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## 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	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

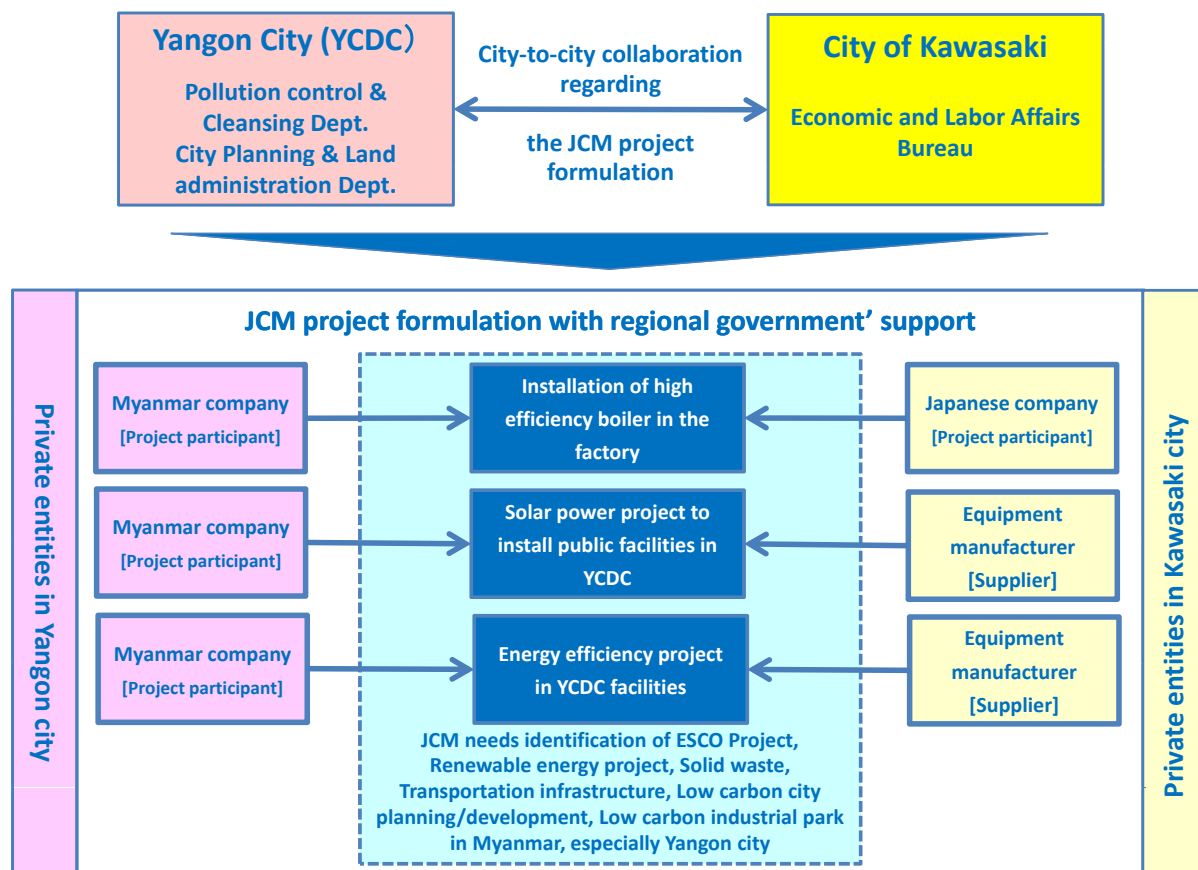
Nippon Koei Co., Ltd.  
Kawasaki City

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## Contents

1. Overview of the 2<sup>nd</sup> Year project
2. Three major items for the 2<sup>nd</sup> 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
3. Schedule and each task

## 1. Overview of the 2<sup>nd</sup> 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**

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

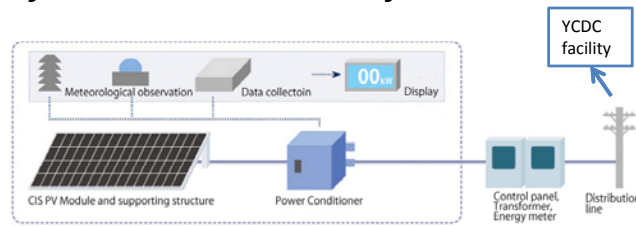
By Feb 2017

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<sup>2</sup>)
  - 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

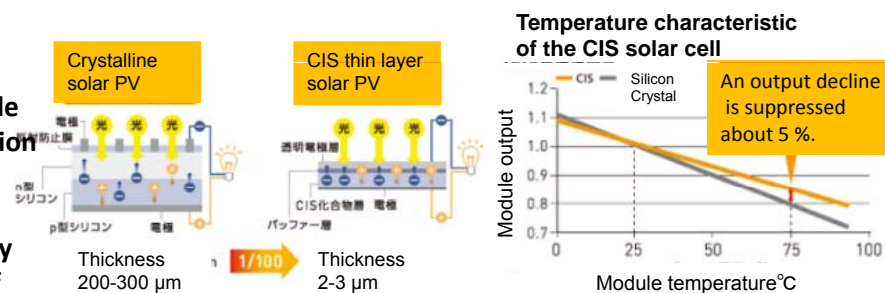
- (i) Installation of 2MW PV generation system(CIS solar module, connection box, junction box, power conditioner, transformer, etc).
- (ii) The next generation solar panel CIS solar cell of a Solar Frontier copper, indium and selenium (CIS) for the main ingredient.
- (iii) Power generation decline is 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 load to YCDC and check the existing 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
<b>Schedule for City-to-city Collaboration Activity</b>														
<b>Schedule for City-to-city Collaboration Activity</b>	[Green bar from Jun to Dec]										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	
<b>Schedule for Solar PV Pilot Project Planning</b>														
Confirmation of candidate PV site with area and distribution line layout and site visit	[Blue bar]													x
Confirmation of YCDC load to be supplied by PV	[Blue bar]										xx			
Determination of candidate site		[Blue bar]									xx		x	
Design and preparation of equipment specification			[Blue bar]										x	xx
Cost estimation of PV system				[Blue bar]									x	xx
Study of tariff and financial feasibility					[Blue bar]						x		xx	
Coordination with YESC about net-metering		[Blue bar]											x	xx
Implementation plan							[Blue bar]				x		xx	
Clarification of procedure for budgeting	[Red bar]										xx			
- Documentation for budgeting						[Red bar]					xx	x		
- Internal procedure for budget allocation						[Red bar]					xx			
- Approval of budget								[Red star]			xx			
<b>Final Report submission to MoEJ</b>									[Blue star]			x	xx	

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

xx : Key responsibility, x: support

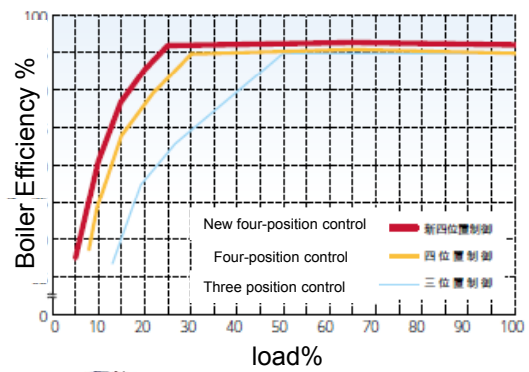
## Outline of Technique

- (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.

### 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

Comparison of efficiency in different load%



High-efficiency drum-less boiler



IBD System

# Large-scale Solar power facilities in Kawasaki-City



## Case 1: Ukishima Large-scale Solar power plant



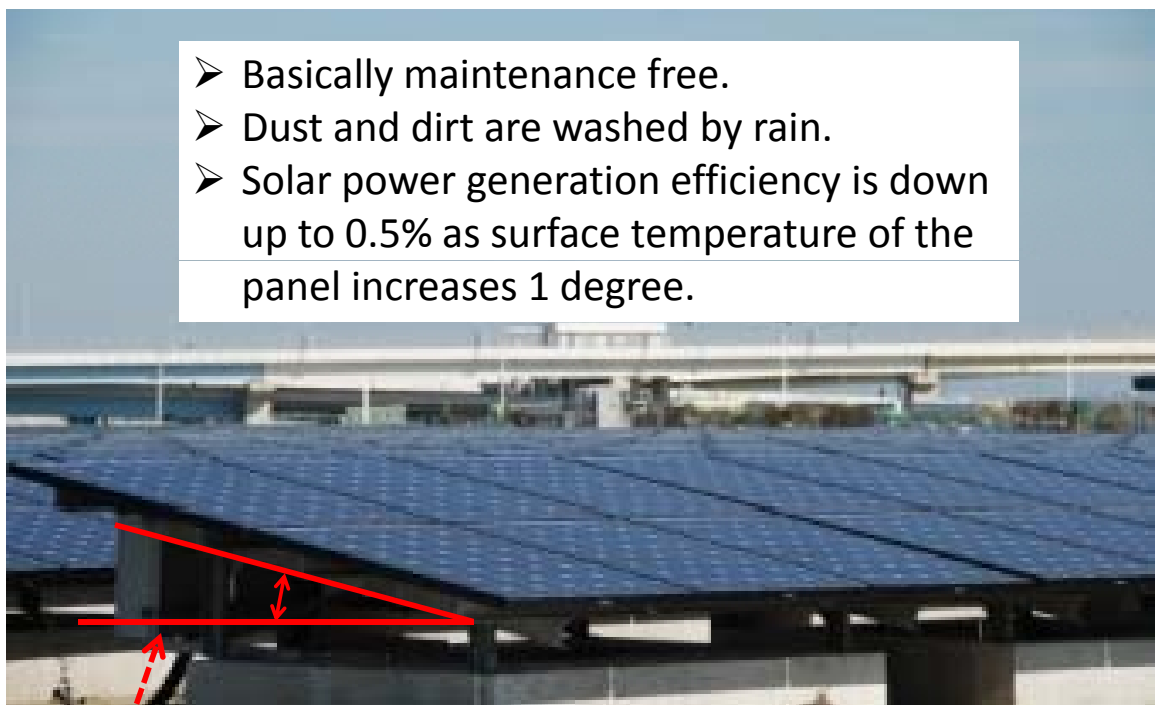
Site area: 11ha (11,000 m<sup>2</sup>)

## 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

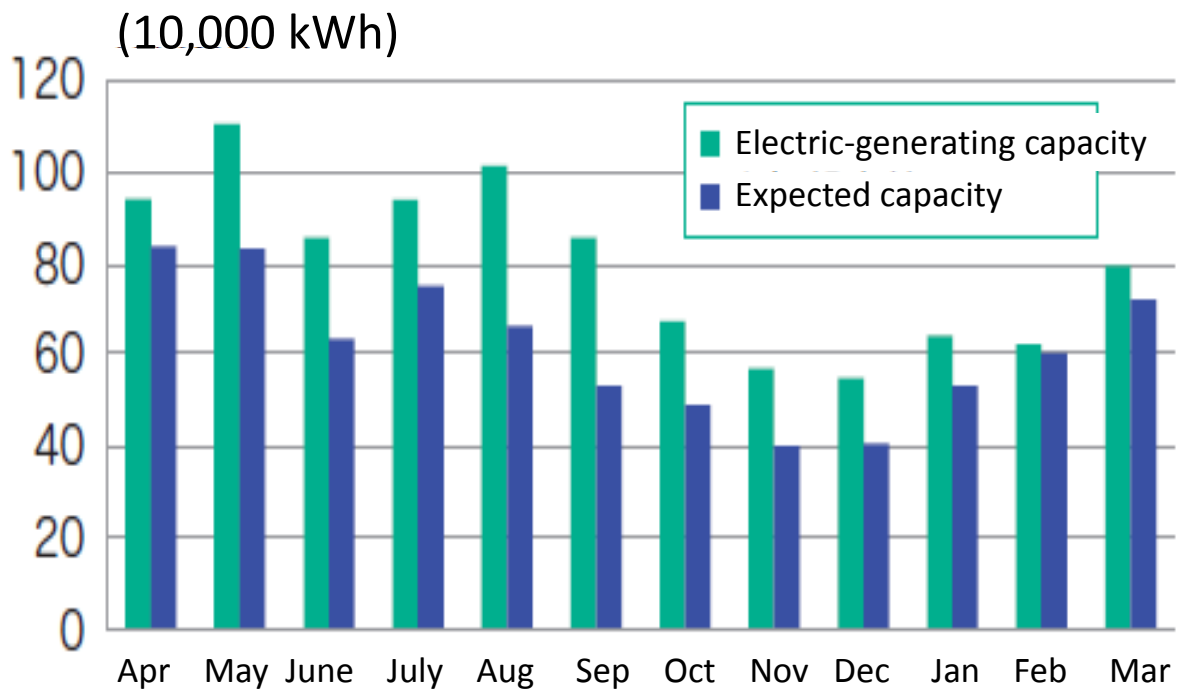
## Characteristics of solar panel

- Basically maintenance free.
- Dust and dirt are washed by rain.
- Solar power generation efficiency is down up to 0.5% as surface temperature of the panel increases 1 degree.



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

- 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

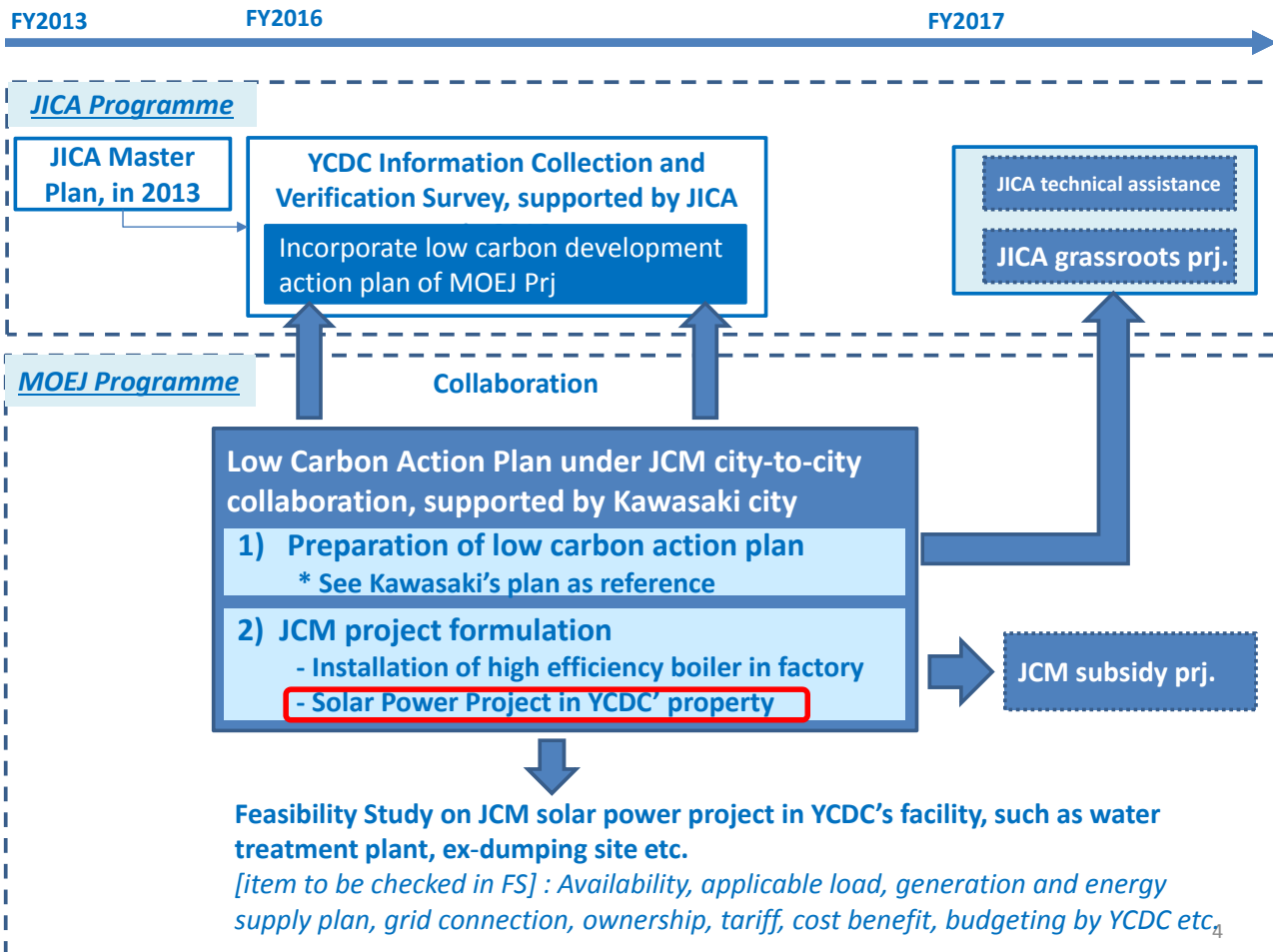
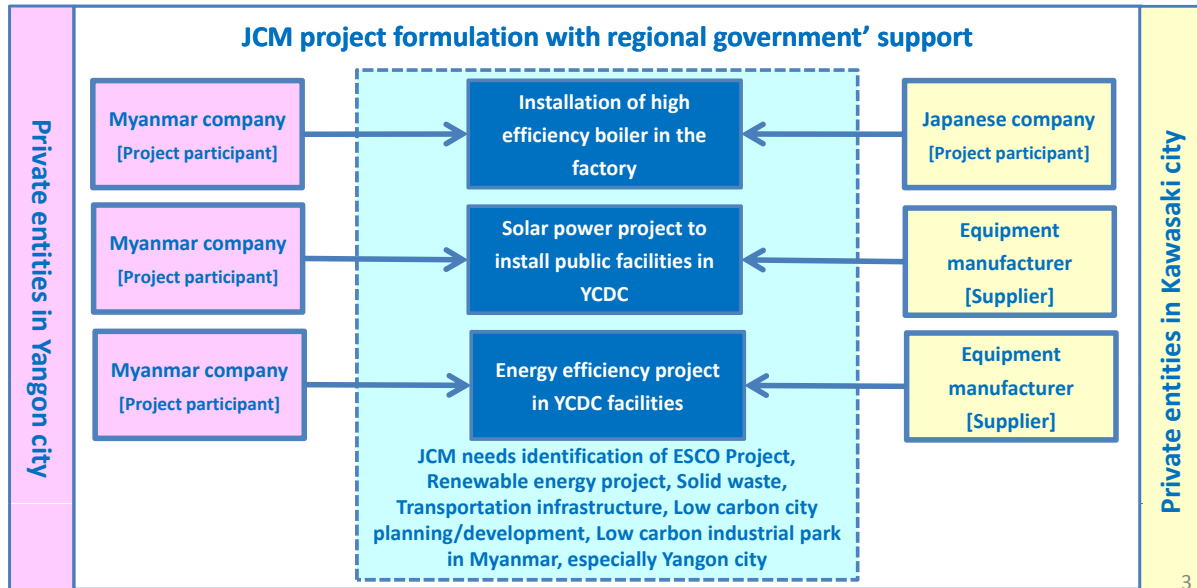
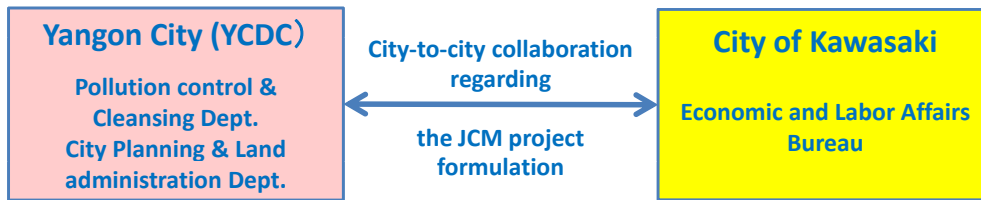
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**Contents**

1. Overview of the 2<sup>nd</sup> Year JCM Formulation through City-to-city collaboration project
2. Invitation to Kawasaki-City and Kitakyushu Seminar in Japan
3. Progress of Solar PV Generation Pilot Project Plan
4. Schedule of Yangon-City Low Carbon Action Plan

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# 1. Overview of the 2<sup>nd</sup> year JCM City-to-city collaboration project



## 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 2<sup>nd</sup> 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



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## 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 - <b>Discussion about Low Carbon Society Action Plan</b> - <b>Discussion about MoU modificatoin</b> - 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.

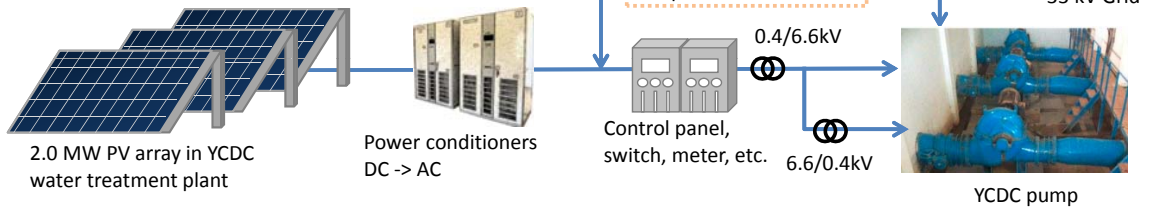
- **Two (2) YCDC staffs** from Pollution Control and Cleansing Dept and/or City Planning and Land Administration Dept who are in charge of JCM activities and low carbon action plan.
- At the international conference in Kitakyushu, the presentation on JCM activities and low carbon action plan. **Presentation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

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### 3-2. Options of PV System Concept

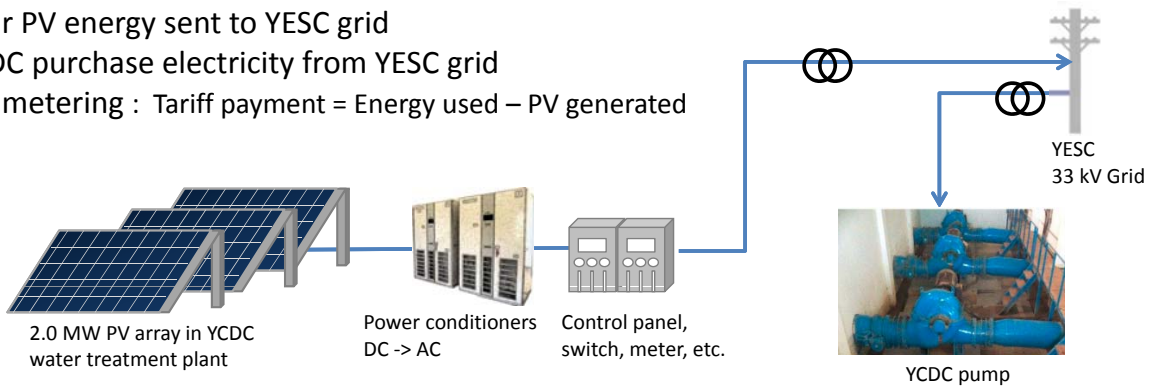
#### Option-1

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



#### Option-3

- Solar PV energy sent to YESC grid
- YCDC purchase electricity from YESC grid
- Net metering :  $\text{Tariff payment} = \text{Energy used} - \text{PV generated}$



### 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 Nyaung Hnit Pin

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

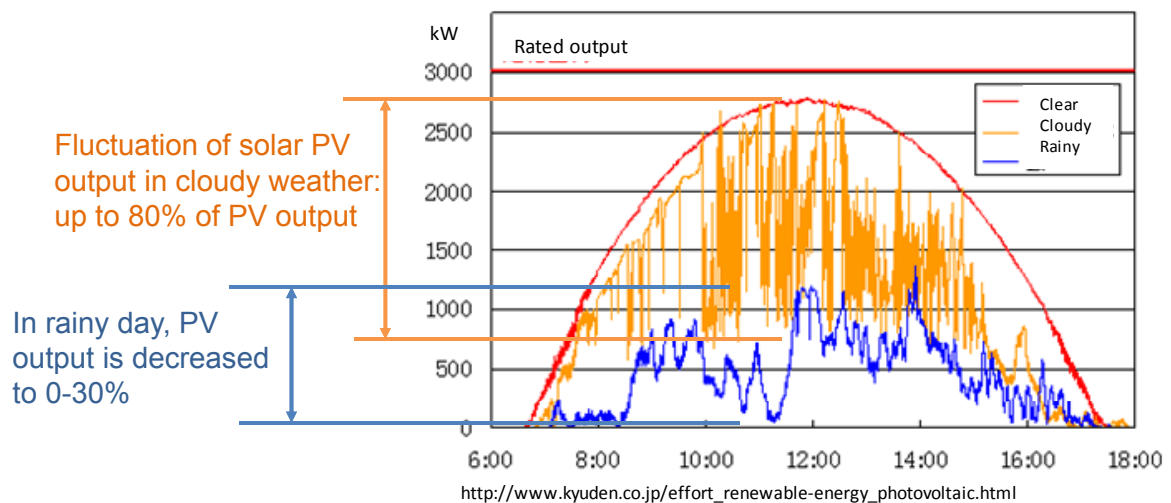
- Selection of pilot project site:
  - Interview survey → Site survey → Document review
- Criteria for selection: needs, demand, location

Candidate	Status	Load	Selection result
<b>Nyaung Hnit Pin</b>	-Peak 7MW, off-peak 6.8 Mw, 24 hr operation -1 <sup>st</sup> phase 2014, 2 <sup>nd</sup> phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1 <sup>st</sup> 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	2 <sup>nd</sup> 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

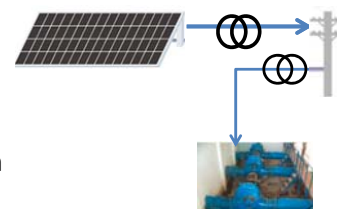
- **Nyaung Hnit Pin** is tentatively selected, however.....
  - Supply to LV 440 kW portion is possible
  - Further study necessary for HV pump supply with electrical documents for the plan up to 2 MW

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### 3-5. Solar PV Challenges and Options

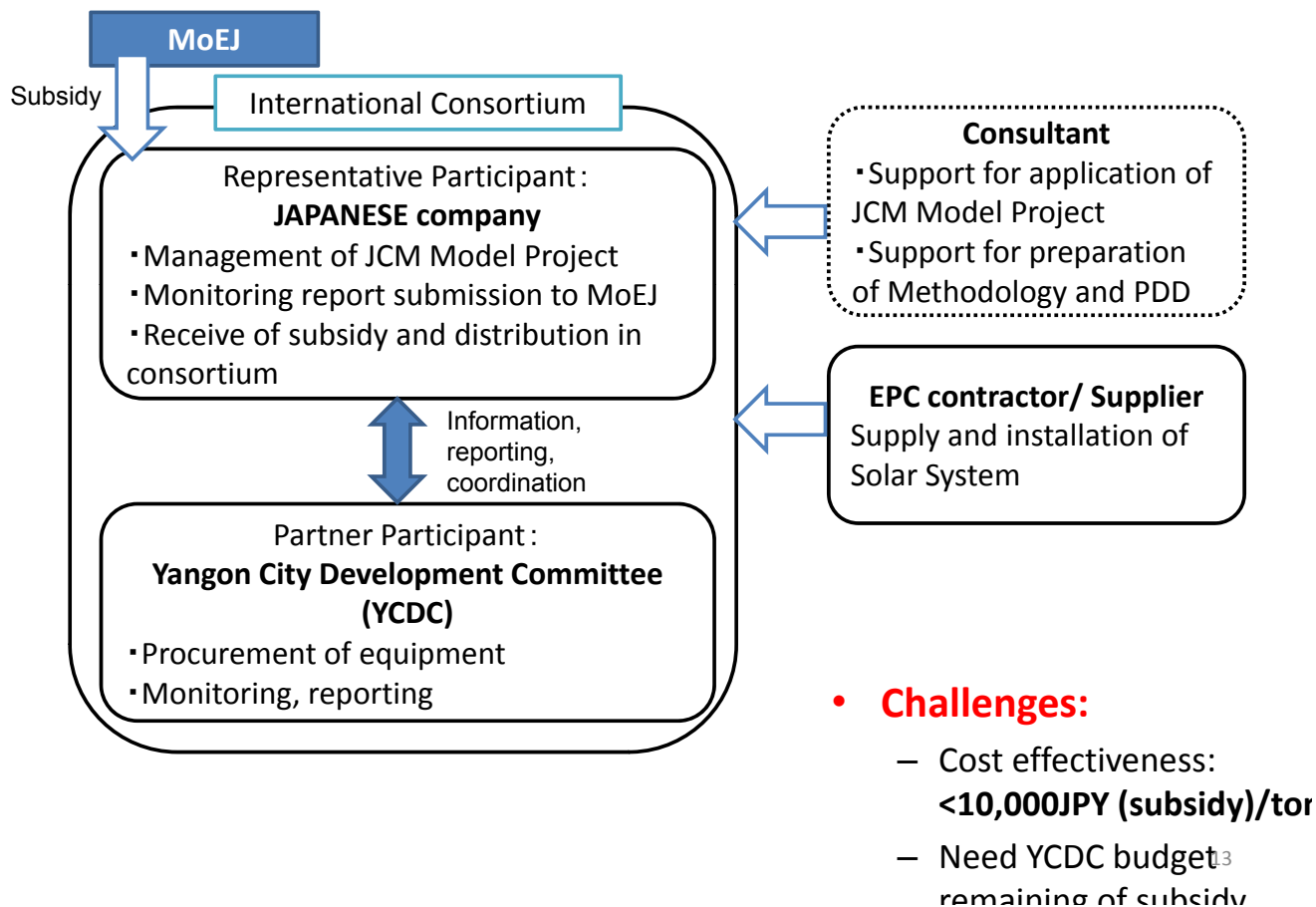


- PV output fluctuates but demand load is stable
- Battery or DG is necessary to cope with PV fluctuation
  - Battery is costly
  - DG consumes fossil fuel and maintenance cost is high
- OPTION: If PV can be fed to YESC Grid, grid can absorb PV fluctuation (up to 10% of grid capacity)
  - It is necessary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



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



### 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 m <sup>2</sup>
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)

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### 3-8. Schedule and each task

Item	2016							2017			Player			
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YCDC	KWSK	NK	EEFC
<b>Schedule for City-to-city Collaboration Activity</b>														
Schedule for City-to-city Collaboration Activity	[Green bar spanning Jun to Feb]										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	
<b>Schedule for Solar PV Pilot Project Planning</b>														
Confirmation of candidate PV site with area and distribution line layout and site visit	[Blue bar]													x
Confirmation of YCDC load to be supplied by PV	[Blue bar]										xx			
Determination of candidate site			[Blue bar]								xx		x	
Design and preparation of equipment specification			[Blue bar]										x	xx
Cost estimation of PV system					[Blue bar]								x	xx
Study of tariff and financial feasibility						[Blue bar]					x		xx	
Coordination with YESC about net-metering					[Blue bar]								x	xx
Implementation plan							[Blue bar]				x		xx	
Clarification of procedure for budgeting	[Red bar]										xx			
- Documentation for budgeting					[Red bar]						xx	x		
- Internal procedure for budget allocation					[Red bar]						xx			
. Approval of budget									★		xx			
<b>Final Report submission to MoEJ</b>										★			x	xx

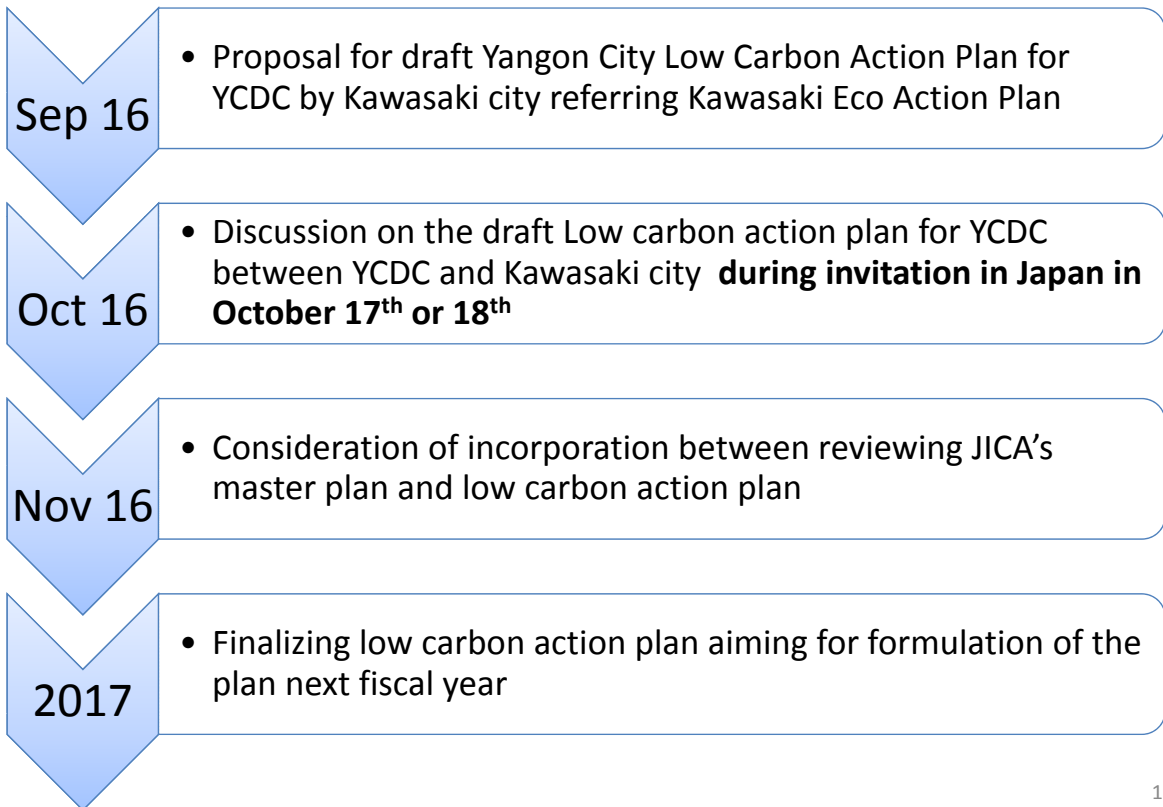
KWSK:Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C

xx : Key responsibility, x: support

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## 4. Schedule for preparation of Low carbon action plan





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

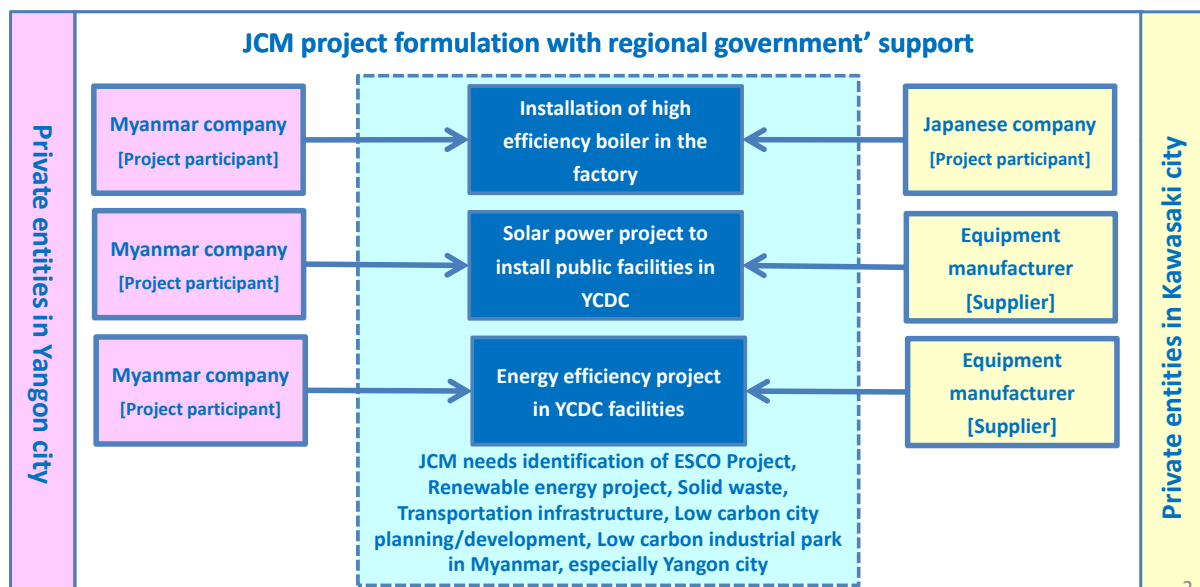
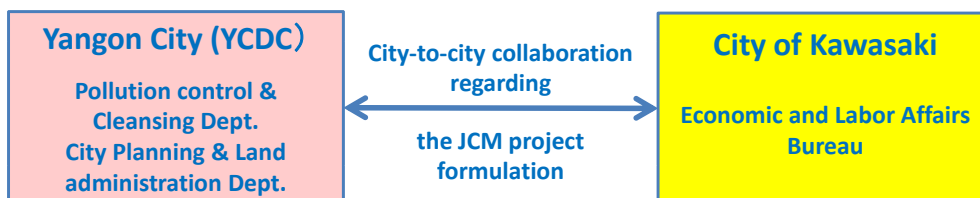
Nippon Koei Co., Ltd. and Kawasaki City

### Contents

1. Overview of the 2<sup>nd</sup> Year JCM Formulation through City-to-city collaboration project
2. YCDC draft low carbon action plan
3. Revise of MoU
4. JCM Model Project: Solar PV Generation Project
5. Way Forward

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### 1. Overview of the 2<sup>nd</sup> year JCM City-to-city collaboration project



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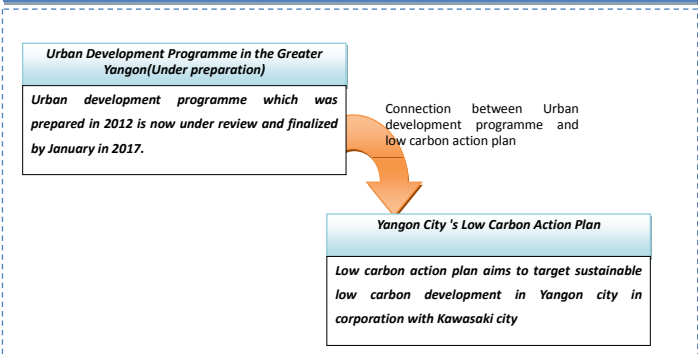
## 2. YCDC Low Carbon Action Plan (LCAP)

- 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

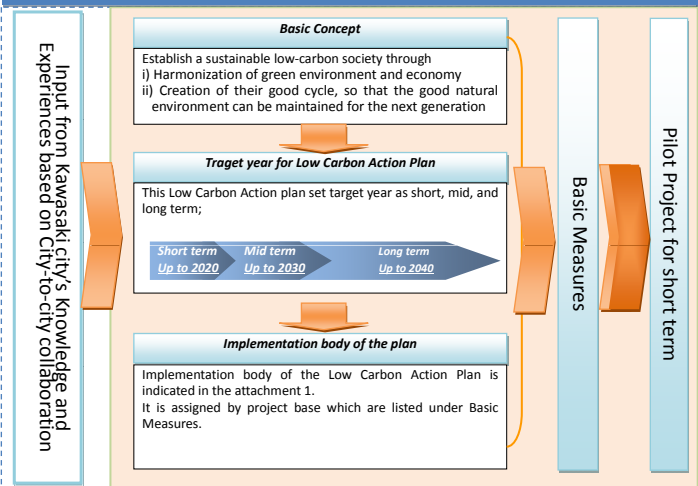
→ Please see separate papers...

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

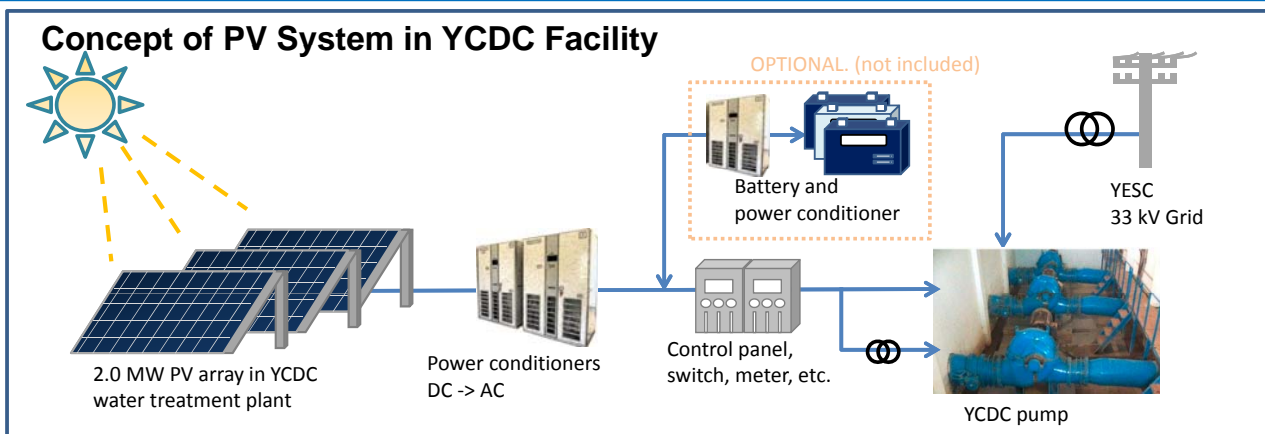
### 1. Policies and plans related to promotion of "Low-carbon Action Plan"



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



## 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 budgeted (50% of investment)	XX Million US\$
Solar Irradiation (Average)	4.69 kWh/m <sup>2</sup> /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 Pin Water Treatment Plant



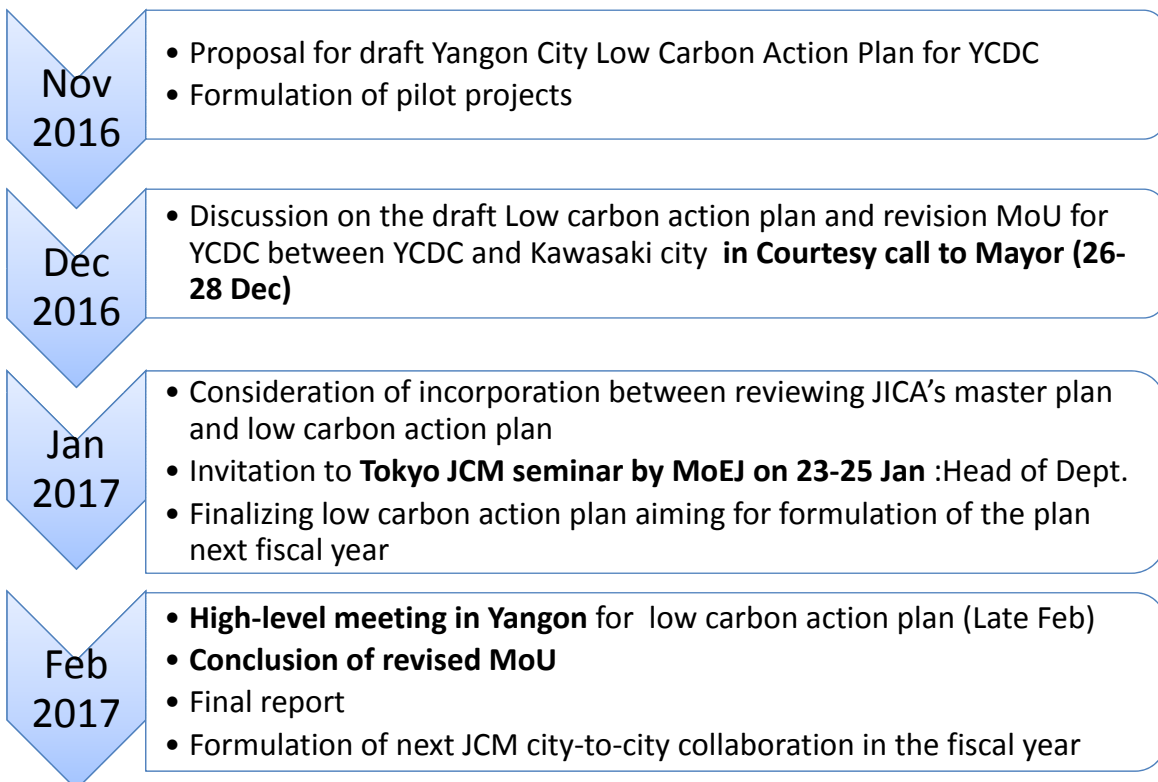
PV site and Pump room in Nyaung Hnit Pin



Pump Layout in Nyaung Hnit Pin

5

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



6

## 5-2. Schedule and each task

Item	2016							2017			Player					
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YCDC	KWSK	NK	EEFC		
<b>Schedule for City-to-city Collaboration Activity</b>																
<b>Schedule for City-to-city Collaboration Activity</b>											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			
<b>Schedule for Solar PV Pilot Project Planning</b>																
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		
Implementation plan											X		XX			
Documentation for budgeting											XX		X			
- Internal procedure for budget allocation														XX		X
. Approval of budget														★		
<b>Final Report submission to MoEJ</b>														★		

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

xx : Key responsibility, x: support

7

## 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**

8





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**<sup>1)</sup> 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 March 2016

### 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

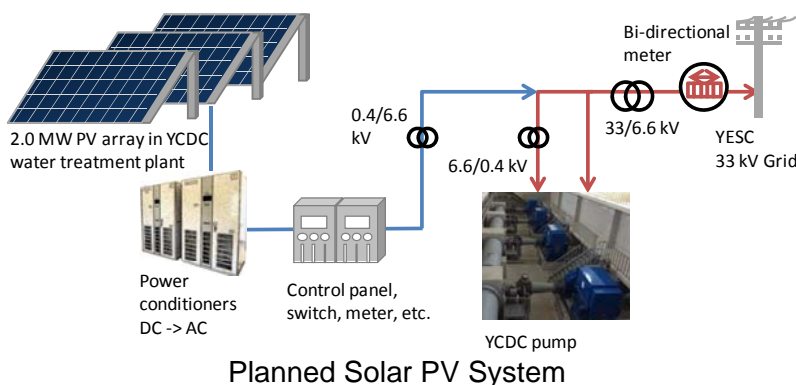
### i. Preparation of Draft "Low Carbon Action Plan" for Yangon city

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



#### Project Summary

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

<sup>1)</sup> **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.

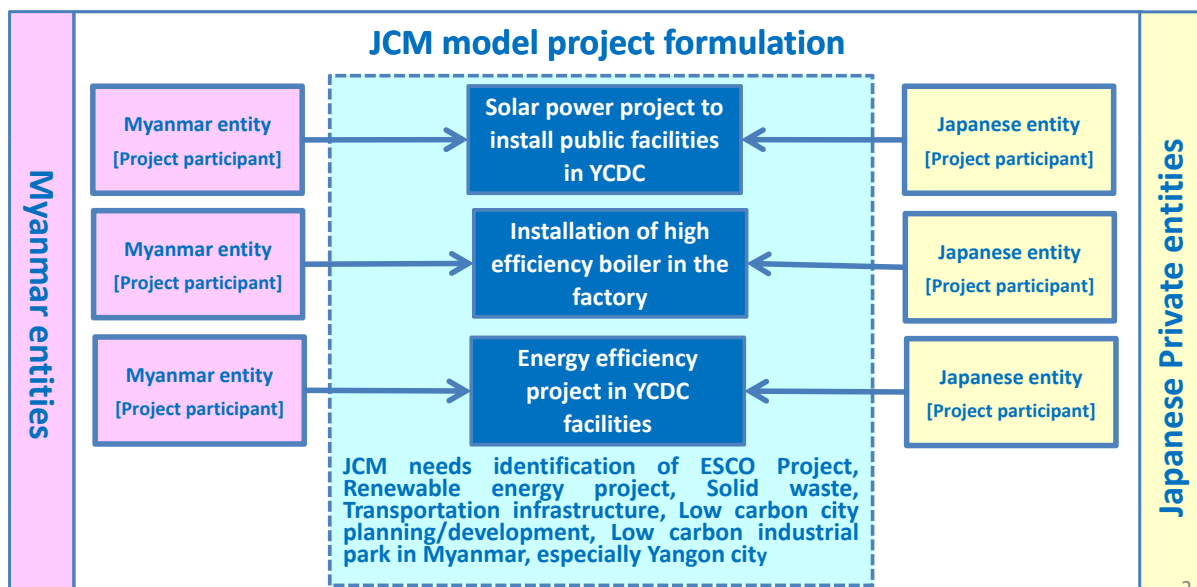
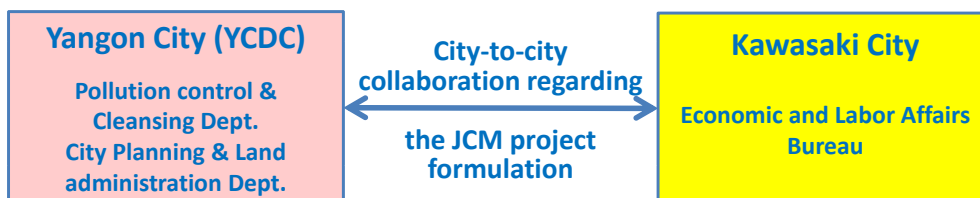
**NIPPON KOEI**

### Contents

1. Overview
  2. Chronology
  3. Low Carbon Action Plan
  3. Proposed JCM model project
  4. Further Actions
- References

1

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



2

## 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
- 1<sup>st</sup> Visit to Kawasaki city and Kawasaki chamber of commerce
- 1<sup>st</sup> Workshop on city-to-city collaboration in Yangon
- Feasibility study for JCM model projects

FY 2016

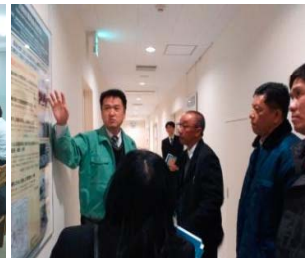
- 2<sup>nd</sup> Visit to Kawasaki city and JCM seminar in Kitakyushu, Japan
- Preparation of draft Low carbon action plan
- Feasibility study of Solar power (JCM model) project on YCDC facilities



Meeting with Kawasaki chamber of commerce



Meeting with Kawasaki city



Visit to Kawasaki city



JCM workshop <sup>3</sup>

## 2. Low Carbon Action Plan (LCAP)

Objective :

**Low carbon action plan (LCAP)  
for sustainable Yangon city development  
with energy-efficient and clean  
technology**

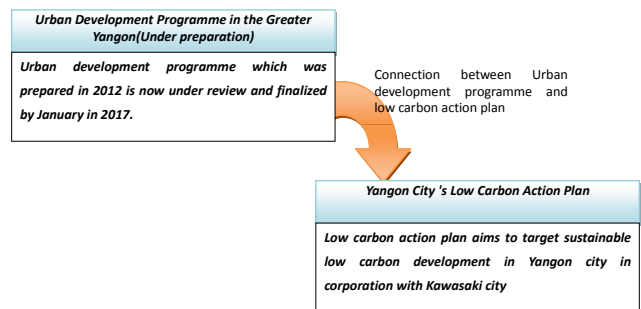
Discussion points :

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

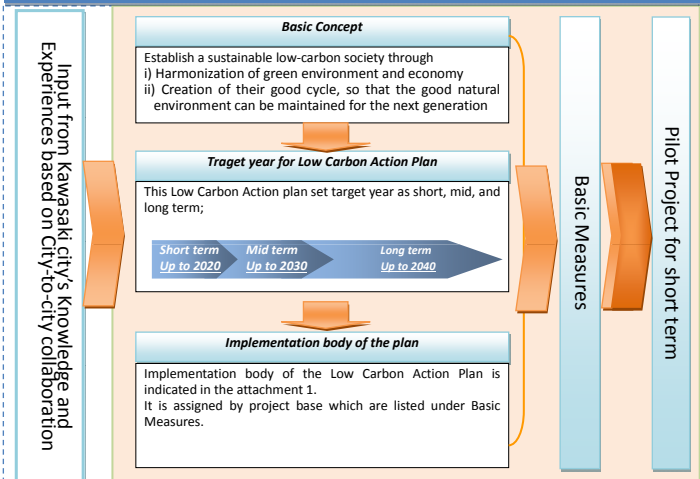
Candidate JCM model projects :

- 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

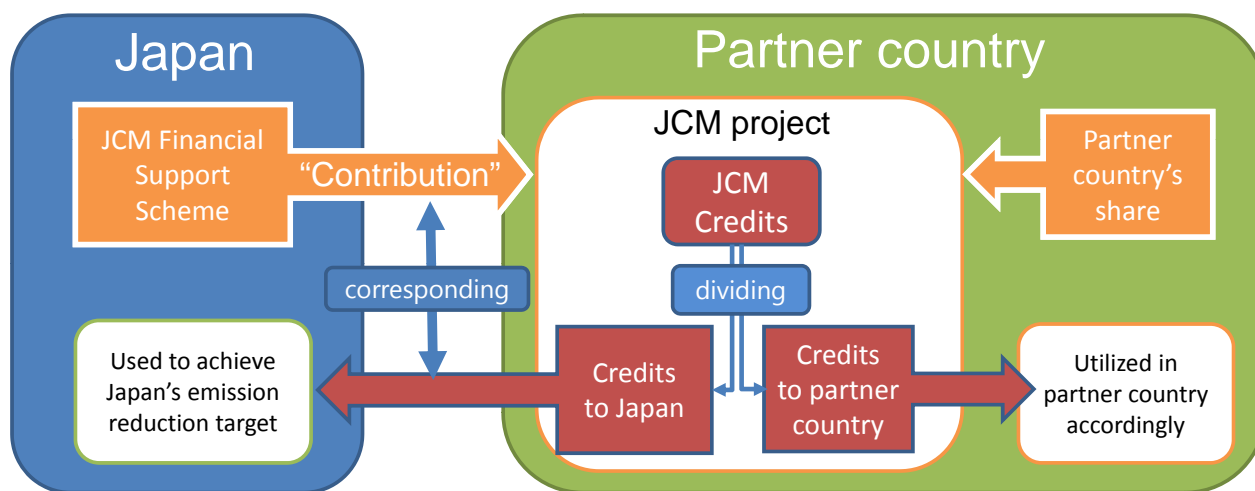
- ✓ The content of MOU is agreed by YCDC and Kawasaki city, and MOU is concluded by March 2017

#### 2) Low Carbon Action Plan (LCAP)

- ✓ Coordination with JICA M/P
- ✓ Finalization of LCAP
- ✓ Participation of Tokyo JCM seminar on 23<sup>rd</sup> 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



### 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

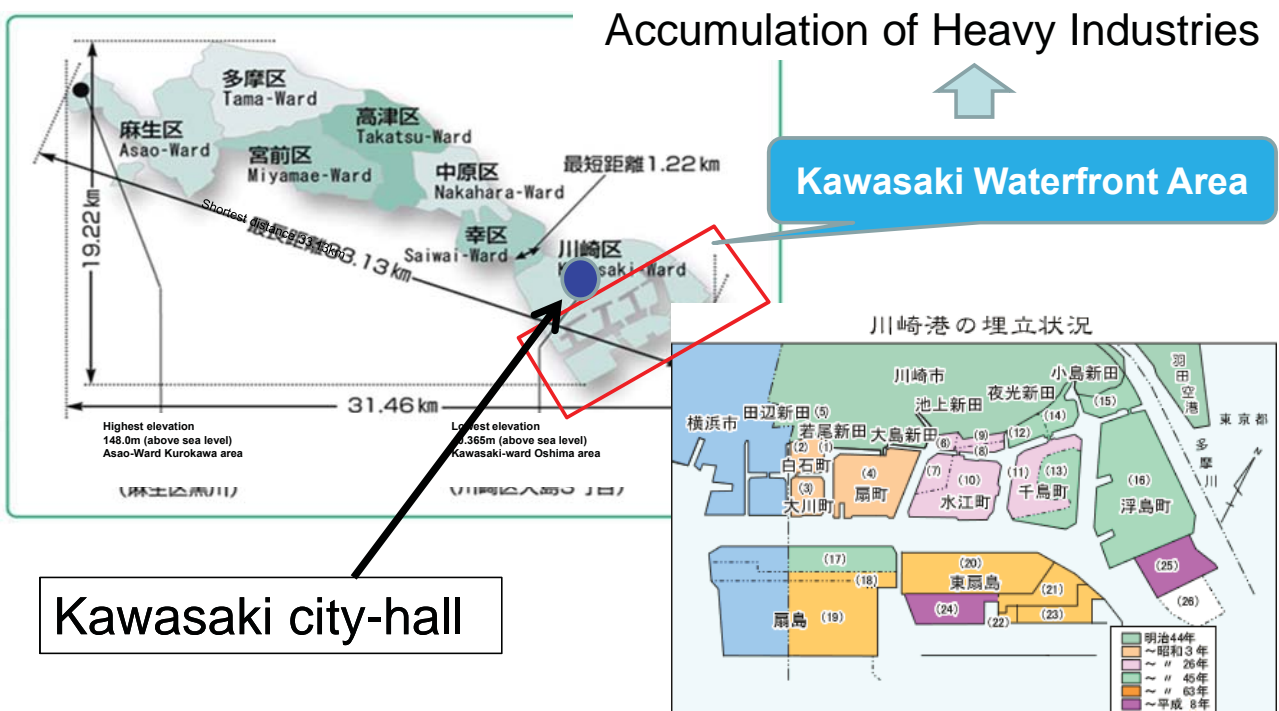
Kawasaki Eco-town

December 2016

Economic and Labor Affairs Bureau  
Kawasaki-city

**Kawasaki city & Waterfront Area**

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km<sup>2</sup>

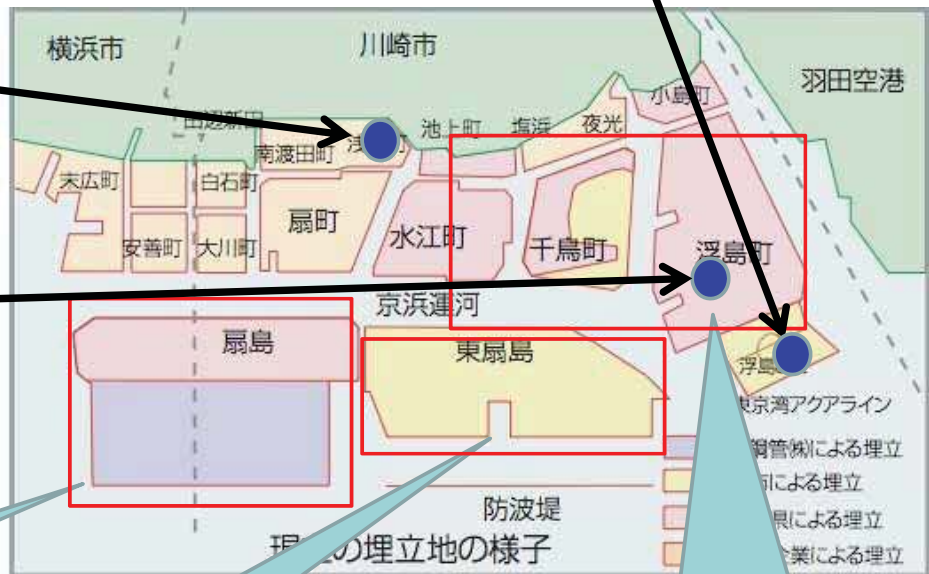


# Location of facilities for the site visit

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

① YAMANAKA  
 Recycling of waste automobile

③ TAKEEI  
 Recycling of mixed waste generated from demolition site



Steel Industry Area

Logistics Area

Refine & Petrochemical complex Area

## Kawasaki Waterfront Area (1950s-60s)

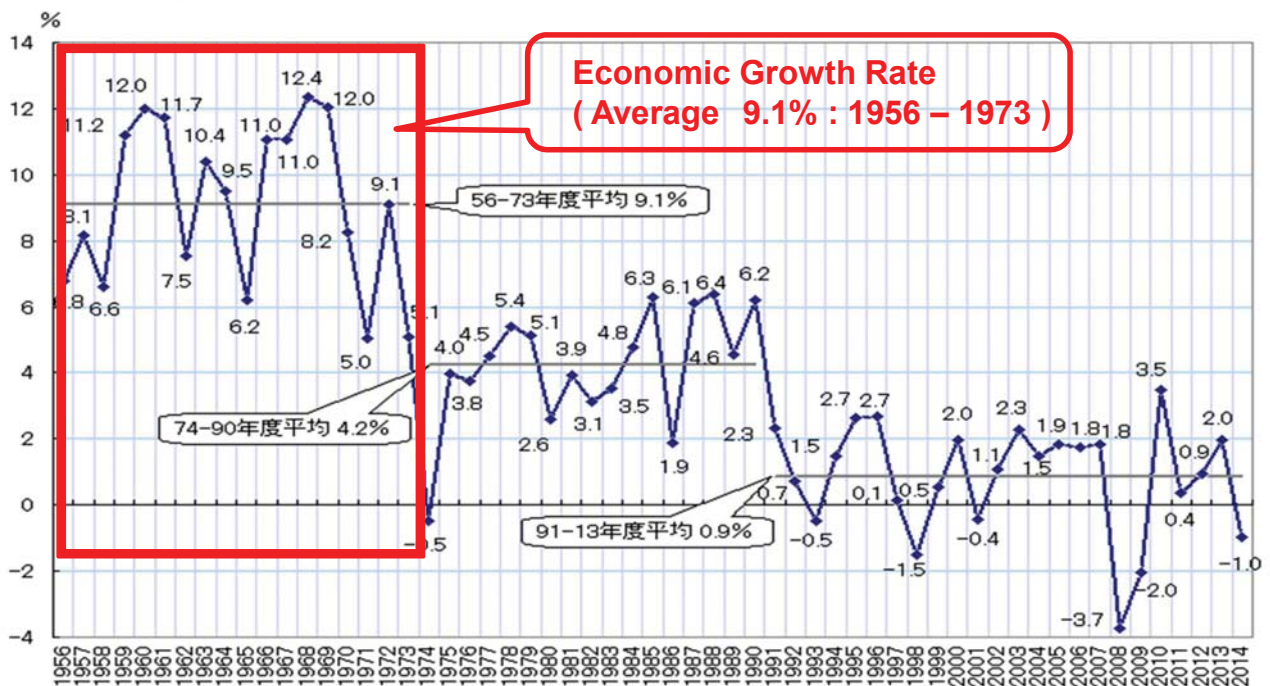




# Rapid Economic growth & Industrial Pollution in Kawasaki ( 1960-70 )



## 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

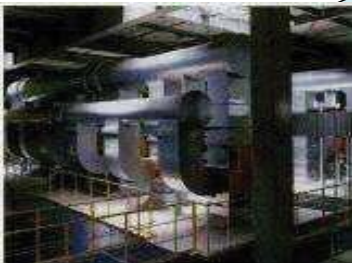
- Investment for pollution control
- Development of pollution control technologies

### Citizen

- Civil action against pollution
- Public awareness for environment

### Kawasaki-city

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



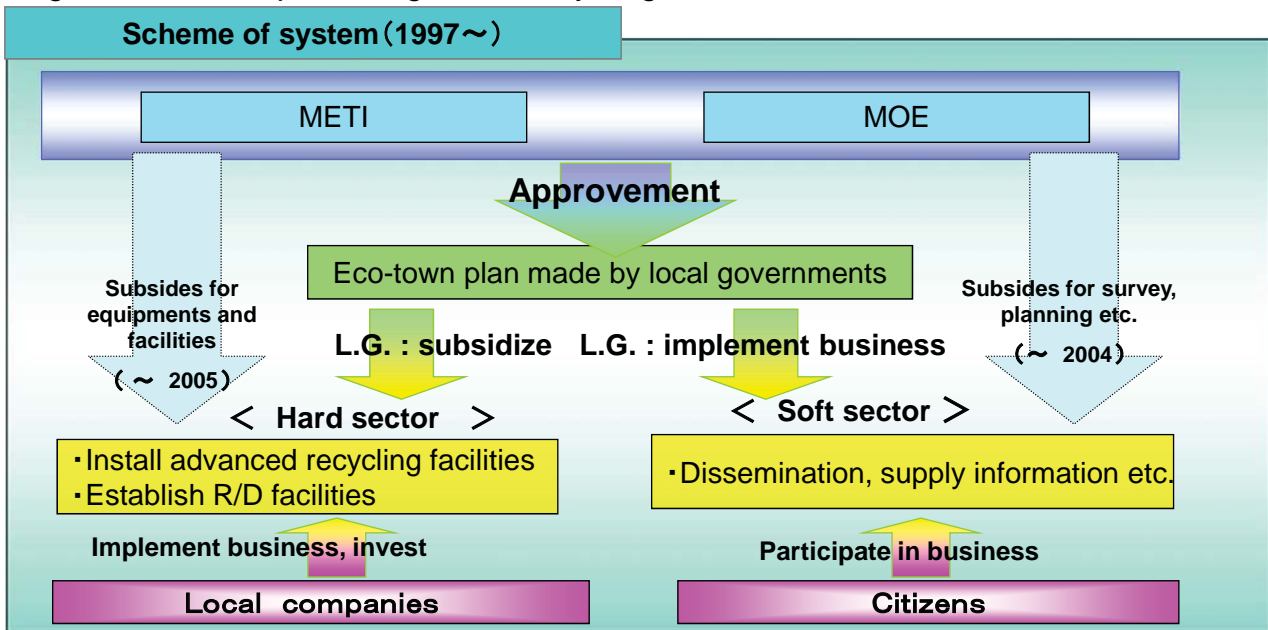
***"Sharing of Roles" & "Cooperative Action"***

**Improvement of Environmental Problems**

# Kawasaki Eco-town Project

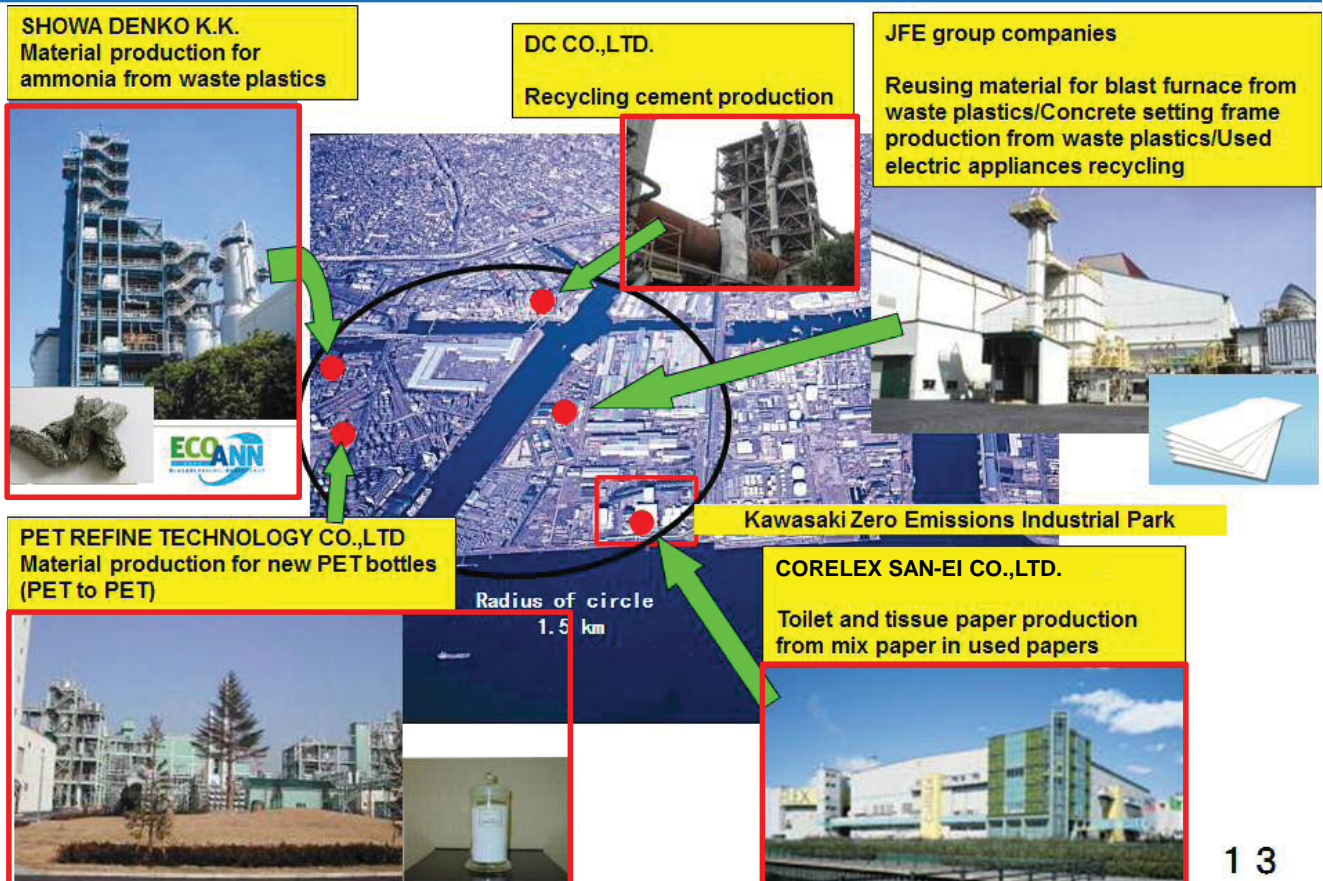
Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

- ① Promotion of environmental industries on locally accumulated technologies
- ② Formation of resources recycling economy and society through reducing waste generation and promoting waste recycling on site



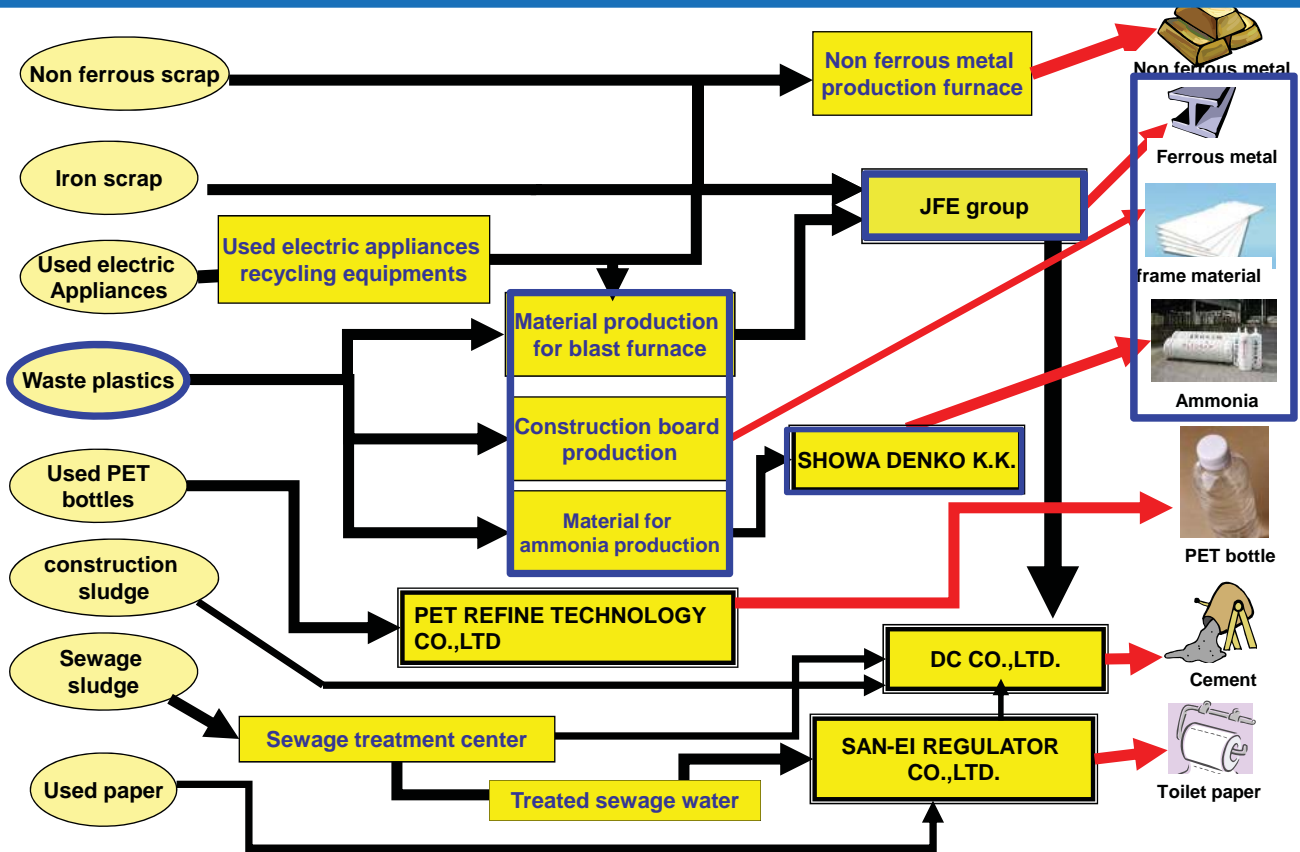
7

## Resource Recycling Facilities in Kawasaki Eco-town



13

## Companies' Collaboration in Kawasaki Eco-town

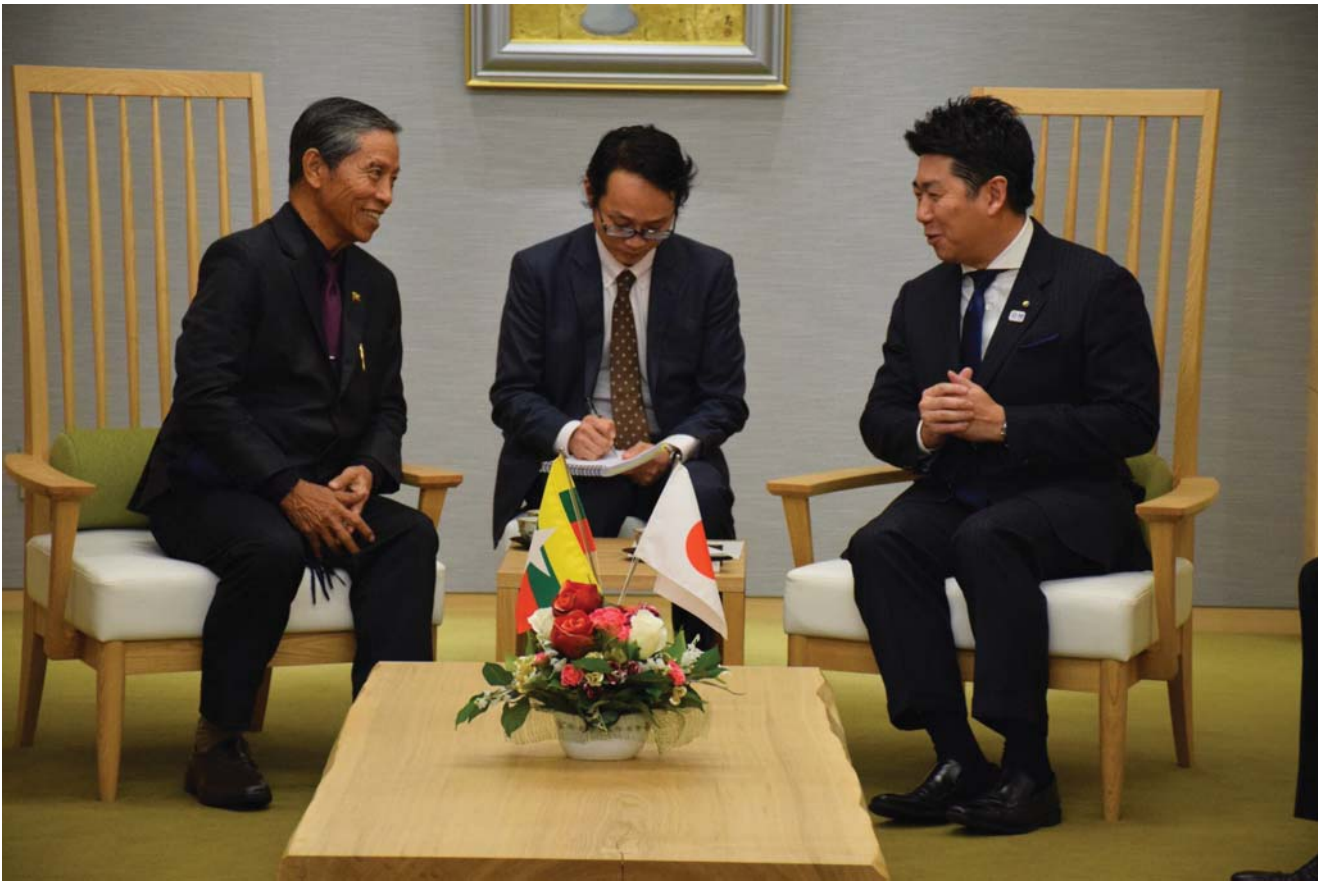


## Summary of Kawasaki Eco-town

- ◆ 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

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## Eco-town related facilities tour ②



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

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### Eco-town related facilities tour ③



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

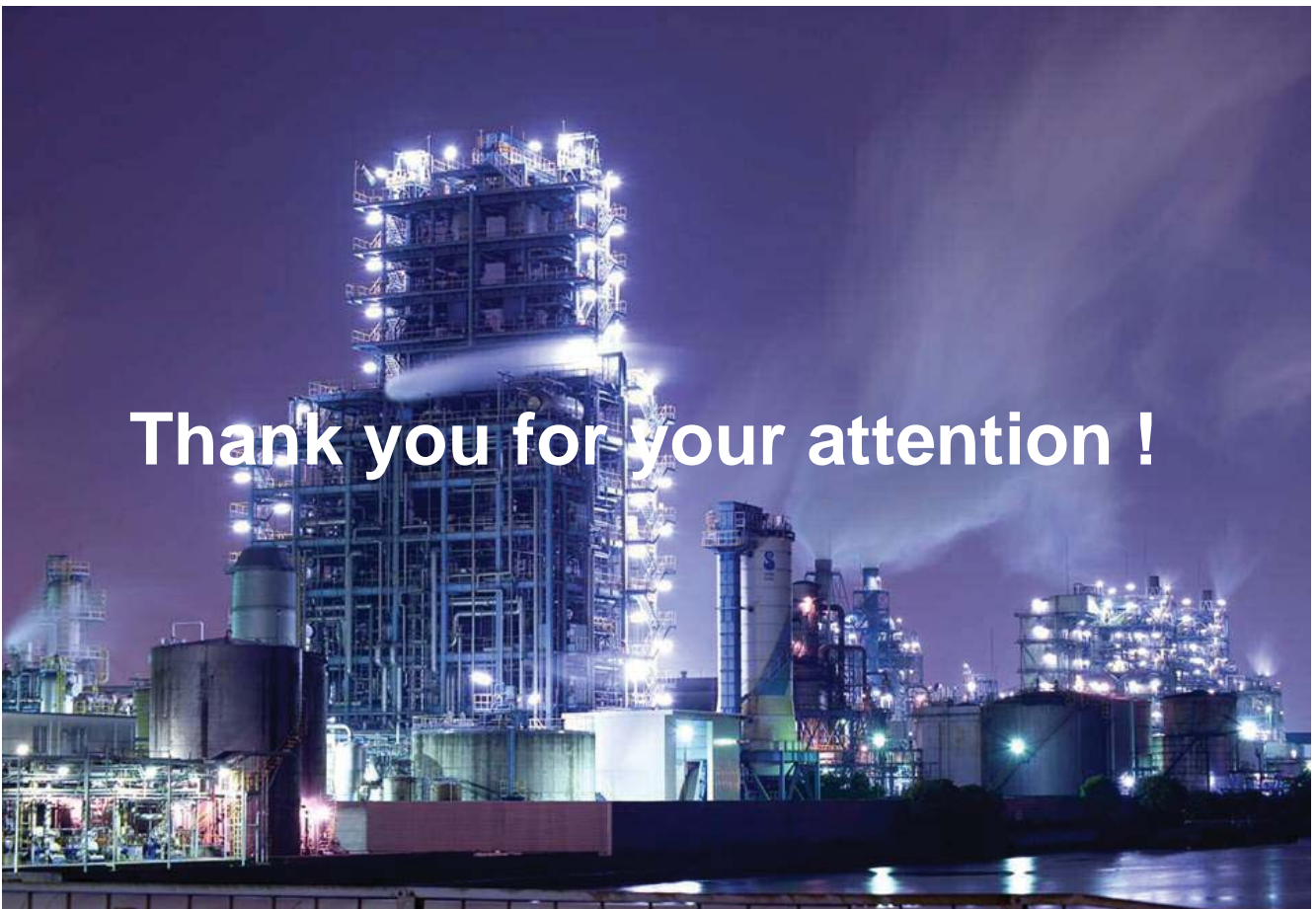
### Large-scale Solar power generation plant in Kawasaki ④



## Large-scale Solar power generation plant in Kawasaki ④



**Thank you for your attention !**

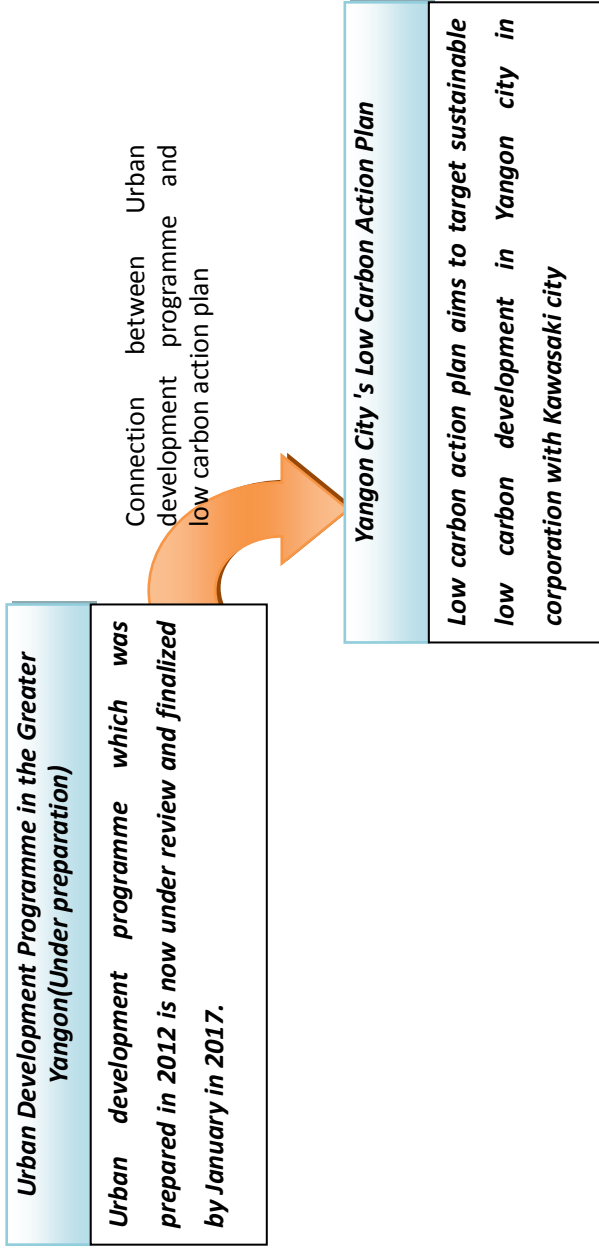


## 2. 低炭素アクションプラン資料

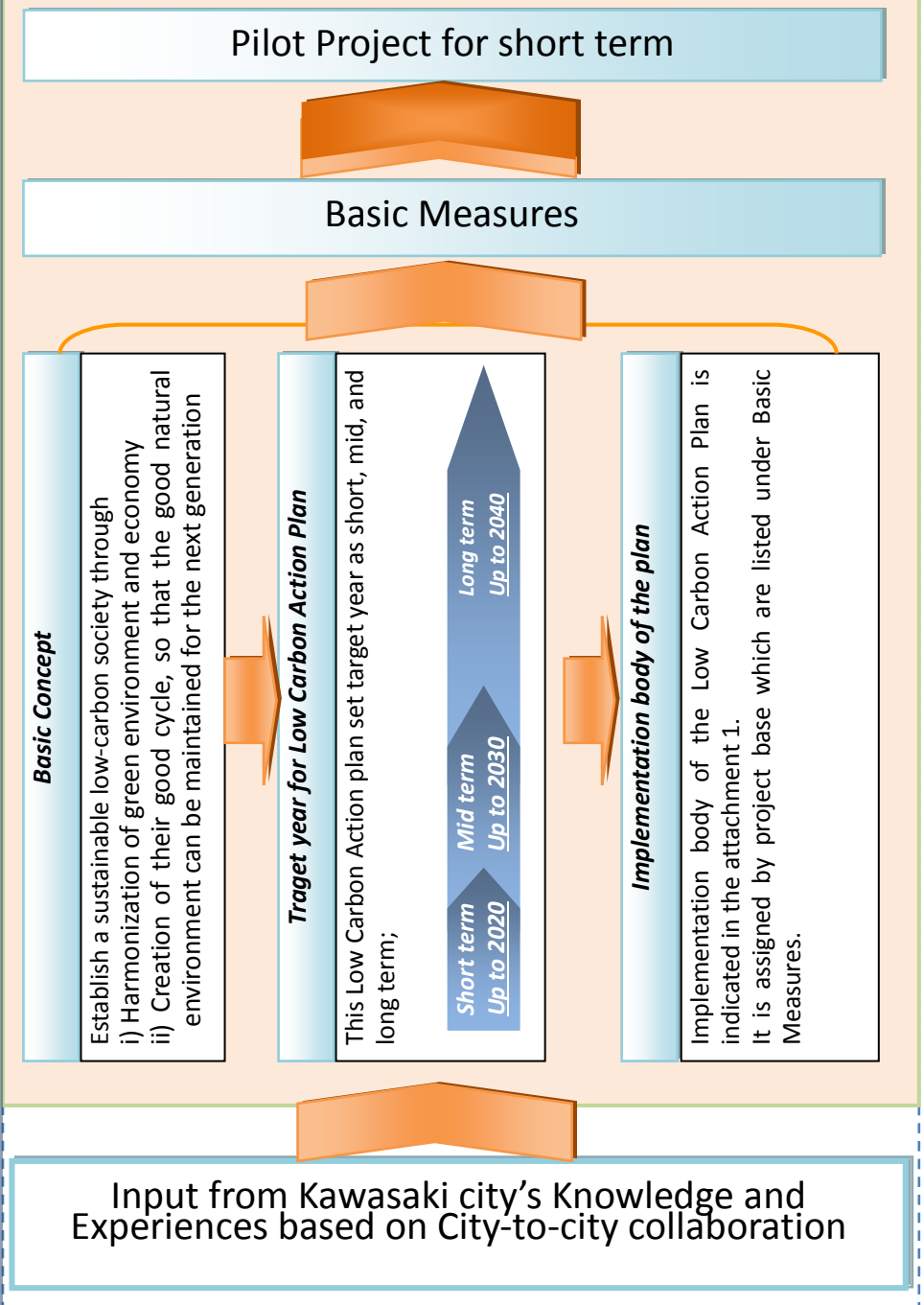


# Low Carbon Action Plan of Yangon City(Draft)

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



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



## 3. Basic Measures of Low Carbon Action Plan

### I. Reduction of greenhouse gas emission from industrial activities

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

### Industry

### II. Utilization of renewable energy resources

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

### Energy

### III. Creation of low-carbon city

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

### Urban City

### VI. Introduction of Low carbon technique in the transportation Sector

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

### Transportation

### V. Creation of recycling-oriented society

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

### Waste Management

### VI. Environmental education and study on global environmental issues

- Promotion of environmental education and study
- Promotion of human resource development

### Education

### VII. Introduction of international technology through city to city corporation

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

### International Corporation

### VIII. Research and development of environmental technologies

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

### MRV

※<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

28<sup>th</sup> September 2016

1

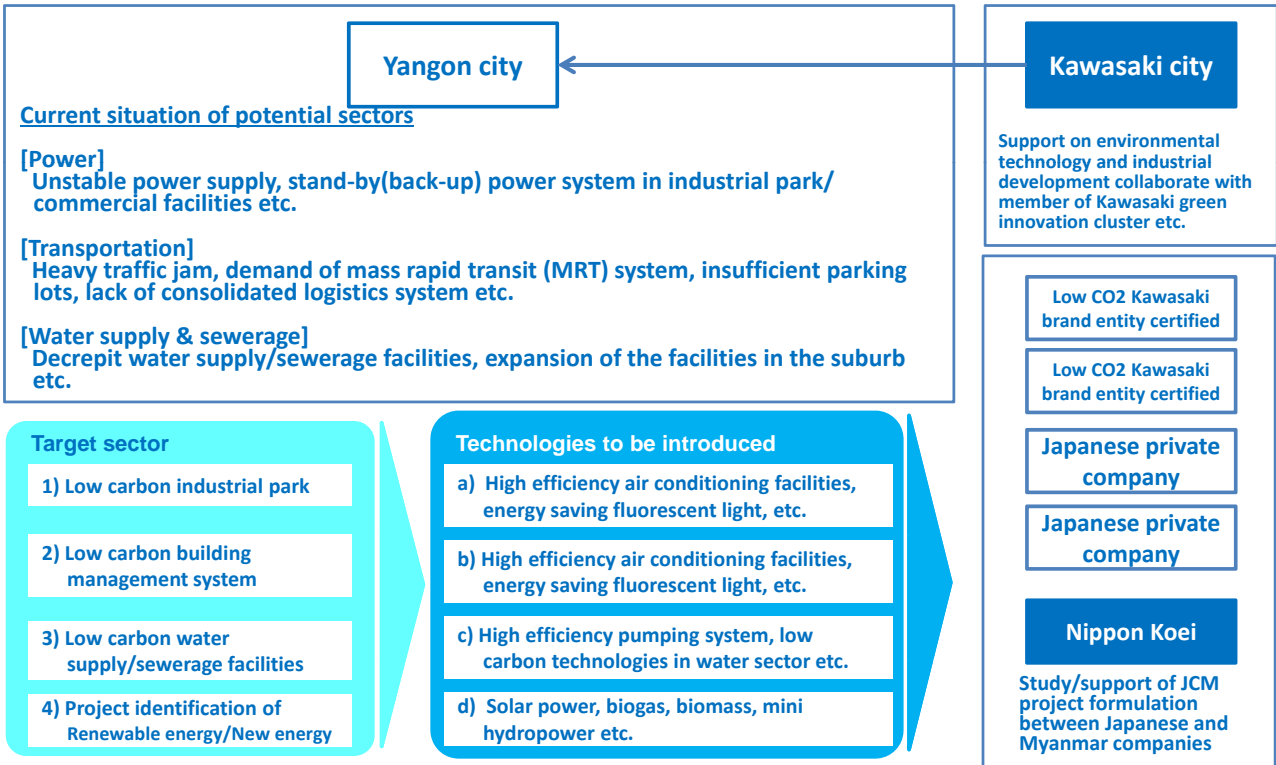
## Contents

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

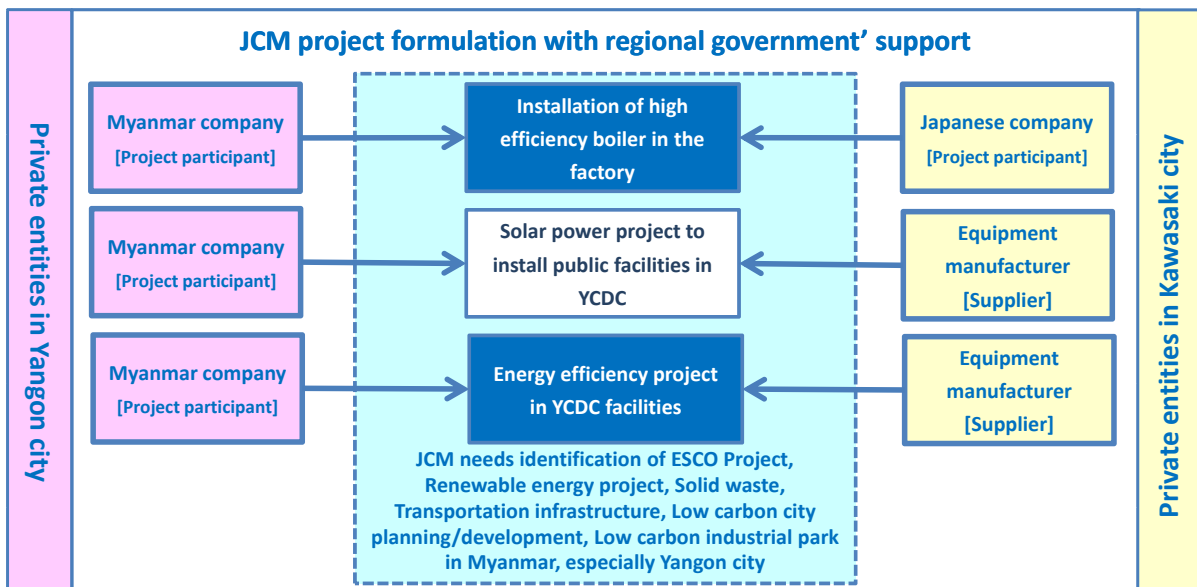
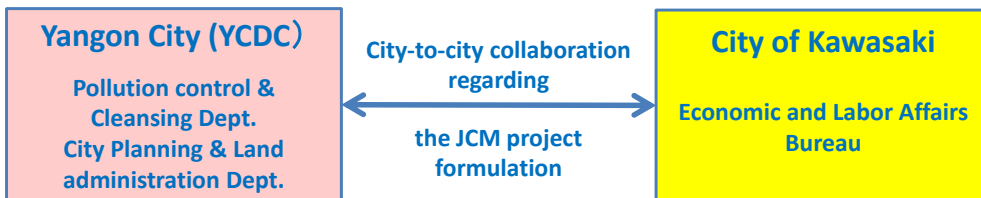
# 1. Overview of JCM City-to-city collaboration project

## 【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.



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



## 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

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

**Government of Japan**

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

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<sub>2</sub> 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)

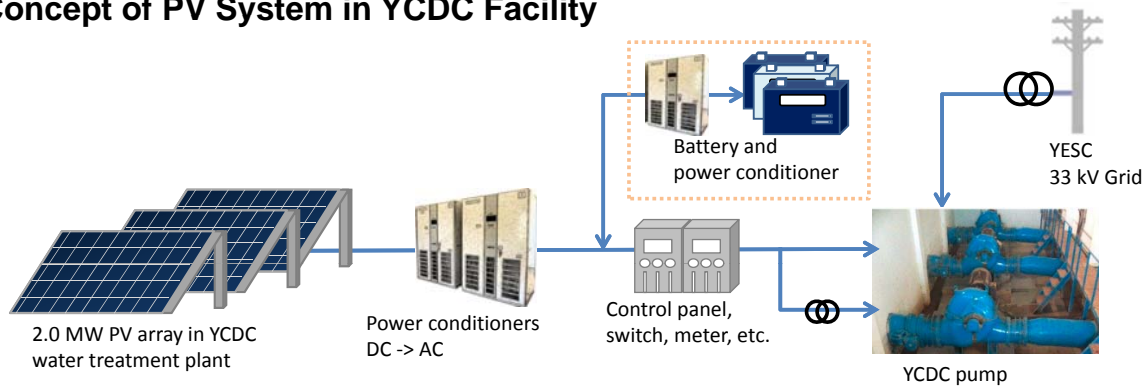
Myanmar  
Sep. 16, 2015  
(Nay Pyi Taw)

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



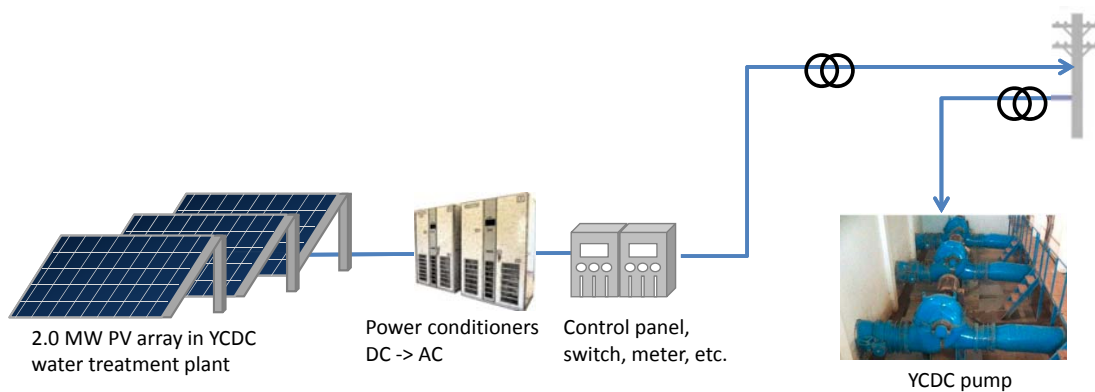
- Solar PV generation system reduces electric energy usage in YCDC pump station
- Solar power for internal supply only (no feed to grid)
- Battery is necessary to absorb fluctuation of PV output

Item	Value
Average tariff	105 MMK/kWh
PV system efficiency	77%
Solar Irradiation (Average)	4.69 kWh/m <sup>2</sup> /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 :  $\text{Tariff payment} = \text{Energy used} - \text{PV generated}$



### 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 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
<b>Nyaung Hnit Pin</b>	-Peak 7MW, off-peak 6.8 Mw, 24 hr operation -1 <sup>st</sup> phase 2014, 2 <sup>nd</sup> phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1 <sup>st</sup> 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	2 <sup>nd</sup> 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 m <sup>2</sup>
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

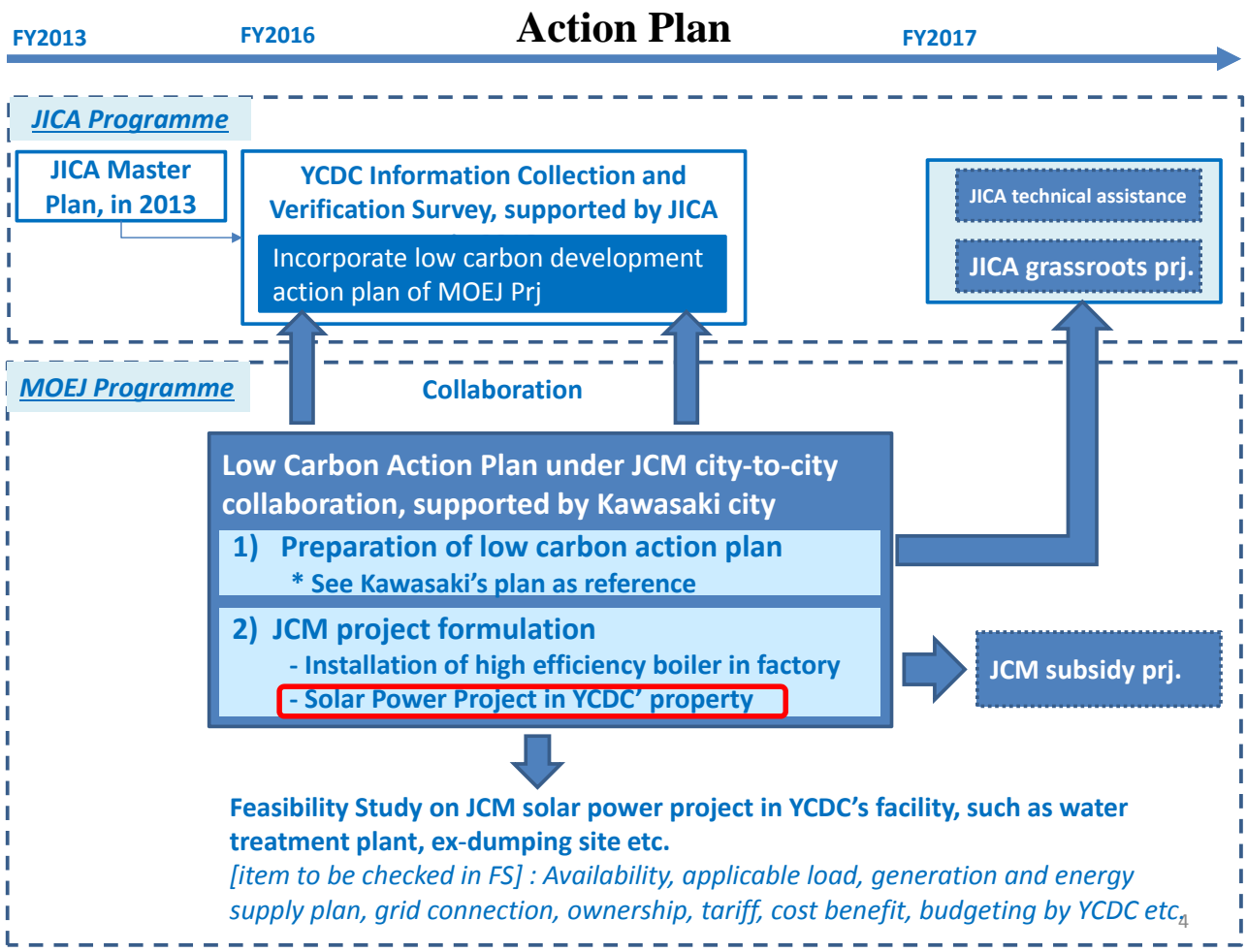
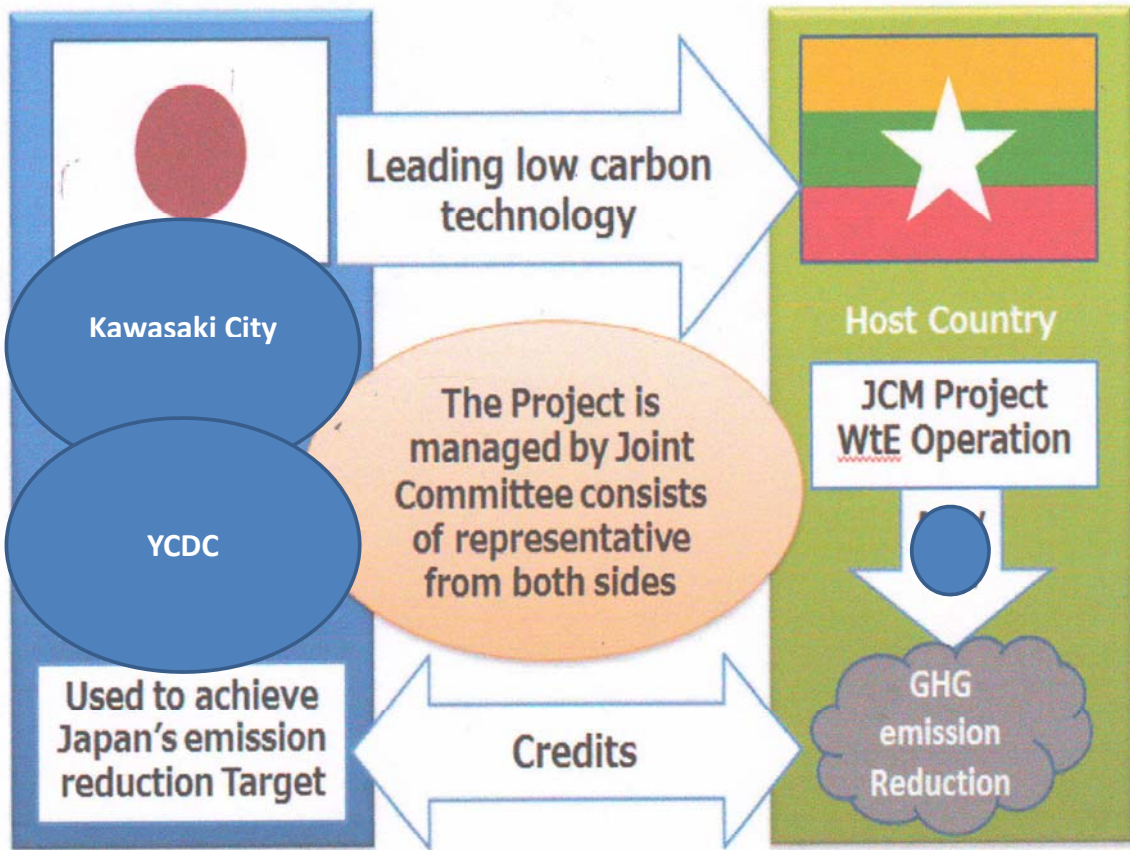




# JCM Project Formulation Study through City-to-City Collaboration between YCDC and Kawasaki city

## 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.



## Menu of City-to-City Collaboration from Kawasaki City

Low carbon society	<ul style="list-style-type: none"> <li>▪ Eco town planning and sharing experience</li> <li>▪ Introduction of energy saving products/ technologies from Japanese private entities</li> <li>▪ Support on Private Sector Collaboration, such as chamber of commerce etc.</li> <li>▪ Support on capacity development through JICA scheme etc.</li> </ul>
Water supply/ Sewerage	<ul style="list-style-type: none"> <li>▪ Sharing of management knowledge on water supply/ sewerage system</li> <li>▪ Sharing of water tariff collecting/ water quality management knowledge</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>▪ Support on system development on car exhaust /air /pollution/ water quality/ soil condition, including analysis know-how</li> </ul>
Solid waste	<ul style="list-style-type: none"> <li>▪ Planning/ Implementation of solid waste collection system</li> <li>▪ Planning/ Implementation of garbage separation program</li> <li>▪ Planning/ Implementation of compost promotion program</li> <li>▪ Knowledge sharing of industrial waste management</li> <li>▪ Establishment of solid waste database etc.</li> </ul>
Education	<ul style="list-style-type: none"> <li>▪ Planning/ Implementation of environmental education programs</li> </ul>
Miscellaneous	<ul style="list-style-type: none"> <li>▪ Implementation of site tour on Kawasaki eco town etc.</li> <li>▪ Establishment of Environmental Impact Assessment (EIA) system</li> </ul>

## <Low Carbon Society Sector>

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

➤ Three major items for the 2<sup>nd</sup> 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

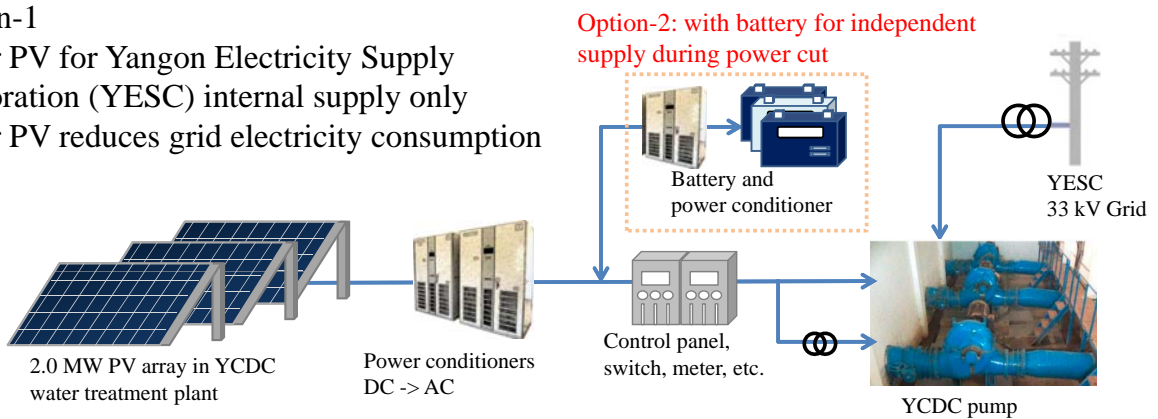
- Selection of pilot project site:
  - Interview survey → Site survey → Document review
- Criteria for selection: needs, demand, location

Candidate	Status	Load	Selection result
<b>Nyaung Hnit Pin</b>	-Peak 7MW, off-peak 6.8 Mw, 24 hr operation -1 <sup>st</sup> phase 2014, 2 <sup>nd</sup> phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1 <sup>st</sup> 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	2 <sup>nd</sup> 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

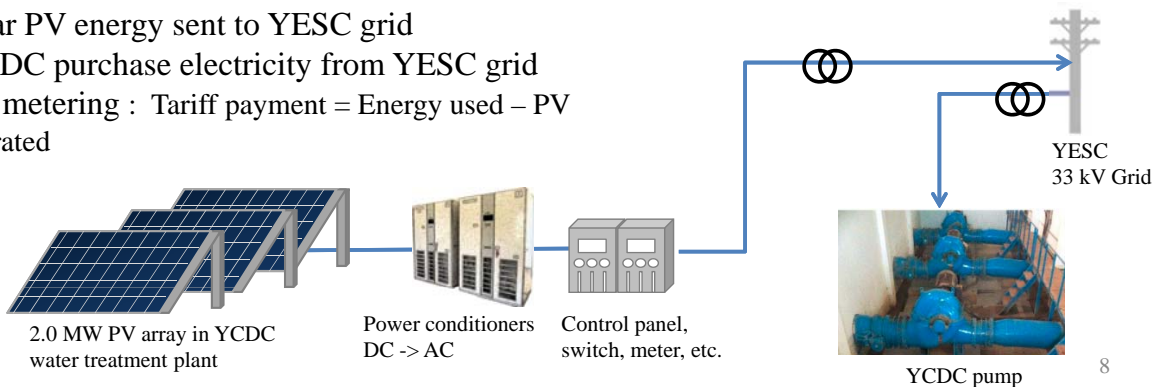
### Option-1

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



### Option-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



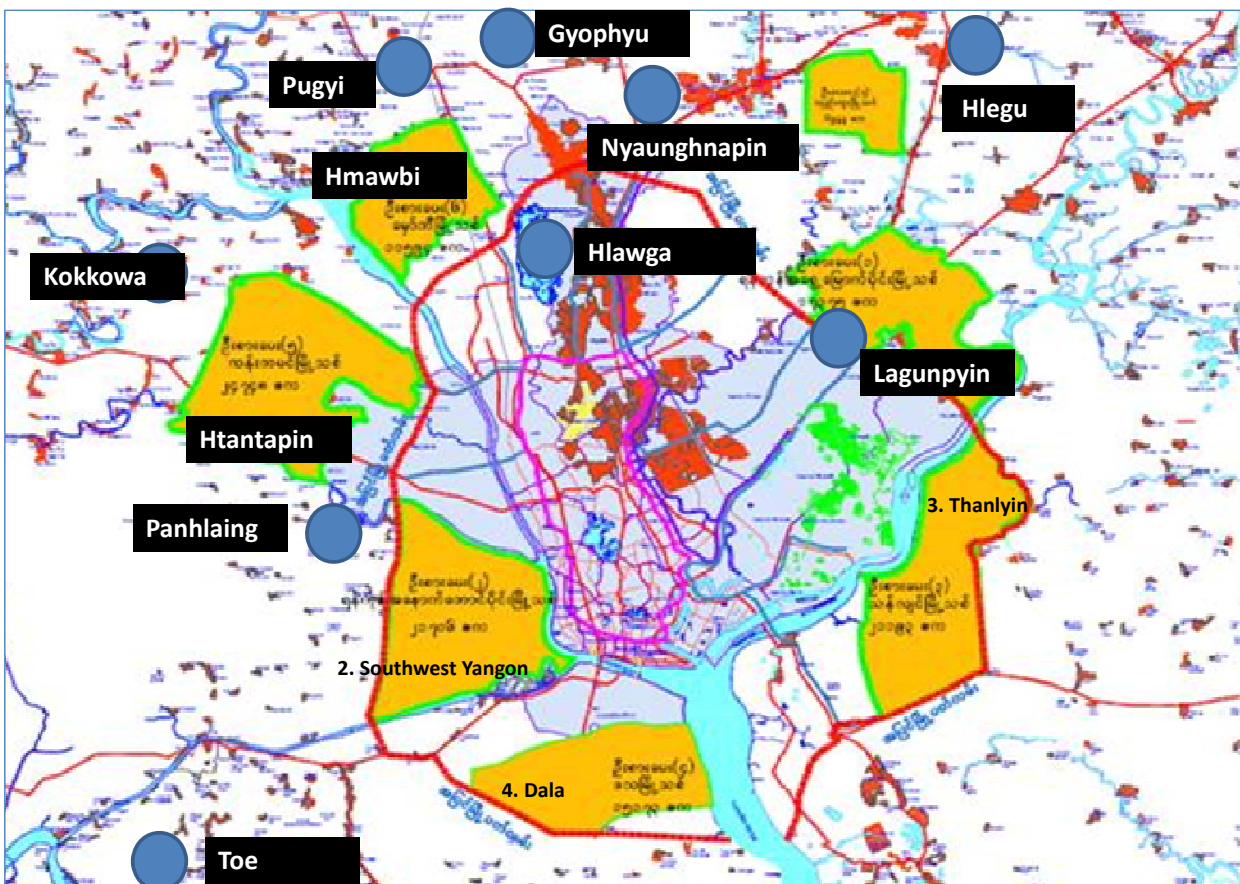
Electric room (PV –related equipment can be stored)

Pump room



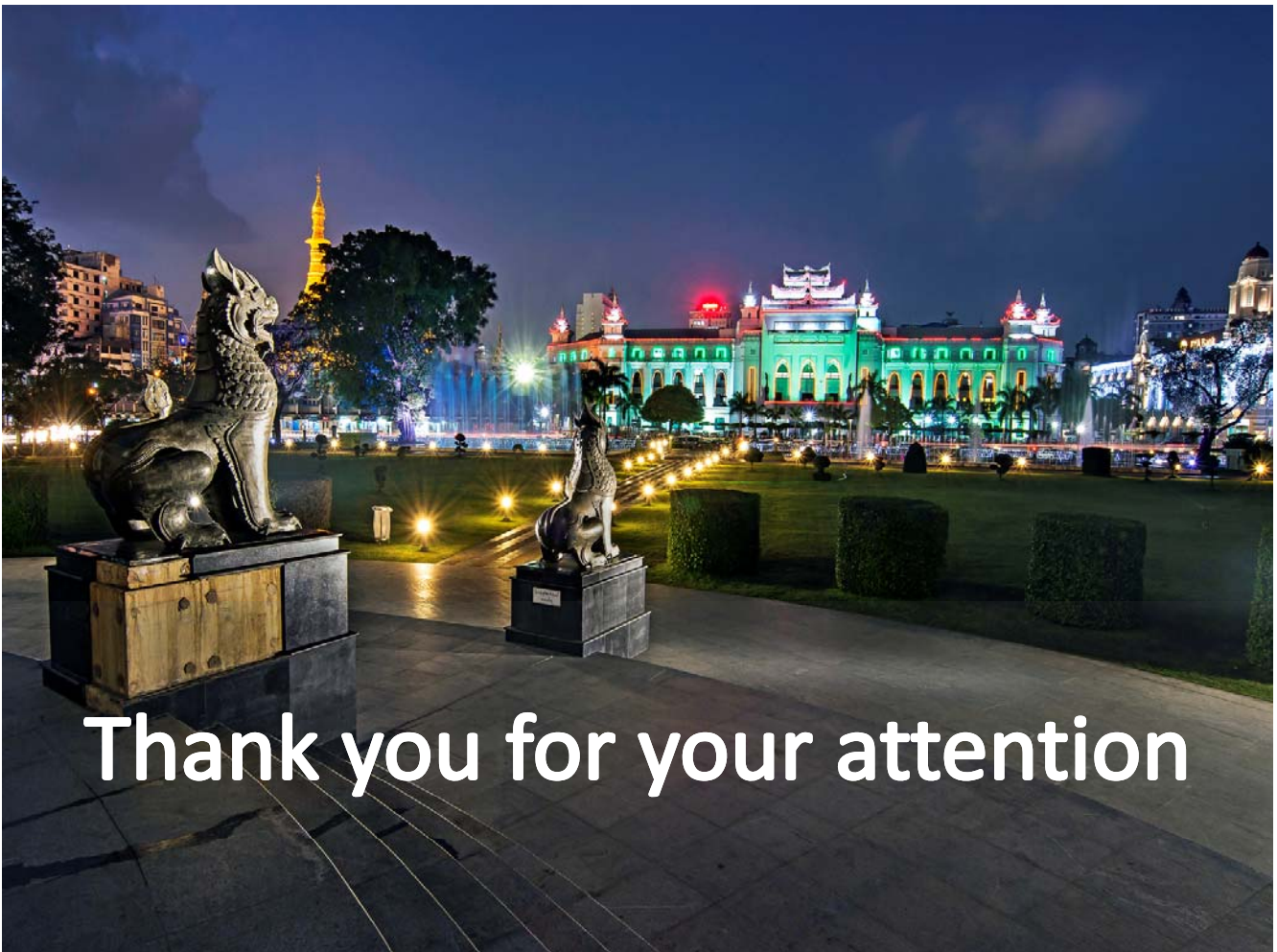
Candidate PV module area

## 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.



**Thank you for your attention**



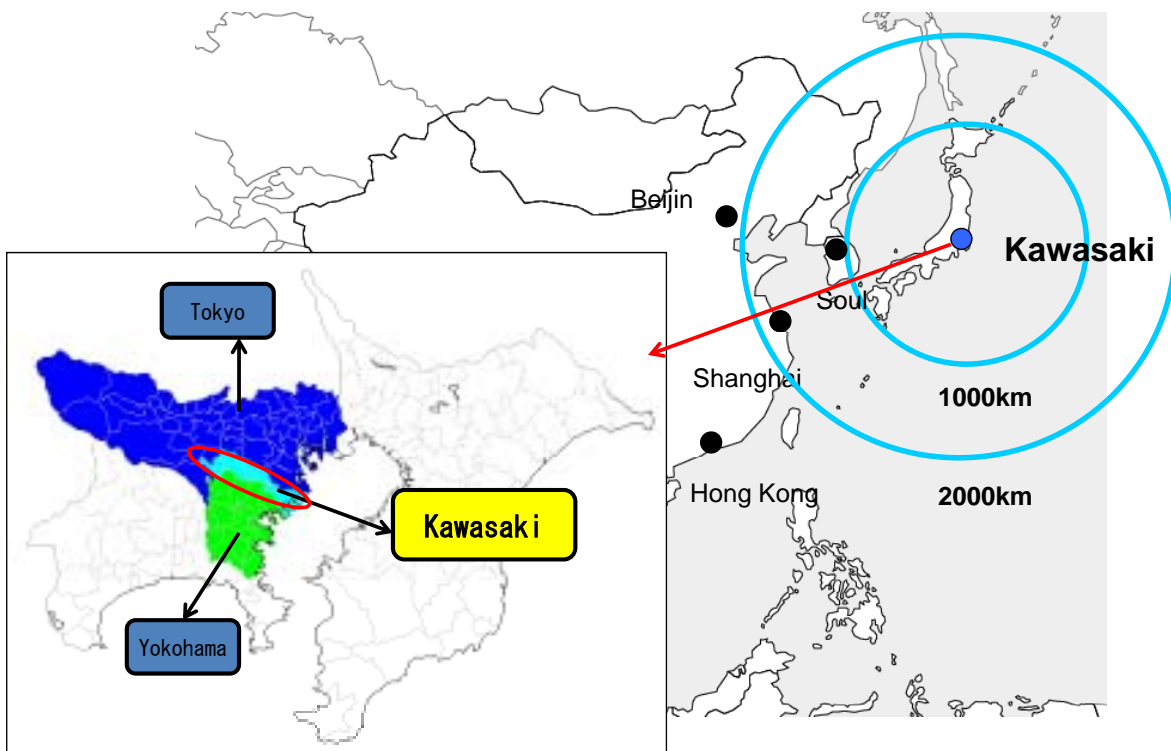
# JCM City-to-City Collaboration between Kawasaki-city and Yangon-city



Economic and Labor Affairs Bureau



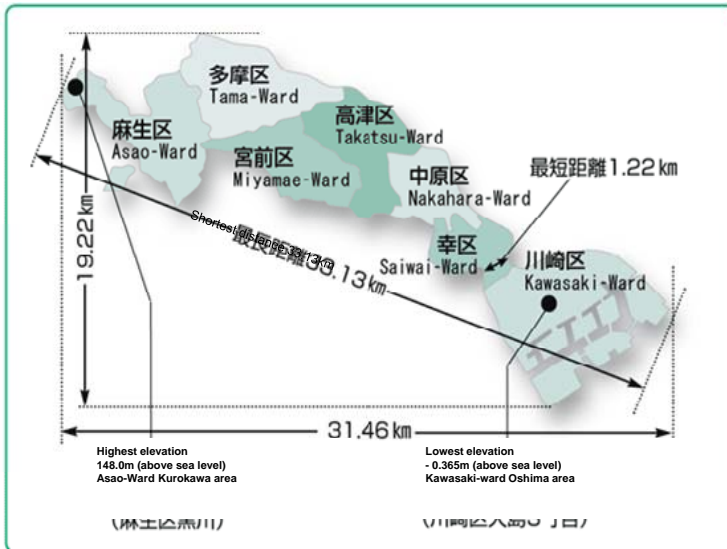
## General information about Kawasaki-city: Location



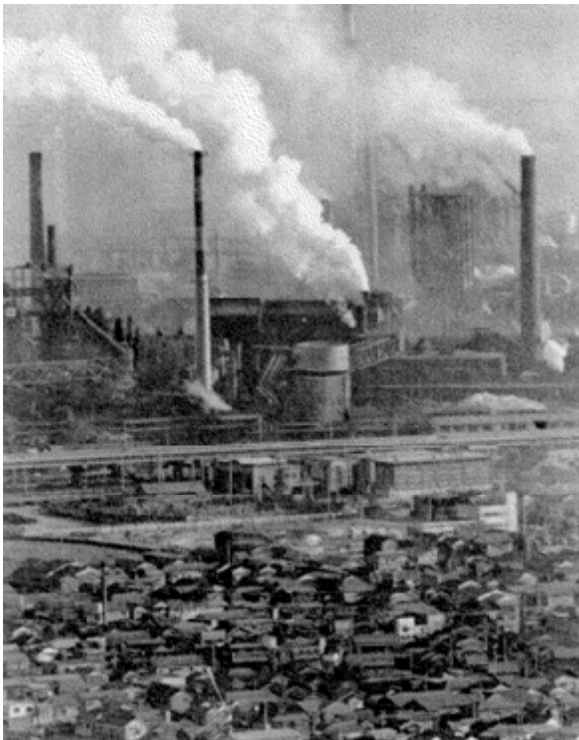
## City profile

- Population:
- Area:
- City budget:
- 7 wards:

APPROX 1.47 million population (2014)  
144.35 Km<sup>2</sup>  
APPROX 10 billion US\$ (2015)  
Kawasaki, Saiwai, Nakahara, Takatsu,  
Miyamae, Tama, Asao



## Experience of industrial pollution ( 1960-70 )



Tama-river (1970)



Tama-river (1970)



**Kawasaki Waterfront Area ( 1970 )**



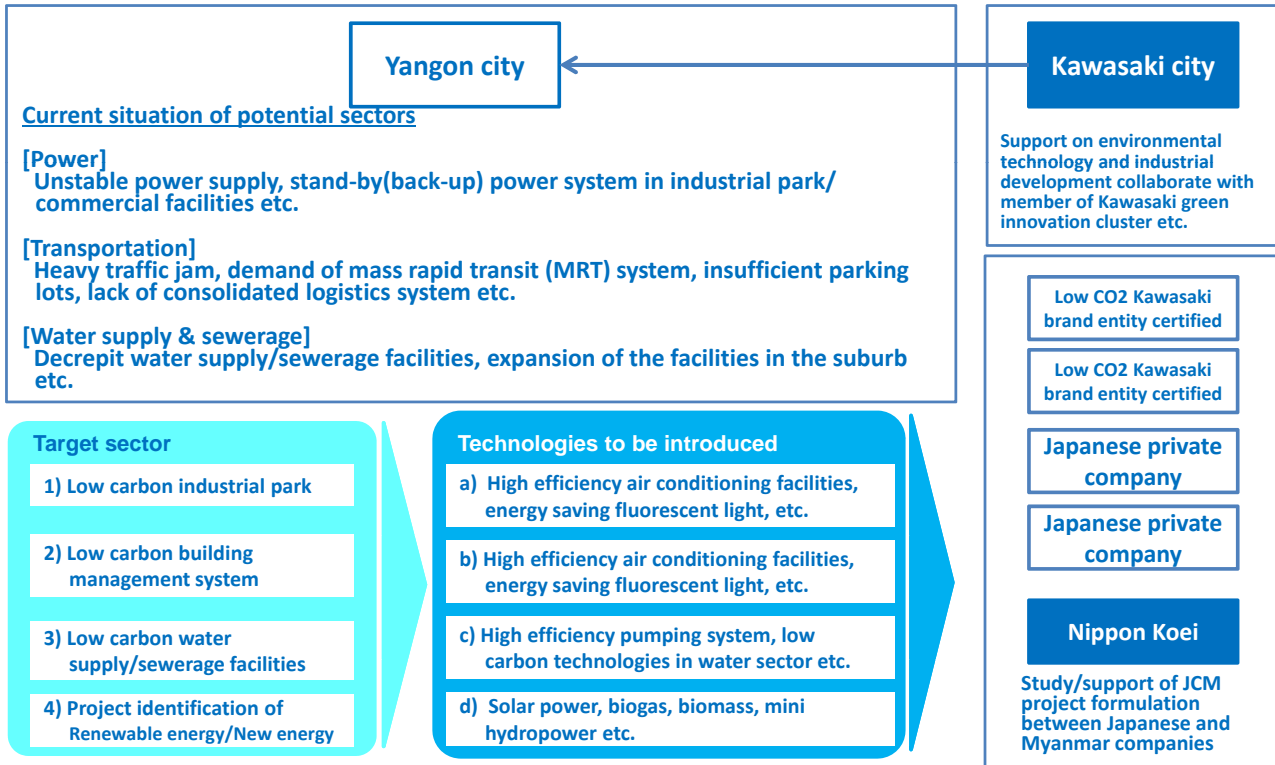
**Kawasaki Waterfront Area ( 2010 )**



# 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.



# 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:

- 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.
- In order to achieve the aforementioned objectives, both parties shall cooperate on the following:
  - Excavating and supporting of low-carbon projects utilizing Joint crediting mechanism (JCM) scheme
  - Technical cooperation and information exchange for realizing low-carbon society of Yangon
  - Supporting creation of new business in a field of environment
- According to this Memorandum of Understanding (MOU), there shall be back to back missions to have exchanges and study visits in both cities.
- 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.
- The contents of this MOU can be amended in accordance with a written agreement of both parties.
- Any disagreement which comes from interpretation of the MOU shall be solved in a friendly way based on both parties' trust and discussion.
- This MOU shall be made in two original copies in English.

March 25<sup>th</sup>, 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:** 1<sup>st</sup> Visit to Yangon-city

**December 2015:** Discussion on Draft MOU at Yangon-city

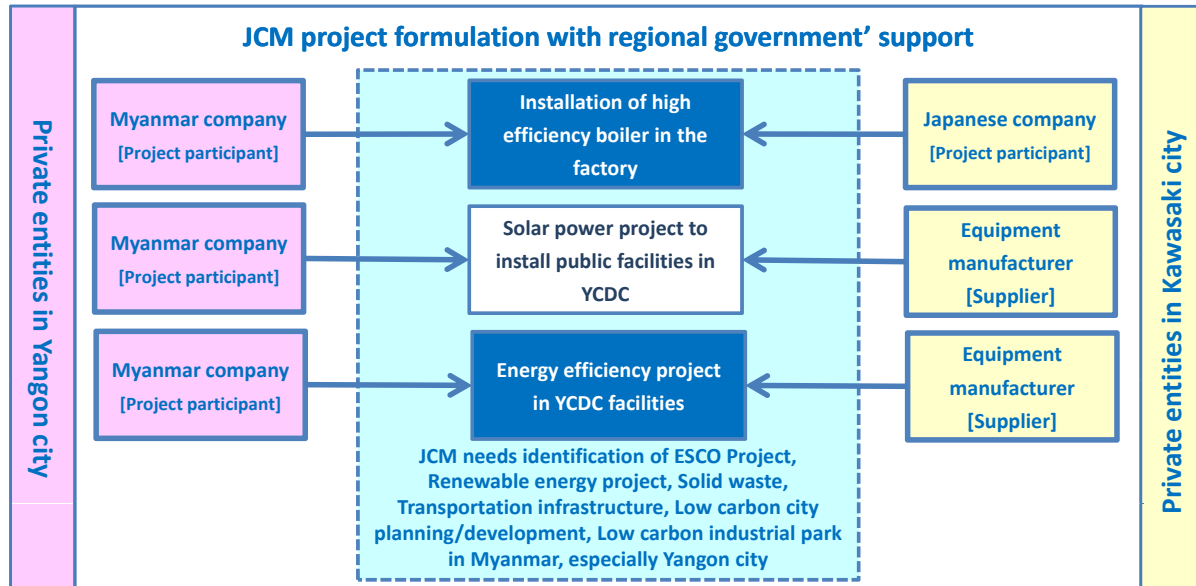
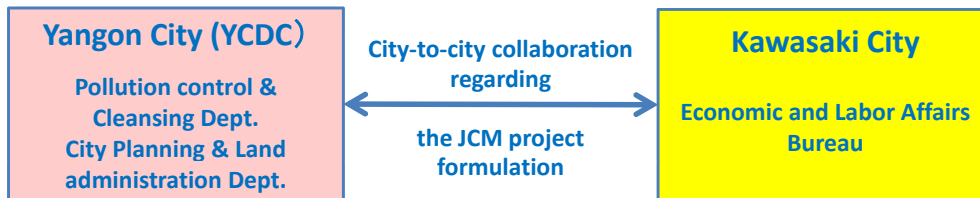
**January 2016:** Workshop on City-to-city collaboration at Yangon-city

**March 2016:** Concluding MOU between Kawasaki city and YCDC



Workshop for city-to-city collaboration at Yangon

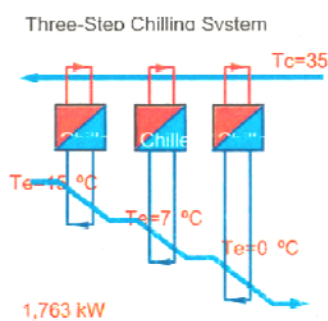
# JCM City-to-city collaboration project ( 2017 )



## 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 boiler

<Introduced technology>



- 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



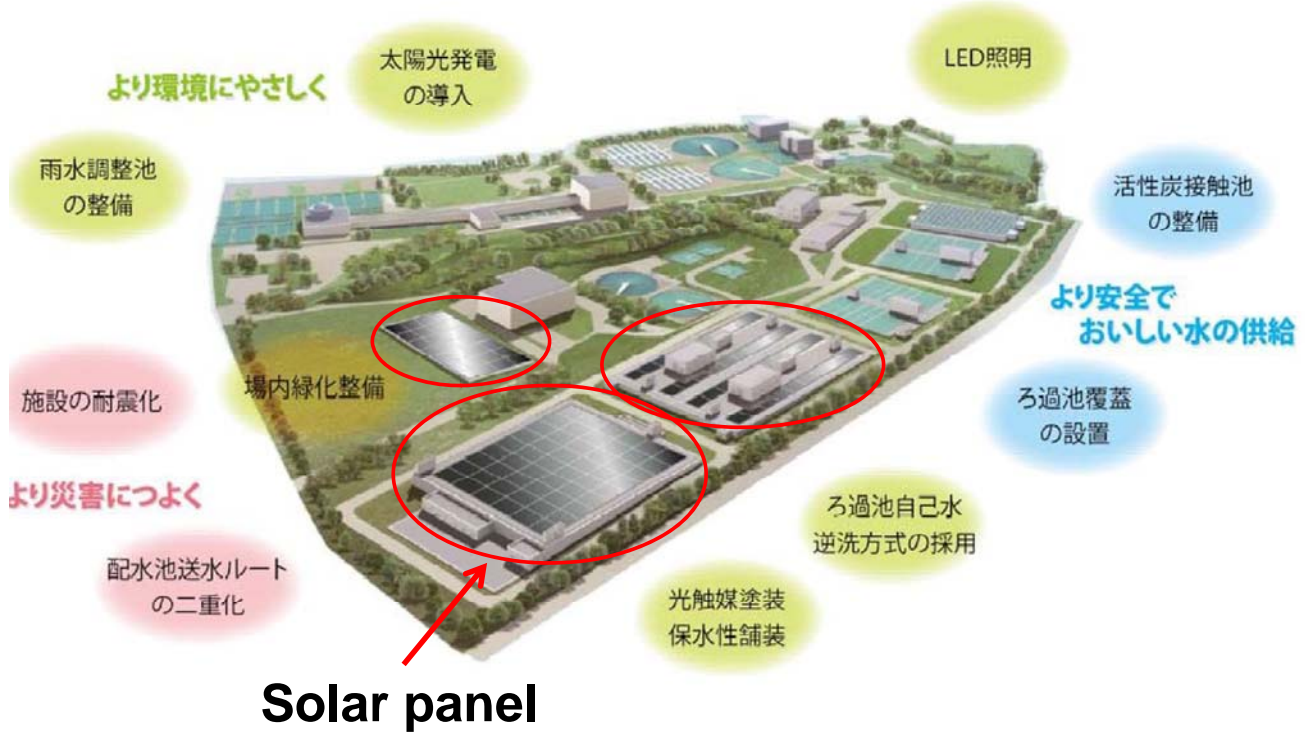
### Detail of Nagasawa water purification plan in Kawasaki

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 m <sup>2</sup>
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)

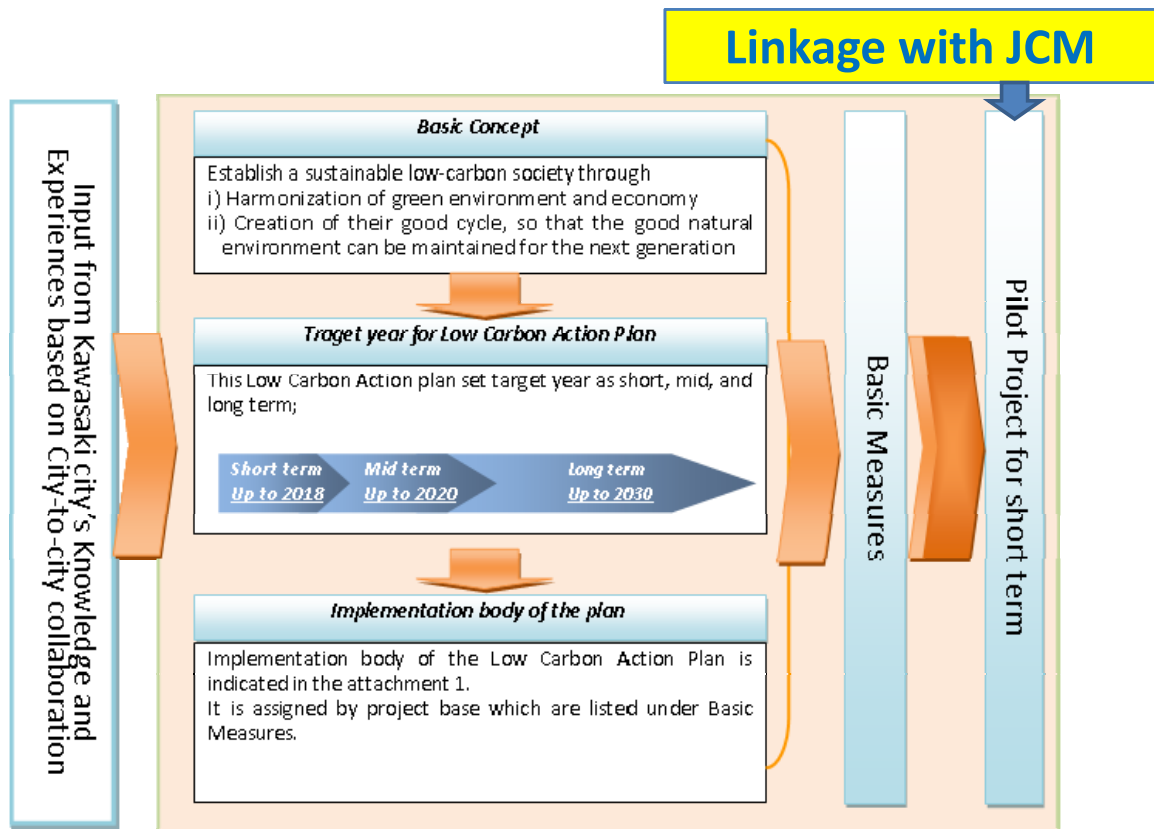
## Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki



# 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



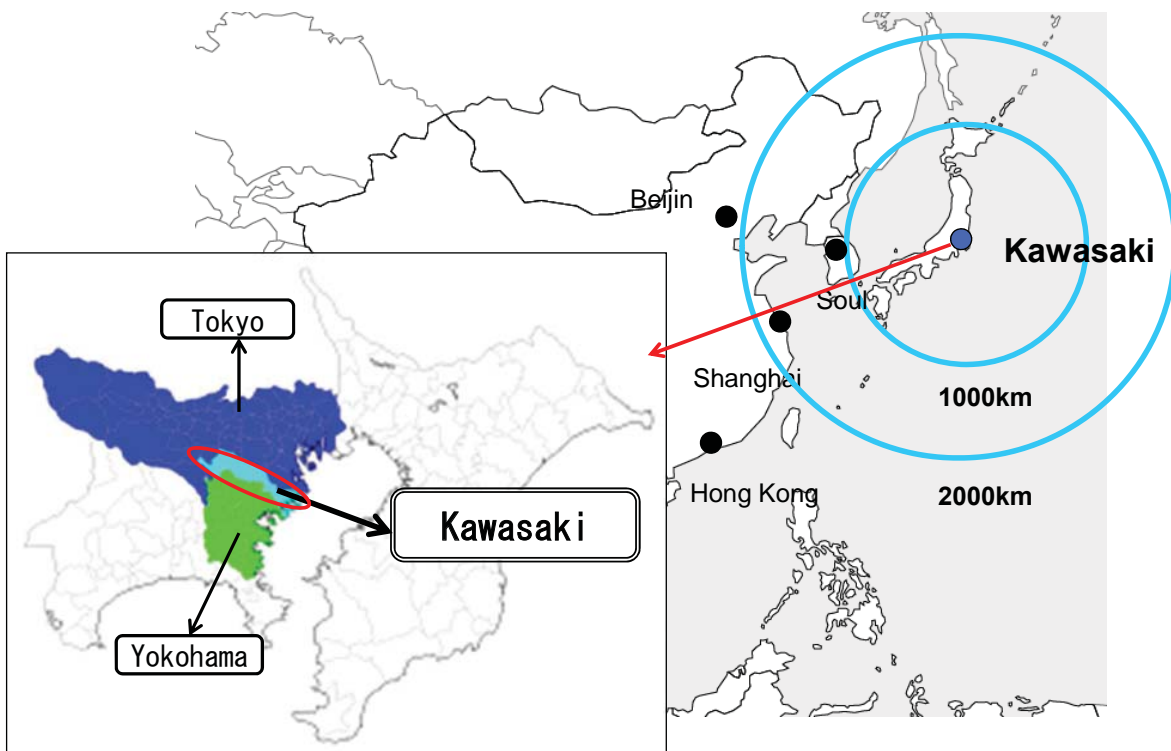
# JCM City-to-City Collaboration between Kawasaki-city and Yangon-city



Kawasaki-city  
Japan

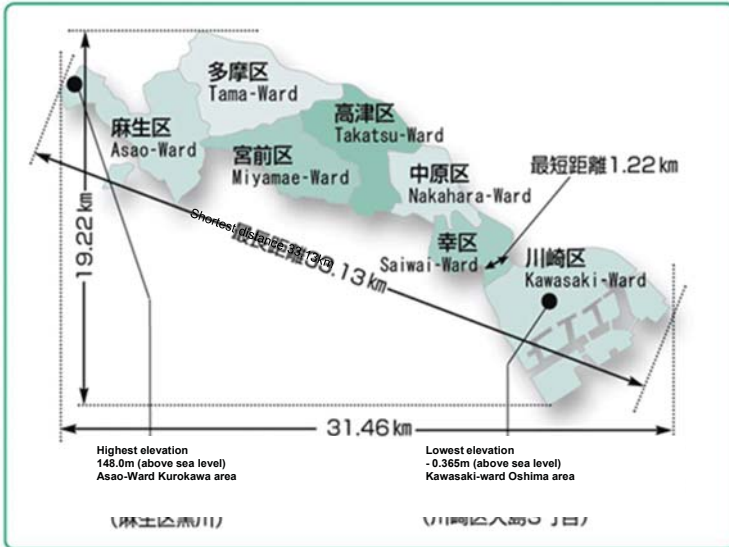


## About Kawasaki-city, Japan



# About Kawasaki-city, Japan

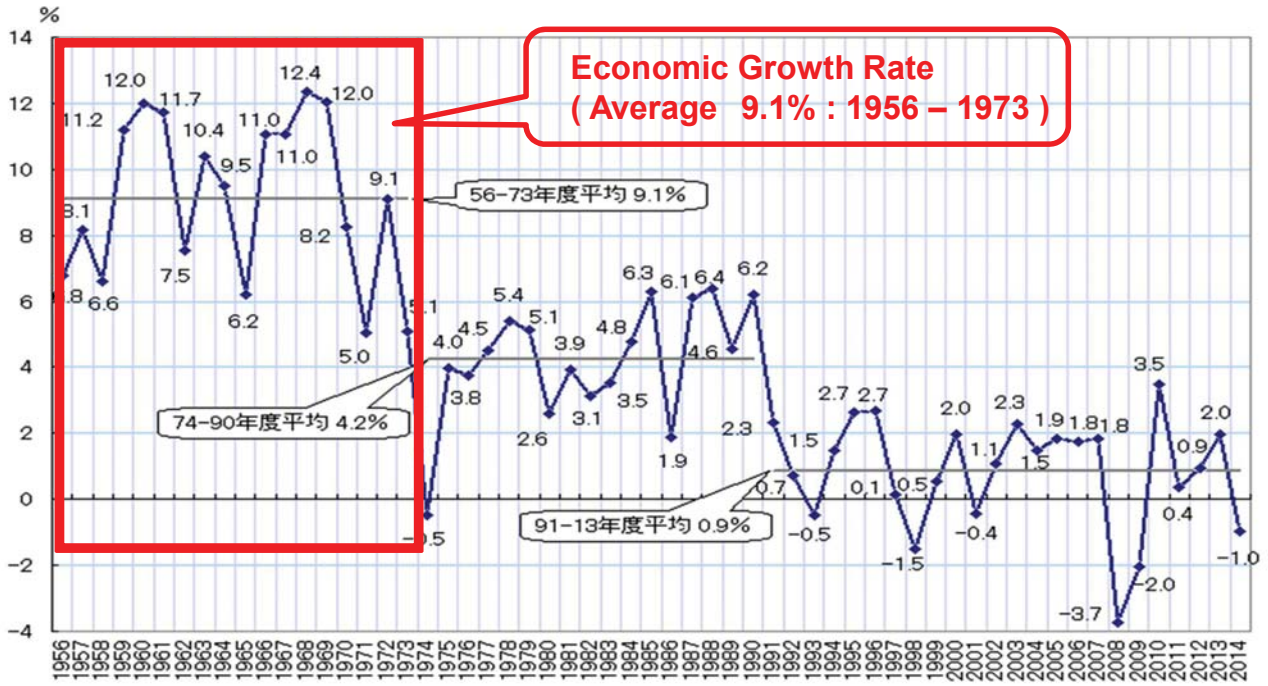
- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km<sup>2</sup>
- City budget: APPROX 10 billion US\$ (2015)



# Experience of Industrial Pollution in Kawasaki ( 1960-70 )



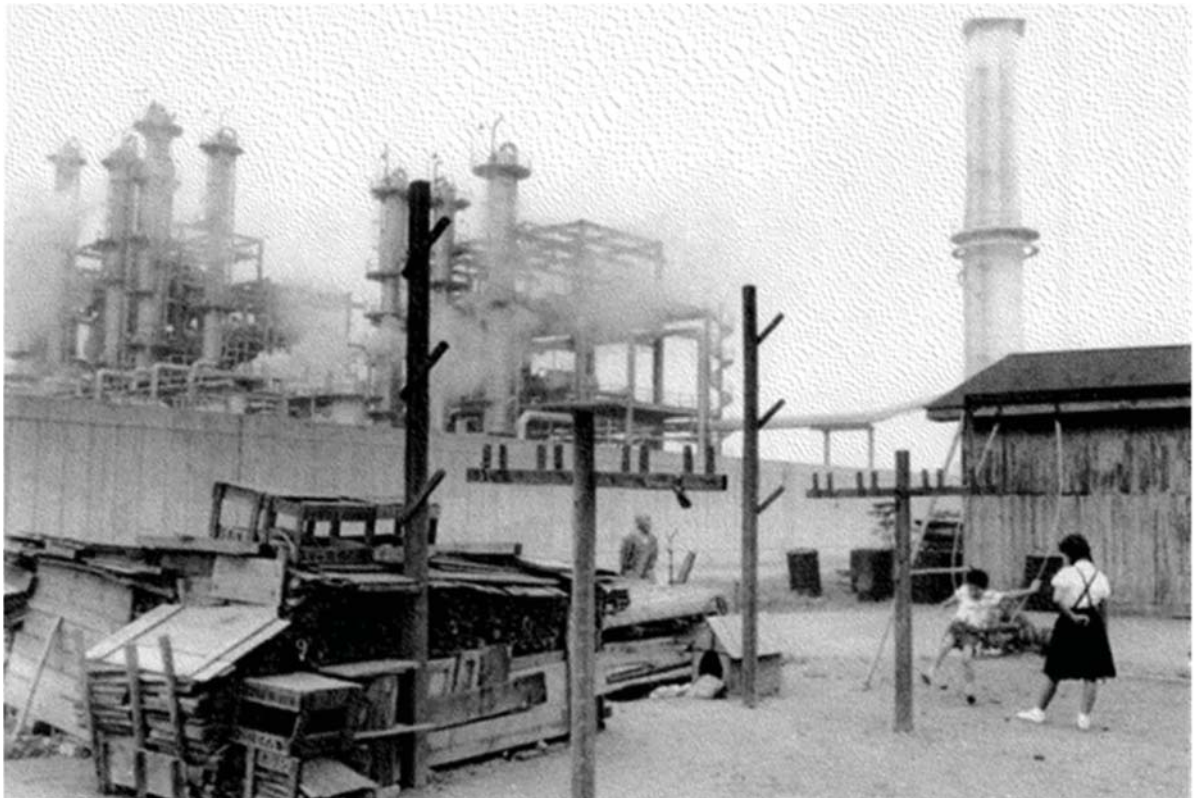
# Economic Growth Rate in Japan



(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

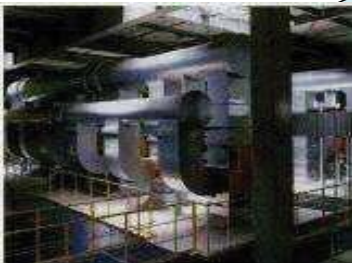
- Investment for pollution control
- Development of pollution control technologies

### Citizen

- Civil action against pollution
- Public awareness for environment

### Kawasaki-city

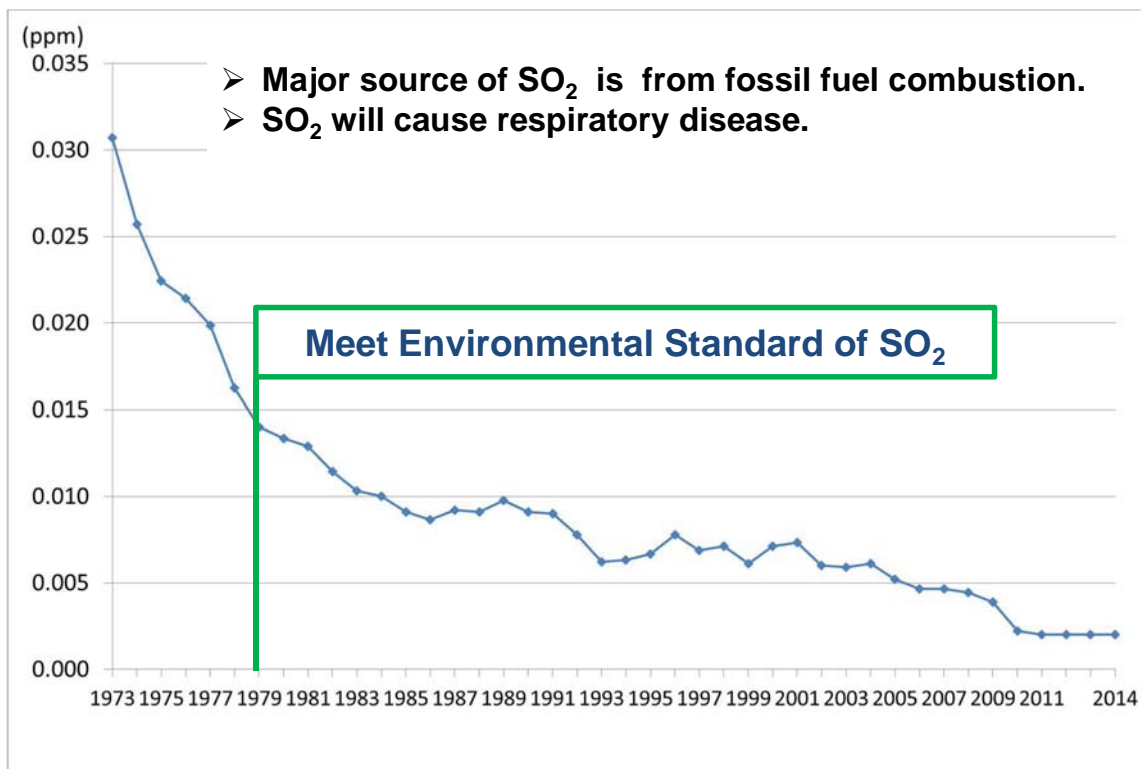
- Pollution control agreement with local industries
- Regulation for pollution control
- Pollution monitoring system



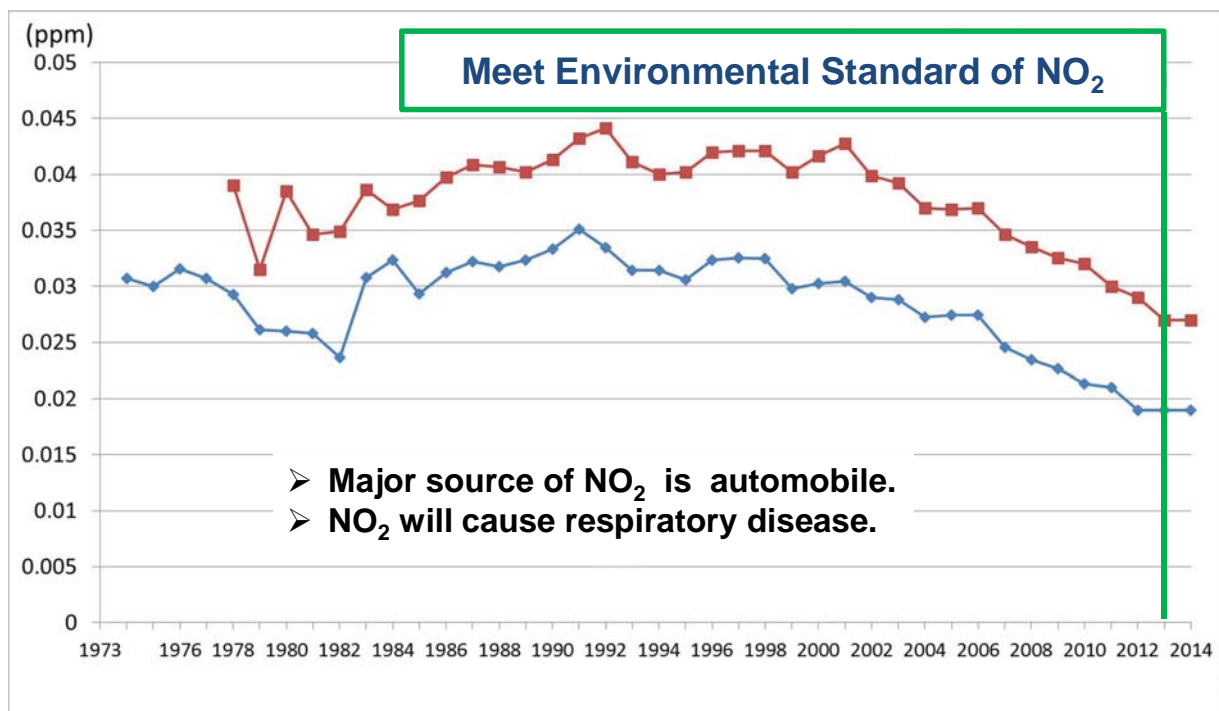
***"Sharing of Roles" & "Cooperative Action"***

**Improvement of Environmental Problems**

## SO<sub>2</sub> Concentration in Air from 1973 - 2014

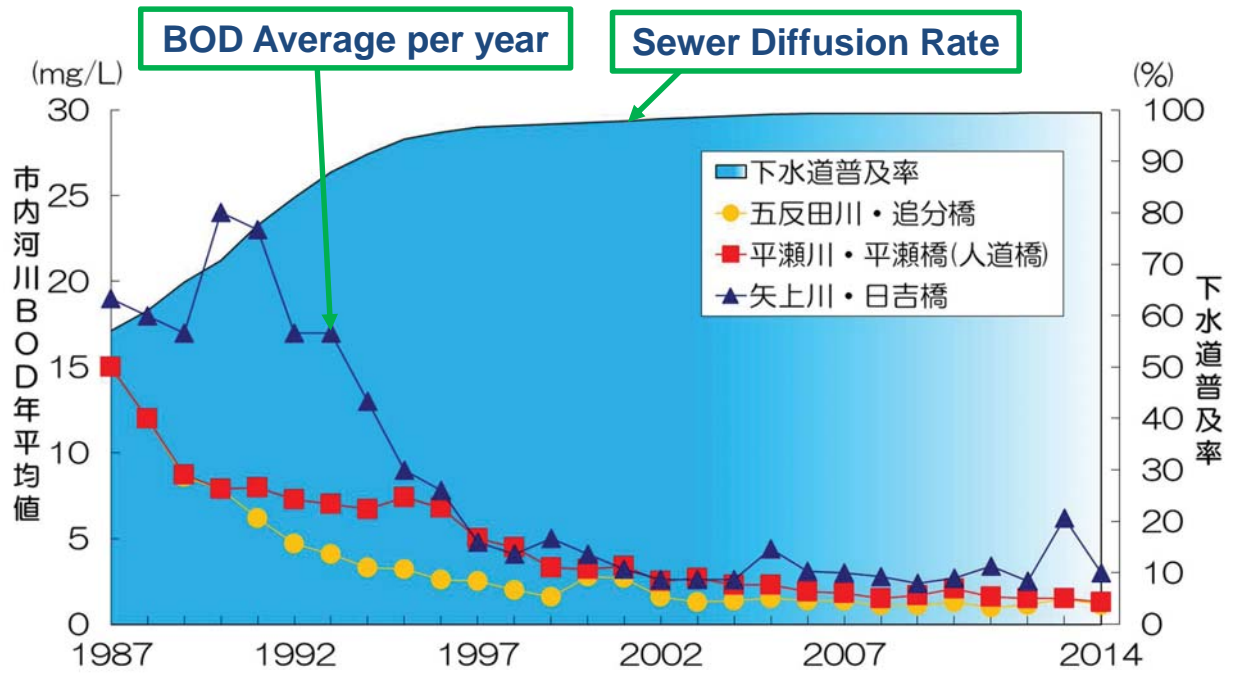


## NO<sub>2</sub> Concentration in Air from 1973 - 2014





# 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

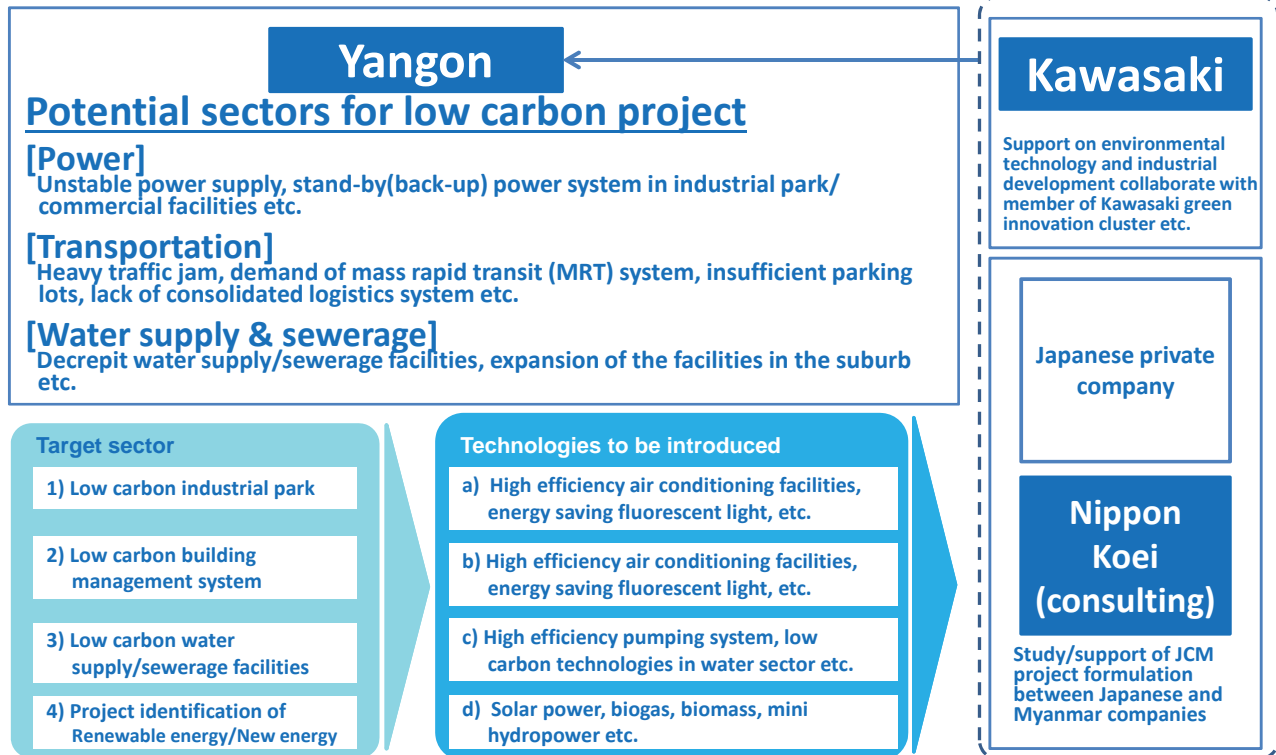
- Population: APPROX 5.2 million population (2014)
- Area: 598.8 Km<sup>2</sup>
- Economic Growth Rate **7.8 %** (2016: Estimated by World Bank)



# 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.



# 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

2016/01/13



Ukishima Incineration Plant

2016/01/14

# JCM City-to-City Collaboration Project ( 2015 )



Building up "Trust" and "Mutual Understanding"

2016/01/29



2016/01/29



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

16/01/29



In Yangon  
Coordinated by NIPPON KOEI  
29<sup>th</sup> January 2016 (Friday)  
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.
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  - (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.
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7. This MOU shall be made in two original copies in English.

March ၃၅<sup>th</sup>, 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:** 1<sup>st</sup> Visit to Yangon-city

**December 2015:** Discussion on Draft MOU at Yangon-city

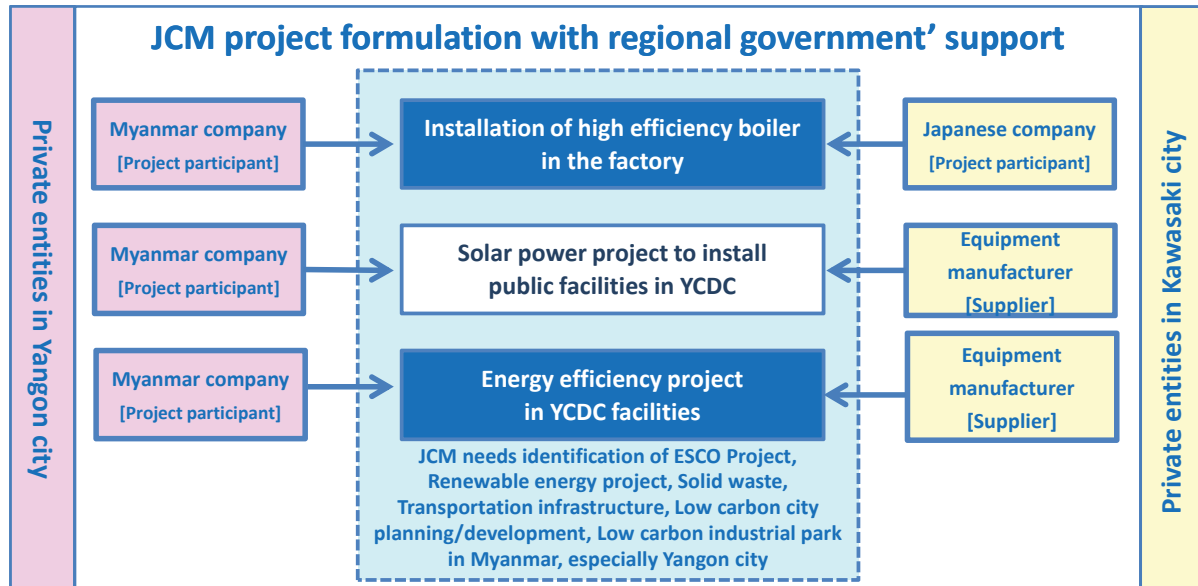
**January 2016:** Workshop on City-to-city collaboration at Yangon-city

**March 2016:** Concluding MOU between Kawasaki city and YCDC



Workshop for city-to-city collaboration at Yangon

# JCM City-to-City Collaboration Project ( 2016 )



## 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
<b>Nyaung Hnit Pin</b>	-Peak 7MW, off-peak 6.8 Nw, 24 hr operation -1 <sup>st</sup> phase 2014, 2 <sup>nd</sup> phase 2015	440 kW (LV) 3.2MW+3.4 MW (HV)	1 <sup>st</sup> 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	2 <sup>nd</sup> 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

29

## Pilot Project Site: Nyaung Hnit Pin Water Purification Plant



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

Pump Room →



← Candidate PV Module Area

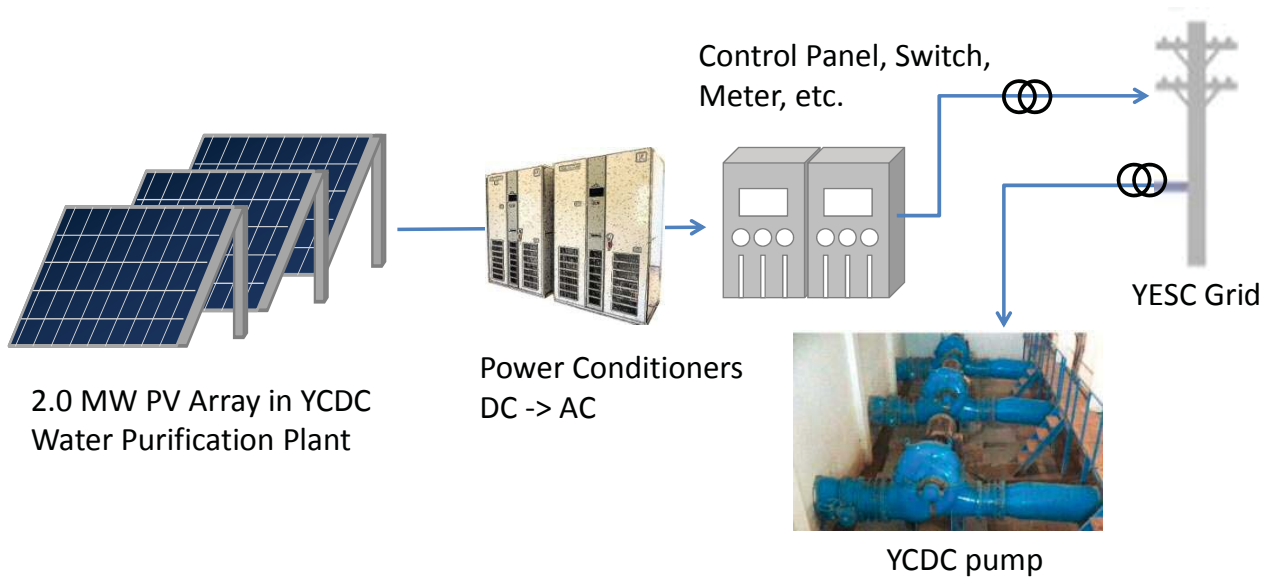
30



## Photo Voltaic (PV) System Concept

### < PV System on Planning >

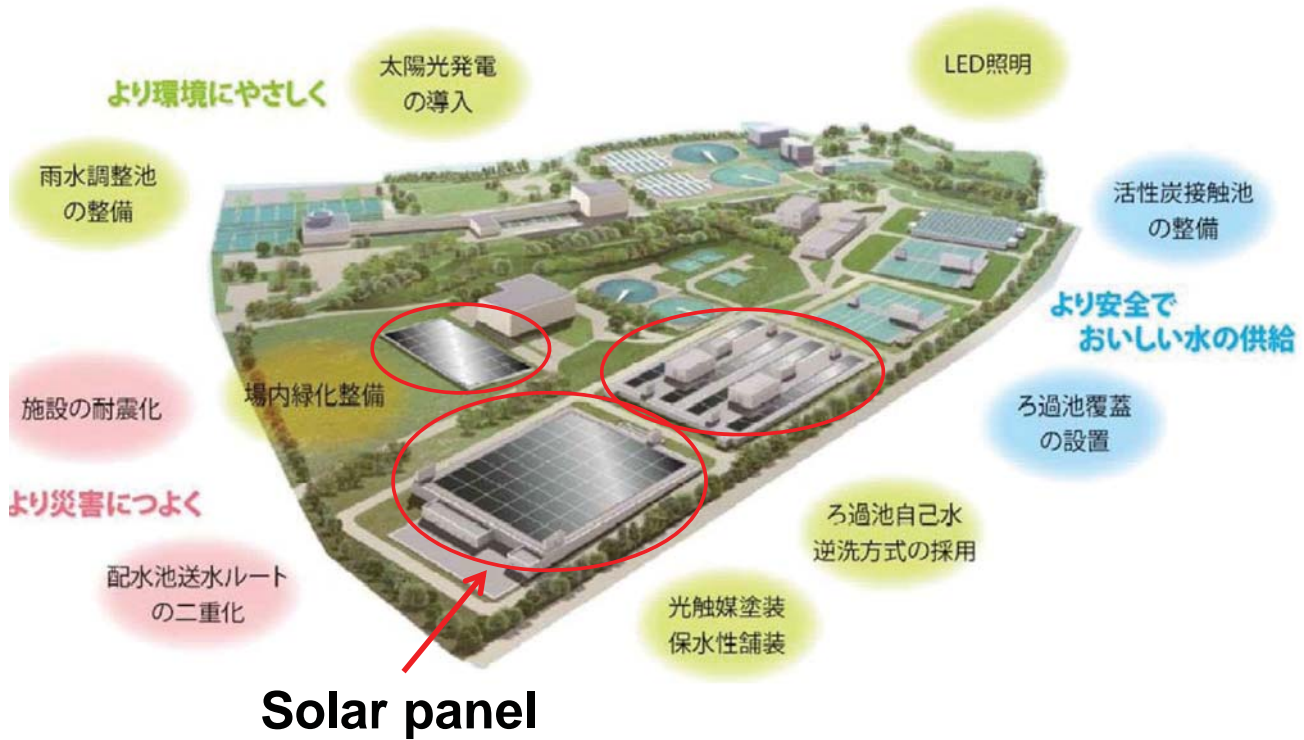
- Solar PV Energy sent to YESC (Yangon Electric Supply Company) grid
- YCDC purchase Electricity from YESC grid
- Net Metering : Tariff Payment = Energy used – PV generated



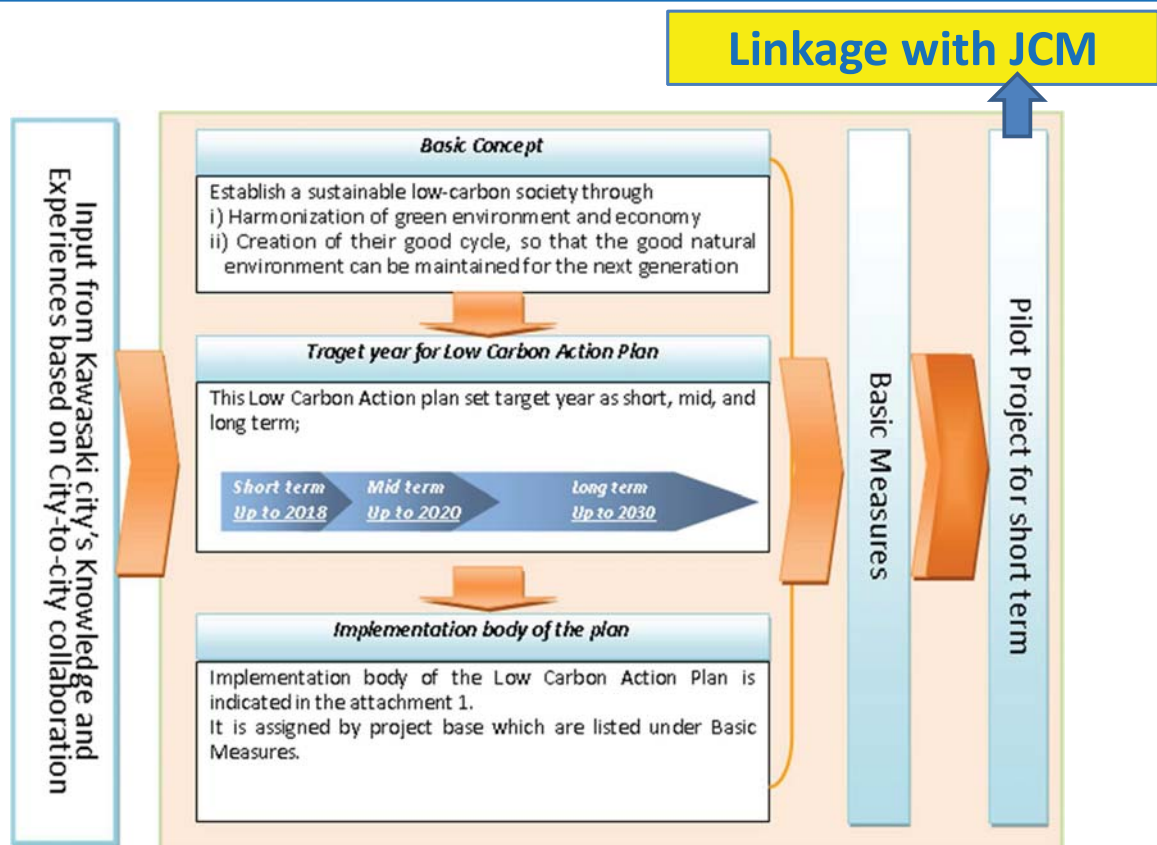
## Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki

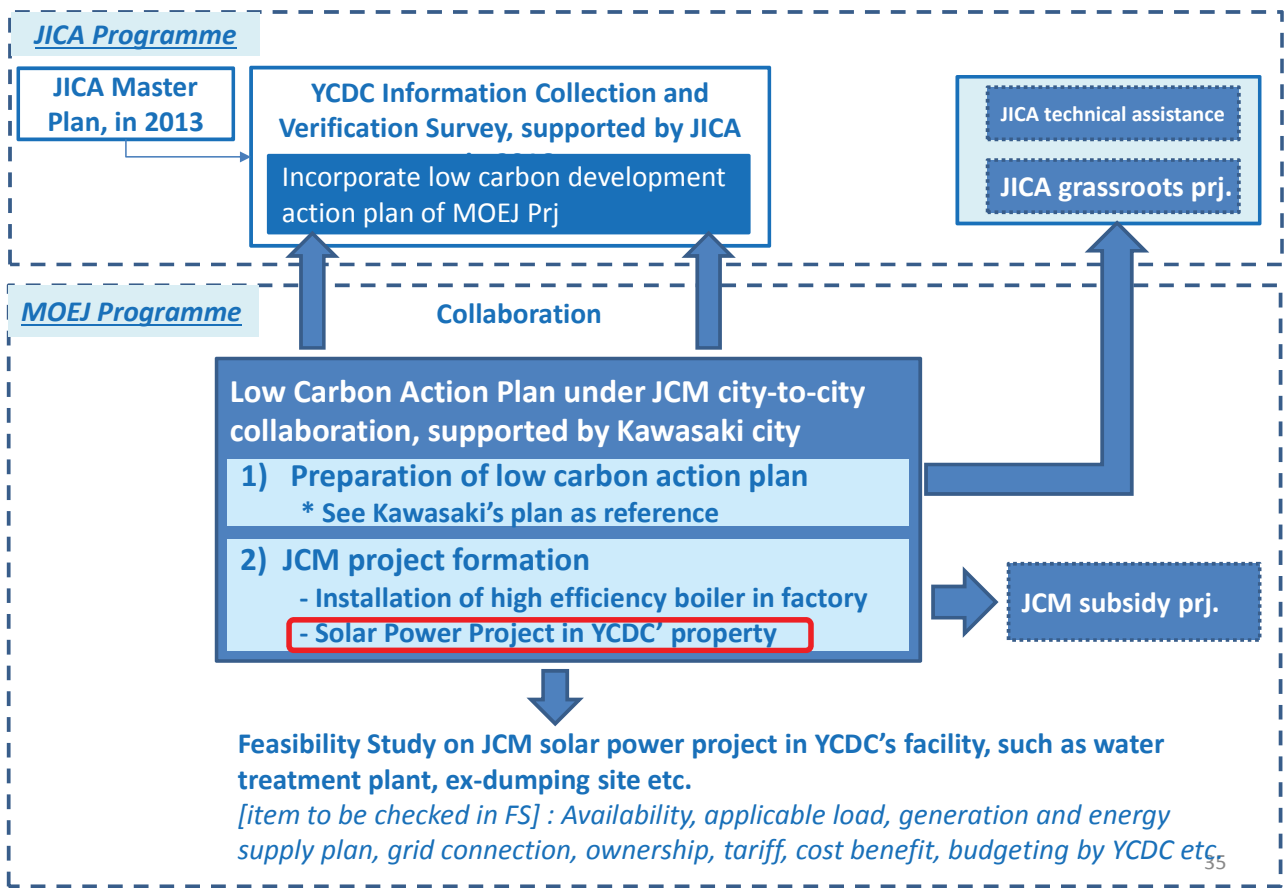


## Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki



## Preparation of Low Carbon Action Plan in Yangon ( 2016 )





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

<p><b>Low Carbon Society</b></p>	<ul style="list-style-type: none"> <li>• Eco town planning and sharing experience</li> <li>• Introduction of energy saving products/technologies from Japanese private entities</li> <li>• Support on Private sector collaboration, such as Kawasaki Chamber of Commerce and Industry etc.</li> <li>• Support on capacity development through JICA scheme etc.</li> </ul>
<p><b>Monitoring</b></p>	<ul style="list-style-type: none"> <li>• Support on system development on car exhaust/air pollution/water quality / soil condition, including analysis know-how</li> </ul>
<p><b>Solid Waste</b></p>	<ul style="list-style-type: none"> <li>• Planning/implementation of solid waste collection system</li> <li>• Planning/implementation of garbage separation program</li> <li>• Planning/implementation of compost promotion program</li> <li>• Knowledge sharing of industrial waste management</li> <li>• Establishment of solid water database etc.</li> </ul>

## 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 )

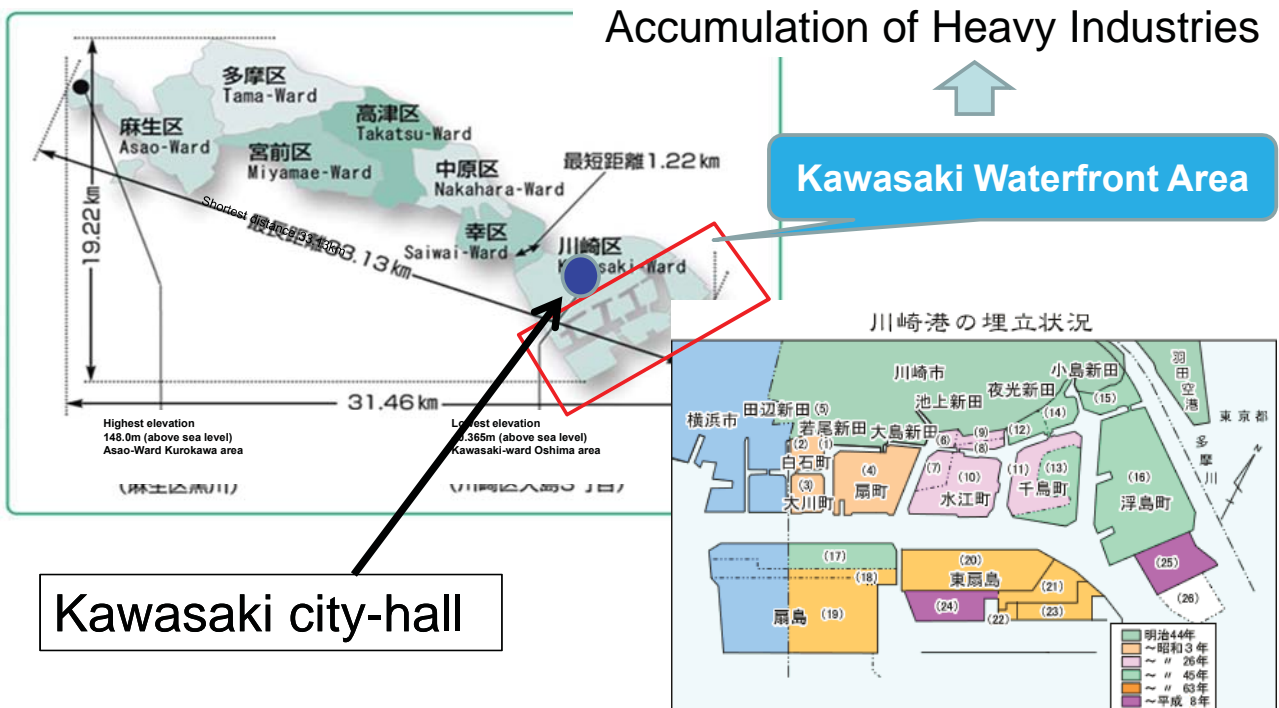
## Site Visit of Kawasaki Eco-town

December 8<sup>th</sup>, 2016

Economic and Labor Affairs Bureau  
Kawasaki-city

### Kawasaki city & Waterfront Area

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km<sup>2</sup>

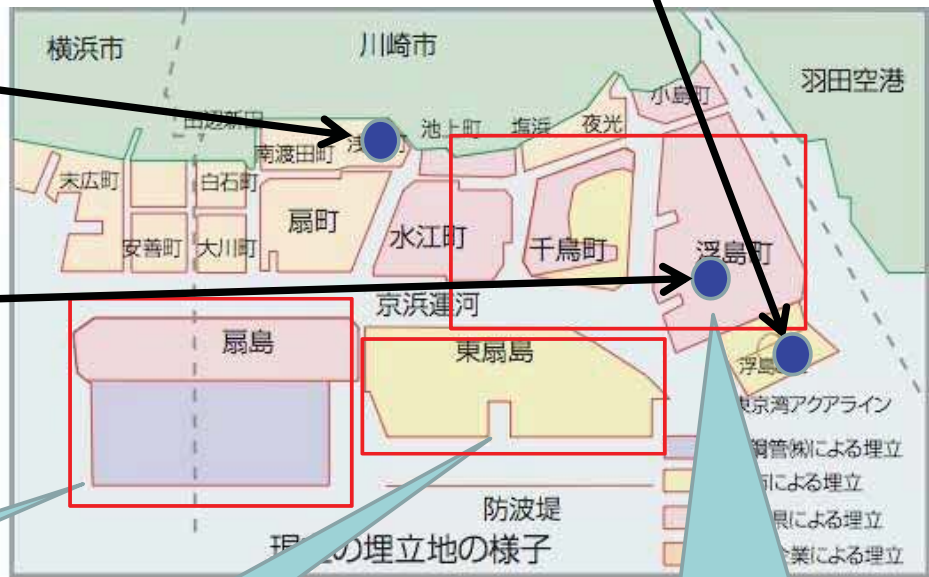


# Location of facilities for the site visit

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

① YAMANAKA  
 Recycling of waste automobile

③ TAKEEI  
 Recycling of mixed waste generated from demolition site



Steel Industry Area

Logistics Area

Refine & Petrochemical complex Area

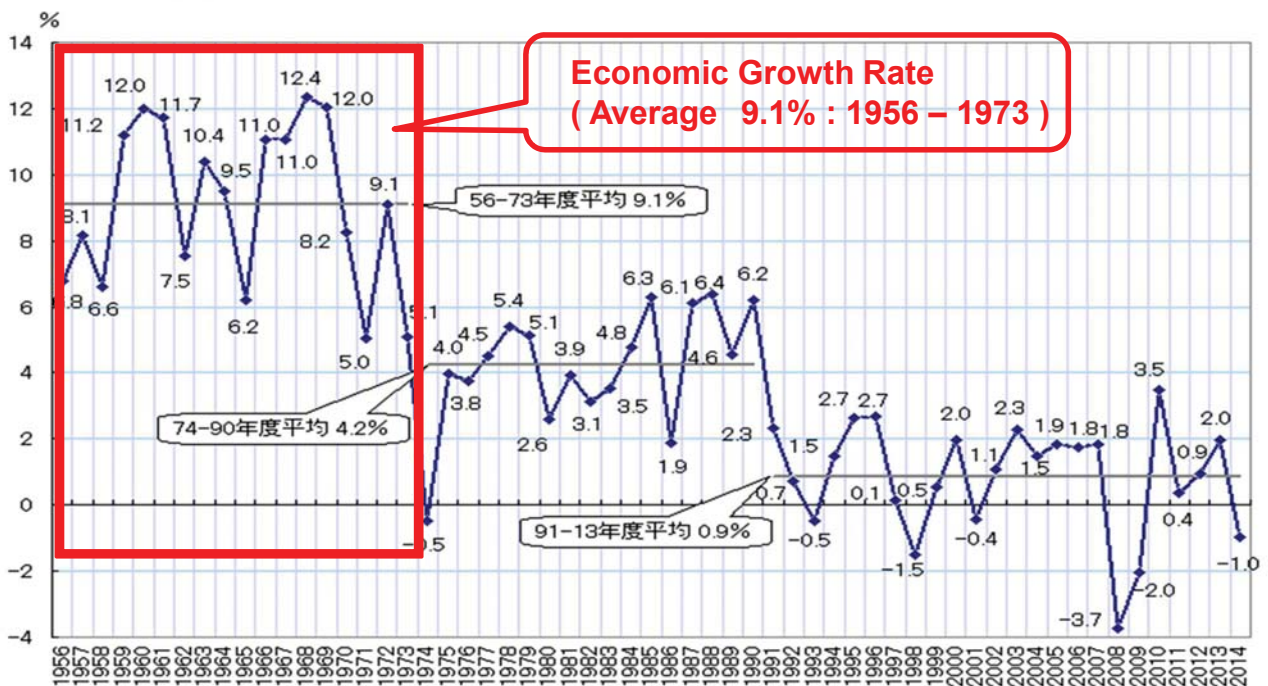
# Kawasaki Waterfront Area (1950s-60s)



# 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



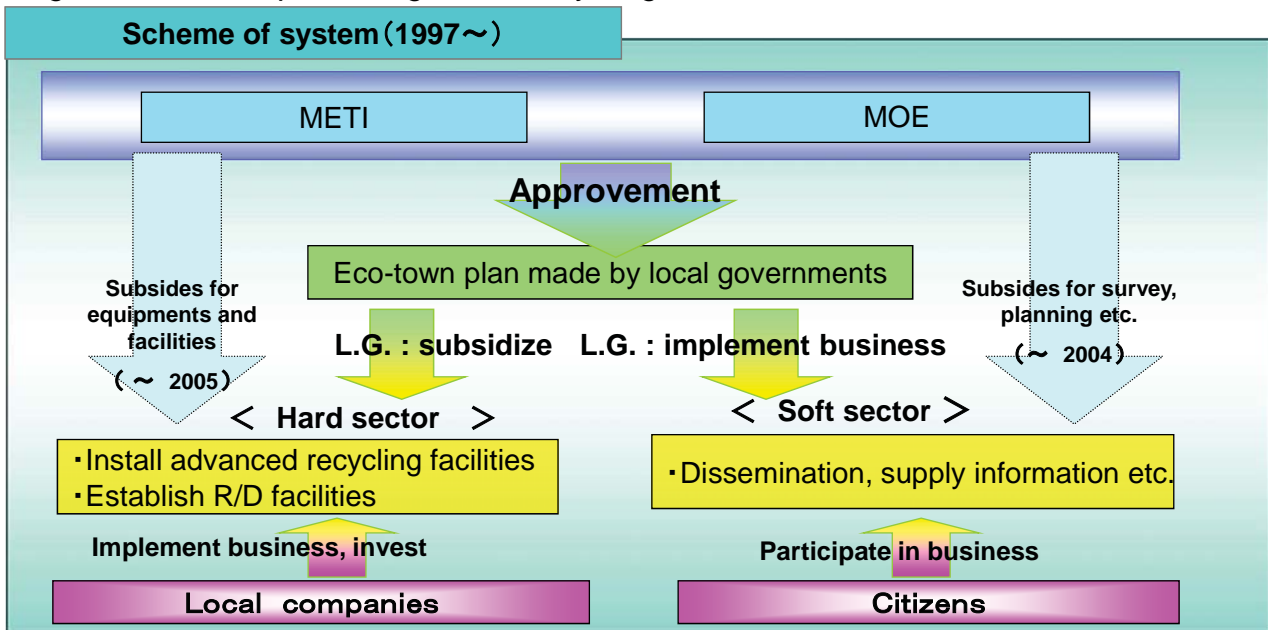
***"Sharing of Roles" & "Cooperative Action"***

**Improvement of Environmental Problems**

# Kawasaki Eco-town Project

Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

- ① Promotion of environmental industries on locally accumulated technologies
- ② Formation of resources recycling economy and society through reducing waste generation and promoting waste recycling on site



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# Resource Recycling Facilities in Kawasaki Eco-town

**SHOWA DENKO K.K.**  
Material production for ammonia from waste plastics

**DC CO.,LTD.**  
Recycling cement production

**JFE group companies**  
Reusing material for blast furnace from waste plastics/Concrete setting frame production from waste plastics/Used electric appliances recycling

**PET REFINE TECHNOLOGY CO.,LTD**  
Material production for new PET bottles (PET to PET)

**CORELEX SAN-EI CO.,LTD.**  
Toilet and tissue paper production from mix paper in used papers

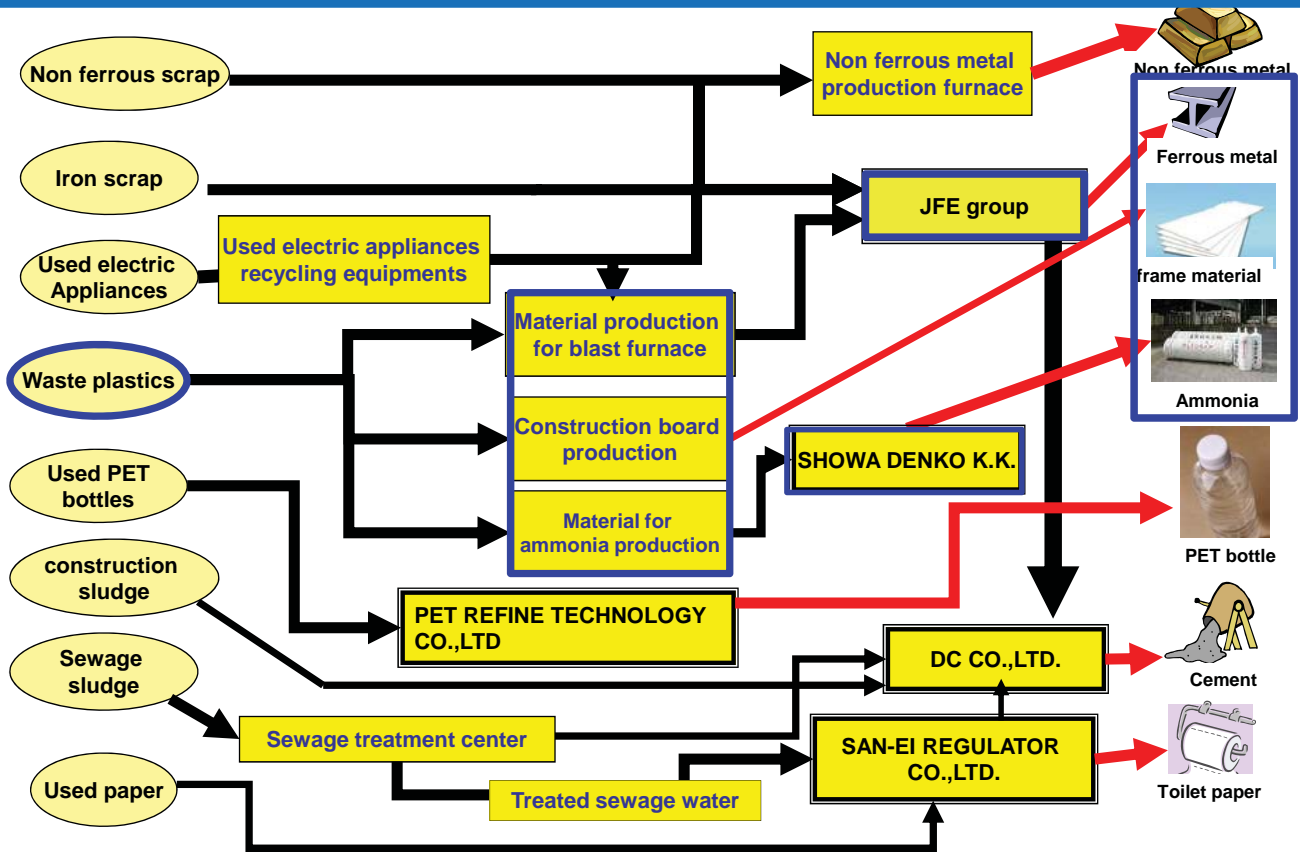
Kawasaki Zero Emissions Industrial Park

Radius of circle 1.5 km

ECOANN

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## Companies' Collaboration in Kawasaki Eco-town



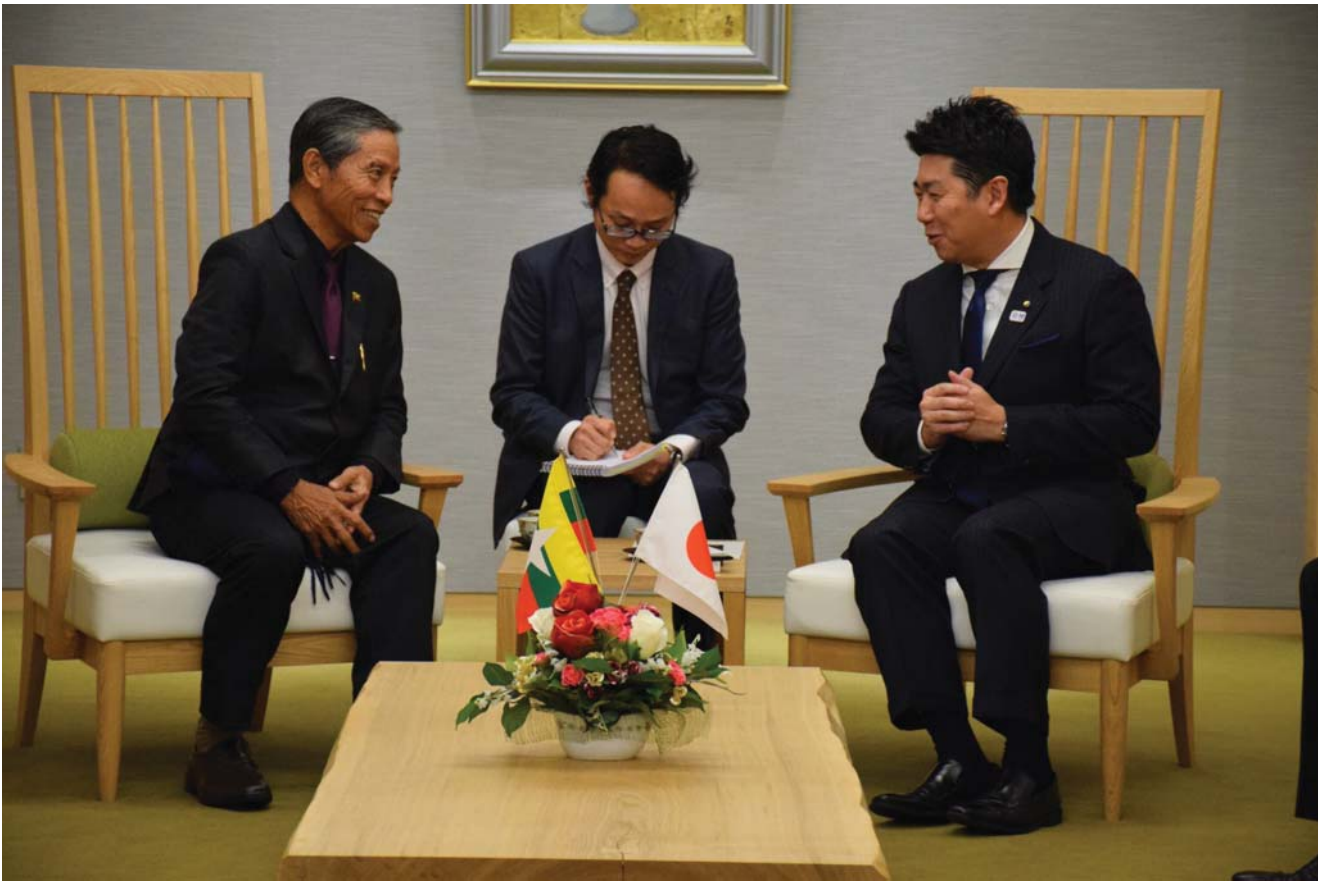
## Summary of Kawasaki Eco-town

- ◆ 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

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## Eco-town related facilities tour ②



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

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### Eco-town related facilities tour ③



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

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### Large-scale Solar power generation plant in Kawasaki ④



## Large-scale Solar power generation plant in Kawasaki ④



**Thank you for your attention !**



### 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** Nippon Koei Co., Ltd. and Kawasaki City

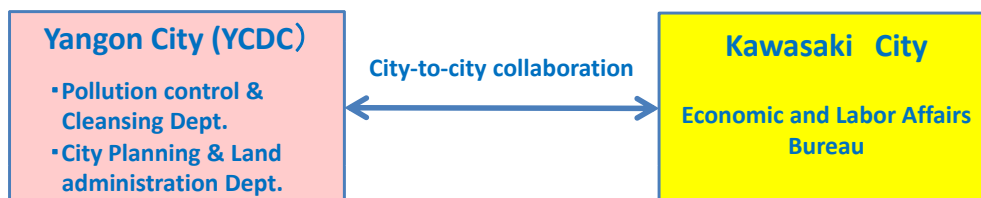


### Contents

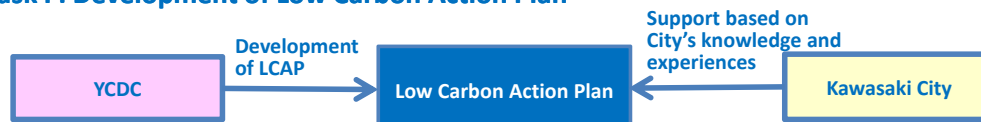
1. Overview
2. Development of Draft Low Carbon Action Plan
3. JCM Model Project 1 : Introduction of One-through Boiler
4. JCM Model Project 2 : Solar PV Generation Project
5. Issues and Further Action

1

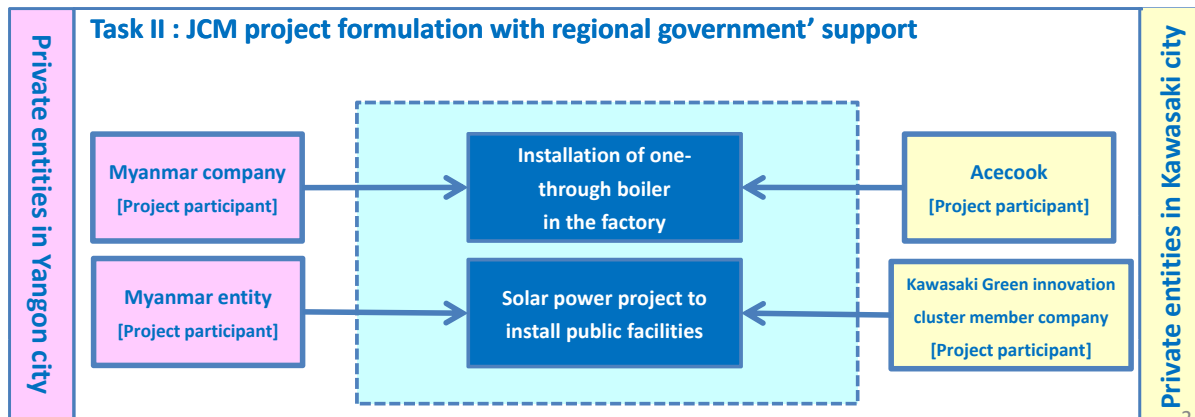
## 1. Overview



### Task I : Development of Low Carbon Action Plan



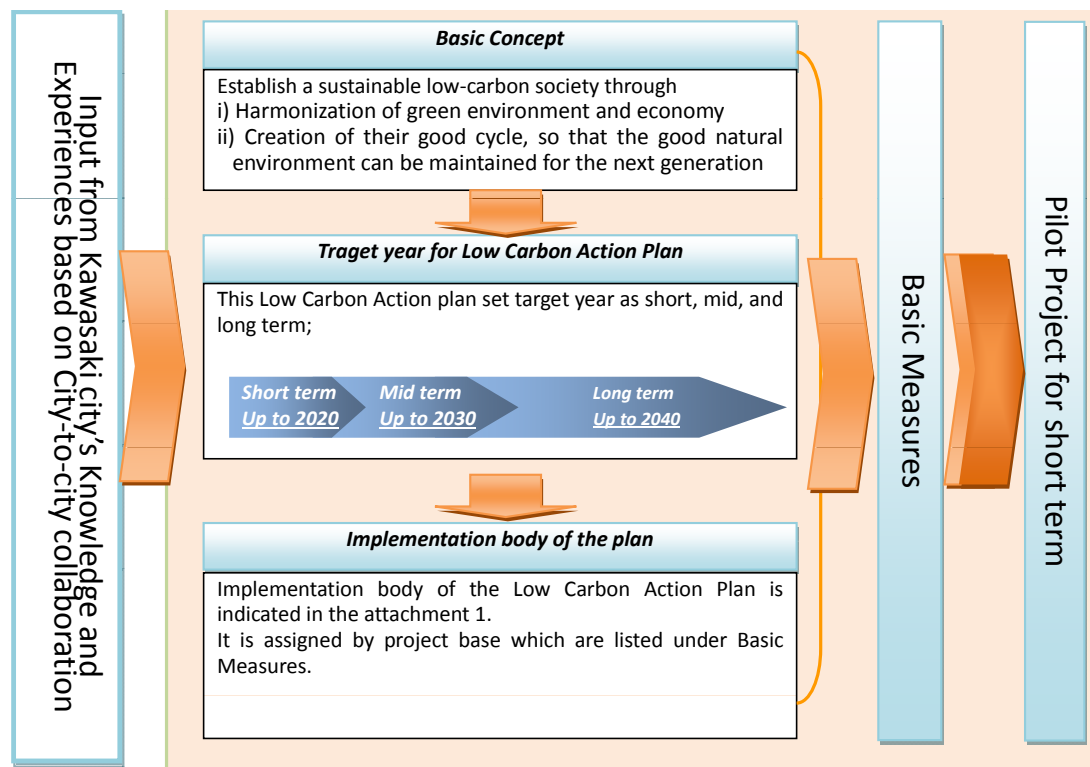
### Task II : JCM project formulation with regional government' support



2

## 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

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

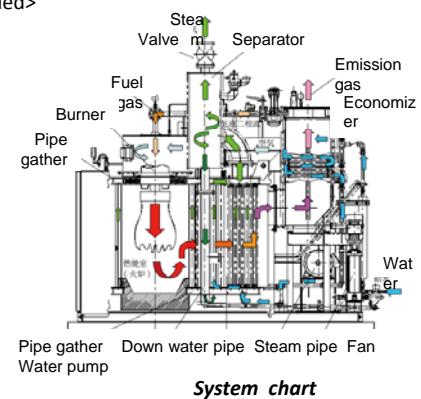
### ➤ Outline of the project

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 CO<sub>2</sub> and air pollutant is reduced by the boiler.

<Technologies to be installed>  
- One-through boiler



Image of One-through boiler



System chart

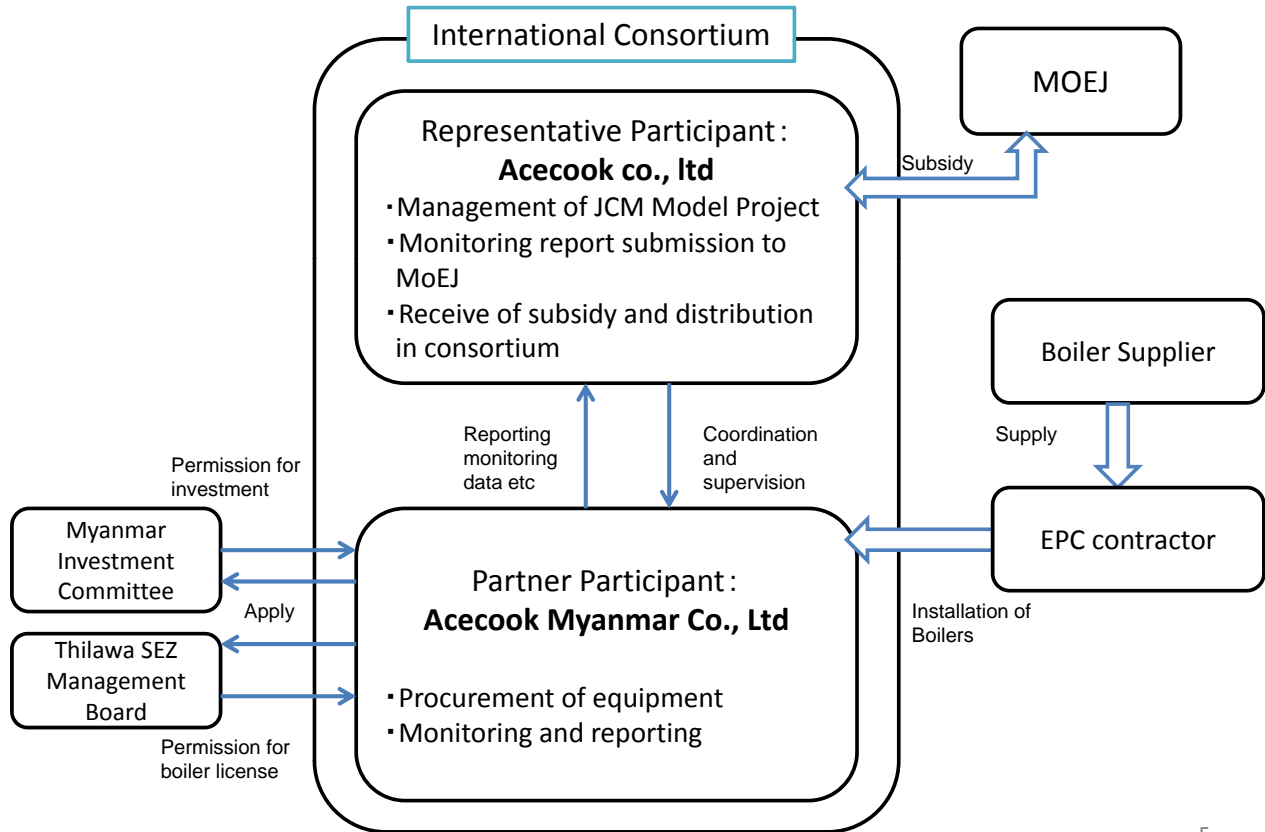
The proposed JCM model project was adopted **as JCM model project in September 2016** and initiated from October 2016.

Introduced technology	<ul style="list-style-type: none"> <li>• <b>One-through Boiler</b>, 2 t/h x 6 units = 12 t/h (rated capacity)</li> <li>• The boiler has the nature of low NO<sub>x</sub> as well as energy saving</li> </ul>
Estimated GHG emission reduction	674[tCO <sub>2</sub> per year]
Implementation period	Initiated from October 2016

4

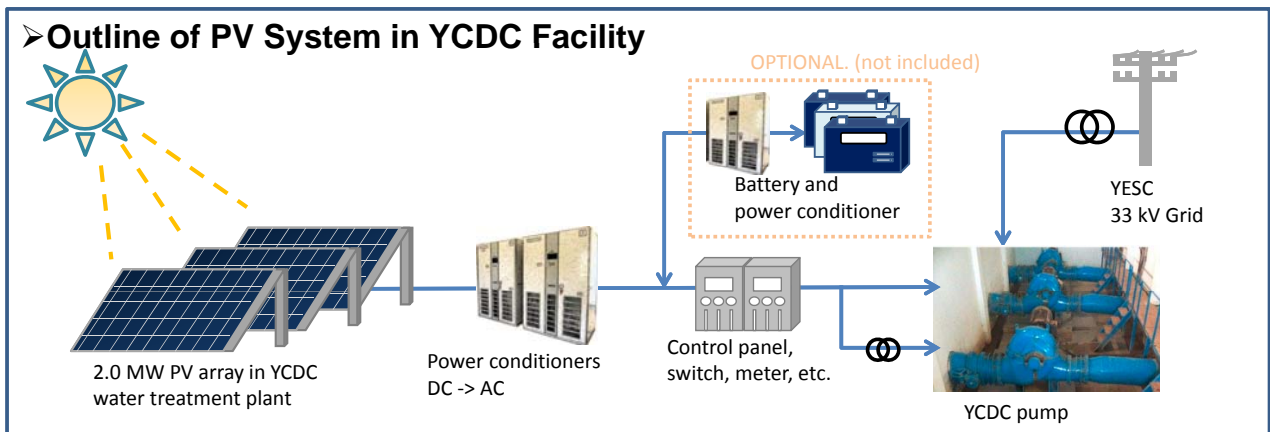


### 3. Project 1 /Introduction of Once-through Boiler -Implementation structure-



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



#### 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/m <sup>2</sup> /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-CO <sub>2</sub>

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## 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

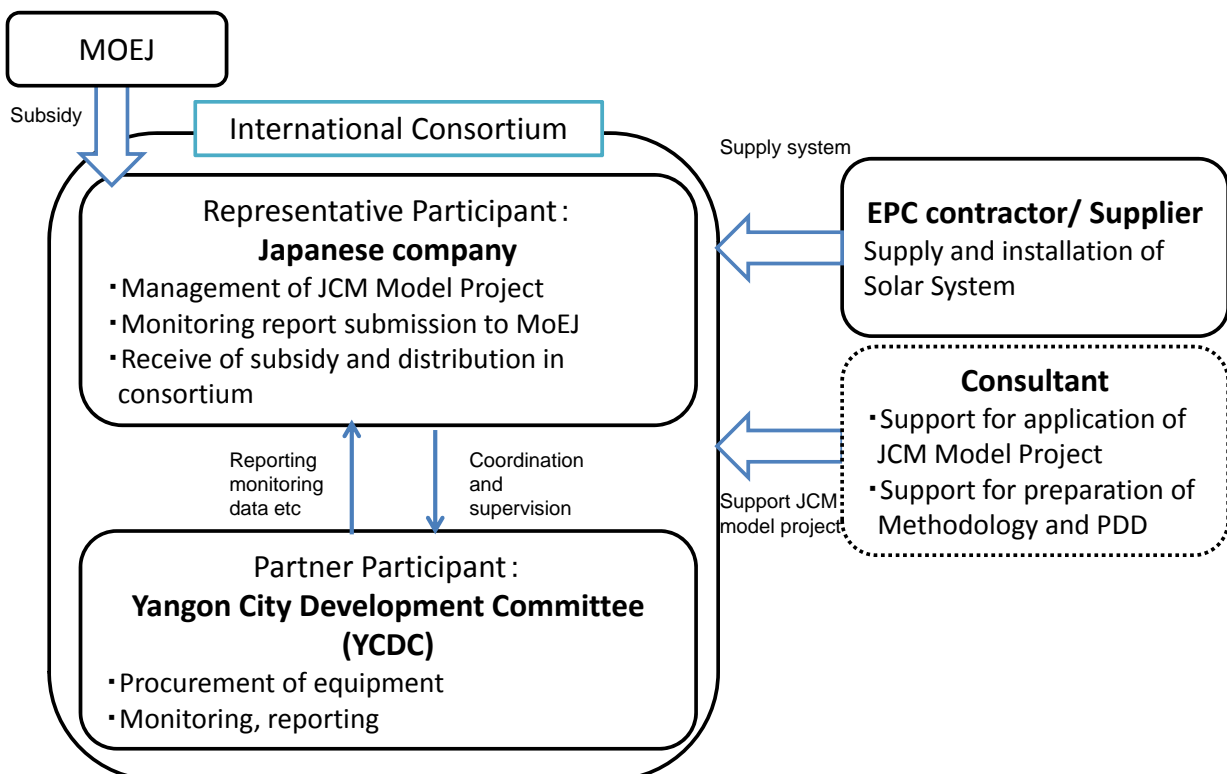


### Basic information of Nyaung Hnit Pin WTP

- 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 needed to formulate LCAP getting consensus through relevant sectors

(Further Action)	FY2016	FY2017	FY2020	FY2030	FY2040
0) Development of LCAP draft	[Green bar from FY2016 to FY2017]				
1) Formulation of LCAP	[Green bar from FY2017 to FY2020]				
2) Development of introduction system for Low Carbon technology	[Green bar from FY2017 to FY2020]				
3) Capacity development of staff	[Green bar from FY2017 to FY2020]				
4) Dissemination activities for low carbon sector	[Green bar from FY2017 to FY2030]				
5) Implementation of pilot projects	[Red bar from FY2017 to FY2040]				

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

#### 2) JCM model project

- Preparation of budget and authorization of the project in YCDC 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 ボイラー市場調査収集資料



# EAST POWER BOILER

Keeping professional, keeping development, keeping quality



Local Sole Agent  
UEEG Limited

Unit #320, Block C-3rd Floor, Pearl Condo, Kabaraye Pagoda Road  
Yangon, Myanmar

Ph : +95 9 965 055 682, +95 9 972721090

Email : [UEEGlimited@outlook.com](mailto:UEEGlimited@outlook.com)

# EPCB

BOILER BROCHURE

## EAST POWER



Qingdao East Power Industry Equipment Co., Ltd



## 企业简介 BRIEF INTRODUCTION

Qingdao East Power Industrial Equipment Co., Ltd is located in Qingdao, China, specialized in design and production of boilers. Our main products includes coal fired boiler series, biomass fired boiler, CFB circulating Fluidized Steam Bed Boiler, oil gas fired boiler and some boiler accessories. And these boilers are environment protected and energy conserved. It has been approved by the Provincial Environment Department.

And we can manufacture and supply boiler as per CE, ASME, AS standard, also with these certification.

Our boilers have been used well in all Chinese regions, also have been exported to Australia, Thailand, Vietnam, Mexico, Philippines, Kazakhstan, Russia, Africa(such as Angola, Uganda, Ethiopia), Latin American, Mongolia, Pakistan, etc.

### Quality control system

Each worker must has the Certificate before joining in and starting work.

Each producing process is marked Work Number of the Workman and Inspector, and input the information to computer procedure. So we can check the person responsible swiftly.

Each welding line is inspected rigorously with radiographic test and X-rays is saved to official file.

Each boiler is tested seriously with water pressure and inspected by the Shandong province Institute of Specific Equipment Inspection and Research, then get the Qualified Certification of Boiler.

We offer the products with high quality and competitive price and hope we have a good cooperation with you.



DLZ series coal-fired steam boiler technique parameter

Item/Type	DLZ1.0/7-A II		DLZ3.0/7-A II		DLZ4.1/25-A II		DLZ6.1/25-A II		DLZ10.1/25-A II		DLZ15.1/25-A II		DLZ20.1/25-A II		DLZ25.1/25-A II		DLZ30.1/25-A II	
	DLZ1.0/7-A II	DLZ3.0/7-A II	DLZ4.1/25-A II	DLZ6.1/25-A II	DLZ10.1/25-A II	DLZ15.1/25-A II	DLZ20.1/25-A II	DLZ25.1/25-A II	DLZ30.1/25-A II	DLZ35.1/25-A II	DLZ40.1/25-A II	DLZ45.1/25-A II	DLZ50.1/25-A II	DLZ55.1/25-A II	DLZ60.1/25-A II	DLZ65.1/25-A II	DLZ70.1/25-A II	DLZ75.1/25-A II
Rated capacity t/h	1	2	3	4	6	8	10	15	20	25	30	35	40	45	50	55	60	65
Rated steam pressure Mpa	0.7/1.0/1.25																	
Rated steam temperature °C	170/184/194																	
Feed water temperature °C	20																	
Heated area M <sup>2</sup>	4.68/16.1	6.2/20.5	8.2/45.3	10.0/73.53	15.2/92.38	22.3/159.5	19.5/207.6	30.2/80	34.36/428.51	89.2/1457.79	44.5/628.6	81.76	81.76	81.76	81.76	81.76	81.76	81.76
Boiler heat efficiency %	76	77	82	78	78	80.5	80.6	80.8	81	81.38	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76
Fuel consumption t/h	175	346	519	692	1012	1325	1655	2480	3290	3551	4230	4230	4230	4230	4230	4230	4230	4230
Effective area of grate	1.8	3.04	3.34	5.14	9.38	10.9	12	17	22.56	24.67	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
Transpirable area of boiler mm	Length	4876	5290	5360	6237	6300	7486	7600	7350	7810	8478	8900	8900	8900	8900	8900	8900	8900
	Width	1800	2240	2240	2680	3150	3200	3200	3370	3370	2600	2600	2600	2600	2600	2600	2600	2600
	Height	2820	3228	3228	3520	3838	3350	3680	3510	3500	2740	2850	2850	2850	2850	2850	2850	2850
Weight of transport parts of boiler transportation (t)	13.3/13.5/13.7	16.5/16.8/16.8	20.8/21	27	35	31	44	22	25	25.5	30	30	30	30	30	30	30	30

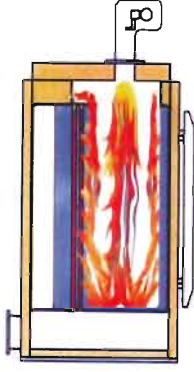
DLZ series coal-fired hot water boiler technique parameter

Item/Type	DLZ3.7/47/95/75 A II		DLZ5.1/47/95/75 A II		DLZ6.1/47/95/75 A II		DLZ8.1/47/95/75 A II		DLZ10.1/47/95/75 A II		DLZ12.1/47/95/75 A II		DLZ14.1/47/95/75 A II		DLZ16.1/47/95/75 A II		DLZ18.1/47/95/75 A II	
	DLZ3.7/47/95/75 A II	DLZ5.1/47/95/75 A II	DLZ6.1/47/95/75 A II	DLZ8.1/47/95/75 A II	DLZ10.1/47/95/75 A II	DLZ12.1/47/95/75 A II	DLZ14.1/47/95/75 A II	DLZ16.1/47/95/75 A II	DLZ18.1/47/95/75 A II	DLZ20.1/47/95/75 A II	DLZ22.1/47/95/75 A II	DLZ24.1/47/95/75 A II	DLZ26.1/47/95/75 A II	DLZ28.1/47/95/75 A II	DLZ30.1/47/95/75 A II	DLZ32.1/47/95/75 A II	DLZ34.1/47/95/75 A II	DLZ36.1/47/95/75 A II
Rated capacity MW	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	21	21	21	21	21	21	21	21	21
Rated working pressure Mpa	0.7																	
Supply water temperature °C	95																	
Return water temperature °C	70																	
Circle flow m <sup>3</sup> /h	24	49	72	96	80	108	133	200	200	300	300	300	300	300	300	300	300	300
Heated area Regulation m <sup>2</sup>	4.5/20.12	6.2/29.5	6.7/31.2	7.8/35.2	11.2/50.28	15.2/67.5	19.5/87.6	28.5/127.6	38.5/172.6	57.5/257.6	76.6/342.6	95.7/427.6	114.8/512.6	133.9/597.6	153.0/682.6	172.1/767.6	191.2/852.6	210.3/937.6
Heat efficiency %	78	77	82	78	78	80.5	80.6	80.8	81	81.37	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76
Fuel consumption t/h	175	346	487	664	1025	1325	1655	2485	2685	3500	3500	3500	3500	3500	3500	3500	3500	3500
Effective area of grate m <sup>2</sup>	1.8	2.7	3.58	5.14	8	10.9	12	17.81	22.51	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
Size of transportation mm	Length	4876	5019	5560	6510	7000	7486	7600	8600	8600	8600	8600	8600	8600	8600	8600	8600	8600
	Width	1800	2130	2200	2600	2950	3180	3200	3373	3370	2450	2450	2450	2450	2450	2450	2450	2450
	Height	2870	3222	3410	3520	3938	3354	3660	3160	3500	2984	2984	2984	2984	2984	2984	2984	2984
Weight of transportation ton	13.5	16.5	23.6	26.5	35	30	44	22	25	25.5	30	30	30	30	30	30	30	30

\* Notes: This form only for your reference. If any changed, please refer to Ex-factory technical documents.







Central combustion three reheat backhaul oil (gas)-fired boiler

- The furnace used to burn the centre of a unique technology , the entire wet back structure, the furnace volume is big, make full used of radiation furnace heat exchanger, and through enhancing the combustion of fuels Burnout level, making boiler thermal efficiency
- improved greatly. This simplifies the furnace heating surface design, especially for the low-power boiler.

Central combustion three reheat backhaul oil (gas)-fired boiler parameter

Item/Model	WNS0.5-0.7-Y(Q)	WNS1.0-0.7-Y(Q)	WNS1.5-0.7-Y(Q)	WNS2-1.25-Y(Q)	WNS2-1.25-Y(Q)	WNS3-1.25-Y(Q)	WNS4-1.25-Y(Q)	WNS5.0-1.25-Y(Q)	WNS7-1.25-Y(Q)	WNS10-1.25-Y(Q)	WNS15-1.25-Y(Q)	WNS21-1.25-Y(Q)	WNS28-1.25-Y(Q)
	Rated capacity/Kg/h	500	1000	1500	2000	3000	4000	4000	4000	4000	4000	4000	4000
Capacity MW	0.7	1.4	2.1	2.8	3.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Rated working pressure MPa	0.7	0.7	0.7	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Rated steam temperature °C	169	169	169	194	194	194	194	194	194	194	194	194	194
Design efficiency %	Light oil	97	97	97	97	97	97	97	97	97	97	97	97
	Heavy oil	98	98	98	98	98	98	98	98	98	98	98	98
	City gas	88	88	88	88	88	88	88	88	88	88	88	88
	Natural gas	88	88	88	88	88	88	88	88	88	88	88	88
Main steam valve seat mm	DN40	DN50	DN65	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80
	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25
Feed water tube diameter MM	1-DN40	1-DN40	1-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40
	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40
Blowdown tube diameter MM	1-DN40	1-DN40	1-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40	2-DN40
	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40	1-DN40
Safety valve diameter MM	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25
	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25	DN25
Chimney diameter MM	1950	2400	3000	3700	4000	4000	4000	4000	4000	4000	4000	4000	4000
	1900	1670	1660	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Biggest transportation size	1500	1890	2050	2100	2400	2800	2800	2800	2800	2800	2800	2800	2800
	1500	1890	2050	2100	2400	2800	2800	2800	2800	2800	2800	2800	2800
Rated supply/return water temperature °C	110	110	110	110	110	110	110	110	110	110	110	110	110
	110	110	110	110	110	110	110	110	110	110	110	110	110
Boiler circulation water temperature °C	110	110	110	110	110	110	110	110	110	110	110	110	110
	110	110	110	110	110	110	110	110	110	110	110	110	110
Return/outflow water tube diameter mm	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100
	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100	DN100

Note: This form only for your reference. If any changed, please refer to Ex-factory technical documents.



Product Description

- Flue gas in the high temperature furnace stay a long residence time. After several times wind distribution, fully burning , fuel efficiency is high without black smoke.
- Soot carbon dioxide, sulphur dioxide, such as the environmental indicators is better than the national discharge standard, and conform to the current international emission reduction policies.
- Fuel burning continuous, stable working condition, can guarantee the steam output.
- Manual feeding, remove slag, simple operation, without cumbersome procedures, start quickly.
- Boiler Capacity 1-4 Ton (0.7-2.8 MW)

DZG series Fixed Grate Steam Boiler

Item/Type	DZG0 5-0.7/1.0-J	DZG1-0.7/1.0/1.25-J	DZG2-0.7/1.0/1.25-J	DZG4-0.7/1.0/1.25-J	DZG0 35-0.7/95/70-J	DZG0 7-0.7/95/70-J	DZG1 4-0.7/95/70-J
	Rated capacity t/h	0.5	1	2	4	0.35	0.7
Rated steam pressure MPa	0.7/1.0	0.7/1.0/1.25	0.7/1.0/1.25	1.25	0.7	0.7	0.7
Rated steam temperature °C	170/184	170/184	170/184/194	170/184/194	95	95	95
Feed water temperature °C	20	20	20	20	70	70	70
Heated area M <sup>2</sup>	2.3/16.2	4.68/16.1	5.9/30.7		2.3/16.2	4.55/20.12	6.17/39.5
Suitable fuel type	soft coal, biomass, coles, blind coal, ect						
Boiler heat efficiency %	76	78	79	78	76	78	78.0
	95	198	396	794	76	146	290
Fuel consumption kg/h	0.98	1.52	2.4	3.88	0.98	1.5	2.4
	2970	3782	4307	6240	2970	3782	4900
Transportation size of boiler mm	1950	1920	2130	2700	1950	1800	2130
	2660	2620	3222	3678	2660	2670	3222
Weight of largest parts of boiler transportation (ton)	8.3/6.4	11/11/11.6	15.7/15.8/18	24	8.3	11	15.5

Electric Steam Boiler Parameter

Item/model	LDR0.05- -0.4-D	LDR0.1- 0.4/0.7-D	LDR0.2- 0.4-D	LDR0.2- 0.7-D	LDR0.3- 0.4/0.7-D	WDR0.5- 0.7-D	WDR1.0- 0.7/1.0-D	WDR1.5 -1.0-D	WDR2.0- 1.0-D
rated heat capacity Kw	36	75	144	144	216	360	720	1080	1440
rated steam capacity	0.05	0.1	0.2	0.2	0.3	0.5	1	1.5	2
rated working pressure MPa	0.4	0.4/0.7	0.4	0.7	0.4/0.7	0.7	0.7/1.0	1.0	1.0
Power x class number Kw x n	12x3	15x5	24x6	24x6	24x9	24x15	24x30	33x32	24x60
saturated steam temperature °C	154	154/170	154	170	154/170	170	184	184	184
Designed thermal efficiency (%)	≥98								
rated operational voltage V	~ 380 V								
mode of connection	three-phase three-wire system								
Steam caliber DN	20	25	40	40	40	50	65	65	80
Inlet Diameter DN	20	25	25	25	25	25	40	40	40
safe vavle diameter DN	25	40	40	40	40	40	2x40	2x40	4x40
blowdown valve diameter DN	25	40	40	40	40	40	40	40	40
Boiler Weight Kg	160	220	420	486	500/550	1980	2245/2300	2600	4000
outlook size	length m	700	890	1180	1220	2450	2450	2800	2500
	width m	470	700	960	970	1700	1800	2000	2000
	height m	1250	1310	1470	1520	1700	2000	2050	2300

Notes: This form only for your reference, if any changed, please refer to Ex-factory technical documents.



Product Description

- All components marked with UL,CAS,CE safety certification identifications, fully dip electric heat producing components are fastened on the flange, which make it is easy to replace.
- The heat producing components is made of erosion resistance stainless steel, heating tube and INCOLOY800 alloy steel, it possesses the property of long continuous operating endurance, erosion resistance, relief dirty and low surface load;
- The circuit is design withy fuse to make sure the oblique electric wave is under control. So the circuit is safe.
- Main machine and control system are separated for the high power boiler to avoide the component from interfering and heat producing components from aging.
- Dynamical digital control is applied to the control system.is has the functions of PID adjustment, pump interlock; heat producing work alternately, real time parameter display.

## LHS Series Oil / Gas Fired Boiler



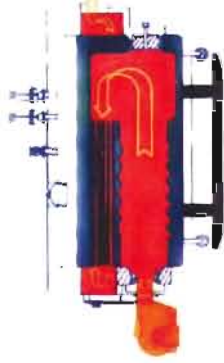
### Product Description

- Flow interrupters are set in the fire tube to slow down the rate of the heat efficiency.
- The mist flows in the fire tube, the LHS boilers have a large water capacity and have wide adaptability to the load.
- An openable ash clean door is set at the bottom of the boiler. The top cover of the boiler can be opened for easy cleaning ash and prolong the endurance of the boiler.
- Controller is safe and lower running cost to a great extent.

### LHS oil (gas)-fired steam boiler parameter

Item/model	LHS0.1-0.4/0.7-Q.Y	LHS0.15-0.7-Q.Y	LHS0.2-0.4/0.7-Q.Y	LHS0.3-0.4/0.7-Q.Y	LHS0.5-0.4/0.7-Q.Y	LHS0.8-0.7/1.0-Q.Y	LHS1.0-0.7/1.0-Q.Y
Rated heat capacity kw	≈70	≈105	≈140	≈210	≈350	≈560	≈700
Rated capacity t/h	0.1	0.15	0.2	0.3	0.5	0.8	1.0
Rated working pressure MPa	0.4/0.7	0.7	0.4/0.7	0.4/0.7	0.4/0.7	0.7/1.0	0.7/1.0
Saturated steam temperature °C	152/170	170	152/170	152/170	152/170	170/184	170/184
Design heat efficiency %	>90	>90	>89	>89	>89	>89	>89
Heating area m²	2.65	4.9	5.08	6.2	12.7	18.4	23.1
Boiler water capacity L	360	360	510	930	1040	1620	2760
Flue diameter mm	Φ160	Φ250	Φ250	Φ250	Φ300	Φ400	Φ350
Feed water diameter DN	25	25	25	25	25	40	40
Main steam tube diameter DN	25	40	40	40	40	50	65
Safety valve diameter DN	40	40	40	40	40	2x40	2x40
Blowdown tube diameter DN	40	40	40	40	40	40	40
Fuel consumption	Light oil kg/h						
	Natural gas Nm³/h						
	Liquid gas Nm³/h						
Transportation weight kg	Coal gas Nm³/h						
	≈400/420						
	≈600/700						
Outlook size	≈1000/1050						
	L mm						
	W mm						
H mm							

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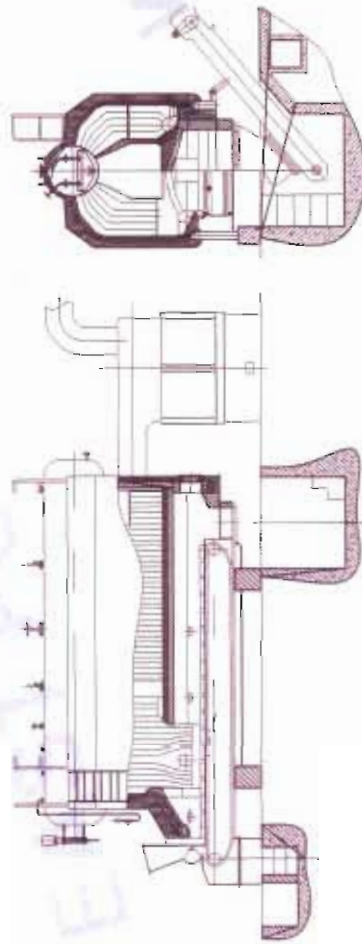
### Standardized three reheat backhaul oil (gas)-fired boiler

- WNS series of fuel oil gas-fired boiler uses the standard three return trip technologies, the entire wet back structure.
- The furnace heat transfer and breathing tube radiation heat convection rational design, layout of adequate heating boilers, high thermal efficiency.
- This furnace water capacity, full heat exchanger, especially for medium and large sized boiler.

### Standardized three reheat backhaul oil (gas)-fired boiler parameter

Item/Model	WNS2-1.25-Y(C)	WNS3-1.25-Y(C)	WNS4-1.25-Y(C)	WNS6-1.25-Y(C)	WNS8-1.25-Y(C)	WNS10-1.25-Y(C)	WNS1.4-1.0/0.57/0-1.0/0.57/0-Y(C)	WNS2.1-1.0/0.57/0-1.0/0.57/0-Y(C)	WNS2.8-1.0/0.57/0-1.0/0.57/0-Y(C)	WNS3.6-1.0/0.57/0-1.0/0.57/0-Y(C)	WNS7-1.0/0.57/0-1.0/0.57/0-Y(C)
Rated capacity t/h	2000	3000	4000	8000	8000	10000	1	1	1	1	1
Capacity MW	1	1	1	1	1	1	1.4	2.1	2.8	4.2	5.6
Rated working pressure Mpa	1.25	1.25	1.25	1.25	1.25	1.25	1	1	1	1	1
Rated supply/return water temperature °C	1	1	1	1	1	1	85/70	85/70	85/70	85/70	85/70
Design efficiency %	90	91	91	91	91	91	91	91	91	91	91
Boiler circulation water amount m³/h	1	1	1	1	1	1	48	72	96	144	182
Fuel consumption	Light oil kg/h										
	Heavy oil kg/h										
	City gas Nm³/h										
Supply/return water tube diameter mm	Natural gas Nm³/h										
	2-DN40										
	2-DN40										
Blowdown tube diameter mm	2-DN40										
	2-DN40										
	2-DN40										
Safety valve tube diameter mm	2-DN40										
	2-DN40										
	2-DN40										
Chimney diameter mm	2-DN40										
	2-DN40										
	2-DN40										
Biggest transportation size	2-DN40										
	2-DN40										
	2-DN40										
Rated steam temperature °C	2-DN40										
	2-DN40										
	2-DN40										

Notes: This form only for your reference, if any changed, please refer to Ex-factory technical documents.

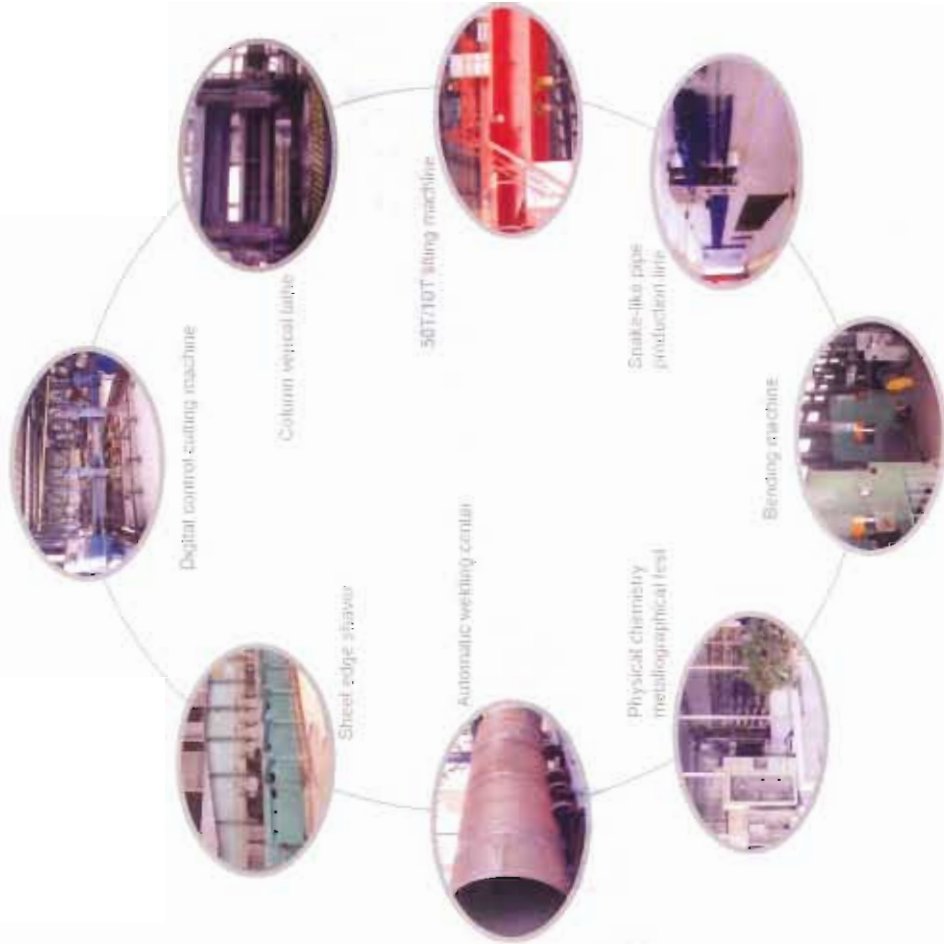


**Product Description**

- The single drum design with thread boiler smoke pipe, arch tube sheet, wing flue structure,
- For the application of different fuels, chain grate and reciprocating grate is divided into two series. With energy, strong radiation arch, can be applied to all types of bituminous coal combustion.
- With high standards, high-quality auxiliary equipment, accessories, automated control to ensure the boiler is safe, stable.
- Compact, 1-20T / H fast assembly, 25-35T / H large assembly, single-layer arrangement, one-time investment province.
- Boiler capacity of 1-35T / H (0.7-29MW).

生产和检测设备

PRODUCTION AND INSPECTION EQUIPMENT



**EPCB** QINGDAO EAST POWER  
INDUSTRY EQUIPMENT CO., LTD



## 企业简介

### BRIEF INTRODUCTION

Qingdao East Power Industry Equipment Co., Ltd is located in Qingdao, China, specialized in design and production of boilers. Our main products include coal fired boiler, biomass fired boiler, CFB circulating Fluidized Bed Steam Boiler, oil gas fired boiler and some boiler accessories. And these boilers are environment-friendly and energy-saving. Our products have been approved by the Provincial Environment Department.

We can manufacture and supply boiler as per ASME, CE and AS standards, also with these certifications.

Our boilers have been used well in all Chinese regions, and have been exported to more than 40 countries, such as Australia, America, Japan, Canada, Russia, Serbia, Thailand, Mexico, Columbia, Cyprus, Pakistan, Mongolia, Angola, Nigeria, Mauritania, etc.

Quality control system

Each worker must have the Certificate before joining in and starting work.

Each producing process is marked work number of the workman and inspector, and input the information to computer procedure. So we can check the responsible person swiftly.

Each welding line is inspected rigorously with radiographic test and X-ray; is saved to official files.

Each boiler is tested seriously with water pressure and inspected by the Shandong Province Institute of Specific Equipment Inspection and Research, then get the Qualified Certification of Boiler.

We offer the products with high quality and competitive price and hope we have a good cooperation with you.



**EPCB**  
BOILER BROCHURE

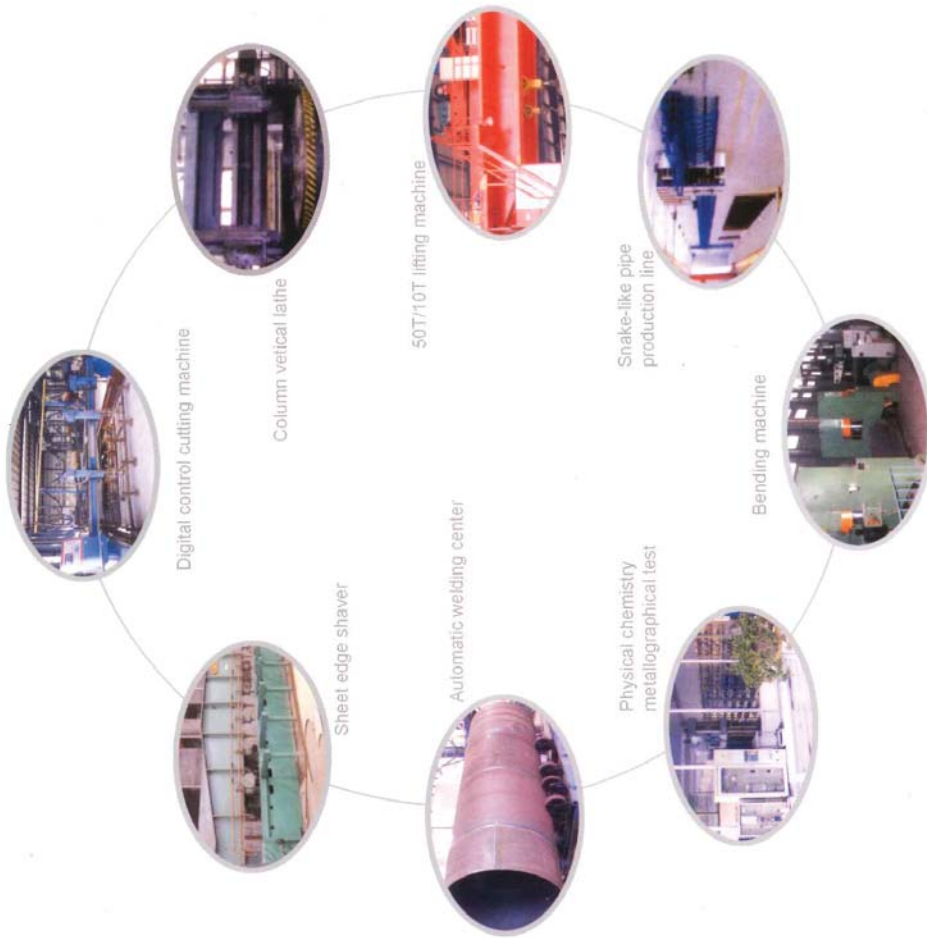


EAST POWER

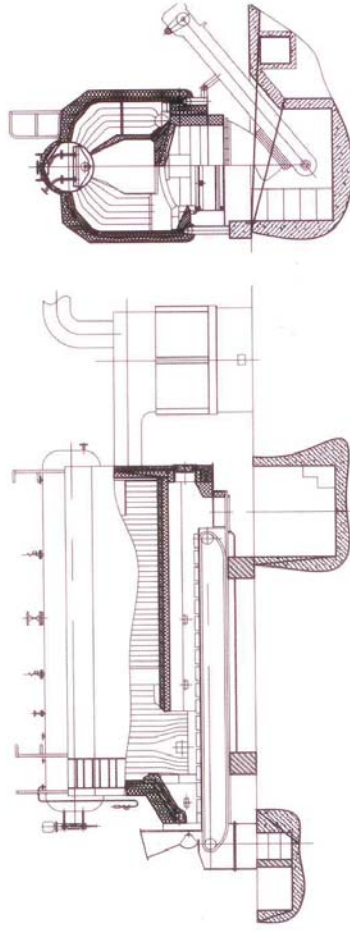
Qingdao East Power Industry Equipment Co., Ltd

生产和检测设备

PRODUCTION AND INSPECTION EQUIPMENT



DZL series coal-fired boiler



Product Description

- The single drum design with thread boiler smoke pipe, arch tube sheet, wing flue structure.
- For the application of different fuels, the grate be divided in two series, chain grate series and reciprocating grate series. With energy-efficient, strong radiation arch, can be applied to all types of bituminous coal combustion.
- With high standards, high-quality auxiliary equipment, accessories, automated control to ensure the boiler is safe and stable.
- Compact, 1-20T / H fast assembly, 25-35T / H large assembly, single-layer arrangement, one-time investment is saving.
- Boiler capacity is 1-35T / H (0.7-29MW).

**DZL series coal-fired steam boiler technique parameter**

Item/Type	DZL1-0.7-A-II		DZL2-1.0-A-II		DZL3-1.25-A-II		DZL4-1.25		DZL6-1.25		DZL8-1.25		DZL10-1.25		DZL15-1.25		DZL20-1.25		DZL25-1.25-A-II		DZL30-1.25-A-II		
	1	2	3	4	6	8	10	15	20	25	30	40	50	60	70	80	100	120	150	200	250	300	
Rated capacity t/h	0.7	1.0	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
Rated steam pressure MPa	0.7	1.0	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
Rated steam temperature °C	170	184	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	
Feed water temperature °C	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Heated area m <sup>2</sup> radiation/convection	4.68/16.1	6.2/29.5	8.2/45.3	10.067/3.53	15.282/2.39	22.3/1.59	29.5/2.07	33.290	34.364/0.85	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	39.3/4.57	
Boiler thermal efficiency %	79	79.07	82	80	81	80.5	80.6	81	80.5	80.6	81	81.38	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76
Fuel consumption kg/h	167	330	488	662	998	1325	1655	2480	3290	3551	4230	4230	4230	4230	4230	4230	4230	4230	4230	4230	4230	4230	4230
Effective area of grate m <sup>2</sup>	1.8	3.04	3.34	5.14	9.36	10.9	12	17	22.56	24.67	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
Transportation size of boiler mm	4876	5290	5360	6237	6300	7486	7600	7350	7610	8478	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000
Weight of largest parts of boiler transportation (t)	2820	3208	3208	3520	3938	3550	3660	3510	3500	2740	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650
	13.3/13.5/13.7/18.5/18.8/18.8	20.8/21	27	35	31	44	22	25	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5

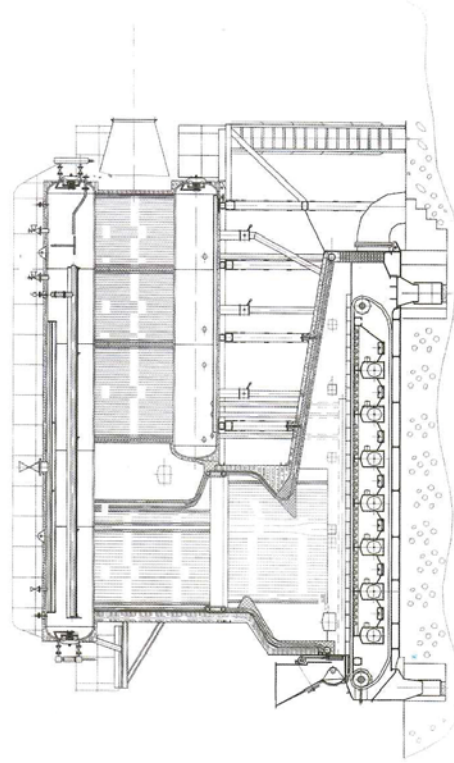
**DZL series coal-fired hot water boiler technique parameter**

Item/Type	DZL0.7		DZL1.4		DZL2.1		DZL2.8		DZL4.2		DZL5.6		DZL7.0		DZL10.5		DZL14		DZL21	
	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	21	28	42	56	70	10.5	14	21	28	42	56
Rated capacity MW	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	21	28	42	56	70	10.5	14	21	28	42	56
Rated working pressure MPa	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	21	28	42	56	70	10.5	14	21	28	42	56
Supply water temperature °C	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Return water temperature °C	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Circulation flow m <sup>3</sup> /h	24	48	72	96	144	192	240	360	480	720	960	1440	1920	2400	3600	4800	7200	9600	14400	19200
Heated area m <sup>2</sup> radiation/convection	4.55/20.12	6.2/39.5	6.7/54.2	7.8/165	15.2/22.38	22.3/159.5	19.5/207.6	23.5/282	34.36/408.51	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6	76/601.6
Boiler thermal efficiency %	79	79.07	82	80	81	80.5	80.6	81	80.5	80.6	81	81.38	81.76	81.76	81.76	81.76	81.76	81.76	81.76	81.76
Fuel consumption kg/h	167	330	488	662	998	1325	1655	2480	3290	3551	4230	4230	4230	4230	4230	4230	4230	4230	4230	4230
Effective area of grate m <sup>2</sup>	1.8	3.04	3.34	5.14	9.36	10.9	12	17	22.56	24.67	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
Transportation size of boiler mm	4876	5290	5360	6237	6300	7486	7600	7350	7610	8478	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000
Weight of largest parts (t)	2870	3222	3410	3520	3938	3550	3660	3510	3500	2740	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.



**SZL series coal-fired boiler**



**Product Description**

- This series boiler belong to double drums water tube boilers, designed for blowdown on surface, and the quality of steam is pretty good.
- Steam boiler divided into saturated steam boiler and overheat steam boiler, and meet the needs separately.
- Boiler uses quick fitting or assembly structure. The 4-6 t/h boiler is quick fitting pipe structure, completely assembled in our factory. The boiler above 6 t/h is composed of 2 main components, upper boiler proper and chain grate base part, short installation time and low charge for installation.
- Boiler capacity is 4-35T / H (2.8-29MW).

**SZL series coal-fired steam boiler technique parameter**

Item/Type	SZL4-1.25-A-II SZL4-1.6-A-II	SZL6-1.25-A-II SZL6-1.6-A-II	SZL8-1.25-A-II SZL8-1.6-A-II	SZL10-1.25-A-II SZL10-1.6-A-II	SZL15-1.25-A-II SZL15-1.6-A-II	SZL20-1.25-A-II SZL20-1.6-A-II	SZL25-1.25-A-II SZL25-1.6-A-II
	Rated capacity t/h	4	6	8	10	15	20
Rated steam pressure MPa	1.25/1.6	1.25/1.6	1.25/1.6	1.25/1.6	1.25/1.6	1.25/1.6	1.25/1.6
Rated steam temperature °C	194/204	194/204	194/204	194/204	194/204	194/204	194/204
Feed water temperature °C	20	60	60	60	105	105	105
Heated area   radiation/ convection m <sup>2</sup>	15.6/112	21.6/132	25.2/171.5	29.5/204.1	37.2/284.68	58.4/307.4	64.8/384.8
Boiler thermal efficiency %	81	80.3	81.6	81	81	80.7	80.0
Fuel consumption t/h	658	1002	1336	1673	2535	3378	4272
Effective area of grate m <sup>2</sup>	6.4	7.8	10.04	11.8	17.81	22.56	24.52
Transportation size of boiler mm	length	7070	7880	8100	9300	11500	12000
	width	2750	2960	3100	3100	3300	3300
	height	3524	3524	3525	3525	3540	3540
Weight of largest parts (t)	31/31.4	34.5	30	34	44.5	55	60

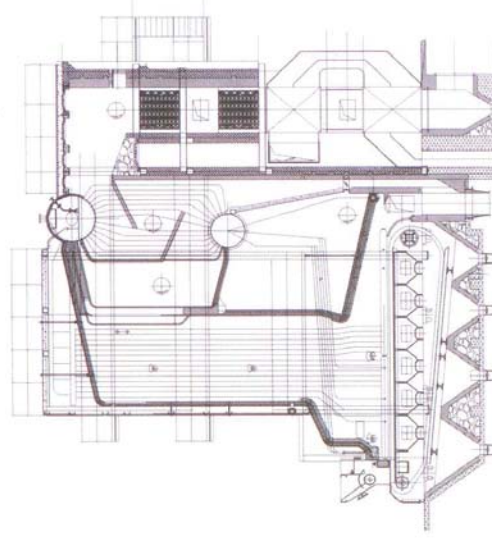
**SZL series coal-fired hot water boiler technique parameter**

Item/Type	SZL2.8-0.7/95/70-A-II	SZL4.2-1.0/115/70-A-II	SZL5.6-1.0/115/70-A-II	SZL7.0-1.0/115/70-A-II	SZL10.5-1.25/115/70-A-II	SZL14-1.25/130/70-A-II
	Rated capacity MW	2.8	4.2	5.6	7	10.5
Rated steam pressure MPa	0.7	1.0	1.0	1.0	1.25	1.25
Supply water temperature °C	95	115	115	115	115	130
Feed water temperature °C	70	70	70	70	70	70
Circulation flow m <sup>3</sup> /h	96	80	106	133	200	200
Heated area   radiation/ convection m <sup>2</sup>	15.6/112	21.6/132	25.2/171.5	29.5/204.1	37.2/284.68	58.4/307.4
Boiler thermal efficiency %	81	80.3	81.6	81	81	80
Fuel consumption t/h	658	1002	1336	1688	2530	3375
Effective area of grate m <sup>2</sup>	6.4	7.8	10.04	11.8	17.81	22.56
Transportation size of boiler mm	length	7070	7880	8100	9300	11500
	width	2750	2960	3100	3100	3300
	height	3524	3524	3525	3525	3540
Weight of largest parts (t)	31	33.5	29	39	43	54

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.



**SHL series coal-fired steam boiler**



**Product Description**

- This series boiler belongs to double drums boiler of horizontal type heat pipes arranged steam, hot water boiler, boiler furnace equipment for the chain scheduling, fuel design based on bituminous coal, with economizer, air preheater, drum induced draft fan, gear box, motor control and dust remover, realizing mechanized operation.
- Part of the machine use pure natural circulatory system.



**SHL series coal-fired steam boiler technique parameter**

Item/Type	SHL20-1.6-A II SHL20-2.5-A II SHL20-2.5/400-A II	SHL25-1.6-A II SHL25-2.5-A II SHL25-2.5/400-A II	SHL30-1.6-A II SHL30-2.5-A II SHL30-2.5/400-A II	SHL35-1.6-A II SHL35-2.5-A II SHL35-2.5/400-A II	SHL40-1.6-A II SHL40-2.5-A II SHL40-2.5/400-A II
Rated capacity (t/h)	20	25	30	35	40
Rated pressure (MPa)	1.6/2.5/2.5	1.6/2.5/2.5	1.6/2.5/2.5	1.6/2.5/2.5	1.6/2.5/2.5
Saturated steam temperature (°C)	204/225/400	204/225/400	204/225/400	204/225/400	204/225/400
Feed water temperature (°C)	105	105	105	105	105
Boiler thermal efficiency %	82.77	82.2	80.38	80.38	80.38
Heated area	chamber area m <sup>2</sup>	458	550	526.2	573.6
	filter m <sup>2</sup>	154	157	159	176
	economizer m <sup>2</sup>	446	557.5	307.8	338
	air preheater m <sup>2</sup>	440	557	537	588.6
Design fuel	Grade II soft coal				
combustion way	flake grate firing				
fuel consumption (kg/h)	2840	3528	4280	4970	5680
Effective area of grate (m <sup>2</sup> )	22.6	28.85	30.1	32.5	35.1
Basis size (mm)	upper drum height	10450	10800	10800	10800
	the highest height of boiler	11350	11350	11750	11750
boiler width	4220	4590	5080	5450	5820
boiler length	4970	5710	9695	9695	9695

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.



**DZL series Biomass-fired steam boiler**



Eight characters flue



Biomass coal



Biomass dust

**Product Description**

Forming solid biomass fuels (referred to as biomass fuels, commonly known as: straw coal), is the use of new technologies and specialized equipment will crop straw, wood chips, sawdust, peanut shell, corn cob, rice straw, rice husk, straw bran, tree branches and leaves, hay and other modern compression molding carbon clean fuel, biomass fuel sources extensively, is an inexhaustible renewable energy, biomass burn rate of 96%, 4% of the remaining ash can be recycled K, achieved a "straw-Fuel-fertilizer" in circulation. Use of biomass fuels, clean and environmental friendly, renewable energy, environmental protection consistent with national energy policy received strong advocacy and promotion. Biomass fuels as the fourth largest energy after coal, oil, natural gas, it will become the world's most important energy. Biomass fuels containing sulfur are very low, there is no problem of desulfurization, heat value in 3600 ~ 5100 kcal / kg, not only can replace the coal and other fuels, and its low cost, greatly reduce the cost of boiler operation, and compared with oil gas and electric boiler, the cost decreased by 60%, 40%, 70%.

Boiler capacity of 1-10T / H (0.7-7.0MW).

**DZL series biomass-fired steam boiler technique parameter**

Item/Type	DZL1.0-M DZL1.25-M	DZL2.0-M DZL2.25-M	DZL3.0-M DZL3.25-M	DZL4.1-25-M	DZL5-1-25-M	DZL6-1-25-M	DZL8-1-25-M	DZL10-1-25-M
Rated capacity t/h	1	2	3	4	6	8	10	10
Rated steam pressure MPa	1.0/1.25	1.0/1.25	0.7/1.25	1.25	1.25	1.25	1.25	1.25
Rated steam temperature °C	184/194	184/194	170/184	194	194	194	194	194
Feed water temperature °C	20	20	20	20	20	20	20	20
Heated area m <sup>2</sup> radiation convection	4.55/20.12	7.84/15	9.5/50.6	11.9/79	17.4/108.1	25.7/172.1	25.7/172.1	25.7/172.1
Boiler thermal efficiency %	80	80	81	81	83	85	85	87
Fuel consumption kg/h	179	358	531	707	1036	1382	1382	1648
Effective area of grate m <sup>2</sup>	1.8	3.04	3.34	5.14	8.12	10.9	10.9	12
Transportation size of boiler mm	4876 1800 2870	5290 2240 3400	5360 2240 3500	6258 2700 3814	6630 3150 4186	7486 3200 3650	7486 3200 3650	7600 3200 4000
Weight of largest parts of boiler (t)	13.5/14.2	20.8/21.9	22.1/23	29	32	35	35	47

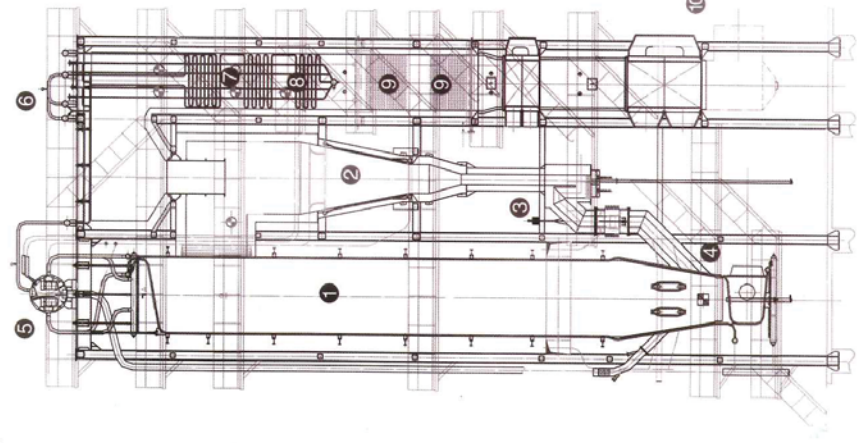
**DZL series biomass-fired hot water boiler technique parameter**

Item/Type	DZL0.7- 0.7/95/70-M	DZL1.4- 0.7/95/70-M	DZL2.1- 0.7/95/70-M	DZL2.8- 0.7/95/70-M	DZL4.2- 1.0/115/70-M	DZL5.6- 1.0/115/70-M	DZL7.0- 1.0/115/70-M
Rated capacity MW	0.7	1.4	2.1	2.8	4.2	5.6	7.0
Rated working pressure MPa	0.7	0.7	0.7	0.7	1.0	1.0	1.0
Supply water temperature °C	95	95	95	95	115	115	115
Return water temperature °C	70	70	70	70	70	70	70
circulation flow m <sup>3</sup> /h	24	48	72	96	80	106	133
Heated area m <sup>2</sup> radiation/convection	4.55/20.12	7.84/15	9.5/50.6	11.9/79	17.4/108.1	25.7/172.1	25.7/172.1
Boiler thermal efficiency %	80	80	81	81	83	85	87
Fuel consumption kg/h	179	358	531	707	1036	1382	1648
Effective area of grate m <sup>2</sup>	1.8	3.04	3.34	5.14	8.12	10.9	12
Largest transportation size mm	4876 1800 2870	5290 2240 3400	5360 2240 3500	6258 2700 3814	6630 3150 4186	7486 3200 3650	7600 3200 4000
Weight of largest parts of boiler (t)	12.7	19	21	29	32	35	47

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.



**Circulating Fluidized Bed Power Station Boiler**



- 1 Furnance
- 2 Cyclone Separator
- 3 U Loop Seal
- 4 Lighting Burner
- 5 Drum
- 6 Boiler Plat Form
- 7 High-temperature Superheater
- 8 Low-temperature Superheater
- 9 Economizer
- 10 Air Preheater

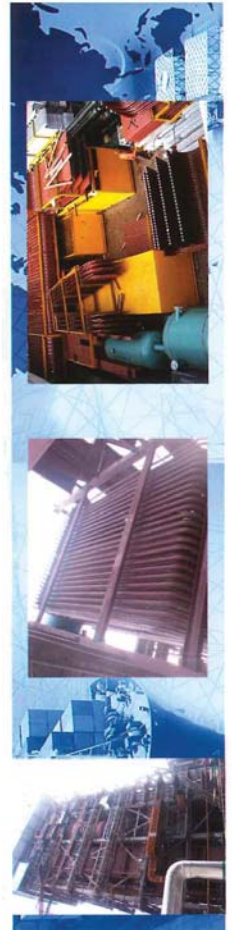
**Product Description**

- Circulating fluidized bed is of low-temperature combustion, therefore, nitrogen oxides emissions of such boiler is much lower than that of coal-powder boiler, and such boiler could directly desulfurized during combustion process. Circulating fluidized bed boiler with high desulfurization rate is economical.
- Circulating fluidized bed boiler could adopt various coal types and has high combustion efficiency, which is especially suitable for low quality, low calorific value coal.
- The ash of circulating fluidized bed boiler is of high activity, thus it is easy to realize comprehensive utilization without secondary pollution.
- Circulating fluidized bed boiler could adjust its load in a wide range. Lowest load can be reduced 30% of full capacity.

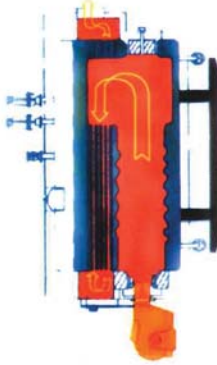
**Circulating Fluidized Bed Power Station boiler technique parameter**

Item/Model	EPC-350.82-A EPC-355.3-A	EPC-755.82-A EPC-755.3-A	EPC-1303.82-A EPC-1305.3-A	EPC-2309.8-A
Rated capacity t/h	35	75	130	220
Rated steam pressure MPa	3.82/5.3	3.82/5.3	3.82/5.3	9.81
Rated steam temperature °C	450/500	450/500	450/500	540
Feed water temperature °C	150	150	150	215
Boiler heated area m <sup>2</sup>	radiation heating surface	188	380.3	777.39
	Mixed-heating surface	-	-	242
Superheater	345.5	633	1089.5	2840
	Economizer	663	1448	2721.98
Air preheater	746	1743	2514.5	8746
Fluidized bed area m <sup>2</sup>	4.43	7.7	15.2	24.56
Available coal	Soft coal, Lean coal, Anthracite			
Design thermal efficiency %	88.3	90	90	89.2
Available size of coal mm	≤10	≤10	≤8	0-10
Grain size of desulfurizer mm	≤2	≤2	≤1.5	0-1.5
Desulfurization efficiency %	≥80	≥80	≥80	≥90
Ca/S Ratio	2.5	2.5	2.5	2.5
Hot air temperature (primary/secondary air) °C	130/120	145/135	207/201	231/235
Exhaust smoke temperature °C	150	150	~140	135
Transportation weight of Max. parts (kg)	10488	15538	18465	61718
Outside dimension of after-installed (L*W*H) m	2.7*9.2*14.9	33.85*12*16.25	43.2*11.85*20.93	24.7*23*48.9

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**WNS Oil / Gas Fired Boiler**



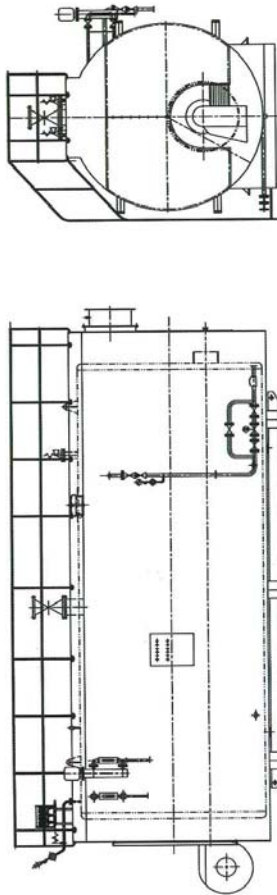
**Horizontal oil (gas)-fired boiler**

- WNS series of fuel oil gas-fired boiler uses the three return trip technologies, the entire wet back structure.
- The furnace heat transfer and breathing tube radiation heat convection rational design, layout of adequate heating boilers, high thermal efficiency.
- This furnace water capacity, full heat exchanger, especially for medium and large sized boiler.

**Horizontal oil (gas)-fired steam boiler parameter**

Item/Type	WNS0.5-0.7-Y(Q)	WNS1.0-0.7-Y(Q)	WNS1.5-1.25-Y(Q)	WNS2-1.25-Y(Q)	WNS3-1.25-Y(Q)	WNS4-1.25-Y(Q)	WNS6-1.25-Y(Q)	WNS8-1.25-Y(Q)	WNS10-1.25-Y(Q)	WNS12-1.25-Y(Q)	WNS15-1.25-Y(Q)	WNS20-1.25-Y(Q)	
	Rated capacity kg/h	500	1000	1500	2000	3000	4000	6000	8000	10000	12000	15000	20000
Rated working pressure MPa	0.7 / 1.0 / 1.25												
Rated steam temperature °C	170 / 184 / 194												
Design efficiency %	≥ 92												
	Fuel consumption	light oil kg/h	72	97	146	210	285	424.8	560	643	833	1042	1389
chimney diameter	heavy oil kg/h	38	76	105	156.5	225.1	305.5	455.3	600.2	689.2	883	1117	1489
	natural gas Nm <sup>3</sup> /h	44	85	116	174.3	250.7	340	507.1	668.6	767.7	995	1244	1659
Largest transportation size	φ250	φ350	φ350	φ350	φ450	φ500	φ500	φ600	φ650	φ750	φ800	φ900	
	1950	2400	3300	3400	4500	4600	4800	6400	7200	7150	7500	9150	
	1300	1670	1660	2100	2600	2550	2750	3200	3200	3200	3500	4000	
	1500	1890	2050	2368	2600	2604	2950	3114	3262	3500	3850	4500	

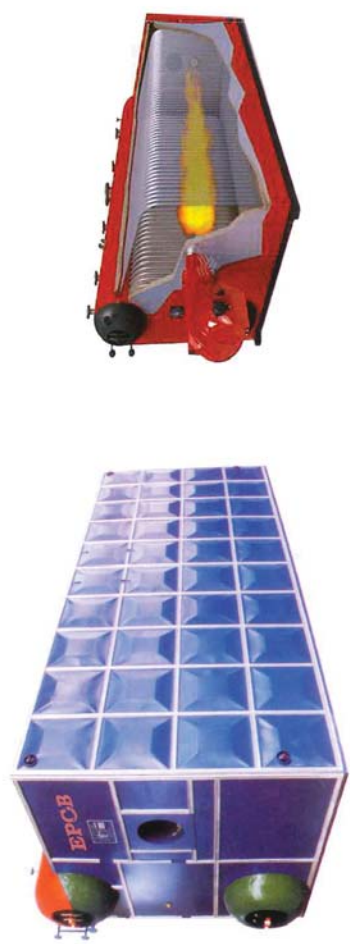
Notes: This form only for your reference, if any changed, please refer to factory technical documents.



Horizontal oil (gas)-fired hot water boiler parameter

Item/Type	WNS0.35-0.7-95/70	WNS0.7-1-95/70	WNS1.05-1-95/70	WNS1.4-1-95/70	WNS2.1-1.095/70	WNS2.8-1.095/70	WNS4.2-1.095/70	WNS5.6-1.095/70	WNS7-1.095/70	WNS8.4-1.095/70	WNS10.5-1.095/70	WNS14-1.095/70	WNS15.4-1.095/70	
	0.35	0.7	1.05	1.4	2.1	2.8	4.2	5.6	7	8.4	10.5	14	15.4	
Rated Capacity MW	0.35	0.7	1.05	1.4	2.1	2.8	4.2	5.6	7	8.4	10.5	14	15.4	
Rated working pressure MPa	0.7/1.1													
Rated supply/return water temperature °C	95/70	95/70	95/70	95/70	95/70	95/70	95/70	95/70	95/70	115/90	115/90	115/90	115/90	
Design efficiency %	≥ 92													
Boiler circulation water flow m <sup>3</sup> /h	12	24	36	48	72	96	144	192	240	288	360	480	294	
	light oil kg/h	32	65	105	133	195	274	382.8	516	636.6	758	957.6	1238.4	1369
Fuel consumption	heavy oil kg/h	34.3	69.7	112.5	142.6	209	293.7	410	553.1	685.6	812	1064.5	1489	
	natural gas Nm <sup>3</sup> /h	38.2	76.8	125.4	158.8	232.8	327.1	457	616.1	763.6	905	1148.4	1658	
chimney diameter	φ200	φ350	φ350	φ350	φ450	φ450	φ500	φ600	φ650	—	—	—	—	
	φ200	φ350	φ350	φ350	φ450	φ450	φ500	φ600	φ650	—	—	—	—	
Largest transportation size	L (mm)	2150	2718	3000	3350	4270	4930	5570	5968	6939	7150	7400	8650	8800
	W (mm)	1265	1500	1510	1880	1985	1980	2344	2450	2574	3000	3200	3450	3400
	H (mm)	1580	1733	1900	2270	2440	2374	2800	2800	3006	3200	3600	4050	4000

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Product Description

- Fully automatic operation, safe and reliable, with a variety of boiler control and protection devices, vapor pressure, water pressure and burning all with the automatic control systems. Hot water boiler is also equipped with process control and temperature and time control.
- Easy to operate and maintain, labour-saving.
- Equipped with imported brand-name burner, fuel fully combustion and energy conservation, environmental protection.
- Closed combustion-wide boiler room, pollution-free, good-looking and clean.
- Compact structure, easy installation.

SZS Series Oil/Gas-Fired Boiler

Item/Model	SZS2-1.25/1.62.5-Y(Q)	SZS4-1.25/1.62.5-Y(Q)	SZS6-1.25/1.62.5-Y(Q)	SZS10-1.25/1.62.5-Y(Q)	SZS20-1.25/1.62.5-Y(Q)	SZS35-1.25/1.62.5-Y(Q)
Rated steam capacity (t/h)	2000	4000	6000	10000	20000	35000
Rated steam pressure MPa	1.25/1.62.5					
Rated steam temperature °C	194/203/225/400					
Heated area m <sup>2</sup>	68.8	125.3	185.1	210	435.2	906
	18.48	37	49.8	144	236	413
Economizer heating surface m <sup>2</sup>	light oil / heavy oil / natural gas / LPG					
Design efficiency %	89	90.35	89.67	90.24	89.17	90.3

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LHS Series Oil / Gas Fired Boiler



Product Description

- Flow interrupters are set in the fire tube to slow down the rate of the heat efficiency.
- The mist flows in the fire tube, the LHS boilers have a large water capacity and have wide adaptability to the load.
- An openable ash clean door is set at the bottom of the boiler. The top cover of the boiler can be opened for easy cleaning ash and prolong the endurance of the boiler.
- Controller is safe and lower running cost to a great extent.

LHS oil(gas)-fired steam boiler parameter

Item/Type	LHS0.1-0.40.7-Q.Y	LHS0.15-0.7-Q.Y	LHS0.2-0.40.7-Q.Y	LHS0.3-0.40.7-Q.Y	LHS0.5-0.40.7-Q.Y	LHS0.8-0.71.0-Q.Y	LHS1.0-0.71.0-Q.Y
Rated power kw	≈70	≈105	≈140	≈210	≈350	≈560	≈700
Rated steam capacity t/h	0.1	0.15	0.2	0.3	0.5	0.8	1.0
Rated working pressure MPa	0.40.7	0.7	0.40.7	0.40.7	0.40.7	0.71.0	0.71.0
Saturated steam temperature °C	152/170	170	152/170	152/170	152/170	170/184	170/184
Design efficiency %	>80	>90	>89	>89	>89	>88	>89
Heated area m <sup>2</sup>	2.05	4.9	5.08	8.2	12.7	18.4	23.1
Boiler water capacity L	360	360	510	930	1040	1620	2760
flue diameter	φ160	φ250	φ250	φ250	φ300	φ400	φ350
feed water diameter	DN25	DN25	DN25	DN25	DN25	DN40	DN40
main steam tube diameter	DN25	DN40	DN40	DN40	DN50	DN50	DN65
safety valve diameter	DN40	DN40	DN40	DN40	2xDN40	2xDN40	2xDN40
blowdown tube diameter	DN40	DN40	DN40	DN40	DN40	DN40	DN40
Fuel consumption							
light oil kg/h	7.0	10.4	13.8	22.5	34.5	51.5	68.2
natural gas Nm <sup>3</sup> /h	8.0	12.4	16.5	24.0	40.3	60.5	80.6
LPG Nm <sup>3</sup> /h	3.2	4.8	6.4	10.4	16.0	23.8	31.6
coal gas Nm <sup>3</sup> /h		27.9	37.4	54.0	90.7	136.0	178.2
Transportation weight (kg)	≈400/420	≈550	≈600/700	≈1000/1050	≈1200	≈1800/2000	≈2600/2730
Boiler size							
L (mm)	800	900	1000	1200	1200	1430	1600
W (mm)	750	850	960	1150	1150	1380	1550
H (mm)	1610	1620	1840	2080	2390	2600	2790

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YY(Q)W Type of Horizontal oil (gas)-fired Thermal oil Boiler

Product Description

- The position between the burner joint and the coil is sealed with good seal, large flexible space, to increase the service life of burner and enhance the heating efficiency.
- Triple coil structure is adopted by the boiler with three-pass flue gas, compact design and space-saving. Heating efficiency of the air pre-heater enhance up to 92% or more.
- Multiple running with safety protection make boiler's operation more safety and simply. High temperature control precision (±1°C) and good combustion effect.
- Automatic control functions, to extend the service life of equipment while saving human resources.



YY(Q)W Type of Horizontal oil (gas)-fired Thermal oil Boiler

Model	YQ1W-18-Y(Q)	YQ1W-24-Y(Q)	YQ1W-30-Y(Q)	YQ1W-36-Y(Q)	YQ1W-42-Y(Q)	YQ1W-48-Y(Q)	YQ1W-54-Y(Q)	YQ1W-60-Y(Q)	YQ1W-66-Y(Q)	YQ1W-72-Y(Q)	YQ1W-78-Y(Q)	YQ1W-84-Y(Q)	YQ1W-90-Y(Q)	YQ1W-96-Y(Q)	YQ1W-102-Y(Q)	YQ1W-108-Y(Q)	YQ1W-114-Y(Q)	YQ1W-120-Y(Q)	
	Rated thermal power x10 <sup>4</sup> kcal/h	180	240	350	600	870	1200	1400	1800	2400	3000	3500	4000	4600	5200	6000	7000	8000	9600
Design thermal efficiency (%)	≥83	≥83	≥83	≥85	≥85	≥85	≥85	≥85	≥85	≥85	≥86	≥86	≥86	≥86	≥88	≥88	≥88	≥88	≥88
Rated working pressure (MPa)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Max. working temperature (°C)	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320
Thermal oil capacity (m <sup>3</sup> )	0.15	0.23	0.32	0.44	0.8	0.86	1.1	1.48	2.2	3.5	4.6	4.9	5.7	7.2	8.4	9.6	12.6		
Circulation oil capacity (m <sup>3</sup> /h)	18	20	30	60	80	100	100	150	200	200	230	230	250	300	400	500	560		
60#heavy oil (Kg/h)	20	27	40.2	67	100	134	162	203	270	338	408	472	540	672	815	1080	1350		
Diesel (Kg/h)	19	26	39	65	98	130	154	196	260	326	393	454	520	650	785	1043	1302		
Natural gas (Nm <sup>3</sup> /h)	23	31	47	79	119	158	190	236	315	395	476	555	635	790	950	1285	1583		
Liquefied petroleum gas (Nm <sup>3</sup> /h)	7.7	10.5	15.3	26	38	51	62.3	77	103.5	130	155	178	207	260	310	415	521		
Boiler size																			
L (mm)	1500	1950	2300	2920	3620	4100	4250	4400	4700	4980	5250	6190	6250	6480	6580	7100			
W (mm)	1100	1240	1450	1560	1780	2000	2150	2300	2600	2650	2760	2820	3050	3150	3380	3780	4050		
H (mm)	1500	1520	1680	1790	2050	2250	2300	2550	2850	3150	3250	3380	3400	3600	3800	4280	4600		
weight (t)	1.5	1.65	2.7	3.9	5.2	7.5	8.2	10	12.9	17.5	20	20.8	29.2	42.5	49	59	63		
Chimney diameter	φ250	φ300	φ300	φ350	φ400	φ400	φ400	φ400	φ450	φ500	φ500	φ650	φ650	φ700	φ700	φ850	φ1000		

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Horizontal Coal-fired Thermal oil Boiler



Product Description

- Low steel consumption, high air leakage efficient, high coal leakage volume, suitable to burn II soft coal;
- Adoption of automatic temperature control function is made to achieve stable heating and precise temperature adjustment.
- It adopts perfect running control and safety monitoring device with safety, reliability and easy operation.
- Fast temperature rise, high thermal efficiency, with overload capacity at a certain degree to ensure output of boiler.

Horizontal Chain Grate Coal-fired Thermal oil Boiler

Model	YLW-1900MA		YLW-1600MA		YLW-1300MA		YLW-1000MA		YLW-800MA		YLW-600MA		YLW-400MA		YLW-350MA		YLW-300MA		YLW-250MA		YLW-200MA		YLW-1600MA		YLW-1400MA		YLW-1200MA		YLW-1000MA		YLW-800MA		YLW-600MA		YLW-400MA		YLW-350MA		YLW-300MA		YLW-250MA		YLW-200MA									
	Rated power KW	1900	1600	1300	1000	800	600	400	350	300	250	200	1900	1600	1300	1000	800	600	400	350	300	250	200	1900	1600	1300	1000	800	600	400	350	300	250	200	1900	1600	1300	1000	800	600	400	350	300	250	200							
Rated thermal efficiency %	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79	≥79						
Rated working pressure MPa	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Max. working temperature °C	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320		
Thermal oil capacity m³	2.8	3.5	4.85	5.4	5.8	6.8	7.9	8.8	9.8	13.5	14.8	15.6	16.9	18.1	19.4																																					
Circulating oil Capacity m³/h	165	200	225	280	280	300	340	400	400	520	600	660	800	800	800																																					
Main valve size	DN150	DN150	DN150	DN200	DN200	DN200	DN250	DN250	DN250	DN300	DN325	DN350	DN400	DN400	DN400																																					
Whole system power kW	75	85	85	130	130	150	180	205	205	260	280	310	315	320	350																																					
Available fuel	AI, All, All soft coal																																																			
Weight (kg)	21500	23000	24000	26500	32000	35000	45000	64000	66500	66800	87600	98000	128500	146000	168000																																					

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.

DZG series Fixed Grate Steam Boiler



Product Description

- Flue gas in the high temperature furnace stay a long residence time. After several times wind distribution, fully burning, fuel efficiency is high without black smoke.
- Soot carbon dioxide, sulphur dioxide, such as the environmental indicators is better than the national discharge standard, and conform to the current international emission reduction policies.
- Fuel burning continuous, stable working condition, can guarantee the steam output.
- Manual feeding, remove slag, simple operation, without cumbersome procedures, start quickly.
- Boiler Capacity 1~4 Ton (0.7-2.8 MW)

DZG series Fixed Grate Steam Boiler

Item\Type	DZG0.5-0.7/1.0-J	DZG1-0.7/1.0/1.25-J	DZG2-0.7/1.0/1.25-J	DZG4-0.7/1.0/1.25-J	DZG0.35-0.7/1.0/1.25-J	DZG0.7-0.7/1.0/1.25-J	DZG1.4-0.7/1.0/1.25-J	
	Rated capacity t/h	0.5	1	2	4	0.35	0.7	1.4
Rated steam pressure Mpa	0.7/1.0	0.7/1.0/1.25	0.7/1.0/1.25	1.25	0.7	0.7	0.7	0.7
Rated steam temperature °C	170/184	170/184	170/184/194	170/184/194	95	95	95	95
Feed water temperature °C	20	20	20	20	70	70	70	70
Heated area radiation / convection M <sup>2</sup>	2.3/16.2	4.68/16.1	5.8/30.7	10.06/75	2.3/16.2	4.55/20.12	6.17/39.5	6.17/39.5
Suitable fuel type	soft coal, biomass, cokes, blind coal, ect.							
Boiler heat efficiency %	76	78	78	78	76	78	78	78.0
Fuel consumption kg/h	99	198	396	794	76	146	290	290
Effective area of grate	0.98	1.5	2.4	3.98	0.98	1.5	2.4	2.4
Transportation length	2970	3782	4307	6240	2970	3782	4900	4900
width	1950	1920	2130	2700	1950	1800	2130	2130
height	2660	2820	3222	3678	2660	2870	3222	3222
Weight of largest parts of boiler transportation (ton)	8.3/8.4	11/11/11.6	15.7/15.8/18	24	8.3	11	15.5	15.5

## Steam Autoclave

### Steam autoclave Description

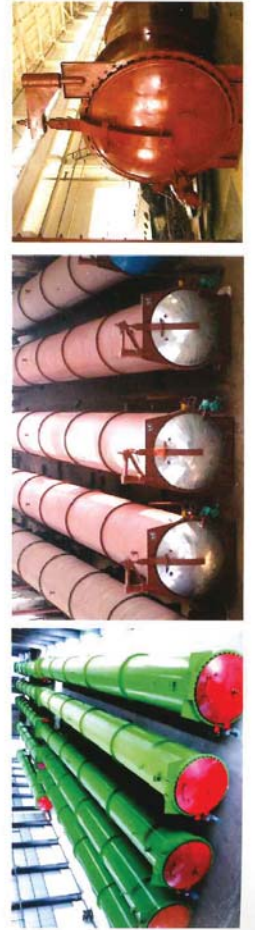
- Steam autoclave is a huge pressure vessel with a large size and heavy weight, that has a wide use, such as the autoclave curing of the building material like aerated concrete block, concrete pipe pile, coal dust bricks, macro calcium silicate board, asbestos insulation board etc. At the same time, steam autoclave can also be used in the production process that will need autoclave curing, for example: rubber products, heavy material melting, high pressure processing of the chemical fiber products, cable sulfide, chemical industry, pharmaceutical industry, insulation material, textile industry, military industry and so on.



### Steam Autoclave Parameter

No.	specification	Max.design Pressure (Mpa)	Working Pressure (Mpa)	Design temperature (°C)	Working temperature (°C)	Medium	Size (M)
1	φ2×21	1.4	1.3	198.34	194.13	Saturated steam	22.12×26×2.973
2	φ2.5×31.5	1.6	1.5	203	200	Saturated steam	33.2×32×4
3	φ2.68×39	1.6	1.5	203	200	Saturated steam	40.65×3.46×4.25
4	φ2.85×26	1.65	1.5	205	205	Saturated steam	27.4×3.958×4.504
5	φ2.85×39	1.65	1.5	205	205	Saturated steam	40.4×3.958×4.504

\* Notes: This form only for your reference, if any changed, please refer to factory technical documents.



## Pressure Vessel & Heat Exchanger

### Pressure vessel Description

- Our company is qualified to design and manufacture A1/A2 pressure vessel, also certified of ASME "S" (power boiler) and U (pressure vessel). We are the biggest heavy equipment production base of the north area.

### Pressure vessel parameter

Material	304, 316, Q235, 16MnR, 20R
Pressure	0-2.5Mpa
Volume	1m <sup>3</sup> -10000m <sup>3</sup>
Type	Oil tank, drum, steam separator, storage tank



### Tubular Heat Exchanger Description

- Tubular Heat Exchanger is a kind of general equipment for heat exchange. It can be used in the chemical industry, light industry, power system, ship reduction, metallurgy heating system and so on, especially in oil refining and chemical processing.

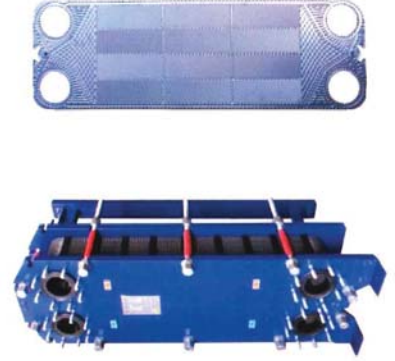
### Tubular Heat Exchanger

Model No.	GR01-GR250
Diameter	DN150-DN1500
Exchange area	7-1300m <sup>2</sup>
Working pressure	0.5-2.5MPa
Working temperature	≤250 °C
Max. Loading Capacity	15-1800m <sup>3</sup> /h



### Plate Heat Exchanger Description

- Plate Heat Exchanger is a new type of high-efficiency heat-exchange equipment. Nowadays, plate heat exchanger is widely used in the processes of heating, refrigeration, condensation and evaporation in the chemical industry, petroleum, food industry, metallurgy, machinery, light industry, power system, mine, pharmaceutical and central heating, etc.



### Plate Heat Exchanger

Model No.	BR07-BR180
Diameter	DN32-DN350
Exchange area	7-1300m <sup>2</sup>
Working pressure	0.2-1.25MPa
Working temperature	≤150 °C
Max. Loading Capacity	15-1800m <sup>3</sup> /h

**EPCB** Your reliable choice

### Typical Customer Project



• 10T biomass boiler exported to Mexico



• SZS water tube oil gas fired boiler



• Gas boiler in oil company office building



• 6T coal boiler in Food factory



• Boiler house outside looking



• Heavy oil boiler in CNPC oilfield



• 8T coal steam boiler exported to Indonesia



• 20 Ton coal steam boiler



• Container boiler exported



• 75 Ton CFB boiler



• 25 Ton coal boiler for China government department



• Oilfield Vacuum Boiler



## QINGDAO EAST POWER BOILER

Keeping professional, keeping development, keeping quality

QINGDAO EAST POWER INDUSTRY EQUIPMENT CO., LTD  
Add: Hi-technology Industrial Park, Qingdao, China  
Tel: +86 532 66717007  
Fax: +86 532 66717006  
Email: info@cn-eastpower.com  
Web: www.cn-eastpower.com

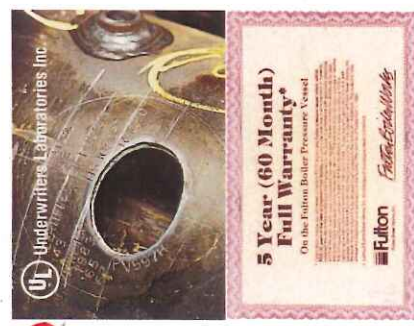


**Polished Stainless Jacket**

A relatively inexpensive option for the customer who requires a smart look. No matter if it's a stainless jacket or a complete skid-mounted unit(s) with boiler, return system, blowdown, and any other special equipment, Fulton can build to any industrial process application.

**Fulton Warranty No.1 in the Industry!**

All Fulton Boilers are completely trimmed packaged boilers. No additional fuel train items or electrical wiring is needed. Boiler is supplied with installation manual, ready for quick installation by the Fulton representative.

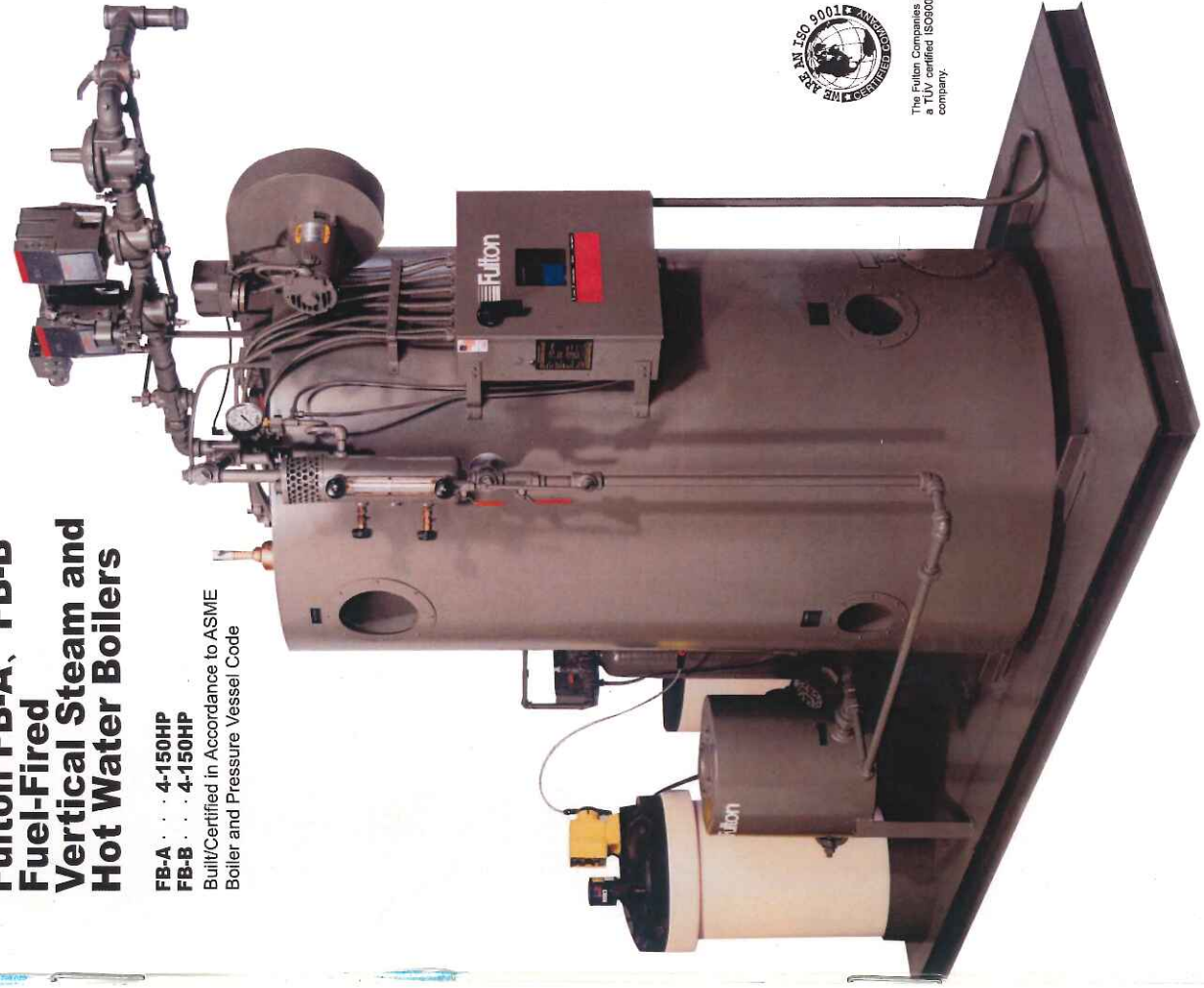


Industrial/Commercial Division  
 The Fulton Companies

**Fulton FB-A, FB-B  
 Fuel-Fired  
 Vertical Steam and  
 Hot Water Boilers**

**FB-A · · · 4-150HP**  
**FB-B · · · 4-150HP**

Built/Certified in Accordance to ASME  
 Boiler and Pressure Vessel Code



The Fulton Companies is  
 a TUV certified ISO9001  
 company.

Local Sole Agent  
**UEEG Limited**  
 Unit #320, Block C-3rd Floor, Pearl Condo,  
 Kabaraye Pagoda Road  
 Yangon, Myanmar  
 Ph : +95 9 965 055 682, +95 9 972721090  
 Email : [UEEGlimited@outlook.com](mailto:UEEGlimited@outlook.com)



## Fulton vertical fuel-fired steam and hot water boiler

For over 60 years the Fulton vertical tubeless boilers have remained a compact trouble-free boiler supplying steam and hot water to virtually every type of industry imaginable.

The Classic efficient FB-A, FB-B Fulton boilers are available in 13 sizes ranging from 4 to 150 BHP.

Simplicity and reliability offer years of trouble-free operation. With no tubes or coils to scale up, rust or burn out, a Fulton Boiler reduces plant operating costs by eliminating down time and expensive repairs.

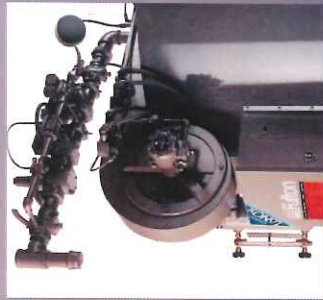
All Fulton Boilers feature the Fulton designed top mounted down-fired standard power burner or new optional low emissions burner. The velocity of the premixed air and gas reduces the residence time in the low emissions burner. Due to this high velocity gas/air mixture, Fulton's burners are capable of maintaining NOx concentrations below 20 PPM and 60 PPM CO corrected to 3% O<sub>2</sub>. The Fulton Low Emissions Burner is also under 20 ng NOx/joule output.

## Fulton Engineers/Manufactures Total System for Industrial Process Applications

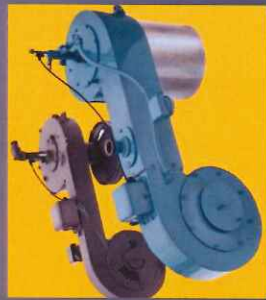
Fulton, involved in engineering total systems to meet the needs of a specific application has been manufacturing steam boilers for over 60 years. Fulton's engineering, drafting, and manufacturing capabilities can build just about anything around a customer's needs. Fulton's custom built, factory skid mounted and pre-piped equipment save a tremendous amount of time and work on the job site.



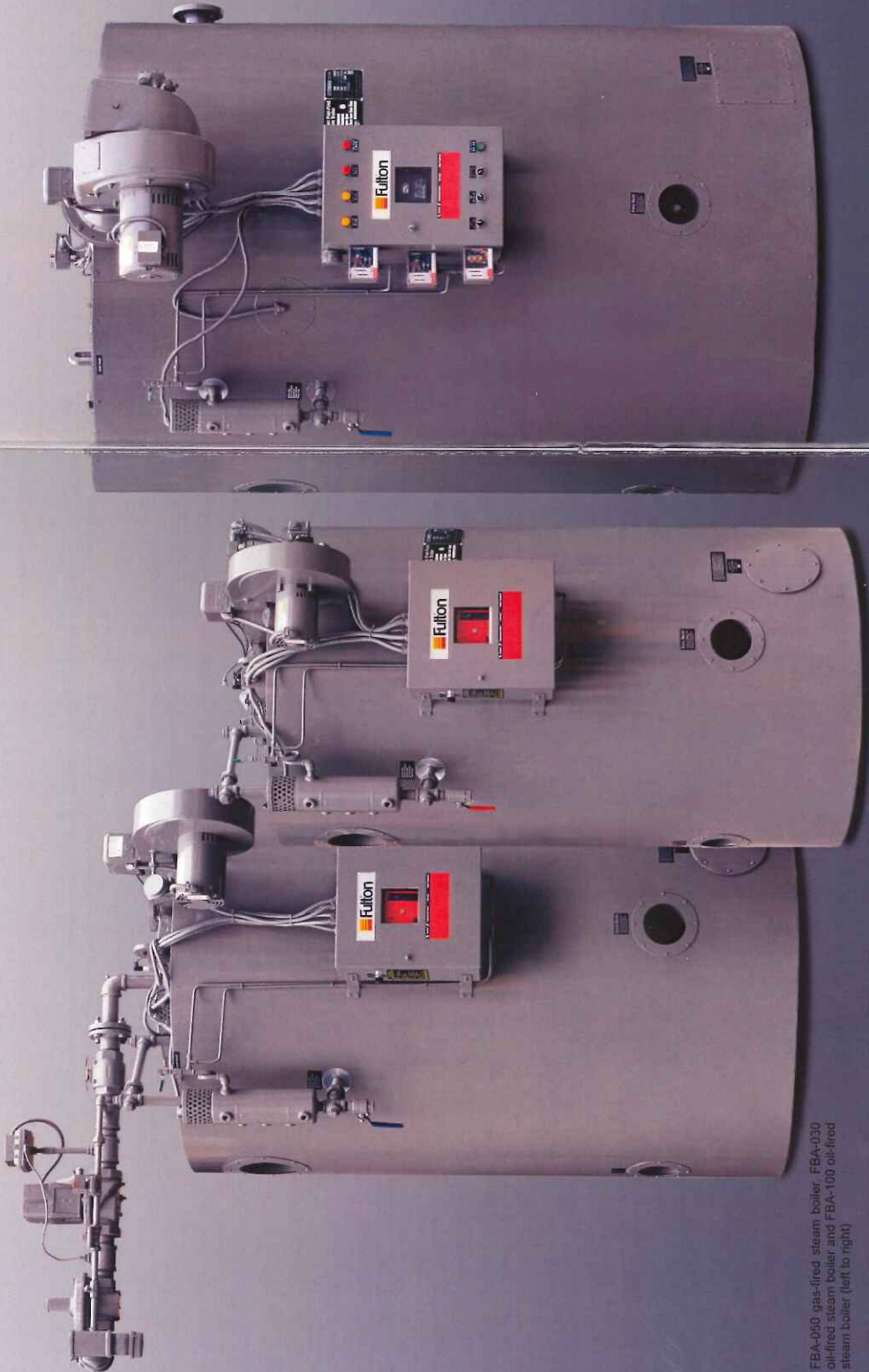
Custom skid mounted boiler and accessories



The Fulton Classic FB-A, FB-B boilers can be ordered with combination oil and gas capabilities or be converted at any time simply and economically.

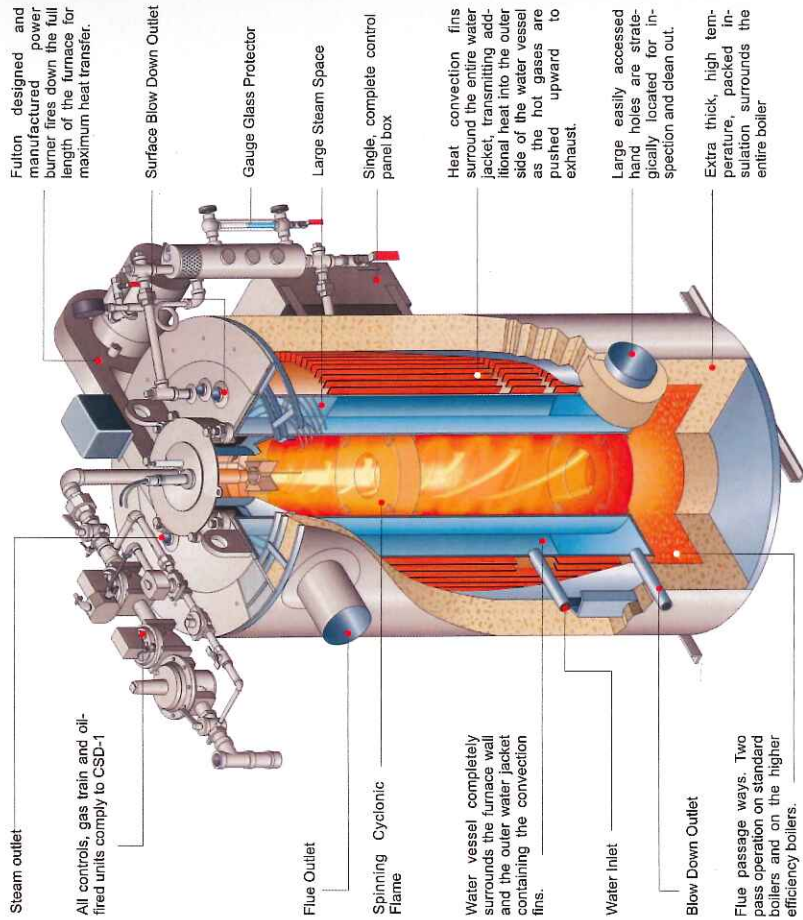


Standard top-mounted down-fired burner (back) and low emission burner (front)



FBA-050 gas-fired steam boiler, FBA-030 oil-fired steam boiler and FBA-100 oil-fired steam boiler (left to right)

Component View/Features of the vertical tubeless boiler (4-60BHP.)

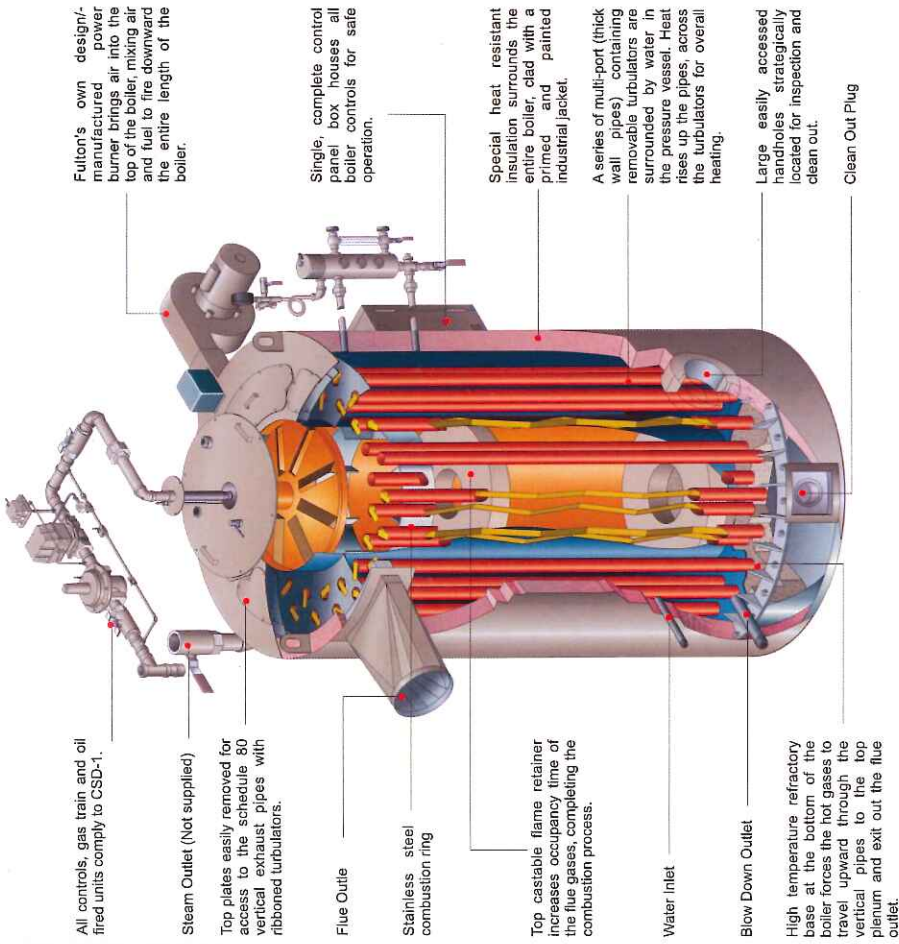


The Fulton Difference

Pipe Within a Pipe

The furnace (Pressure vessel) is simply stated, a "pipe within a pipe." The top mounted burner sends a spinning, cyclonic flame down the center furnace chamber. The hot gases return upward in the secondary flue passage, traveling over the heat convection fins. These fins transmit the remaining heat onto the outer side of the water vessel. This results in the most uniform overall heating of the boiler, maximizing the pressure vessel's longevity.

Component View/Features of the VMP Design in 80-150 BHP



The Fulton Difference

Pipe vs. Tube

Sixty years after creating the vertical tubeless category of boilers, Fulton has introduced another innovation—the PipeType Boiler. Constructed of Schedule 80, heavy wall pipes replacement is a thing of the past. This simple design is proven by decades of experience, and is backed by our unmatched warranty. See the difference there or call us for physical sample of our "Pipe vs. Tube".



### Specifications/Steam boiler

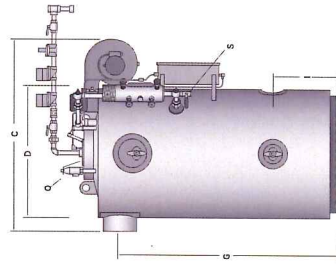
Model FB-A	4	6	10	15	20	30	40	50	60	80	100	130	150
Rated Capacity	138	207	345	518	690	1035	1380	1725	2070	2760	3450	4484	5175
Steam output	63	94	157	235	312	470	627	783	939	1252	1565	2034	2348
Approximate Fuel Consumption at Rated Capacity													
Light oil	3.77	5.65	9.42	14.71	18.91	29.07	36.41	48.80	58.14	76.10	91.31	121.75	140.55
Propane Gas	1.88	2.81	4.69	7.32	9.41	14.47	19.12	24.29	28.94	37.68	45.45	60.61	69.97
Natural Gas	4.74	7.11	11.85	18.51	23.79	36.58	48.34	61.41	73.16	95.76	114.91	153.22	176.87
Town Gas	12.06	18.09	30.14	47.06	60.50	93.02	122.92	158.15	188.05	245.51	292.21	358.61	413.97
Natural Gas Boiler	IN 1	1	1	1.25	1.5	1.5	1.5	1.5	2	2.5	3	3	3
Connection Size	MM 25	25	25	32	38	38	38	38	50	64	76	76	76
Burner	3450 RPM/60CY												
Motor HP	2850 RPM/50CY	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/2	1/2	1/2	1/2	1/2
Electric Power Requirements (in Amps)	3Phase 0.9	0.9	0.9	0.9	0.9	1.4	1.4	2.6	3.7	2.6	3.7	4.6	4.6
Control voltage	220V/50HZ/1 Phase	2	2	2	2	2	2	2	2	2	2	2	2

Note: High pressure boilers ordered with an extra pressure control for night heating have less than rated output while operating at low pressure.

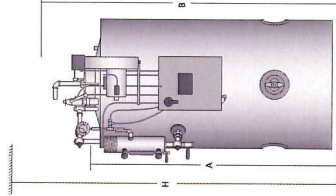
### Specifications/Hot water boiler

Model FB-B	4	6	10	15	20	30	40	50	60	80	100	130	150
Rated Capacity	136	205	341	512	682	1023	1365	1706	2047	2729	3412	4435	5117
Output	63	94	157	235	312	470	627	783	939	1252	1565	2034	2348
Approximate Fuel Consumption at Rated Capacity													
Light oil	3.70	5.55	9.25	13.09	17.45	26.18	34.90	43.63	52.35	68.25	85.32	110.91	126.57
Propane Gas	1.84	2.76	4.61	6.99	9.14	13.72	18.37	21.72	26.06	33.88	42.47	55.21	63.00
Natural Gas	4.66	6.99	11.64	16.47	21.96	32.94	43.92	54.90	65.88	85.89	107.37	139.58	159.28
Town Gas	11.84	17.76	29.60	41.88	55.84	83.77	111.69	139.61	167.53	218.41	273.02	354.92	405.02
Natural Gas Boiler	IN 1	1	1	1.25	1.5	1.5	1.5	1.5	2	2.5	3	3	3
Connection Size	MM 25	25	25	32	38	38	38	38	50	64	76	76	76
Burner	3450 RPM/60CY												
Motor HP	2850 RPM/50CY	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/2	1/2	1/2	1/2	1/2
Electric Power Requirements (in Amps)	3Phase 0.9	0.9	0.9	0.9	0.9	1.4	1.4	2.6	3.7	2.6	3.7	4.6	4.6
Control voltage	220V/50HZ/1 Phase	2	2	2	2	2	2	2	2	2	2	2	2

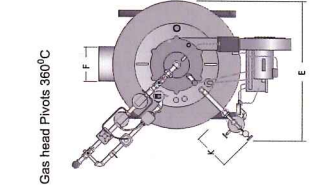
Note: Fuel consumption based on light oil 11800 kcal/kg, Natural gas 8850kcal/m<sup>3</sup>, Propane gas 25000kcal/m<sup>3</sup>, Town gas 3500kcal/m<sup>3</sup>. Specifications are approximate. We reserve the right to change specifications.



Side View



Front View



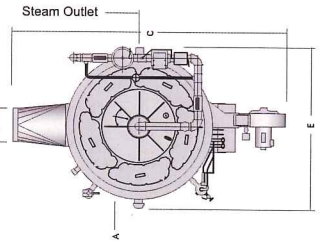
Top View

FB-A/FB-B (4-60BHP)

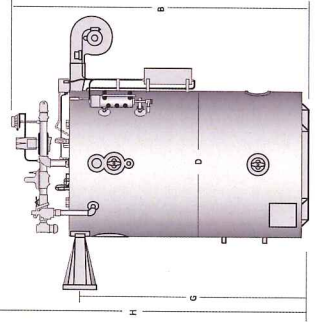
### Dimensions and Weights FB-A, FB-B are approximately the same.

Model FB-A, FB-B	4	6	10	15	20	30	40	50	60	80	100	130	150
Heights and widths													
A Boiler Height	47	57	63	69	72	82	73.5	87	93	93	99	117	117
B Boiler Height With Trim & Fuel Train Assembly	MM 1194	1448	1600	1753	1829	2083	1867	2210	2362	2362	2515	2889	2972
C Overall Depth Stack To Burner Fan Housing	IN 65	75	80.5	86.5	92.5	102	94	106.5	120	122	125	135	141
D Boiler Diameter	IN 44	44	46	47	67	73	78	78	90	90	120	134	136
E Overall Width With Water Column	MM 660	660	710	760	980	1170	1400	1400	1400	1588	1740	1936	1943
F Flue Outlet Diameter	IN 6	6	8	8	10	12	12	12	12	14	14	16	16
G To Center of Flue Outlet	MM 152	152	152	203	254	305	305	305	305	356	356	400	407
H Clearance Required for Burner	IN 72	82	86	92	96	106	106	114	124	126	129	151	157
Removed from Ceiling to Ground	MM 1828	2083	2184	2337	2438	2692	2692	2896	3150	3200	3277	3635	3988
Boiler Front	IN 41	41	41	41	41	41	41	41	41	41	41	41	41
Boiler Back/Side	MM 1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041
Water Content	US.GAL 14	16	24	39	77	170	220	245	270	375	580	876	904
Weight	LITERS 53	61	91	148	292	643	835	927	1022	1419	2195	3317	3423
Gross Shipping Weight	LB 1400	1700	2000	2280	3400	4780	6400	6526	7280	10506	11608	15418	15550
	KG 640	770	910	1035	1545	2170	2905	2963	3305	4770	5270	7000	7060

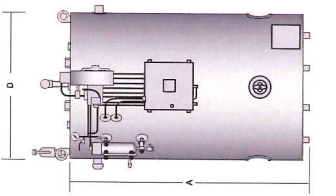
Note: Specifications are approximate. We reserve right to change specifications.



Top View



Side View



Front View

FB-A/FB-B (80-150HP)

Key Project References for Boiler

1. AA Pharmacy
2. Japan Cotton
3. Win & Win Ply wood
4. Progress Biochen
5. Fuji Soap
6. Shwe Tha Zin May
7. Yes Myanmar carton box ( Inno group )
8. Young Tailoring

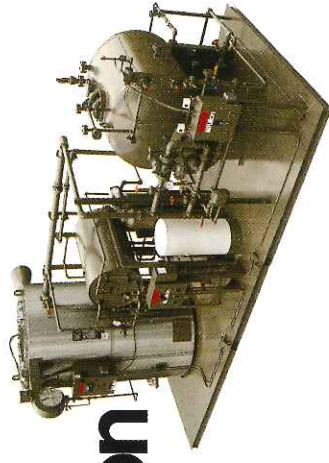
Key Project Reference for Valves in Thailand

1. Siam Steel
2. Bangkok Ranch
3. General Environmental
4. Thai Rung Union Car
5. Thai Beverage
6. PTT
7. Word Flex
8. Mill Con steel
9. KF Food

1. Boiler Consulting Services.
2. Steam Plant Designing Services.
3. Boiler & Accessories Supply.
4. Boiler Installation & Repair Services.
5. Boiler Accessories Fabrication Services.
6. Boiler House Designing Services.
7. Piping Services (steam, hot water & oil).
8. Valves Supply & Install.
9. Insulation & Cladding Services.
10. Trading Services.
11. Hot Water Solution for Hotel & Factory
12. Certificate Argon, Electrode Welding..
13. One Stop Solution/Turn key Supplier.



U E E G



Contact us:

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 Corner of Sayasan Road &  
 KabaAye Pagoda Road, Yangon, Myanmar.  
 Phone : +9595055682, +95972721090.  
 Office : +95965055682.  
 Mail : ueeglimited@outlook.com.

**WNS Oil & Gas Fire Steam & Hot Water Boiler**



1.5 units  
9/11  
89%

Standardized oil & gas – fired boiler.

- WNS series of fuel oil gas-fired boiler uses the standard three return trip technology the entire wet back structure
- The furnace heat transfer and breathing tube radiation heat convection rational design, layout of the adequate heating boilers, high thermal efficiency.
- This furnace water capacity, full heat exchanger, especially for medium and large sized boiler.

**DZL Series Biomass-fired Steam Boiler**



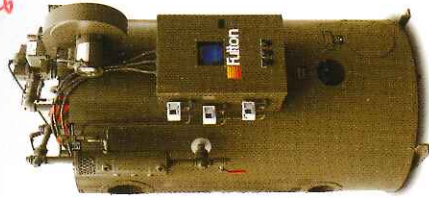
82%

Standardized Biomass-fired steam boiler

- The single drum design with thread boiler smoke pipe, arch tube sheet, wing flue structure
- For the application of the different fuels, the grate be divided in two series, chain grate series and reciprocating grate series. With energy-efficient, strong radiation arch, can be applied to all type of bituminous coal combustion.
- With high standards, high-quality auxiliary equipment, accessories, automated control to ensure the boiler is safe and stable.
- Compact 1-20T/hr fast assembly, 25-35T/hr large assembly, single-layer arrangement, one-time investment is saving for at least 25 years.
- Boiler capacity is 1-35T/hr (0.7-29MW)

**FBA-FBB Series Tubes-less Steam & Hot Water Boiler**

89%



Design features for FBS-FBB series

- Fulton design and manufactured power burner fires down the full length of the furnace for the maximum heat transfer.
- Heat convection fins surround the entire water jacket, transmitting additional heat into the outer side of the water vessel as the hot gases are pushed upward to exhaust.

- Water vessel completely surrounds the furnace wall and the outer water jacket containing the convection fins.
- Extra thick, high temperature, packed insulation surrounds the entire boiler.

**RB Series Steam & Hot Water Boiler**



89%

Design features for RB series

- Designed and constructed to BS 2790 and ASME code, with standard maximum operation pressure 1.25 Mpa.
- Equipped with Nu-way (Special for RB series with Fulton Brand) oil, Gas or duel fuel automatic high/low burner, modulating burner is optional according to customer requirement.
- Compact design, smaller than boiler of equal capacity.
- 100% NDT (Non-destructive Test) on all major pressure vessel welds.
- Divided front door, easy access and inspection of welds.
- 3 years warranty on pressure vessel backed by Fulton worldwide service and spare system.

Product List

- Foot valve swing type
- Duo check valve ( butterfly check valve)
- Silent check valve
- Swing check valve
- Wafer disc check valve
- Ball valve full bore
- Valve cast iron full bore
- Air Vent cast iron valve
- Pneumatic/Electric actuator Butterfly valve wafer type & LUG type
- Clip/wheel type Butterfly valve wafer & full LUG type
- Sight glass cast iron
- Ball valve reduce port/full port screw end
- Stainless steel/brass type screw end Gate Valve
- Stainless steel/brass type Flange end Gate Valve
- Knife gate valve
- Thermodynamic Steam trap
- Stainless steel/cast iron/brass Y-strainer
- Steam/water solenoid valve
- Screw/flange end Safety Valve
- Electronic/Pneumatic valve control
- Pressure reduction valve
- Flanges

