motor, compressor, etc
- location adjacent to PV site is much preferred
- Capacity (kW), operation hours of the load equipment to be studied
- Current electricity tariff (Kyat/kWh) of YCDC

(3) Budgeting procedure in YCDC

→ Design, preparation of specification, cost estimation, implementation plan by EEFC and NK

2-2-2. Pilot Project-1 YCDC Solar PV Generation Plan : Details on Technology

Study Title [**JCM Project Formulation Study Through City-to-City Collaboration in Yangon** (CIS PV Generation Project for YCDC Facility)]

Outline of Technique

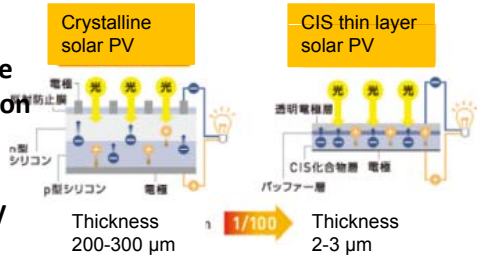
(i) Installation of 2MW PV generation system(CIS solar module, connection box, junction box, power conditioner, transformer, etc).

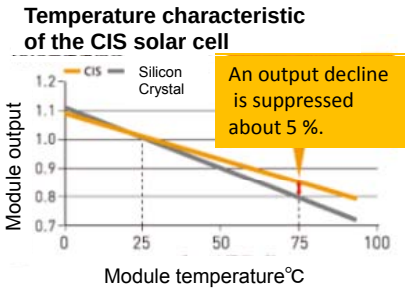
(ii) The next generation solar panel CIS solar cell of a Solar Frontier copper, indium and selenium (CIS) for the main ingredient.

(iii) Power generation decline is reduced irrespective of the weather and the actual power generation is maintained. Long term output stability is expected and implementation of sustainable project is possible.

Feature of CIS PV

- **Less affect of heat and shade**
- **Large actual power generation**
- **Low cost**
- **Long time output stability**
- **Resource saving, low energy consumption at the time of production**





Experience

(i) 2500MW of country such as Kansai International Airport (11.6MW), Mt. Yonekura(10MW), Ise City(5.2MW), Yokosuka City(2.6MW), Iwate Town(2.3MW).

(ii) Over 3000MW around the world such as America : total 200MW, Europe : 450MW and Asia : 150MW, etc.

2-2-3. Solar PV Generation Pilot Project: Work Procedure

◇ **Steps to PV project formulation**

Step1 Identification of candidate for PV project site

→ Select one or two candidates considering conditions and feasibility of the project

Step 2 Confirmation of Conditions for PV site

→ Confirmation of electric lord to YCDC and check the exiting facilities' potential

Step3 Proposal for PV project plan and cost

→ Proposal for PV system and financial plan to YCDC

Step4 Confirmation of procedure for project cost

→ Based on the financial plan selected at Step3, confirm the procedure of preparation of project cost in YCDC

Step5 Preparation of JCM model project proposal

3. Schedule and each task

Item	2016							2017			Player			
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YCDC	KWSK	NK	EEFC
Schedule for City-to-city Collaboration Activity														
Schedule for City-to-city Collaboration Activity											xx	x		
Attendance to high-level conference (if requested from MoEJ)											(x)		(x)	
Working group meeting	★		★		★	★					x	x	x	
Workshop in Japan (invitation)								★			xx	x	xx	
Workshop in Yangon									★		xx	x	x	
Schedule for Solar PV Pilot Project Planning														
Confirmation of candidate PV site with area and distribution line layout and site visit	■												x	
Confirmation of YCDC load to be supplied by PV	■										xx			
Determination of candidate site		■									xx		x	
Design and preparation of equipment specification		■	■										x	xx
Cost estimation of PV system				■									x	xx
Study of tariff and financial feasibility					■						x		xx	
Coordination with YESC about net-metering		■	■	■	■								x	xx
Implemenation plan							■	■			x		xx	
Clarification of procedure for budgeting	■										xx			
- Documentation for budgeting						■					xx	x		
- Internal procedure for budget allocation						■	■				xx			
. Approval of budget								★			xx			
Final Report submission to MoEJ									★			x	xx	

KWSK:Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C

xx : Key responsibility, x: support

Reference : Pilot Project-2: High-Efficiency Drum-Less Boiler in Factories in Yangon

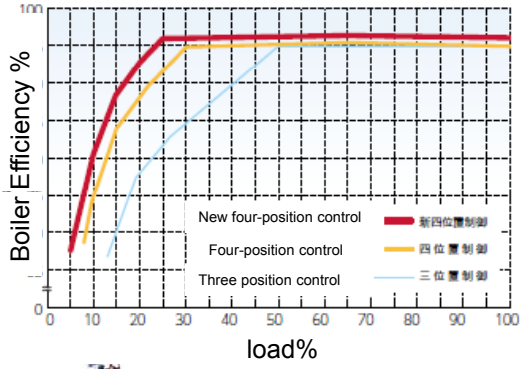
Study Title [**JCM Project Formulation Study Through City-to-City Collaboration in Yangon** (Installation of High-Efficiency Drum-Less Boiler in Food)]

Outline of Technique

(i) Installation of small type high-efficiency drum-less boiler
2 t/h x 6 units = 12 t/h (rated capacity)

(ii) The boiler has the nature of low NOx as well as energy saving → co-benefit which decreases both emission of CO2 and air pollutant.

Comparison of efficiency in different load%



Activities in City-to-city collaboration

Know-how for implementation	Knowledge sharing with other companies
Support for monitoring	Monitoring of projects that contributes low-carbon society and collaboration in the database
Promotion for dissemination	Introduction in YCDC low carbon society action plan and matching

High-efficiency drum-less boiler

IBD System

川崎市 KAWASAKI CITY

City-to-city collaboration
between Yangon and Kawasaki

Large-scale Solar power facilities in Kawasaki-City

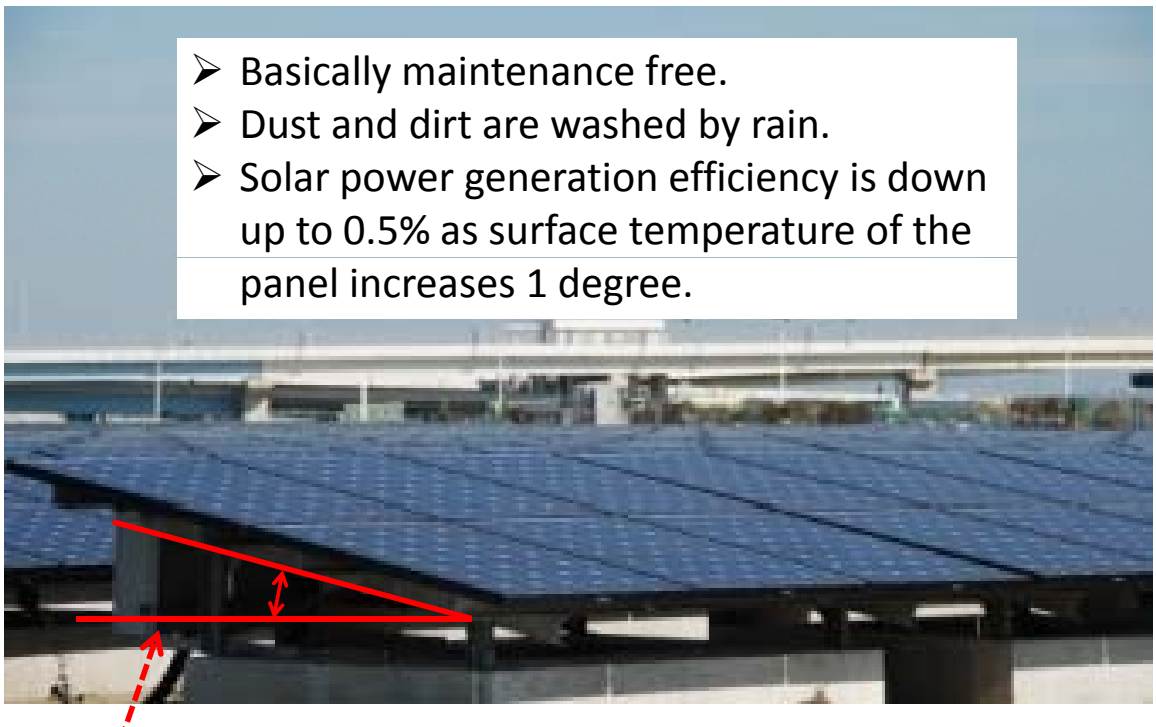
Case 1: Ukishima Large-scale Solar power plant

Site area: 11ha (11,000 m2)

Specification of the Solar-power plant

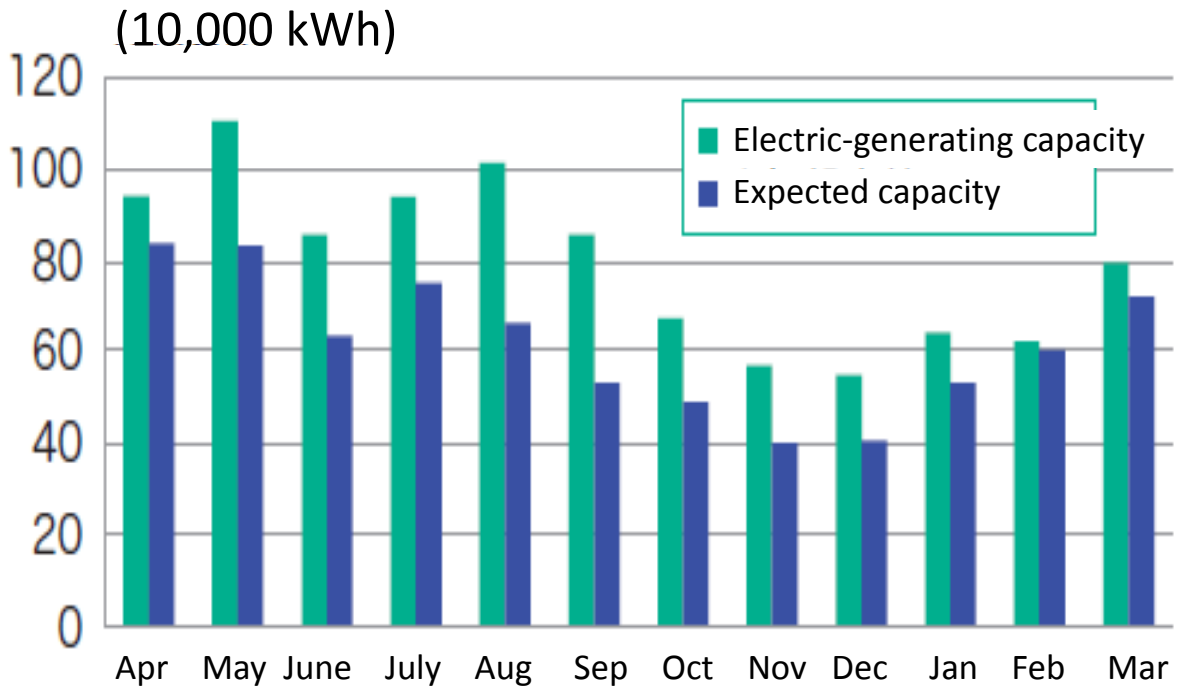
Operation start	2011. Aug
Contractor	Toshiba corporation
Solar panel maker	Sharp corporation
Spec of the panel per unit	198 W
Type of the panel	Single-crystal silicon type
Number of the panel installed	37,926 units
Maximum output	7,000 kW

Characteristics of solar panel



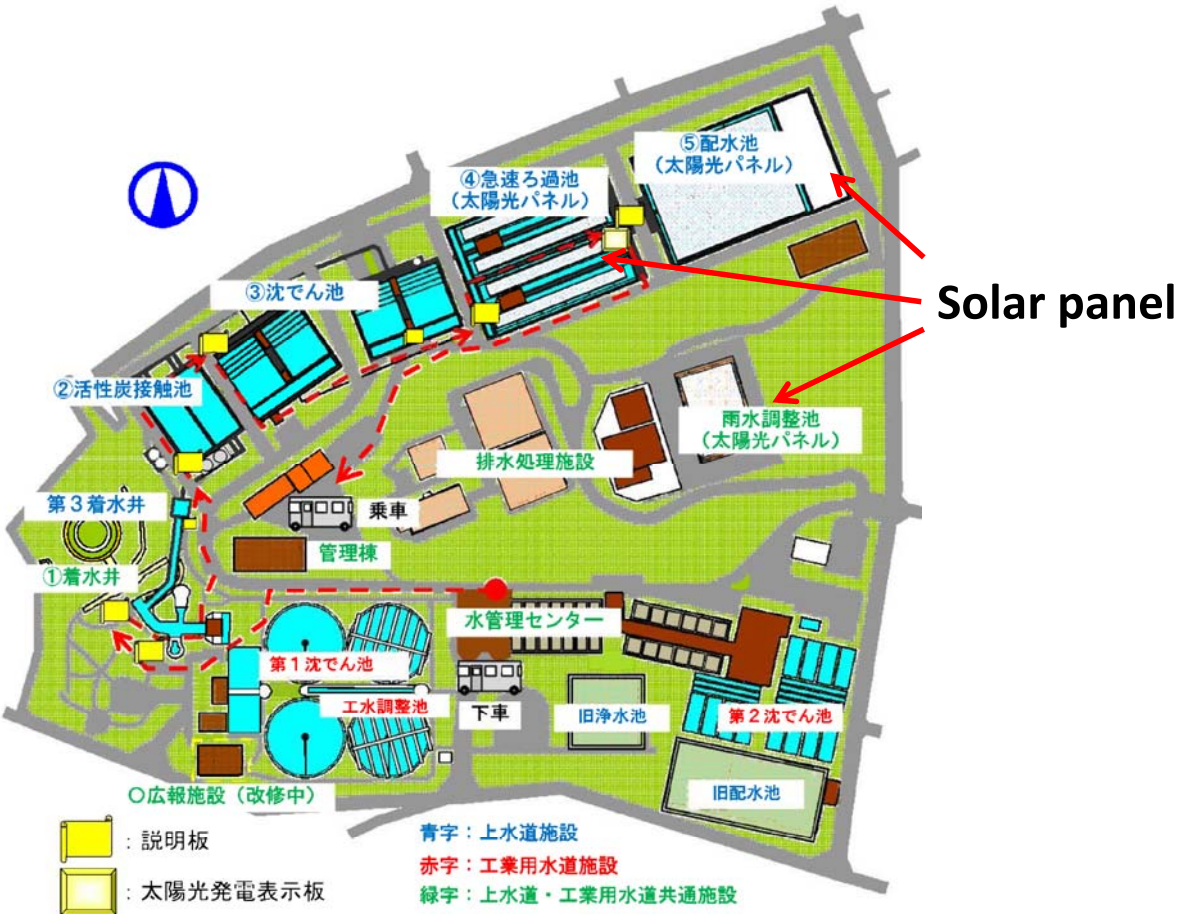
Angle of inclination is 10 degrees.

Operation Result (2014)



Operation Result (2012-2014)		
Capacity of the Electric-Generation		
	First setting	7.40 million kWh
	2012	9.69 million kWh
	2013	9.51 million kWh
	2014	9.30 million kWh
CO2 Reduction (per year)		
	First setting	3,100 ton per year
	2012	5,100 ton per year
	2013	5,100 ton per year
	2014	4,700 ton per year

Case 2: Nagasawa Water purification plant



Solar panel

Solar panel

- **Maximum output: 1,155 kW**
- **The solar panel provide 20% of electricity the facility needed**
- **Initial cost: 800 million Yen (8 million US dollar)**

平成２８年度低炭素社会実現のための都市間連携に基づく JCM 案件形成可能性調査

ヤンゴン現地調査スケジュール　第 2 回渡航 2016 年 9 月

日程	調査予定	備考
渡航者	**日本工営**	---
9 月 12 日（月）	HND - BKK - RGN	---
9 月 13 日（火）	MKI 打合せ 資料収集	・現地作業体制、手順、工程、必要対応事項の確認
9 月 14 日（水）	PCCD 協議	・川崎市・北九州セミナーへの招聘に係る協議 ・太陽光発電パイロット事業に係る協議
	UEEG 面談	・リファレンスボイラの情報収集、ボイラ市場調査
9 月 15 日（木）	CPLA 協議	・川崎市・北九州セミナーへの招聘に係る協議 ・低炭素アクションプラン作成に向けた協議
	WSD 電気関係打合せ、図面・資料収集	・系統図、ポンプ負荷パターン、制御方式、配電盤資料、切り替え方式、繋ぎこみ可能個所の確認
9 月 16 日（金）	**現地調査**	・太陽光発電事業接続電気設備・用地の確認、図面収集
	YESC **面談**	・独立太陽光設備設置手続き要否の確認 ・系統連系の可能性に係る協議
	RGN – BKK - HND	---
9 月 17 日（土）	羽田着	---

JCM Project Formulation Study through City-to-City Collaboration of Yangon and Kawasaki City

Progress Report Meeting

September, 2016

Nippon Koei Co,. Ltd.
Kawasaki City

Contents

1. Overview of the 2nd year JCM City-to-city collaboration project

Yangon City (YCDC)
Pollution control & Cleansing Dept.
City Planning & Land administration Dept.

City-to-city collaboration regarding the JCM project formulation

City of Kawasaki
Economic and Labor Affairs Bureau

JCM project formulation with regional government' support

Private entities in Yangon city

Myanmar company [Project participant]	Installation of high efficiency boiler in the factory	Japanese company [Project participant]
Myanmar company [Project participant]	Solar power project to install public facilities in YCDC	Equipment manufacturer [Supplier]
Myanmar company [Project participant]	Energy efficiency project in YCDC facilities	Equipment manufacturer [Supplier]

JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city

Private entities in Kawasaki city

FY2013 FY2016 FY2017

JICA Programme

JICA Master Plan, in 2013

YCDC Information Collection and Verification Survey, supported by JICA

Incorporate low carbon development action plan of MOEJ Prj

JICA technical assistance

JICA grassroots prj.

MOEJ Programme

Collaboration

Low Carbon Action Plan under JCM city-to-city collaboration, supported by Kawasaki city

1) Preparation of low carbon action plan
* See Kawasaki's plan as reference

2) JCM project formulation
- Installation of high efficiency boiler in factory
- Solar Power Project in YCDC' property

JCM subsidy prj.

Feasibility Study on JCM solar power project in YCDC's facility, such as water treatment plant, ex-dumping site etc.
[item to be checked in FS] : Availability, applicable load, generation and energy supply plan, grid connection, ownership, tariff, cost benefit, budgeting by YCDC etc.

2-1. Invitation to Kawasaki City and Kitakyushu Seminar

- Objective of invitation to KAWASAKI City
  - To discuss about Action Plan for low carbon society
  - To discuss about 2nd MoU
  - To visit to Nagasawa water treatment plant as the model of PV system
  - To visit to companies in Kawasaki for energy efficient technology
- Objective of invitation to KITAKYUSHU Seminar
  - To attend the seminar organized by Ministry of Environment in Japan, and share knowledge and experience of other JCM city-to-city collaboration
  - To give presentation on city to city collaboration between Yangon city and Kawasaki city

2-2. Invitation to Kawasaki City and Kitakyushu Seminar

Date	Plan	Action	Stay
2016/10/17	Move: Yangon -> Bangkok -> Haneda		Kawasaki
2016/10/18	Visit to Kawasaki City Hall, Site visit to solar power system in Nagasawa Water Treatment Plant	- Courtesy call to Kawasaki Mayor, Kawasaki Economic and Labor Affairs Bureau **- Discussion about Low Carbon Society Action Plan** **- Discussion about MoU modificatoin** - Visit to Nagasawa, as model of PV system in water treatment plant	Kawasaki
2016/10/19	Visit to company with energy efficient technique in Kawasaki Move to Kitakyushu	Factory and company visit in Kawasaki city	Kitakyushu
2016/10/20	Participation of International conference in Kitakyushu	Presentation about city to city collaboration in English is kindly requested by the nominated staff of YCDC in the seminar in Kitakyushu.	Kitakyushu
2016/10/21	Participation of International conference in Kitakyushu		Kitakyushu
2016/10/22	Move: Fukuoka (Tentative) -> Bangkok -> Yangon		

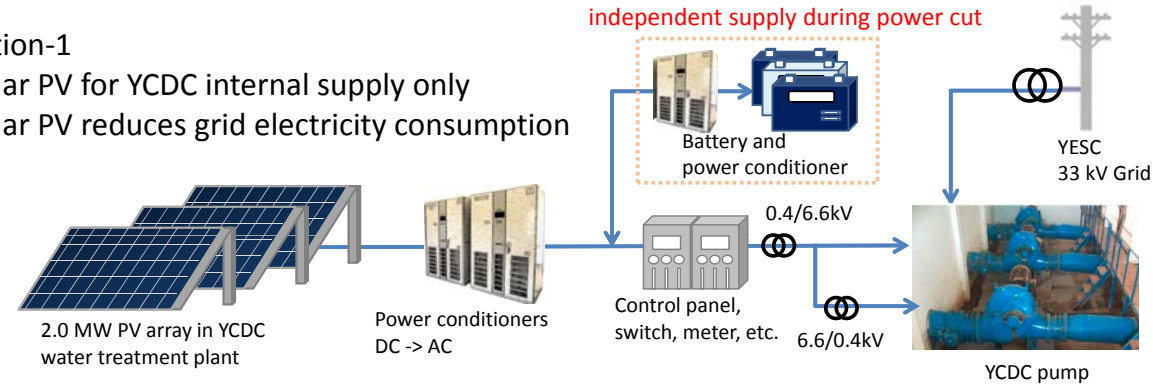
Detailed schedule in the above is subject to be changed.

- **Two (2) YCDC staffs** from Pollution Control and Cleansing Dept and/or City Planning and Land Administration Dept who are in charge of JCM activities and low carbon action plan.
- At the international conference in Kitakyushu, the presentation on JCM activities and low carbon action plan. **Presentation is kindly requested in English.**

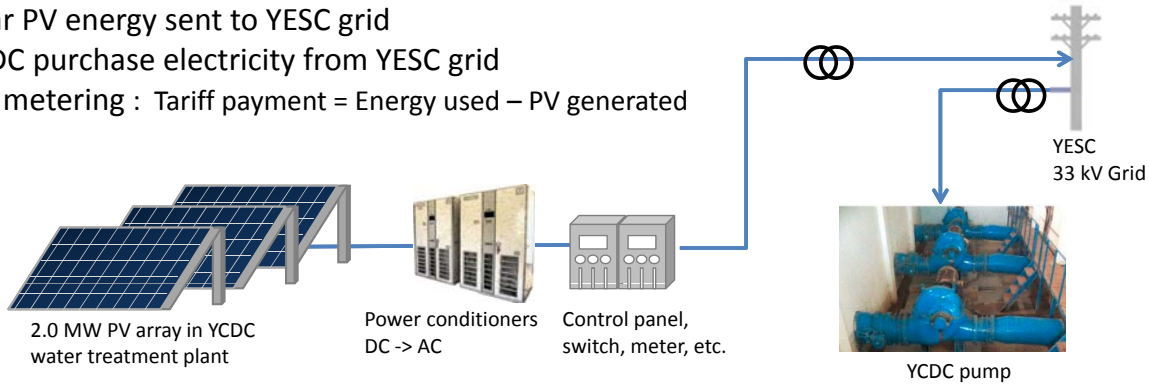
3-2. Options of PV System Concept

Option-1
-Solar PV for YCDC internal supply only
-Solar PV reduces grid electricity consumption

Option-2: with battery for independent supply during power cut



Option-3
-Solar PV energy sent to YESC grid
- YCDC purchase electricity from YESC grid
-Net metering : Tariff payment = Energy used – PV generated



3-3. Pilot Project Site

Electric room (PV – related equipment can be stored) in Nyaung Hnit Pin

Pump room in Nyaung Hnit Pin

Candidate PV module area in in Nyaung Hnit Pin

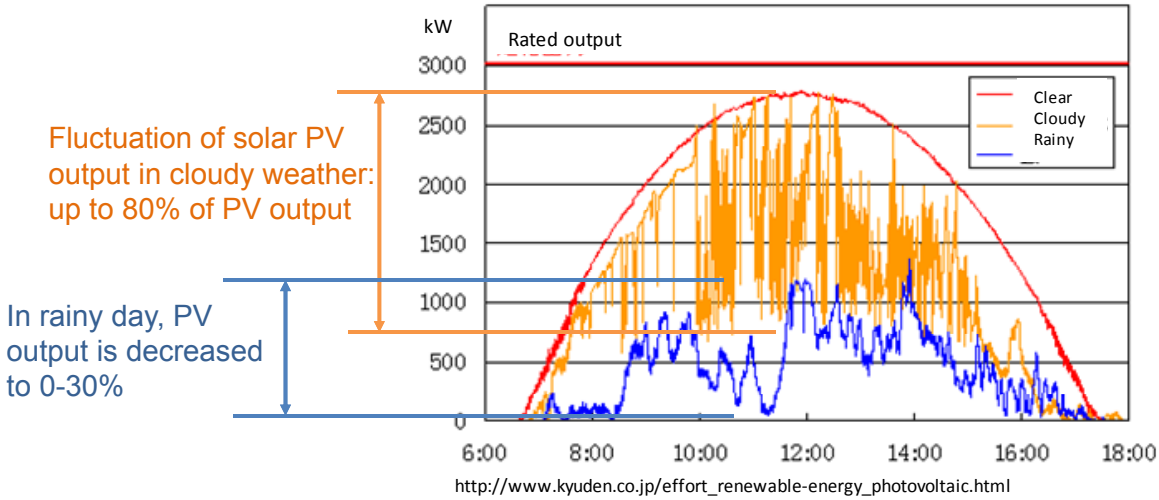
3-4. Selection of Solar PV Generation Pilot Project of YCDC Facility

- Selection of pilot project site:
  - Interview survey → Site survey → Document review
- Criteria for selection: needs, demand, location

Candidate	Status	Load	Selection result
Nyaung Hnit Pin	-Peak 7MW, off-peak 6.8 Nw, 24 hr operation -1st phase 2014, 2nd phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1st priority: PV possible to supply LV side. (110 kW x 4 unit of lift-up pump) For HV side, further study necessary.
Hlawga	- 24hr, fixed demand - 1MW x 2nos, 6.6 kV - Pump installation in 2008	2 MW	2nd priority: Under partial update (new electric board has mismatch of interface). →It will take time until PV connection study becomes possible.
La Gun Byin	132kWx6+25 kWx6 + 30 kWx4, 400V Peak 450 kW, off-peak 350 kW	450 kW	Too small, remote

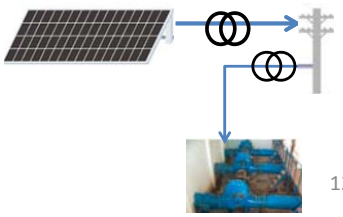
- **Nyaung Hnit Pin** is tentatively selected, however……
  - Supply to LV 440 kW portion is possible
  - Further study necessary for HV pump supply with electrical documents for the plan up to 2 MW

3-5. Solar PV Challenges and Options

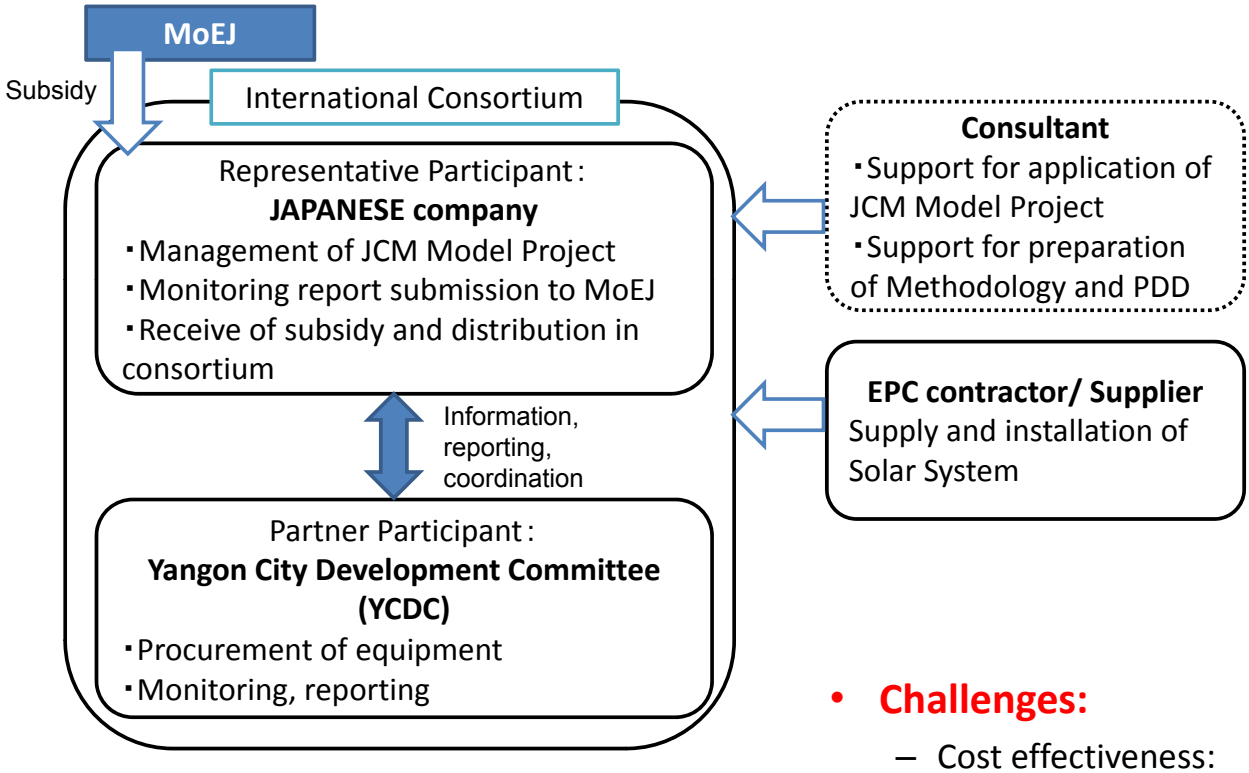


http://www.kyuden.co.jp/effort_renewable-energy_photovoltaic.html

- PV output fluctuates but demand load is stable
- Battery or DG is necessary to cope with PV fluctuation
  - Battery is costly
  - DG consumes fossil fuel and maintenance cost is high
- OPTION: If PV can be fed to YESC Grid, grid can absorb PV fluctuation (up to 10% of grid capacity)
  - → It is necessary to confirm regulation in YESC for grid connection for net metering or PPA



3-6. Solar PV Implementation structure as JCM model project



- **Challenges:**
  - Cost effectiveness: **<10,000JPY (subsidy)/tor**
  - Need YCDC budget remaining of subsidy

3-6. Schedule and Way Forward for PV Pilot Project Plan

Sep-Oct 2016

- Preparation of system component and specification
- Cost estimation
- Economic and financial evaluation
  - Challenges: low tariff late, necessity of battery cost

Nov2016

- Submission of financial proposal for budgeting
  - **Procedure flow, information items, example of budgeting document (if any) is kindly requested**
- Monitoring plan, CO2 reduction assessment
- Implementation plan and schedule for JCM

Dec 2016-Jan 2017

- Official procedure for JCM project budgeting of YCDC with Regional government

Mar-Apr 2017

- Preparation of the proposal for JCM model project

3-7. Example of Nagasawa Water Treatment Plant in Kawasaki

Overall View of Nagasawa

PV modules installed above reservoir

PCS and battery

Item	Description
Total solar PV capacity	1157 kW (266 kW on filtration pond + 612 kW on distributing reservoir, and 279 kW on regulation pond)
Total solar PV area	9,400 m2
Battery capacity	242 kWh x 2 = 484 kWh (Li-ion Battery)
Main objective	-To support minimum power at the time of digester - To enable interconnection with independent gas turbine and independent generation
Annual generation energy	1.13 GWh/year (20% of total electric energy in Nagasawa)
Annual saving	0.28 mil USD/yr (100 JPY/USD, 25 JPY/kWh)

3-8. Schedule and each task

Item	2016							2017			Player			
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YCDC	KWSK	NK	EEFC
Schedule for City-to-city Collaboration Activity														
Schedule for City-to-city Collaboration Activity											xx	x		
Attendance to high-level conference (if requested from MoEJ)											(x)		(x)	
Working group meeting	★			★		★					x	x	x	
Workshop in Japan (invitation)					★						xx	x	xx	
Workshop in Yangon								★			xx	x	x	
Schedule for Solar PV Pilot Project Planning														
Confirmation of candidate PV site with area and distribution line layout and site visit													x	
Confirmation of YCDC load to be supplied by PV											xx			
Determination of candidate site											xx		x	
Design and preparation of equipment specification													x	xx
Cost estimation of PV system													x	xx
Study of tariff and financial feasibility											x		xx	
Coordination with YESC about net-metering													x	xx
Implemenation plan											x		xx	
Clarification of procedure for budgeting											xx			
- Documentation for budgeting											xx	x		
- Internal procedure for budget allocation											xx			
. Approval of budget								★			xx			
Final Report submission to MoEJ									★			x	xx	

KWSK:Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C

xx : Key responsibility, x: support

4. Schedule for preparation of Low carbon action plan

Sep 16

- Proposal for draft Yangon City Low Carbon Action Plan for YCDC by Kawasaki city referring Kawasaki Eco Action Plan

Oct 16

- Discussion on the draft Low carbon action plan for YCDC between YCDC and Kawasaki city **during invitation in Japan in October 17th or 18th**

Nov 16

- Consideration of incorporation between reviewing JICA's master plan and low carbon action plan

2017

- Finalizing low carbon action plan aiming for formulation of the plan next fiscal year

平成２８年度低炭素社会実現のための都市間連携に基づく JCM 案件形成可能性調査

ヤンゴン現地調査スケジュール　第 3 回渡航 2016 年 11 月

Schedule on Third Trip (November 2016)

Date	Schedule		Note
6 Nov (Sun)	NRT - BKK - RGN		---
7 Nov (Mon)	9:30　Meeting with JICA advisor 11:30 Meeting with CPLA 14:00 Meeting with MKI		-Coordination for heads group meeting
8 Nov (Tue)	13:00　Meeting with PCCD 15:00　Meeting with JFE Yangon Office 17:00　Meeting with MBS		
9 Nov (Wed)	10:00　1)　Heads Group Meeting with Public Relation dept, PCCD, CPLA, WSD 18:00 Meeting with JICA		-coordination for MoU and courtesy call,　PV system generation plan
10 Nov (Thu)	RGN-BKK	9:00-10:00 meeting with MKI 11:00 Meeting with WSD 13:30　Meeting with boiler supplier	
	Meeting with ERS	15:30 Mr. Nay Moe	
11 Nov (Fri)	Meeting with representative company for JCM	14:00　Meeting with YESC distribution Dept.	
	BKK - NRT	RGN-BKK	---
12 Nov (Sat)	- NRT	-NRT	---

JCM Project Formulation Study through City-to-City Collaboration of Yangon and Kawasaki City

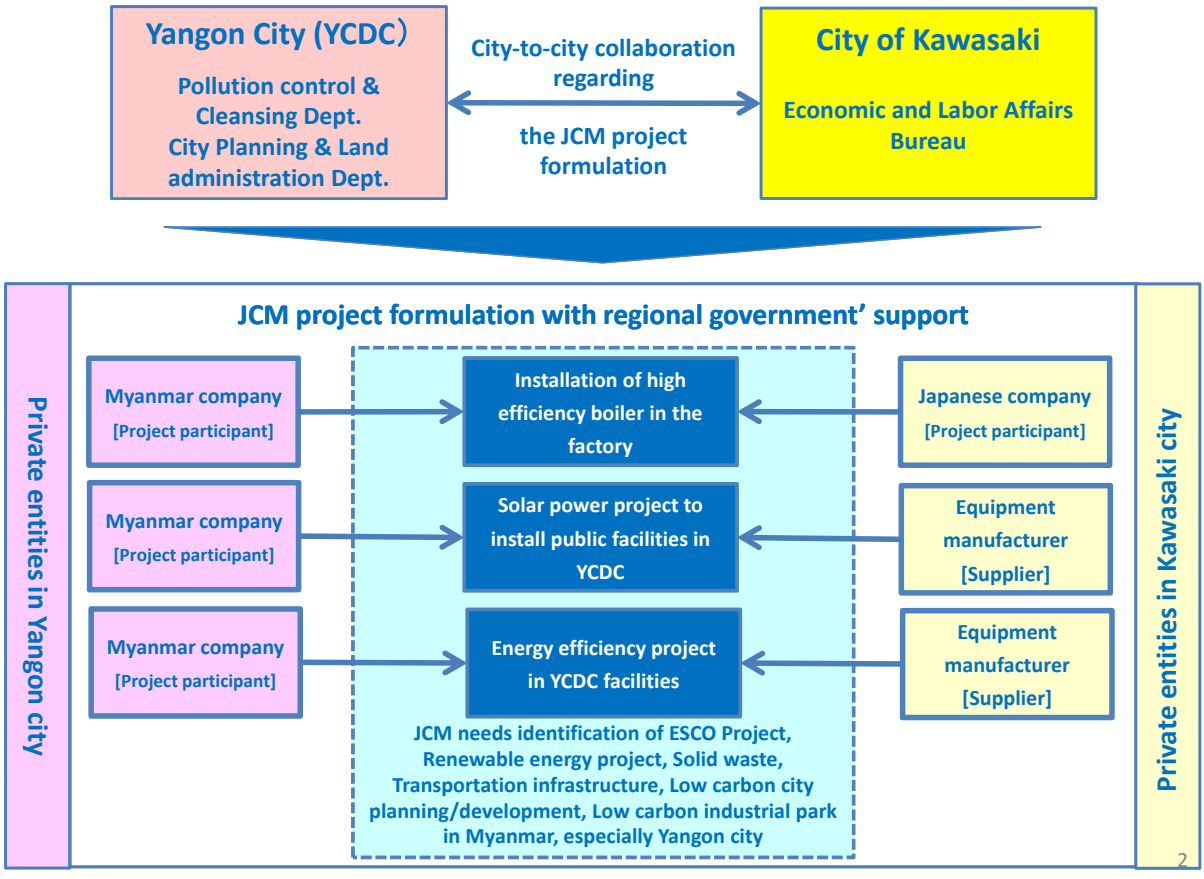
Progress Meeting No.2

November, 2016

Nippon Koei Co,. Ltd. and Kawasaki City

Contents

1. Overview of the 2nd year JCM City-to-city collaboration project

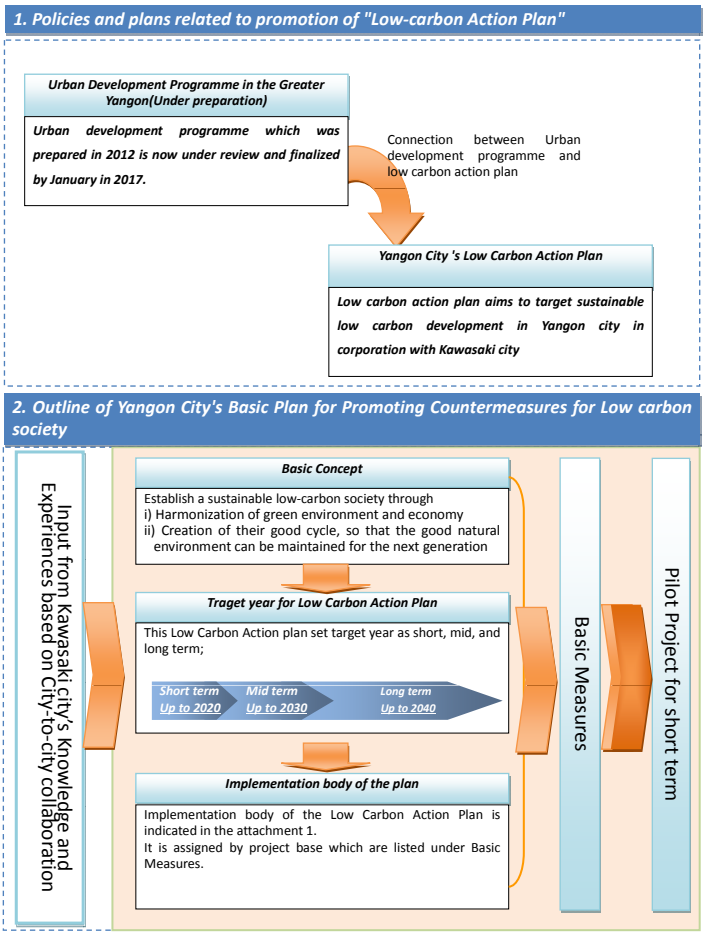


2. YCDC Low Carbon Action Plan (LCAP)

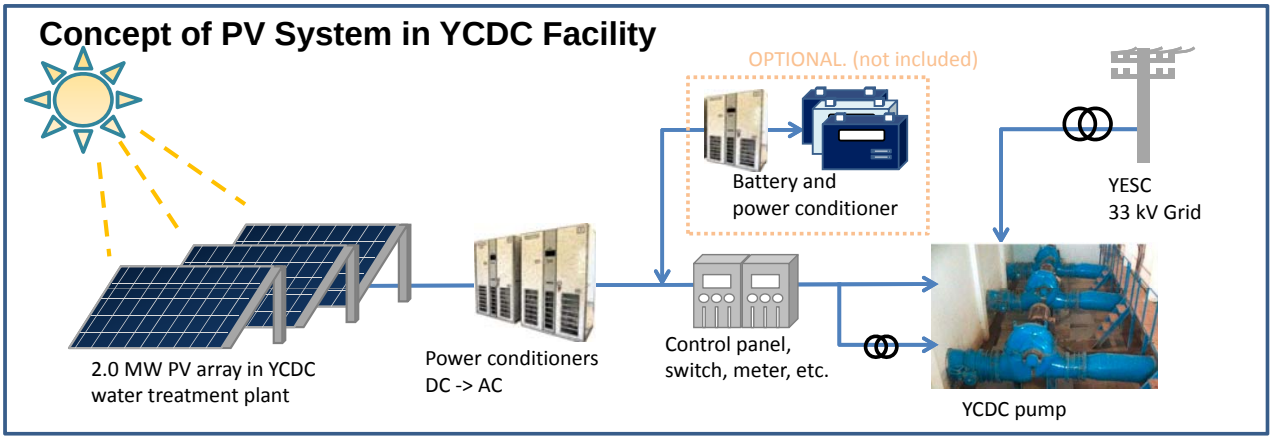
- YCDC LCAP formulation for:
  - Policy, plans, and basic measures
  - Roles and responsibility of departments
  - Relationship with revision of urban development plan (JICA)
- Candidate pilot projects for short term plan
  - Solar PV generation project
  - Waste collection system
  - Master plan and F/S of Waste-to-energy plant
  - Other possible candidate projects

→ Please see separate papers…

- Input of YCDC' vision and ideas for the above
- Approval process from government



4-1. Solar PV Generation Pilot Project Plan : System concept



- Solar PV generation system reduces electric energy usage in YCDC pumps
- Battery is optional (not included)
- **Land leveling and compaction is necessary by YCDC (not included in the cost at present)**
- **Annual maintenance and Power conditioner replacement after 10yrs is necessary**

Item	Value
Investment cost	XX Million US$
YCDC budged (50% of investment)	XX Million US$
Solar Irradiation (Average)	4.69 kWh/m2/d
Planned capacity (Tentative)	2,054 kWp
Annual generation energy	approx. 8% of consumption
Annual saving	XX mil MMK
CO2 reduction	1,167 ton-CO2

4-2. Pilot Project Site: Nyaung Hnit Poin Water Treatment Plant

PV site and Pump room in Nyaung Hnit Pin

Pump Layout in Nyaung Hnit Pin

5-1. Way forward JCM city-to-city collaboration

Nov 2016

- Proposal for draft Yangon City Low Carbon Action Plan for YCDC
- Formulation of pilot projects

Dec 2016

- Discussion on the draft Low carbon action plan and revision MoU for YCDC between YCDC and Kawasaki city **in Courtesy call to Mayor (26-28 Dec)**

Jan 2017

- Consideration of incorporation between reviewing JICA's master plan and low carbon action plan
- Invitation to **Tokyo JCM seminar by MoEJ on 23-25 Jan** :Head of Dept.
- Finalizing low carbon action plan aiming for formulation of the plan next fiscal year

Feb 2017

- **High-level meeting in Yangon** for low carbon action plan (Late Feb)
- **Conclusion of revised MoU**
- Final report
- Formulation of next JCM city-to-city collaboration in the fiscal year

5-2. Schedule and each task

Item	2016							2017			Player			
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YCDC	KWSK	NK	EEFC
Schedule for City-to-city Collaboration Activity														
Schedule for City-to-city Collaboration Activity											xx	xx		
Working group meeting	★			★		★	★				xx	x	x	
Workshop in Japan (invitation)					★			★			xx	xx	x	
Workshop in Yangon									★		xx	x	x	
Preparation of YCDC low carbon action plan											xx	x	x	
MoU revise											xx	xx	x	
Schedule for Solar PV Pilot Project Planning														
Confirmation of candidate PV site with area and distribution line layout and site visit													x	
Confirmation of YCDC load to be supplied by PV											xx			
Determination of candidate site											xx		x	
Design and preparation of equipment specification													x	xx
Cost estimation of PV system													x	xx
Study of tariff and financial feasibility											x		xx	
Coordination with YESC about net-metering													x	xx
Implemenation plan											x		xx	
Documentation for budgeting											xx		x	
- Internal procedure for budget allocation											xx		x	
. Approval of budget										★	xx			
Final Report submission to MoEJ										★		x	xx	

KWSK:Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C

xx : Key responsibility, x: support

5-3. Way forward and requests to YCDC

Solar PV pilot project plan

- Provision of cost of land leveling and compaction work
- Official procedure for JCM project budgeting of YCDC with Regional government
- Demarcation and implementation body for budgeting
- Preparation of the proposal for JCM model project 2017

Low Carbon Action Plan

- **Appointment and attendance of JCM Tokyo Seminar in 23-25 Jan 2017**
- **Coordinating High-level meeting in Yangon in late February 2017**
- Official procedure for approval of low carbon action plan in YCDC with Regional government in FY2017
- Support for proposal for JCM F/S study in FY2017, such as
  - IoT waste collection system
  - pump replacement to high-efficiency equipment

MoU Revise

- Procedure for MoU revise
- **Arrangement for the Courtesy call to mayor and secretary in late Dec 2017**

平成２８年度低炭素社会実現のための都市間連携に基づく JCM 案件形成可能性調査

ヤンゴン現地調査スケジュール　第 4 回渡航 2016 年 12 月

Schedule on Third Trip (December 2016)

Nippon Koei Co., Ltd.

Date	Schedule			Note
	Mr. Ishikawa	**Mr. Fukahori**	**Ms. Nakagawa**	
25 Dec Sun	HND-BKK (26 Dec 0:20) TG661	NRT-RGN	NRT-RGN	
26 Dec Mon	BKK-RGN (8:00-8:45) TG303 Meeting with PCCD, WSD, CPLA Courtesy call to Mayor	Courtesy call to Mayor Meeting with PCCD, WSD, CPLA	Courtesy call to Mayor Meeting with PCCD, WSD, CPLA	
27 Dec Tue	Courtesy call to secretary, Site visit of water treatment plant for JCM project			
28 Dec Wed	Meeting with EOJ, JICA, JFE RGN-BKK, BKK-NRT (19:50-21:45) TG306 (23:55-07:35) TG642	Meeting with EOJ, JICA, JFE RGN-NRT	Meeting with MKI Site visit to factory for Myanmar boiler information RGN-NRT	
29 Dec Thu	Arrive in NRT	Arrive in NRT	Arrive in NRT	

YCDC: Yangon City Development committee, WSD: Water and Sanitary Dept., PCCD: Pollution Control & Cleansing Dept., YESC: Yangon Electric Service Corporation, CPLAD: City Planning and Land Administration Dept., MKI: Myanmar Koei International Ltd. EOJ: Embassy of Japan

City to City Collaboration study between Yangon city and Kawasaki city funded by Ministry of Environment, Japan (MOEJ)

The study is conducted by collaboration between Yangon city and Kawasaki city aiming for **introduction of low carbon technologies in Yangon city** under JCM scheme[1] and **development of low carbon action plan** from 2015 and now ongoing.

I) Implementation body

II) Result of the first year's study from August 2015 to March2016

i. Execution of MOU between Yangon city and Kawasaki city

In March 2016, YCDC and Kawasaki city concluded MOU for implementation of low carbon society in Yangon city supported by Kawasaki city.

ii. Adoption of JCM subsidy project

The following two projects were adopted as JCM subsidy project which was studied in the first year's city to city collaboration study and has just initiated the project with subsidy from MOEJ.

1) Introduction of High-efficiency one-through Boiler in Instant Noodle Factory
2) Introduction of Energy Saving Brewing Systems to Beer Factory

III) Ongoing activities for the second year's study from April 2016 to March 2017

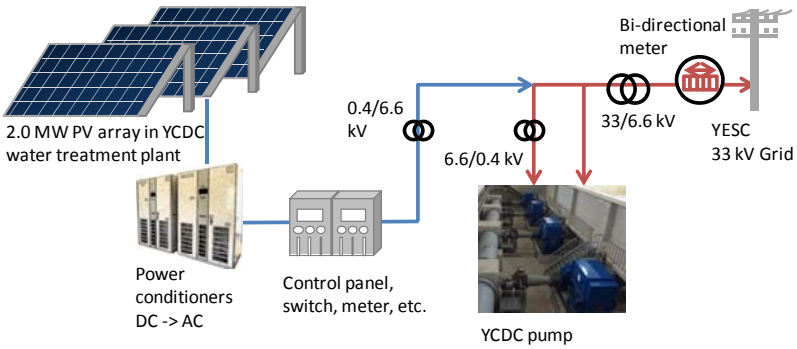
i. Preparation of Draft "Low Carbon Action Plan" for Yangon city

Low Carbon Action Plan is a plan which set policy by sectors aiming for implementation of low carbon society as well as pilot projects which promote implementation of low carbon technologies in Yangon city.

ii. Preparation of JCM subsidy project

The following project is currently prepared by discussion with YCDC for next year's application for JCM subsidy.

P1 Introduction of Solar PV system into Nyaung Hnit Pin Water Treatment Plant



Planned Solar PV System

Project Summary

Item	Value
Investment cost	5.5 Million US$ (JCM subsidy at most 50% of the cost)
Solar Irradiation	4.69 kWh/m2/d (Ave.)
Planned capacity	2,054 kWp
Annual generation energy	2.96 GWh (approx. 8% of consumption)
Annual saving	310 mil MMK
Recovery years	10.6 years
CO2 reduction	1,167 ton-CO2

1) JCM scheme: Joint crediting mechanism(JCM) is a GHG(Green house gas) mitigation activity proposed by Japanese government as a means to facilitate the diffusion of leading low-carbon technologies, systems, and so forth in developing countries. Under JCM scheme, the subsidy is prepared by MOEJ which subsidy at most 50% of the project cost.

JCM Project Formulation Study through City-to-City Collaboration of Yangon City and Kawasaki City

Courtesy Call from Kawasaki City

December 2016

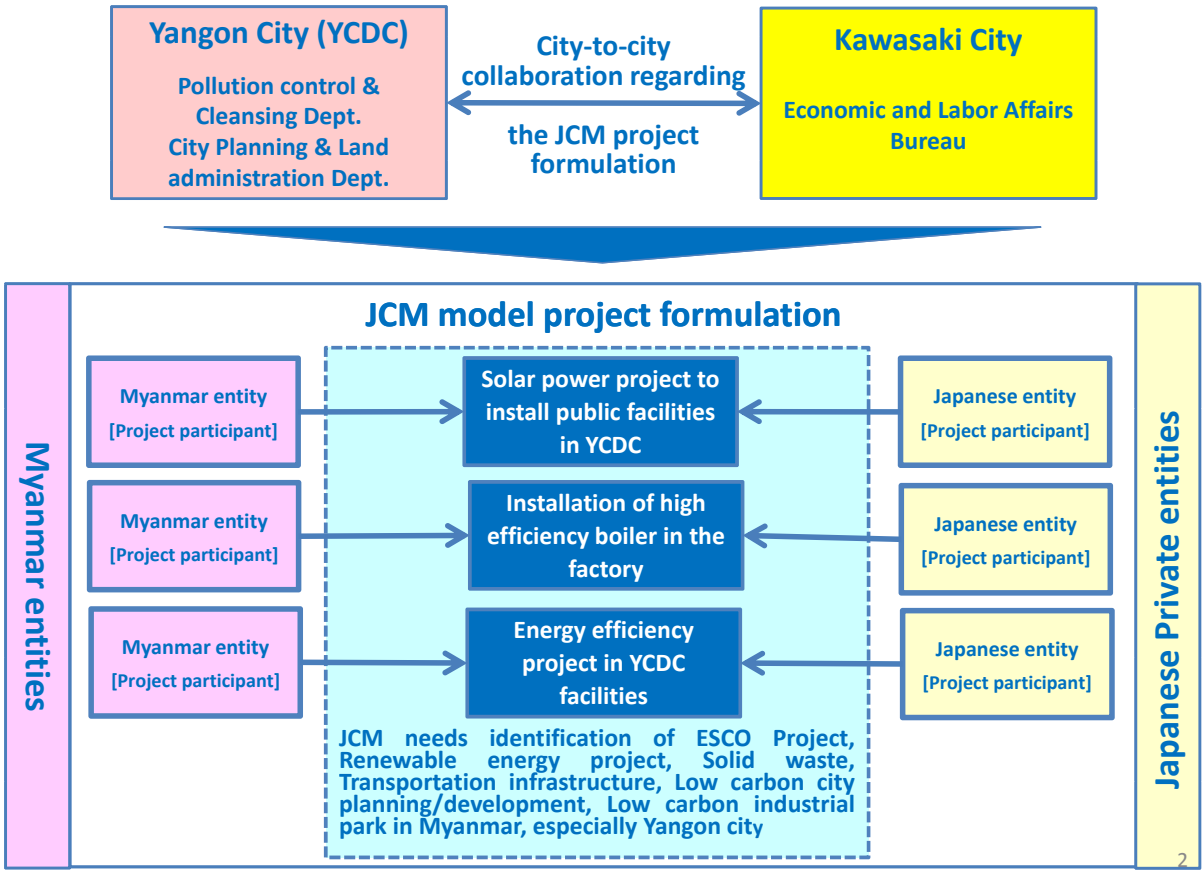
Kawasaki City and Nippon Koei Co., Ltd.

川崎市 KAWASAKI CITY

NIPPON KOEI

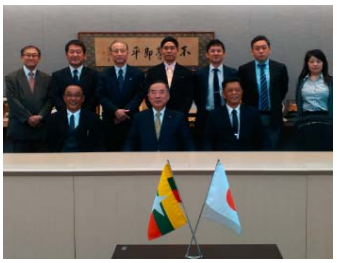
Contents

1. Overview of JCM City-to-city Collaboration Project



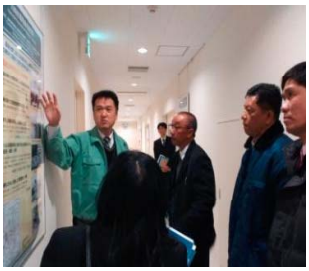
2. Chronology of City-to-city Collaboration

Before 2015	• *Formulation of JICA Master Plan* • *JCM project formulation: Waste-to-energy plant by JFE Engineering*
FY 2015	• **Commencement of JCM city to city collaboration between YCDC and Kawasaki** • **1st Visit to Kawasaki city and Kawasaki chamber of commerce** • **1st Workshop on city-to-city collaboration in Yangon** • **Feasibility study for JCM model projects**
FY 2016	• **2nd Visit to Kawasaki city and JCM seminar in Kitakyushu, Japan** • **Preparation of draft Low carbon action plan** • **Feasibility study of Solar power (JCM model) project on YCDC facilities**



Meeting with Kawasaki chamber of commerce

Meeting with Kawasaki city



Visit to Kawasaki city

JCM workshop

2. Low Carbon Action Plan (LCAP)

Objective :

Low carbon action plan (LCAP)

for sustainable Yangon city development with energy-efficient and clean technology

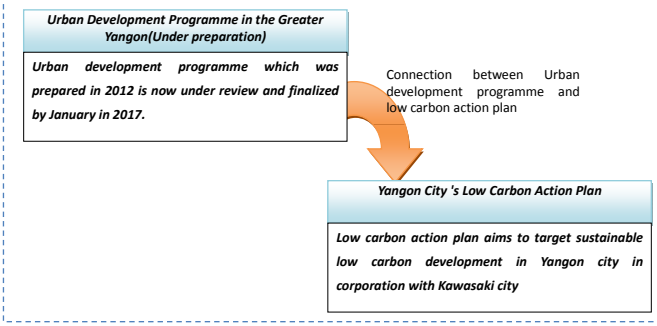
Discussion points :

- Policy, plans, and basic measures
- Roles and responsibility of departments
- Relationship with revision of urban development plan (JICA)

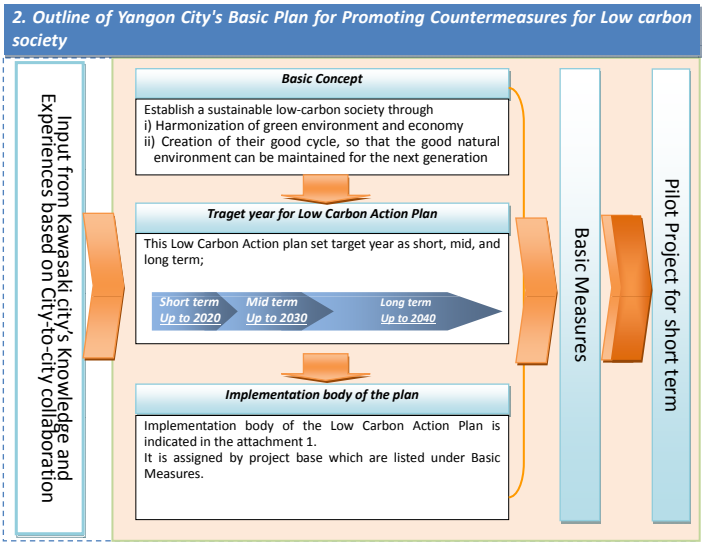
Candidate JCM model projects :

- Solar power project
- Water supply with High efficiency pump project
- Waste collection system
- Waste-to-energy project
- Other possible projects

1. Policies and plans related to promotion of "Low-carbon Action Plan"

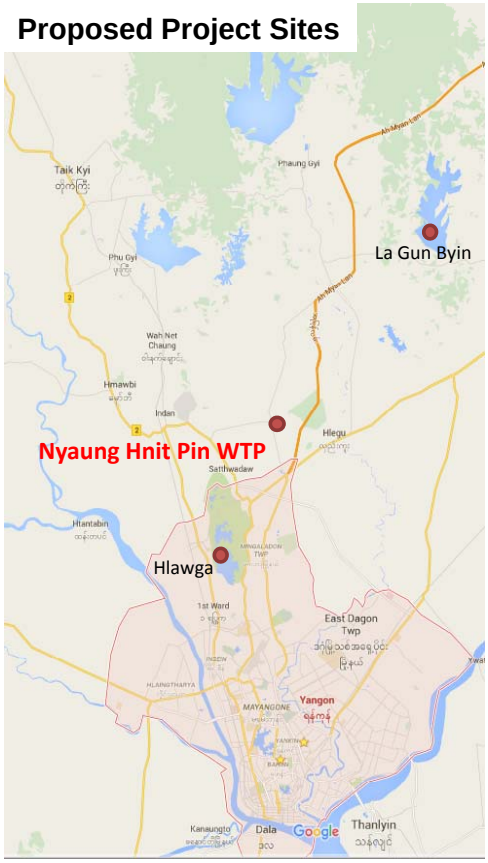


2. Outline of Yangon City's Basic Plan for Promoting Countermeasures for Low carbon society



3. Proposed JCM Model Project : Solar Power Project (2/2)

Proposed Project Sites



PV site and Pump room in Nyaung Hnit Pin

Pump Layout in Nyaung Hnit Pin

4. Further Actions

1) Conclusion of MOU

- ✓ The content of MOU is agreed by YCDC and Kawasaki city, and MOU is concluded by March 2017

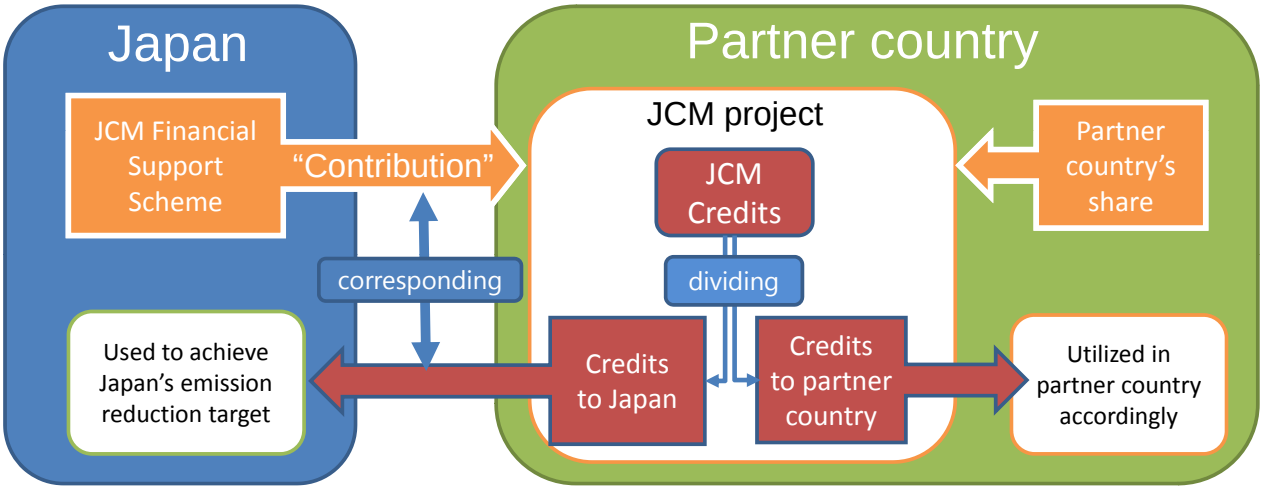
2) Low Carbon Action Plan (LCAP)

- ✓ Coordination with JICA M/P
- ✓ Finalization of LCAP
- ✓ Participation of Tokyo JCM seminar on 23rd of Jan.2017
- ✓ **Coordinating High-level meeting in Yangon in early March 2017**
- ✓ Support for proposal on JCM F/S study in FY2017, such as i) IoT waste collection system, ii) pump replacement to high-efficiency equipment etc.

3) Solar Power Project in YCDC Facility

- ✓ Estimation of Project cost including land leveling and compaction work
- ✓ Official procedure for JCM project budgeting of YCDC with Regional government
- ✓ Demarcation and implementation body for project
- ✓ Preparation of the proposal for JCM model project 2017

Reference : JCM Scheme



Joint Crediting Mechanism (JCM) is

- Facilitating diffusion of leading low carbon technologies and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions from Japan to GHG emission reductions and use them to achieve Japan's emission reduction target
- Support of initial investment cost up to 50% from Government of Japan

City-to-City Collaboration of
Yangon City and Kawasaki City

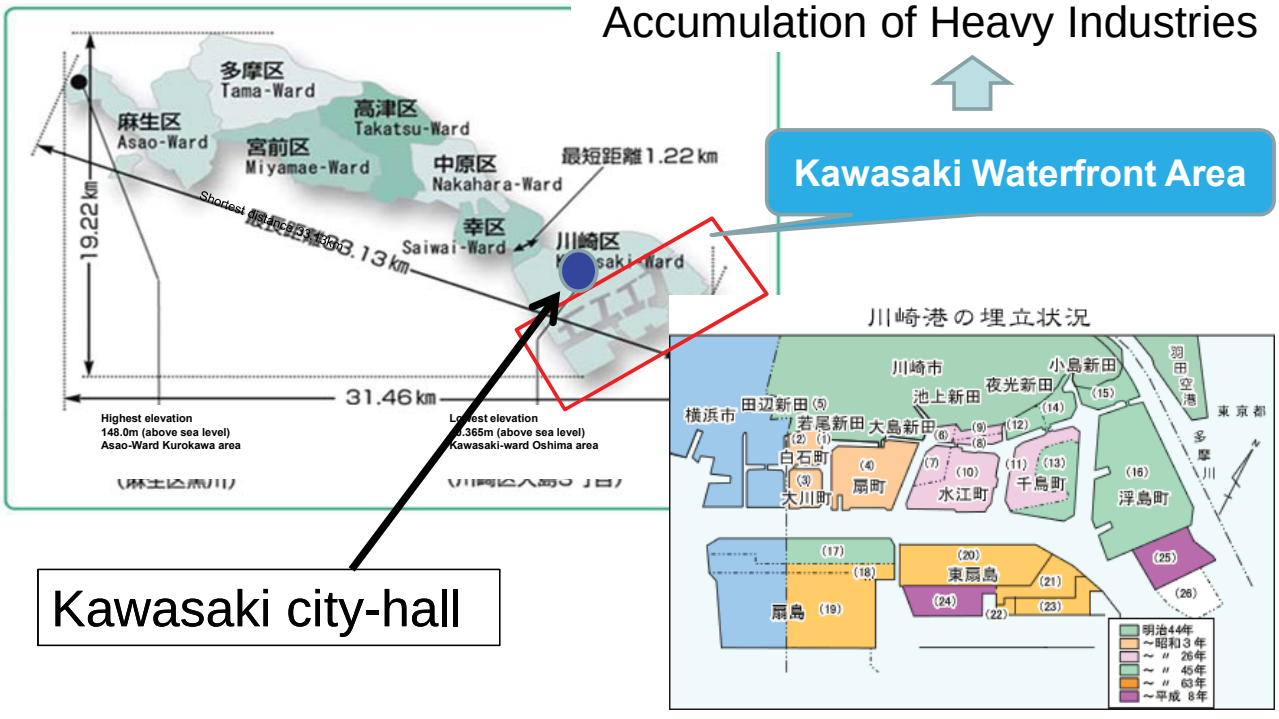
Kawasaki Eco-town

December 2016

Economic and Labor Affairs Bureau
Kawasaki-city

Kawasaki city & Waterfront Area

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km2

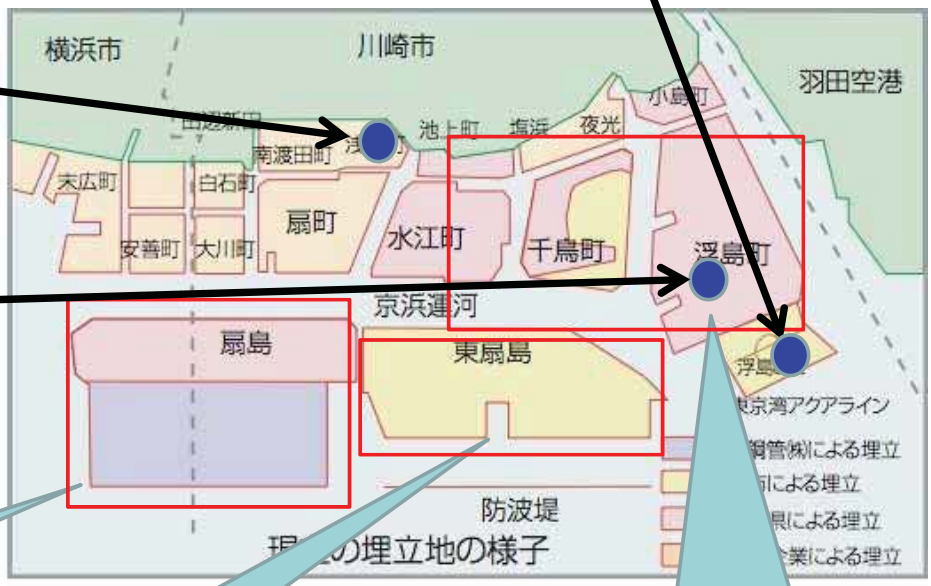


Location of facilities for the site visit

②Ukishima Recycling Facility (& Mega-solar Electric Plant)
Recycling of waste paper and plastic generated from household

①YAMANAKA
Recycling of waste automobile

③TAKEEI
Recycling of mixed waste generated from demolition site



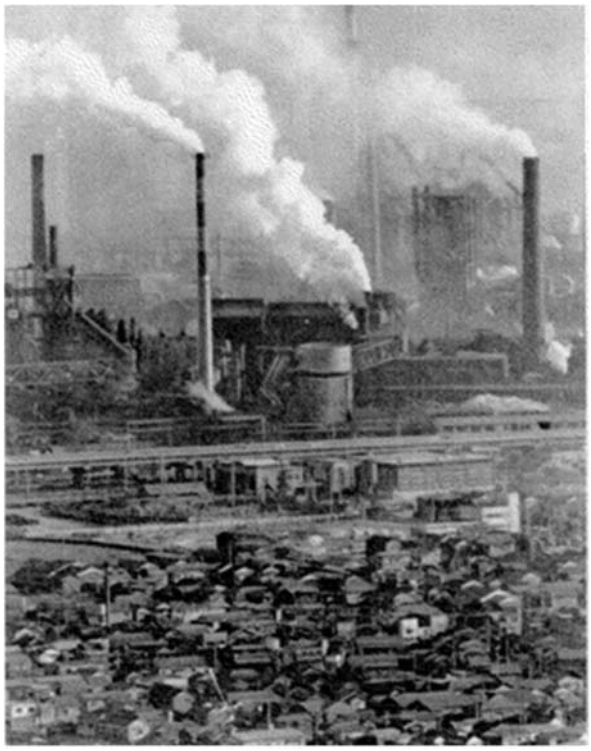
Steel Industry Area

Logistics Area

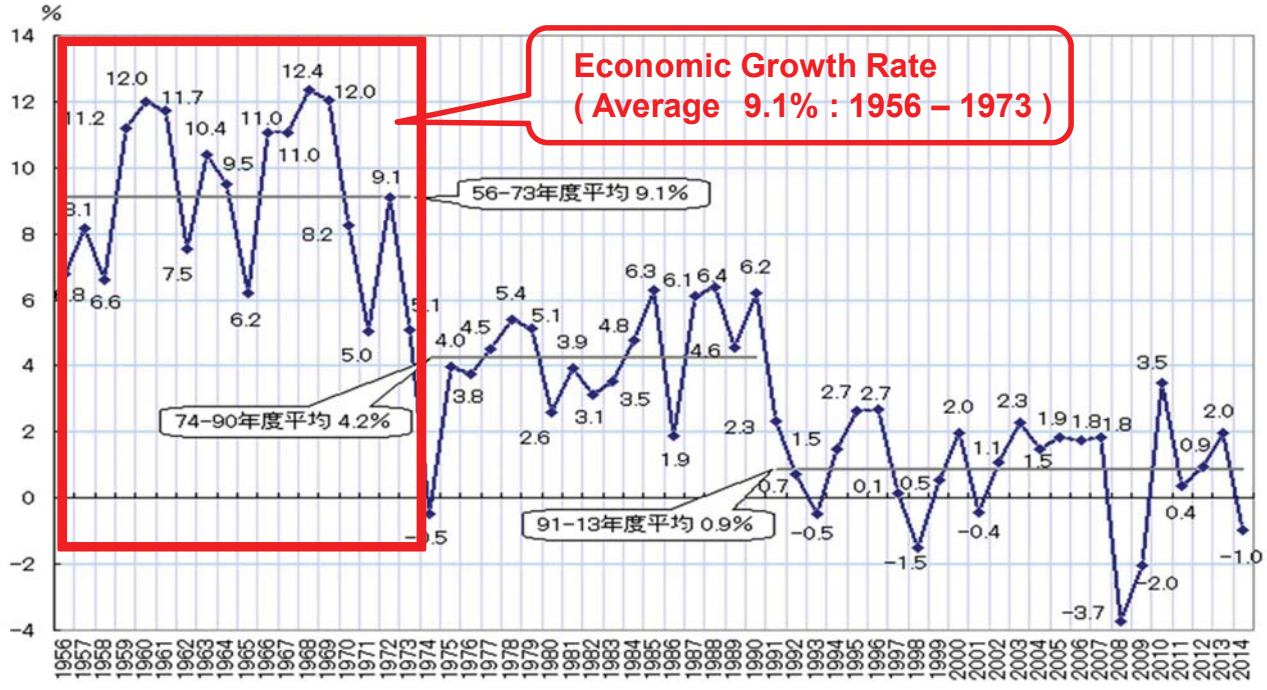
Refine & Petrochemical complex Area

Kawasaki Waterfront Area (1950s-60s)

Rapid Economic growth & Industrial Pollution in Kawasaki (1960-70)



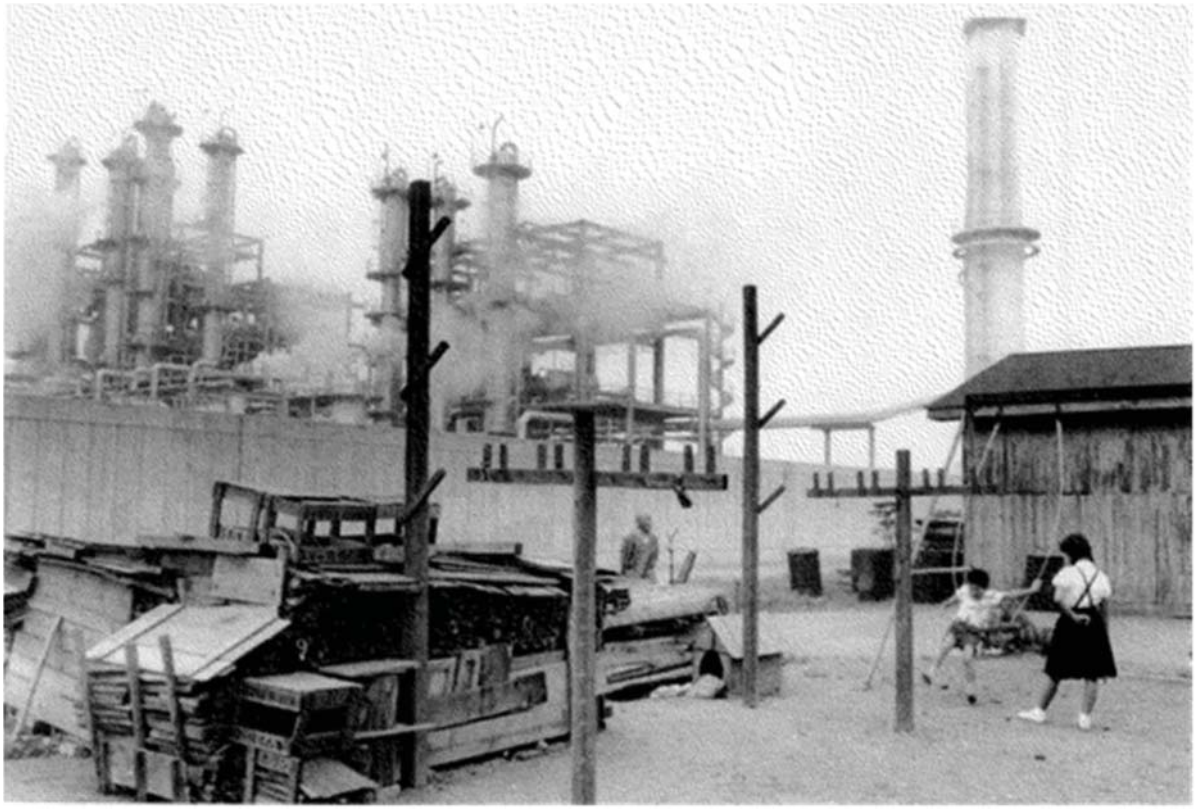
Economic Growth Rate in Japan



（注）年度ベース。93SNA連鎖方式推計。平均は各年度数値の単純平均。1980年度以前は「平成12年版国民経済計算年報」（63SNAベース）、1981～94年度は年報（平成21年度確報）による。それ以降は、2015年7–9月期2次速報値 <2015年12月8日公表>

（資料）内閣府SNAサイト

Factories nearby Residential Area in Kawasaki (1970)



Tama-River (1970)

Air Pollution over Kawasaki Waterfront Area (1960)

Current Landscape of Tama-River (2016)

Current Landscape over Kawasaki Waterfront Area (2016)

Efforts to overcome Pollution Problems

Local Business

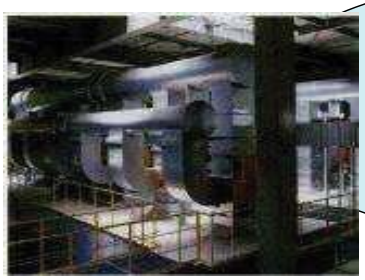
- Investment for pollution control
- Development of pollution control technologies

Citizen

- Civil action against pollution
- Public awareness for environment

Kawasaki-city

- Pollution control agreement with local industries
- Regulation for pollution control
- Pollution monitoring system



"Sharing of Roles" & "Cooperative Action"

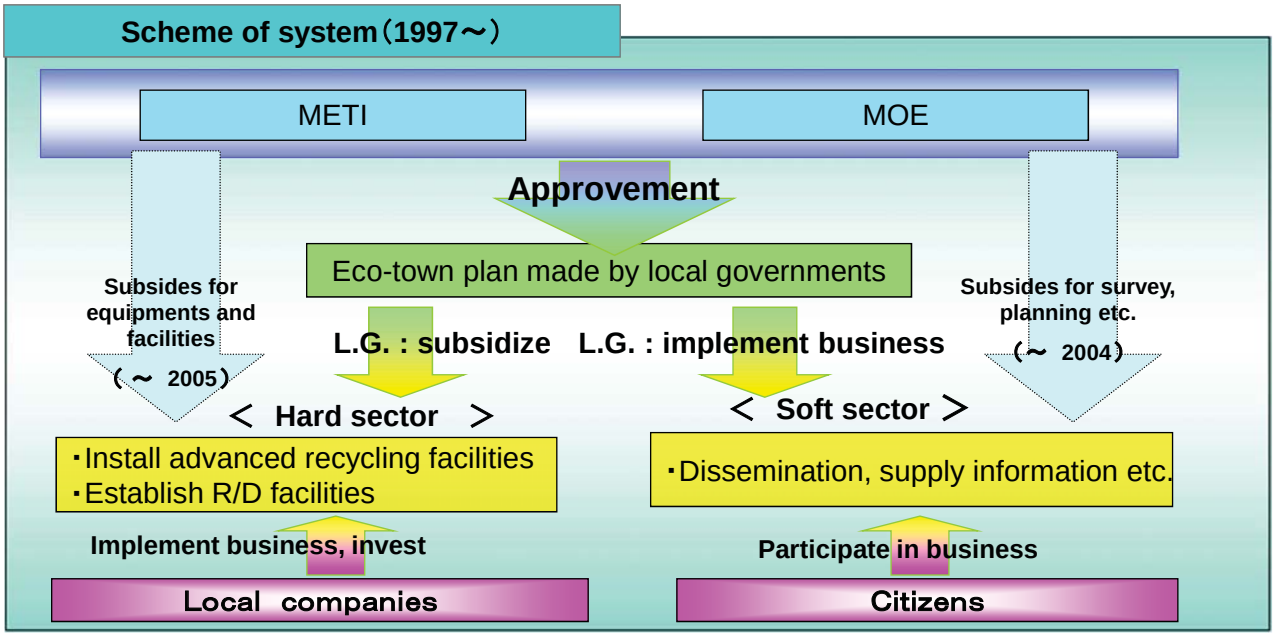
Improvement of Environmental Problems

Kawasaki Eco-town Project

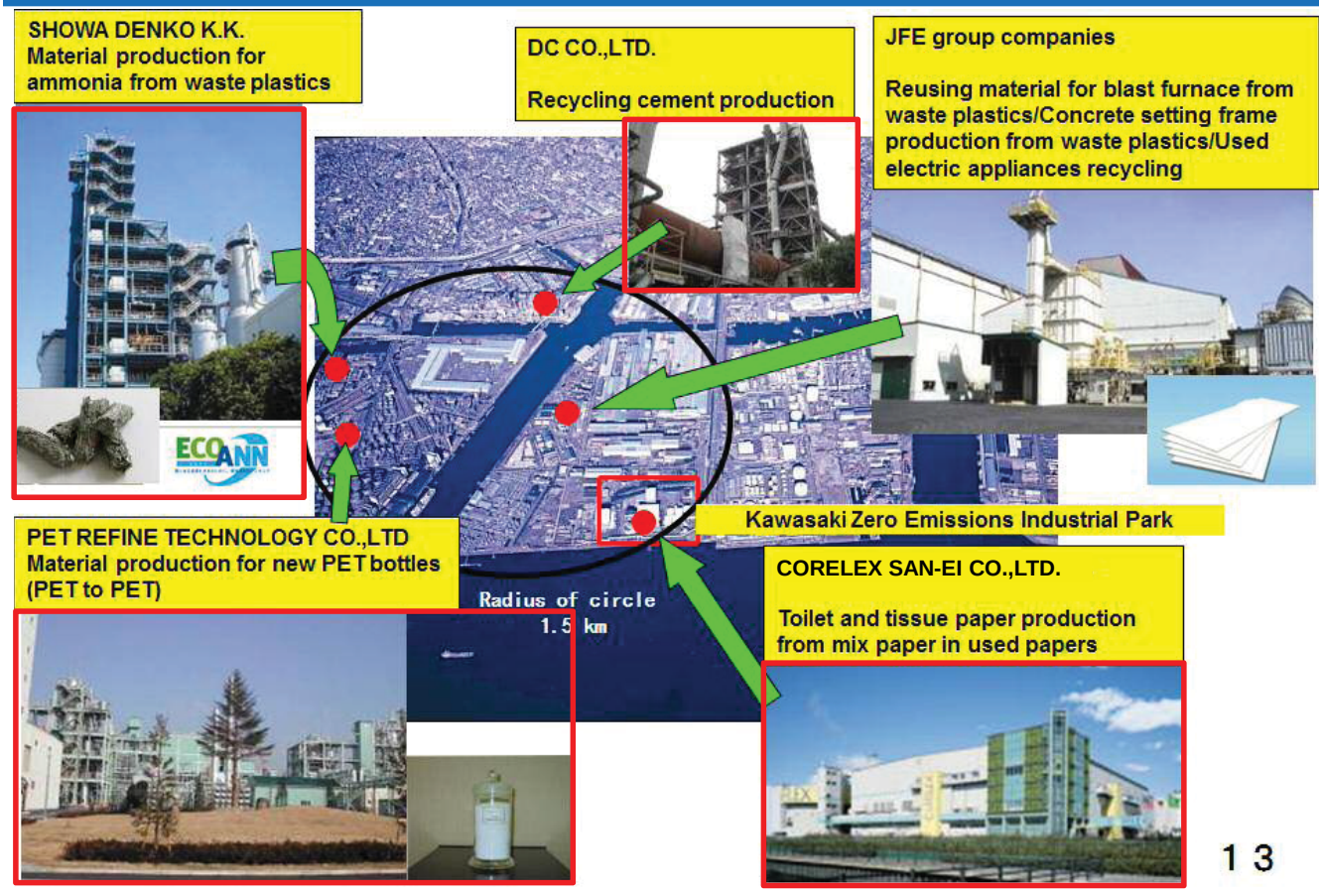
Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

①Promotion of environmental industries on locally accumulated technologies

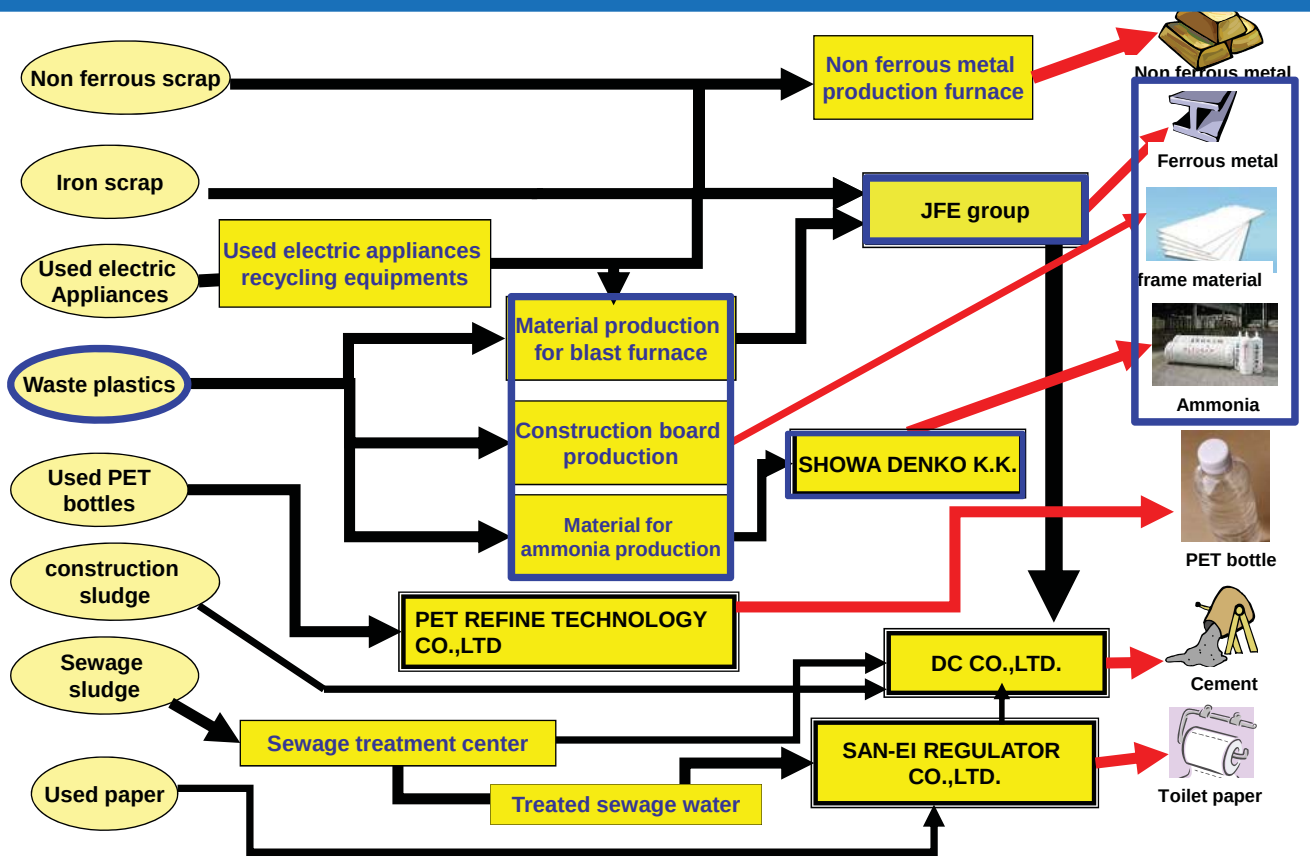
②Formation of resources rcycling economy and society through reducing waste generation and promoting waste recycling on site



Resource Recycling Facilities in Kawasaki Eco-town



Companies' Collaboration in Kawasaki Eco-town



Summary of Kawasaki Eco-town

◆Many different types of industries have been accumulated into Kawasaki Waterfront area, and then

Recycle facilities in Eco-town functioning to process industrial wastes as a raw materials for other industries.

◆Among approved 26 Eco-towns in Japan, Kawasaki Eco-town promotes recycles at a high standard;

Showcase of Resource recycling business and technologies

Visit to Kawasaki city mayor

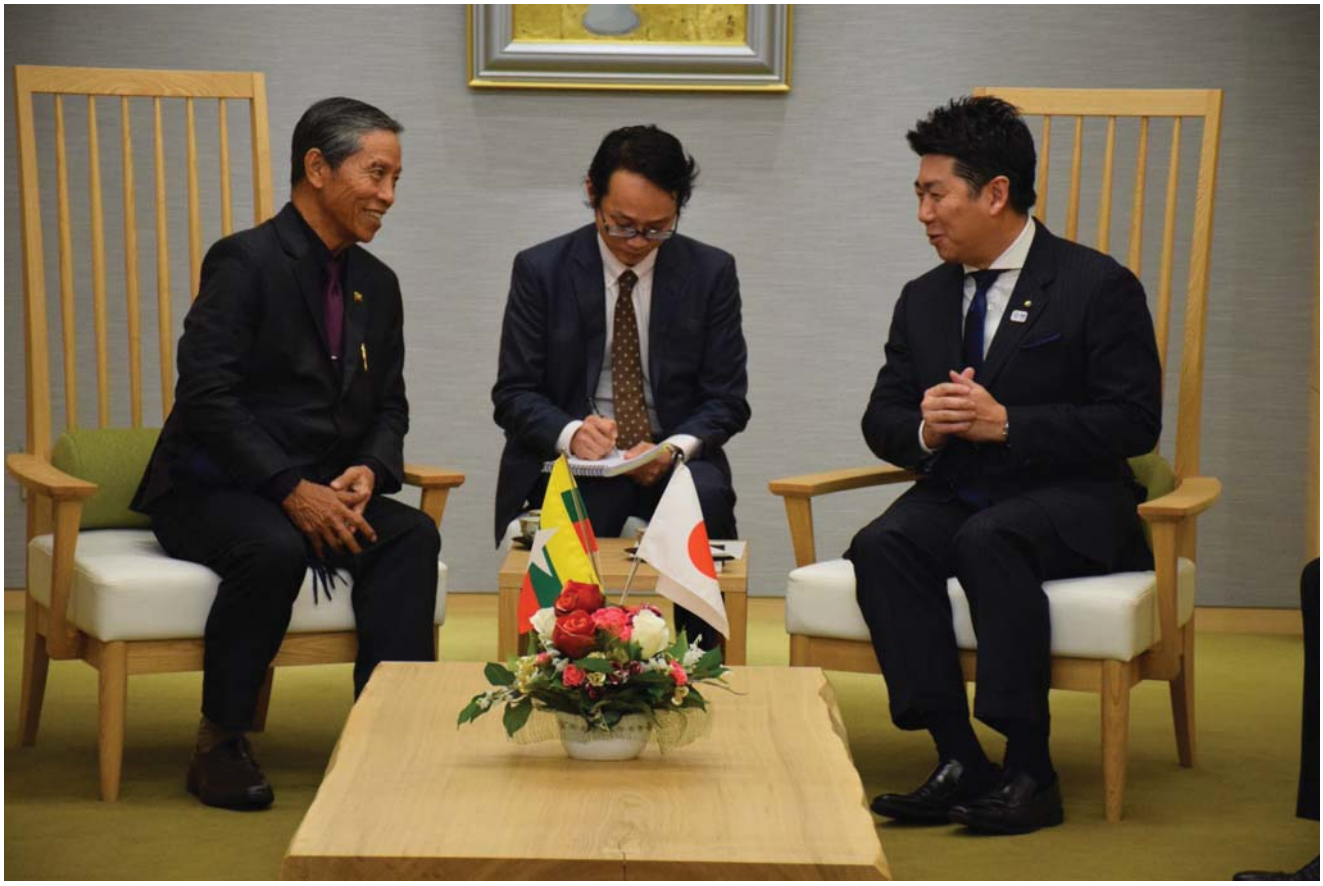


Photo with Kawasaki city mayor, chairman of city council, and chairman of Kawasaki Chamber of Commerce and Industry

Eco-town related facilities tour ①

YAMANAKA: Industrial waste management company of waste automobile

Eco-town related facilities tour ②

TAKEEI : Industrial waste management company of Mixed waste from demolition site

Eco-town related facilities tour ③

21

Ukishima Resource Recycling facility: Separation of plastics and paper waste from household

Large-scale Solar power generation plant in Kawasaki ④

Large-scale Solar power generation plant in Kawasaki ④

2.　低炭素アクションプラン資料

Low Carbon Action Plan of Yangon City(Draft)

1. Policies and plans related to promotion of "Low-carbon Action Plan"

Urban Development Programme in the Greater Yangon(Under preparation)

Urban development programme which was prepared in 2012 is now under review and finalized by January in 2017.

Connection between Urban development programme and low carbon action plan

Yangon City 's Low Carbon Action Plan

Low carbon action plan aims to target sustainable low carbon development in Yangon city in corporation with Kawasaki city

2. Outline of Yangon City's Basic Plan for Promoting Countermeasures for Low carbon society

Input from Kawasaki city's Knowledge and Experiences based on City-to-city collaboration

Basic Concept

Establish a sustainable low-carbon society through
i) Harmonization of green environment and economy
ii) Creation of their good cycle, so that the good natural environment can be maintained for the next generation

Traget year for Low Carbon Action Plan

This Low Carbon Action plan set target year as short, mid, and long term;

Short term Up to 2020 → Mid term Up to 2030 → Long term Up to 2040

Implementation body of the plan

Implementation body of the Low Carbon Action Plan is indicated in the attachment 1.
It is assigned by project base which are listed under Basic Measures.

Basic Measures

Pilot Project for short term

3.Basic Measures of Low Carbon Action Plan

I. Reduction of greenhouse gas emission from industrial activities — Industry

1. Establishment of a business model towards "low-carbon Yangon City"
2. Fostering eco-friendly industries
3. Creation of an eco-friendly model for industrial complexes

II. Utilization of renewable energy resources — Energy

1. Promotion of Solar-city Project ＜**PP1: Introduction of solar PV into YCDC facility**＞
2. Creation of a system for making an effective use of energy
3. Making a wider use of renewable energy resources, considering the regional characteristics

III. Creation of low-carbon city — Urban City

1. Encourage construction of highly energy efficient buildings
2. Introduction of energy efficient technology into public sector＜**PP2: Introduction of high efficiency pumps into existing purification plant>**
3. Promotion of energy efficient technology to private sector ＜**PP2: Introduction of High efficiency boilers in factory>**

VI. Introduction of Low carbon technique in the transportation Sector — Transportation

1. Establishment of eco-friendly transportation network
2. Enhance convenience of public transportation
3. Promotion of measures for greenhouse gas emitted from automobiles

V. Creation of recycling-oriented society — Waste Management

1. Promotion of 3R activities of non-industrial wastes and industrial wastes
2. Introduction of low-carbon waste incineration facility＜**PP3: Introduction of waste to energy facility >**
3. Reduction of greenhouse gas emission from collection and transportation of wastes＜**PP4: Introduction of IT based waste collection system>**

VI. Environmental education and study on global environmental issues — Education

1. Promotion of environmental education and study
2. Promotion of human resource development

VII. Introduction of international technology through city to city corporation — International Corporation

1. Contribution to reduction of global greenhouse gas emission by introducing international technology through city to city corporation
2. Supporting and cooperating international environmental conservation activities

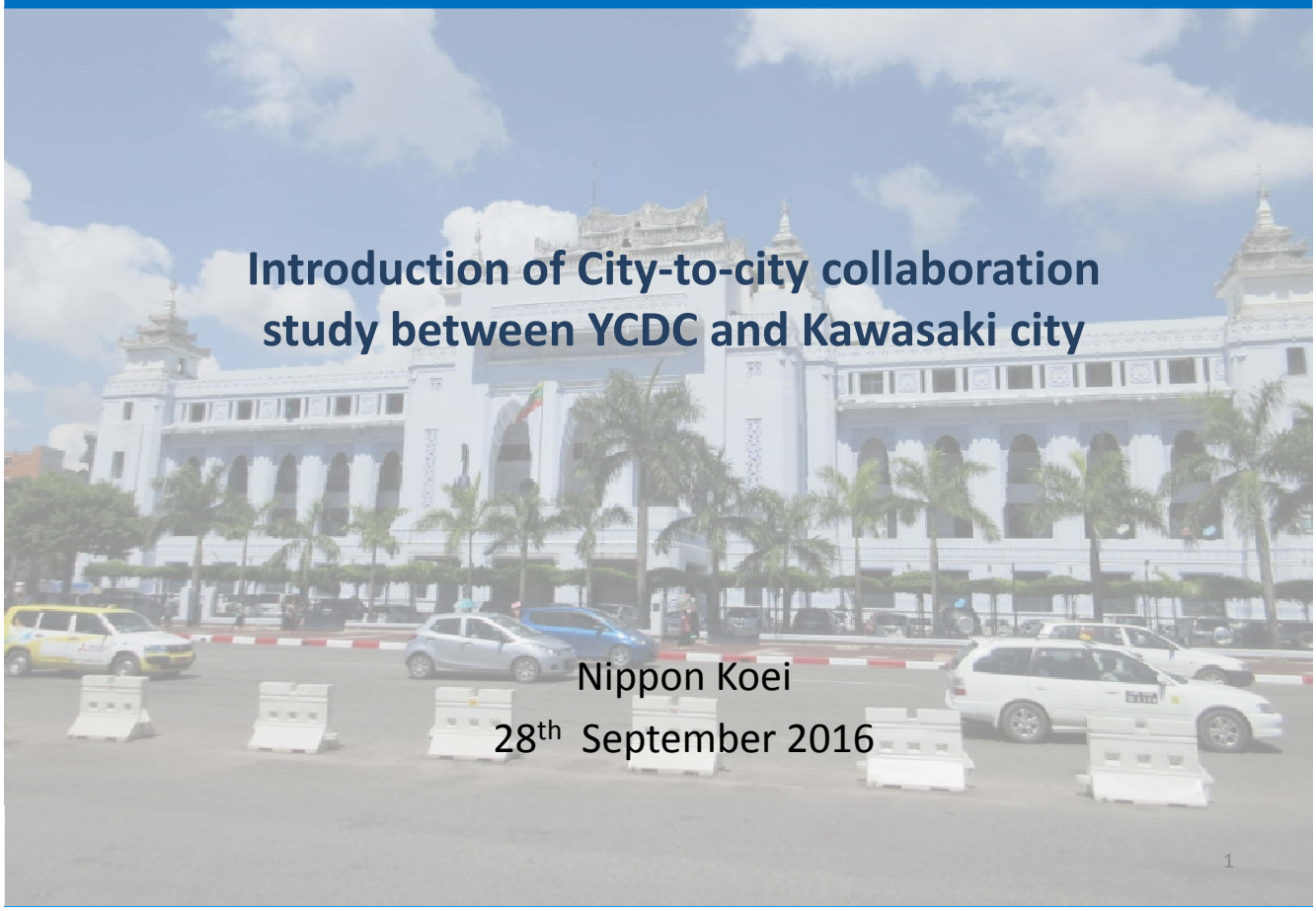
VIII. Research and development of environmental technologies — MRV

1. Research and development of environmental technologies, and promotion of scientific measures
2. Conducting MRV in order to promote introduction of saving energy technology

※<PP:Pilot Project>: it indicates idea of pilot project

3.　招聘・セミナー関連資料

3-1　招聘説明資料（YCDC 水環境グループ招聘受入れ）



Introduction of City-to-city collaboration study between YCDC and Kawasaki city

Nippon Koei

28th September 2016

Contents

1. Overview of JCM Formulation through City-to-city collaboration project between YCDC and Kawasaki city
2. Introduction of JCM scheme
3. JCM project formulation in Yangon: Solar PV Generation Pilot Project Plan
4. Example of Nagasawa Water Treatment Plant in Kawasaki

1. Overview of JCM City-to-city collaboration project

【Objectives】
To contribute to sustainable development and realize low carbon society in Yangon, the study aims to formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.

Yangon city

Current situation of potential sectors

[Power]
Unstable power supply, stand-by(back-up) power system in industrial park/ commercial facilities etc.

[Transportation]
Heavy traffic jam, demand of mass rapid transit (MRT) system, insufficient parking lots, lack of consolidated logistics system etc.

[Water supply & sewerage]
Decrepit water supply/sewerage facilities, expansion of the facilities in the suburb etc.

Kawasaki city

Support on environmental technology and industrial development collaborate with member of Kawasaki green innovation cluster etc.

Target sector	Technologies to be introduced
1) Low carbon industrial park	a) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
2) Low carbon building management system	b) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
3) Low carbon water supply/sewerage facilities	c) High efficiency pumping system, low carbon technologies in water sector etc.
4) Project identification of Renewable energy/New energy	d) Solar power, biogas, biomass, mini hydropower etc.

Low CO2 Kawasaki brand entity certified

Low CO2 Kawasaki brand entity certified

Japanese private company

Japanese private company

Nippon Koei

Study/support of JCM project formulation between Japanese and Myanmar companies

1. Overview of JCM City-to-city collaboration project

Yangon City (YCDC)
Pollution control & Cleansing Dept.
City Planning & Land administration Dept.

City-to-city collaboration regarding the JCM project formulation

City of Kawasaki
Economic and Labor Affairs Bureau

JCM project formulation with regional government' support

Private entities in Yangon city

Myanmar company [Project participant]

Myanmar company [Project participant]

Myanmar company [Project participant]

Installation of high efficiency boiler in the factory

Solar power project to install public facilities in YCDC

Energy efficiency project in YCDC facilities

Japanese company [Project participant]

Equipment manufacturer [Supplier]

Equipment manufacturer [Supplier]

Private entities in Kawasaki city

JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city

2. Introduction of JCM scheme

The budget for projects starting from FY 2016 is 6.7 billion JPY (approx. USD 67 million) in total by FY2018

※Includes collaboration with projects supported by JICA and other governmental-affiliated financial institute.

Government of Japan

Finance part of an investment cost (**less than half**)

Conduct MRV and expected to deliver at least half of JCM credits issued

International consortiums (which include Japanese entities)



- Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO_2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
- Eligible Projects : starting installation after the adoption of the financing and finishing installation within three years.

2. Introduction of JCM scheme

- Japan has held consultations for the JCM with developing countries since 2011 and has established the JCM with Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar and Thailand.

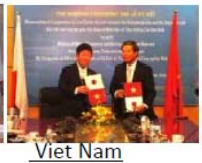

Mongolia
Jan. 8, 2013
（Ulaanbaatar）


Bangladesh
Mar. 19, 2013
(Dhaka)


Ethiopia
May 27, 2013
(Addis Ababa)

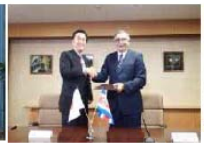

Kenya
Jun. 12,2013
(Nairobi)


Maldives
Jun. 29, 2013
(Okinawa)


Viet Nam
Jul. 2, 2013
(Hanoi)


Lao PDR
Aug. 7, 2013
(Vientiane)


Indonesia
Aug. 26, 2013
(Jakarta)


Costa Rica
Dec. 9, 2013
(Tokyo)

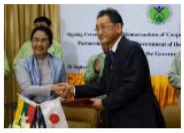

Palau
Jan. 13, 2014
(Ngerulmud)


Cambodia
Apr. 11, 2014
(Phnom Penh)


Mexico
Jul. 25, 2014
(Mexico City)


Saudi Arabia
May 13, 2015


Chile
May 26, 2015
(Santiago)

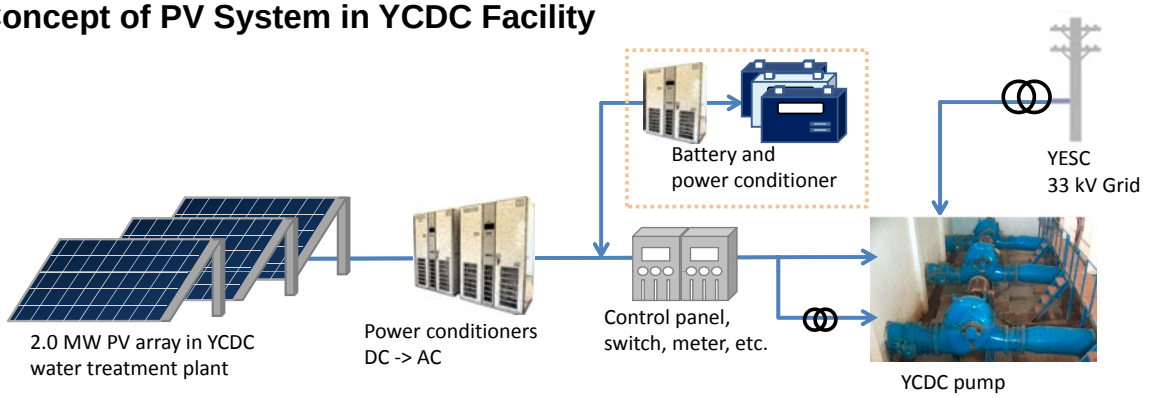

Myanmar
Sep. 16, 2015
(Nay Pyi Taw)


Thailand
Nov. 19, 2015
(Tokyo)

- In addition, the Philippines and Japan signed an aide memoire with intent to establish the JCM.

3. JCM project formulation in Yangon: Solar PV Generation Pilot Project Plan

Concept of PV System in YCDC Facility

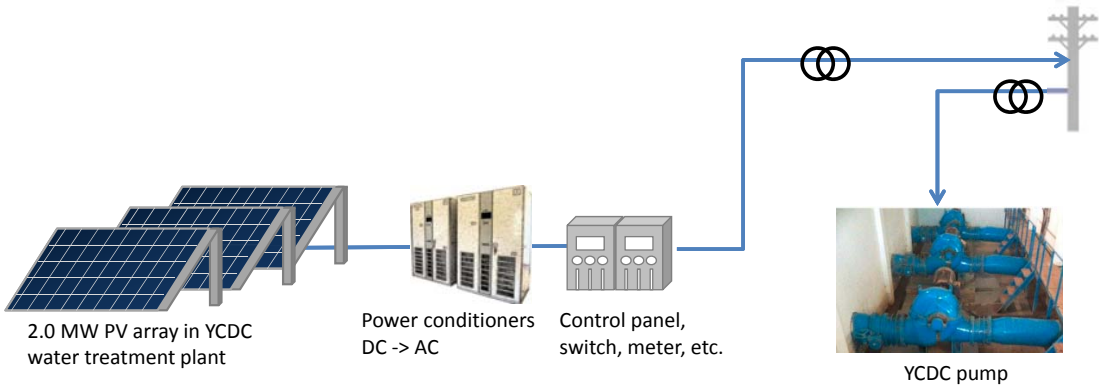


- Solar PV generation system reduces electric energy usage in YCDC pump station
- Solar power for internal supply only (no feed to grid)
- Battery is necessary to absorb fluctuation of PV output

Item	Value
Average tariff	105 MMK/kWh
PV system efficiency	77%
Solar Irradiation (Average)	4.69 kWh/m2/d
Planned capacity (Tentative)	2,000 kWp
Annual generation energy	2.85 GWh (8-10 % of consumption)
Annual saving	299 mil MMK

3. JCM project formulation in Yangon: Solar PV Generation Pilot Project Plan: Option

Option:
-Solar PV energy sent to YESC grid
- YCDC purchase electricity from YESC grid
- Net metering : Tariff payment = Energy used – PV generated



3. Pilot Project Site

Electric room (PV – related equipment can be stored) in Nyaung Hnit Pin

Pump room in Nyaung Hnit Pin

Candidate PV module area in in Nyaung Hnit Pin

3. Selection of Solar PV Generation Pilot Project of YCDC Facility

- Selection of pilot project site:
  - Interview survey → Site survey
- Criteria for selection: needs, demand, location

Candidate	Status	Load	Selection result
Nyaung Hnit Pin	-Peak 7MW, off-peak 6.8 Nw, 24 hr operation -1st phase 2014, 2nd phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1st priority: PV possible to supply LV side. (110 kW x 4 unit of lift-up pump) For HV side, further study necessary.
Hlawga	- 24hr, fixed demand - 1MW x 2nos, 6.6 kV - Pump installation in 2008	2 MW	2nd priority: Under partial update (new electric board has mismatch of interface). →It will take time until PV connection study becomes possible.
La Gun Byin	132kWx6+25 kWx6 + 30 kWx4, 400V Peak 450 kW, off-peak 350 kW	450 kW	Too small, remote

- **Nyaung Hnit Pin** is tentatively selected.

3. Schedule and Way Forward for PV Pilot Project Plan

Sep-Oct 2016

- Preparation of system component and specification
- Cost estimation
- Economic and financial evaluation
  - Challenges: low tariff late, necessity of battery cost

Nov2016

- Submission of financial proposal for budgeting
- Monitoring plan, CO2 reduction assessment
- Implementation plan and schedule for JCM

Dec 2016-Jan 2017

- Official procedure for JCM project budgeting of YCDC with Regional government

Mar-Apr 2017

- Preparation of the proposal for JCM model project

4. Example of Nagasawa Water Treatment Plant in Kawasaki

Overall View of Nagasawa

PV modules installed above reservoir

PCS and battery

Item	Description
Total solar PV capacity	1157 kW (266 kW on filtration pond + 612 kW on distributing reservoir, and 279 kW on regulation pond)
Total solar PV area	9,400 m2
Battery capacity	242 kWh x 2 = 484 kWh (Li-ion Battery)
Main objective	-To support minimum power at the time of digester - To enable interconnection with independent gas turbine and independent generation
Annual generation energy	1.13 GWh/year (20% of total electric energy in Nagasawa)
Annual saving	0.28 mil USD/yr (100 JPY/USD, 25 JPY/kWh)

Solar panel

- **Maximum output: 1,155 kW**
- **The solar panel provide 20% of electricity the facility needed**
- **Initial cost: 800 million Yen (8 million US dollar)**

3.　招聘・セミナー関連資料

3-2　北九州 JCM セミナー・川崎市招聘関連資料

JCM Project Formulation Study through City-to-City Collaboration between YCDC and Kawasaki city

KAWASAKI CITY

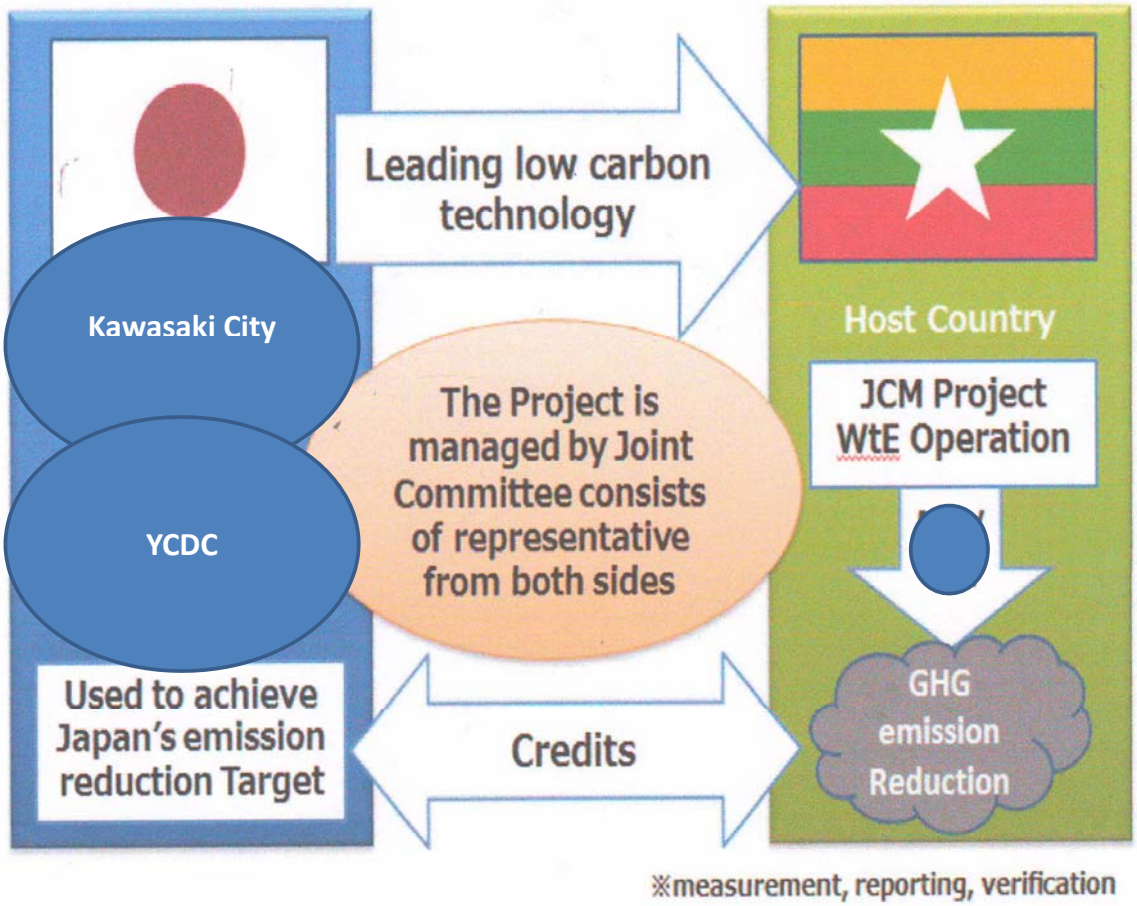
Objectives between Yangon City and Kawasaki City

-To contribute to sustainable development and realize low carbon society in Yangon

-To formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.

-To implement Clean Development Mechanism (CDM) including clean air, clean land and clean water.

- To cooperate and obtain carbon credit project with Kawasaki City according to JCM Scheme.



Action Plan

FY2013 — FY2016 — FY2017

JICA Programme

JICA Master Plan, in 2013

YCDC Information Collection and Verification Survey, supported by JICA

Incorporate low carbon development action plan of MOEJ Prj

JICA technical assistance

JICA grassroots prj.

MOEJ Programme

Collaboration

Low Carbon Action Plan under JCM city-to-city collaboration, supported by Kawasaki city

1) Preparation of low carbon action plan
   * See Kawasaki's plan as reference

2) JCM project formulation
   - Installation of high efficiency boiler in factory
   - Solar Power Project in YCDC' property

JCM subsidy prj.

Feasibility Study on JCM solar power project in YCDC's facility, such as water treatment plant, ex-dumping site etc.

[item to be checked in FS] : Availability, applicable load, generation and energy supply plan, grid connection, ownership, tariff, cost benefit, budgeting by YCDC etc.

Menu of City-to-City Collaboration from Kawasaki City

Low carbon society	▪ **Eco town planning and sharing experience** ▪ **Introduction of energy saving products/ technologies from Japanese private entities** ▪ **Support on Private Sector Collaboration, such as chamber of commerce etc.** ▪ **Support on capacity development through JICA scheme etc.**
Water supply/ Sewerage	▪ Sharing of management knowledge on water supply/ sewerage system ▪ Sharing of water tariff collecting/ water quality management knowledge
Monitoring	▪ Support on system development on car exhaust /air /pollution/ water quality/ soil condition, including analysis know -how
Solid waste	▪ Planning/ Implementation of solid waste collection system ▪ Planning/ Implementation of garbage separation program ▪ Planning/ Implementation of compost promotion program ▪ Knowledge sharing of industrial waste management ▪ Establishment of solid waste database etc.
Education	▪ Planning/ Implementation of environmental education programs
Miscellaneous	▪ Implementation of site tour on Kawasaki eco town etc. ▪ Establishment of Environmental Impact Assessment (EIA) system

<Low Carbon Society Sector>

YCDC would like to implement High-voltage Solar PV site in Nyaung Hnit Pin Reservoir.

➢ Three major items for the 2nd Year project

1) Preparation for low carbon action plan supported by Kawasaki city

- Introduction of Kawasaki city's low carbon plan

2) JCM project formulation for PV generation project in YCDC

- Introduction of Solar project in Kawasaki city

3) JCM project formulation for High-efficiency Drum-less Boiler in Factories

Selection of Solar PV Generation Pilot Project of YCDC Facility

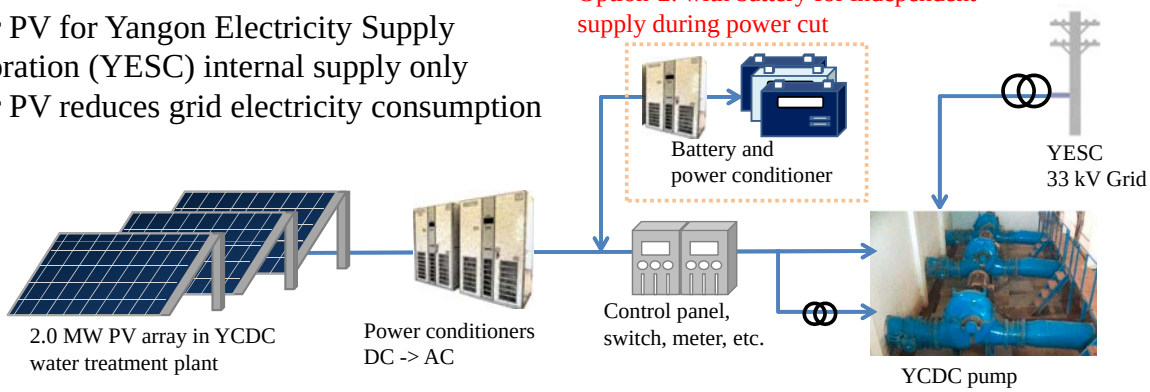
- Selection of pilot project site:
  - Interview survey → Site survey → Document review
- Criteria for selection: needs, demand, location

Candidate	Status	Load	Selection result
Nyaung Hnit Pin	-Peak 7MW, off-peak 6.8 Nw, 24 hr operation -1st phase 2014, 2nd phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1st priority: PV possible to supply LV side. (110 kW x 4 unit of lift-up pump) For HV side, further study necessary.
Hlawga	- 24hr, fixed demand - 1MW x 2nos, 6.6 kV - Pump installation in 2008	2 MW	2nd priority: Under partial update (new electric board has mismatch of interface). →It will take time until PV connection study becomes possible.
La Gun Byin	132kWx6+25 kWx6 + 30 kWx4, 400V Peak 450 kW, off-peak 350 kW	450 kW	Too small, remote

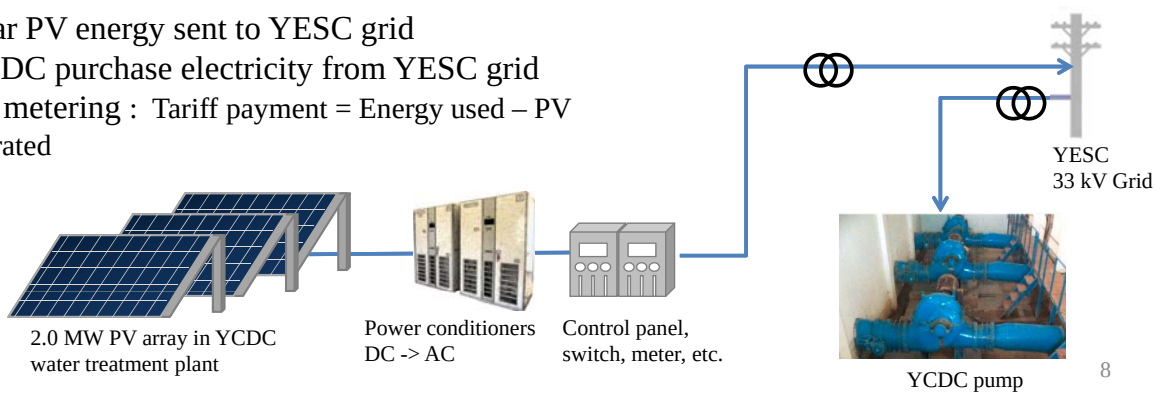
Options of Photo Voltaic (PV) System Concept

Option-1
-Solar PV for Yangon Electricity Supply Corporation (YESC) internal supply only
-Solar PV reduces grid electricity consumption

Option-2: with battery for independent supply during power cut



Option-3
-Solar PV energy sent to YESC grid
- YCDC purchase electricity from YESC grid
-Net metering : Tariff payment = Energy used – PV generated



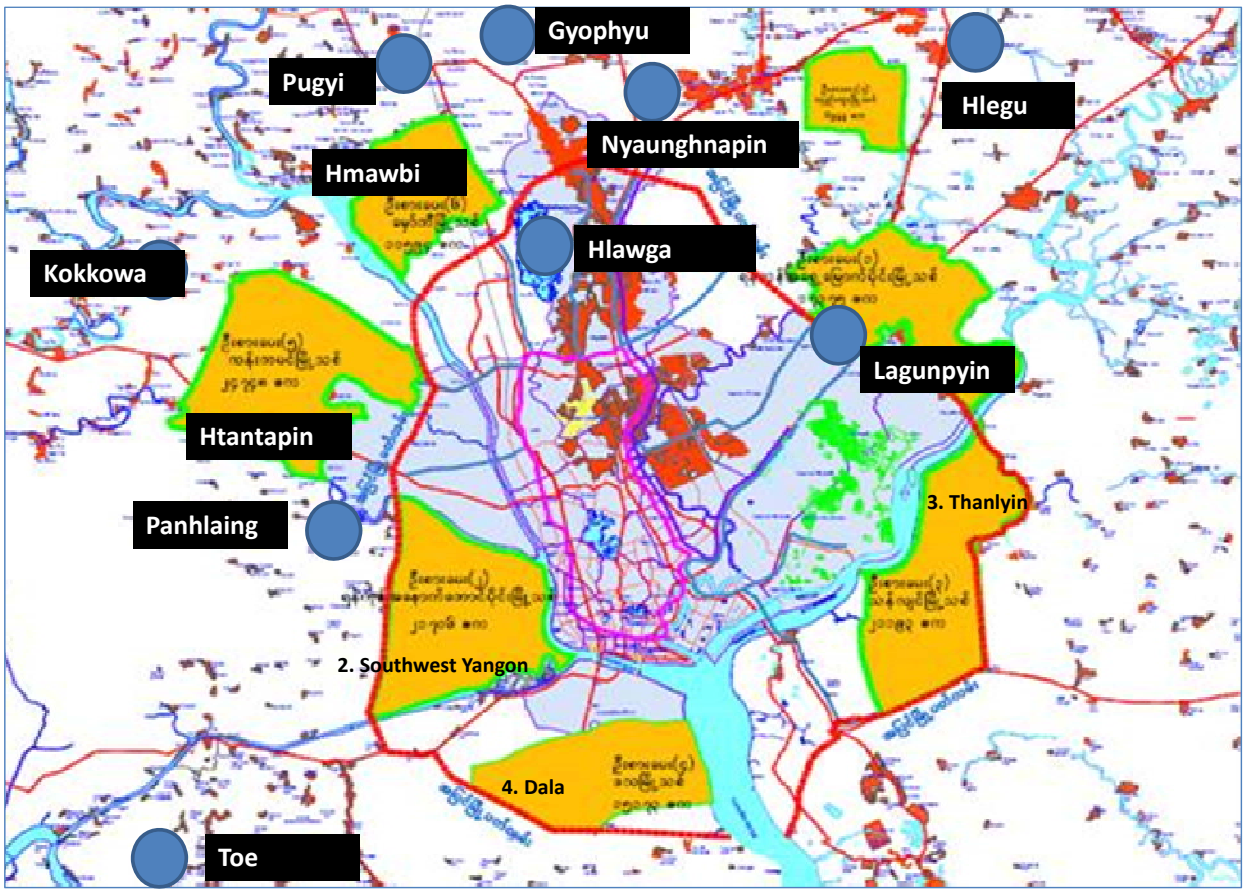
Nyaung Hnit Pin Pilot Project Site

Electric room (PV –related equipment can be stored)

Pump room

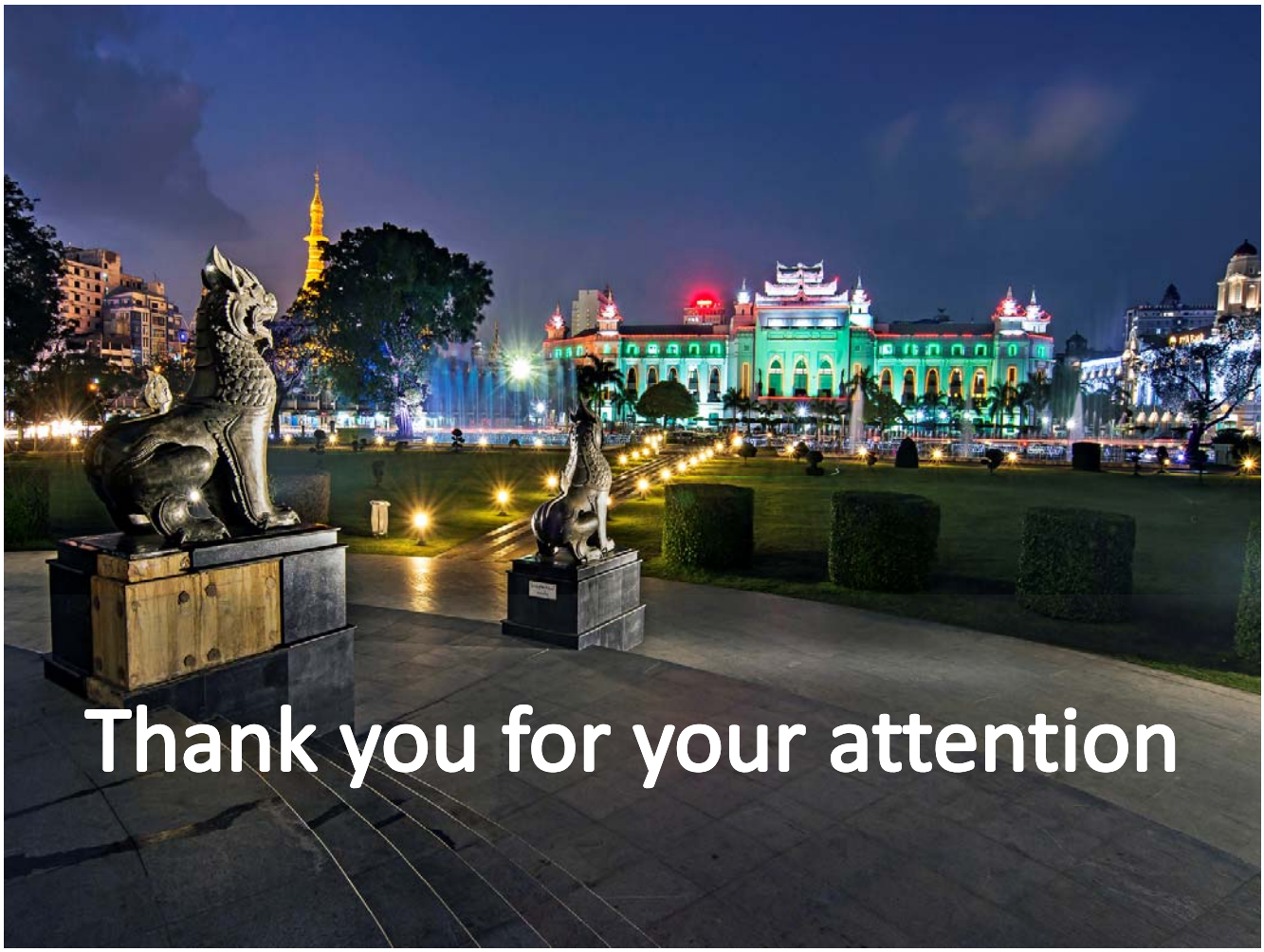
Candidate PV module area

Planned Water Resources for 2040



Recommendation

- To promote city-to-city collaboration between YCDC and Kawasaki city and have to share future vision of low carbon development of YCDC
- To support and promote JCM project by selecting pilot project in the Low Carbon Action Plan
- To promote sustainable development of YCDC in collaboration of Kawasaki city
- YCDC wants to get technology transfer from JCM scheme.



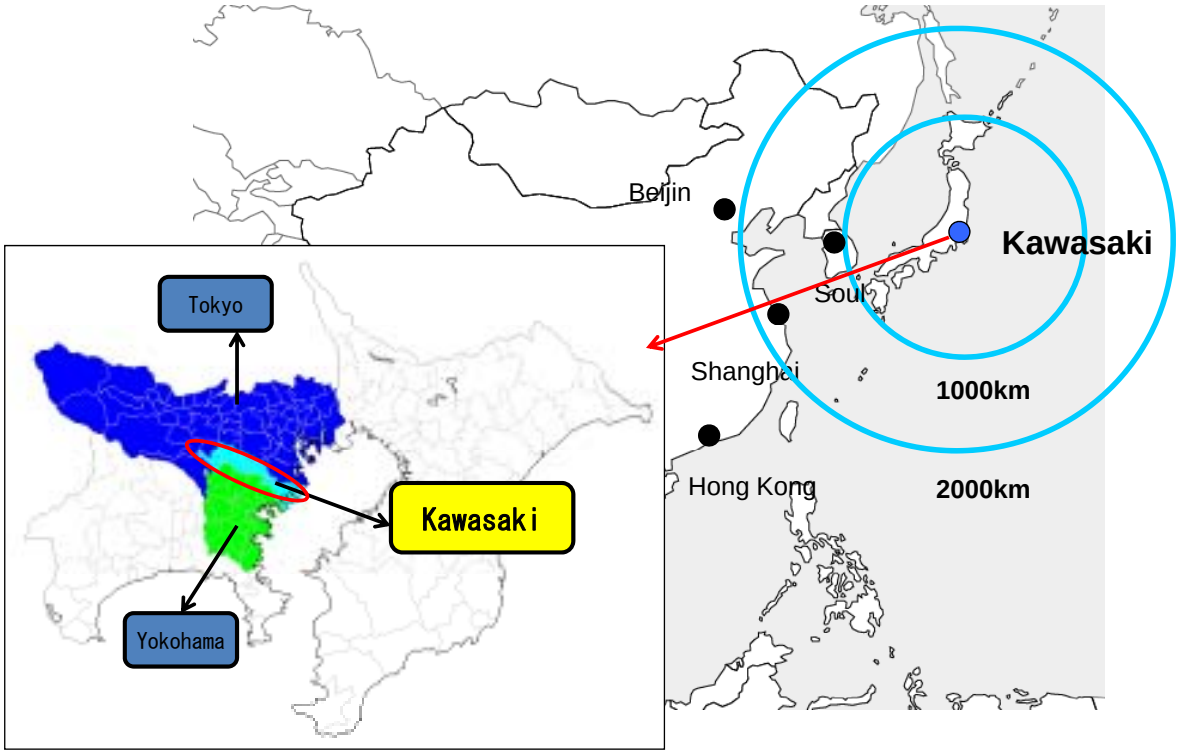
Workshop on JCM City-to-City
Collaboration Projects in Kitakyushu city

JCM City-to-City Collaboration
between Kawasaki-city and Yangon-city

Economic and Labor Affairs Bureau

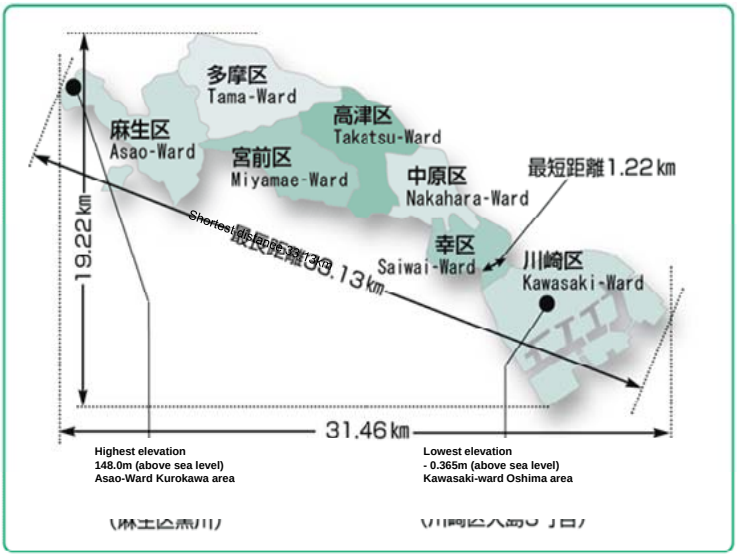
川崎市 KAWASAKI CITY

General information about Kawasaki-city: Location

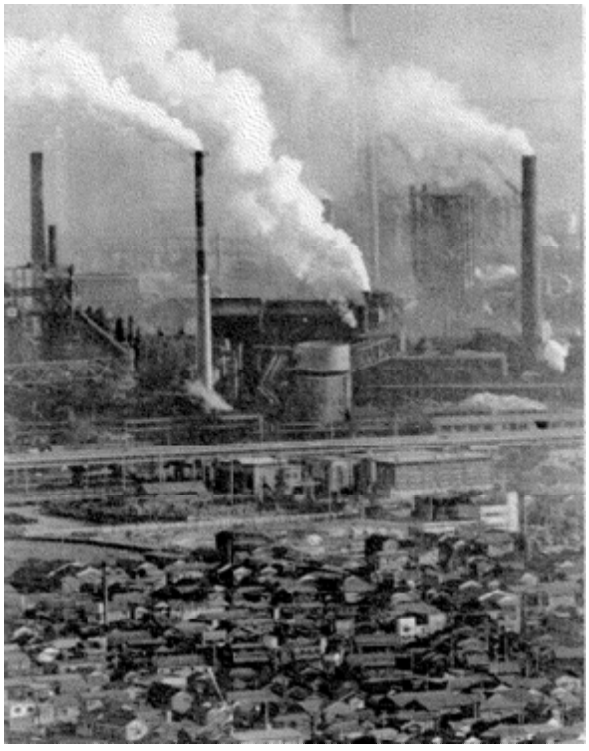


City profile

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km2
- City budget: APPROX 10 billion US$ (2015)
- 7 wards: Kawasaki, Saiwai, Nakahara, Takatsu, Miyamae, Tama, Asao



Experience of industrial pollution (1960-70)



Tama-river (1970)

Tama-river (1970)

Kawasaki Waterfront Area (1970)

Kawasaki Waterfront Area (2010)

JCM City-to-city collaboration project (2016)

【Objectives】
To contribute to sustainable development and realize low carbon society in Yangon, the study aims to formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.

Yangon city

Current situation of potential sectors

[Power]
Unstable power supply, stand-by(back-up) power system in industrial park/ commercial facilities etc.

[Transportation]
Heavy traffic jam, demand of mass rapid transit (MRT) system, insufficient parking lots, lack of consolidated logistics system etc.

[Water supply & sewerage]
Decrepit water supply/sewerage facilities, expansion of the facilities in the suburb etc.

Kawasaki city

Support on environmental technology and industrial development collaborate with member of Kawasaki green innovation cluster etc.

Low CO2 Kawasaki brand entity certified

Low CO2 Kawasaki brand entity certified

Japanese private company

Japanese private company

Nippon Koei

Study/support of JCM project formulation between Japanese and Myanmar companies

Target sector

1) Low carbon industrial park
2) Low carbon building management system
3) Low carbon water supply/sewerage facilities
4) Project identification of Renewable energy/New energy

Technologies to be introduced

a) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
b) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
c) High efficiency pumping system, low carbon technologies in water sector etc.
d) Solar power, biogas, biomass, mini hydropower etc.

MOU between Kawasaki city and YCDC (2016)

Memorandum of Understanding
Between the City of Kawasaki, JAPAN and the City of Yangon, Myanmar on the City to City Collaboration

In order to promote city to city collaboration between Kawasaki and Yangon for achievement of low carbon city in Yangon and thus to contribute to the further prosperity of both, the City of Kawasaki and the City of Yangon hereby agree upon the following:

1. Both parties shall be committed to promote city to city collaboration for achievement of low carbon society in Yangon and contribute to the further prosperity of Kawasaki and Yangon within the fields of technical cooperation, information exchange, and economic exchange as well as develop cooperative framework based the idea of both cities are on win-win and equal relationship.
2. In order to achieve the aforementioned objectives, both parties shall cooperate on the following:
   (a) Excavating and supporting of low-carbon projects utilizing Joint crediting mechanism (JCM) scheme
   (b) Technical cooperation and information exchange for realizing low-carbon society of Yangon
   (c) Supporting creation of new business in a field of environment
3. According to this Memorandum of Understanding (MOU), there shall be back to back missions to have exchanges and study visits in both cities.
4. This MOU shall become effective on the signed date and remain valid for three years. If one country wants to terminate the MOU, they shall inform in writing before one month, otherwise the MOU will be continued automatically.
5. The contents of this MOU can be amended in accordance with a written agreement of both parties.
6. Any disagreement which comes from interpretation of the MOU shall be solved in a friendly way based on both parties' trust and discussion.
7. This MOU shall be made in two original copies in English.

March 25th, 2016

H.E U Hla Myint
Mayor of Yangon

Mr. Norihiko Fukuda
Mayor of Kawasaki

August 2015: Start of city-to-city collaboration

October 2015: 1st Visit to Yangon-city

December 2015: Discussion on Draft MOU at Yangon-city

January 2016: Workshop on City-to-city collaboration at Yangon-city

March 2016: Concluding MOU between Kawasaki city and YCDC

Workshop for city-to-city collaboration at Yangon

JCM City-to-city collaboration project (2017)

Yangon City (YCDC)
Pollution control & Cleansing Dept.
City Planning & Land administration Dept.

City-to-city collaboration regarding the JCM project formulation

Kawasaki City
Economic and Labor Affairs Bureau

JCM project formulation with regional government' support

Private entities in Yangon city

- Myanmar company [Project participant] → Installation of high efficiency boiler in the factory ← Japanese company [Project participant]
- Myanmar company [Project participant] → Solar power project to install public facilities in YCDC ← Equipment manufacturer [Supplier]
- Myanmar company [Project participant] → Energy efficiency project in YCDC facilities ← Equipment manufacturer [Supplier]

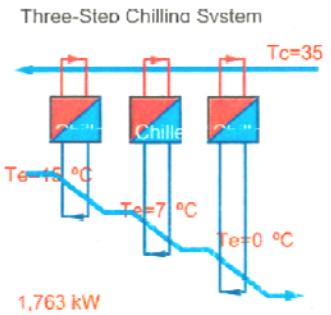
JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city

Private entities in Kawasaki city

Ongoing JCM model projects (2017)

JCM model project1:Saving energy by introduction of ejector system

<Introduced technology>



- Cascade system of high-efficiency reciprocating refrigerators can reduce electricity consumption and CO2 emission
- 28% electricity reduction

Item	Value
Location	Drinking factory in Yangon
Efficiency	COP4.3, compressor 95%
Capacity	Compressor 1401+1039kW Condenser 1650 kW x 2
Investment	2.25 mil US$
Annual saving	1.8-3.2 GWh/year (0.18-0.32 mil US$/yr)
CO2 Reduction	1029 ton/year

JCM model project2:Saving energy by introduction of high efficiency boilor

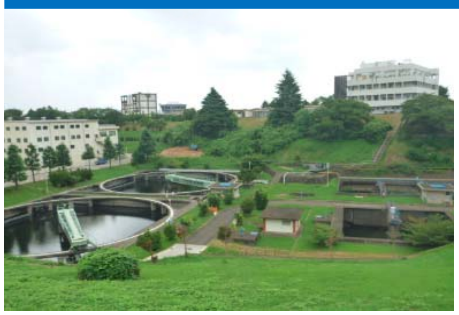
<Introduced technology>

High-efficiency once-through boiler with monitoring system

- High-efficiency once-through oil boiler reduce fossil fuel and CO2 emission
- Co-benefit of reduction of air pollutant
- 9.6% fuel reduction

Item	Value
Location	Food factory in Yangon
Efficiency	94%
Capacity	2 ton/h x 6 nos
Investment	0.81 mil USD
Annual fuel saving	257 kL/yr, 0.14 mil US$/yr
CO2 Reduction	674 ton/year

Ongoing JCM model project (2017):
Installation of solar power generation device in public facility in Yangon

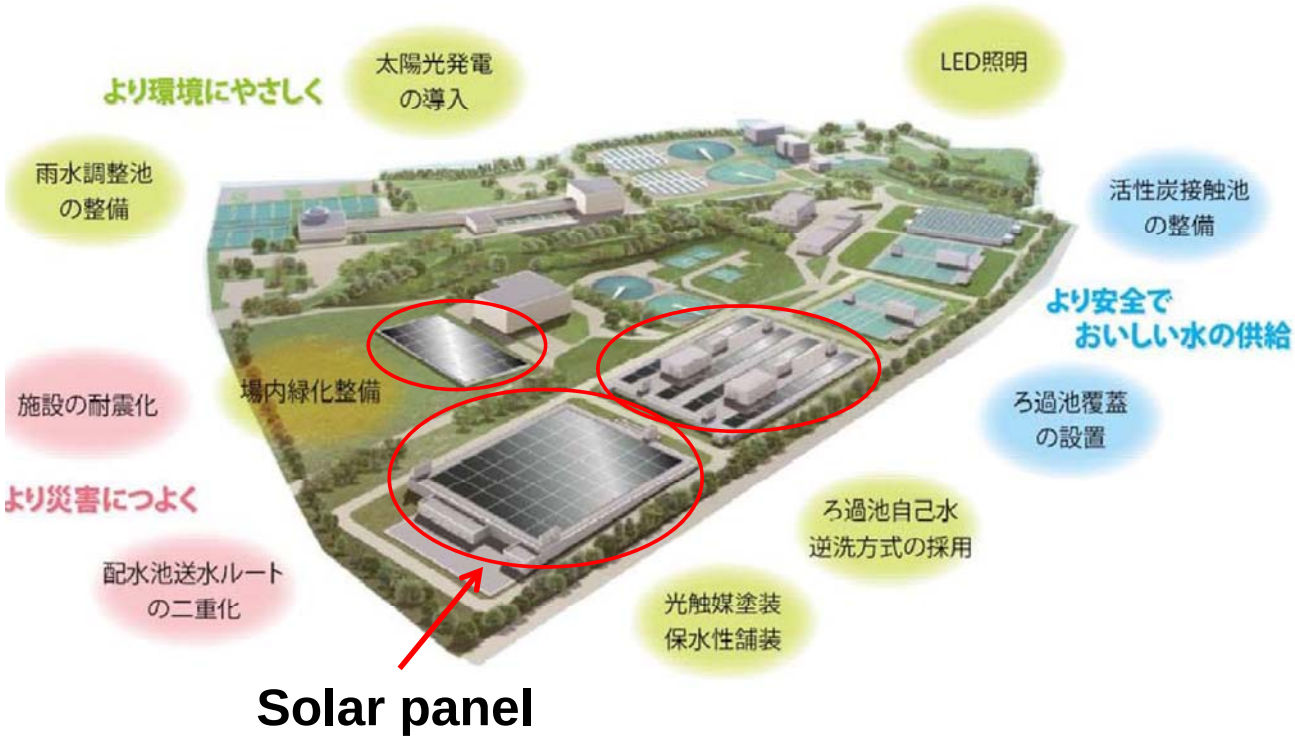


Detail of Nagasawa water purification plan in Kawasaki

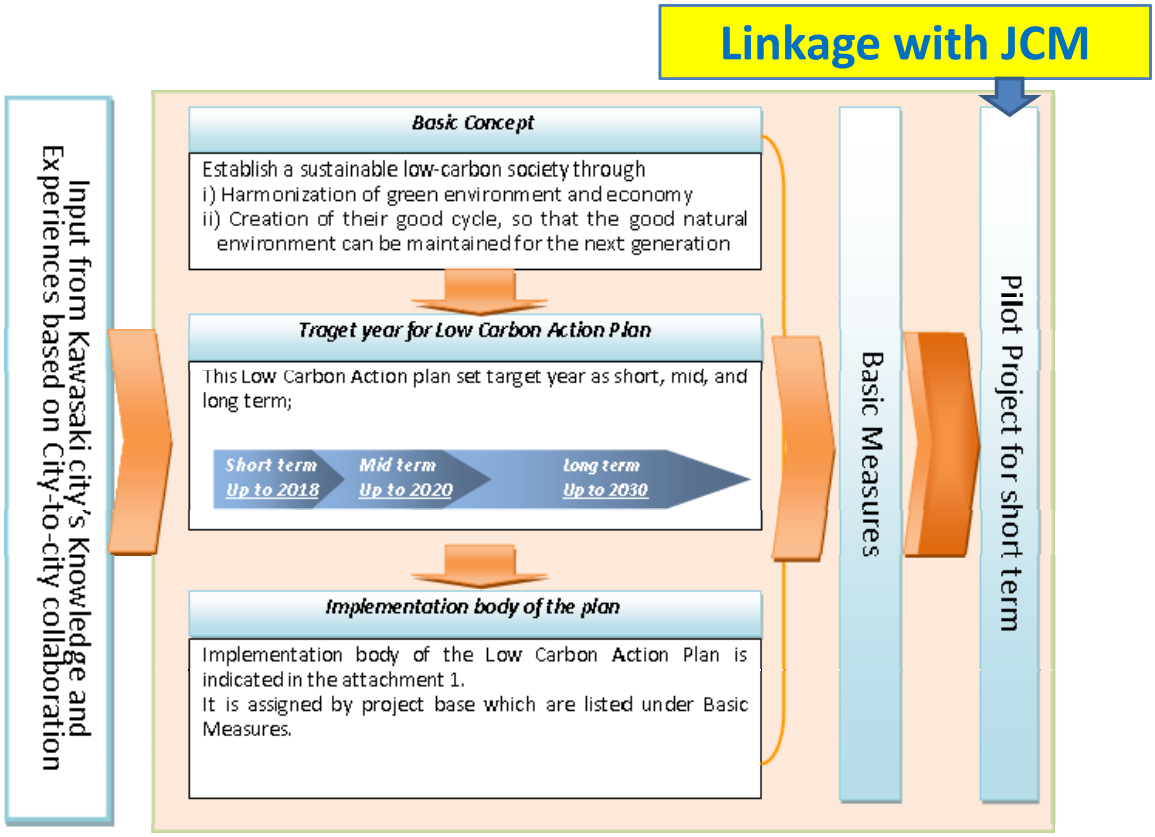
Item	Description
Total solar PV capacity	1157 kW (266 kW on filtration pond + 612 kW on distributing reservoir, and 279 kW on regulation pond)
Total solar PV area	9,400 m2
Battery capacity	242 kWh x 2 = 484 kWh (Li-ion Battery)
Main objective	-To support minimum power at the time of digester - To enable interconnection with independent gas turbine and independent generation
Annual generation energy	1.13 GWh/year (20% of total electric energy in Nagasawa)

Image of installation of solar power generation device in public facility:
Nagasawa Water Purification Plant in Kawasaki

Image of installation of solar power generation device in public facility:
Nagasawa Water Purification Plant in Kawasaki



Preparation of Low Carbon Action Plan in Yangon (2017)



3.　招聘・セミナー関連資料

3-3　COP22 発表資料

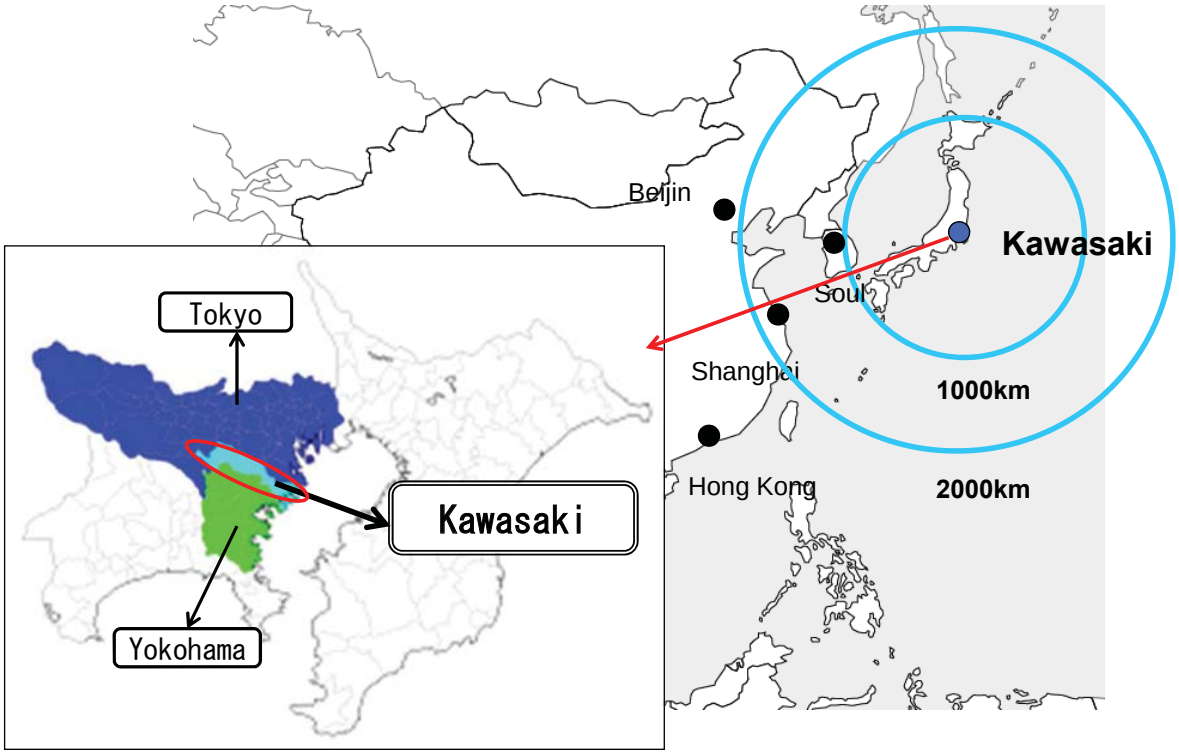
JCM City-to-City Collaboration

between Kawasaki-city and Yangon-city

Kawasaki-city
Japan

川崎市
KAWASAKI CITY

About Kawasaki-city, Japan



About Kawasaki-city, Japan

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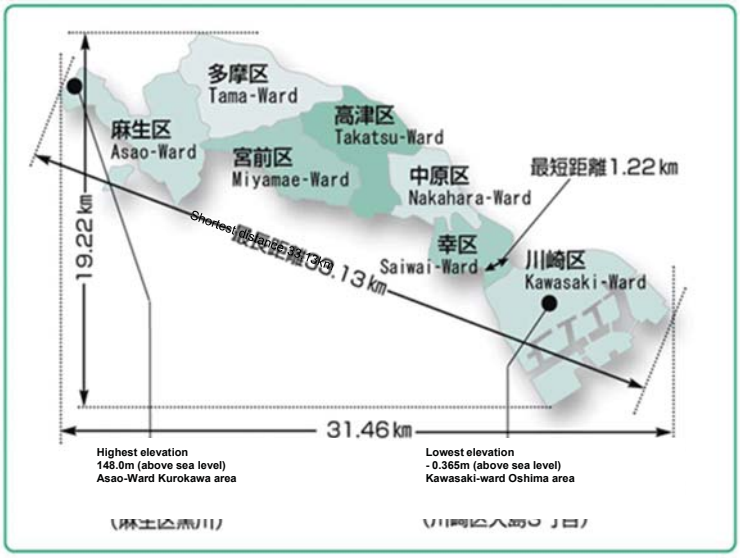
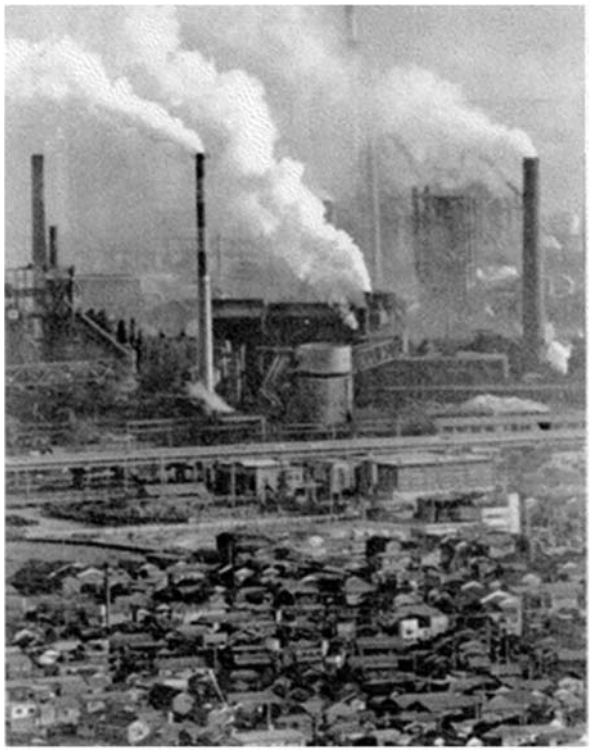
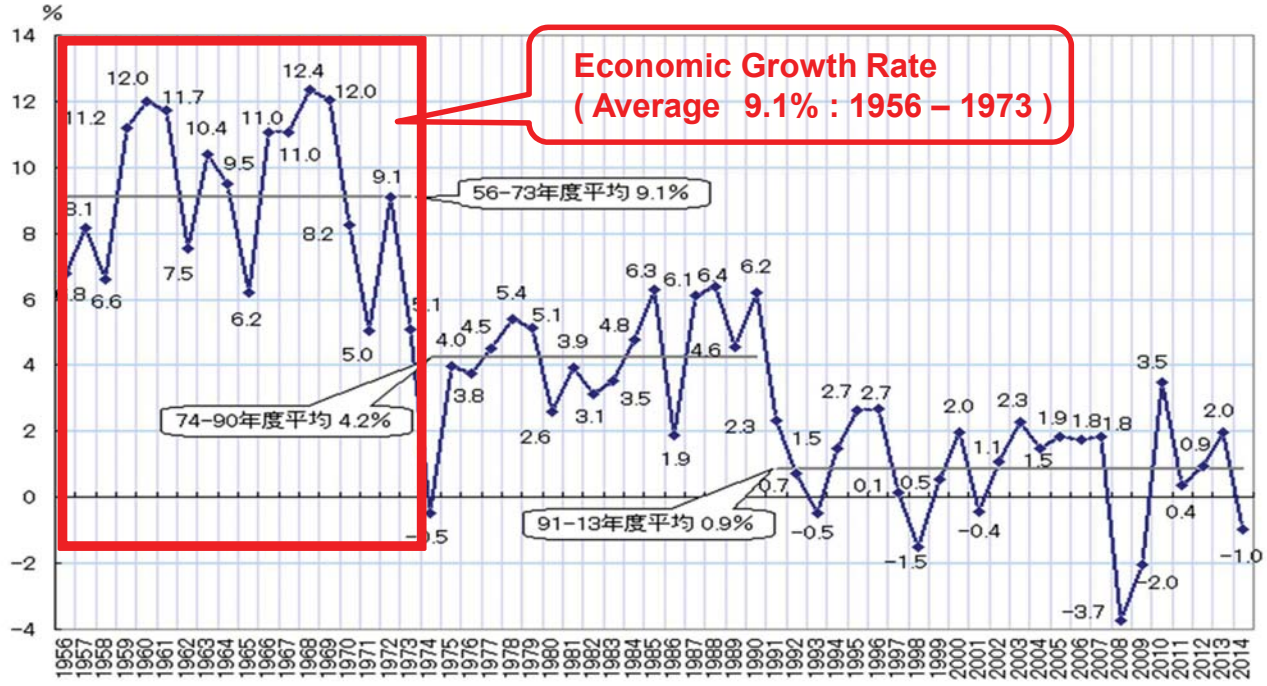


Experience of Industrial Pollution in Kawasaki (1960-70)



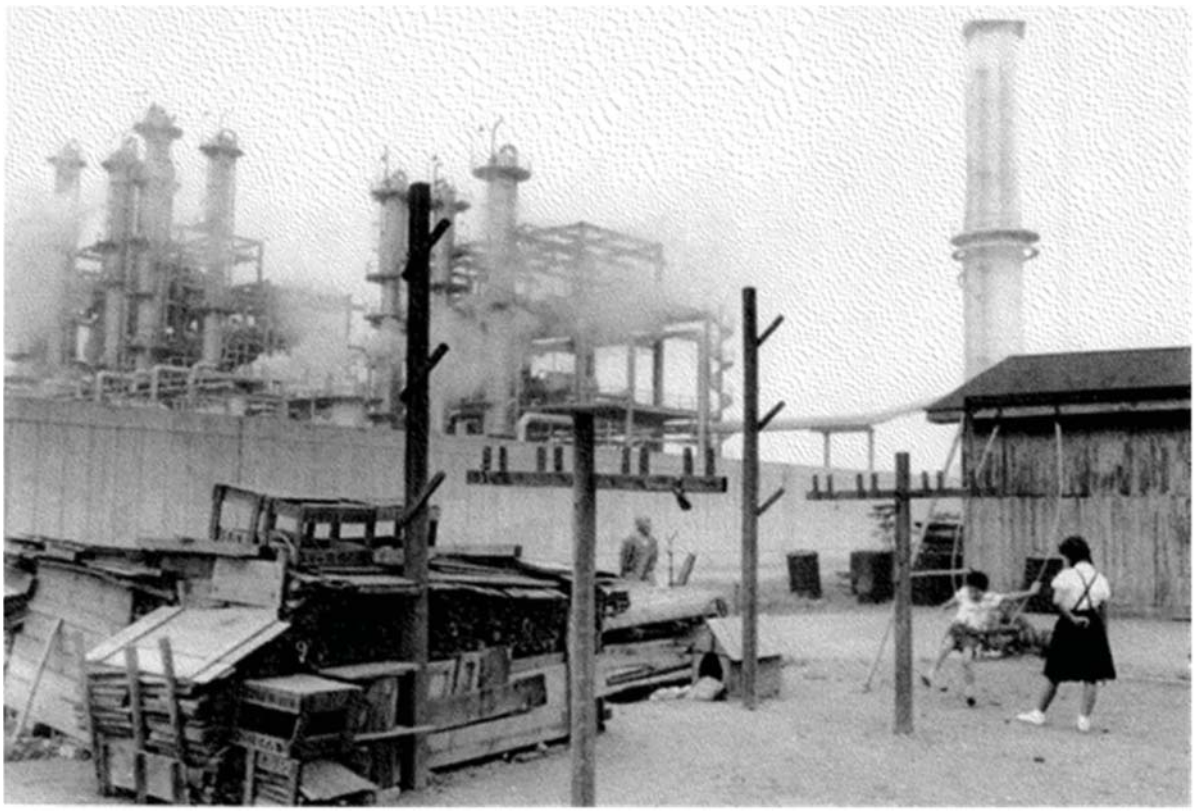
Economic Growth Rate in Japan



（注）年度ベース。93SNA連鎖方式推計。平均は各年度数値の単純平均。1980年度以前は「平成12年版国民経済計算年報」（63SNAベース）、1981～94年度は年報（平成21年度確報）による。それ以降は、2015年7–9月期2次速報値 〈2015年12月8日公表〉

（資料）内閣府SNAサイト

Factories nearby Residential Area in Kawasaki (1970)



Water Pollution at Tama-River (1970)

Tama-River covered by full of Garbage (1970)

Air Pollution over Kawasaki Waterfront Area (1960)

Efforts to overcome Pollution Problems

Local Business

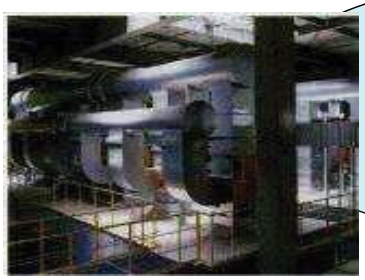
- Investment for pollution control
- Development of pollution control technologies

Citizen

- Civil action against pollution
- Public awareness for environment

Kawasaki-city

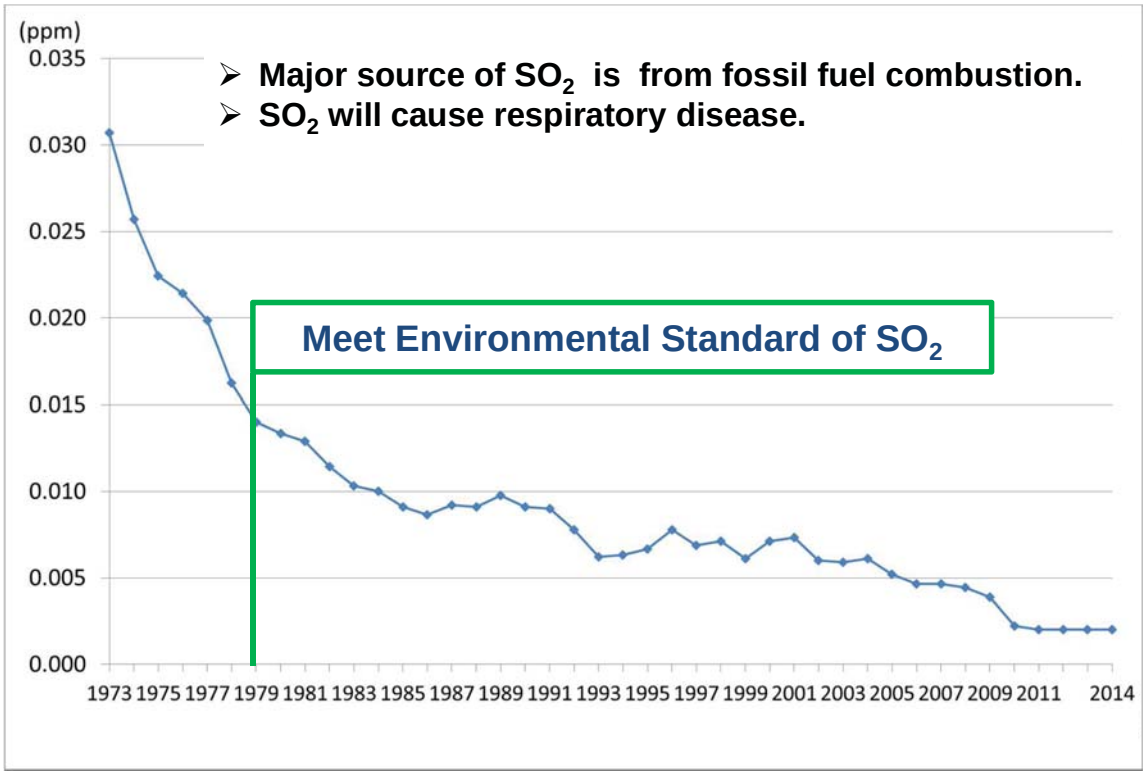
- Pollution control agreement with local industries
- Regulation for pollution control
- Pollution monitoring system



"Sharing of Roles" & "Cooperative Action"

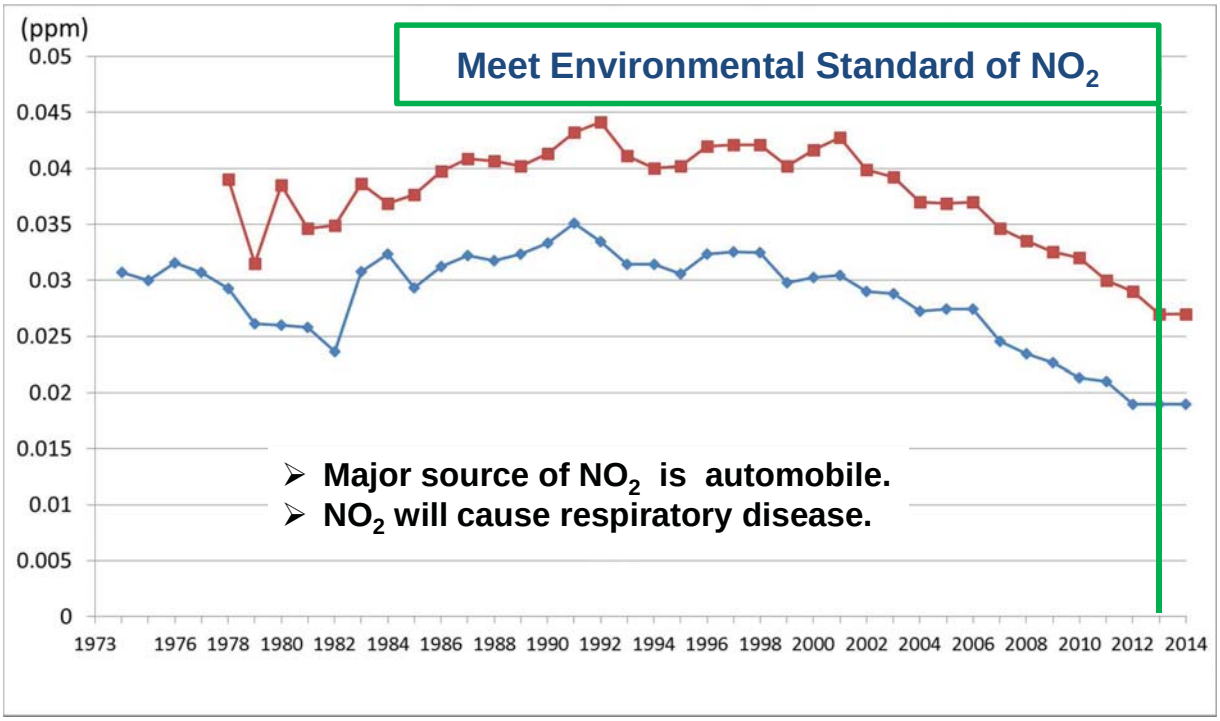
Improvement of Environmental Problems

SO_2 Concentration in Air from 1973 - 2014



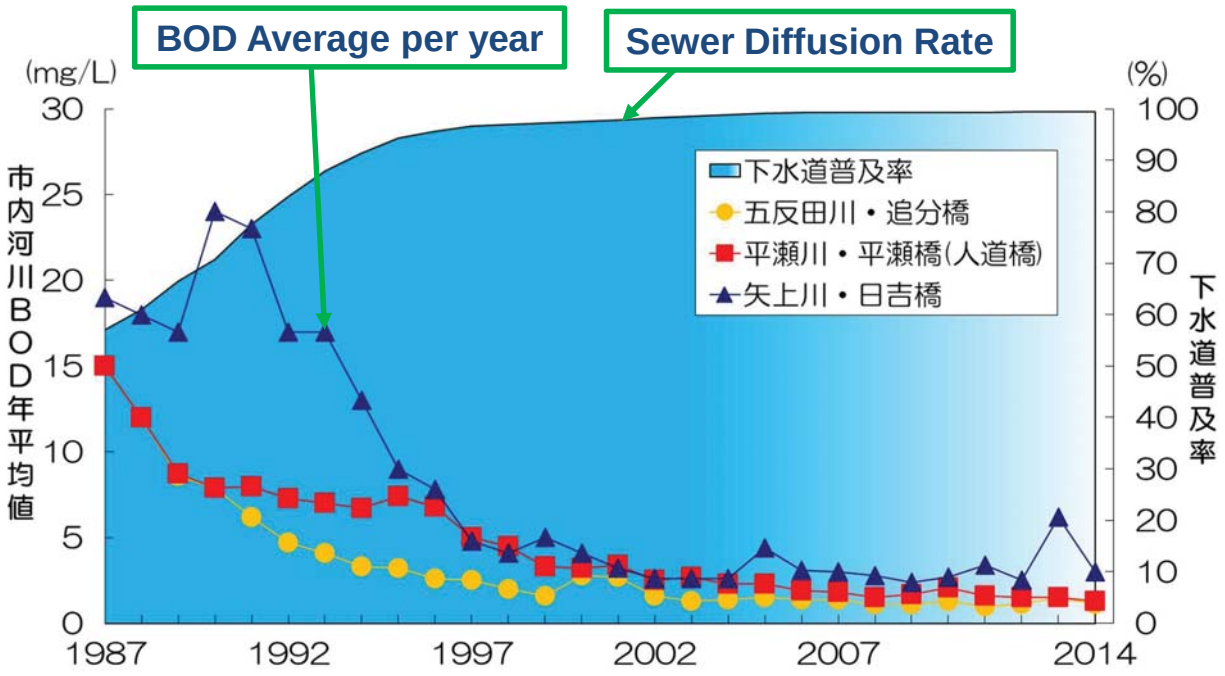
- Major source of SO_2 is from fossil fuel combustion.
- SO_2 will cause respiratory disease.

NO_2 Concentration in Air from 1973 - 2014



- Major source of NO_2 is automobile.
- NO_2 will cause respiratory disease.

BOD in River Water and Sewer Diffusion Rate from 1987 - 2014



Current Landscape of Tama-River (2016)

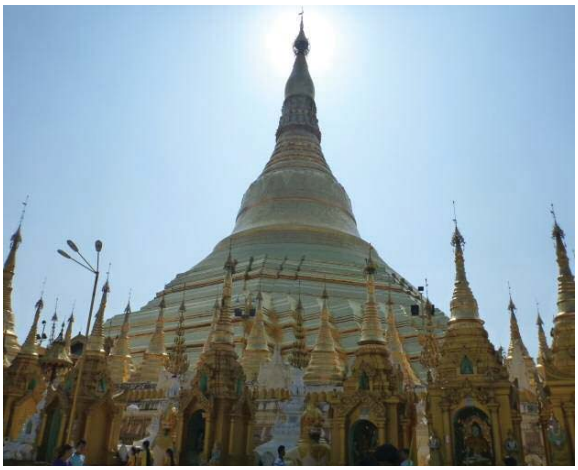
Current Landscape over Kawasaki Waterfront Area (2016)

Current Landscape over Kawasaki Waterfront Area (2016)

About Yangon-city, Myanmar

About Yangon-city, Myanmar

- Population: APPROX 5.2 million population (2014)
- Area: 598.8 Km^2
- Economic Growth Rate **7.8 %** (2016: Estimated by World Bank)



JCM City-to-City Collaboration Project (2015)

【Objectives】
To contribute to sustainable development and realize low carbon society in Yangon, the study aims to formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.

Yangon

Potential sectors for low carbon project

[Power]
Unstable power supply, stand-by(back-up) power system in industrial park/ commercial facilities etc.

[Transportation]
Heavy traffic jam, demand of mass rapid transit (MRT) system, insufficient parking lots, lack of consolidated logistics system etc.

[Water supply & sewerage]
Decrepit water supply/sewerage facilities, expansion of the facilities in the suburb etc.

Target sector	Technologies to be introduced
1) Low carbon industrial park	a) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
2) Low carbon building management system	b) High efficiency air conditioning facilities, energy saving fluorescent light, etc.
3) Low carbon water supply/sewerage facilities	c) High efficiency pumping system, low carbon technologies in water sector etc.
4) Project identification of Renewable energy/New energy	d) Solar power, biogas, biomass, mini hydropower etc.

Kawasaki

Support on environmental technology and industrial development collaborate with member of Kawasaki green innovation cluster etc.

Japanese private company

Nippon Koei (consulting)

Study/support of JCM project formulation between Japanese and Myanmar companies

JCM City-to-City Collaboration Project (2015)


Mingaradon Industrial park in Yangon


Pollution Control and Cleansing Department in YCDC


City Planning and Land Administration in YCDC


Meeting with CPLA&PCCD in YCDC regarding City-to-city collaboration workshop

JCM City-to-City Collaboration Project (2015)


Kawasaki Chamber of Commerce and Industry


Economic and Labor Affairs Bureau of Kawasaki

Zero-Emission Industrial park

Ukishima Incineration Plant

JCM City-to-City Collaboration Project (2015)

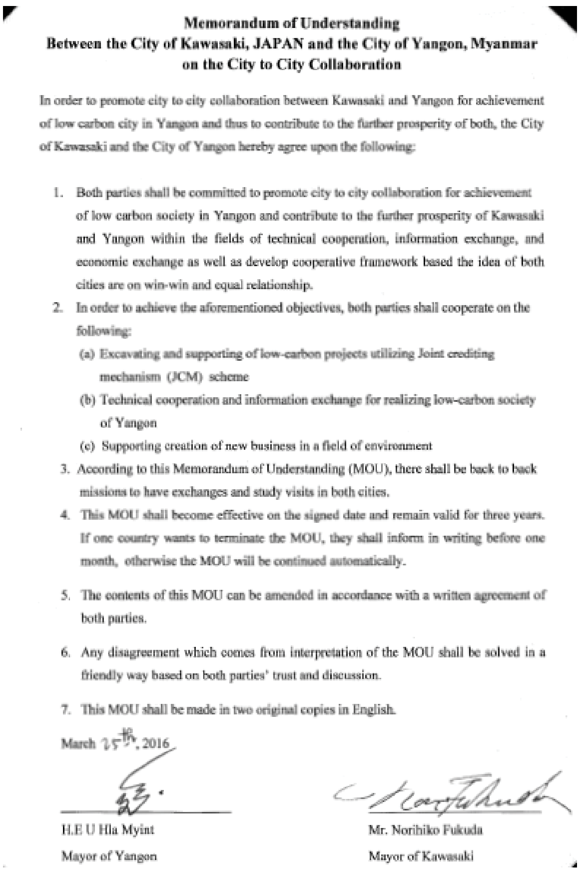
Building up "Trust" and "Mutual Understanding"


City-to-city collaboration workshop held in Yangon city hall

JCM City-to-City Collaboration Project (2015)

City News article

Achievement: MOU between Kawasaki and Yangon (2015)



Memorandum of Understanding
Between the City of Kawasaki, JAPAN and the City of Yangon, Myanmar
on the City to City Collaboration

In order to promote city to city collaboration between Kawasaki and Yangon for achievement of low carbon city in Yangon and thus to contribute to the further prosperity of both, the City of Kawasaki and the City of Yangon hereby agree upon the following:

1. Both parties shall be committed to promote city to city collaboration for achievement of low carbon society in Yangon and contribute to the further prosperity of Kawasaki and Yangon within the fields of technical cooperation, information exchange, and economic exchange as well as develop cooperative framework based the idea of both cities are on win-win and equal relationship.
2. In order to achieve the aforementioned objectives, both parties shall cooperate on the following:
   (a) Excavating and supporting of low-carbon projects utilizing Joint crediting mechanism (JCM) scheme
   (b) Technical cooperation and information exchange for realizing low-carbon society of Yangon
   (c) Supporting creation of new business in a field of environment
3. According to this Memorandum of Understanding (MOU), there shall be back to back missions to have exchanges and study visits in both cities.
4. This MOU shall become effective on the signed date and remain valid for three years. If one country wants to terminate the MOU, they shall inform in writing before one month, otherwise the MOU will be continued automatically.
5. The contents of this MOU can be amended in accordance with a written agreement of both parties.
6. Any disagreement which comes from interpretation of the MOU shall be solved in a friendly way based on both parties' trust and discussion.
7. This MOU shall be made in two original copies in English.

March 25th, 2016

H.E U Hla Myint
Mayor of Yangon

Mr. Norihiko Fukuda
Mayor of Kawasaki

August 2015: Start of city-to-city collaboration

October 2015: 1st Visit to Yangon-city

December 2015: Discussion on Draft MOU at Yangon-city

January 2016: Workshop on City-to-city collaboration at Yangon-city

March 2016: Concluding MOU between Kawasaki city and YCDC

Workshop for city-to-city collaboration at Yangon

JCM City-to-City Collaboration Project (2016)

Yangon City (YCDC)

Pollution control & Cleansing Dept.
City Planning & Land administration Dept.

City-to-city collaboration regarding the JCM project formation

Kawasaki City

Economic and Labor Affairs Bureau

JCM project formulation with regional government' support

Private entities in Yangon city

Myanmar company [Project participant]	Installation of high efficiency boiler in the factory	Japanese company [Project participant]
Myanmar company [Project participant]	Solar power project to install public facilities in YCDC	Equipment manufacturer [Supplier]
Myanmar company [Project participant]	Energy efficiency project in YCDC facilities	Equipment manufacturer [Supplier]

JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city

Private entities in Kawasaki city

Ongoing JCM Model Project (2016):
Installation of Solar Power Generation Device in Public Facility in Yangon

Selection of Solar PV Generation Pilot Project of YCDC Facility

- Selection of Pilot Project Site:
  - (1) Interview Survey → (2) Site Survey → (3) Document Review
- Criteria for Selection: Needs, Demand, Location

Candidate	Status	Load	Selection result
Nyaung Hnit Pin	-Peak 7MW, off-peak 6.8 Nw, 24 hr operation -1st phase 2014, 2nd phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1st priority: PV possible to supply LV side. (110 kW x 4 unit of lift-up pump) For HV side, further study necessary.
Hlawga	- 24hr, fixed demand - 1MW x 2nos, 6.6 kV - Pump installation in 2008	2 MW	2nd priority: Under partial update (new electric board has mismatch of interface). →It will take time until PV connection study becomes possible.
La Gun Byin	132kWx6+25 kWx6 + 30 kWx4, 400V Peak 450 kW, off-peak 350 kW	450 kW	Too small, remote

Pilot Project Site: Nyaung Hnit Pin Water Purification Plant

← Electric Room (PV –related Equipment can be stored)

Pump Room →

← Candidate PV Module Area

Photo Voltaic (PV) System Concept

< PV System on Planning >

- Solar PV Energy sent to YESC (Yangon Electric Supply Company) grid
- YCDC purchase Electricity from YESC grid
- Net Metering : Tariff Payment = Energy used – PV generated

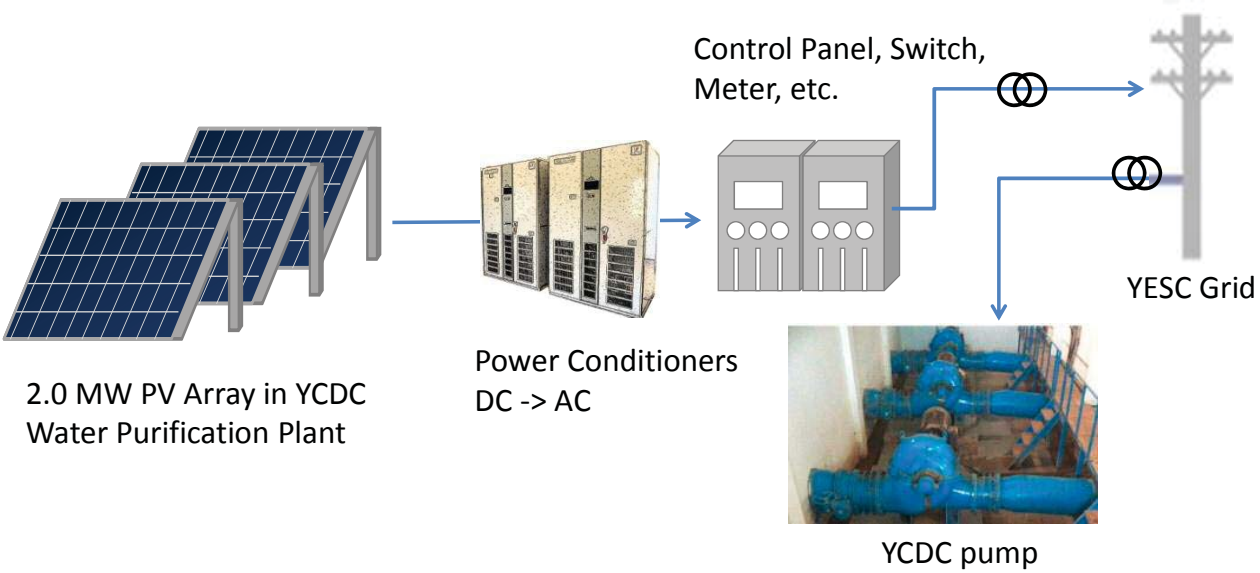
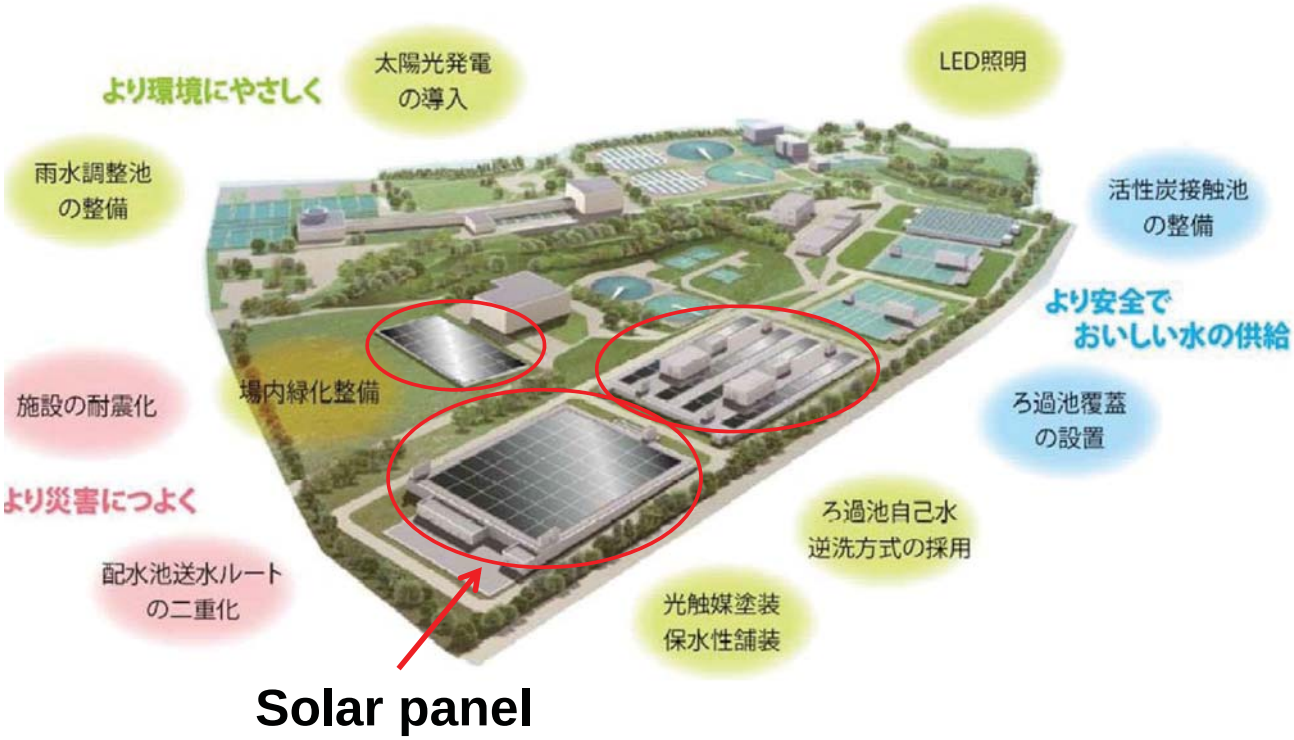


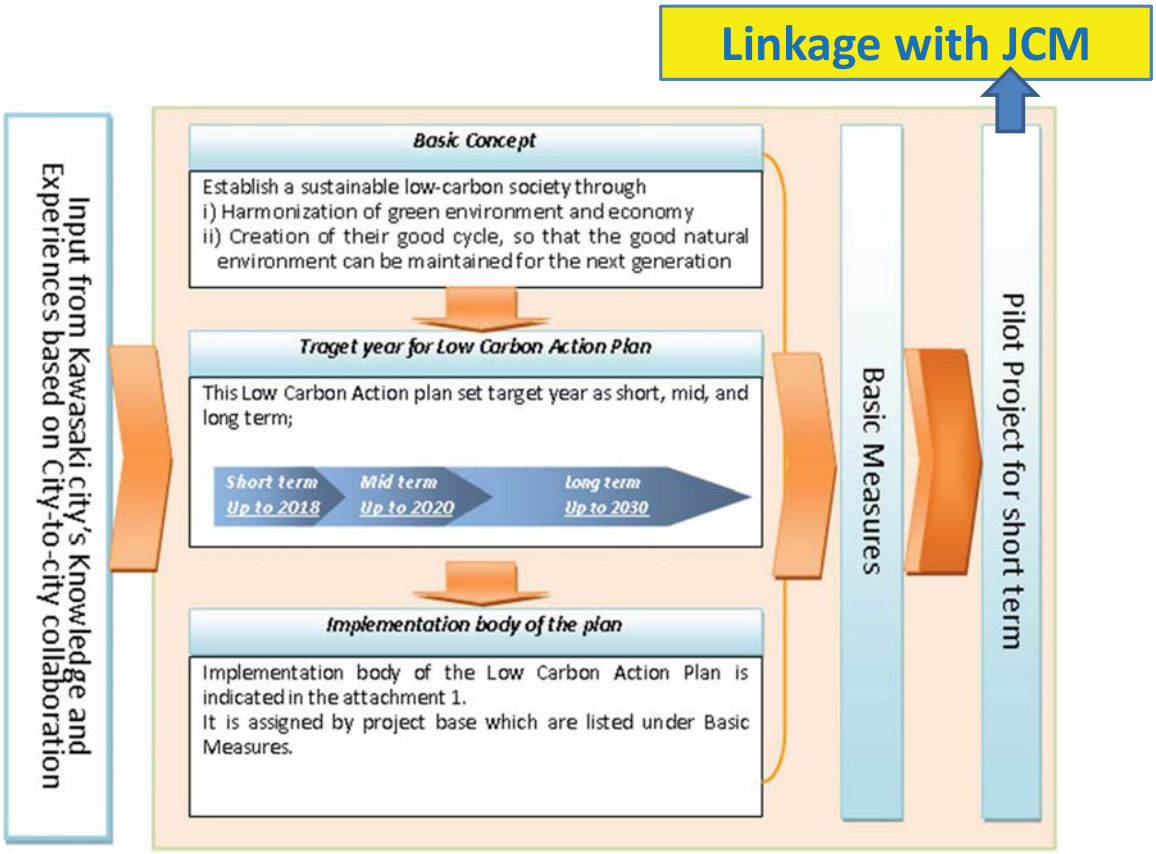
Image of installation of solar power generation device in public facility:

Nagasawa Water Purification Plant in Kawasaki

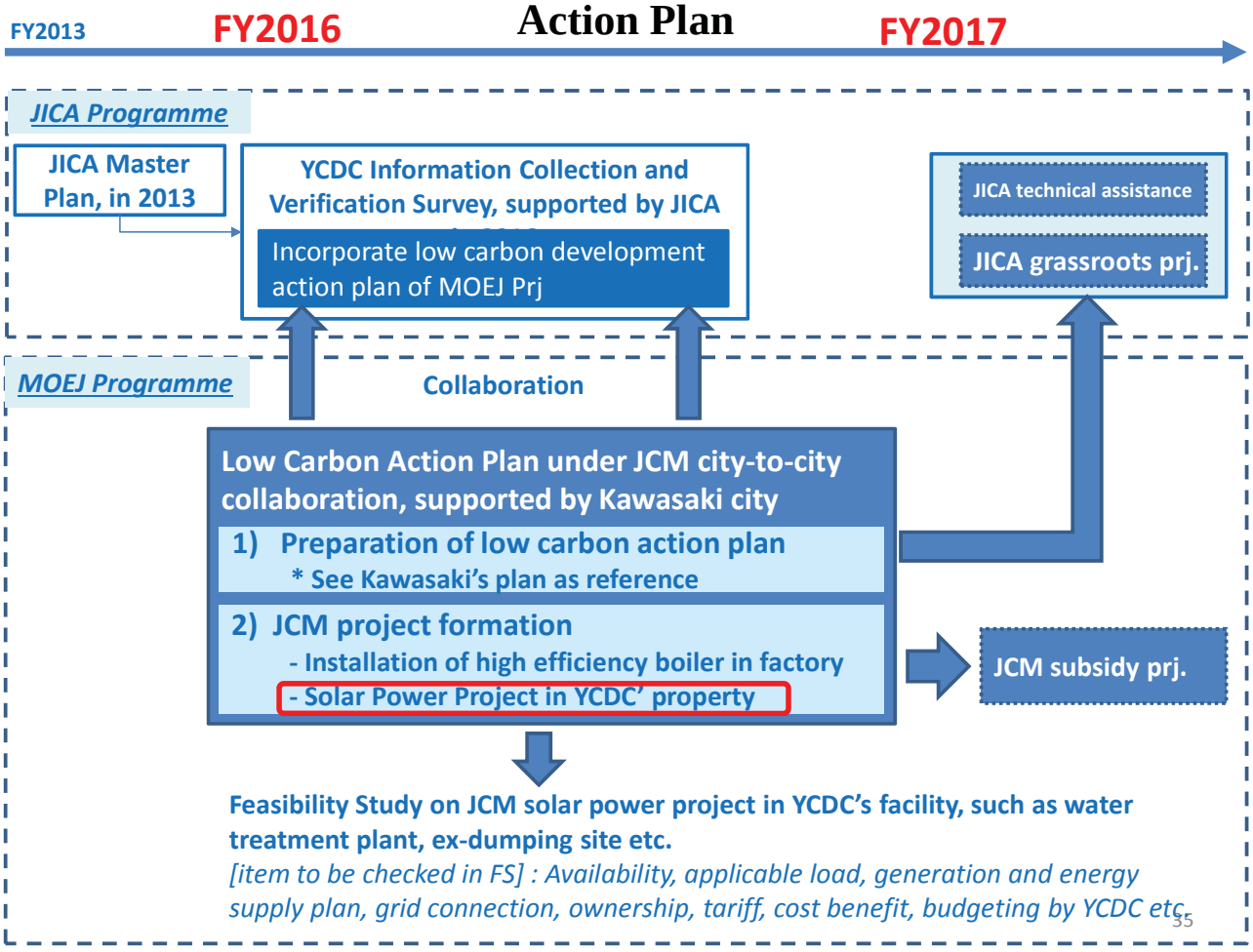
Image of installation of solar power generation device in public facility:
Nagasawa Water Purification Plant in Kawasaki



Preparation of Low Carbon Action Plan in Yangon (2016)



Action Plan



Potential of City-to-City Collaboration in the future (1)

Low Carbon Society	• Eco town planning and sharing experience • Introduction of energy saving products/technologies from Japanese private entities • Support on Private sector collaboration, such as Kawasaki Chamber of Commerce and Industry etc. • Support on capacity development through JICA scheme etc.
Monitoring	• Support on system development on car exhaust/air pollution/water quality / soil condition, including analysis know-how
Solid Waste	• Planning/implementation of solid waste collection system • Planning/implementation of garbage separation program • Planning/implementation of compost promotion program • Knowledge sharing of industrial waste management • Establishment of solid water database etc.

Potential of City-to-City Collaboration (2)

Water supply /Sewerage	• Sharing of management knowledge on water supply / sewerage system • Sharing of water tariff collecting / water quality management knowledge
Education	• Planning / implementation of environmental education programs
Other options	• Implementation of site tour on Kawasaki eco town etc. • Establishment of Environmental Impact Assessment (EIA) system

+

Introduction of Japanese Advanced Products and Technologies in terms of “Low Carbon” or “Zero Carbon”

Future Direction of JCM City-to-City Collaboration Project between Kawasaki and Yangon

- To promote City-to-City Collaboration between Kawasaki and Yangon city, and have to share **Future Vision of Low Carbon Development of Yangon-city**

- To support and promote **JCM Project by selecting Pilot Project in the Low Carbon Action Plan**

- To promote **Technology Transfer to Yangon-city supported by JCM scheme**

Thank you for your kind attention.

3.　招聘・セミナー関連資料

3-4　計画財務大臣川崎招聘関連資料

H.E. U Kyaw Win

(Union Minister, Ministry of Planning and Finance)

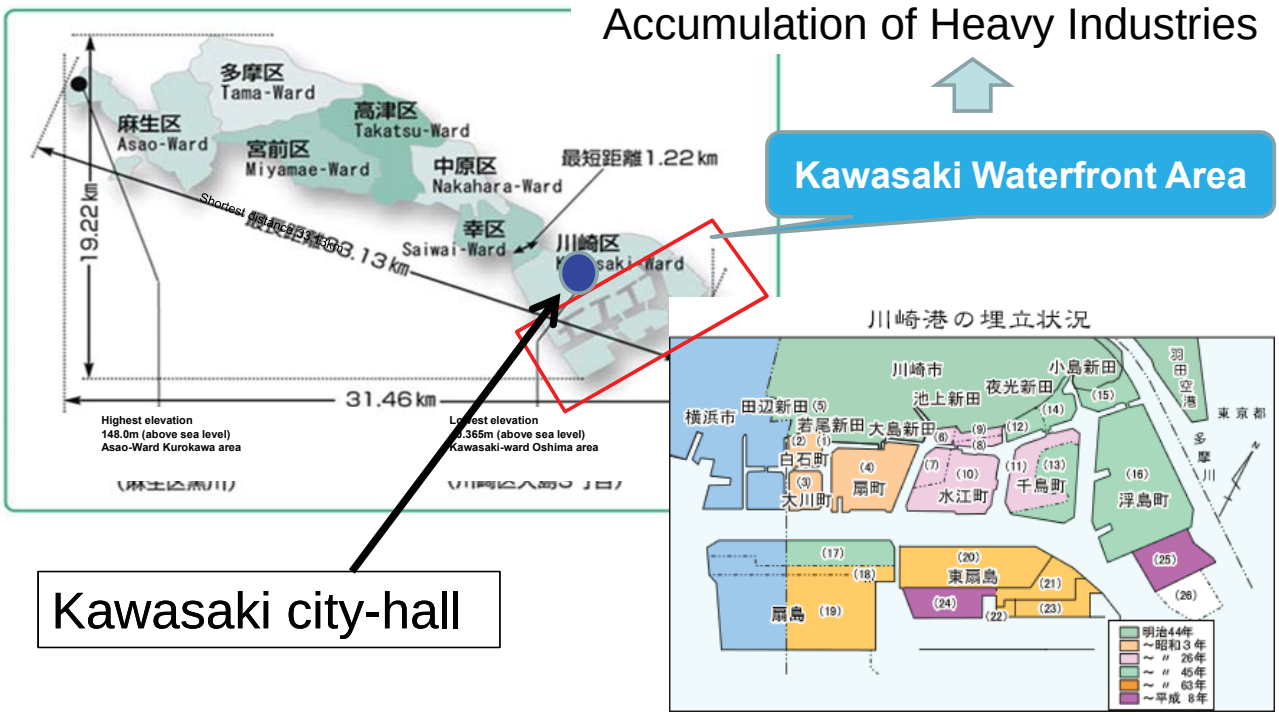
Site Visit of Kawasaki Eco-town

December 8th, 2016

Economic and Labor Affairs Bureau
Kawasaki-city

Kawasaki city & Waterfront Area

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km2

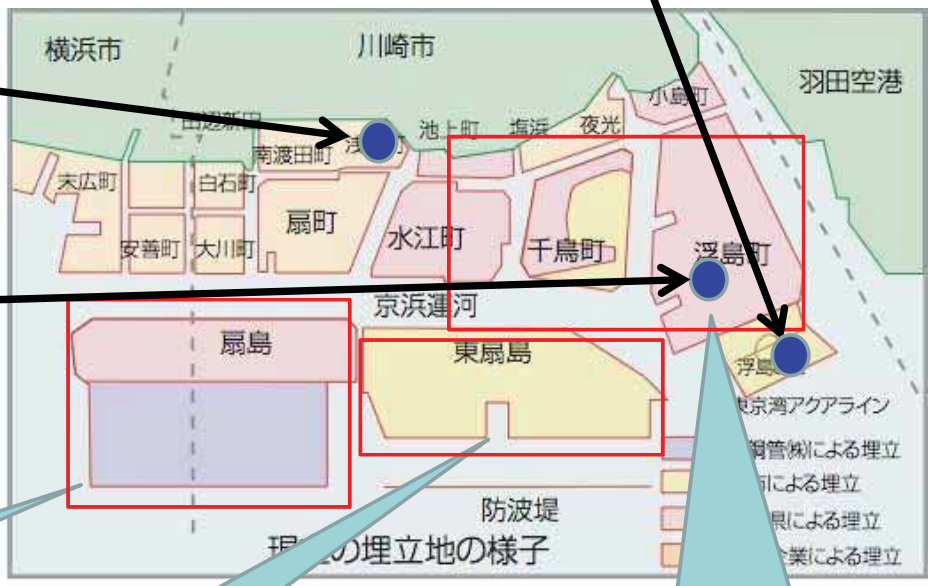


Location of facilities for the site visit

②Ukishima Recycling Facility (& Mega-solar Electric Plant)
Recycling of waste paper and plastic generated from household

①YAMANAKA
Recycling of waste automobile

③TAKEEI
Recycling of mixed waste generated from demolition site



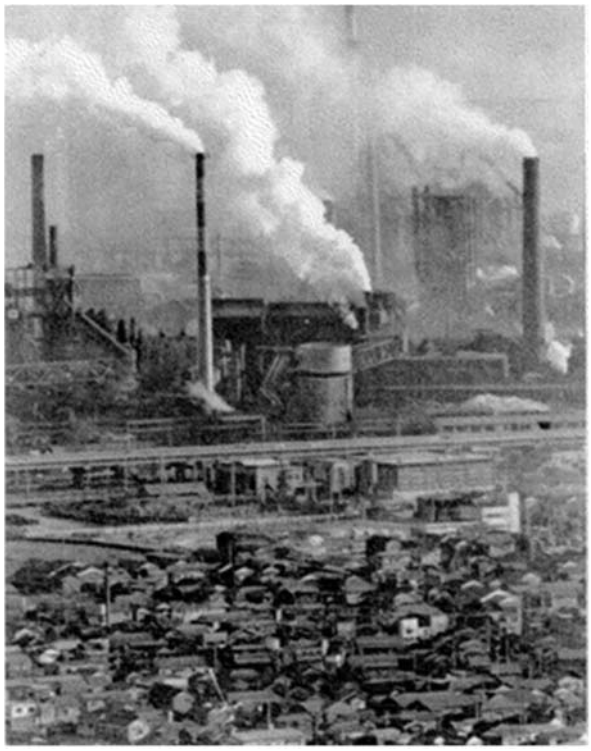
Steel Industry Area

Logistics Area

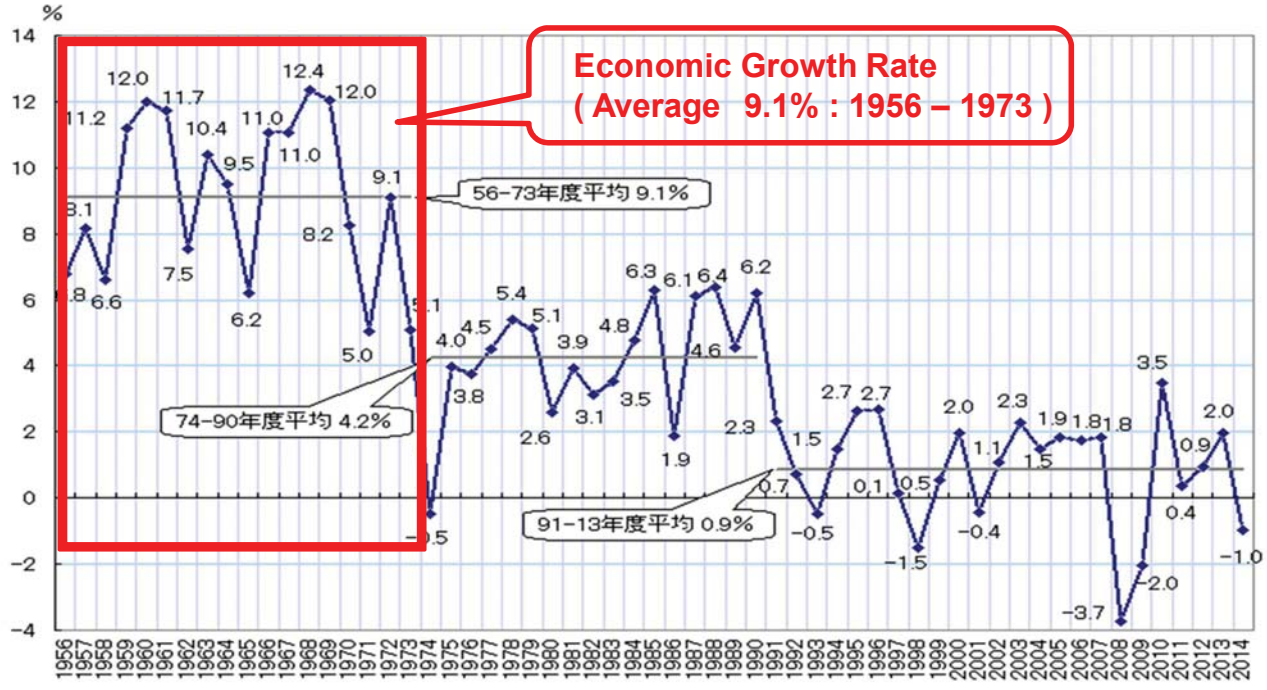
Refine & Petrochemical complex Area

Kawasaki Waterfront Area (1950s-60s)

Rapid Economic growth & Industrial Pollution in Kawasaki (1960-70)



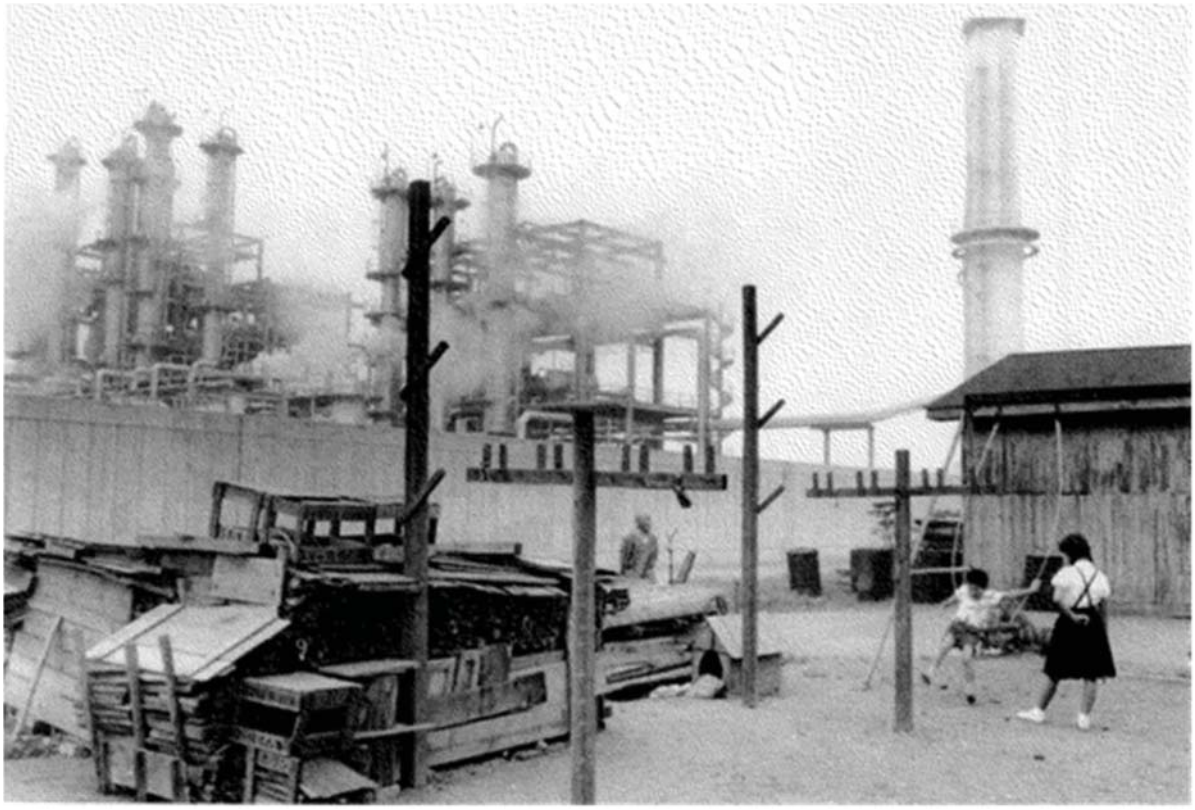
Economic Growth Rate in Japan



（注）年度ベース。93SNA連鎖方式推計。平均は各年度数値の単純平均。1980年度以前は「平成12年版国民経済計算年報」（63SNAベース）、1981～94年度は年報（平成21年度確報）による。それ以降は、2015年7–9月期2次速報値 <2015年12月8日公表>

（資料）内閣府SNAサイト

Factories nearby Residential Area in Kawasaki (1970)



Tama-River (1970)

Air Pollution over Kawasaki Waterfront Area (1960)

Current Landscape of Tama-River (2016)

Current Landscape over Kawasaki Waterfront Area (2016)

Efforts to overcome Pollution Problems

Local Business

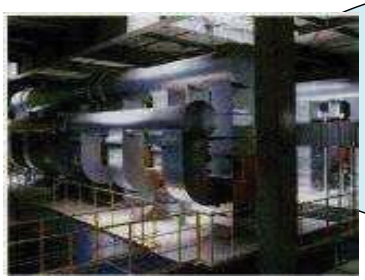
- Investment for pollution control
- Development of pollution control technologies

Citizen

- Civil action against pollution
- Public awareness for environment

Kawasaki-city

- Pollution control agreement with local industries
- Regulation for pollution control
- Pollution monitoring system



"Sharing of Roles" & "Cooperative Action"

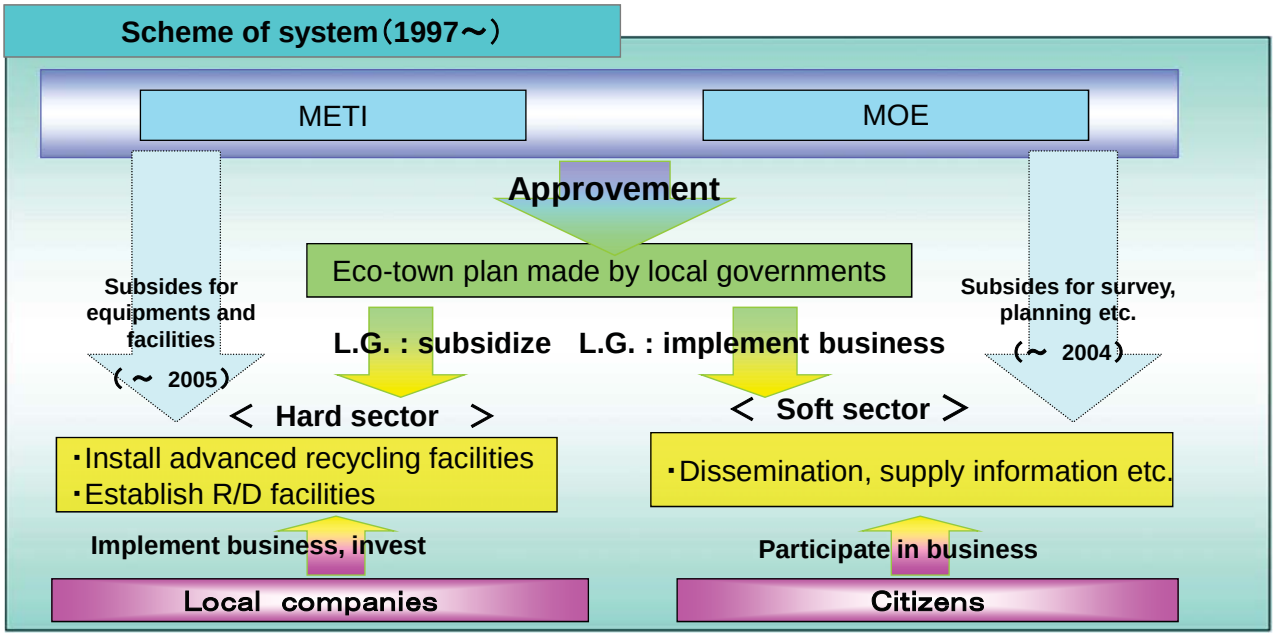
Improvement of Environmental Problems

Kawasaki Eco-town Project

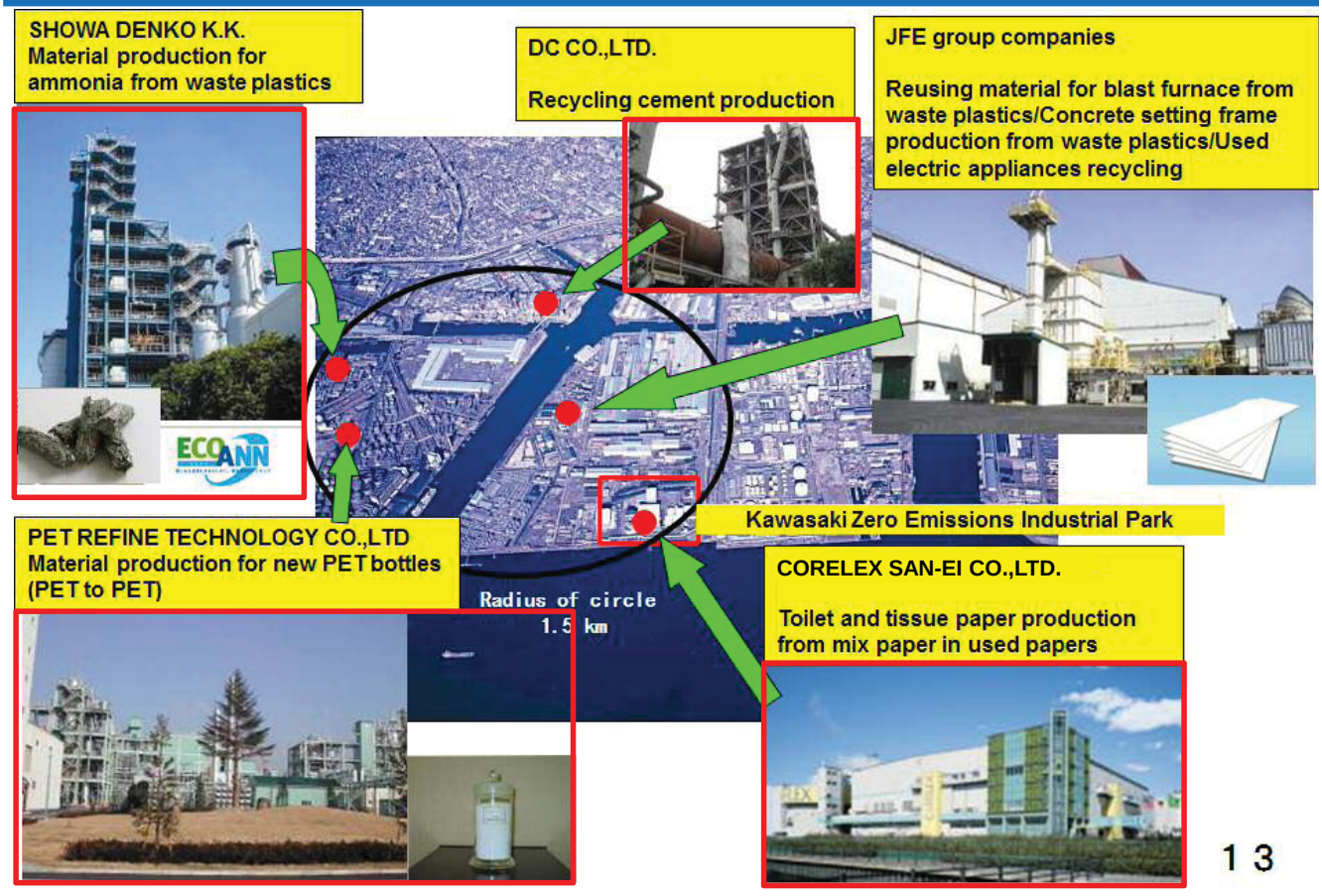
Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

①Promotion of environmental industries on locally accumulated technologies

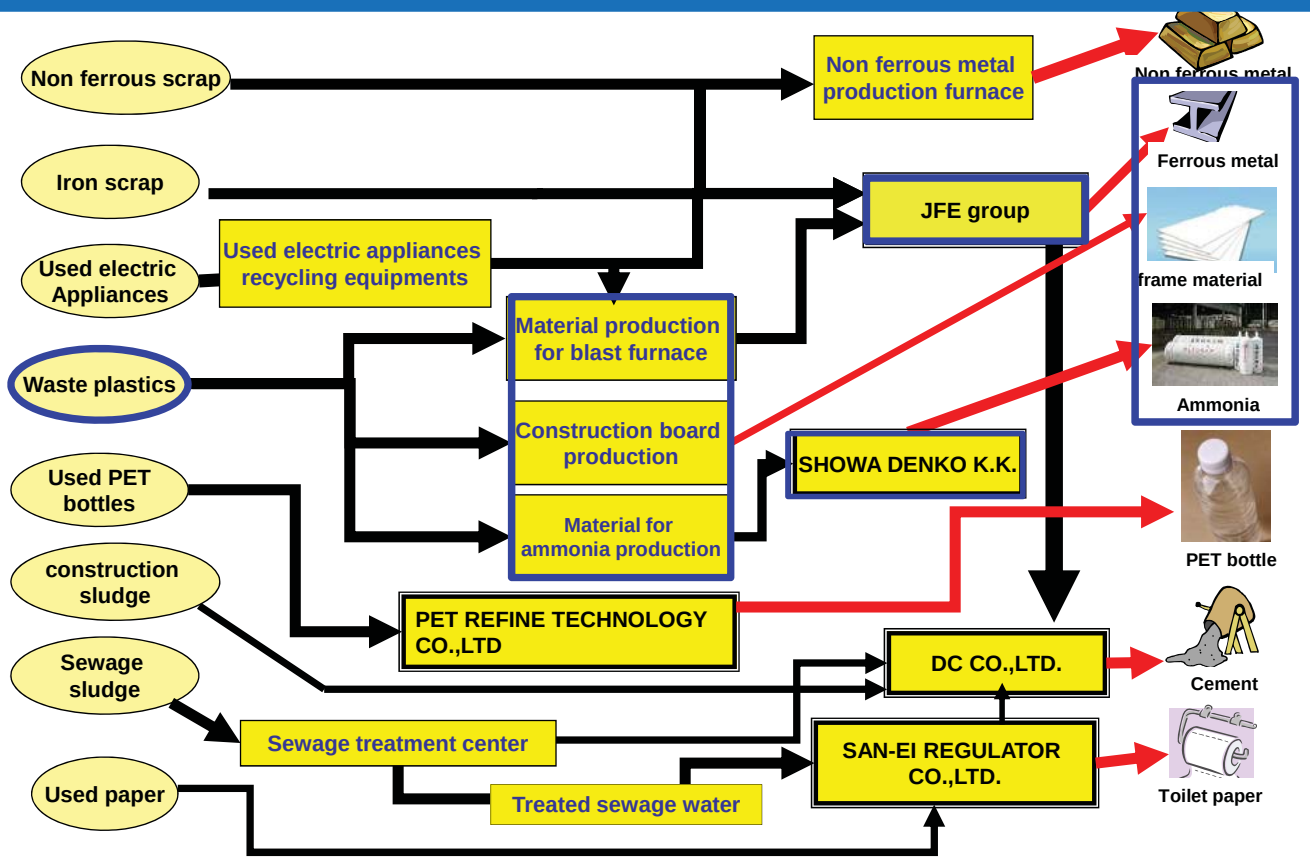
②Formation of resources rcycling economy and society through reducing waste generation and promoting waste recycling on site



Resource Recycling Facilities in Kawasaki Eco-town



Companies' Collaboration in Kawasaki Eco-town



Summary of Kawasaki Eco-town

◆Many different types of industries have been accumulated into Kawasaki Waterfront area, and then

Recycle facilities in Eco-town functioning to process industrial wastes as a raw materials for other industries.

◆Among approved 26 Eco-towns in Japan, Kawasaki Eco-town promotes recycles at a high standard;

Showcase of Resource recycling business and technologies

Visit to Kawasaki city mayor

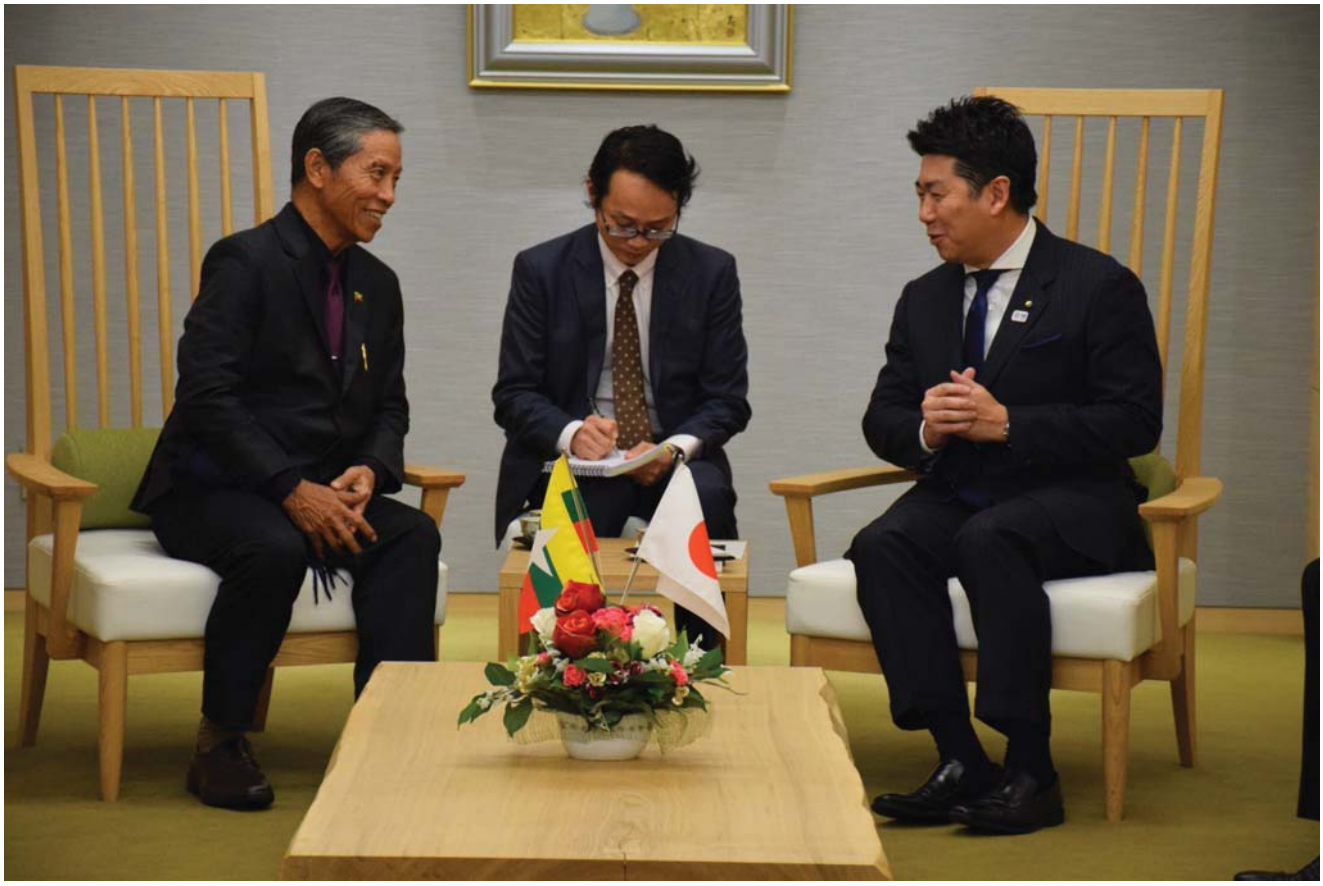


Photo with Kawasaki city mayor, chairman of city council, and chairman of Kawasaki Chamber of Commerce and Industry

Eco-town related facilities tour ①

YAMANAKA: Industrial waste management company of waste automobile

Eco-town related facilities tour ②

TAKEEI : Industrial waste management company of Mixed waste from demolition site

Eco-town related facilities tour ③

Ukishima Resource Recycling facility: Separation of plastics and paper waste from household

Large-scale Solar power generation plant in Kawasaki ④

Large-scale Solar power generation plant in Kawasaki ④

3.　招聘・セミナー関連資料

3-5　東京 JCM セミナー関連資料

JCM Project Formulation Study through City-to-City Collaboration of Yangon City and Kawasaki City

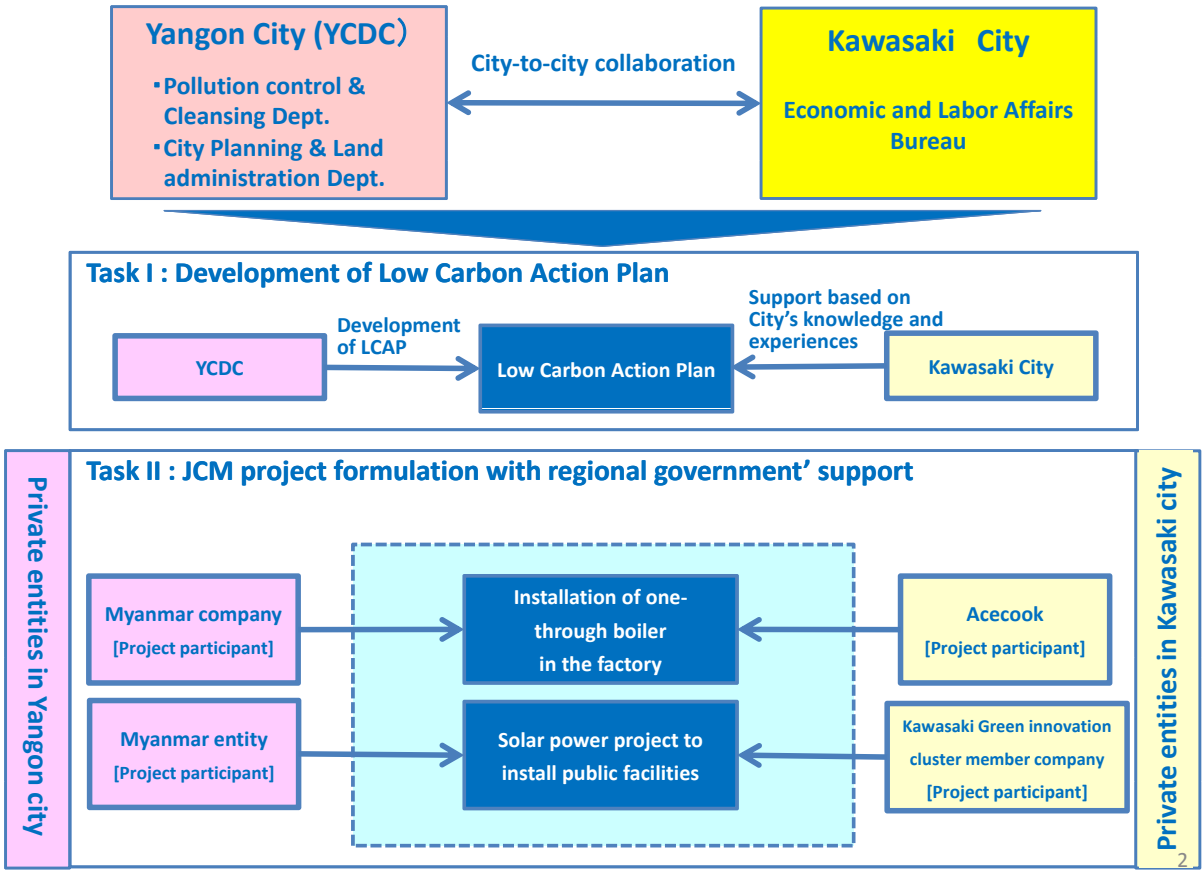
JCM Tokyo Seminar

January 23, 2017

Nippon Koei Co,. Ltd. and Kawasaki City

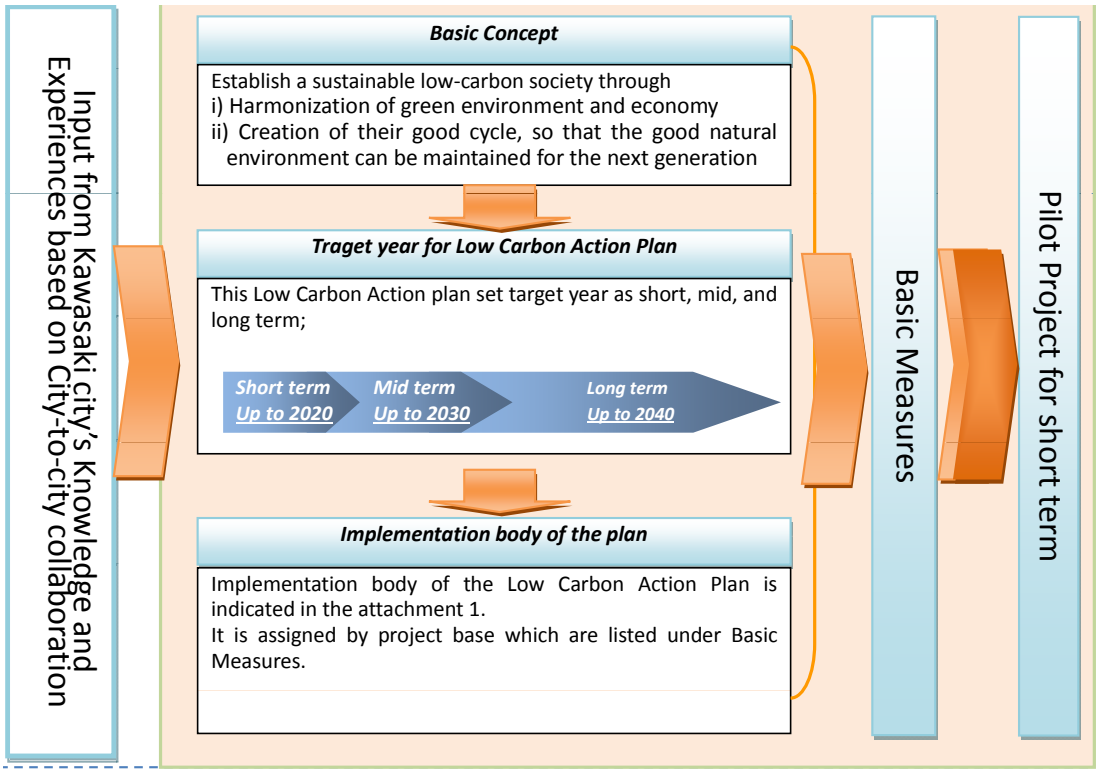
Contents

1. Overview



2. Development of Low Carbon Action Plan (LCAP)

Yangon's "Low Carbon Action Plan" is prepared in corporation with Kawasaki city in order to support development of JCM model projects.



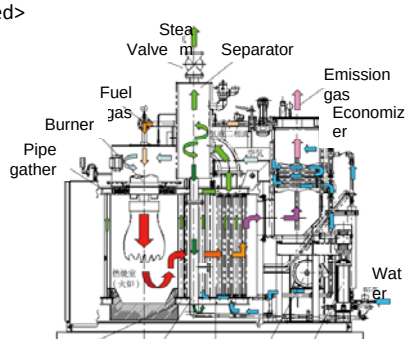
3. Project 1 /Introduction of Once-through Boiler - Outline -

➢Outline of the project

For energy saving, drum-less boiler of high-efficiency and low air pollutant emission type is installed in a food factory Thilawa SEZ. Diesel oil consumption and emission of CO2 and air pollutant is reduced by the boiler.

<Technologies to be installed>
- One-through boiler

Image of One-through boiler

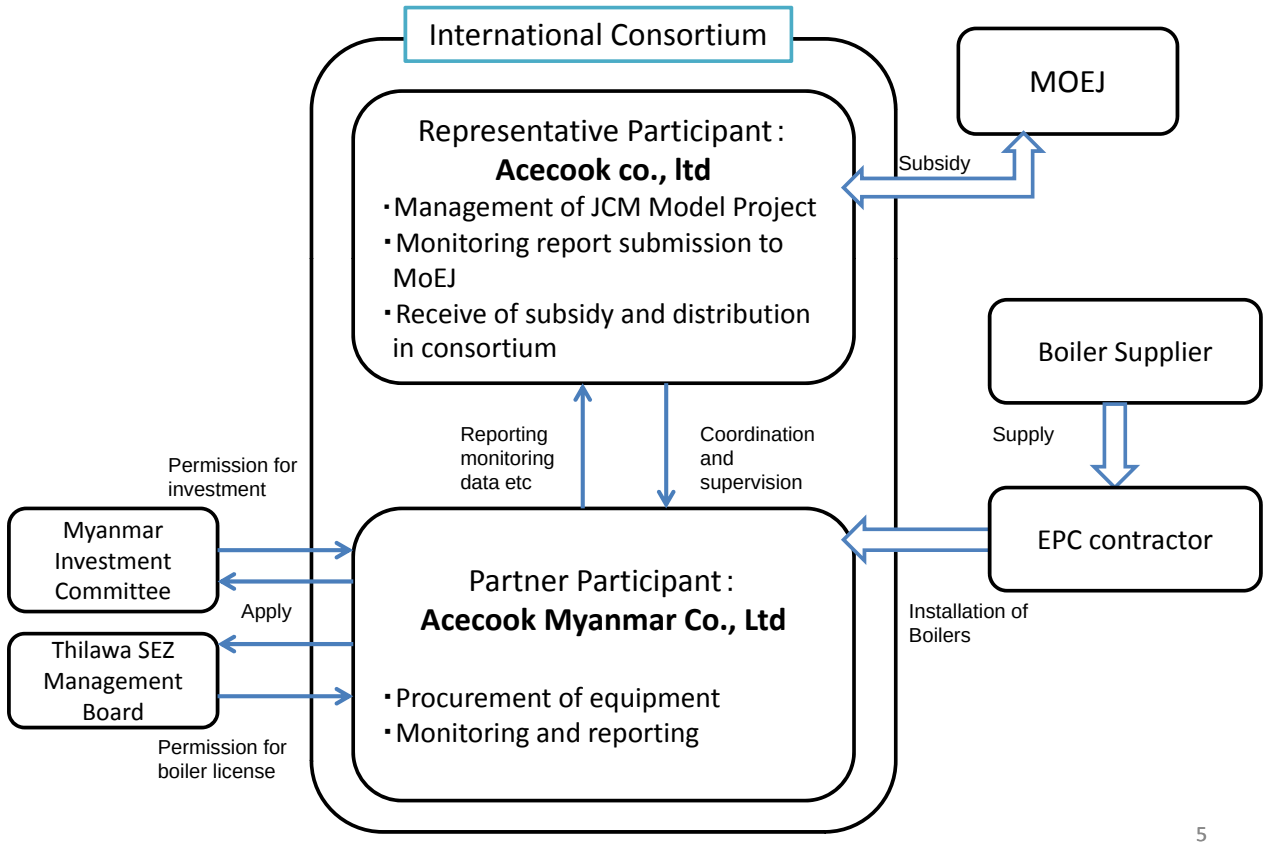


System chart

The proposed JCM model project was adopted **as JCM model project in September 2016** and initiated from October 2016.

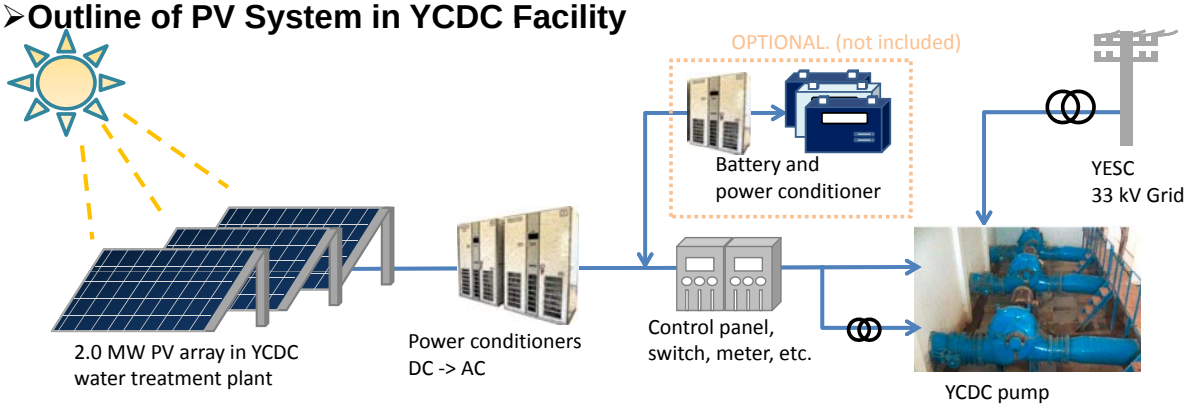
Introduced technology	• One-through Boiler, 2 t/h x 6 units = 12 t/h (rated capacity) • The boiler has the nature of low NOx as well as energy saving
Estimated GHG emission reduction	674[tCO2 per year]
Implementation period	Initiated from October 2016

3. Project 1 /Introduction of Once-through Boiler -Implementation structure-



4. Project 2/Solar PV Generation Project- Outline-

➢**Outline of PV System in YCDC Facility**



Project Summary

- Introduction of Solar PV system into YCDC pumping station and use generated electricity for pump operation
- Project owner; YCDC Water & Sanitation Dept.

Item	Value
Solar Irradiation (Average)	4.69 kWh/m2/d
Planned capacity (Tentative)	2,054 kWp
Annual generation energy	2.96 GWh (approx. 8% of consumption)
Annual saving	2.6million JPY
GHG emission reduction	1,100 ton-CO2

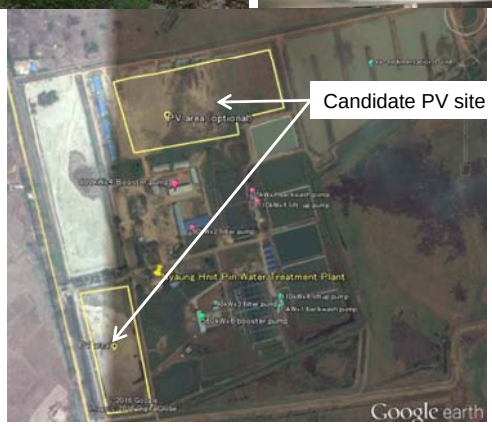
4. Project 2/Solar PV Generation Project - Site selection-

Site Selection

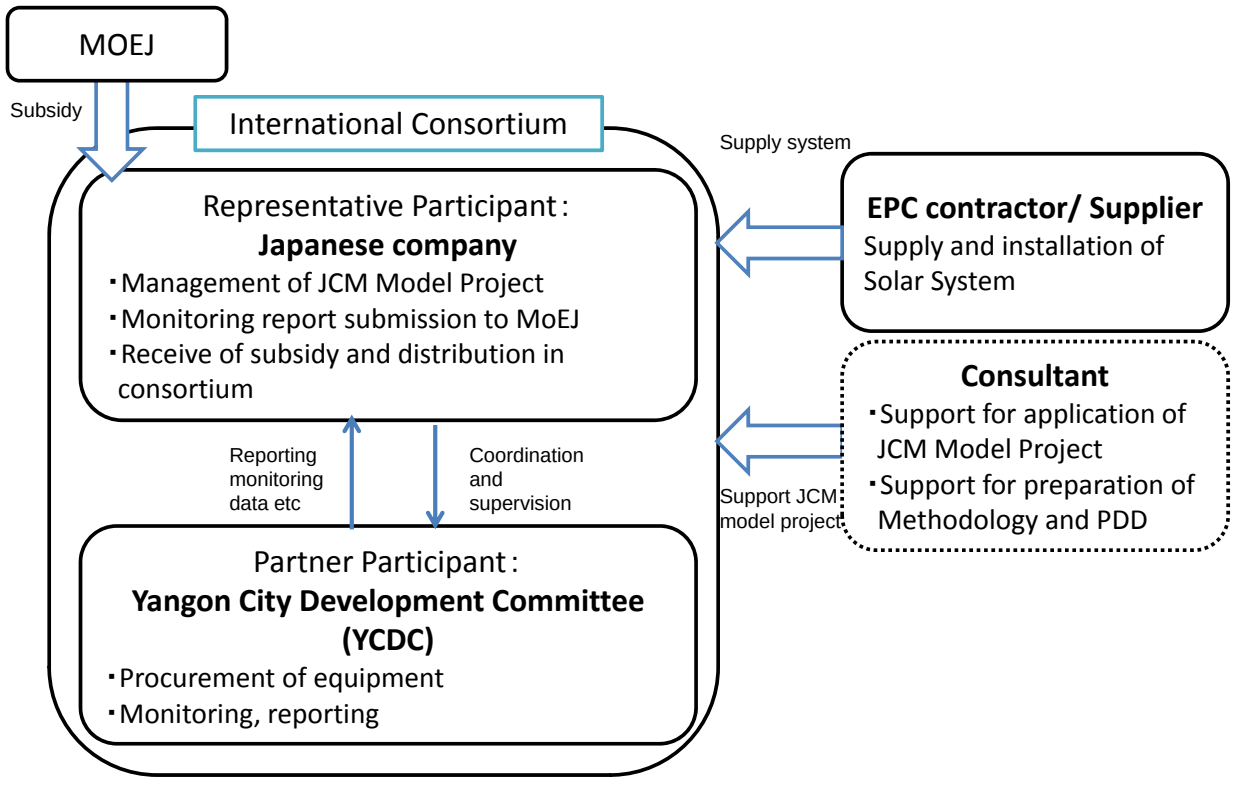
Nyaung Hnit Pin Water Treatment plant was selected as the PV generation project site from three candidate sites considering feasibility of project implementation

Basic information of Nyaung Hnit Pin WTP

- located at 44km from Yangon city center
- Water pump 560kw x 6unit, 800kw x 4 unit
- Power consumption at Peak time 7MW, at off-peak 6.8 MW
- Operation 24 hours



4. Project 2/Solar PV Generation Project- Implementation Structure-



5. Issues and Further Action

➢ *Issues and Further Action for coming fiscal year*

1)Low Carbon Action Plan(LCAP)

- In this study, Draft LCAP is prepared and <u>needed to formulate</u> LCAP getting consensus through relevant sectors

- As further step, <u>finalizing Draft of LCAP and preparing official formulation</u> toward coming fiscal year
- In the next year, it plans to formulate LCAP and <u>start pilot projects which are selected for priority projects by YCDC</u>

2) JCM model project

- <u>Preparation of budget and authorization of the project in YCDC</u> are needed until it apply to JCM model project.
- Preparation of applying for JCM model project for coming fiscal year internal authorization of project implementation in YCDC, and budgeting are proceeded continuously discussing with project participants.

4.　案件組成技術資料

4-1　事業候補地

33ｋＶ受電

33ｋＶ/6600Ｖ

電気室／配電

電気室内

電気室

増設スペース

改造スペース有

２期ポンプハウス

浄水池

二期ポンプハウス

オペレータデスク

オペレータデスク

ポンプ

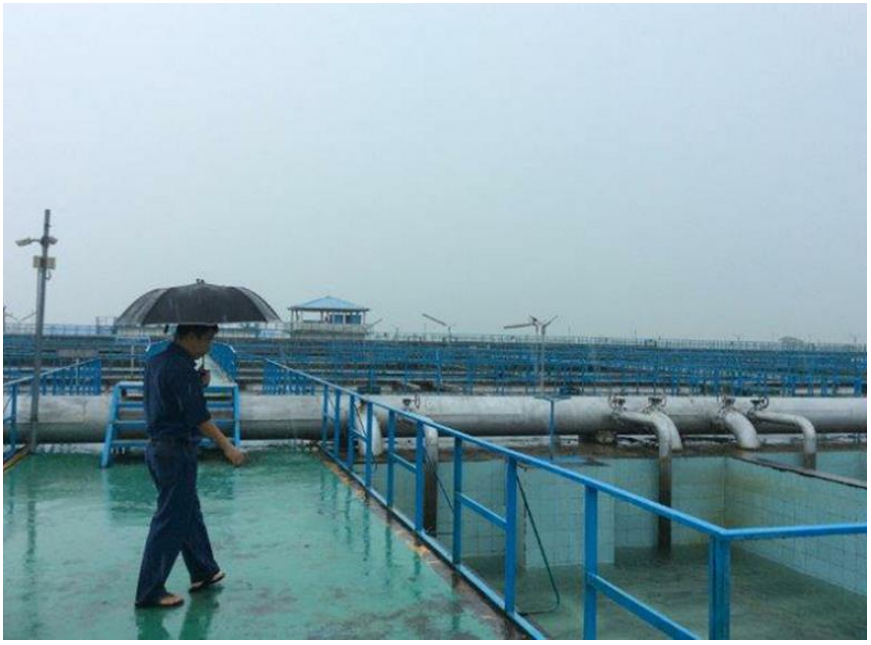
施工写真

施工：Han Sein Thant Engineering

treated water reservoir

Back Wash Pump Station

treated water reservoir



LOW LIFT pump house

Ｙ－Δ起動盤

低圧配電盤

低圧ポンプ

自主メンテしてるが、

環境は非常に悪い

起動盤

正面

１期：旧ポンプハウス

右

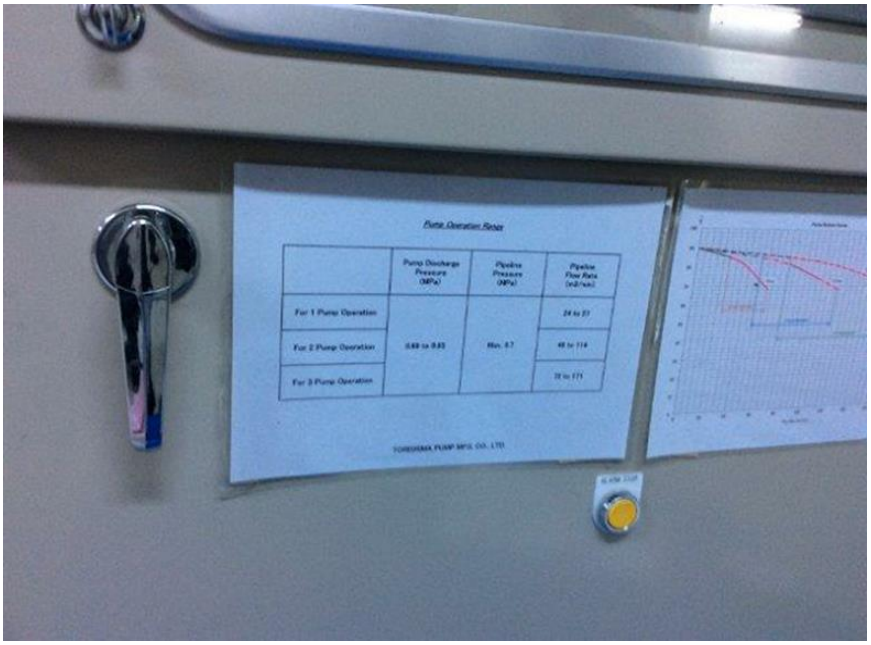
１期：新ポンプハウス

１期：旧ポンプハウス

接地盤

ポンプ起動盤

同上



モニタリングパネル

盤内

盤内

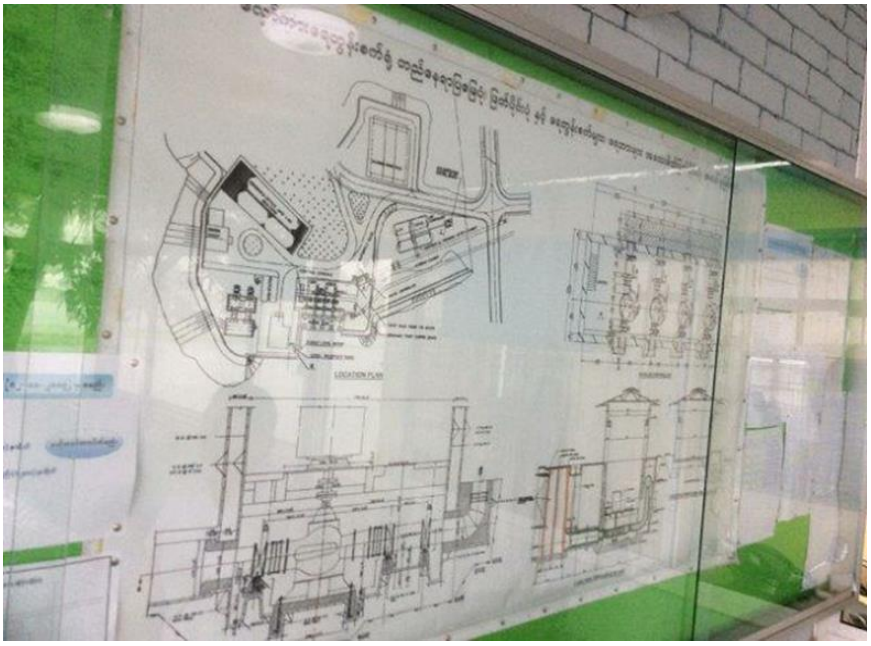
ポンプ起動盤

酉島製作所　ポンプ

敷地内

ＰＶ候補地

ＰＶ候補地



Ｈｌａｗｇａｒ

全体図

Ｈｌａｗｇａｒ

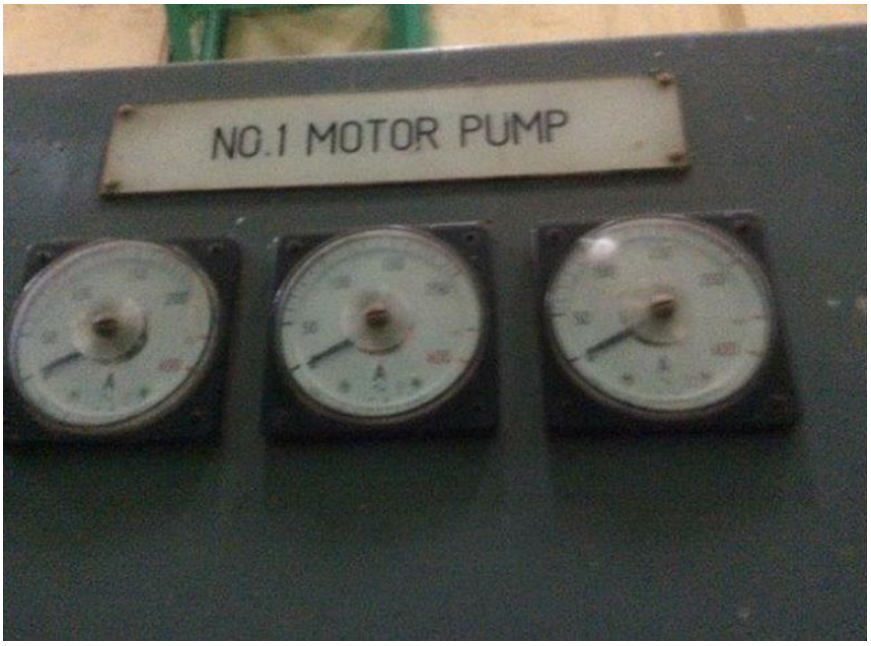
ポンプ室

シュナイダー社製

ポンプ盤

Ｈｌａｗｇａｒ

ポンプ



Ｈｌａｗｇａｒ

Hlaw Gar

Hlaw Gar

33ｋＶ盤

Hlaw Gar

33ｋＶ盤

Hlaw Gar

6.6ｋＶ受電盤

Hlaw Gar

変電所

Hlaw Gar

受電所

4.　案件組成技術資料

4-2　導入技術カタログ

オフィスビルから大規模プラントまで。
規模や条件に応じたシステムをご提案いたします。

▶ 公共·産業用太陽光発電システム

気温計·日射計

気温や日射量などのデータの計測に用いる機器となります。

気温計　日射計

オペレーション&メンテナンスサービス

太陽光発電所を長期にわたり安定した運用サポートを致します。

1 太陽電池モジュール

太陽の光エネルギーを受けて、直流電力を発生させます。

2 接続箱

発電した直流電力はここでまとめられ、パワーコンディショナに送られます。

壁掛け

※平置きもございます

3 パワーコンディショナ

太陽電池モジュールで発電した直流電力を、交流電力に変換します。

4 リチウムイオン蓄電システム

太陽光発電との組み合わせで、停電時の電源確保に威力を発揮します。

5 計測監視専用パソコン

現在の発電量を計測し、データとして集積することができます。

（オプション）

6 表示装置

計測監視専用パソコンのデータをリアルタイムに表示することができます。

（オプション）

屋内用表示装置　屋外用表示装置

2010

スペイン·大規模発電施設にて京セラ製太陽電池約40MW稼働開始

2011 世界初の「長期連続試験」※認証

公共·産業用高出力太陽電池モジュールが、「地球温暖化防止活動環境大臣表彰※」を受賞

※地球温暖化防止に顕著な功績のあった個人や団体の功績をたたえるため、1998年より環境省が毎年実施しているもの。

世界有数の第三者認証機関、テュフ ラインランド（本社ドイツ）が、太陽電池性能品質テストとして実施する「長期連続試験」において、世界で初めて※、京セラの多結晶シリコン型太陽電池モジュールが認証される

※一般的な国際基準であるIEC（国際電気標準会議）よりもさらに厳しい条件下で、約1年間にわたり連続した試験を行う総合的な太陽電池性能品質テスト。2011年1月認証。

2013

鹿児島七ツ島メガソーラー発電所にて京セラ製太陽電池70MW稼働開始

2014

多結晶シリコン太陽電池セルの量産レベルにおいて、世界最高クラス変換効率18.6%※を達成

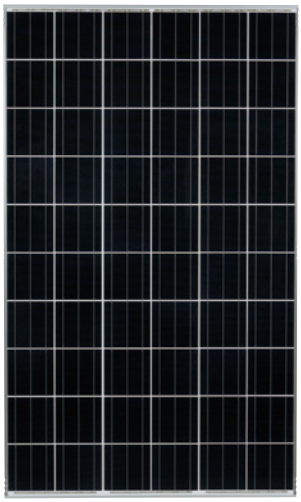
※当社調べ（2014年2月）。

2015

公共産業用リチウムイオン蓄電システム販売開始

選べる多彩なラインナップ

高効率多結晶シリコン太陽電池モジュール



メガソーラーに対応した大型モジュール

公称最大出力
270W

型式：**KK270P-3CD3CG**
セル実効変換効率：**18.4%**
モジュール変換効率：**16.4%**
外形寸法(W)×(L)×(H)：1662mm×990mm×46mm
質量：19.0kg

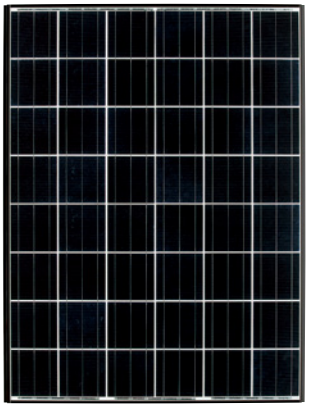
公称最大出力
265W

型式：**KK265P-3CD3CG**
セル実効変換効率：**18.1%**
モジュール変換効率：**16.1%**
外形寸法(W)×(L)×(H)：1662mm×990mm×46mm
質量：19.0kg

陸屋根等に適した
レギュラーモジュール

公称最大出力
238.1W

型式：**KK2381P-3CD4CG**
セル実効変換効率：**18.1%**
モジュール変換効率：**16.0%**
外形寸法(W)×(L)×(H)：1500mm×990mm×46mm
質量：17.5kg

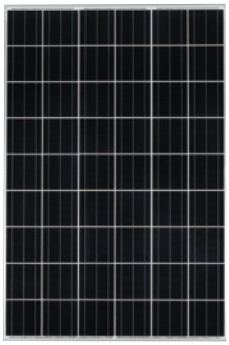


傾斜屋根に適した
レギュラーモジュール

公称最大出力
200W

型式：**KK200P-3CRCG**
セル実効変換効率：**17.1%**
モジュール変換効率：**14.7%**
外形寸法(W)×(L)×(H)：1338mm×1012mm×36mm
質量：16.5kg

積雪地域対応



積雪2mまでの
地域に設置可能

公称最大出力
233W

型式：**KK233P-3CG3CG**
セル実効変換効率：**17.7%**
モジュール変換効率：**15.6%**
外形寸法(W)×(L)×(H)：1500mm×990mm×46mm
質量：19.0kg

特別注文用太陽電池モジュール

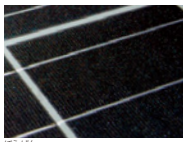
お客様のオーダーに細やかに対応できるよう、
製品の機能バリエーションを充実させています。

▶ 防眩(ぼうげん)タイプ
ガラスに当った太陽光の反射を散乱させることにより、一箇所への反射を抑制します。
高速道路や空港施設などに多く採用されています。

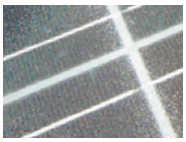
▶ 高耐荷重タイプ
モジュールフレームを強化する事で、耐荷重性能を高めました。積雪地域などへ採用されています。

▶ 塩害地域タイプ
塩害地域への設置をご検討されている場合、塩害対策仕様もございます。

▶ 独立電源用太陽電池モジュール
街灯や自動販売機などの電源として、ご利用頂いております。



防眩(ぼうげん)モジュール



一般モジュール

中部国際空港株式会社様

上市町立宮川小学校様
(富山県)

●本文中の「公称最大出力」は、JIS C8990で規定するAM1.5、放射照度1,000W/㎡、モジュール温度25℃での値です。「セル実効変換効率(%)」は[モジュール公称最大出力(W)×100]÷[1セルの全面積(㎡)×1モジュールのセル数(個)×放射照度(W/㎡)](放射照度=1,000W/㎡)、「モジュール変換効率(%)」は[モジュール公称最大出力(W)×100]÷(モジュール面積(㎡)×放射照度(W/㎡)](放射照度=1,000W/㎡)、で算出しています。

京セラの長期信頼性

太陽光発電の長期信頼性・耐久性を実証

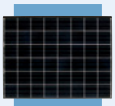
京セラは、1984年に「佐倉ソーラーエネルギーセンター」（千葉県・佐倉市）を設立。同センターに設置された多結晶シリコン型の太陽光発電システムは現在も稼働し続けており、当時からの高い技術と長期信頼性を実証しています。

佐倉ソーラーエネルギーセンター

▶「長期連続試験」※1認証を取得

テュフ ラインランド（本社 ドイツ）の「長期連続試験」において、世界で初めて※1、京セラの多結晶シリコン型太陽電池モジュールが認証されました。

1枚の同じ太陽電池で連続して全試験実施



耐久力マラソン
試験期間：約12ヶ月

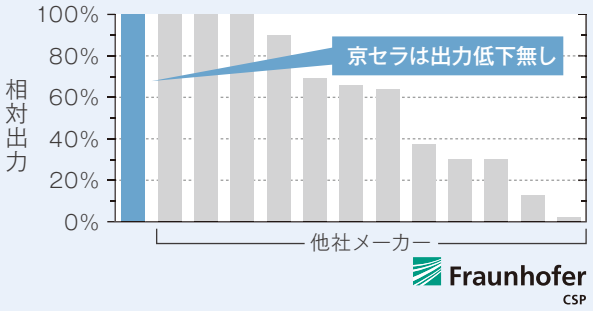
		国際基準比
高温高湿試験	2,000時間	×2倍
温度サイクル試験	400サイクル	×2倍
結露凍結試験	40 サイクル	×4倍
バイパスダイオード温度試験	1時間+1時間	×1回

※1：一般的な国際基準であるIEC（国際電気標準会議）よりもさらに厳しい条件下で、約1年にわたり連続した試験を行う総合的な太陽電池性能品質テスト。2011年1月認証。

▶耐PID試験で出力低下ゼロ

ドイツの国際研究機関 フラウンホーファー研究機構※2、アメリカの太陽電池試験機関 ピーブイ エボリューションラブズ※3の耐PID試験をクリアしています。

耐PID試験の出力低下率



※2：耐PID（=Potential Induced Degradation）試験。直流電圧1,000V、温度50℃、湿度50%の環境下に48時間置き、初期の出力に対するモジュールの出力低下率を比較。2012年6月認証。

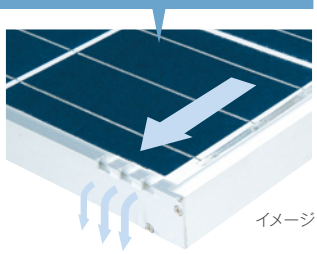
※3：加圧電圧±1,000V、温度85℃、湿度85%の環境下に600時間置き、初期の出力に対するモジュールの出力低下率を比較。2012年11月認証。

▶防汚タイプモジュール※4

低い傾斜角度で設置される場合に適しています

太陽電池モジュールの周囲4辺を構成するアルミフレームの長辺側に凹水切り加工を施し、表面ガラスに付着したホコリを雨水とともに排出します。

京セラ独自のアルミフレーム（特許登録済）



イメージ

※4：採用型式：KK270P-3CD3CG、KK265P-3CD3CG、KK2381P-3CD4CG、KK233P-3CG3CGに標準設定

▶低反射ガラス

太陽電池セルの表面ガラスに、光の透過率を高め、反射ロスを抑える「低反射ガラス」で高い発電量を実現しています。

太陽光発電の買取制度

太陽光発電などの再生可能エネルギーで発電された電気を、電力会社が一定期間、固定価格で買い取る制度注1を利用できます。

その他制度の詳細、申請手続き等については、販売窓口にお問い合わせいただくか、経済産業省のウェブサイトをご覧ください。

▶平成28年度買取価格と期間※5

	10kW以上（全量買取）	10kW未満（余剰買取）	
		出力制御対応機器設置義務なし	出力制御対応機器設置義務あり※6
買取価格	24円/kWh（税抜）	太陽光発電単独 31円/kWh	太陽光発電単独 33円/kWh
買取期間	20年間	10年間	

詳しくは、http://www.enecho.meti.go.jp/category/saving_and_new/saiene/kaitori/

※5：平成28年4月1日から平成29年3月31日までに適用開始された方の買取価格。適用開始初年度の買取価格で10kW以上は同額で20年間、10kW未満は同額で10年間固定ですが、経済産業省で決定される買取価格は年度毎に見直されます。また、10kW以上の場合は余剰買取も選択でき、全量買取と同じ買取価格・期間が適用されます。※6：北海道電力、東北電力、北陸電力、中国電力、四国電力、九州電力、沖縄電力の需給制御に係る区域において、平成27年4月1日以降に接続契約申込みが受領された発電設備は、出力制御対応機器の設置が義務づけられ、これに該当する発電設備については、「出力制御対応機器設置義務あり」の調達価格が適用されます。設置が義務づけられていない場合には、仮に出力制御対応機器を設置したとしても、「出力制御対応機器設置義務なし」の調達価格が適用されます。注1：「電気事業者による再生可能エネルギー電気の調達に関する特別措置法」に基づき実施。

高エネルギー効率で、電力を無駄なく安定供給

パワーコンディショナ（参考例）

HIVERTER-NP203i

型式：HIVERTER-NP203i

大規模発電システムなど
電力系統への
大規模連系に対して、
高い安定性を発揮。

株式会社日立製作所の
製品となります。

500 kW | 三相3線 | 据置き | 屋内

※屋外用（オプション）

SUNNY CENTRAL

型式：SC500CP-10-JP

自己消費電力量が
極めて少なく、
各種運転データ収集も
可能なメガソーラー用。

SMA Solar Technology
AGの製品となります。

500 kW | 三相3線 | 据置き | 屋外

SOLARPACK

型式：SPM250-CS1B

並列運転することにより
メガワットクラスの
大容量システムにも対応。

日新電機株式会社の
製品となります。

250 kW | 三相3線 | 据置き | 屋内/屋外

屋内用

SOLARPACK

型式：SPM100-CS1B

FRT要件を制御電源
供給不要で実現
屋外型の
パワーコンディショナを
ラインナップ

日新電機株式会社の
製品となります。

100 kW | 三相3線 | 据置き | 屋内/屋外

屋内用

ラインバックオメガ

型式：LBBCA-100-T3K-F-A

現地での
力率調整が可能で、
オプションで
自立運転機能も対応可。

株式会社 GSユアサの製品となります。「ラインバックオメガ」は、株式会社GSユアサの登録商標です。

100 kW | 三相3線 | 据置き | 屋内

※屋外用（オプション）

ラインバックΣⅢ

型式：LBBFA-**-T3K-F-A※1

最大5ユニット（50kW）の
構成が可能。オプションで
自立運転・蓄電池搭載も可能。

株式会社 GSユアサの製品となります。「ラインバックΣⅢ」は、株式会社GSユアサの登録商標です。

※1：**には定格出力容量を表す10,20,30,40,50の数値が入ります。

10~50 kW | 三相3線 | 据置き | 屋内

※屋外用（オプション）

ラインバックαⅢ

型式：LBSG-10-T3-F-A

軽量小型で、屋外（壁掛け設置）に
対応しています。

単相3線式（自立運転機能あり）もございます。株式会社GSユアサの製品となります。「ラインバックαⅢ」は、株式会社GSユアサの登録商標です。

10 kW | 三相3線 | 壁掛け | 屋外

エコノライン® RX

型式：PVS-590　多数台連系対応

接続箱・昇圧機能内蔵で機器削減できます。
ファン交換不要のファンレスタイプ。

- 自立運転機能（最大1.5kVA）
- 低騒音化設計（40dB（A特性にて））

＊防塵防水性能IP55

5.9 kW | 単相3線 | 壁掛け | 屋外

エコノライン® EX

型式：PVN-552　多数台連系対応

省スペースで静音設計。
表示が見やすいLEDランプ採用。

- 自立運転機能（最大1.5kVA）
- 低騒音化設計（40dB（A特性にて））

5.5 kW | 単相3線 | 壁掛け | 屋内

小型パワーコンディショナを系統ごとに複数設置。設置・管理がシンプルで、
システム全体の工事量も集中型と比べ軽減されます。

SUNNY TRIPOWER

型式：STP 10000TLEE-JP-10

SMA Solar Technology AG
の製品となります。

10 kW | 三相3線 | 壁掛け | 屋外

SUN2000

型式：SUN2000-28KTL

華為技術日本株式会社の
製品となります。

27.5 kW | 三相3線 | 壁掛け | 屋外

パワーコンディショナについて、電力会社からの太陽光発電出力制御への対応品も準備しております。

出力抑制対応について、仕様等詳しくは当社販売窓口までお問い合わせください。

●運転時の高周波音は聴覚感度が高い方にとって不快に感じる場合があります。聴覚感度が高いと思われる方がいらっしゃる場合には事前にご相談ください。●パワーコンディショナや配線から発生する電気的ノイズが、近隣（目安として半径100m以内）のアマチュア無線やラジオ等の電波受信に影響を与えることがあります。近隣にアマチュア無線等のアンテナがある場合は、購入される前に販売窓口へご相談ください。●設置環境により、パワーコンディショナ上部の壁（屋内設置の場合は壁や天井）にホコリが付着する場合があります。

仕様等詳しくは当社販売窓口までお問い合わせください。

太陽光発電との組み合わせで停電時の電源確保に威力を発揮

リチウムイオン蓄電システム

リチウムイオン蓄電システム

型式：**DS1015、DS2015**

搬入、設置が容易な省スペース
セパレートシステム構成。
蓄電池の増設や施設の
電気仕様に応じたトランス選定等、
各種カスタム対応可能。

ニチコン株式会社の製品となります。

15kWh × 複数増設対応可能　**三相3線**　定格出力 **10kW/20kW**

ラインバックΣⅢ

型式：**LBBFA-＊＊-T3CRLLK(Li)-F-A**※1

蓄電池の技術と太陽光発電用
パワーコンディショナの技術を集約。
各種カスタマイズ可能（鉛蓄電池も対応可）
であり、定格出力10～50kWと
幅広いニーズへ対応。

株式会社 GSユアサの製品となります。
実際の蓄電池盤は扉付きとなります。
「ラインバックΣⅢ」は、株式会社GSユアサの登録商標です。

イメージ

16.9kWh × 並列数　**三相3線**　定格出力 **10~50kW**

太陽光発電連係型 リチウムイオン蓄電システム

型式：**EGS-LM72AⅢ・BⅢ**

電気自動車やハイブリッド車にも採用される
高品質の充電器と、数々の世界基準に
準拠したリチウムイオン蓄電池を搭載。

7.2kWh※2　**単相3線**　定格出力 **2.5kW**

大容量タイプ リチウムイオン蓄電システム

型式：**EGS-LM1201**

従来品比（7.2kWh）で、スリムで大容量。
寒冷地での設置範囲の周囲温度下限も
−10℃から、−20℃までに拡大。

12kWh※2　**単相3線**　定格出力 **3kW**

※1：＊＊には定格出力容量を表す10,20,30,40,50の数値が入ります。※2：実際に使用できる容量は、EGS-LM1201では、放電深度92%、電力変換効率94%となり、初期値での蓄電システムとしての最大使用可能容量の目安は、10.4kWhとなります。EGS-LM72AⅢ（BⅢ）は、放電深度80%と電力変換効率94%を掛けた値となり、初期値での蓄電システムとしての最大使用可能容量の目安は約5.4kWhとなります。周辺温度やお客様宅での消費電力量により電力変換効率が下がる場合があります。

仕様等詳しくは当社販売窓口までお問い合わせください。

▶平成28年度予算「再生可能エネルギー事業者支援事業費補助金」

民間事業者※3が、固定価格買取制度の認定を受けない太陽光発電と、またあわせて蓄電システムを導入する場合、補助金を受けることができます。

公募期間	公募期間 平成28年4月28日（木）～平成28年9月9日（金）17:00必着　　予算額 約33.5億円 公募期間中、4回の締切が設けられ、締切毎に審査、交付決定されます。各締切時点において予算額を超える申請があった場合、公募期間中でも公募は終了されます。
補助対象設備となる発電設備※4（別途、熱利用設備も対象）	①太陽光発電（出力10ｋW以上）、②風力発電、③水力発電、④地熱発電、⑤バイオマス発電 蓄電池は①～⑤の設備と併せて設置する場合のみ対象。性能要件は発電設備出力合計値の同等以下で、系統電力を蓄電しない事。 （太陽光発電の出力は、太陽電池モジュール最大出力合計値と、パワーコンディショナの出力合計値のいずれか低い方で、kW単位の小数点以下を切捨）
太陽光発電補助率等	補助対象経費の合計額の1／3以内と、10万円／ｋWのいずれか低い額　　補助上限額 発電設備1億円／年度 対象設備の導入事業に必要な設計費、設備費、工事費も補助対象経費となります。※5

※3：民間事業者とは、民間企業及び青色申告を行う個人事業主。※4：発電設備は自家消費を目的とし導入する事業者が対象となるため、「固定価格買取制度」の設備認定を受けないこと、また年間発電量が、ひとつの需要先の年間消費電力量の範囲内であることが必要です。※5：各経費については対象外になる項目もあります。

▶平成26年度補正予算「再生可能エネルギー接続保留緊急対応補助金」

（再生可能エネルギー発電事業者のための蓄電システム導入支援事業）事業期間の1年延長に伴い、公募期間が延長となり、補助上限額も一部改定となりました。

申請期間	予約申請受付期間 平成27年3月31日（火）～平成28年11月30日（水）17:00必着
補助額	下記のいずれか低いものが補助上限額となります。 ■蓄電システム機器費x補助率【補助率】●中小企業等……補助対象経費の1/2以内●大企業……補助対象経費の1/3以内■補助対象設備の蓄電容量x蓄電容量1kWh当たり15万円 ■再エネ発電設備の出力x再エネ発電設備の出力1kW当たり30万円■1申請当たりの補助上限額……5億円（同一事業者が複数申請する場合、1事業者当たりの補助上限額の合計は10億円）
補助対象範囲	補助対象は、以下の機器や工事です。●補助対象機器：システムの蓄電容量が10.0kWh以上の蓄電システム本体機器（①蓄電池部②電力変換装置③蓄電システム制御装置④計測・表示装置⑤キュービクルや筐体）が補助対象です。■補助対象工事：補助対象となる蓄電システムの蓄電容量が4,800Ah・セル以上の場合、蓄電システム設置工事費の一部を補助対象とします。
対象者	10kW以上の太陽光発電システムをこれから設置予定・検討されている法人、個人事業主、個人※6に対して、 蓄電システム設備への補助金が受けられる場合があります。（電力会社への系統連系協議の申込が受理された後の申請）

※6：個人による申請は、申請者が所有する住宅に再生可能エネルギー発電設備並びに補助対象設備を設置する場合に限ります。

補助金制度について詳しくは、一般社団法人 環境共創イニシアチブのホームページをご覧ください https://sii.or.jp/

規模や目的に合わせて選べる「見える」システム

計測表示システム（オプション）

計測表示システムを使えば、太陽光発電システムの稼働状況がひと目でわかり、データとして蓄積することができます。また、表示装置により、環境への取り組みを周囲にアピールできるだけでなく、環境意識の啓発効果も期待できます。

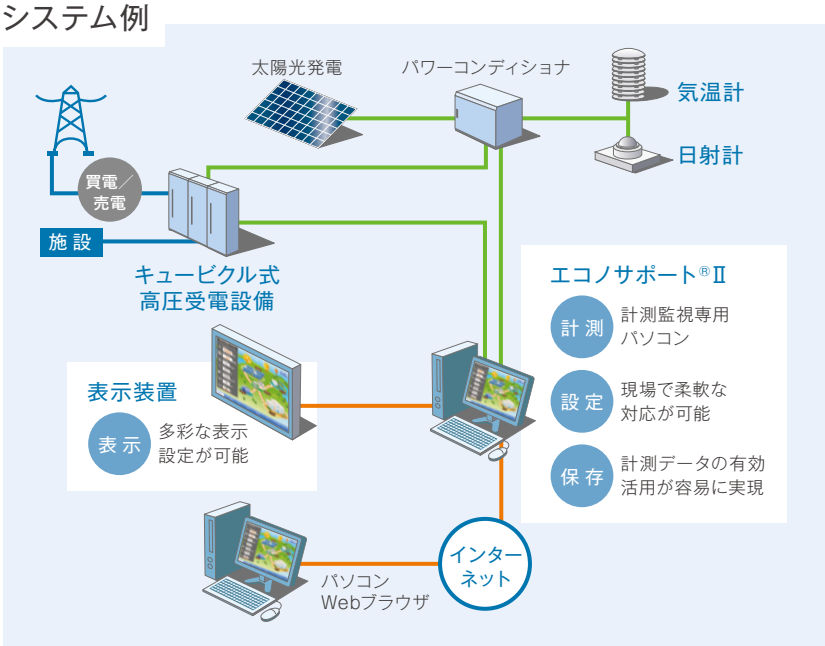
計測監視システム「エコノサポート®Ⅱ」

インターネットを介した「リモート監視」や「蓄電システム監視」にも対応。複数の施設の発電状況をまとめて管理したり、機器やシステムの異常をメールで受け取ることも可能で、幅広い規模・状況のシステムに対応したオールインワンシステムです。

- ○ パワーコンディショナ発電量監視※1
- ○ 遠隔から異常検知、監視が可能

※1：京セラ用通信プロトコル搭載機種が対応可能です。

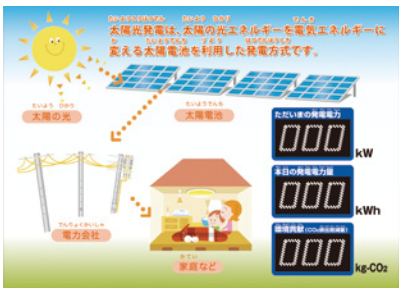
システム例



▶ 表示装置

屋内用液晶ディスプレイ表示装置は、太陽光発電システムの発電状況をはじめ、さまざまな情報を提供できます。また、LEDを使用した屋外用表示装置を使用すれば、地域に向けても環境への取り組みをアピールすることができます。

ディスプレイ表示装置



LED表示装置

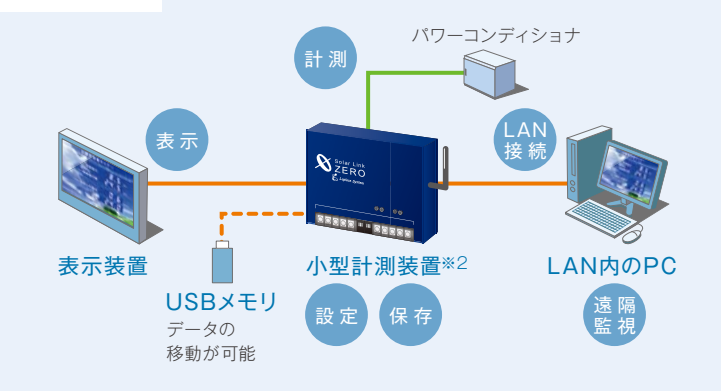
「小型計測装置」※2

計測用パソコンを使わず、稼働状況をディスプレイに表示可能。LANに接続すれば、パソコンで発電状況を確認したり、各種報告に必要なデータをダウンロードすることもできます。

- ○大型ディスプレイ対応で充実の表示機能
- ○3年分のデータを記録可能（CSV形式）
- ○2系統計測、日射計測などにも対応した計測機能
- ○お手持ちのパソコンで各種設定の変更が可能

※2：株式会社ラプラス・システムの製品となります。

システム例



お客様のニーズにあわせたシステムパッケージのご提案

公共・産業用太陽光発電システムパッケージ

分散型太陽光発電パッケージ

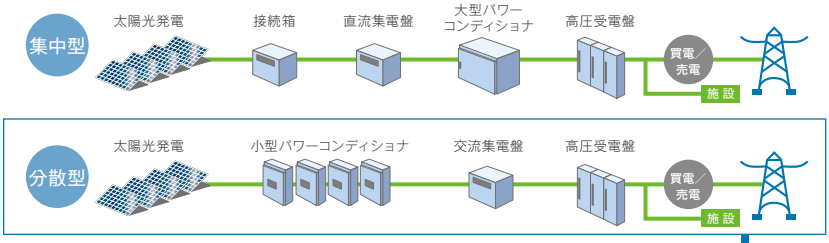
小型パワーコンディショナを系統ごとに複数設置。設置・管理がシンプルで、システム全体の工事量も集中型と比べ低減されます。

- ○ 基礎不要で施工が容易※1
- ○ システム構築により不陸対策などの整地が不要
- ○ マルチMPPT搭載で発電量を最大限発揮
- ○ 冷却装置不要で、システム効率向上
- ○ 故障による発電低下影響範囲を低減
- ○ 設置がシンプルだから工事量も低減
- ○ ご要望に応じたパッケージをご提案

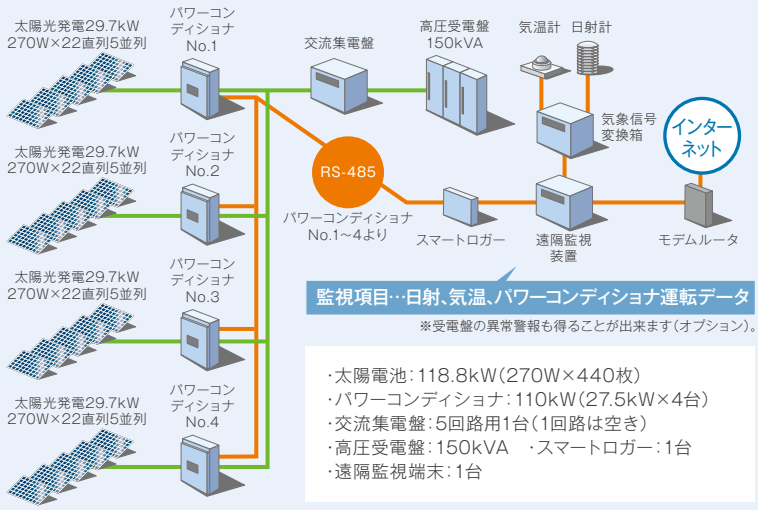
100kW / 250kW / 500kW / 750kW / 1000kW

※1：太陽光発電モジュール部は基礎が必要な場合があります。

▶ 参考事例



100kW分散型パッケージ概要（SUN2000の場合）



※受電盤の異常警報も得ることが出来ます（オプション）。

- ・太陽電池：118.8kW（270W×440枚）
- ・パワーコンディショナ：110kW（27.5kW×4台）
- ・交流集電盤：5回路用1台（1回路は空き）
- ・高圧受電盤：150kVA　・スマートロガー：1台
- ・遠隔監視端末：1台

営農型太陽光発電パッケージ

農地に支柱を立てて組んだ架台の上に、間隔を開けて太陽電池を設置し、営農を継続しながら太陽光発電を行います。営農の継続が太陽電池設置の条件の一つです。

▶ 申請から売電までワンパッケージ

太陽電池 / システム機器 / 架台＋基礎 / 申請代行 / 施工 / 保証と補償

- ○ 専門家による申請代行※2
- ○ 架台基礎一体型工法※3
- ○ 発電の要の太陽電池は京セラ製
- ○ 充実の保証と補償※4

※2：農地（一時）転用申請は、専門の行政書士が代行。
※3：農林水産省の一時点用許可基準をクリアした、自然災害にも強い工法。
※4：丸文営農型太陽光発電パック規定による

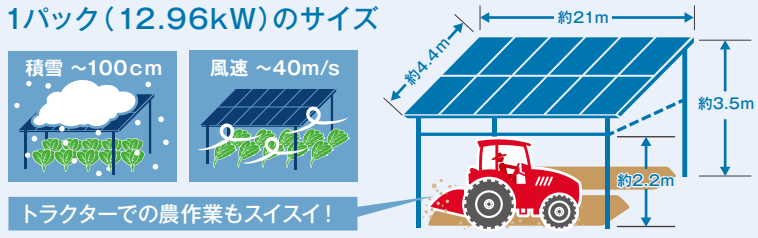
▶ 参考事例

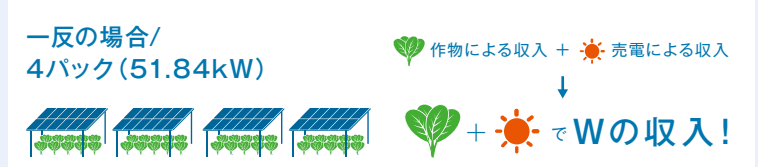
千葉県山武市（落花生）

埼玉県熊谷市（みょうが）

パッケージ概要

丸文営農型太陽光発電パック





※土地の形状により配置方法は異なります。

▶ 野菜の日照条件（参考）

オススメの作物：みょうが・小松菜・にらなど

陽性（陽地性）植物	半陰性（半陰地性）植物	陰性（陰地性）植物
約6時間以上（約12時間のうち）直射日光が当たる場所に適し、日陰は適さない	約3～4時間（約12時間のうち）直接日光が当たる場所に適し、木漏れ日などの日照でも育つ	直射日光の当たらない半日陰から日陰の場所に適し、1日1～2時間（12時間のうち）でも育つ
トマト、ナス、すいか、きゅうり、かぼちゃ、とうもろこし、キャベツ、はくさい、だいこん、にんじん、たまねぎ	いちご、ほうれんそう、こまつな、かぶ、レタス、じゃがいも、さといも、しょうが、アスパラガス、ねぎ	みつば、せり、クレソン、しそ、みょうが、ふき、にら

施工バリエーション

屋根の形状や設置条件に対応する、多彩な施工バリエーション。

太陽光発電システムは、屋根形状や素材・設置する地域の気象条件などにより、設置の仕方が大きく異なるため、お客様のプランに適した施工には、高度な技術と施工知識が必要となります。京セラでは、さまざまな屋根形状・素材・施工条件に対応した、豊富なバリエーションがあり、お客様に適したシステムと工法をご提案いたします。

地上	地上設置・野立て

地上設置とは、地面に設置する工法で、未利用地などの土地スペースを有効活用します。1MW以上のメガソーラー発電所に多く採用されています。

陸屋根	陸屋根設置

固定用の基礎を設けた上に、耐食性・耐久性に優れた傾斜架台を設置し、その上に太陽電池モジュールを強固に固定することで、強風時の安全性を確保できます。

▶ 防水アンカー工法※1

独自の防水アンカーと専用金具により、基礎工事の必要がなく、工期日程の短縮化を実現。屋根面への重量負荷も軽減します。屋根全体の防水工事を同時に行うことも可能で、経年数の長い屋根にも安心して設置できます。

システム例※2

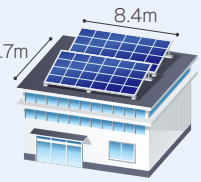
10kWシステム

270W×39枚（約10kW）

設置総面積：90㎡

設置総重量：1,960kg

＊いずれも傾斜角度20度の場合（緯度35度）

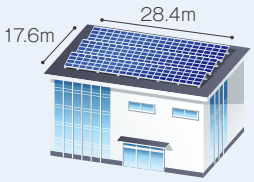


50kWシステム

270W×195枚（約50kW）

設置総面積：500㎡

設置総重量：9,604kg

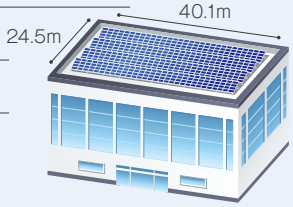


100kWシステム

270W×377枚（約100kW）

設置総面積：983㎡

設置総重量：18,620kg



※1：既設の防水層が保護防水仕上げの場合は屋根全体の防水工事が必要になります。この工法で利用できるシート防水のメーカーと種類には指定があります。

サポート

京セラなら、ご提案から保守まで、お客様のニーズに合わせた細やかなサポートを展開。

計画から運用までの流れ

京セラでは、製品や施工方法に応じた金具をラインナップする一方、ご相談から保守までの細やかなお客様サポート体制を整えることで、多様なニーズにお応えしています。

計画（基本構想）

設備導入の目的をもとに、設備の規模・仕様、スケジュール、および、導入効果などを明確にし、予算を組んでいきます。

お客様
- 基本構想の立案
- システム形態検討
- 発電量予想
- 概算費用
- 助成制度の検討

弊社
- 現地調査
- 施工方法、配置案の提案
- 概算費用の見積
- 最適システムの提案
- 発電量シミュレーション

設計（実施設計）

基本構想をもとに、導入する機器や工事の仕様を決定。より正確なスケジュールと予算を作成していきます。

お客様
- システム設計
- 工事設計
- 実施設計
- 予算書作成
- 発注図書作成

弊社
- 設計図書資料提供

お見積り

設計（実施設計）で決定された仕様や工期をもとに、お見積もりを作成します。その後予算を決定し、いよいよ施工となります。

弊社
- 機器・工事費用の見積

4つの品質

製品品質 －高品質な製品づくり－

太陽電池の原料となるシリコン粒子の鋳造からの全てを自社で行う一貫生産を実現。高い品質を確保しています。

施工品質 －最適な施工を実施－

国内で初めて系統連系システムを設置するなど、長年にわたって蓄積された多彩なノウハウで、お客様のシステムに適した安心・確実施工を実施します。

営業品質 －ニーズに応えるご提案－

あらゆる規模での豊富な導入経験を活かし、お客様に適したシステムをご提案いたします。

サービス品質 －充実のアフターサービス体制－

全国ネットワーク体制を完備。
定期点検やメンテナンスはもちろん、24時間の電話対応などにより、迅速に対応いたします。

▶ 京セラ品質にこだわった高品質な製品づくり

京セラは、独自の技術にこだわり、高品質の製品を作り続けてきました。例えば、多結晶シリコン型太陽電池モジュールはシリコン原料の鋳造から太陽電池モジュールの組み立てまで、全ての工程の最適化により高効率化を実現しました。今後も、「京セラ品質」を追求していきます。


シリコン原料 ▶ 多結晶シリコンインゴット ▶ 多結晶シリコンブロック ▶ 多結晶シリコンウエハー ▶ 多結晶シリコン太陽電池素子

▶ 多様なニーズに応える一貫体制を構築


研究・開発・生産 ▶ ご相談 ▶ 設計・ご提案 ▶ 施 工 ▶ メンテナンス

すべての面でお客様にご満足いただくために、京セラでは、システムのご提案や、設計・施工・メンテナンスなど、太陽光発電に関わるさまざまな業務を一手に担う一貫体制を構築。さらに、それらを迅速・確実に実施する全国ネットワーク体制を実現しています。

オペレーション&メンテナンスサービス（オプション）

太陽光発電所の長期にわたる、安定した運用をサポート。

太陽光発電所の発電停止による損失を防ぐため、モニタリングにより監視、現場復旧、報告までを承ります。

京セラ「O&Mサービス」の強み

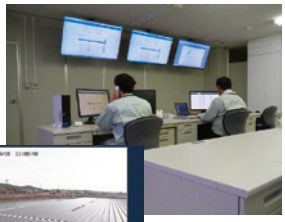
O&M契約を行うと、万一トラブルが発生した場合でも、ワンストップ体制で発電所の復旧を行い、メーカーのネットワークを活かして発電損失を最小限にとどめることができます。

① 太陽電池モジュールのメーカーは問いません
② パワーコンディショナメーカーとの協業体制
③ 発電事業者様に手間を掛けさせません
④ 豊富なメニューから選択が可能

常時監視	24時間監視 発電量分析 駆けつけ 等	保守計画	消耗品交換 機器更新 保守計画更新 等
定期点検	現地視察 不具合確認 発電性能診断 等	施設管理	除草・除雪作業 防犯対策 パネル清掃 等


定期点検（性能診断）


施設管理


常時監視


カメラ監視


関連メーカーとの協力体制

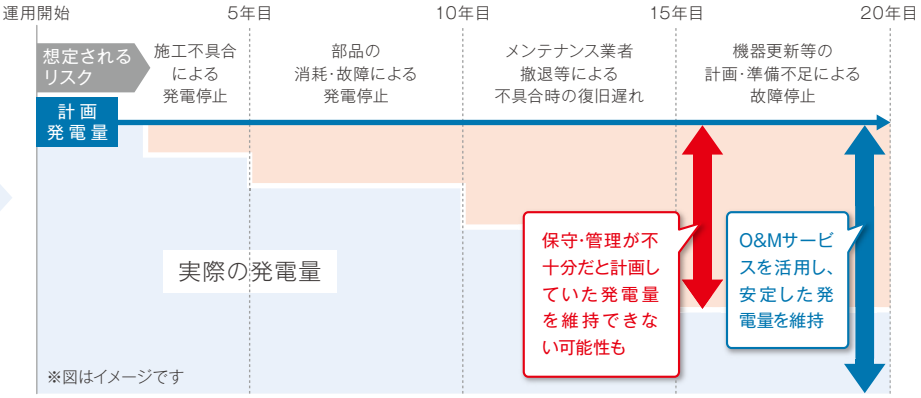
▶ 保守・管理を徹底することで様々なリスクを軽減

TOPIC

太陽光発電の保守・管理の重要度が高まる見通し

経済産業省は、再生可能エネルギー固定価格買取制度の再見直しに着手。新たな方針の一つとして、「適切な事業実施（点検・保守、施設撤去等）を確保する仕組みの導入」※との項目が挙がっています。

だから、O&Mサービス



※経産省「固定価格買取制度（FIT）見直しポイント」より

▶ 導入実績

太陽光発電メーカーとして40年以上の実績とノウハウ

大規模から中・小規模まで、様々な導入実績がある京セラは、保守・管理についても独自ノウハウを蓄積しています。

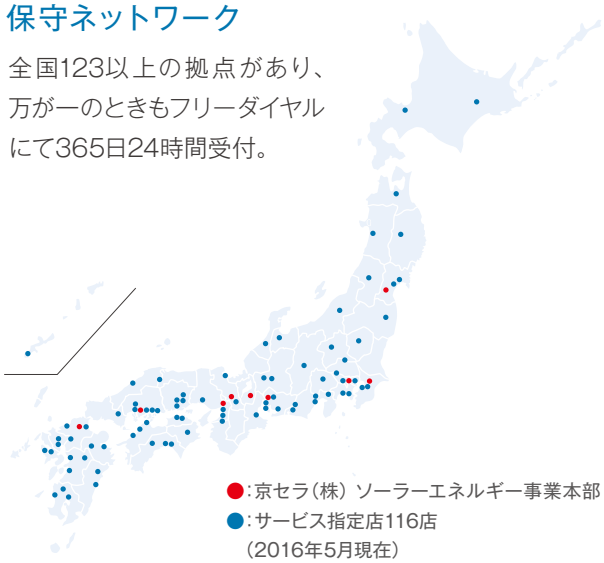
▶ 総合監視センター

京セラの太陽光発電システム技術の象徴である、佐倉市ソーラーエネルギーセンター内に総合監視センターを開設。

自社事業、第三者事業も含め168サイト、248MWの運用&管理を展開しています。（2016年5月現在）

▶ 保守ネットワーク

全国123以上の拠点があり、万が一のときもフリーダイヤルにて365日24時間受付。



●：京セラ（株）ソーラーエネルギー事業本部
●：サービス指定店116店
（2016年5月現在）