

## **Appendix**

### **1. Site Survey**

### **2. Low Carbon Action Plan**

### **3. Seminar and workshop in Japan**

#### **3-1 Workshop Presentation material (YCDC JICA study group)**

#### **3-2 Kitakyusyu JCM seminar**

#### **3-3 COP22 presentation material**

#### **3-4 Site visit by Planning and Finance Deputy Minister**

#### **3-5 Tokyo JCM seminar presentation material**

### **4. JCM project formulation**

#### **4-1 Market survey for boilers**



## **1. Site Survey**





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

### Kick-off Meeting

June, 2016

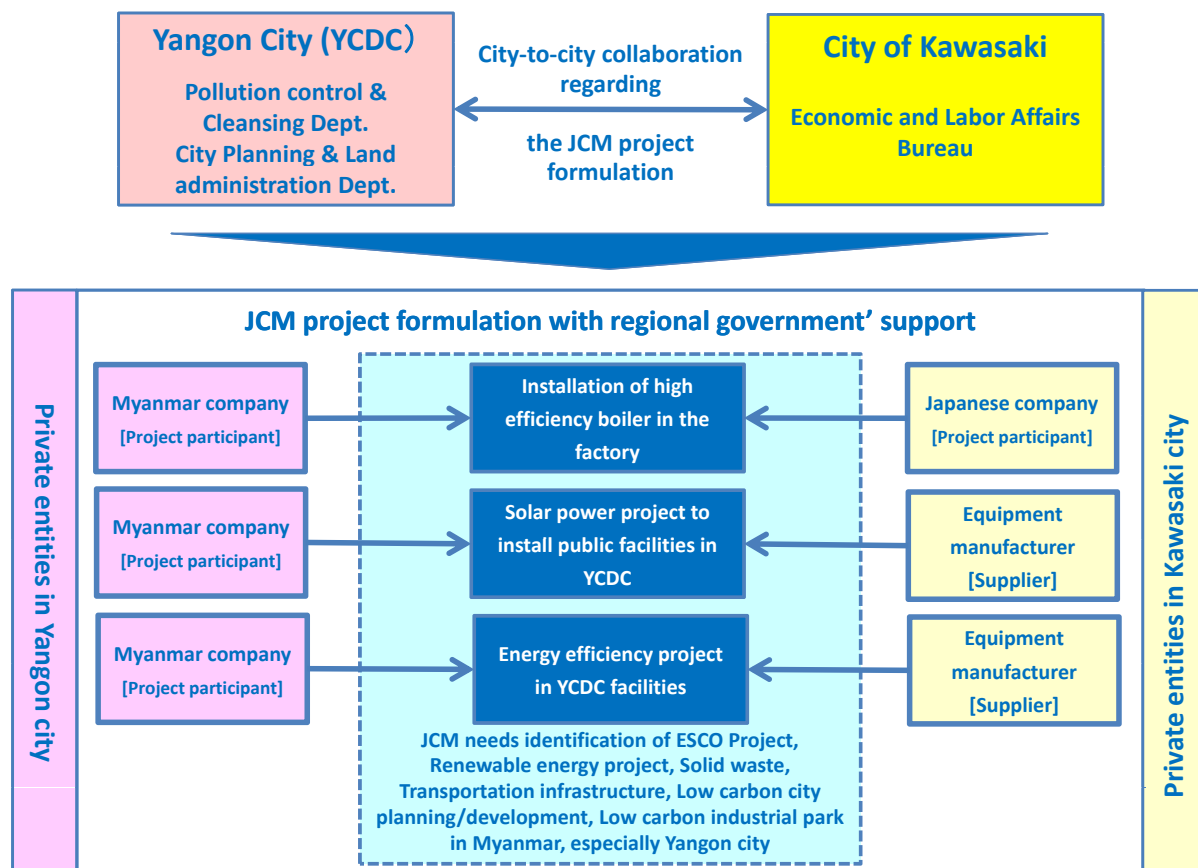
Nippon Koei Co., Ltd.  
Kawasaki City

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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**

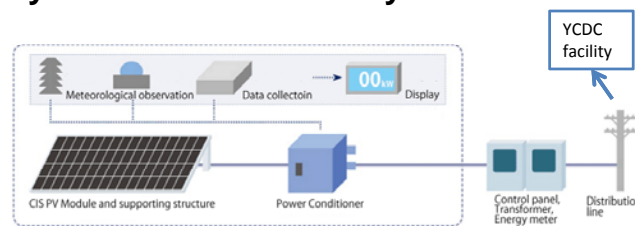
By Feb 2017

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

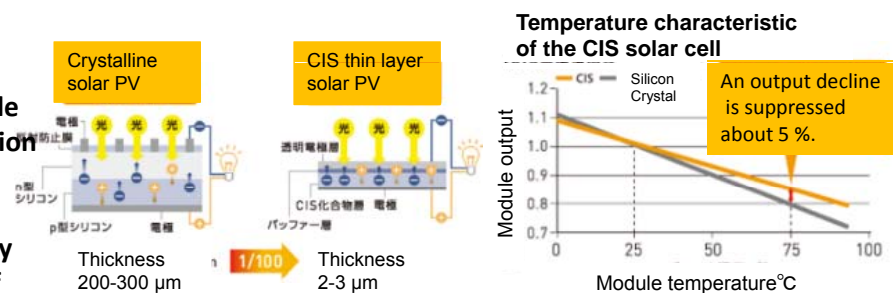
- (i) Installation of 2MW PV generation system(CIS solar module, connection box, junction box, power conditioner, transformer, etc).
- (ii) The next generation solar panel CIS solar cell of a Solar Frontier copper, indium and selenium (CIS) for the main ingredient.
- (iii) Power generation decline is 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

#### Step2 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>											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													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	
Clarification of procedure for budgeting											xx			
- Documentation for budgeting											xx	x		
- Internal procedure for budget allocation											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

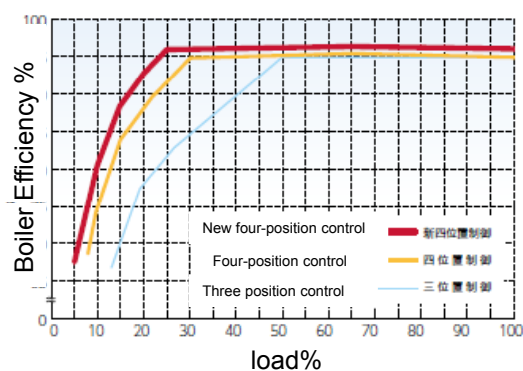
## Outline of Technique

- (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 NO<sub>x</sub> as well as energy saving → co-benefit which decreases both emission of CO<sub>2</sub> 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>)

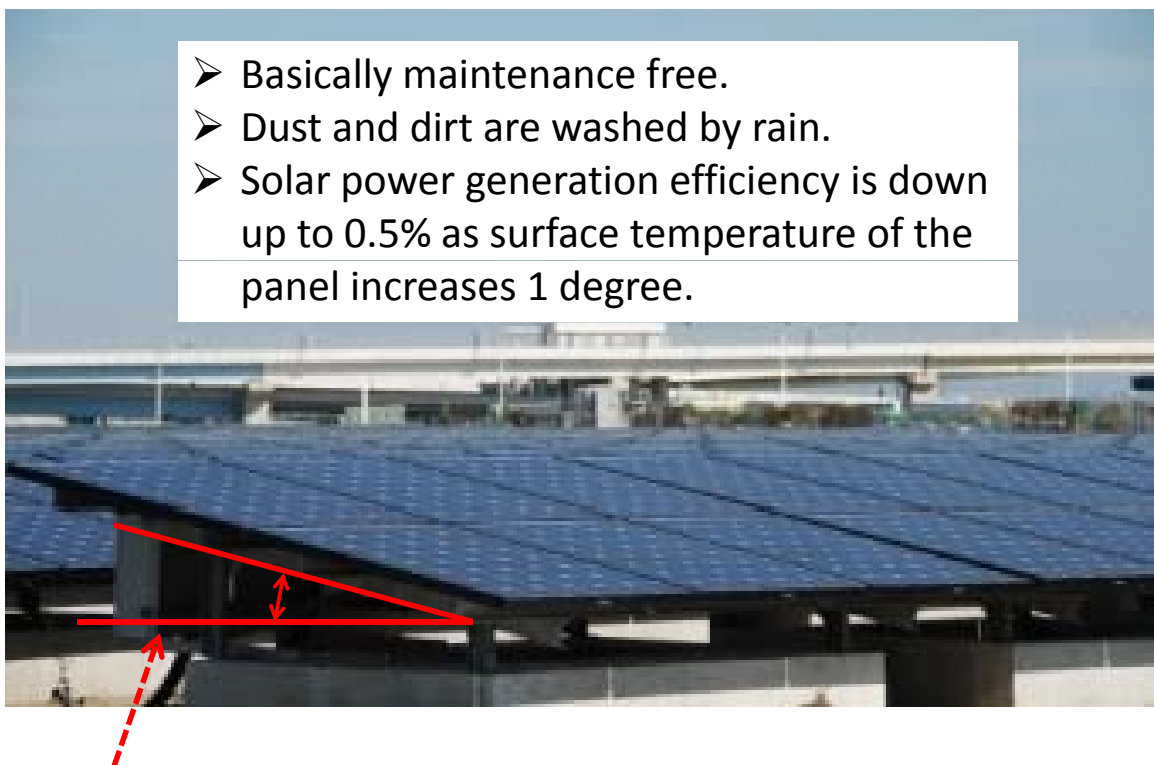


## Specification of the Solar-power plant

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

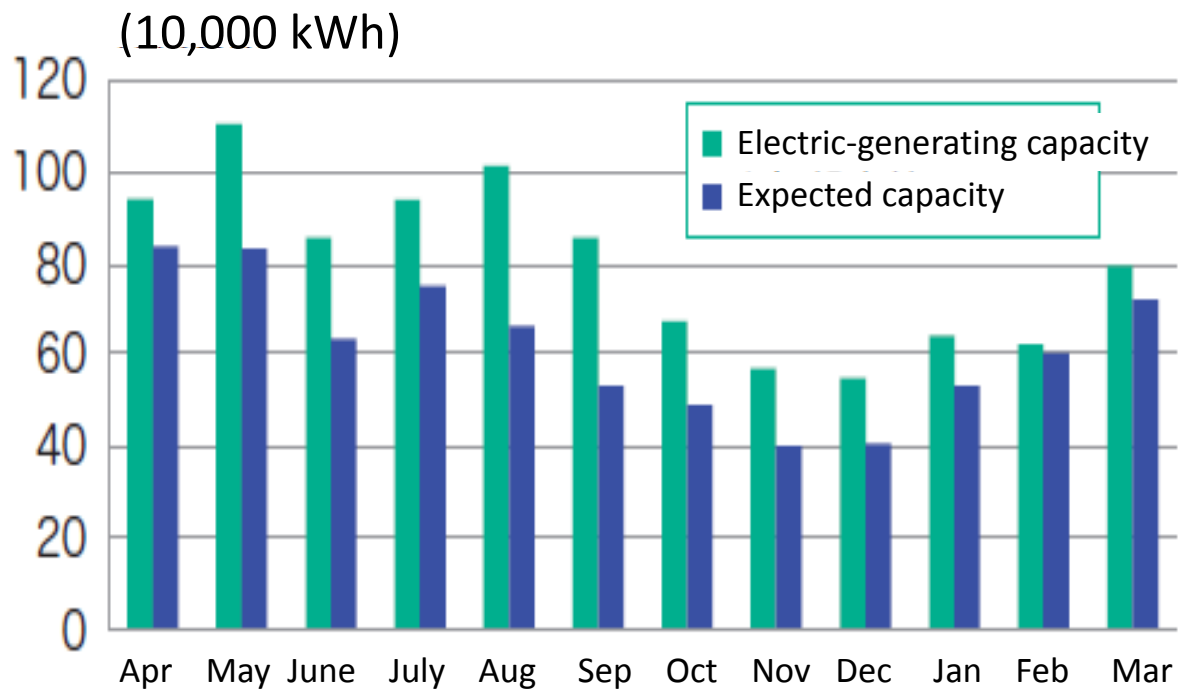
## Characteristics of solar panel

- 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)

# 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

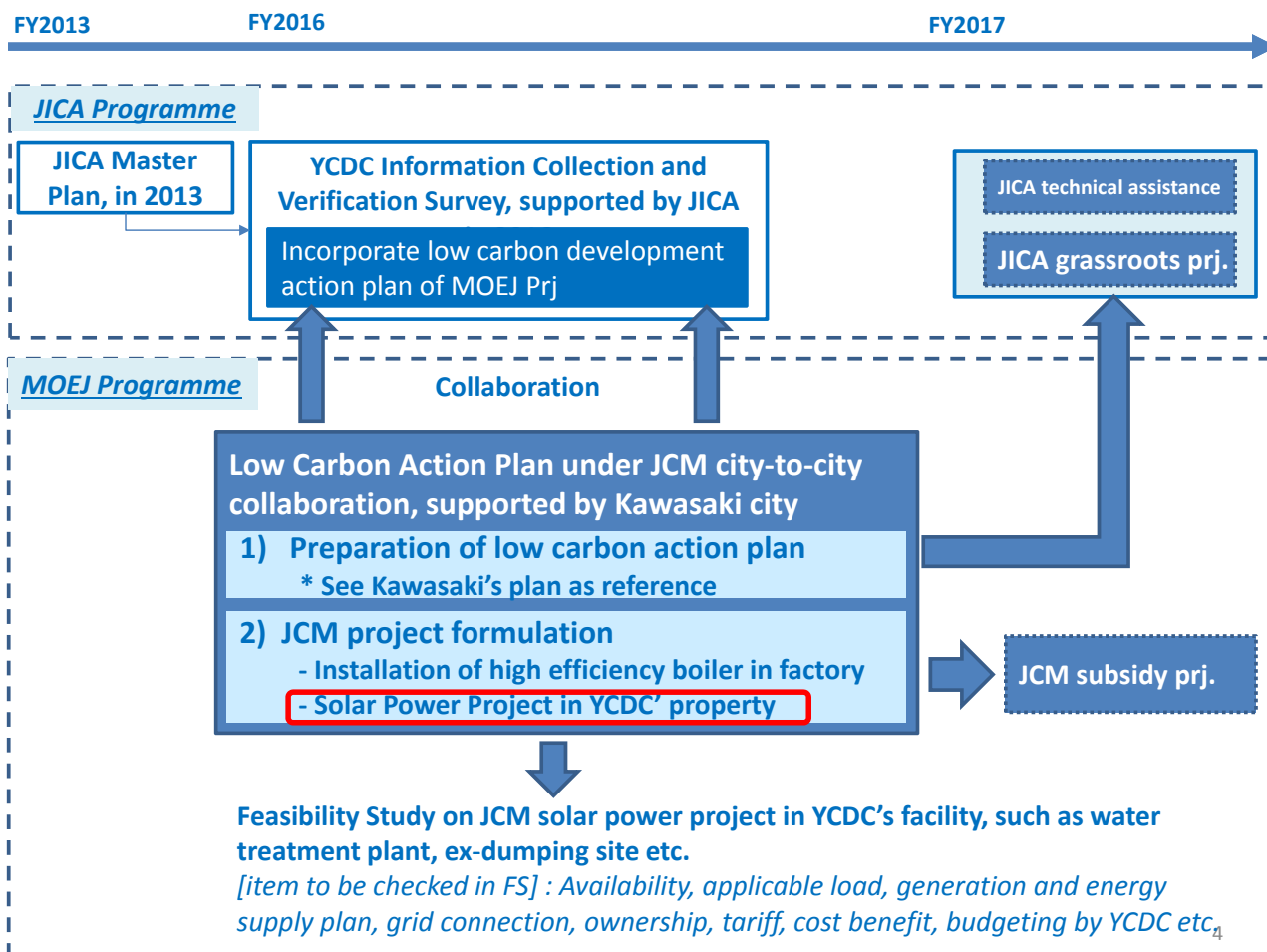
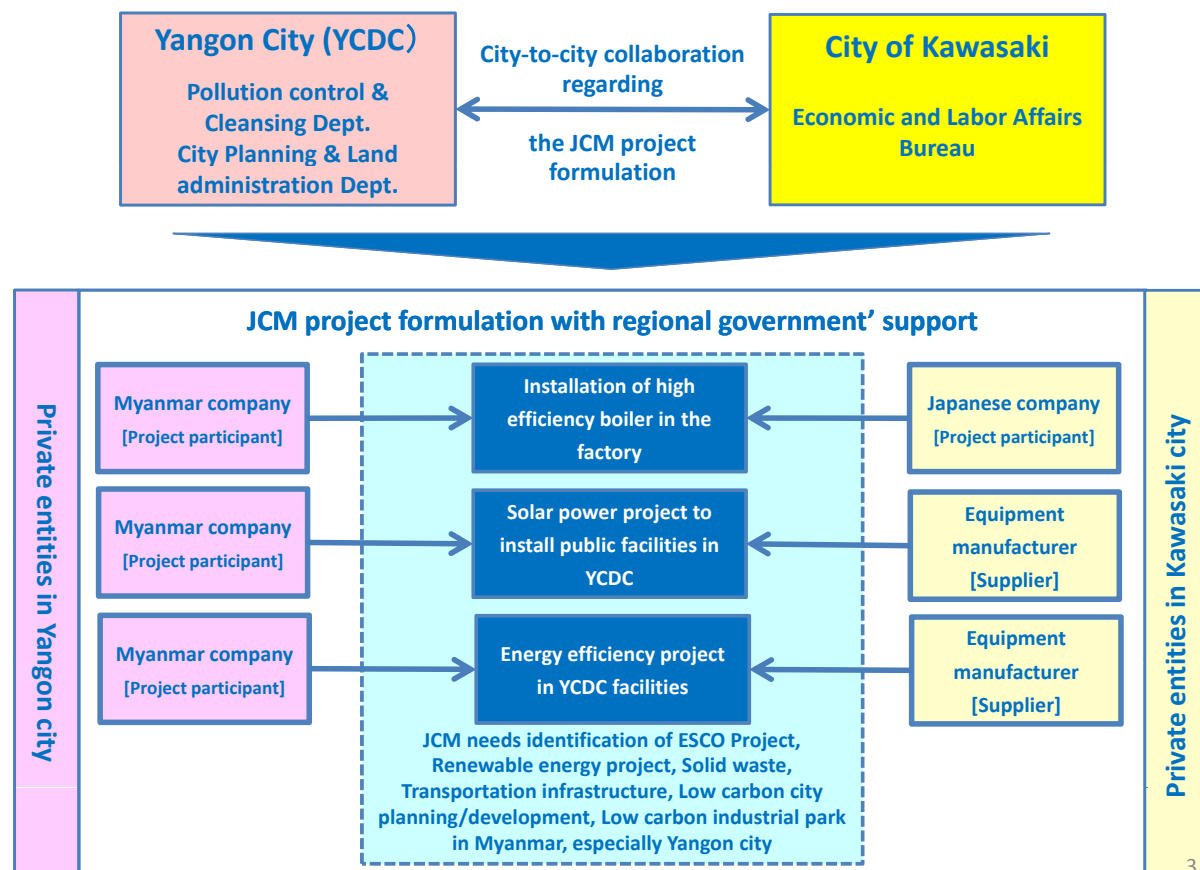
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## Contents

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.

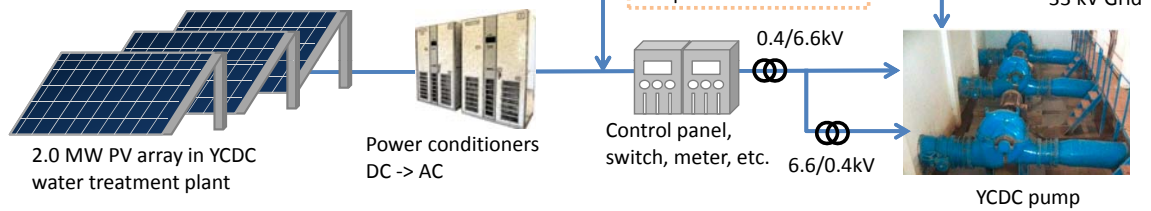
- **Two (2) YCDC staffs** from Pollution Control and Cleansing Dept and/or City Planning and Land Administration Dept who are in charge of JCM activities and low carbon action plan.
- At the international conference in Kitakyushu, the presentation on JCM activities and low carbon action plan. **Presentation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

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## 3-2. Options of PV System Concept

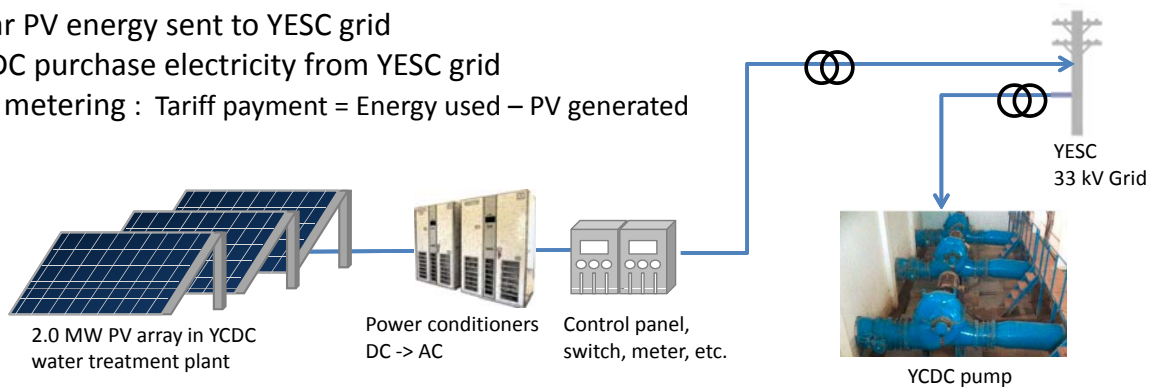
### Option-1

- 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

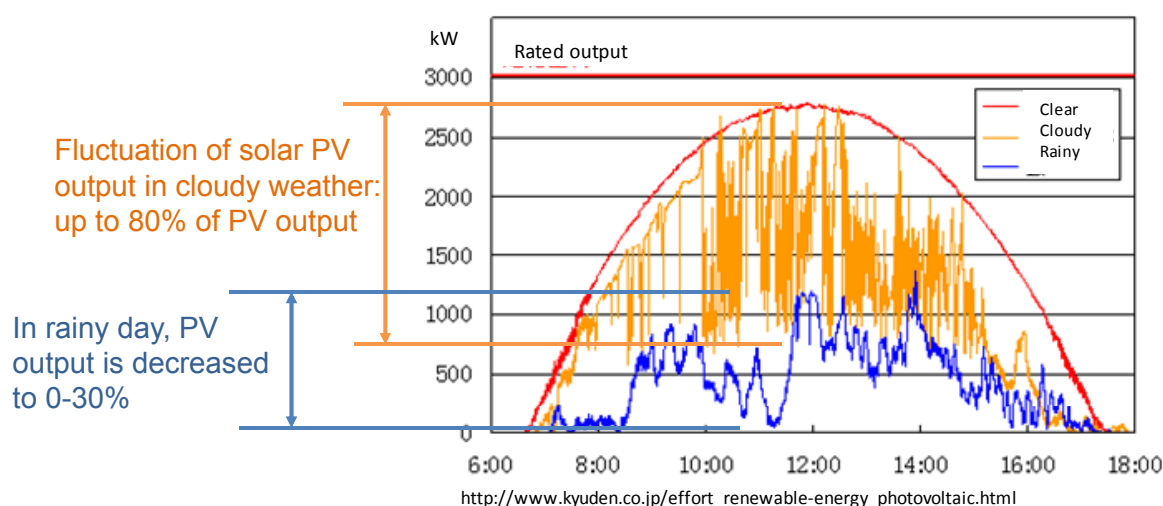
- Selection of pilot project site:
  - Interview survey → Site survey → Document review
- Criteria for selection: needs, demand, location

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

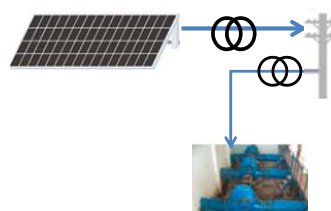
- **Nyaung Hnit Pin** is tentatively selected, however.....
  - Supply to LV 440 kW portion is possible
  - Further study necessary for HV pump supply with electrical documents for the plan up to 2 MW

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

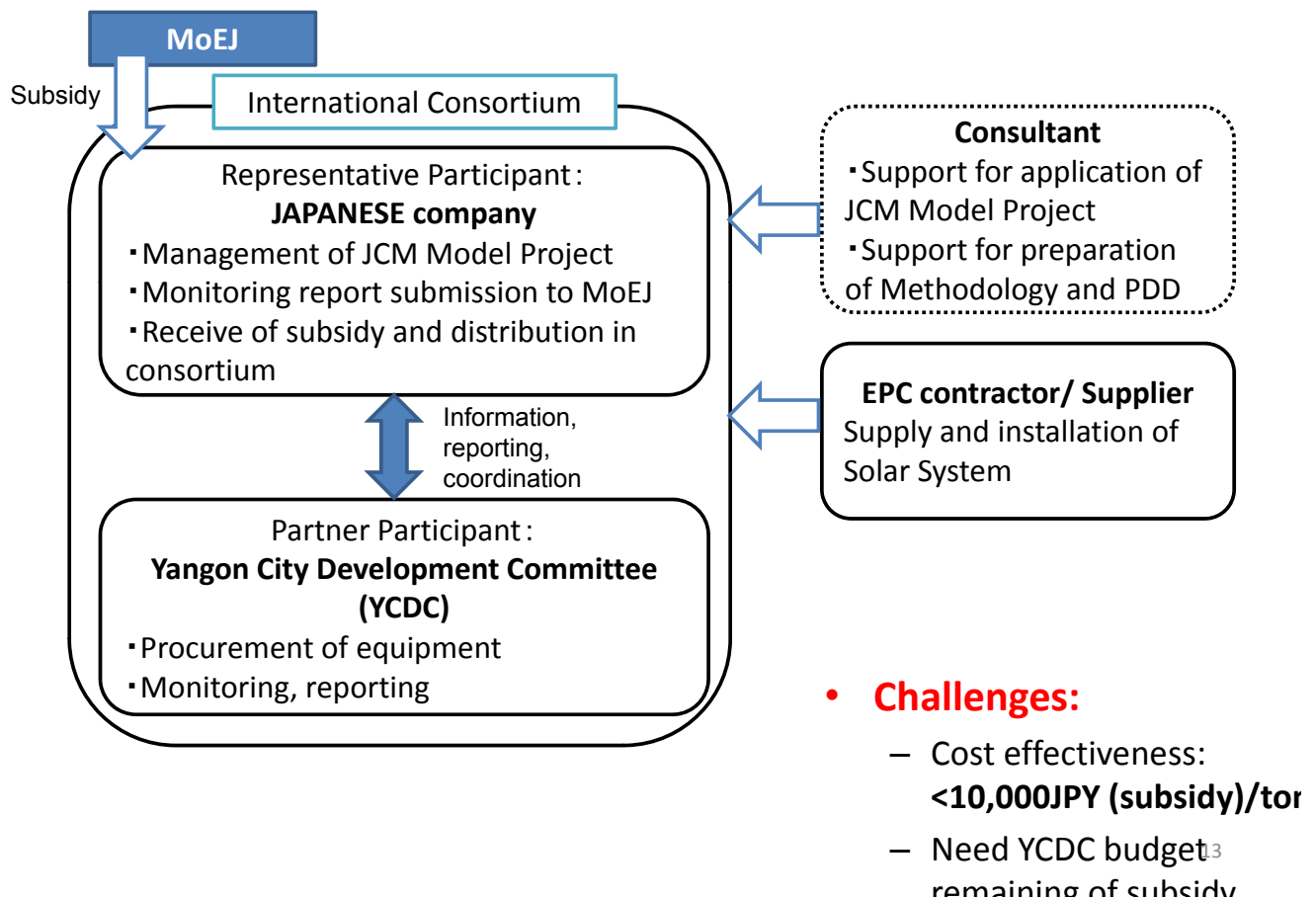


- PV output fluctuates but demand load is stable
- Battery or DG is necessary to cope with PV fluctuation
  - Battery is costly
  - DG consumes fossil fuel and maintenance cost is high
- OPTION: If PV can be fed to YESC Grid, grid can absorb PV fluctuation (up to 10% of grid capacity)
  - It is necessary 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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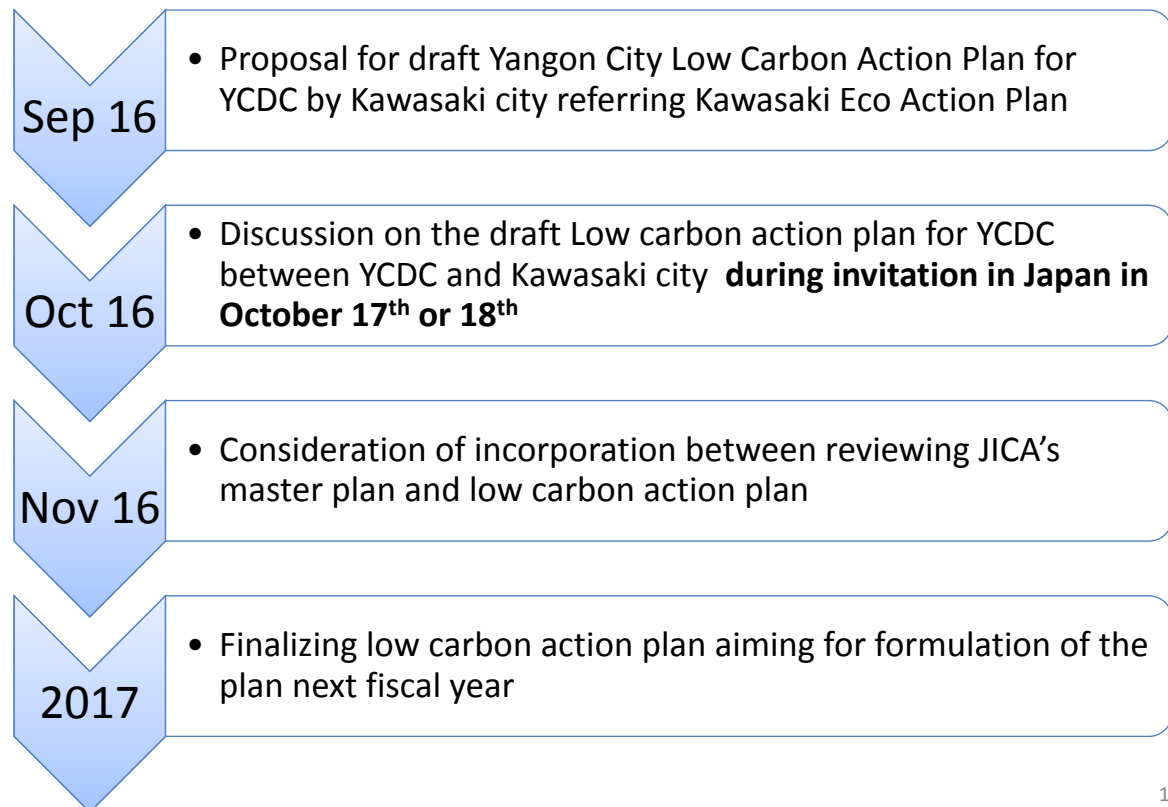
### 3-8. Schedule and each task

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

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

xx : Key responsibility, x: support

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



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

## Progress Meeting No.2

November, 2016

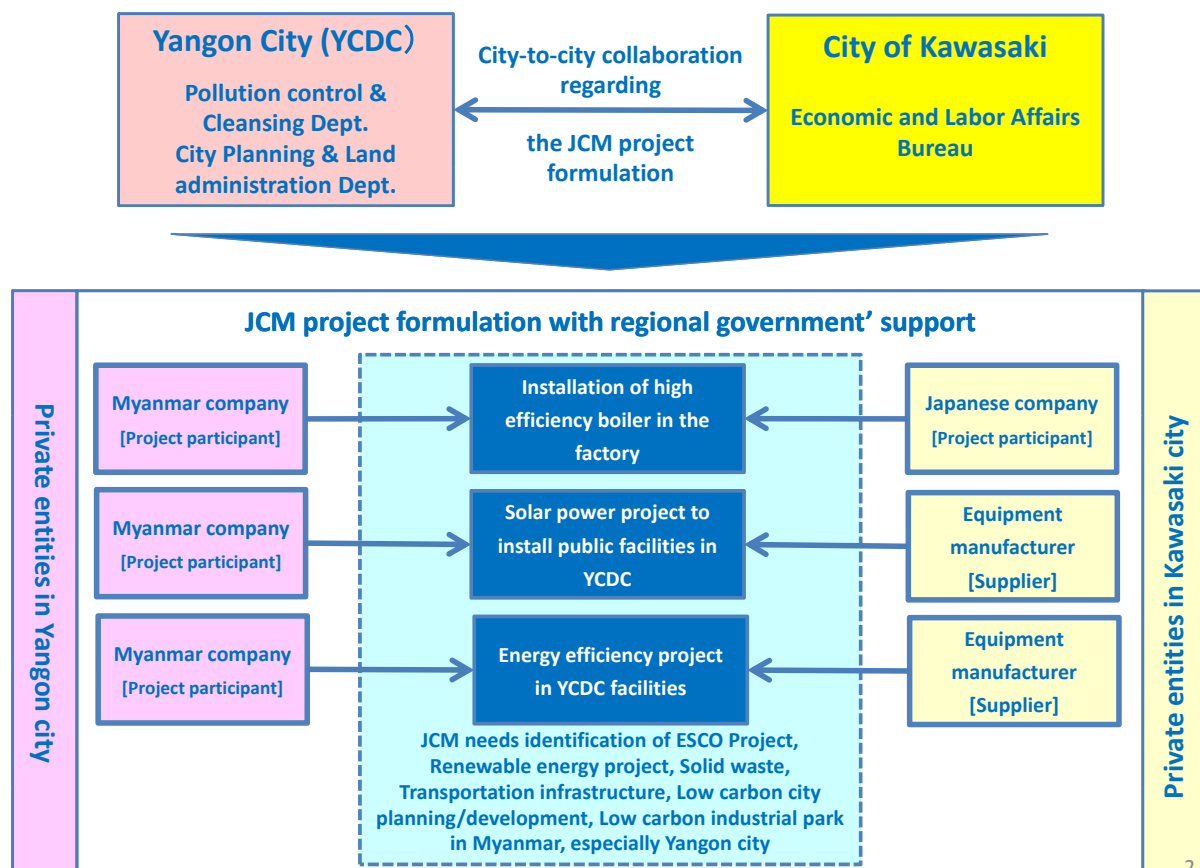
Nippon Koei Co., Ltd. and Kawasaki City

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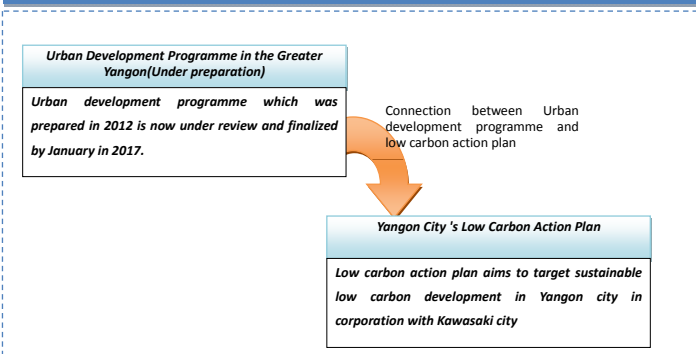
## 2. YCDC Low Carbon Action Plan (LCAP)

- 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

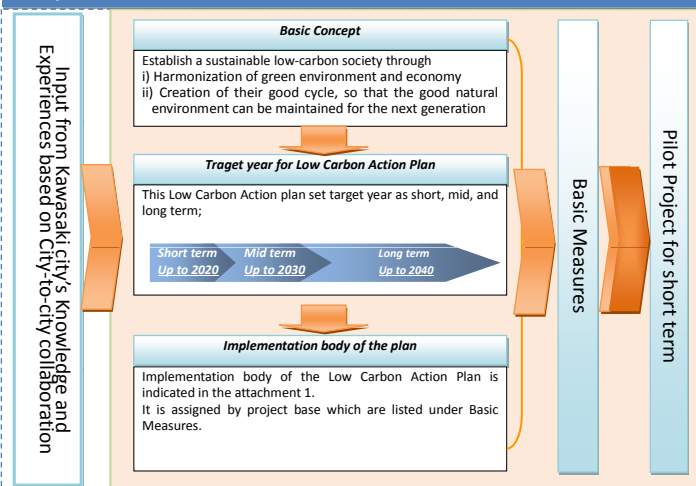
→ Please see separate papers...

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

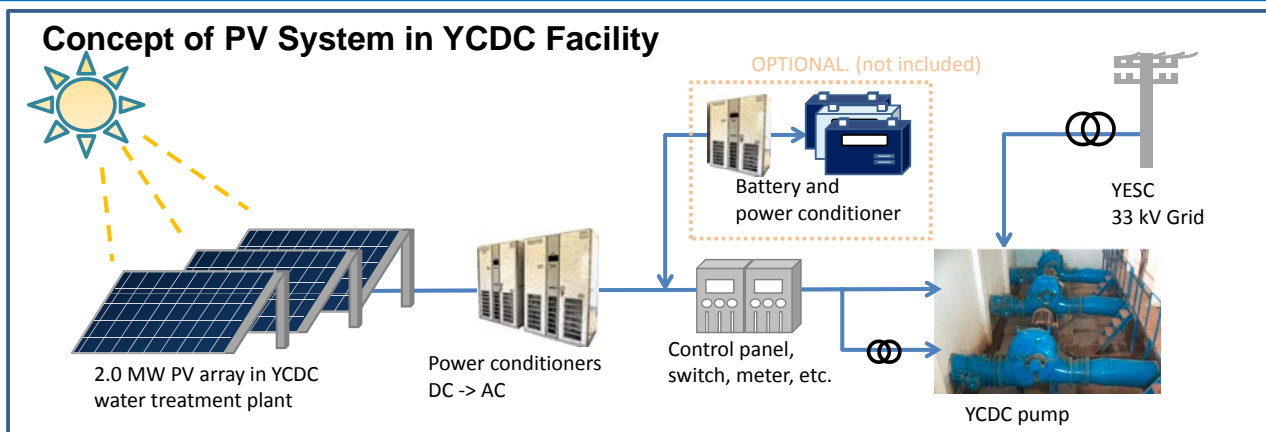
### 1. Policies and plans related to promotion of "Low-carbon Action Plan"



### 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 budged (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 Poin Water Treatment Plant



PV site and Pump room in Nyaung Hnit Pin



Pump Layout in Nyaung Hnit Pin

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

Nov  
2016

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

Dec  
2016

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

Jan  
2017

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

Feb  
2017

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

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## 5-2. Schedule and each task

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

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

xx : Key responsibility, x: support

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## 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**

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# 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

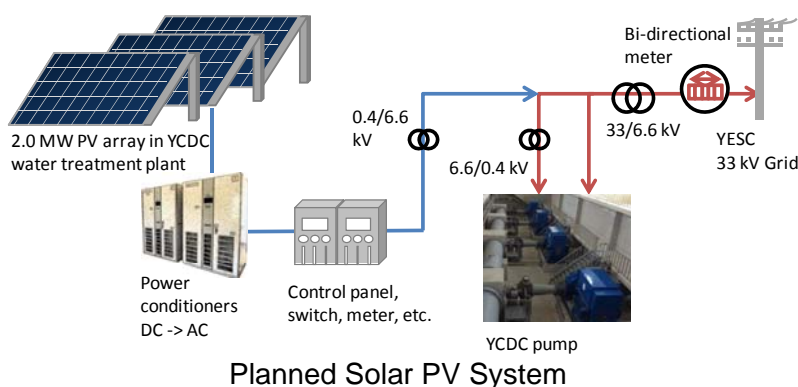
### i. Preparation of Draft "Low Carbon Action Plan" for Yangon city

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.

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 City and Kawasaki City

## Courtesy Call from Kawasaki City

December 2016



Kawasaki City and Nippon Koei Co., Ltd.

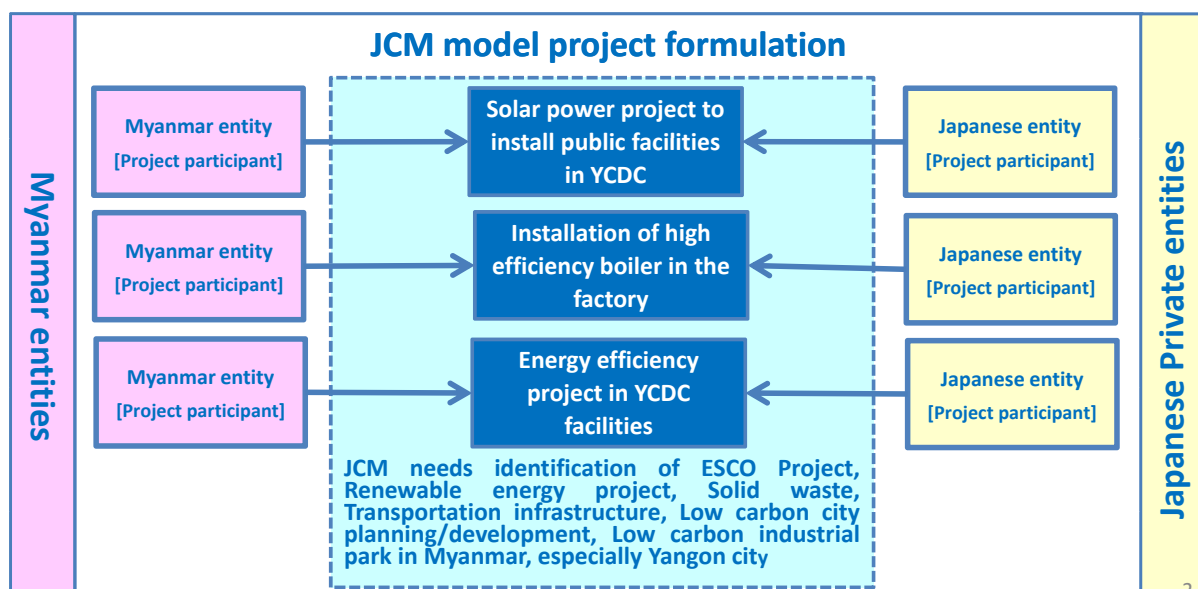
*NIPPON KOEI*

### 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**

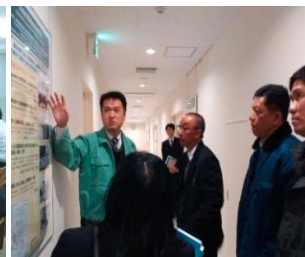
- 2<sup>nd</sup> Visit to Kawasaki city and JCM seminar in Kitakyushu, Japan
- Preparation of draft Low carbon action plan
- Feasibility study of Solar power (JCM model) project on YCDC facilities



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**

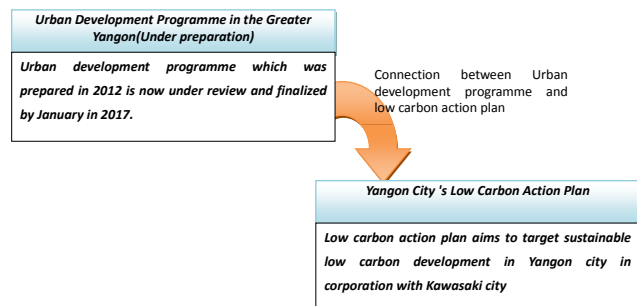
**Discussion points :**

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

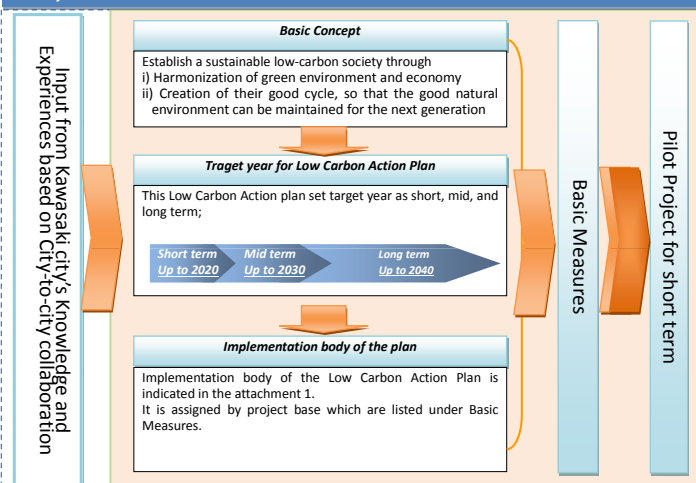
**Candidate JCM model projects :**

- 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"

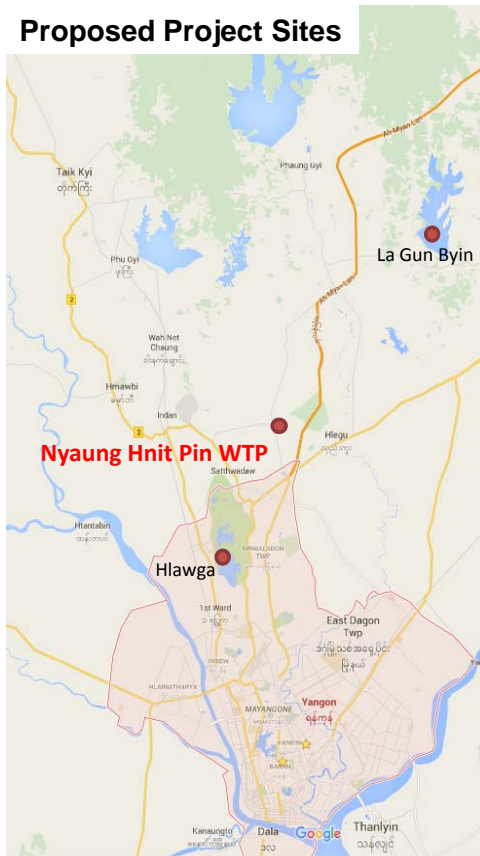


### 2. Outline of Yangon City's Basic Plan for Promoting Countermeasures for Low carbon society



### 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

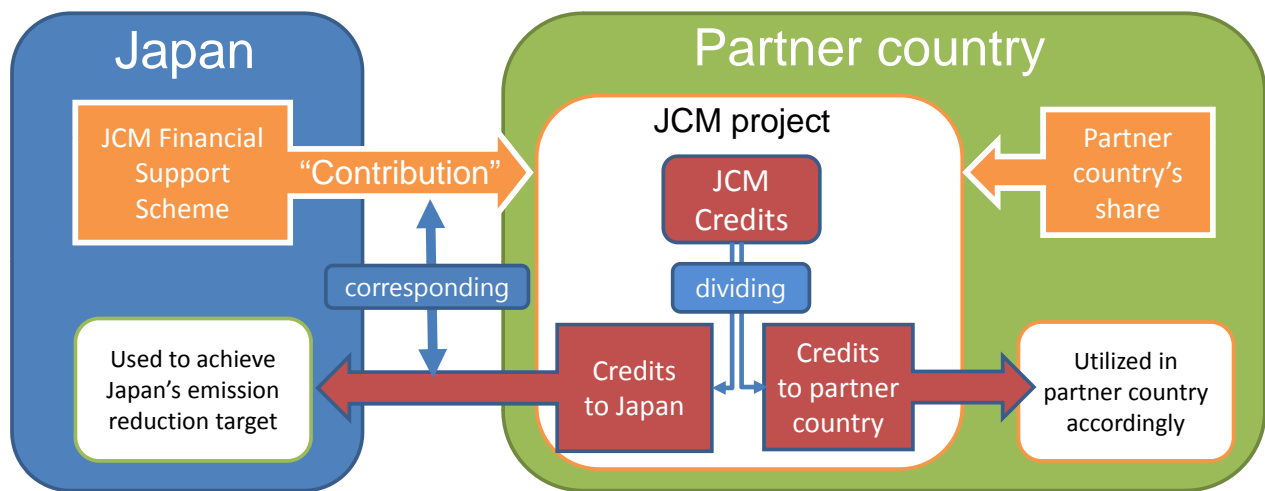
- ✓ The content of MOU is agreed by YCDC and Kawasaki city, and MOU is concluded by March 2017

#### 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

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 of Yangon City and Kawasaki City

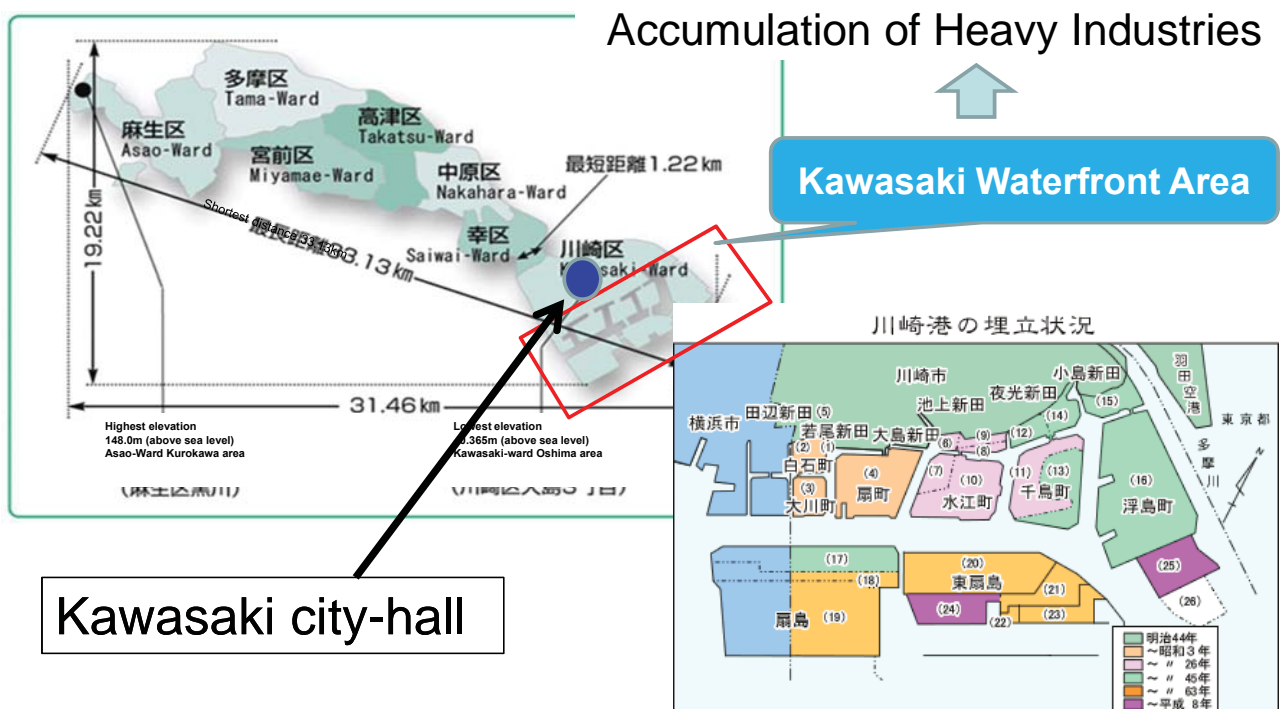
# Kawasaki Eco-town

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>

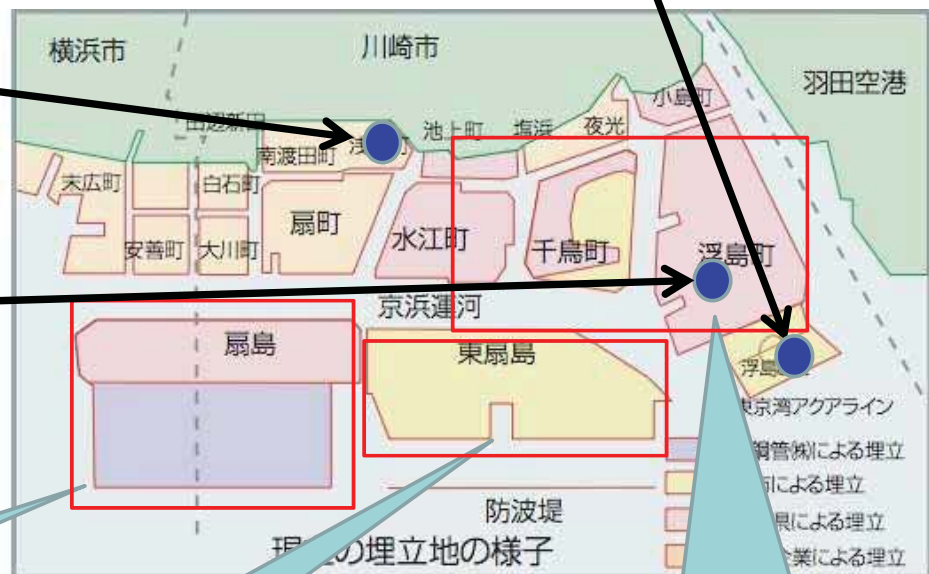


## Location of facilities for the site visit

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

①YAMANAKA  
Recycling of waste automobile

③TAKEEI  
Recycling of mixed waste generated from demolition site



Steel Industry Area

Logistics Area

Refine & Petrochemical complex Area

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

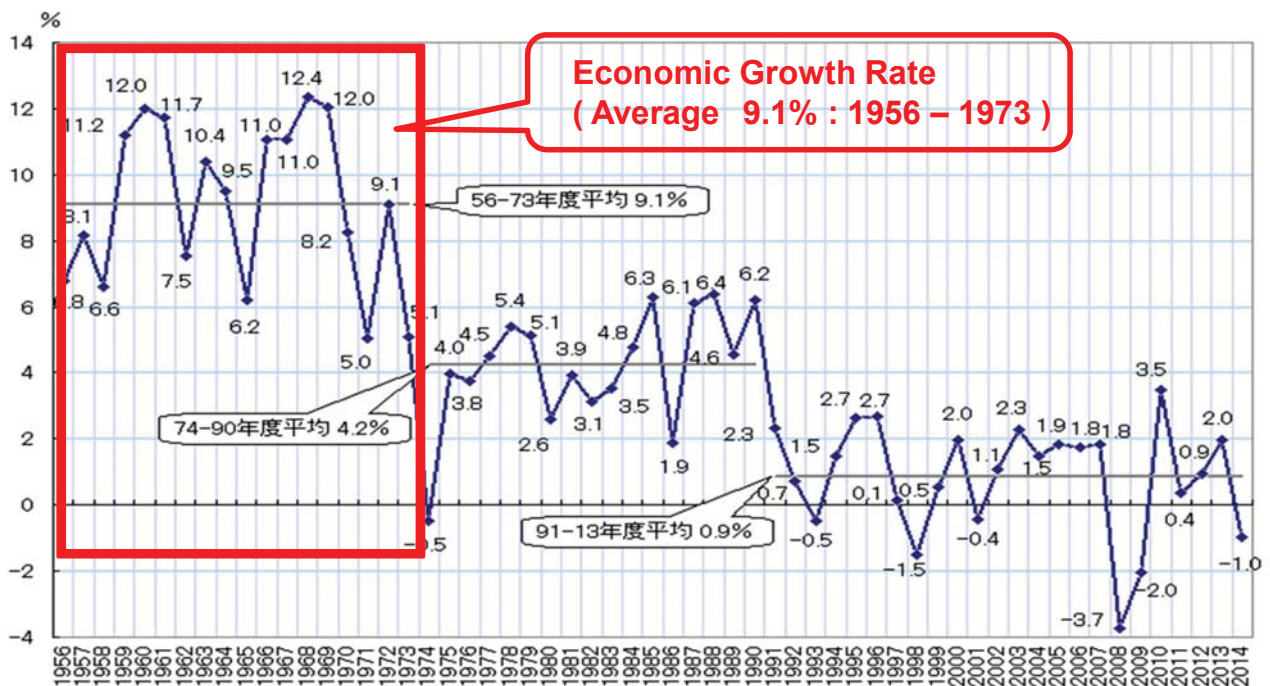




## Rapid Economic growth & Industrial Pollution in Kawasaki ( 1960-70 )



## Economic Growth Rate in Japan

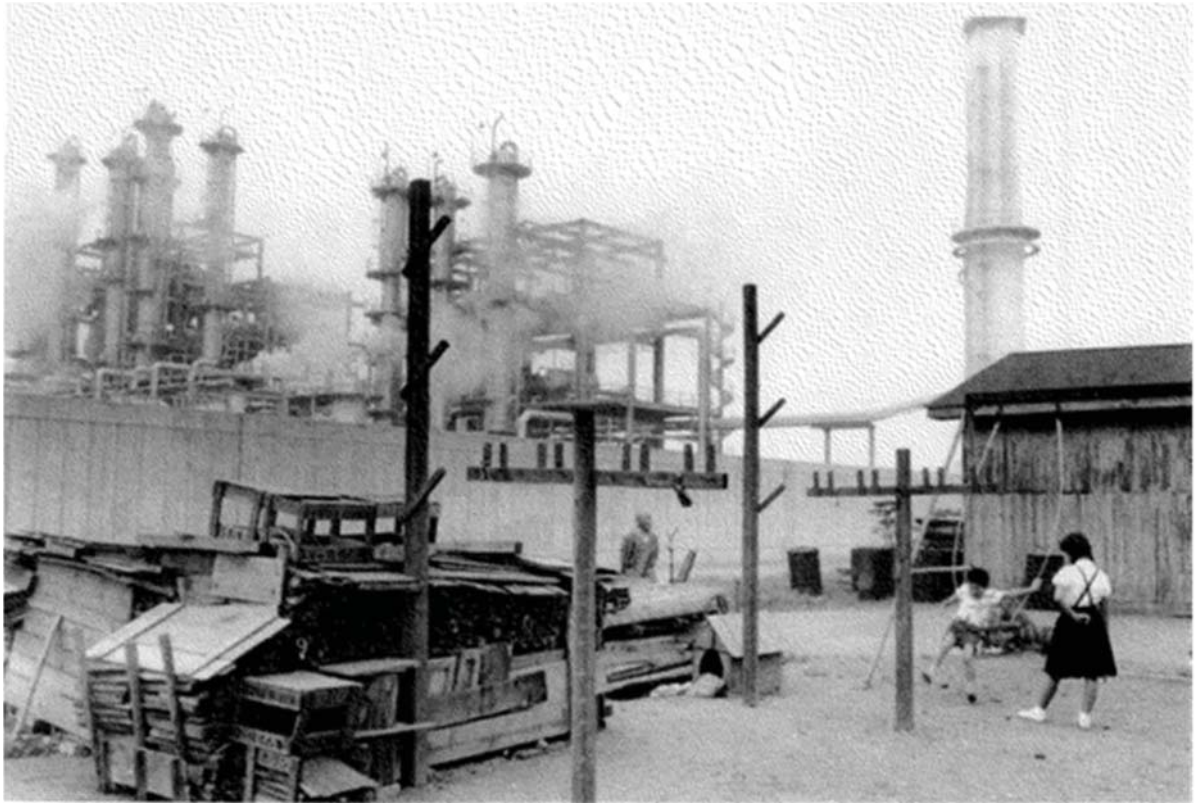


(注) 年度ベース。93SNA連鎖方式推計。平均は各年度数値の単純平均。1980年度以前は「平成12年版国民経済計算年報」(63SNAベース)、1981～94年度は年報(平成21年度確報)による。それ以降は、2015年7-9月期 2次速報値 <2015年12月8日公表>

(資料) 内閣府SNAサイト



## Factories nearby Residential Area in Kawasaki (1970)



## Tama-River (1970)





## Air Pollution over Kawasaki Waterfront Area ( 1960 )



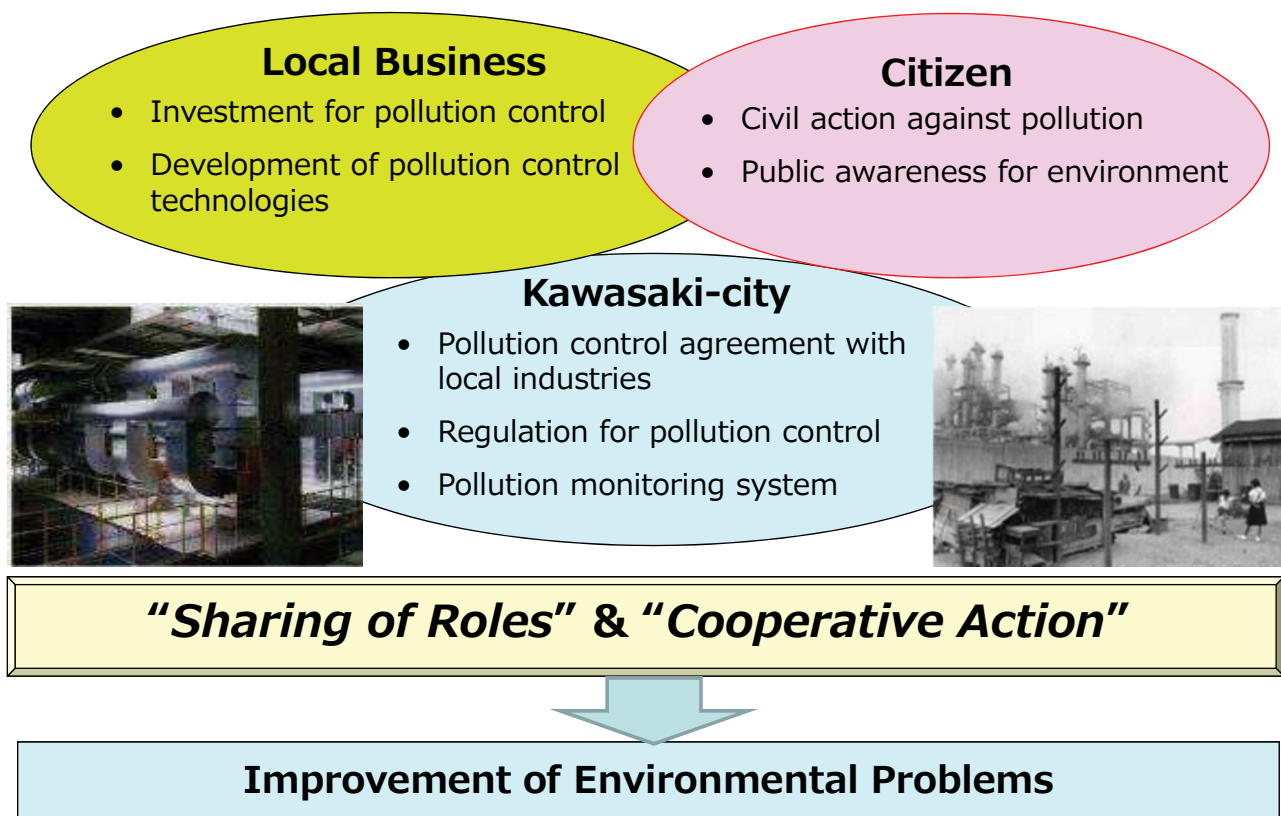
## Current Landscape of Tama-River ( 2016 )



# Current Landscape over Kawasaki Waterfront Area ( 2016 )



## Efforts to overcome Pollution Problems

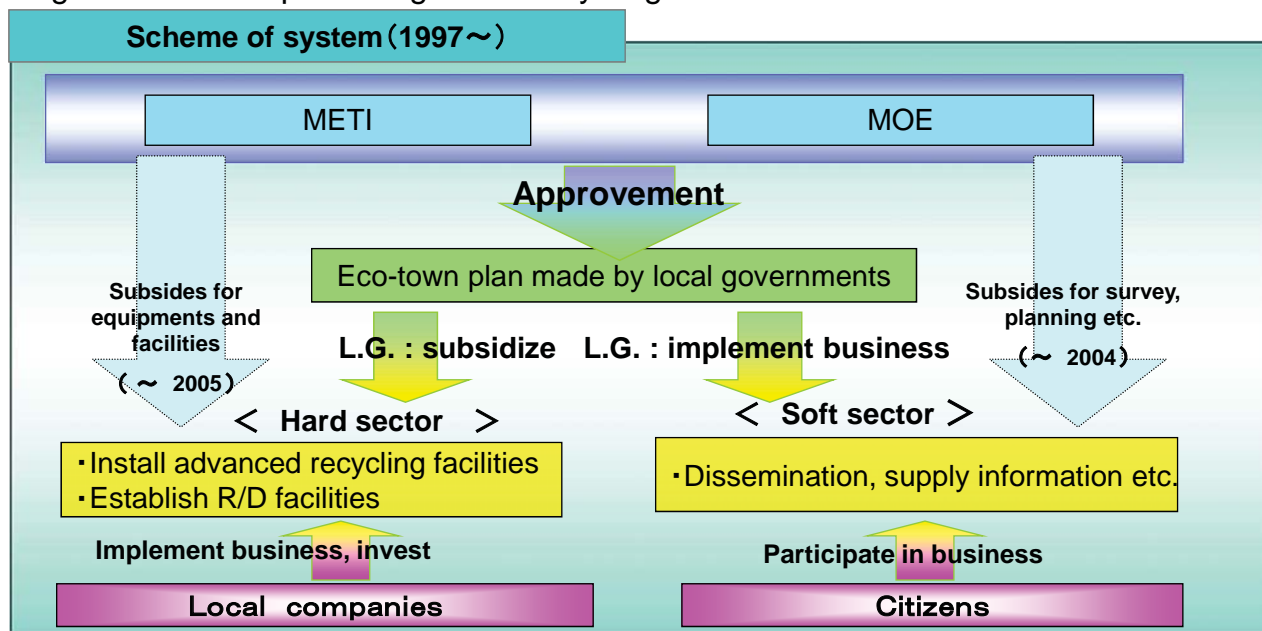




# Kawasaki Eco-town Project

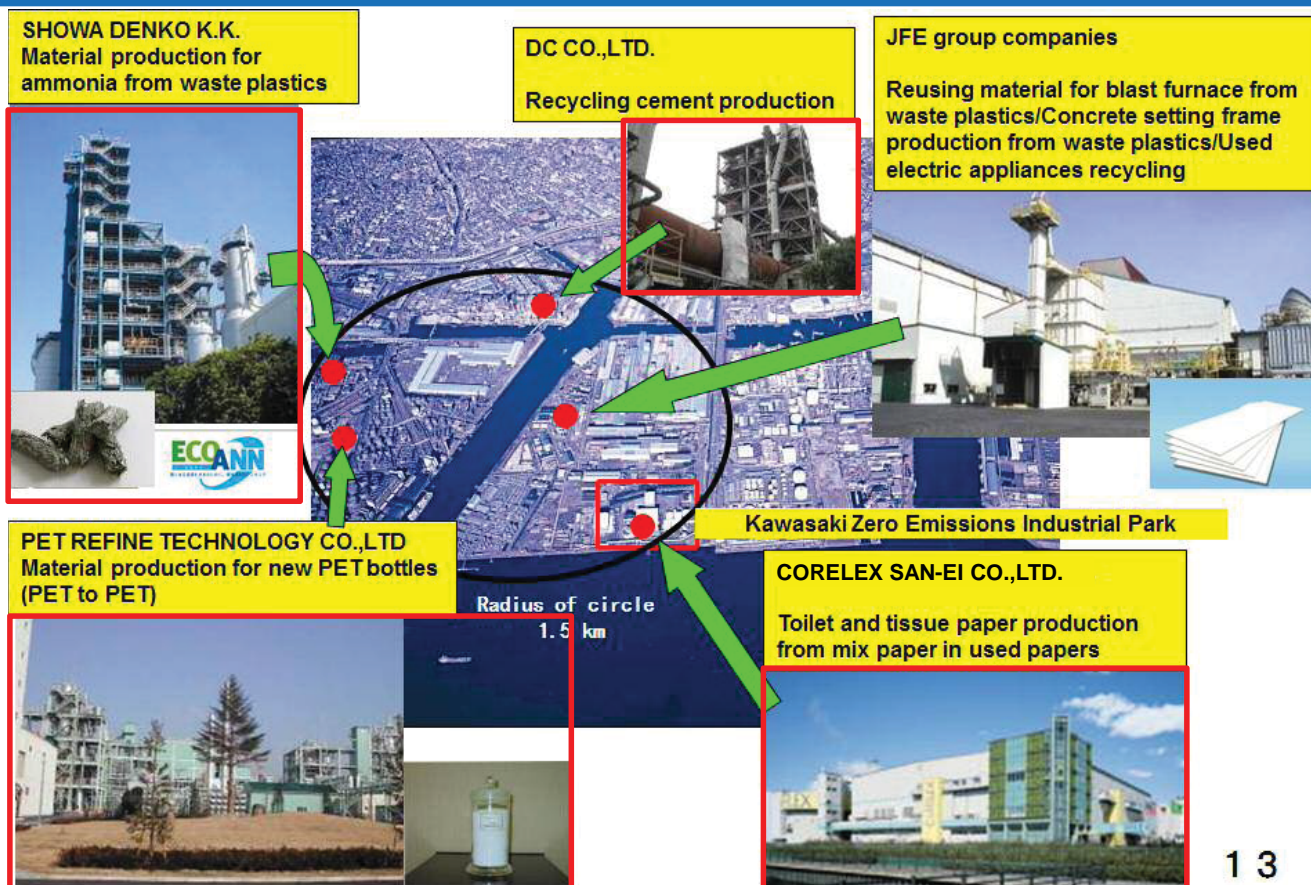
Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

- 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



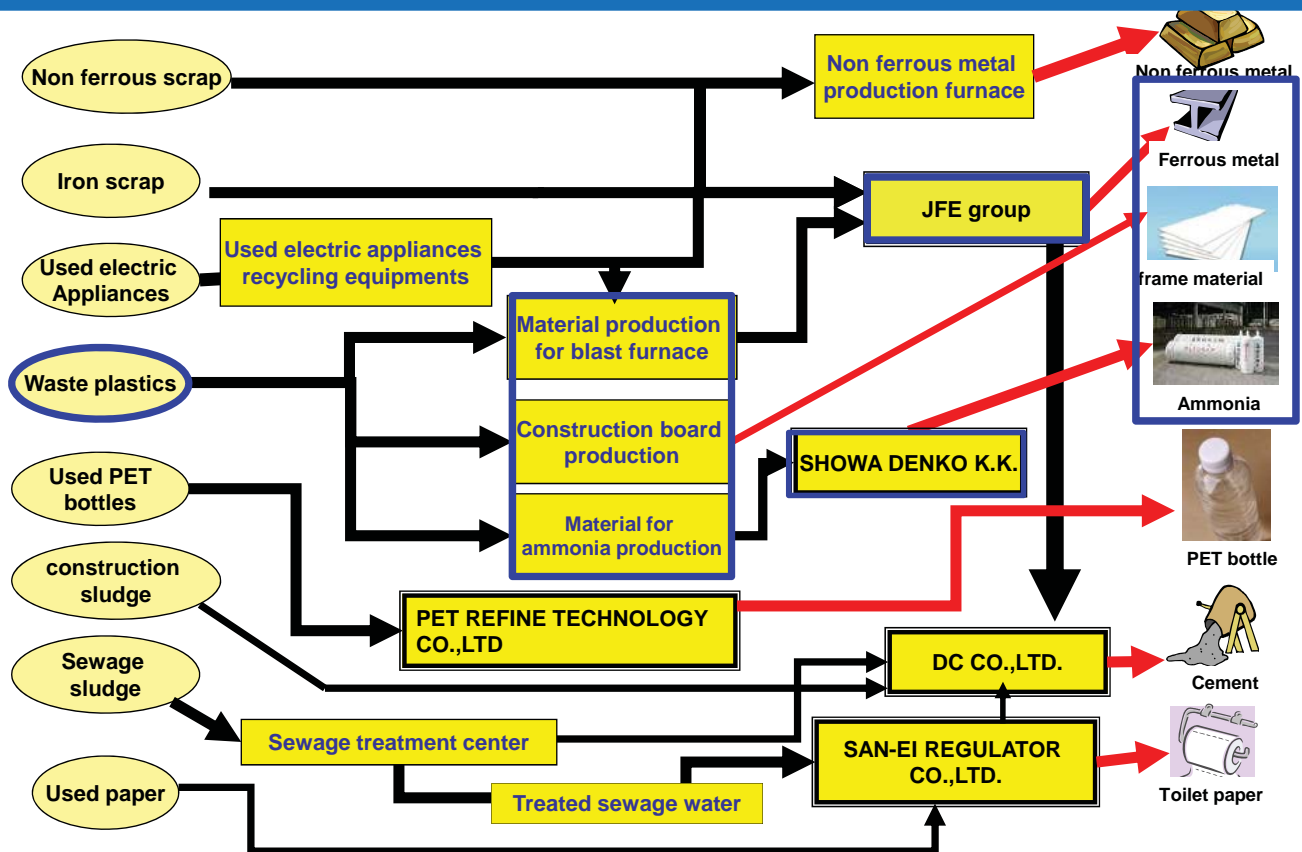
7

## Resource Recycling Facilities in Kawasaki Eco-town



13

## Companies' Collaboration in Kawasaki Eco-town



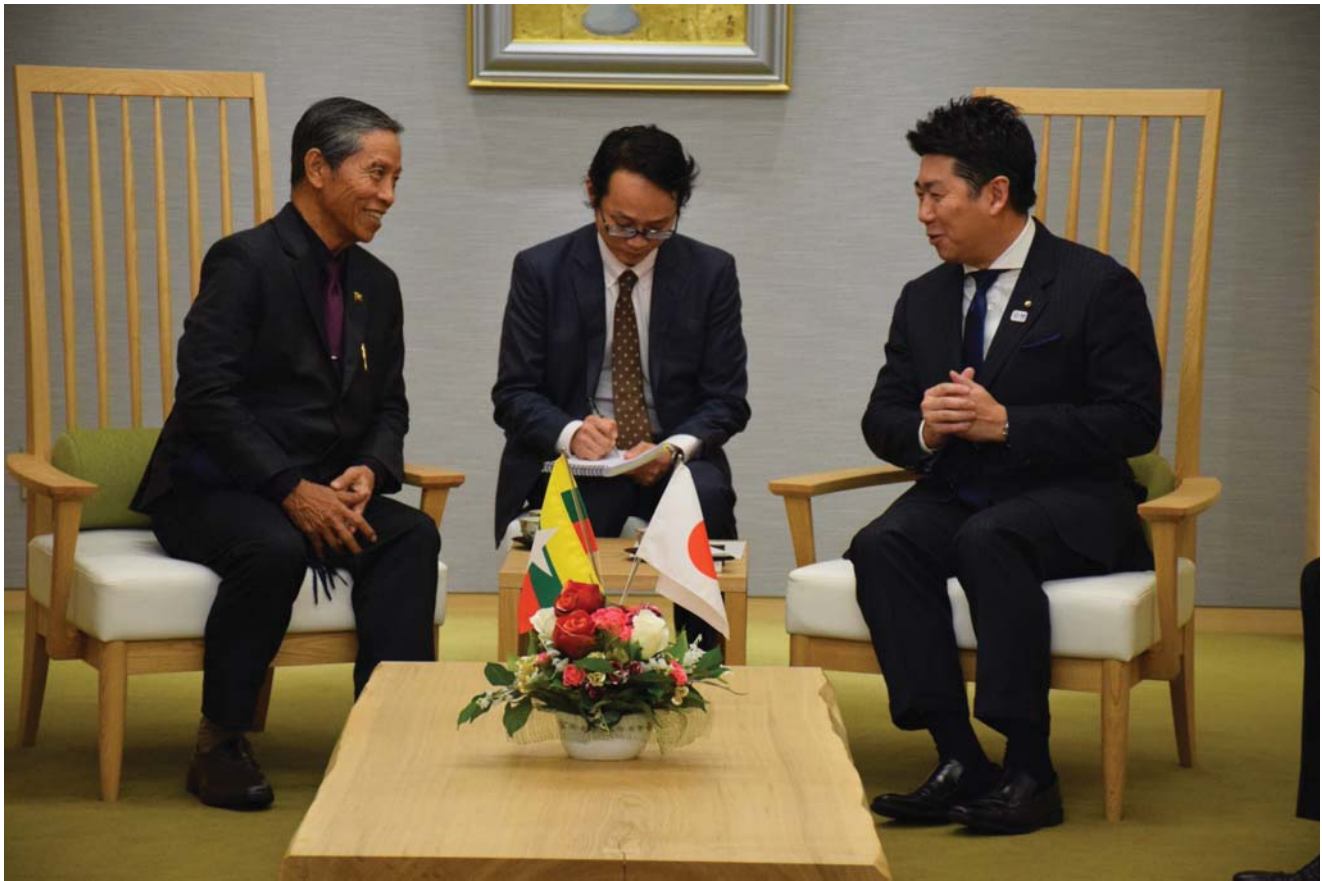
## Summary of Kawasaki Eco-town

- ◆ 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



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

21

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



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



**Thank you for your attention !**





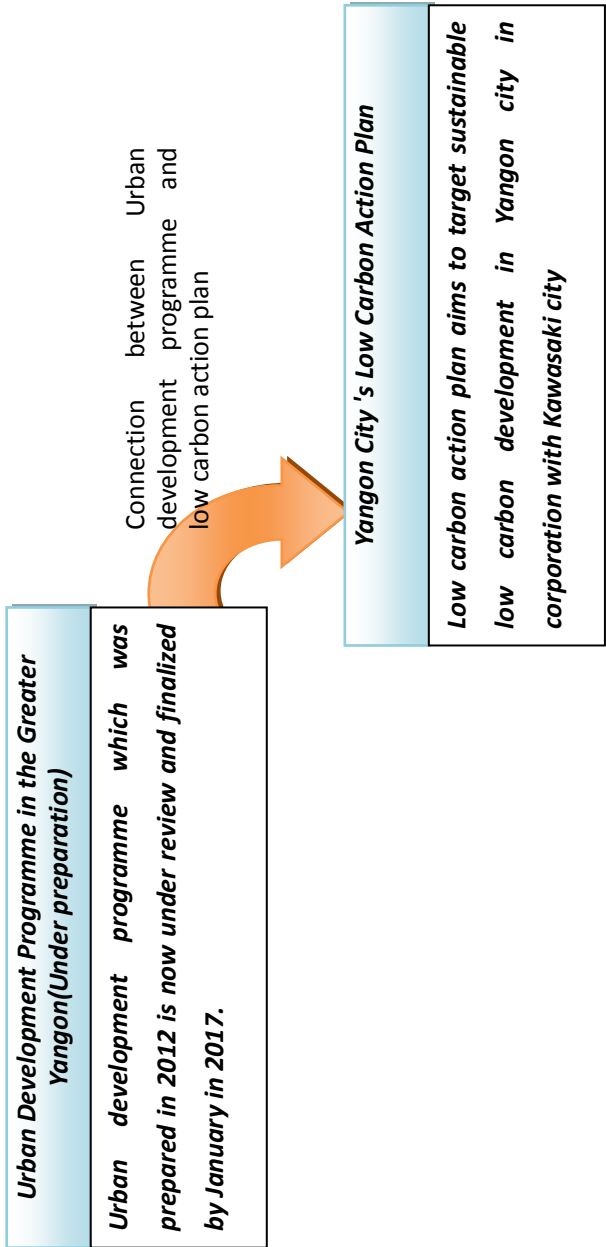
## **2. Low Carbon Action Plan**



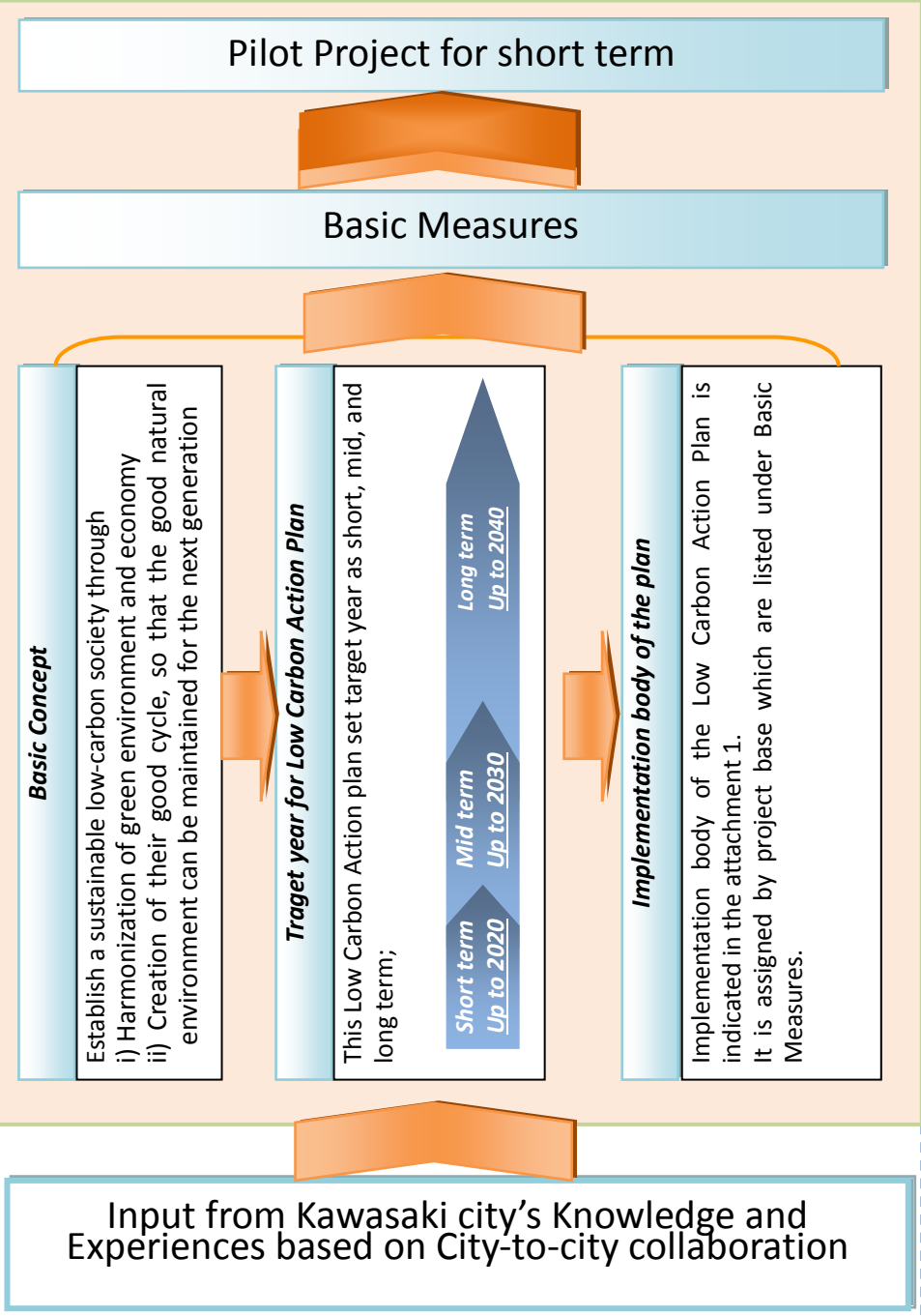


Low Carbon Action Plan of Yangon City(Draft)

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

<b>I. Reduction of greenhouse gas emission from industrial activities</b>  1. Establishment of a business model towards "low-carbon Yangon City" 2. Fostering eco-friendly industries 3. Creation of an eco-friendly model for industrial complexes	<b>Industry</b>
<b>II. Utilization of renewable energy resources</b>  1. Promotion of Solar-city Project < PP1: Introduction of solar PV into YCDC facility > 2. Creation of a system for making an effective use of energy 3. Making a wider use of renewable energy resources, considering the regional characteristics	<b>Energy</b>
<b>III. Creation of low-carbon city</b>  1. Encourage construction of highly energy efficient buildings 2. Introduction of energy efficient technology into public sector < PP2: Introduction of high efficiency pumps into existing purification plant > 3. Promotion of energy efficient technology to private sector < PP2: Introduction of High efficiency boilers in factory >	<b>Urban City</b>
<b>VI. Introduction of Low carbon technique in the transportation Sector</b>  1. Establishment of eco-friendly transportation network 2. Enhance convenience of public transportation 3. Promotion of measures for greenhouse gas emitted from automobiles	<b>Transportation</b>
<b>V. Creation of recycling-oriented society</b>  1. Promotion of 3R activities of non-industrial wastes and industrial wastes 2. Introduction of low-carbon waste incineration facility < PP3: Introduction of waste to energy facility > 3. Reduction of greenhouse gas emission from collection and transportation of wastes < PP4: Introduction of IT based waste collection system >	<b>Waste Management</b>
<b>VI. Environmental education and study on global environmental issues</b>  1. Promotion of environmental education and study 2. Promotion of human resource development	<b>Education</b>
<b>VII. Introduction of international technology through city to city corporation</b>  1. Contribution to reduction of global greenhouse gas emission by introducing international technology through city to city corporation 2. Supporting and cooperating international environmental conservation activities	<b>International Corporation</b>
<b>VIII. Research and development of environmental technologies</b>  1. Research and development of environmental technologies, and promotion of scientific measures 2. Conducting MRV in order to promote introduction of saving energy technology	<b>MRV</b>

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





### **3. Seminar and workshop in Japan**

#### **3-1 Workshop Presentation material (YCDC JICA study group)**





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

Nippon Koei

28<sup>th</sup> September 2016

1

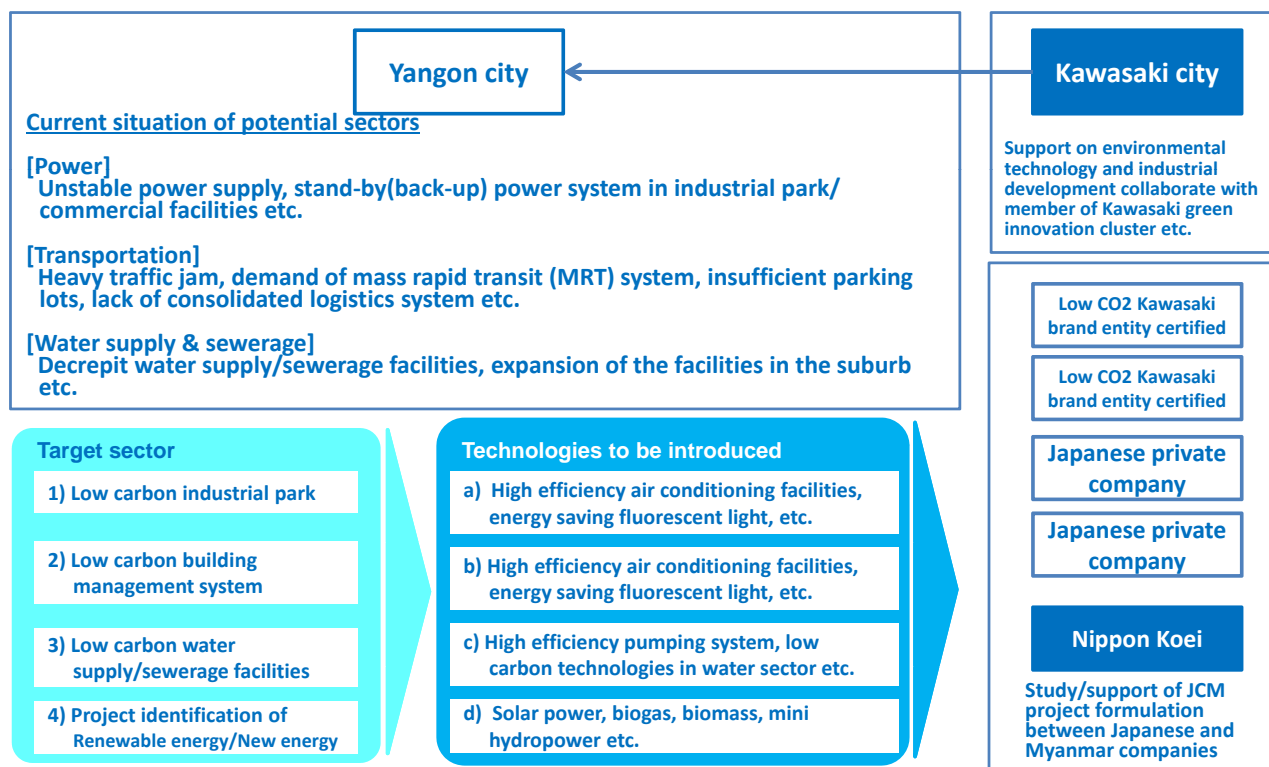
### Contents

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

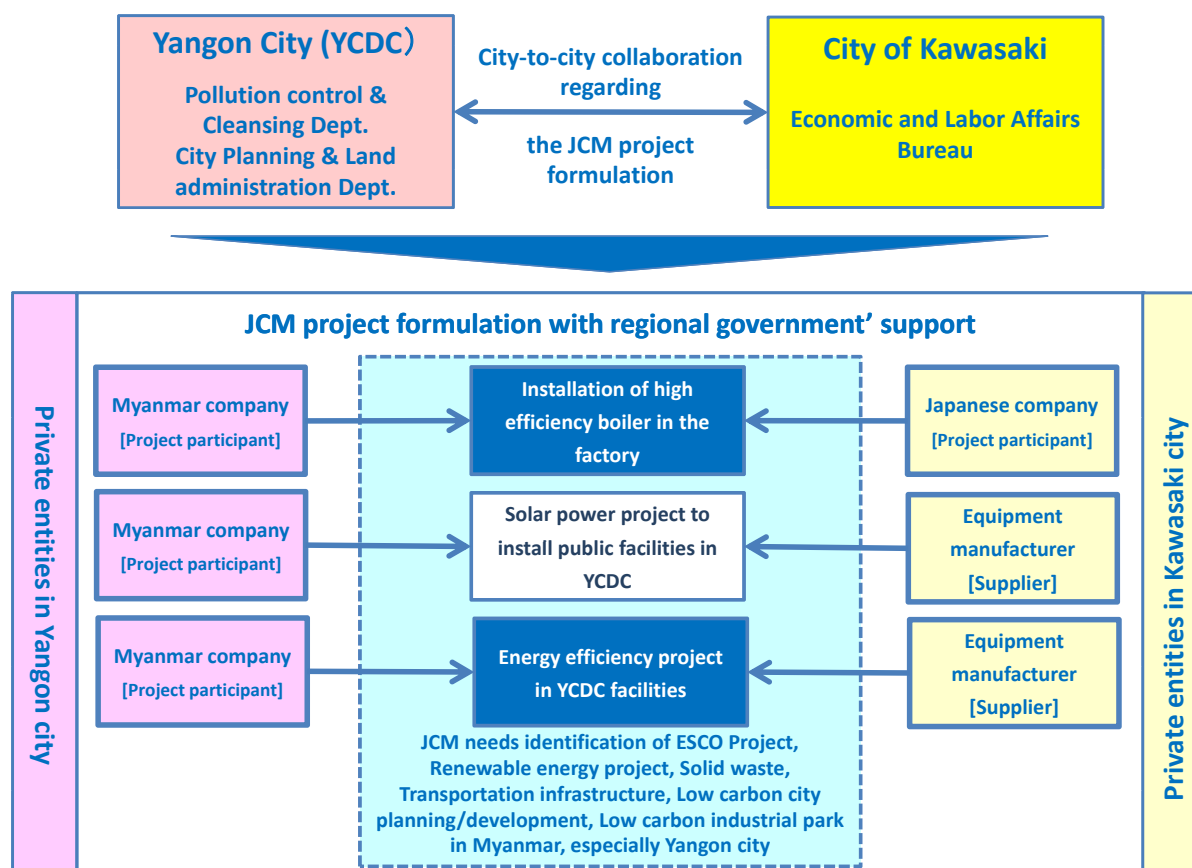
## 1. Overview of JCM City-to-city collaboration project

### 【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)



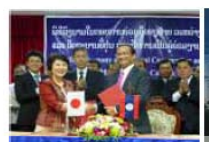
Kenya  
Jun. 12, 2013  
(Nairobi)



Maldives  
Jun. 29, 2013  
(Okinawa)



Viet Nam  
Jul. 2, 2013  
(Hanoi)



Lao PDR  
Aug. 7, 2013  
(Vientiane)



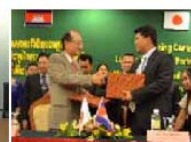
Indonesia  
Aug. 26, 2013  
(Jakarta)



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



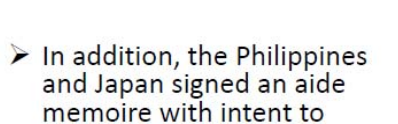
Chile  
May 26, 2015  
(Santiago)



Myanmar  
Sep. 16, 2015  
(Nay Pyi Taw)



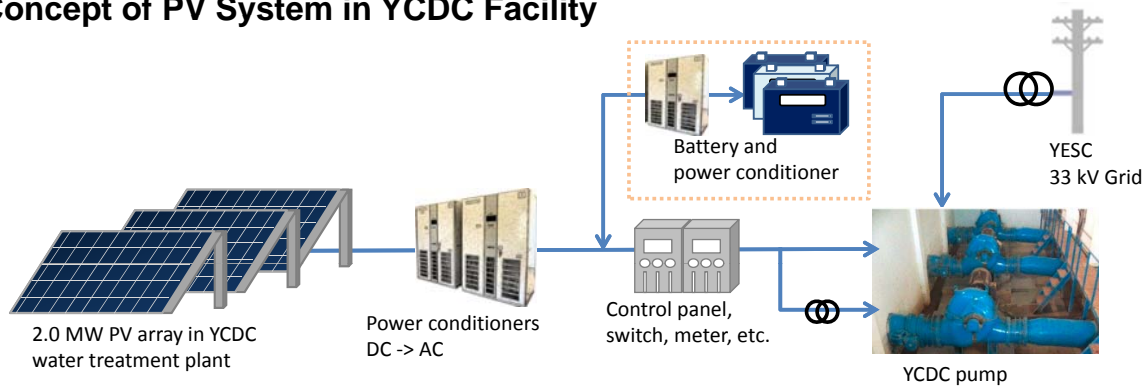
Thailand  
Nov. 19, 2015  
(Tokyo)



- 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



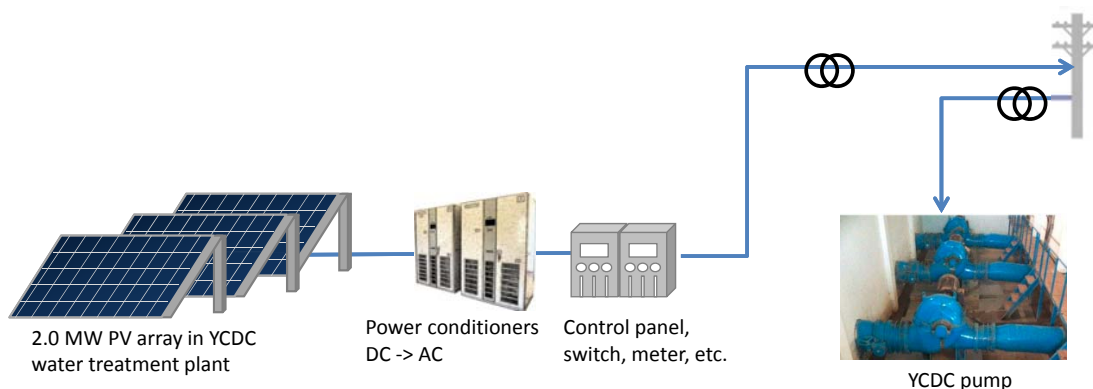
- Solar PV generation system reduces electric energy usage in YCDC pump station
- Solar power for internal supply only (no feed to grid)
- Battery is necessary to absorb fluctuation of PV output

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 : Tariff payment = Energy used – PV generated





### 3. Pilot Project Site



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



Pump room in Nyaung Hnit Pin



Candidate PV module area in 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. Seminar and workshop in Japan**

#### **3-2 Kitakyusyu JCM seminar**



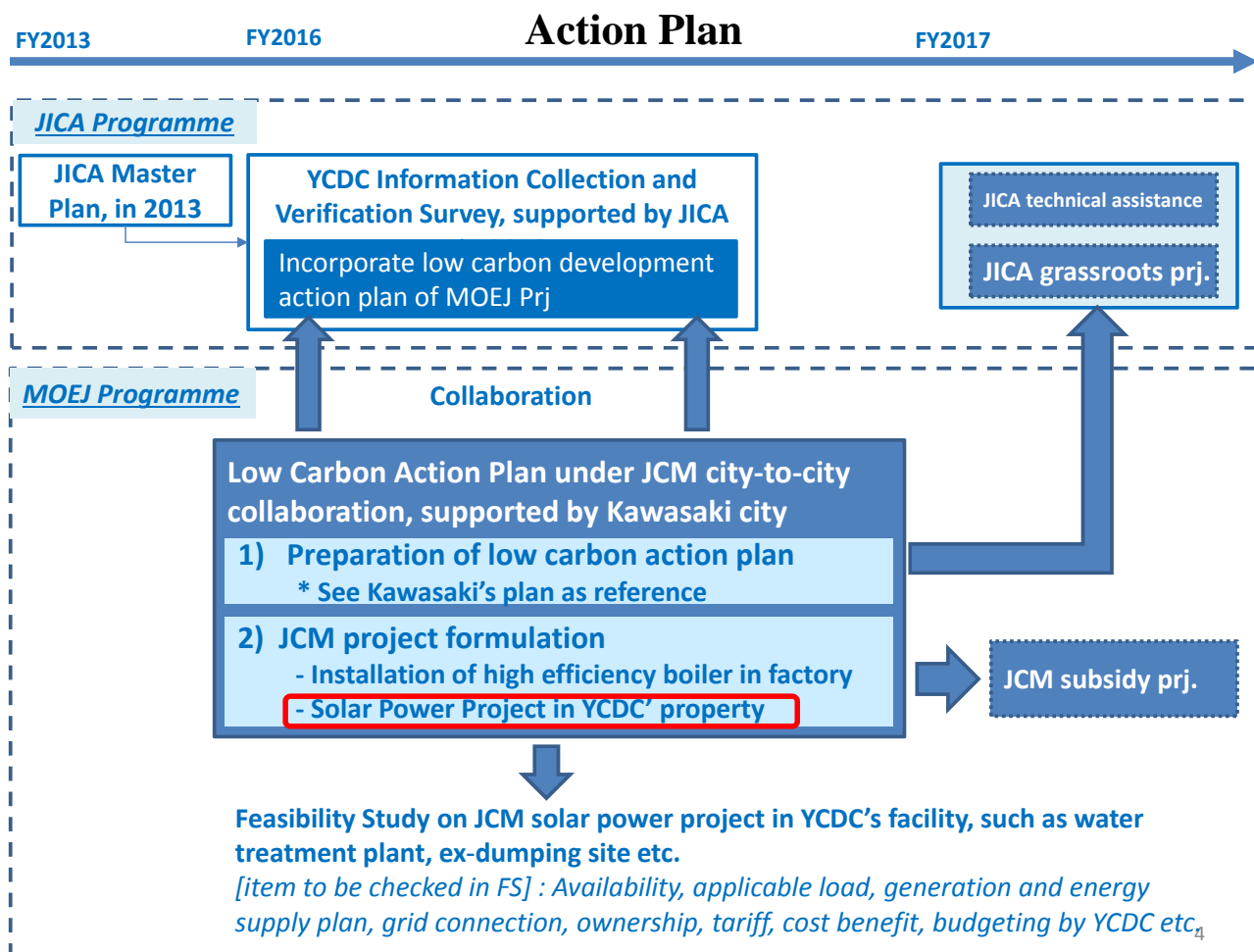
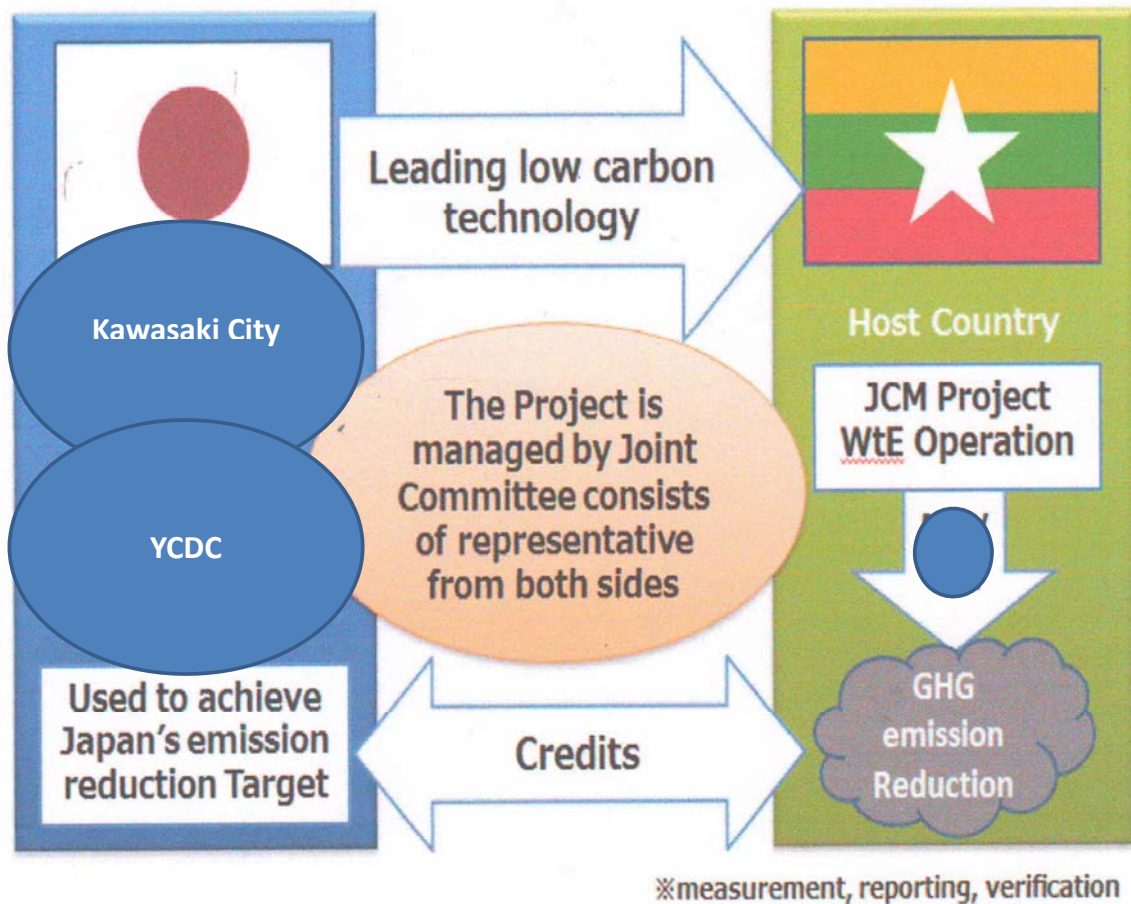


# **JCM Project Formulation Study through City-to-City Collaboration between YCDC and Kawasaki city**

## **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

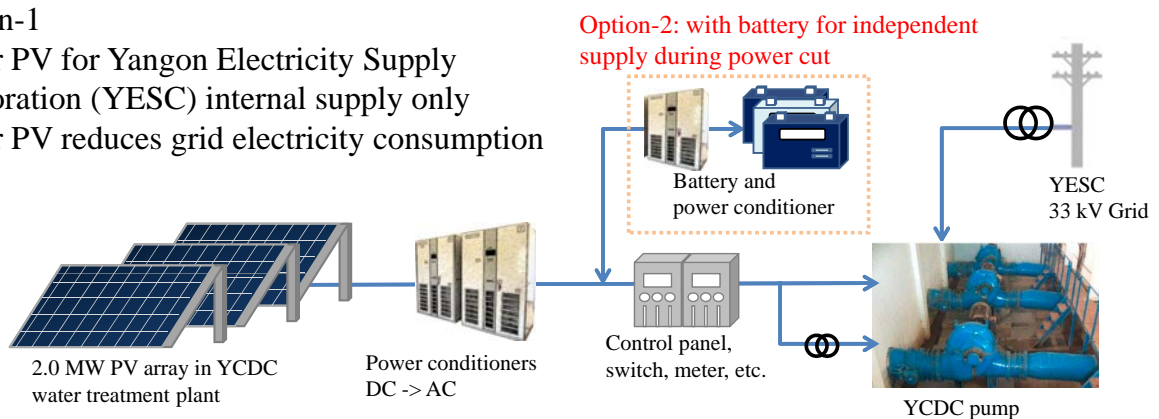
Candidate	Status	Load	Selection result
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Hlawga	- 24hr, fixed demand - 1MW x 2nos, 6.6 kV - Pump installation in 2008	2 MW	2 <sup>nd</sup> priority: Under partial update (new electric board has mismatch of interface). →It will take time until PV connection study becomes possible.
La Gun Byin	132kWx6+25 kWx6 + 30 kWx4, 400V Peak 450 kW, off-peak 350 kW	450 kW	Too small, remote

7

## Options of Photo Voltaic (PV) System Concept

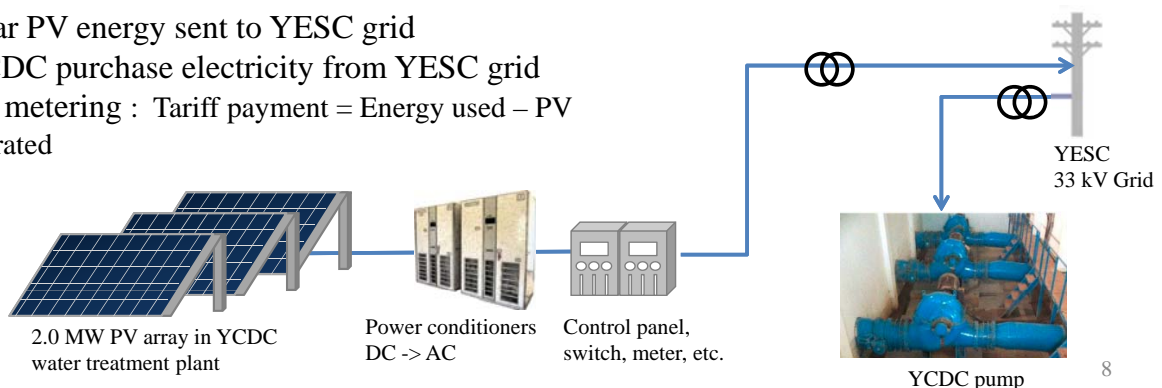
### Option-1

- 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



8

## Nyaung Hnit Pin Pilot Project Site



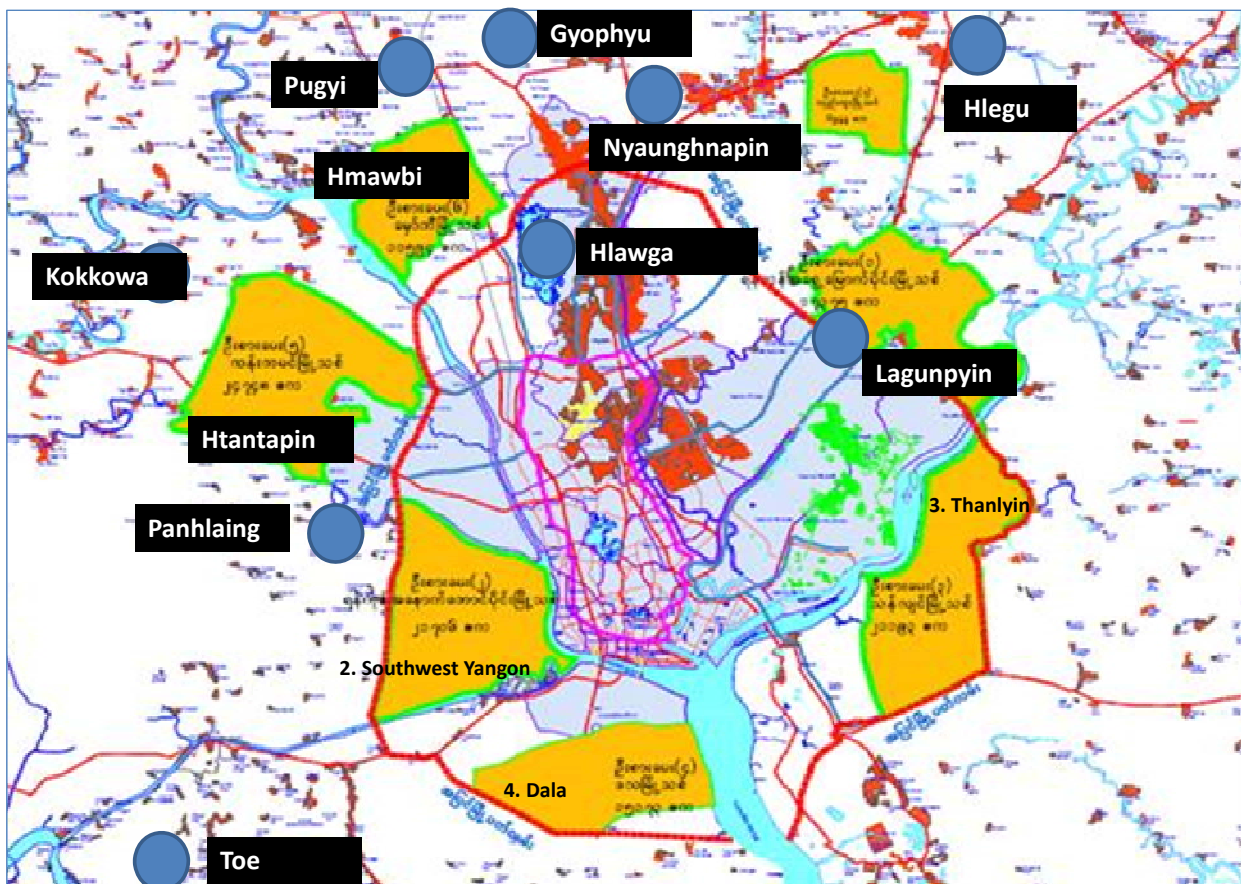
Electric room (PV –related equipment can be stored)

Pump room



Candidate PV module area

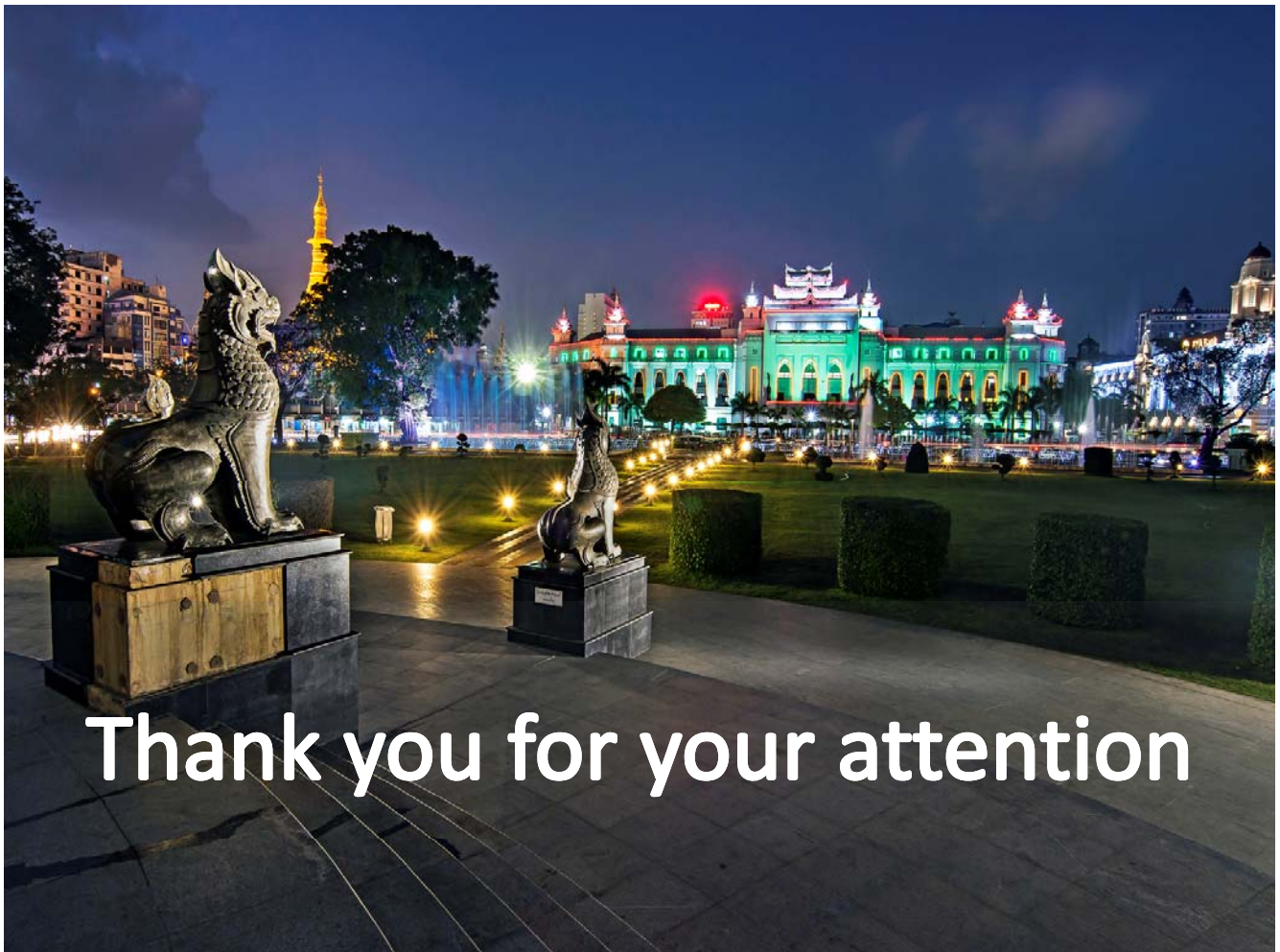
## Planned Water Resources for 2040





## 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**

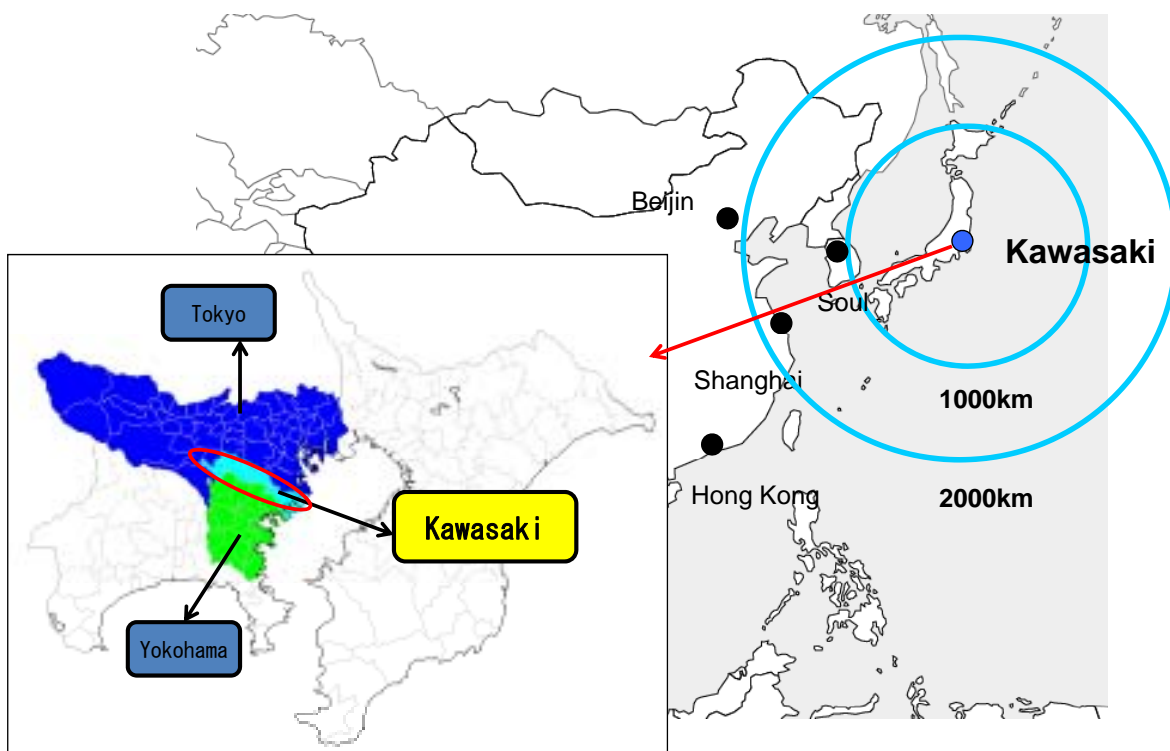
# JCM City-to-City Collaboration between Kawasaki-city and Yangon-city



Economic and Labor Affairs Bureau



## General information about Kawasaki-city: Location

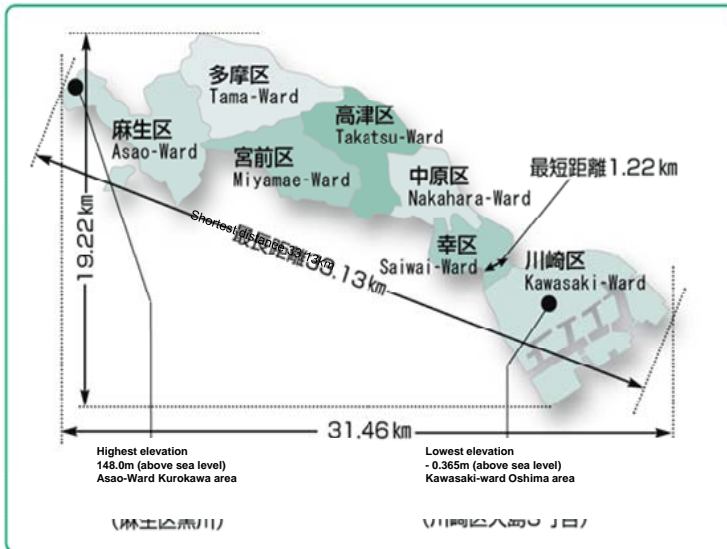




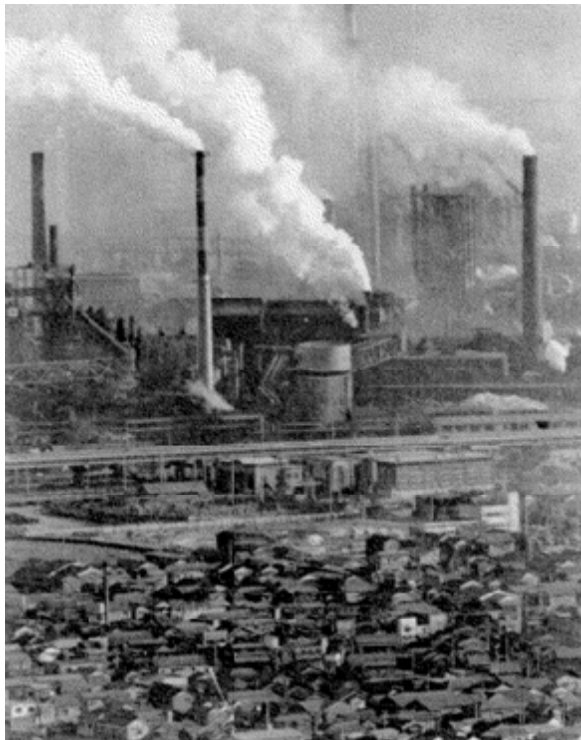
## City profile

- 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 )**



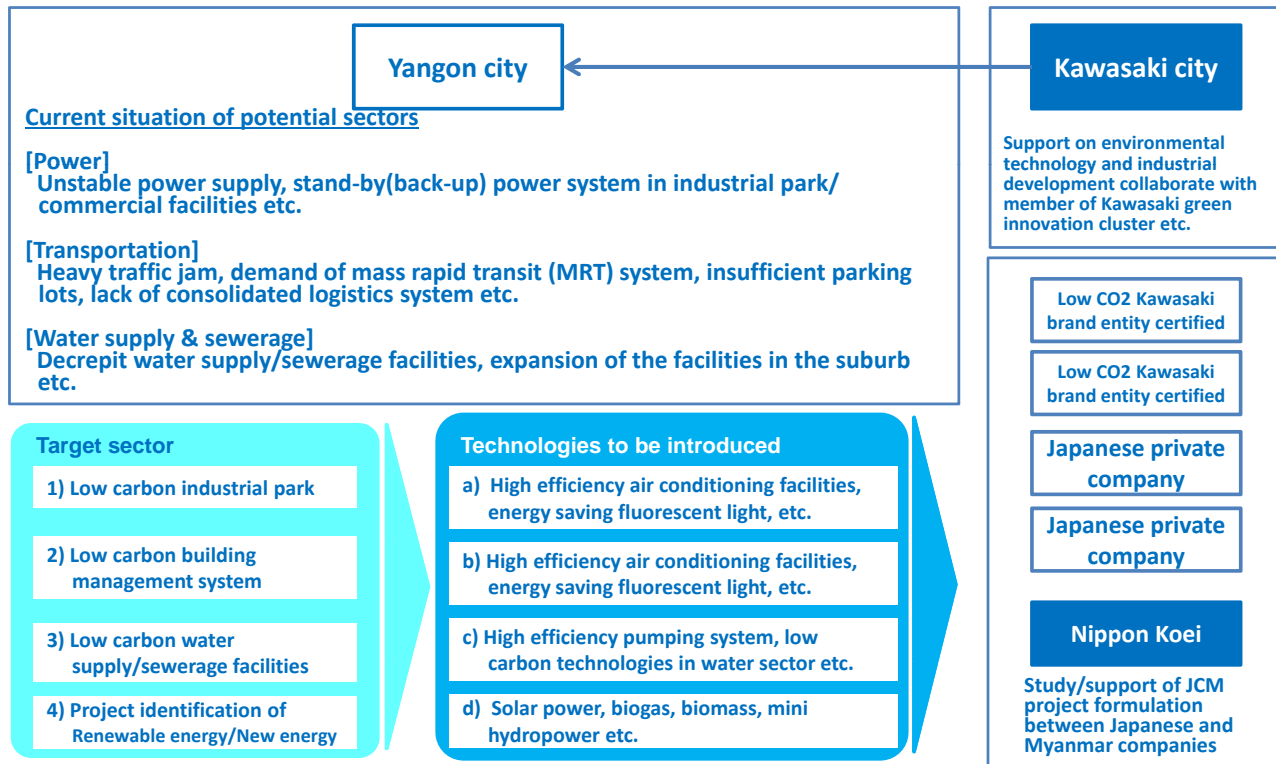
**Kawasaki Waterfront Area ( 2010 )**



# 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:

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

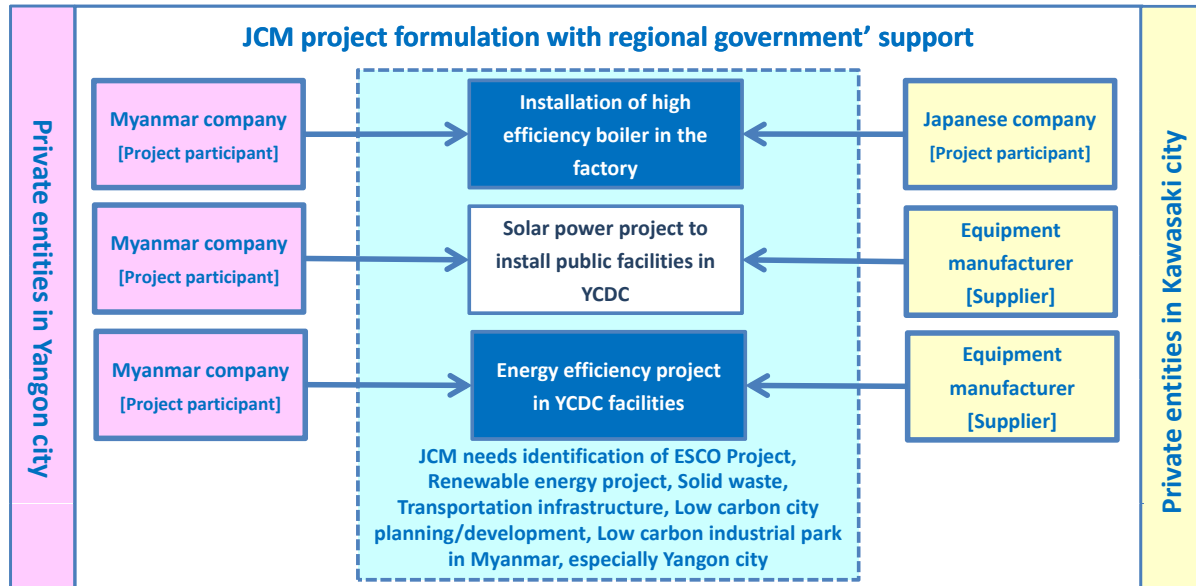
**January 2016:** Workshop on City-to-city collaboration at Yangon-city

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



Workshop for city-to-city collaboration at Yangon

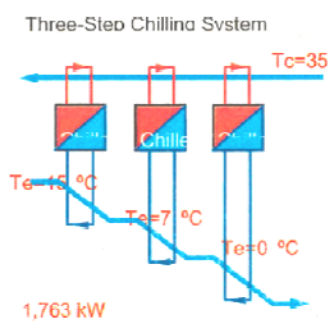
## JCM City-to-city collaboration project ( 2017 )



## 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



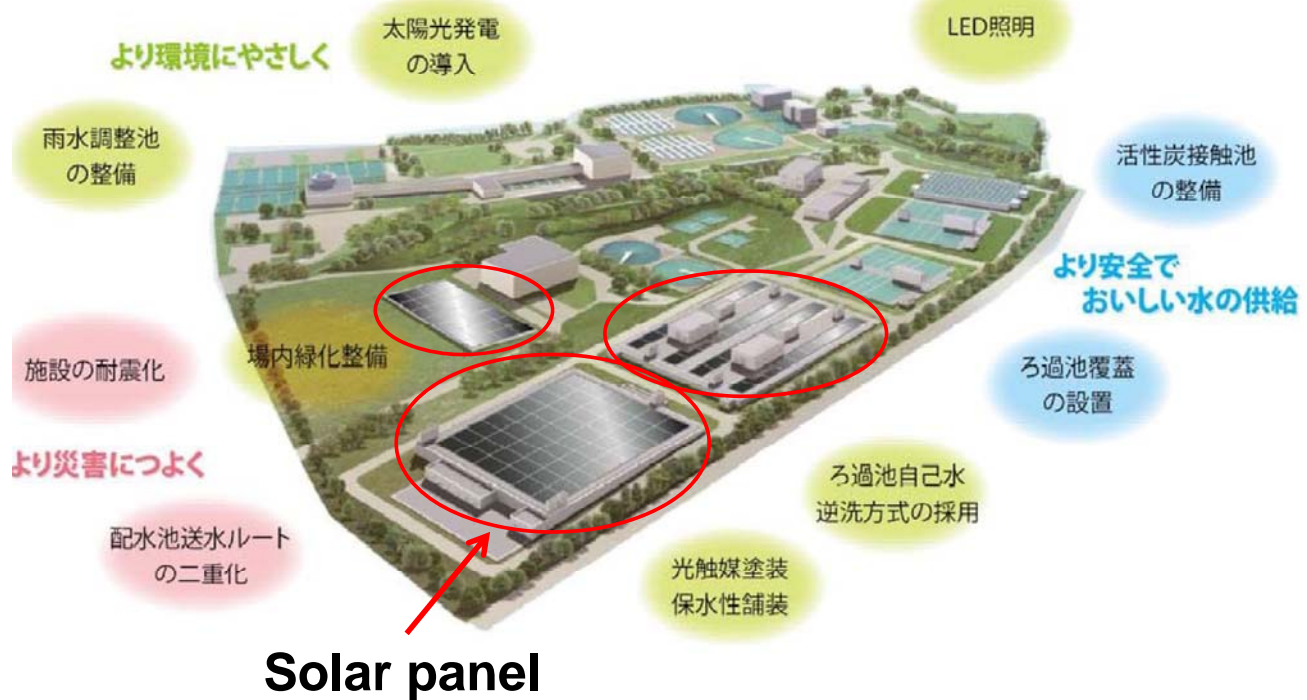
### Detail of Nagasawa water purification plan in Kawasaki

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	<ul style="list-style-type: none"> <li>-To support minimum power at the time of digester</li> <li>- To enable interconnection with independent gas turbine and independent generation</li> </ul>
Annual generation energy	1.13 GWh/year (20% of total electric energy in Nagasawa)

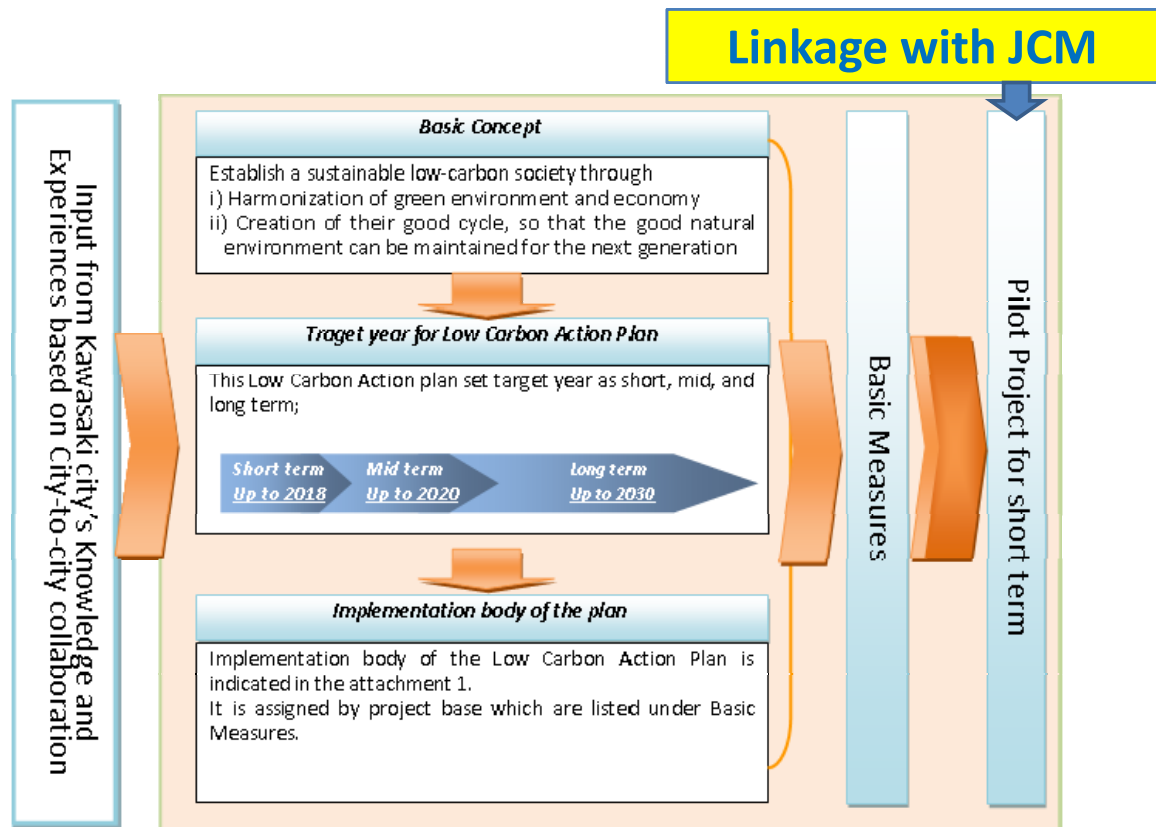
## Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki



## 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. Seminar and workshop in Japan**

#### **3-3 COP22 presentation material**



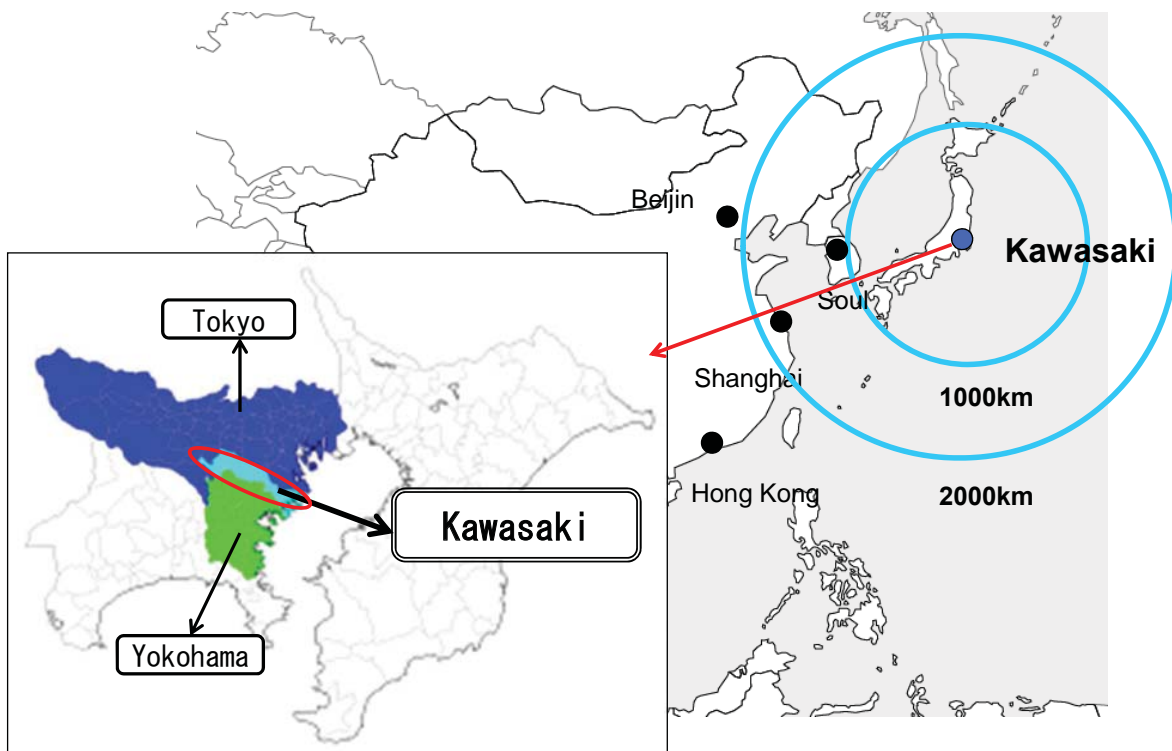
# JCM City-to-City Collaboration between Kawasaki-city and Yangon-city



Kawasaki-city  
Japan



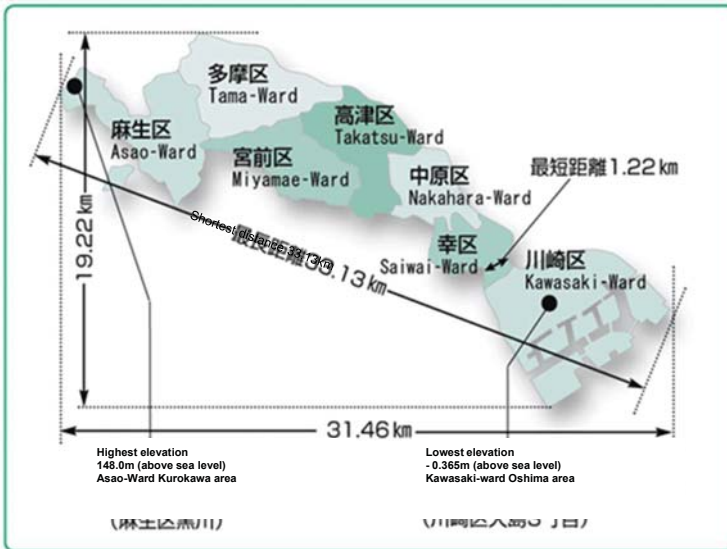
## About Kawasaki-city, Japan



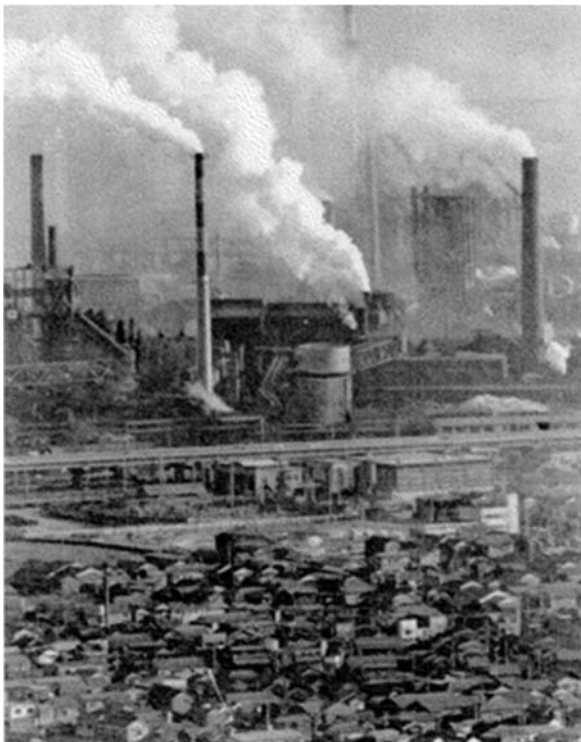


## About Kawasaki-city, Japan

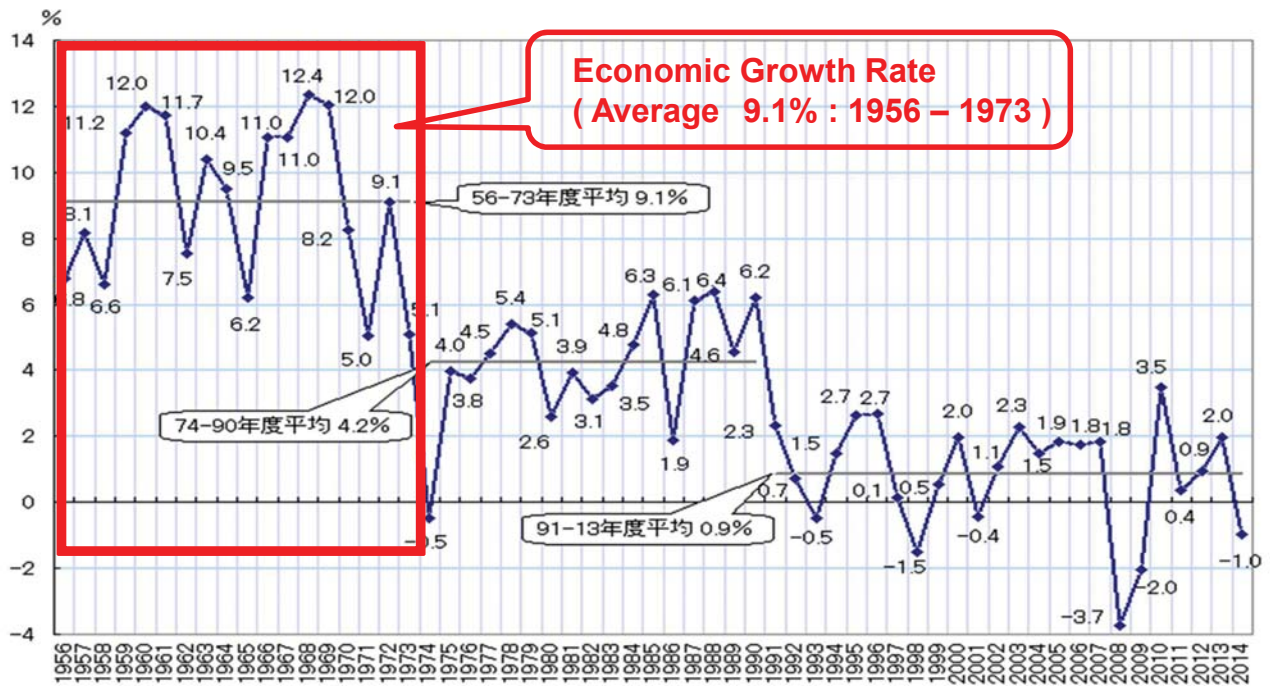
- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km<sup>2</sup>
- City budget: APPROX 10 billion US\$ (2015)



## 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

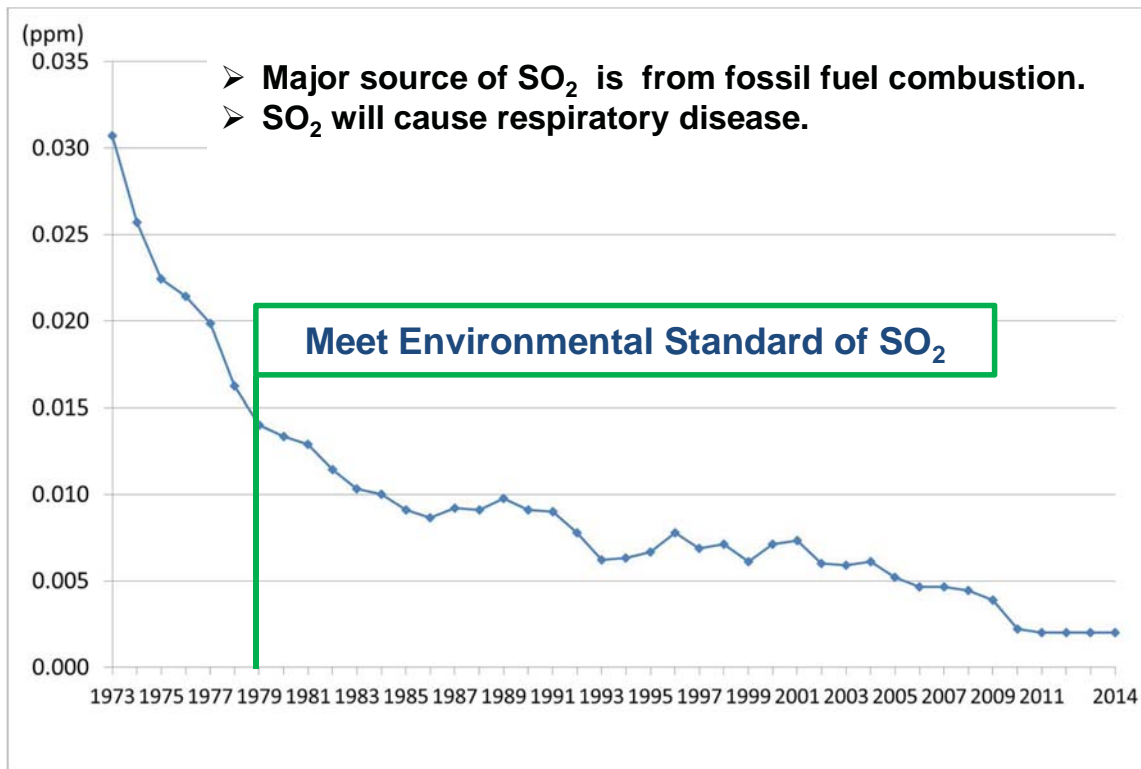
- Pollution control agreement with local industries
- Regulation for pollution control
- Pollution monitoring system



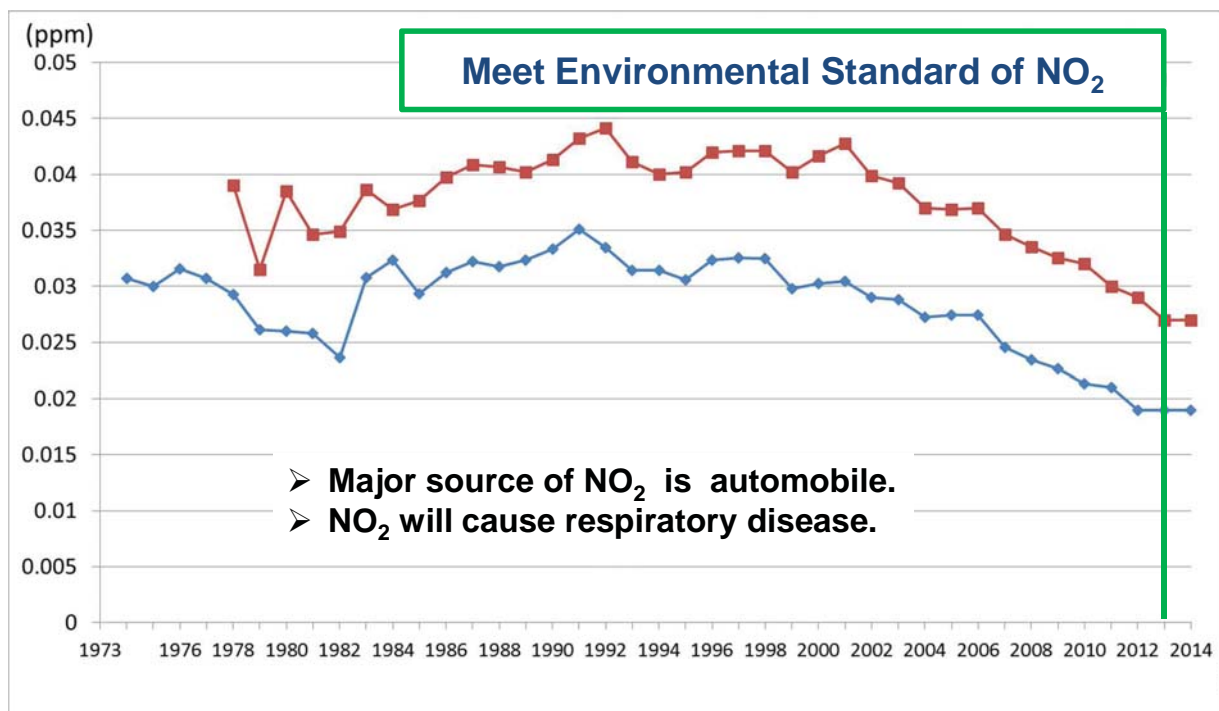
***"Sharing of Roles" & "Cooperative Action"***

**Improvement of Environmental Problems**

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

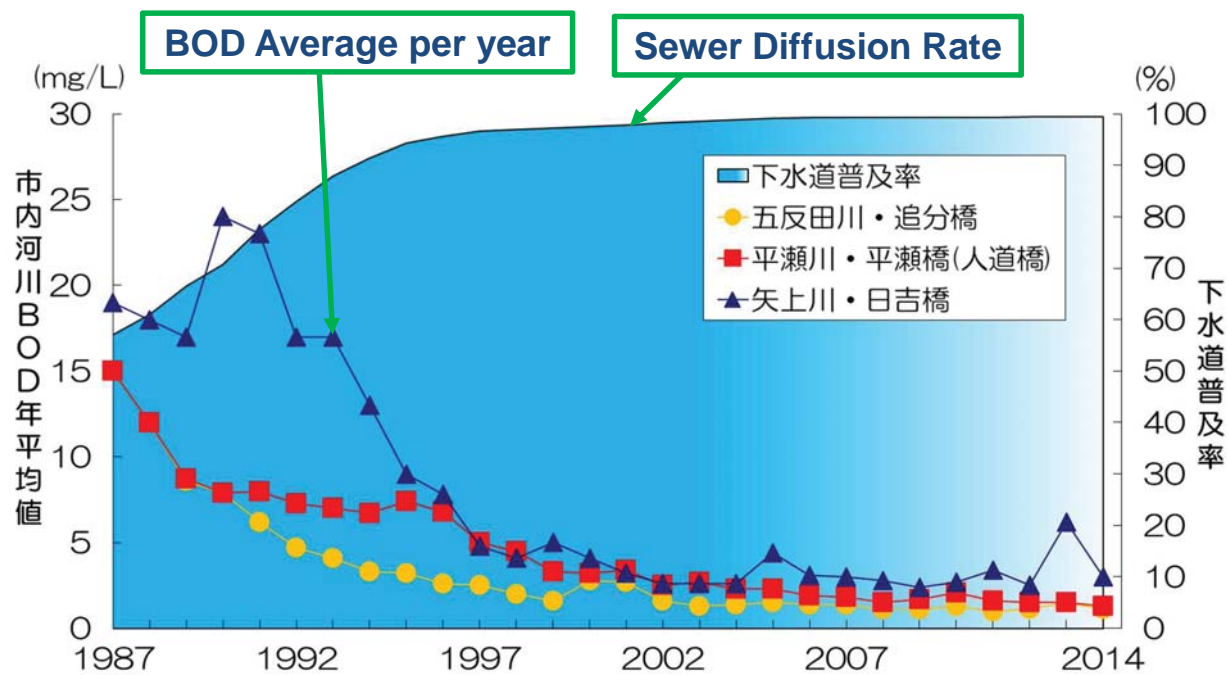


## NO<sub>2</sub> Concentration in Air from 1973 - 2014





## 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 | <b>7.8 %</b> (2016: Estimated by World Bank) |



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

## 【Objectives】

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

## Yangon

### Potential sectors for low carbon project

#### [Power]

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

#### [Transportation]

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

#### [Water supply & sewerage]

Decrepit water supply/sewerage facilities, expansion of the facilities in the suburb etc.

#### Target sector

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

#### Technologies to be introduced

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

## Kawasaki

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

Japanese private company

**Nippon Koei (consulting)**

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

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



Mingaradon Industrial park in Yangon



Pollution Control and Cleansing Department in YCDC



City Planning and Land Administration in YCDC



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



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



Kawasaki Chamber of Commerce and Industry



Economic and Labor Affairs Bureau of Kawasaki



Zero-Emission Industrial park



Ukishima Incineration Plant

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



Building up "Trust" and "Mutual Understanding"



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





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



City News article

## Achievement: MOU between Kawasaki and Yangon (2015)

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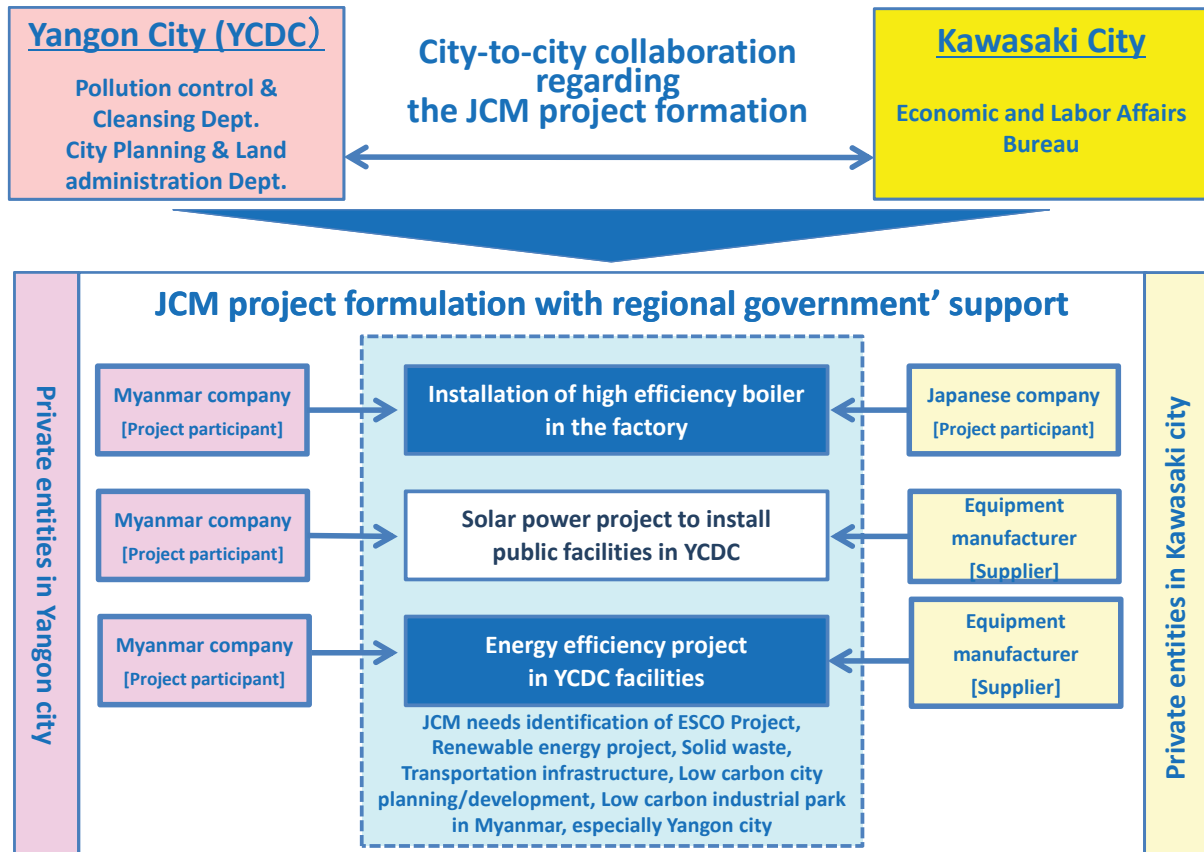
**January 2016:** Workshop on City-to-city collaboration at Yangon-city

**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

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



Electric Room (PV –related Equipment can be stored)

Pump Room →



← Candidate PV Module Area

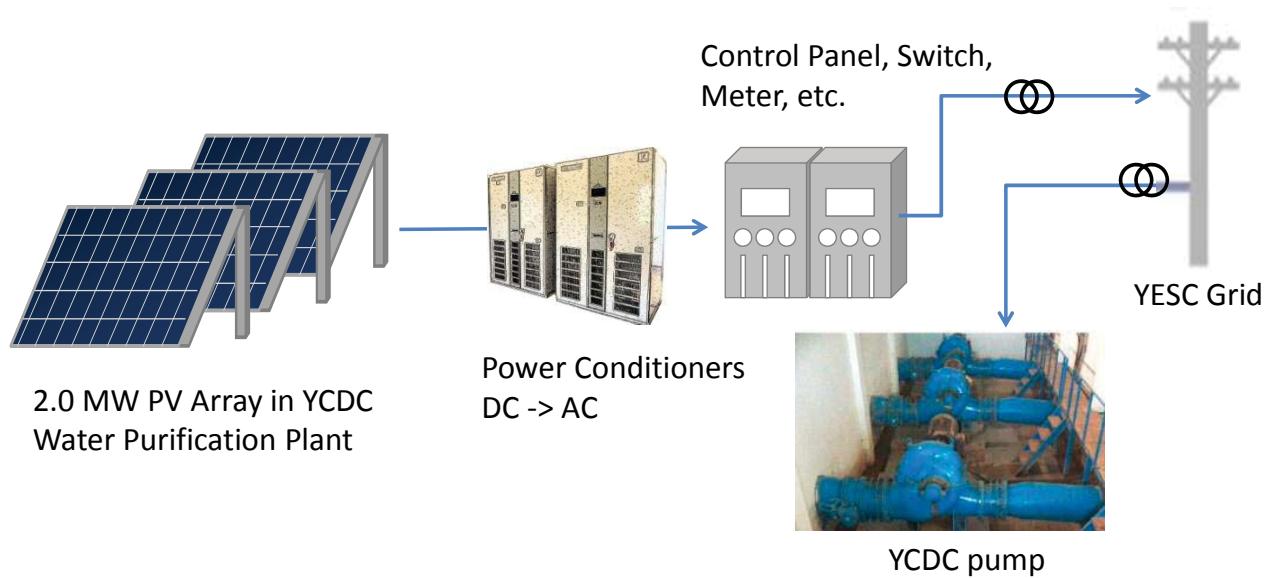
30



## Photo Voltaic (PV) System Concept

### < PV System on Planning >

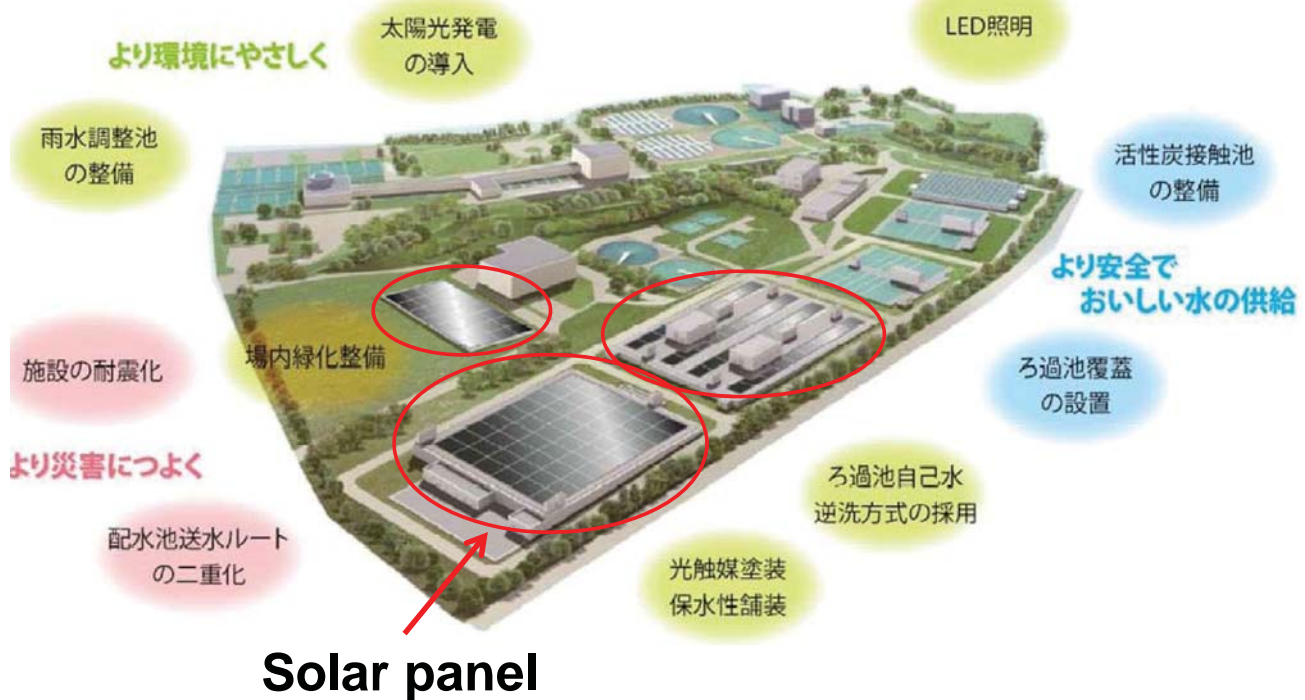
- Solar PV Energy sent to YESC (Yangon Electric Supply Company) grid
- YCDC purchase Electricity from YESC grid
- Net Metering :  $\text{Tariff Payment} = \text{Energy used} - \text{PV generated}$



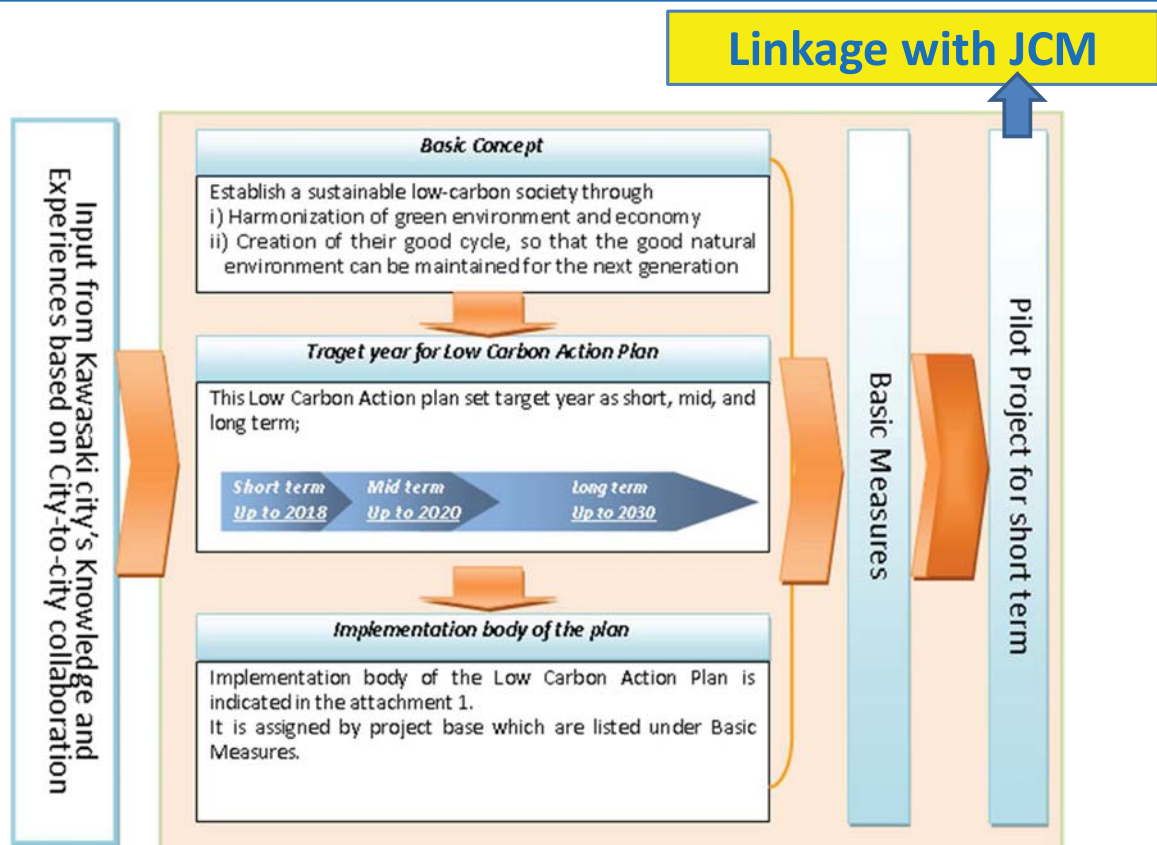
### Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki

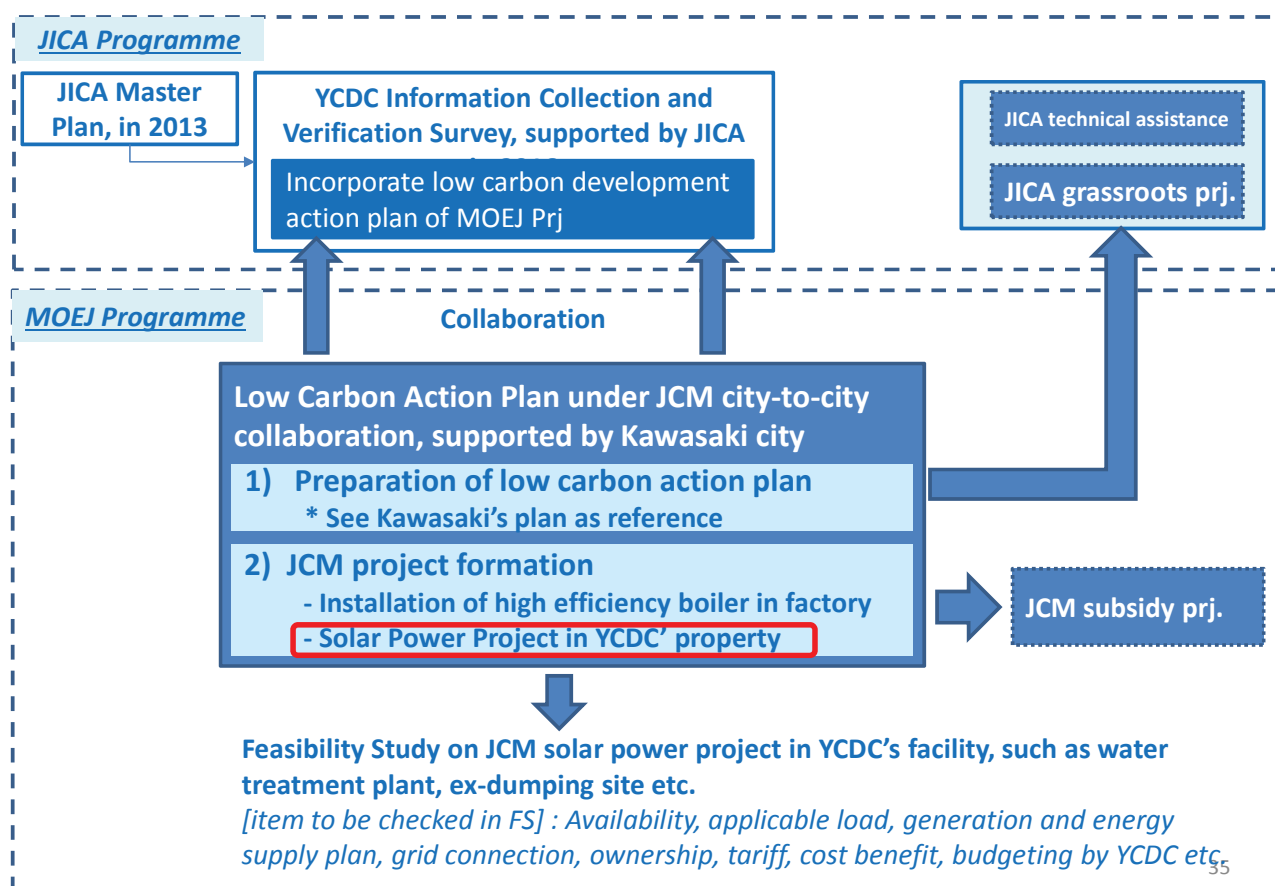


## Image of installation of solar power generation device in public facility: Nagasawa Water Purification Plant in Kawasaki



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





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

### Low Carbon Society

- Eco town planning and sharing experience
- Introduction of energy saving products/technologies from Japanese private entities
- Support on Private sector collaboration, such as Kawasaki Chamber of Commerce and Industry etc.
- Support on capacity development through JICA scheme etc.

### Monitoring

- Support on system development on car exhaust/air pollution/water quality / soil condition, including analysis know-how

### Solid Waste

- Planning/implementation of solid waste collection system
- Planning/implementation of garbage separation program
- Planning/implementation of compost promotion program
- Knowledge sharing of industrial waste management
- Establishment of solid waste database etc.

## Potential of City-to-City Collaboration (2)

### Water supply /Sewerage

- Sharing of management knowledge on water supply / sewerage system
- Sharing of water tariff collecting / water quality management knowledge

### Education

- Planning / implementation of environmental education programs

### Other options

- Implementation of site tour on Kawasaki eco town etc.
- Establishment of Environmental Impact Assessment (EIA) system



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

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

- To promote City-to-City Collaboration between Kawasaki and Yangon city, and have to share **Future Vision of Low Carbon Development of Yangon-city**
- To support and promote **JCM Project by selecting Pilot Project in the Low Carbon Action Plan**
- To promote **Technology Transfer to Yangon-city supported by JCM scheme**



Thank you for your kind attention.





### **3. Seminar and workshop in Japan**

#### **3-4 Site visit by Planning and Finance Deputy Minister**





# H.E. U Kyaw Win

( Union Minister, Ministry of Planning and Finance )

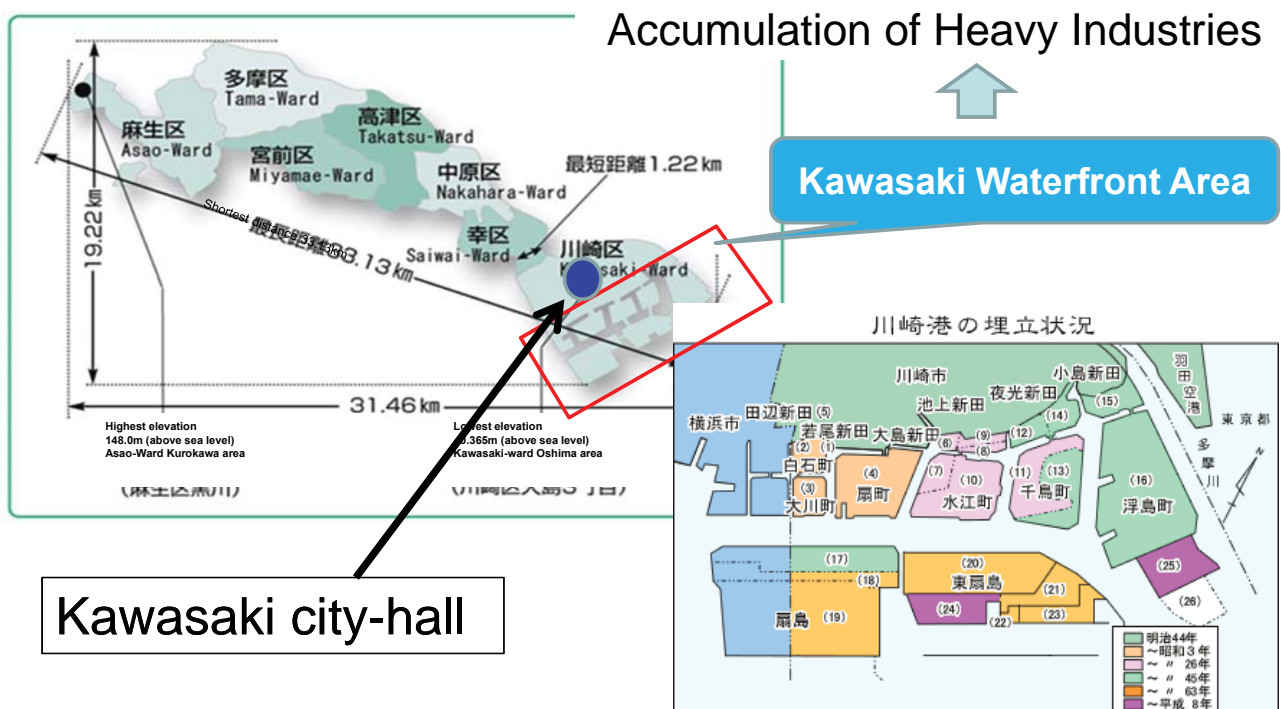
## Site Visit of Kawasaki Eco-town

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>

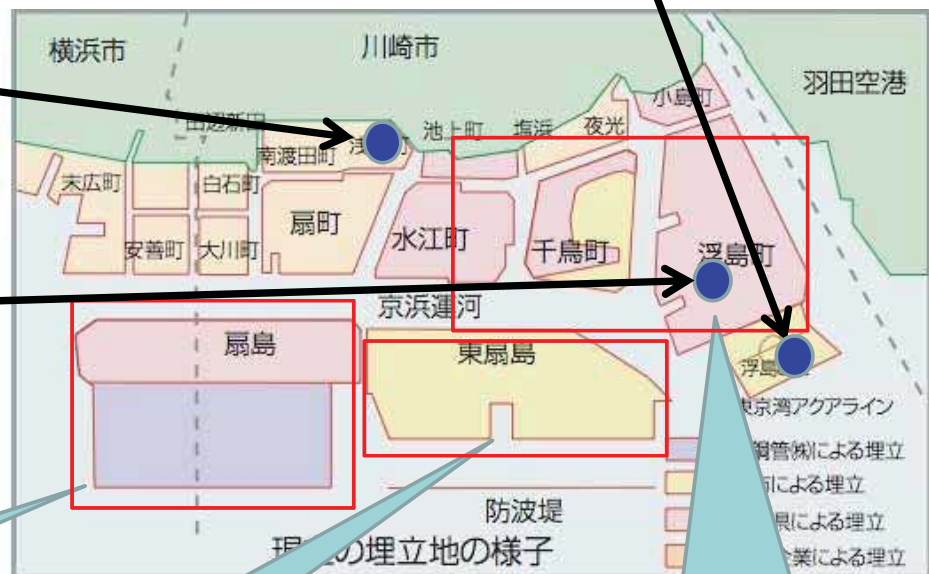


## Location of facilities for the site visit

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

①YAMANAKA  
Recycling of waste automobile

③TAKEEI  
Recycling of mixed waste generated from demolition site



Steel Industry Area

Logistics Area

Refine & Petrochemical complex Area

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

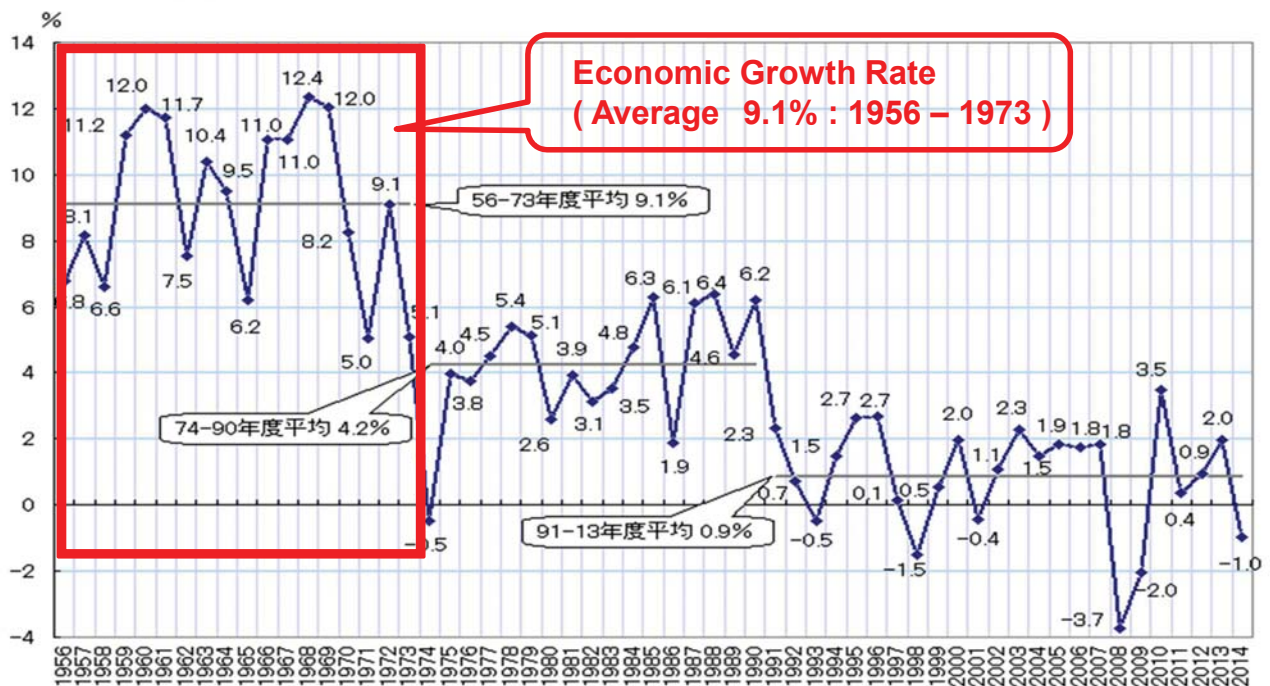




## Rapid Economic growth & Industrial Pollution in Kawasaki ( 1960-70 )



## Economic Growth Rate in Japan

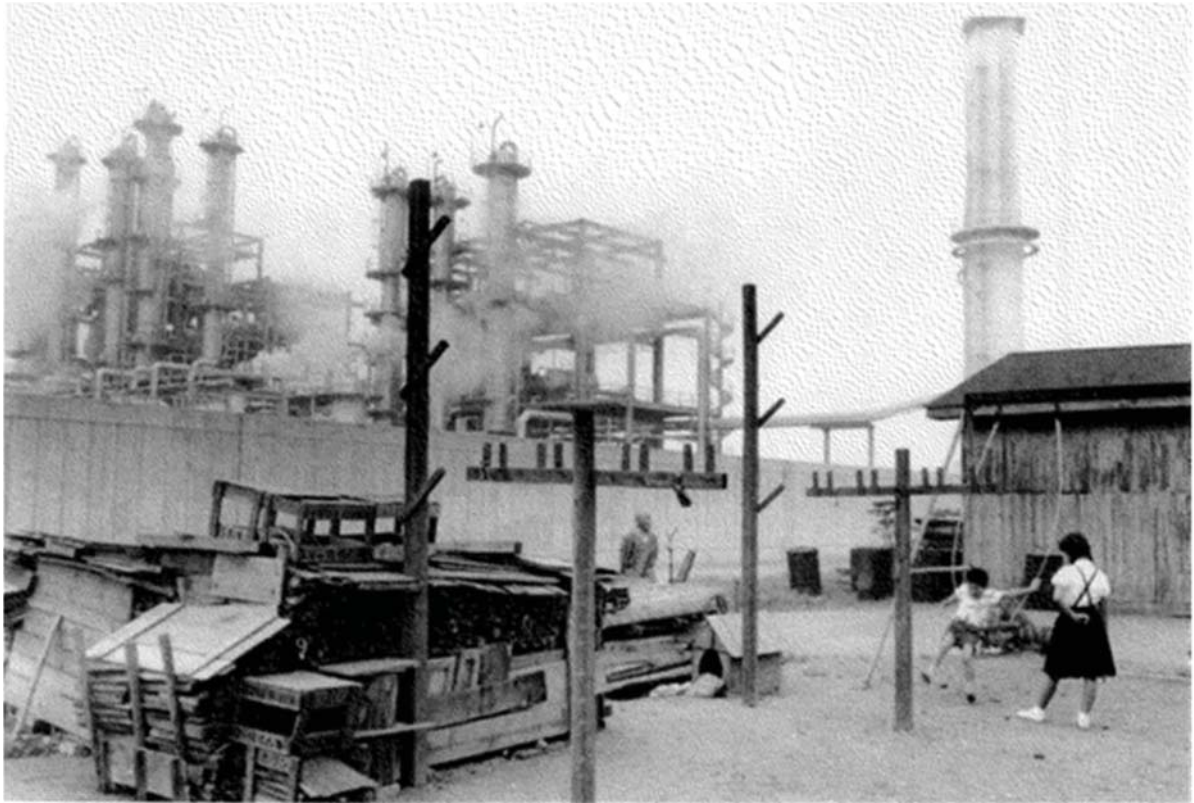


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## Factories nearby Residential Area in Kawasaki (1970)



## Tama-River (1970)





## Air Pollution over Kawasaki Waterfront Area ( 1960 )



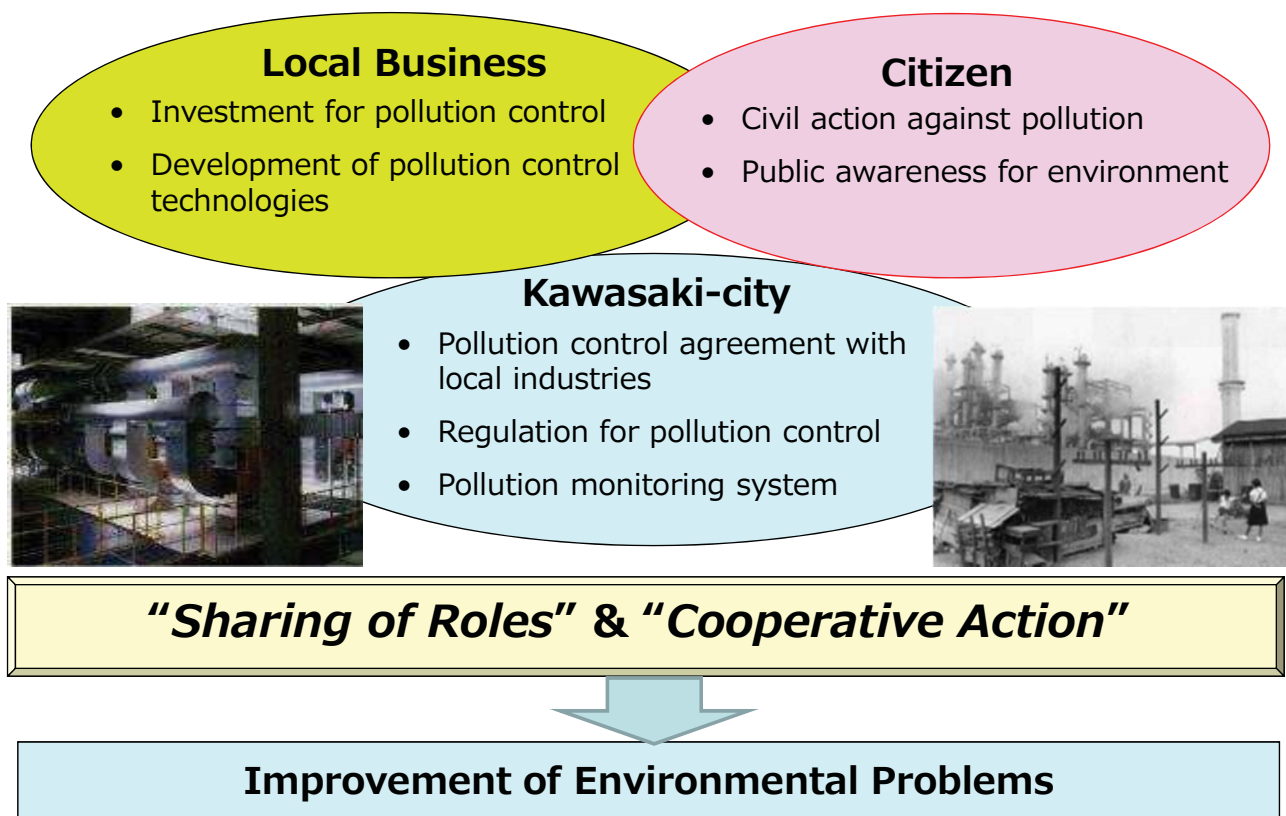
## Current Landscape of Tama-River ( 2016 )



# Current Landscape over Kawasaki Waterfront Area ( 2016 )



## Efforts to overcome Pollution Problems

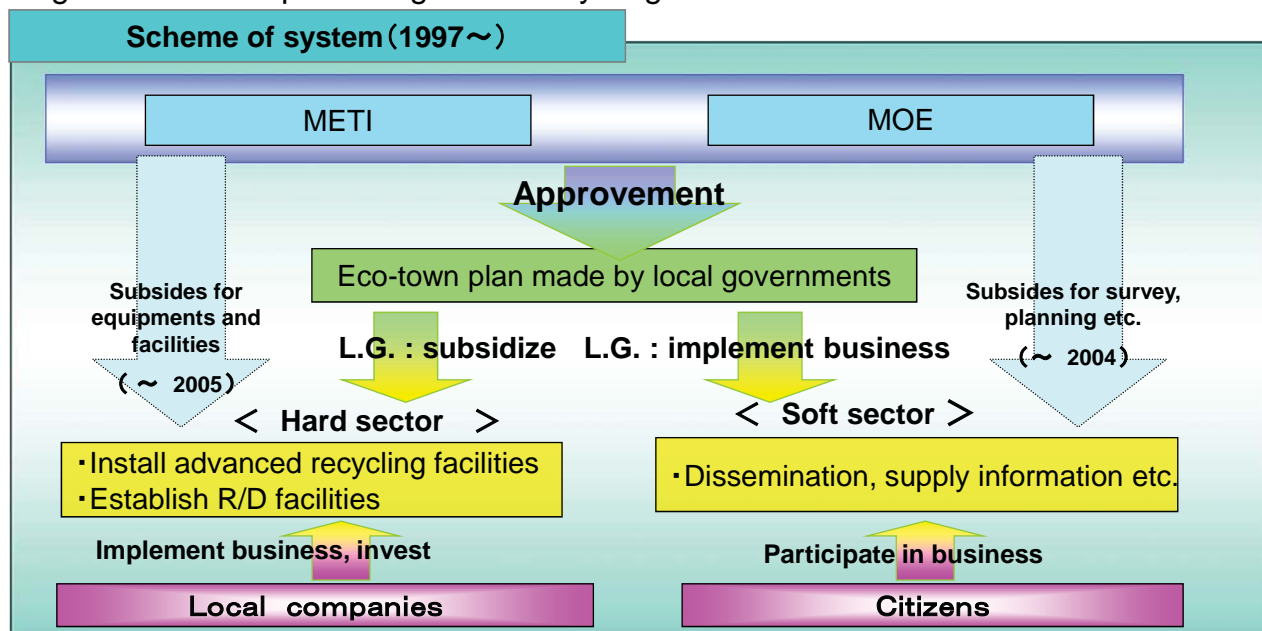




# Kawasaki Eco-town Project

Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

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



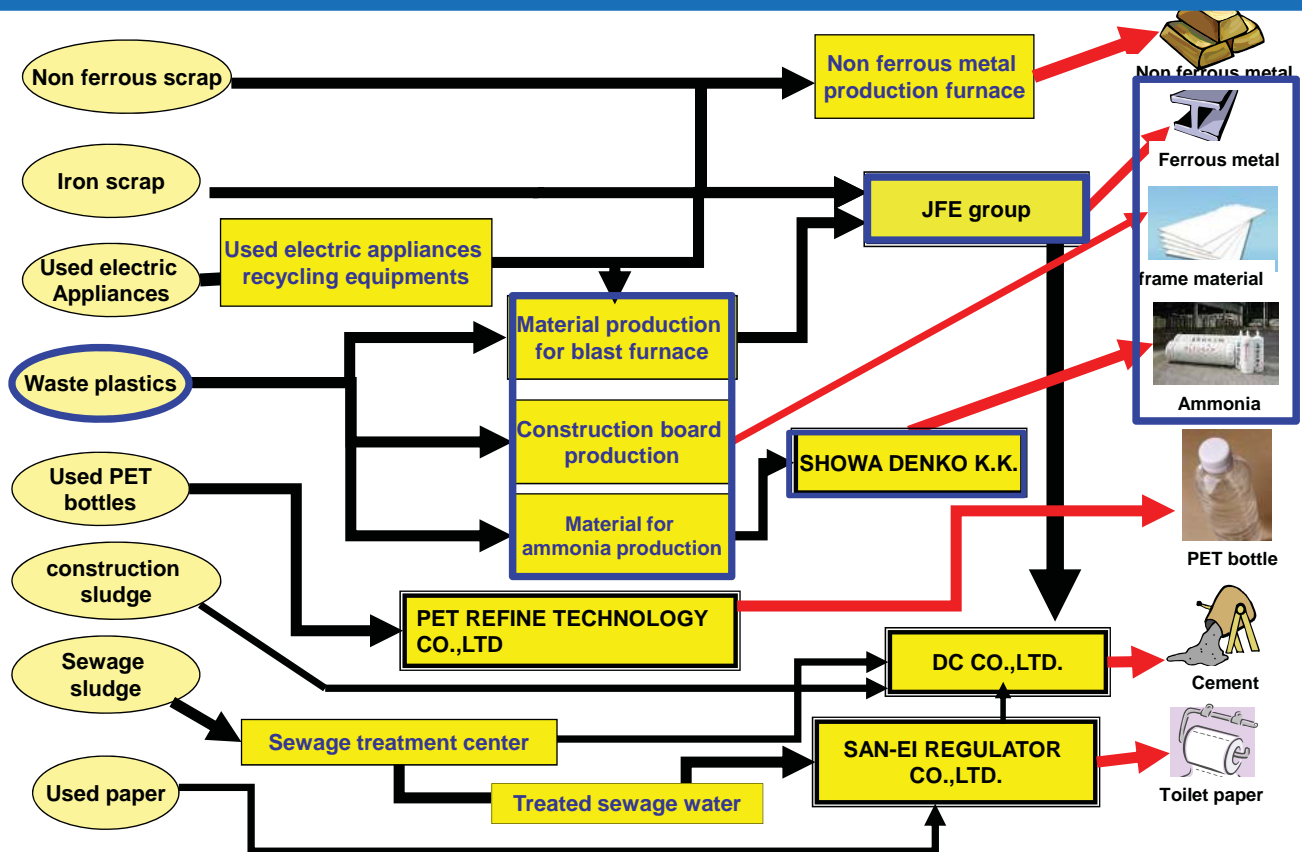
7

## Resource Recycling Facilities in Kawasaki Eco-town



13

## Companies' Collaboration in Kawasaki Eco-town



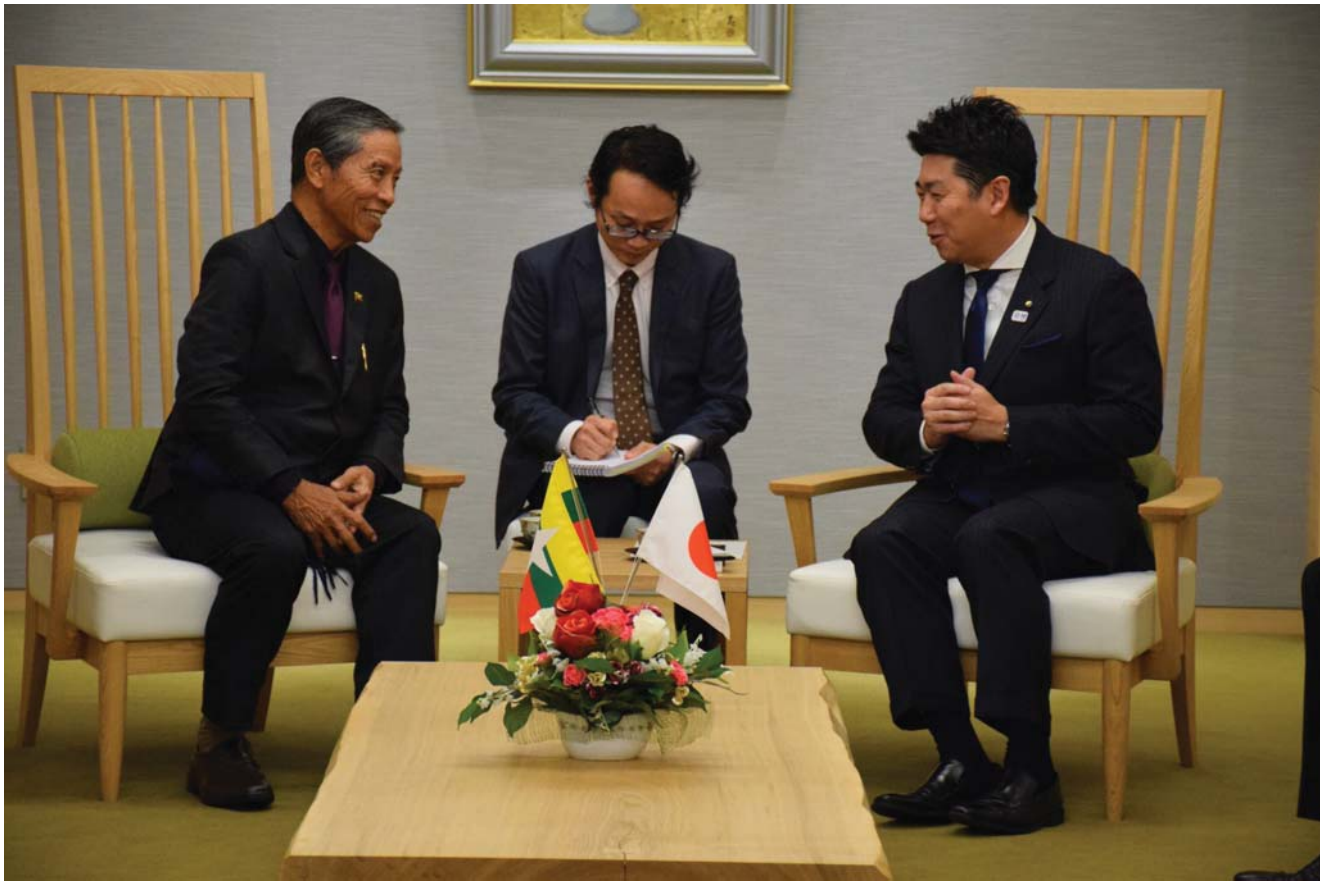
## Summary of Kawasaki Eco-town

- ◆ 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

19

## Eco-town related facilities tour ②



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

20



### Eco-town related facilities tour ③



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

21

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



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



**Thank you for your attention !**





### **3. Seminar and workshop in Japan**

#### **3-5 Tokyo JCM seminar presentation material**



# 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

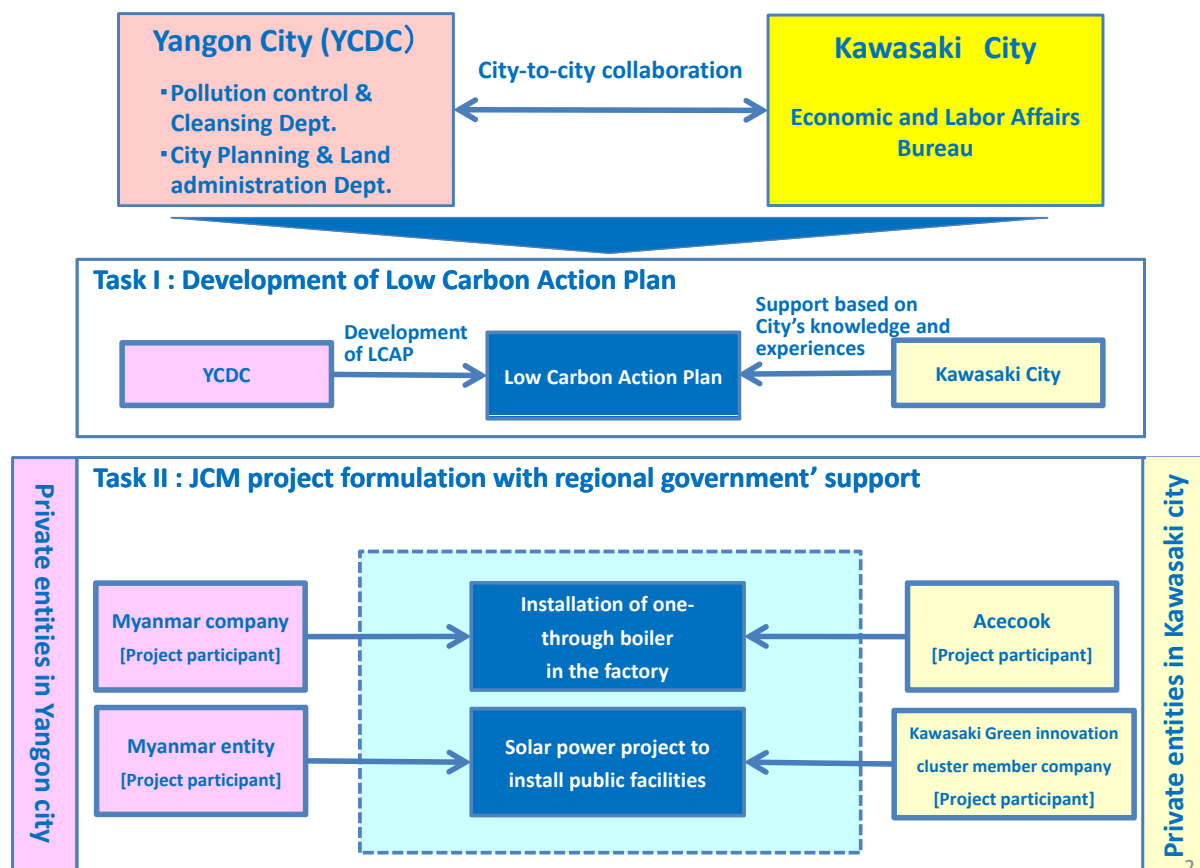


### Contents

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

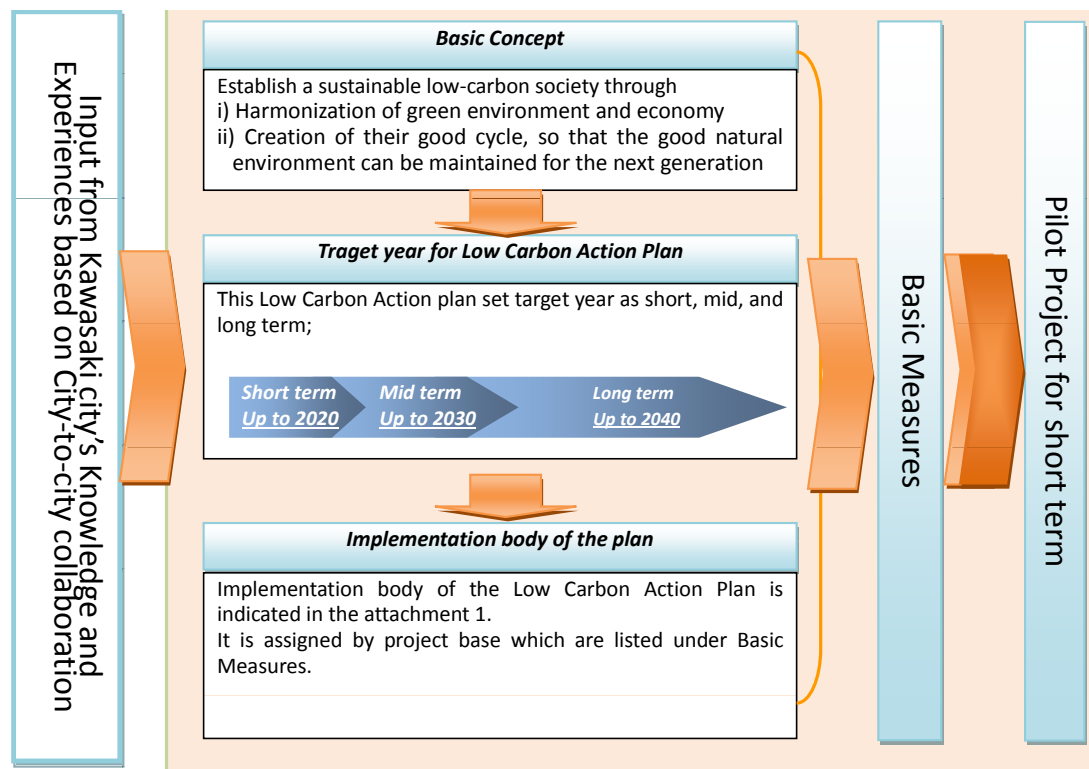
## 1. Overview



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 -

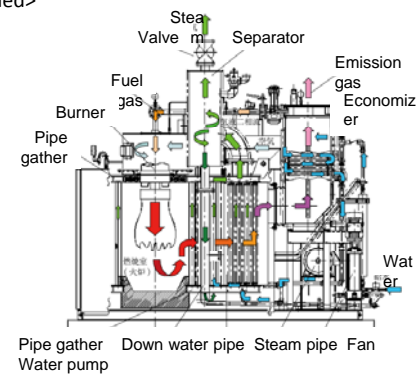
### ➤ Outline of the project

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

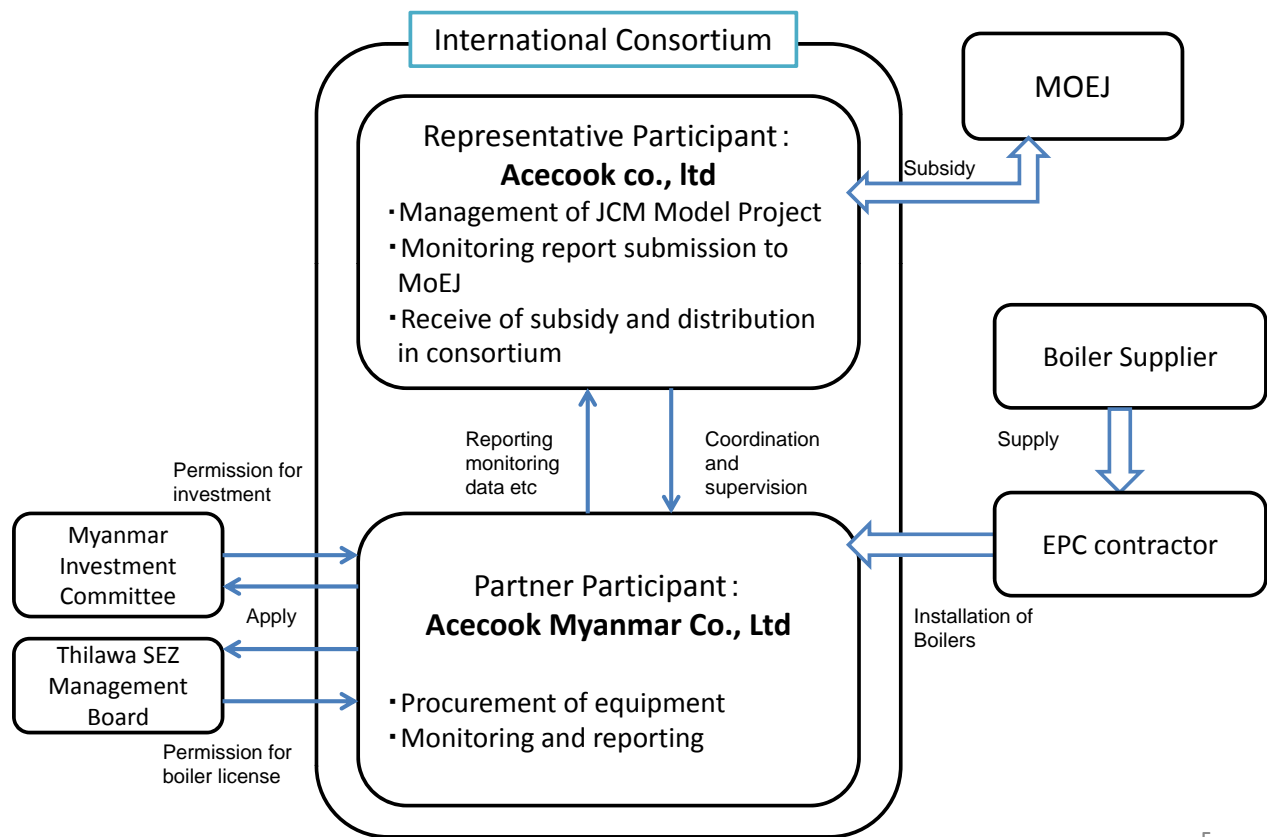
The proposed JCM model project was adopted **as JCM model project in September 2016** and initiated from October 2016.

Introduced technology	<ul style="list-style-type: none"> <li>• <u>One-through Boiler</u>, 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

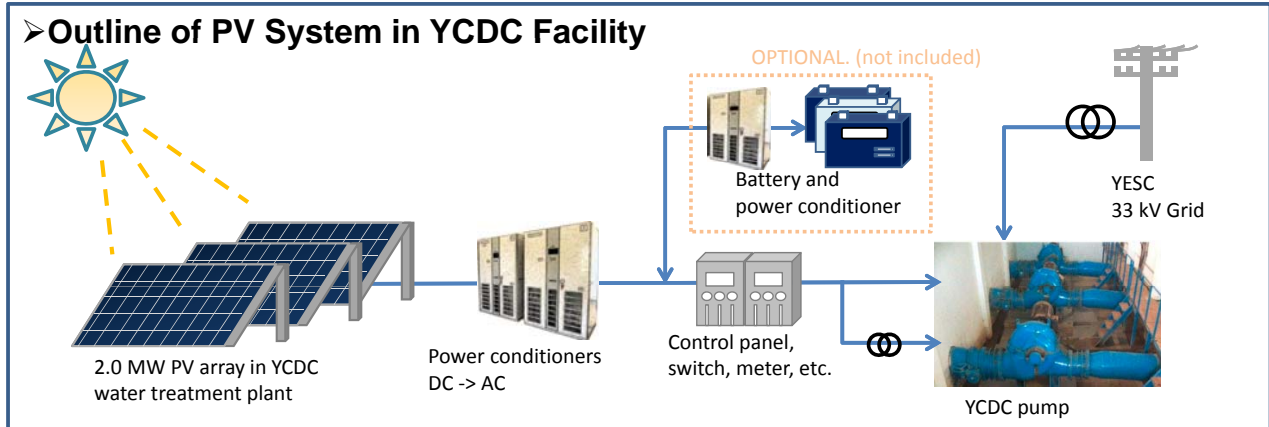


### 3. Project 1 /Introduction of Once-through Boiler -Implementation structure-



5

### 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>

6

## 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



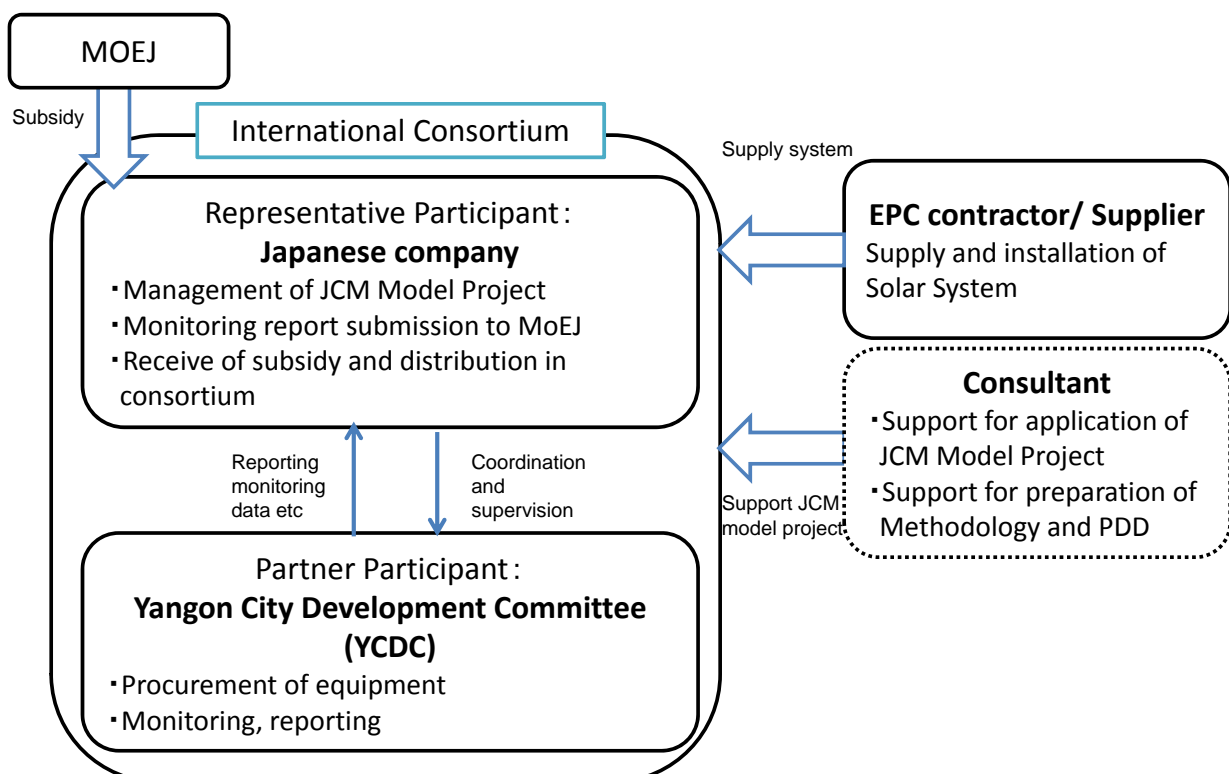
### Basic information of Nyaung Hnit Pin WTP

- 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



7

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

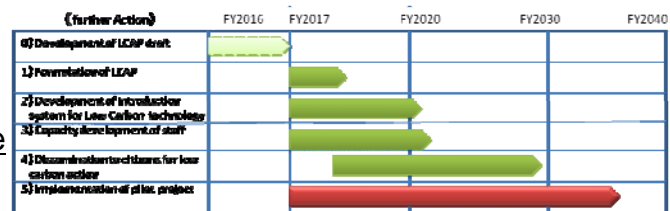


## 5. Issues and Further Action

### ➤ *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



- 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. JCM project formulation**

### **4-1 Market survey for boilers**



## **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	DLZ1.0-1.0-A II DLZ1.0-1.0-A II DLZ1.0-1.0-A II	DLZ2.0-1.0-A II DLZ2.0-1.0-A II DLZ2.0-1.0-A II	DLZ3.0-1.0-A II DLZ3.0-1.0-A II DLZ3.0-1.0-A II	DLZ4.0-1.0-A II DLZ4.0-1.0-A II DLZ4.0-1.0-A II	DLZ5.0-1.0-A II DLZ5.0-1.0-A II DLZ5.0-1.0-A II	DLZ6.0-1.0-A II DLZ6.0-1.0-A II DLZ6.0-1.0-A II	DLZ7.0-1.0-A II DLZ7.0-1.0-A II DLZ7.0-1.0-A II	DLZ8.0-1.0-A II DLZ8.0-1.0-A II DLZ8.0-1.0-A II	DLZ9.0-1.0-A II DLZ9.0-1.0-A II DLZ9.0-1.0-A II	DLZ10.0-1.0-A II DLZ10.0-1.0-A II DLZ10.0-1.0-A II	DLZ11.0-1.0-A II DLZ11.0-1.0-A II DLZ11.0-1.0-A II	DLZ12.0-1.0-A II DLZ12.0-1.0-A II DLZ12.0-1.0-A II	DLZ13.0-1.0-A II DLZ13.0-1.0-A II DLZ13.0-1.0-A II	DLZ14.0-1.0-A II DLZ14.0-1.0-A II DLZ14.0-1.0-A II	DLZ15.0-1.0-A II DLZ15.0-1.0-A II DLZ15.0-1.0-A II	DLZ16.0-1.0-A II DLZ16.0-1.0-A II DLZ16.0-1.0-A II	DLZ17.0-1.0-A II DLZ17.0-1.0-A II DLZ17.0-1.0-A II	DLZ18.0-1.0-A II DLZ18.0-1.0-A II DLZ18.0-1.0-A II	DLZ19.0-1.0-A II DLZ19.0-1.0-A II DLZ19.0-1.0-A II	DLZ20.0-1.0-A II DLZ20.0-1.0-A II DLZ20.0-1.0-A II
Rated capacity t/h	1	2	3	4	6	8	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Rated steam pressure MPa	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Rated steam temperature °C	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
Feed water temperature °C	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Heated area Radiative section M <sup>2</sup>	4.68/16.1	6.29/20.5	8.24/27.3	10.06/33.3	15.29/50.3	22.31/73.5	30.20/100.6	40.81/135.5	53.62/178.7	68.54/228.1	85.66/283.9	104.98/349.1	126.50/421.3	150.22/500.7	176.14/589.1	204.26/683.5	234.58/781.9	267.10/885.3	301.82/1011.5	338.84/1139.9
Boiler heat efficiency %	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Fuel consumption t/h	175	346	519	692	1012	1325	1655	2480	3290	4185	5065	5940	6810	7680	8550	9420	10290	11160	12030	12900
Effective area of grate	1.8	3.04	4.56	6.08	9.36	12.48	16.64	24.96	32.64	41.28	49.92	58.56	67.20	75.84	84.48	93.12	101.76	110.40	119.04	127.68
Transportable size of boiler mm	Length 4876 Width 1800 Height 2820	Length 5290 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208
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	44	53	62	71	80	89	98	107	116	125	134	143	152	161	170

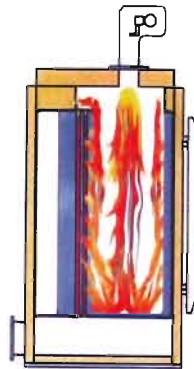
DLZ series coal-fired hot water boiler technique parameter

Item Type	DLZ1.0-1.0-A II DLZ1.0-1.0-A II DLZ1.0-1.0-A II	DLZ2.0-1.0-A II DLZ2.0-1.0-A II DLZ2.0-1.0-A II	DLZ3.0-1.0-A II DLZ3.0-1.0-A II DLZ3.0-1.0-A II	DLZ4.0-1.0-A II DLZ4.0-1.0-A II DLZ4.0-1.0-A II	DLZ5.0-1.0-A II DLZ5.0-1.0-A II DLZ5.0-1.0-A II	DLZ6.0-1.0-A II DLZ6.0-1.0-A II DLZ6.0-1.0-A II	DLZ7.0-1.0-A II DLZ7.0-1.0-A II DLZ7.0-1.0-A II	DLZ8.0-1.0-A II DLZ8.0-1.0-A II DLZ8.0-1.0-A II	DLZ9.0-1.0-A II DLZ9.0-1.0-A II DLZ9.0-1.0-A II	DLZ10.0-1.0-A II DLZ10.0-1.0-A II DLZ10.0-1.0-A II	DLZ11.0-1.0-A II DLZ11.0-1.0-A II DLZ11.0-1.0-A II	DLZ12.0-1.0-A II DLZ12.0-1.0-A II DLZ12.0-1.0-A II	DLZ13.0-1.0-A II DLZ13.0-1.0-A II DLZ13.0-1.0-A II	DLZ14.0-1.0-A II DLZ14.0-1.0-A II DLZ14.0-1.0-A II	DLZ15.0-1.0-A II DLZ15.0-1.0-A II DLZ15.0-1.0-A II	DLZ16.0-1.0-A II DLZ16.0-1.0-A II DLZ16.0-1.0-A II	DLZ17.0-1.0-A II DLZ17.0-1.0-A II DLZ17.0-1.0-A II	DLZ18.0-1.0-A II DLZ18.0-1.0-A II DLZ18.0-1.0-A II	DLZ19.0-1.0-A II DLZ19.0-1.0-A II DLZ19.0-1.0-A II	DLZ20.0-1.0-A II DLZ20.0-1.0-A II DLZ20.0-1.0-A II
Rated capacity MW	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	17.5	21	25	28	31.5	35	38.5	42	45.5	49	52.5
Rated working pressure MPa	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Supply water temperature °C	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Return water temperature °C	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Cycle flow m <sup>3</sup> /h	24	49	72	96	144	192	256	384	512	640	768	896	1024	1152	1280	1408	1536	1664	1792	1920
Heated area Radiative section M <sup>2</sup>	4.55/20.12	6.23/27.5	8.15/36.2	10.06/44.4	15.29/66.7	22.31/98.1	30.20/132.5	40.81/181.9	53.62/238.3	68.54/306.7	85.66/385.1	104.98/474.5	126.50/573.9	150.22/683.3	176.14/811.7	204.26/950.1	234.58/1108.5	267.10/1286.9	301.82/1485.3	338.84/1708.7
Boiler heat efficiency %	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Fuel consumption t/h	175	346	519	692	1012	1325	1655	2480	3290	4185	5065	5940	6810	7680	8550	9420	10290	11160	12030	12900
Effective area of grate m <sup>2</sup>	1.8	3.04	4.56	6.08	9.36	12.48	16.64	24.96	32.64	41.28	49.92	58.56	67.20	75.84	84.48	93.12	101.76	110.40	119.04	127.68
Transportable size of boiler mm	Length 4876 Width 1800 Height 2820	Length 5290 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208	Length 5360 Width 2240 Height 3208
Weight of transportation ton	13.5	16.5	23.6	26.5	35	44	53	62	71	80	89	98	107	116	125	134	143	152	161	170

\* 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 use 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 backhsul oil (gss)-lired boiler parameter

Item/Model	WNS0.5- 0.7-Y(Q)	WNS1.0 0.7-Y	WNS1.5 0.7-Y	WNS2- 0.7-Y(Q)	WNS2- 1.25-Y(Q)	WNS3- 1.25-Y(Q)	WNS4- 1.25-Y(Q)	WNS4.35- 0.7/1.05/70-Y(Q)	WNS7.0- 1.05/70-Y(Q)	WNS1.06- 1.05/70-Y(Q)	WNS1.4- 1.05/70-Y(Q)	WNS2.1- 1.05/70-Y(Q)
	Rated capacity/KG/H	500	1000	1500	2000	3000	4000	1	1	1	1	1
Capacity MW		1	1	1	1	1	1	0.35	0.7	1.05	1.4	2.1
Rated working pressure MPa		0.7	0.7	0.7	0.7	1.25	1.25	0.7	1	1	1	1
Rated steam temperature ℃		169	169	169	169	194	194	1	1	1	1	1
Fuel consumption	Design efficiency %		90	90	90	90	90	90	91	91	91	91
	Light oil	Kg/h	37	72	97	144	146	210	285	32	65	105
	Heavy oil	Kg/h	38	76	105	154	156.5	223	304	34.3	69.7	112.5
	City gas	Nm3/h	68	170	231	342.3	347.7	500	678.6	76.2	153.1	250
	Natural gas	Nm3/h	44	85	116	172	174.3	250.7	340.3	38.2	76.8	125.4
Main steam valves seat mm		DN40	DN50	DN65	DN80	DN80	DN100	1	1	1	1	1
Feed water tube diameter MM		DN25	DN25	DN25	DN25	DN40	DN40	1-DN40	1-DN40	1-DN40	2-DN40	2-DN40
Blowdown tube diameter MM		1-DN40	1-DN40	1-DN40	2-DN40	2-DN40	2-DN50	1-DN40	1-DN40	1-DN40	2-DN40	2-DN40
Safety valve diameter MM		1-DN40	2-DN40	2-DN40	2-DN50	2-DN40	2-DN50	1-DN40	1-DN50	2-DN40	2-DN40	2-DN50
Chimney diameter MM		q250	q350	q350	q350	q450	q500	q200	q350	q450	q450	q500
Biggest transpiration size	L MM	1950	2400	3300	3700	3800	4000	2150	2716	3000	3700	3800
	W MM	1300	1670	1660	2000	2000	2700	1285	1500	1510	1615	1850
H MM		1500	1880	2050	2100	2400	2600	1560	1733	1900	1935	2212
Rated supply/return water temperature ℃		1	1	1	1	1	1	95/70	95/70	95/70	95/70	95/70
Boiler circulation water temperature t/h		1	1	1	1	1	1	12	24	38	48	72
Return/outflow water tube diameter mm		1	1	1	1	1	1	DN65	DN80	DN100	DN125	DN125

**Notes:** 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 Tonn (0.7~2.8 MW)

DZG series Fixed Grate Steam Boiler

Item	DWG 5- 0.7/1.0-J	DWG 1- 0.7/1.0-J	DWG 2- 0.7/1.0-J	DWG 3- 0.7/1.0-J	DWG 4- 0.7/1.0-J	DWG 5- 0.7/1.0-J	DWG 6- 0.7/1.0-J	DWG 7- 0.7/1.0-J	DWG 8- 0.7/1.0-J
Rated capacity /h	0.5	1	2	4	8	16	32	64	128
Rated steam pressure Mpa	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0	0.7/1.0
Rated steam temperature °C	170/184	170/184	170/184	170/184	170/184	170/184	170/184	170/184	170/184
Feed water temperature °C	20	20	20	20	20	20	20	20	20
Heated area M <sup>2</sup> radiation / convection	2.3/16.2	4.6/16.1	5.9/30.7	7.8/30.7	15.6/30.7	31.2/30.7	62.4/30.7	124.8/30.7	249.6/30.7
Suitable fuel type	soft coal biomass, cokes, blind coal, ect								
Boiler heat efficiency %	76	78	79	78	76	76	78	78	78.0
Fuel consumption kg/h	99	198	396	794	1588	3176	6352	12704	25408
Effective area of grate	0.88	1.5	2.4	3.93	7.86	15.72	31.44	62.88	125.76
Transposition area of boiler	2970	3782	4307	6240	2970	2970	3782	4307	4900
size of boiler	1950	1920	2130	2700	1950	1950	1800	2130	2130
height mm	2660	2820	3222	3678	2660	2660	2370	3222	3222
Weight of largest parts of	8.3/8.4	11.1/11.6	15.7/15.8	24	8.3	8.3	1	15.5	15.5



## 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.

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 ℃	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	1120	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.







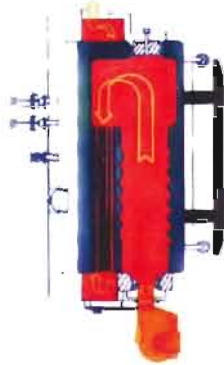
### Product Description

- Flow interupters 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	8.2	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						
	≈550						
Outlook size	L mm						
	W mm						
	H mm						

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



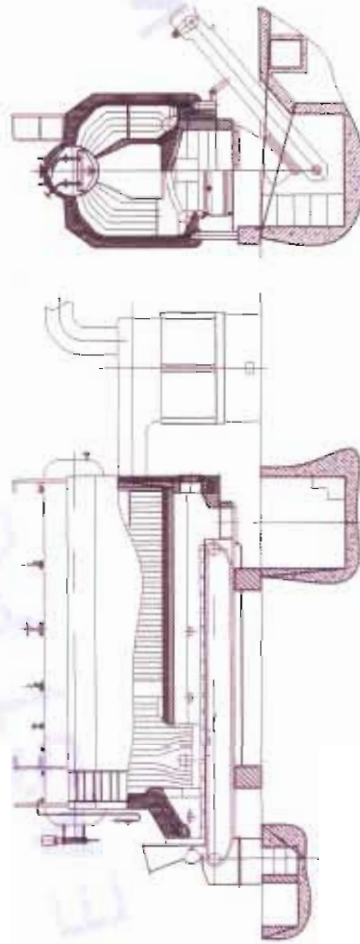
Standardized three reheat backhaul oil (gas)-fired boiler

- 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(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)	WNS1.4- 1.085/70- Y(Q)	WNS2.1- 1.085/70- Y(Q)	WNS2.8- 1.085/70- Y(Q)	WNS3.6- 1.085/70- Y(Q)	WNS4.2- 1.085/70- Y(Q)	WNS5.7- 1.085/70- Y(Q)	WNS7- 1.085/70- Y(Q)
Rated capacity kg/h	2000	3000	4000	8000	8000	10000	1	1	1	1	1	1	1
Capacity MW	1	1	1	1	1	1	1.4	2.1	2.8	4.2	5.6	7	7
Rated working pressure Mpa	1.25	1.25	1.25	1.25	1.25	1.25	1	1	1	1	1	1	1
Rated supply/return water temperature °C	1	1	1	1	1	1	95/70	95/70	95/70	95/70	95/70	95/70	95/70
Design efficiency %	90	91	91	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	240	240
Fuel consumption	Light oil kg/h												
	Heavy oil kg/h												
	City gas Nm³/h												
Supply/return water tube diameter mm	Natural gas Nm³/h												
	174.3												
	250.7												
Blowdown tube diameter mm	2-DN40												
	2-DN40												
	2-DN40												
Safety valve tube diameter mm	2-DN40												
	2-DN40												
	2-DN40												
Chimney diameter mm	Φ350												
	Φ350												
	Φ350												
Biggest transportation size	L mm												
	W mm												
	H mm												
Rated steam temperature °C	194												
	194												
	194												

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

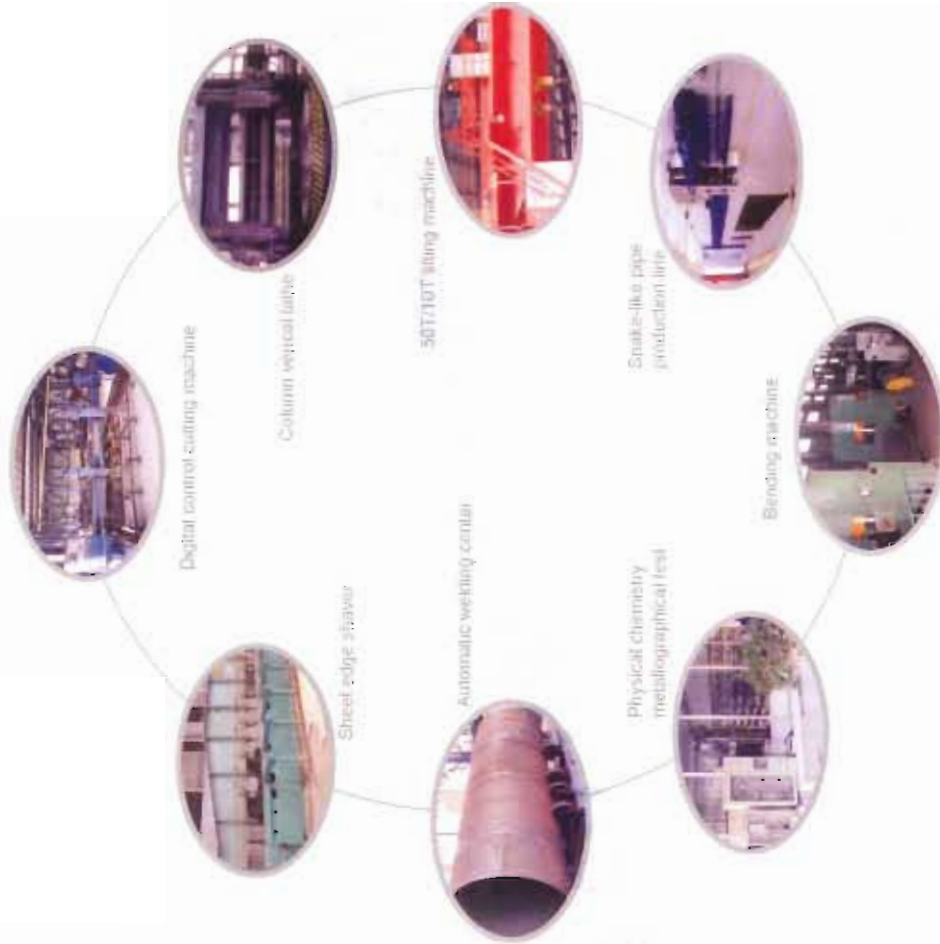


### Product Description

- 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

## BOILER BROCHURE



EAST POWER

Qingdao East Power Industry Equipment Co., Ltd

**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.

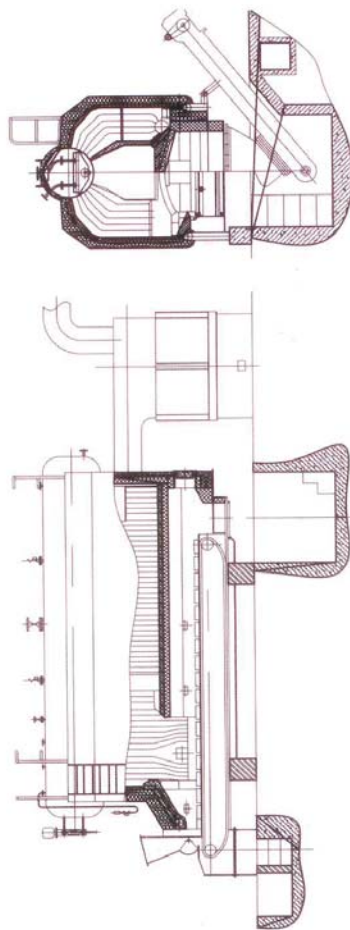


# 生产和检测设备

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 DZL1.0/10-A II DZL1.25-A II	DZL2.0/7-A II DZL2.0/10-A II DZL2.25-A II	DZL3.0/7-A II DZL3.0/10-A II DZL3.25-A II	DZL4.1/25 -A II	DZL6.1/25 -A II	DZL8.1/25 -A II	DZL10.1/25 -A II	DZL15.1/25 -A II	DZL20.1/25 -A II	DZL25.1/25-A II DZL25.15-A II	DZL30.1/25-A II DZL30.15-A II
Rated capacity t/h	1	2	3	4	6	8	10	15	20	25	30
Rated steam pressure MPa	0.7/1.0/1.25	0.7/1.0/1.25	0.7/1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25/1.6	1.25/1.6
Rated steam temperature °C	170/184/194	170/184/194	170/194	194	194	194	194	194	194	194/204	194/204
Feed water temperature °C	20	20	20	20	20	60	105	105	105	105	105
Heated area m <sup>2</sup> radiation/ convection	4.68/16.1	6.2/39.5	8.2/45.3	10.0/73.53	15.2/92.38	22.3/159.5	29.5/207.6	33.2/90	34.3/94.08	39.3/145.79	44.5/826.6
Boiler thermal efficiency %	79	79.07	82	80	81	80.5	80.6	80.6	81	81.38	81.76
Fuel consumption kg/h	167	330	498	662	998	1325	1655	2480	3290	3551	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	28.88
length	4876	5290	5360	6237	6300	7486	7600	7350	7610	8478	9000
width	1800	2240	2240	2660	3150	3200	3200	3370	3370	2600	2600
height	2820	3208	3208	3520	3938	3350	3660	3510	3500	2740	2850
Weight of largest parts of boiler transportation (t)	13.3/13.5/13.7/18.5/18.8	20.8/21	27	35	31	44	22	25	25.5	25.5	30

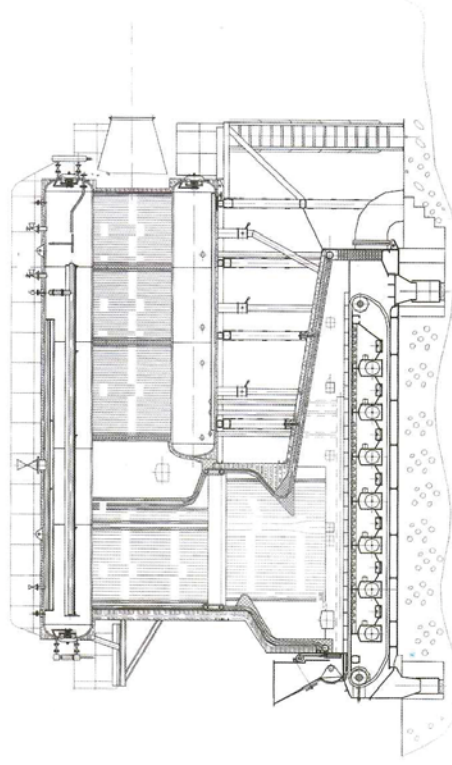
DZL series coal-fired hot water boiler technique parameter

Item/Type	DZL0.7 0.7/50/70-A II	DZL1.4 0.7/80/104-A II	DZL2.1 0.7/80/104-A II	DZL2.8 0.7/80/104-A II	DZL4.2 1.0/115/70-A II	DZL5.6 1.0/115/70-A II	DZL7.0 1.0/115/70-A II	DZL10.5 1.0/115/70-A II	DZL14 1.25/130/70-A II	DZL21 1.25/130/70-A II
Rated capacity MW	0.7	1.4	2.1	2.8	4.2	5.6	7.0	10.5	14	21
Rated working pressure MPa	0.7	0.7	0.7	0.7	1.0	1.0	1.0	1.0	1.25	1.25
Supply water temperature °C	95	95	95	95	115	115	115	115	130	130
Return water temperature °C	70	70	70	70	70	70	70	70	70	70
Circulation flow m <sup>3</sup> /h	24	48	72	96	96	106	133	200	200	300
Heated area radiation/ convection m <sup>2</sup>	4.55/20.12	6.2/39.5	6.7/54.2	7.8/165	15.2/92.38	22.3/159.5	19.5/207.6	23.5/282	34.36/408.51	76/801.6
Boiler thermal efficiency %	79	79.07	82	80	81	80.5	80.6	80.48	81	81.87
Fuel consumption kg/h	167	330	487	662	998	1325	1655	2485	3290	4230
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
length	4876	5019	5950	6510	7000	7486	7600	8600	7610	8650
width	1800	2130	2200	2600	2950	3160	3200	3373	3370	2450
height	2870	3222	3410	3520	3938	3354	3660	3160	3500	2594
Weight of largest parts (t)	13.5	18.5	23.6	26.5	35	30	44	22	25	26.6

\* 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	25
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 kg/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
length	7070	7860	7950	8100	9300	11500	12000
width	2750	2960	3100	3100	3300	3300	3300
height	3524	3524	3525	3525	3522	3540	3540
Weight of largest parts (t)	31/31.4	34.5	30	34	44.5	55	60

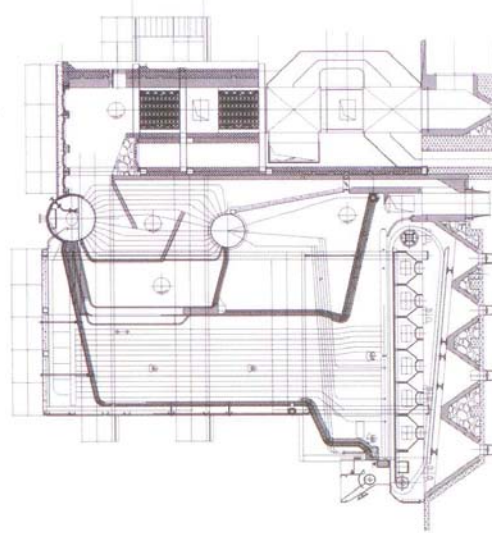
SZL series coal-fired hot water boiler technique parameter

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	14
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 kg/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
length	7070	7860	7950	8100	9300	11500
width	2750	2960	3100	3100	3300	3300
height	3524	3524	3525	3525	3500	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.



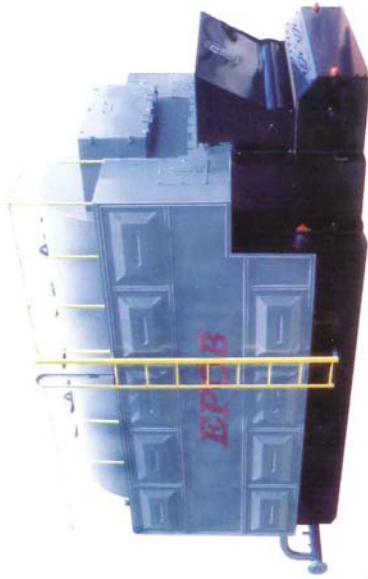
**SHL series coal-fired steam boiler technique parameter**

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					
flame grate firing					
Basis size mm	fuel consumption kg/h	2840	3528	4280	4970
	Effective area of grate m <sup>2</sup>	22.6	28.85	30.1	32.5
	upper drum height	10450	10450	10800	10800
	the highest height of boiler	11350	11350	11750	11750
Basis size mm	boiler width	4220	4590	5080	5450
	boiler length	4970	5710	5935	5935

\* 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 DZL1.1-25-M	DZL2.1-0-M DZL2.1-25-M	DZL3.0-M DZL3.1-25-M	DZL4.1-25-M	DZL6.1-25-M	DZL8.1-25-M	DZL10.1-25-M
Rated capacity t/h	1	2	3	4	6	8	10
Rated steam pressure MPa	1.0/1.25	1.0/1.25	0.7/1.25	1.25	1.25	1.25	1.25
Rated steam temperature °C	184/194	184/194	170/194	194	194	194	194
Feed water temperature °C	20	20	20	20	20	60	105
Heated area m <sup>2</sup> radiation convection	4.55/20.12	7.84/1.5	9.55/0.6	11.9/79	17.4/108.1	25.7/172.1	25.237.6
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
Length	4876	5290	5360	6258	6630	7486	7600
Transportation size of boiler mm	1800	2240	2240	2700	3150	3200	3200
Height	2870	3400	3500	3814	4186	3650	4000
Weight of largest parts of boiler (t)	13.5/14.2	20.8/21.9	22.1/23	29	32	35	47

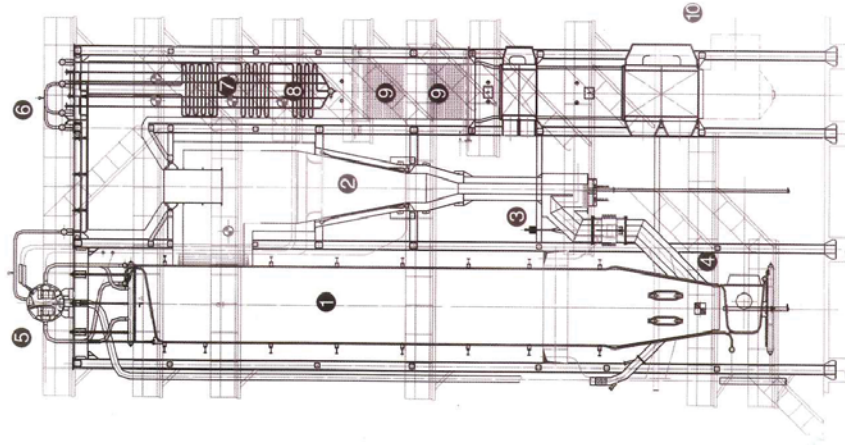
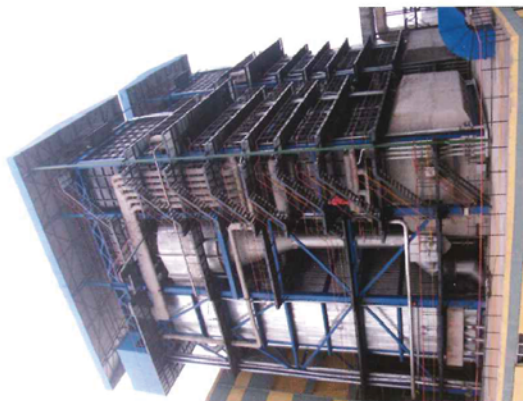
**DZL series biomass-fired hot water boiler technique parameter**

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	7.84/1.5	9.55/0.6	11.9/79	17.4/108.1	25.7/172.1	25.237.6
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
Length	4876	5290	5360	6258	6630	7486	7600
Transportation width mm	1800	2240	2240	2700	3150	3200	3200
Height	2870	3400	3500	3814	4186	3650	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 charged 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.

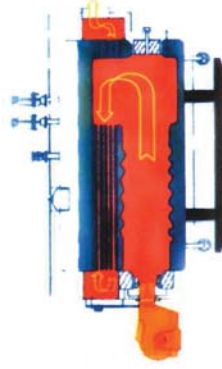
### Circulating Fluidized Bed Power Station boiler technique parameter

Item/Model	EPG-350.82-A EPG-350.3-A	EPG-750.82-A EPG-750.3-A	EPG-1300.82-A EPG-1300.3-A	EPG-2200.8-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	-	-	-
	Superheater	345.5	633	1089.5
	Economizer	663	1448	2721.98
	Air preheater	746	1743	2514.5
Fluidized bed area m <sup>2</sup>	4.43	7.7	15.2	24.56
Available coal				
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	≥90	≥90
Cal/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	18485	61718
Outside dimension of after-installed (L*W*H) m	2.7x2.2x14.9	33.85x12x16.25	43.2x11.85x20.93	24.7x23x48.9

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



## WNS Oil / Gas Fired Boiler



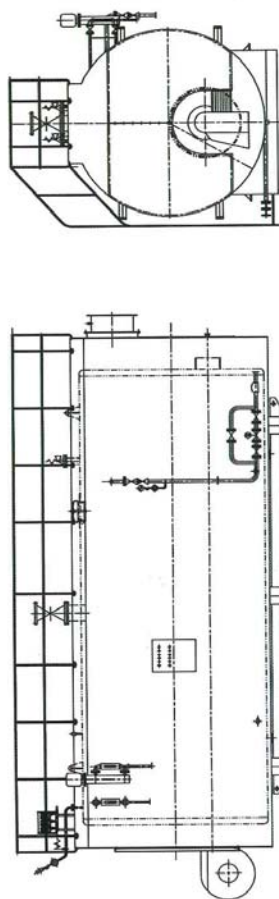
### Horizontal oil (gas)-fired boiler

- 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											
	light oil kg/h	37	72	97	146	210	285	424.8	560	643	833	1042
	heavy oil kg/h	38	76	105	156.5	225.1	305.5	455.3	600.2	689.2	893	1117
	natural gas Nm <sup>3</sup> /h	44	85	116	174.3	250.7	340	507.1	668.6	767.7	995	1244
	chimney diameter	φ250	φ350	φ350	φ350	φ450	φ500	φ500	φ600	φ650	φ750	φ800
Largest transportation size	L (mm)	1950	2400	3300	3400	4500	4600	4800	6400	7200	7150	7500
	W (mm)	1300	1670	1660	2100	2600	2550	2750	3200	3200	3500	4000
	H (mm)	1500	1890	2050	2368	2600	2604	2950	3114	3262	3500	3850

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

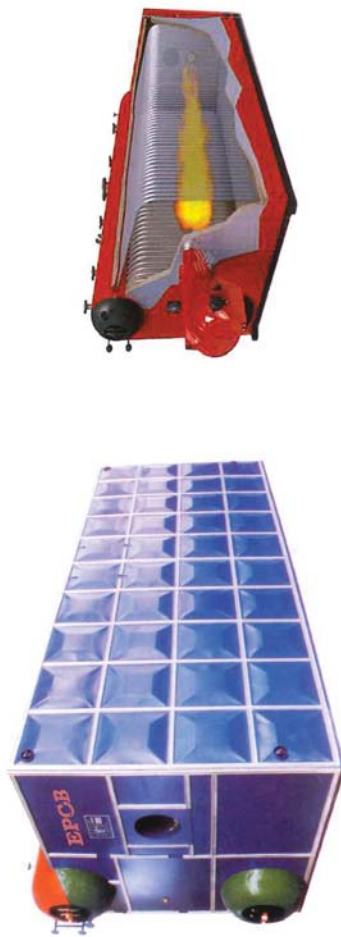


Horizontal oil (gas)-fired hot water boiler parameter

Item/Type	WNS0.35-0.7-95/70 -Y(Q)	WNS0.7-1-95/70 -Y(Q)	WNS1.05-1-95/70 -Y(Q)	WNS1.4-1.095/70 -Y(Q)	WNS2.1-1.095/70 -Y(Q)	WNS2.8-1.095/70 -Y(Q)	WNS4.2-1.095/70 -Y(Q)	WNS5.6-1.095/70 -Y(Q)	WNS7-1.095/70 -Y(Q)	WNS8.4-1.0715/90 -Y(Q)	WNS10.5-1.0715/90 -Y(Q)	WNS14-1.0715/90 -Y(Q)	WNS15.4-1.0715/70 -Y(Q)
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												
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 m³/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	639.6	758	957.6	1238.4	1369
heavy oil kg/h	34.3	69.7	112.5	142.6	209	283.7	410	553.1	685.6	812	1064.5	1382	1489
natural gas Nm³/h	38.2	76.8	125.4	158.8	232.8	327.1	457	616.1	763.6	905	1148.4	1490.4	1658
chimney diameter	φ200	φ350	φ350	φ350	φ450	φ450	φ500	φ600	φ650	—	—	—	—
L (mm)	2150	2718	3000	3350	4270	4930	5570	5968	6939	7150	7400	8650	8800
W (mm)	1265	1500	1510	1890	1985	1980	2344	2450	2574	3000	3200	3450	3400
H (mm)	1580	1733	1900	2270	2440	2374	2800	2800	3006	3200	3600	4050	4000

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

SZS Series Oil / Gas Fired Boiler



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)	SZS16-1.25/1.62.5-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 m²	68.8	125.3	185.1	210	435.2	906	
Economizer heating surface m²	18.48	37	49.8	144	236	413	
Available fuel	light oil / heavy oil / natural gas / LPG						
Design efficiency %	89	90.35	89.67	90.24	89.17	90.3	

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



## 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	LHS0.1-0.4/0.7-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 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	0.4/0.7	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 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	DN40	2×DN40	2×DN40
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	18.0	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	2380	2600	2790

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

## 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-180-Y(Q)	YQ1W-240-Y(Q)	YQ1W-300-Y(Q)	YQ1W-350-Y(Q)	YQ1W-400-Y(Q)	YQ1W-450-Y(Q)	YQ1W-500-Y(Q)	YQ1W-600-Y(Q)	YQ1W-700-Y(Q)	YQ1W-800-Y(Q)	YQ1W-900-Y(Q)	YQ1W-1000-Y(Q)	YQ1W-1200-Y(Q)	YQ1W-1500-Y(Q)	YQ1W-1800-Y(Q)	YQ1W-2000-Y(Q)	YQ1W-2400-Y(Q)	YQ1W-3000-Y(Q)	YQ1W-3500-Y(Q)	YQ1W-4000-Y(Q)	YQ1W-4500-Y(Q)	YQ1W-5000-Y(Q)	YQ1W-6000-Y(Q)	YQ1W-7000-Y(Q)	YQ1W-8000-Y(Q)	YQ1W-9000-Y(Q)	YQ1W-10000-Y(Q)	YQ1W-12000-Y(Q)
	180	240	300	350	400	450	500	600	700	800	900	1000	1200	1500	1800	2000	2400	3000	3500	4000	4500	5000	6000	7000	8000	9000	10000	12000
Rated thermal power	15	20	30	35	40	45	50	50	75	100	120	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000
	×10 <sup>4</sup> kcal/h																											
Design thermal efficiency (%)	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	≥83	
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	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Max. working temperature (℃)	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 (m <sup>3</sup> )	0.15	0.23	0.32	0.44	0.58	0.72	0.86	1.0	1.1	1.48	2.2	3.5	4.6	5.7	7.2	8.4	9.6	12.6										
Circulation oil capacity (m <sup>3</sup> /h)	18	20	30	30	60	80	100	100	150	200	200	200	230	230	250	300	400	500	580									
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	1265	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)																											
	W (mm)																											
	H (mm)																											
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	φ350	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ400	φ450	φ450	φ450	φ450	φ450	φ450	φ450	φ450	φ450	φ450	φ1000

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



## 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	YLU-1900MA 1900MA -160	YLU-2300MA 2300MA -200	YLU-3500MA 3500MA -250	YLU-4000MA 4000MA -350	YLU-4800MA 4800MA -400	YLU-6000MA 6000MA -500	YLU-7000MA 7000MA -600	YLU-8000MA 8000MA -700	YLU-9300MA 9300MA -800	YLU-10000MA 10000MA -900	YLU-12000MA 12000MA -1000	YLU-14000MA 14000MA -1200	YLU-16500MA 16500MA -1400	YLU-19000MA 19000MA -1600
Rated power	1900	2300	3000	3500	4000	4800	6000	7000	8000	9300	10000	12000	14000	16000
Rated thermal efficiency %	279	279	279	279	279	279	279	279	279	279	279	279	279	279
Rated working pressure MPa	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
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
Circulating oil Capacity m³/h	165	200	225	280	280	300	340	400	400	520	600	680	800	800
Main valve size	DN150	DN150	DN150	DN200	DN200	DN250	DN250	DN250	DN250	DN300	DN325	DN350	DN400	DN400
Whole system power kw	75	85	85	130	130	150	180	205	205	260	280	310	320	350
Available fuel	AI, All, All soft coal													
Weight (kg)	21500	23000	24000	29500	32000	35000	45000	64000	66500	66800	87600	98000	128500	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	DZG0.35-0.7/95/70-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	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
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 radiation / convection M²	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
Suitable fuel type	soft coal, biomass, cokes, blind coal, ect.						
Boiler heat efficiency %	76	78	78	78	76	78	78.0
Fuel consumption kg/h	99	198	396	794	76	146	290
Effective area of grate	0.98	1.5	2.4	3.98	0.98	1.5	2.4
Transportation size of boiler mm	2370	3782	4307	6240	2970	3782	4900
height	1950	1920	2130	2700	1950	1800	2130
Weight of largest parts of boiler transportation (ton)	2660	2820	3222	3678	2660	2870	3222
	8.3/8.4	11/11/11.6	15.7/15.8/18	24	8.3	11	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	22.1'2×26×2.973
2	φ2.5×31.5	1.6	1.5	203	200	Saturated steam	33.2'3×2×4
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	27.4'3.595×4.504
5	φ2.85×39	1.65	1.5	205	205	Saturated steam	40.4'3.595×4.504

\* 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

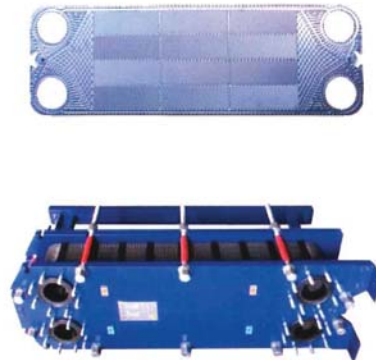


### Plate Heat Exchanger Description

- 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





## 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

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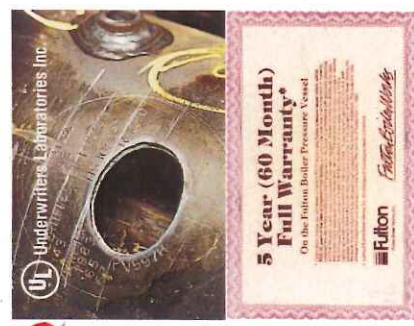


### Polished Stainless Jacket

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.



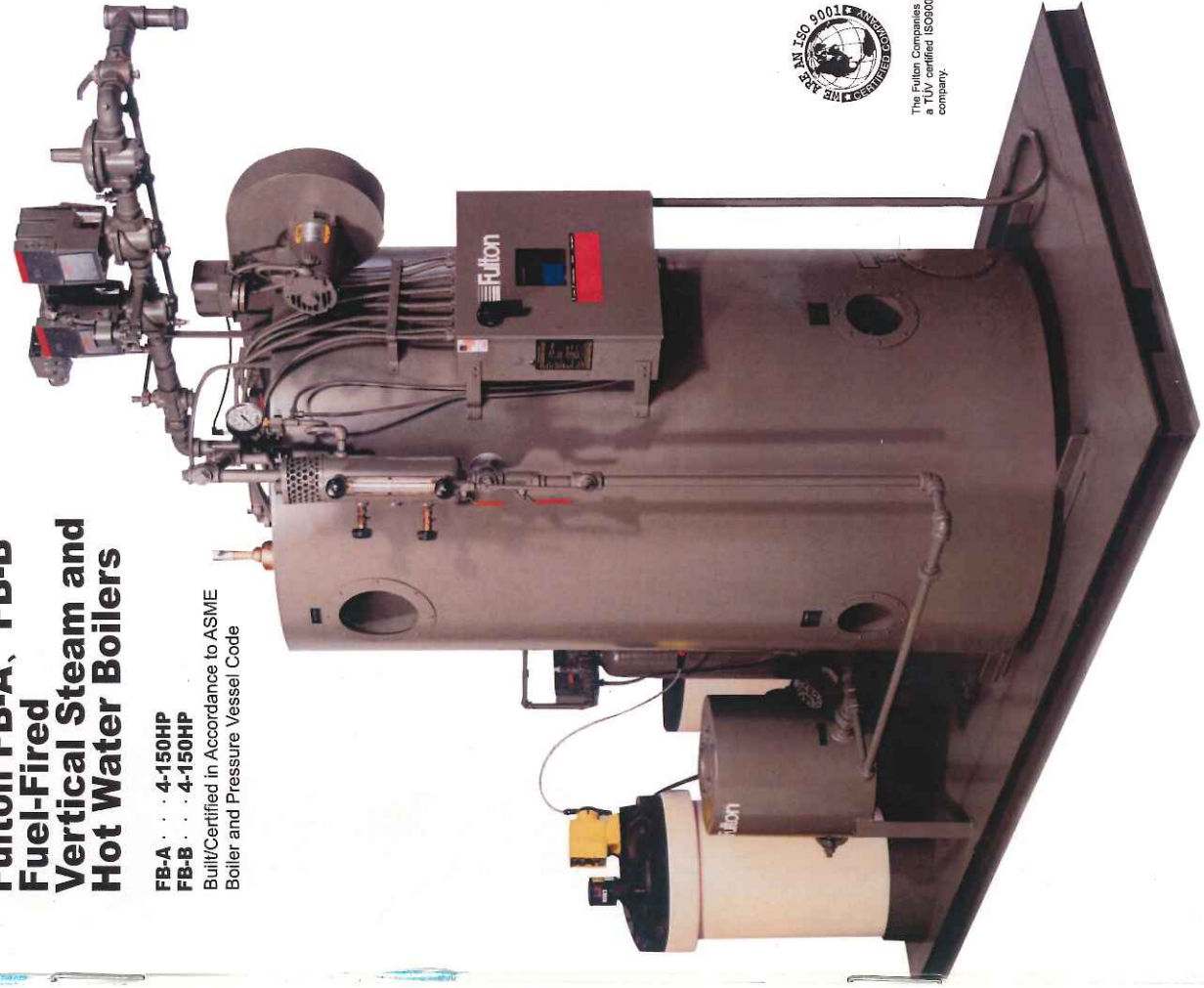
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Industrial/Commercial Division  
The Fulton Companies

## 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.



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.

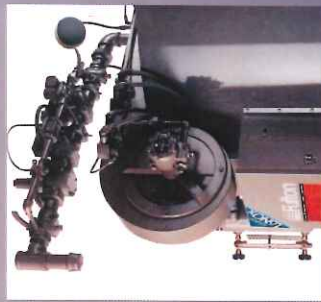
All Fulton Boilers feature the Fulton designed top mounted down-fired standard power burner or new optional low emissions burner. The velocity of the premixed air and gas reduces the residence time in the low emissions burner. Due to this high velocity gas/air mixture, Fulton's burners are capable of 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

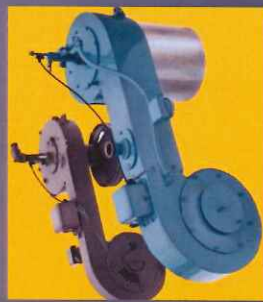
Fulton, involved in engineering total systems to meet the needs of a specific application has been manufacturing steam boilers for over 60 years. Fulton's engineering, drafting, and manufacturing capabilities can build just about anything around a customer's needs. Fulton's custom built, factory skid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



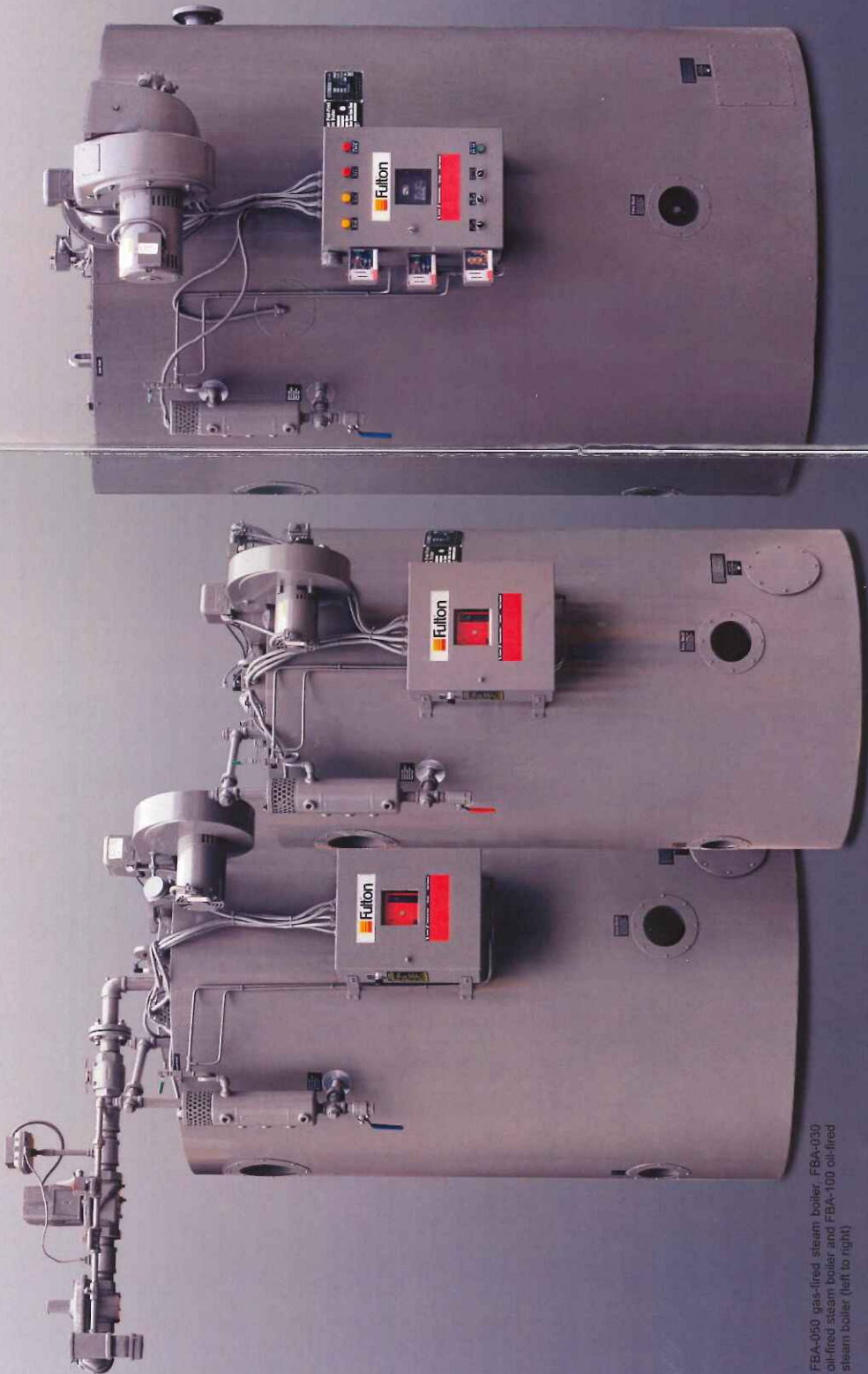
Custom skid mounted boiler and accessories



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.



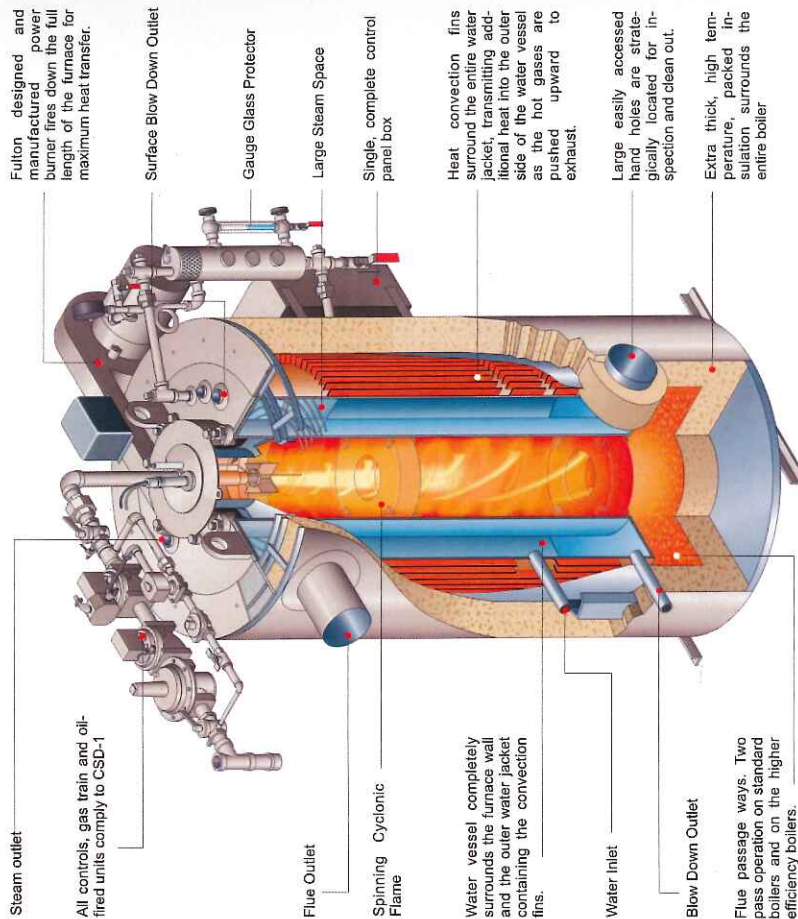
Standard top-mounted down-fired burner (back) and low emission burner (front)



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.)

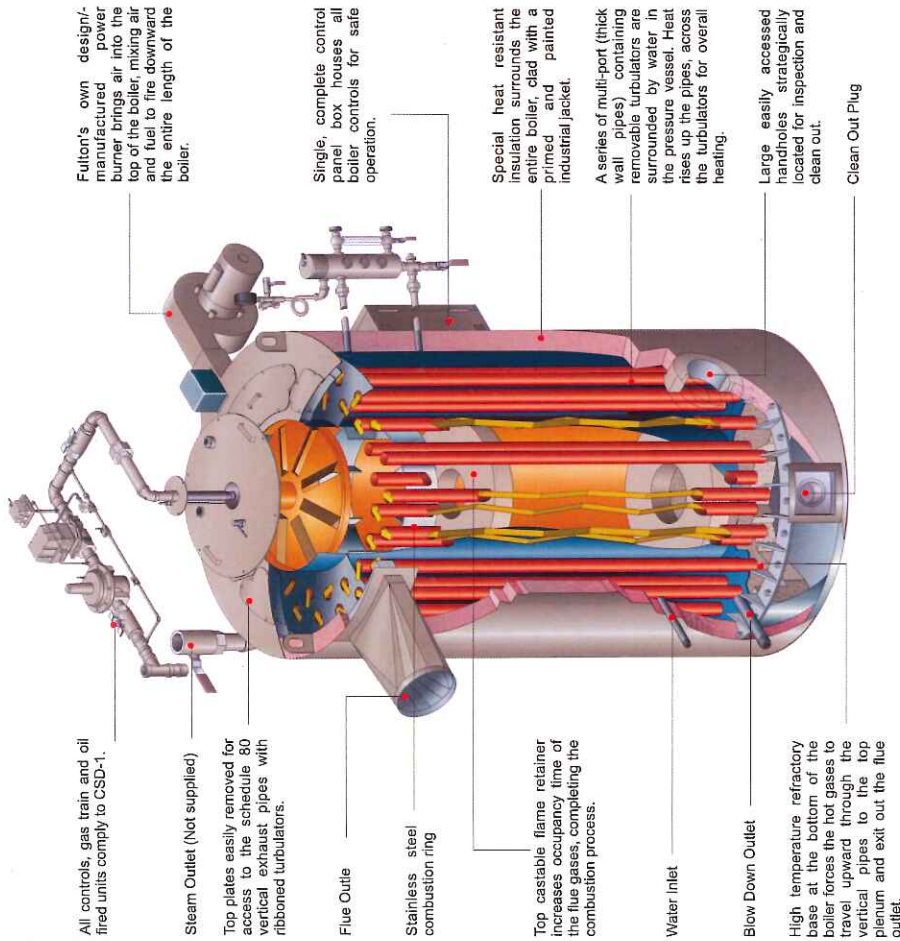


### The Fulton Difference

#### 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 Pipe-type 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

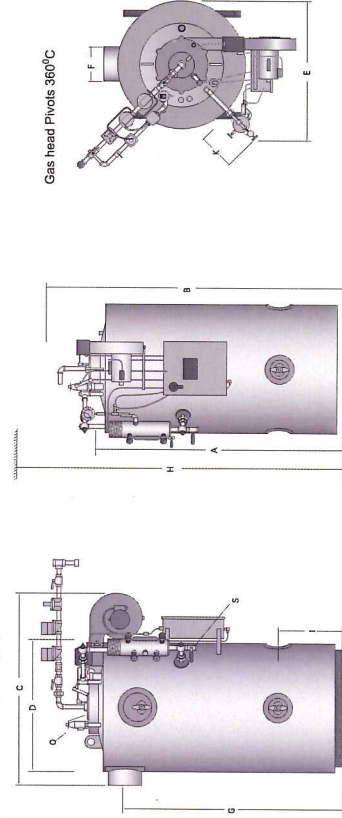
Model FB-A	4	6	10	15	20	30	40	50	60	80	100	130	150
Ratings (see level to 3000ft.)													
Steam out put	LB/HR 138	207	345	518	690	1035	1380	1725	2070	2760	3450	4484	5175
	KG/HR 63	94	157	235	312	470	627	783	939	1262	1565	2034	2348
Approximate Fuel Consumption at Rated Capacity													
Light oil	KG/HR 3.77	5.65	9.42	14.71	18.91	29.07	39.41	48.80	58.14	76.10	91.31	121.75	140.55
Propane Gas	M <sup>3</sup> /HR 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	M <sup>3</sup> /HR 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	M <sup>3</sup> /HR 12.06	18.09	30.14	47.06	60.50	93.02	122.92	158.15	188.05	243.51	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	50	64	76	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	1/3	1/3	1/3	1/3	1/3
Electric Power Requirements (in Amps)													
380V/50HZ	3Phase 0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
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
Ratings (Sea Level to 3000 ft.)													
Output	1000BTU/HR 136	205	341	512	682	1023	1385	1706	2047	2729	3412	4435	5117
	1000KCAL/HR 34.4	51.6	86.0	129.0	172.0	258.0	344.0	430.0	516.0	688.0	860.0	1118.0	1290.0
Hot water OUTPUT(30°C difference)	1147	1720	2867	4300	5733	8600	11467	14333	17200	22933	28667	37267	43000
Approximate Fuel Consumption at Rated Capacity													
Light oil	KG/HR 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	M <sup>3</sup> /HR 1.84	2.76	4.61	6.52	8.69	13.03	17.37	21.72	26.06	33.98	42.47	55.21	63.00
Natural Gas	M <sup>3</sup> /HR 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	M <sup>3</sup> /HR 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	50	64	76	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	1/3	1/3	1/3	1/3	1/3
Electric Power Requirements (in Amps)													
380V/50HZ	3Phase 0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
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 11500 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 right to change specifications.



Side View

Front View

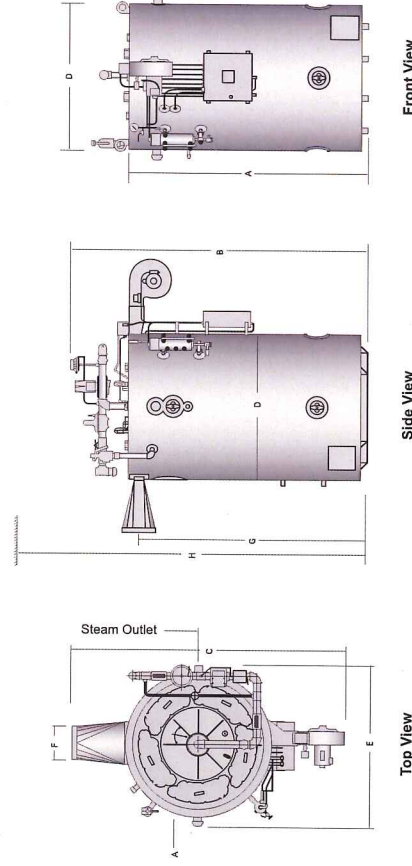
Top View

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	IN 47	57	63	69	72	82	73.5	87	93	93	99	117	117
	MM 1194	1448	1600	1753	1829	2083	1867	2210	2362	2362	2515	2889	2972
B Boiler Height With Trim	IN 65	75	80.5	86.5	92.5	102	94	106.5	120	122	125	135	141
& Fuel Train Assembly	MM 1651	1905	2045	2197	2350	2591	2388	2705	3048	3099	3175	3430	3582
C Overall Depth Stack	IN 44	44	46	47	60	67	73	78	78	90	120	134	136
To Burner Fan Housing	MM 1118	1118	1168	1194	1524	1702	1854	1981	1981	2280	3043	3395	3455
D Boiler Diameter	IN 26	26	28	30	39	46	55	55	55	63	68	76	76.5
	MM 660	660	710	760	990	1170	1400	1400	1400	1588	1740	1936	1943
E Overall Width	IN 33	33	33.5	35.5	43	49	57	57	57	67	75	83	84.5
With Water Column	MM 838	838	851	902	1091	1244	1448	1448	1448	1702	1905	2108	2146
F Flue Outlet Diameter	IN 6	6	6	8	10	12	12	12	12	14	14	16	16
	MM 152	152	152	203	254	305	305	305	305	356	356	400	407
G To Center of Flue Outlet	IN 42	52	58	63	66	73.5	63	79	85	95	107	110	110
	MM 1070	1320	1473	1600	1675	1867	1606	2007	2195	2423	2723	2794	2794
Minimum Clearance													
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	3835	3988
Boiler Front	IN 41	41	41	41	41	41	41	41	41	41	41	41	41
	MM 1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041
Boiler Back/Side	IN 36	36	36	36	36	36	36	36	36	36	36	36	36
	MM 915	915	915	915	915	915	915	915	915	915	915	915	915
Water Content													
	US GAL 14	16	24	39	77	170	220	245	270	375	580	876	904
	LITERS 53	61	91	148	292	643	835	927	1022	1419	2195	3317	3423
Weight													
Gross Shipping Weight	LB 1400	1700	2000	2280	3400	4780	5400	6526	7280	10506	11608	15418	15550
	KG 640	770	910	1035	1545	2170	2505	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

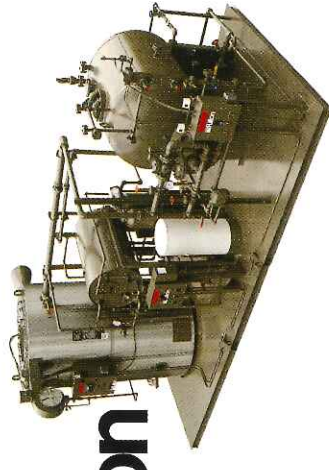
### Key Project Reference for Valves in Thailand

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



**Fulton**



**EPCB**



**SECA**

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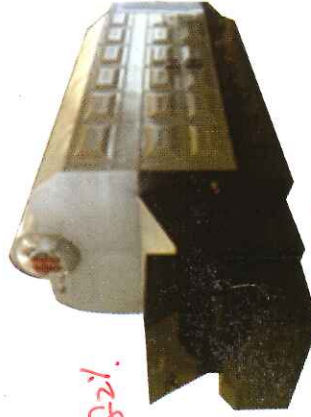
## WNS Oil & Gas Fire Steam & Hot Water Boiler



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.

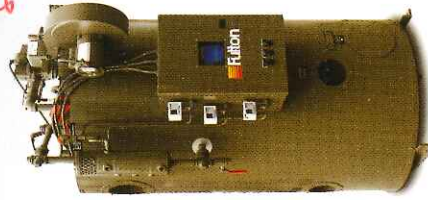
## DZL Series Biomass-fired Steam Boiler



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



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



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 dual 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

