Appendix

1. Site Survey

2. Low Caron 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

Contents

1. Overview of the 2nd Year project

2. Three major items for the 2nd Year project
   1) Preparation for low carbon action plan supported by Kawasaki city
      - Introduction of Kawasaki city's low carbon plan
   2) JCM project formulation for PV generation project in YCDC
      - Introduction of Solar project in Kawasaki city
   3) JCM project formulation for High-efficiency Drum-less Boiler in Factories

3. Schedule and each task
1. Overview of the 2nd year project

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

City of Kawasaki
Economic and Labor Affairs Bureau

City-to-city collaboration regarding
the JCM project formulation

JCM project formulation with regional government’ support

Myanmar company
[Project participant]

Japanese company
[Project participant]

Installation of high efficiency boiler in the factory

Equipment manufacturer
[Supplier]

Solar power project to install public facilities in YCDC

Equipment manufacturer
[Supplier]

Energy efficiency project in YCDC facilities

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

2-1. 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

By Feb 2017

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

Step5: Preparation of Draft Low Carbon Action Plan

from 2017 to 2018
2-2-1. Solar PV Generation Pilot Project: Concept of PV system for YCDC facility

◊ Introduction of Cases of Kawasaki’s Mega solar project (→ separate paper)

◊ Concept of PV System for YCDC Facility

![Diagram of PV System]

◊ Necessary Information
(1) Candidate PV sites and its area (m²)
   - 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 referred
   - 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.

◇ Steps to PV project formulation

**Step 1 Identification of candidate for PV project site**
Select one or two candidates considering conditions and feasibility of the project

**Step 2 Confirmation of Conditions for PV site**
Confirmation of electriclord to YCDC and check the exiting facilities' potential

**Step 3 Proposal for PV project plan and cost**
Proposal for PV system and financial plan to YCDC

**Step 4 Confirmation of procedure for project cost**
Based on the financial plan selected at Step3, confirm the procedure of preparation of project cost in YCDC

**Step 5 Preparation of JCM model project proposal**

3. Schedule and each task

<table>
<thead>
<tr>
<th>Item</th>
<th>2016</th>
<th>2017</th>
<th>Player</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule for City-to-city Collaboration Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance to high-level conference (if requested from MoEJ)</td>
<td>(x)</td>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>Working group meeting</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Workshop in Japan (invitation)</td>
<td>xx</td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>Workshop in Yangon</td>
<td>xx</td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>Schedule for Solar PV Pilot Project Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirmation of candidate PV site with area and distribution line layout and site visit</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirmation of YCDC load to be supplied by PV</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determination of candidate site</td>
<td>xx</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Design and preparation of equipment specification</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Cost estimation of PV system</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Study of tariff and financial feasibility</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Coordination with YESC about net-metering</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Implementeplan</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Clarification of procedure for budgeting</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Documentation for budgeting</td>
<td>xx</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>- Internal procedure for budget allocation</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Approval of budget</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Report submission to MoEJ</td>
<td>xx</td>
<td>xx</td>
<td></td>
</tr>
</tbody>
</table>

KWSK:Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C  
xx : Key responsibility, x: support
Outline of Technique

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

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

Activities in City-to-city collaboration

<table>
<thead>
<tr>
<th>Know-how for implementation</th>
<th>Knowledge sharing with other companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for monitoring</td>
<td>Monitoring of projects that contributes low-carbon society and collaboration in the database</td>
</tr>
<tr>
<td>Promotion for dissemination</td>
<td>Introduction in YCDC low carbon society action plan and matching</td>
</tr>
</tbody>
</table>

![Comparison of efficiency in different load%](image)

![IBD System](image)
Large-scale Solar power facilities in Kawasaki-City

Case 1: Ukishima Large-scale Solar power plant

Site area: 11ha (11,000 m²)
## Specification of the Solar-power plant

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation start</td>
<td>2011. Aug</td>
</tr>
<tr>
<td>Contractor</td>
<td>Toshiba corporation</td>
</tr>
<tr>
<td>Solar panel maker</td>
<td>Sharp corporation</td>
</tr>
<tr>
<td>Spec of the panel per unit</td>
<td>198 W</td>
</tr>
<tr>
<td>Type of the panel</td>
<td>Single-crystal silicon type</td>
</tr>
<tr>
<td>Number of the panel installed</td>
<td>37,926 units</td>
</tr>
<tr>
<td>Maximum output</td>
<td>7,000 kW</td>
</tr>
</tbody>
</table>

## 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)

(10,000 kWh)

<table>
<thead>
<tr>
<th>Month</th>
<th>Electric-generating capacity</th>
<th>Expected capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>May</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>June</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>July</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Aug</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Sep</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Oct</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Nov</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Dec</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Jan</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Feb</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mar</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

## Operation Result (2012-2014)

### Capacity of the Electric-Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>9.69 million kWh</td>
</tr>
<tr>
<td>2013</td>
<td>9.51 million kWh</td>
</tr>
<tr>
<td>2014</td>
<td>9.30 million kWh</td>
</tr>
</tbody>
</table>

### CO2 Reduction (per year)

<table>
<thead>
<tr>
<th>Year</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5,100 ton per year</td>
</tr>
<tr>
<td>2013</td>
<td>5,100 ton per year</td>
</tr>
<tr>
<td>2014</td>
<td>4,700 ton per year</td>
</tr>
</tbody>
</table>
Case 2: Nagasawa Water purification plant

Solar panel
Solar panel

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

September, 2016

Nippon Koei Co., Ltd.
Kawasaki City

Contents

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

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

**City of Kawasaki**
- Economic and Labor Affairs Bureau

City-to-city collaboration regarding the JCM project formulation

**JCM project formulation with regional government’s support**

- Installation of high efficiency boiler in the factory
- Solar power project to install public facilities in YCDC
- Energy efficiency project in YCDC facilities

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

Private entities in Yangon city

- Myanmar company [Project participant]
- Myanmar company [Project participant]
- Myanmar company [Project participant]

Private entities in Kawasaki city

- Japanese company [Project participant]
- Equipment manufacturer [Supplier]
- Equipment manufacturer [Supplier]

FY2013
- JICA Programme
  - JICA Master Plan, in 2013
  - YCDC Information Collection and Verification Survey, supported by JICA
    - Incorporate low carbon development action plan of MOEJ Prj

FY2016
- MOEJ Programme
- Collaboration
- Low Carbon Action Plan under JCM city-to-city collaboration, supported by Kawasaki city
  1) Preparation of low carbon action plan
     * See Kawasaki’s plan as reference
  2) JCM project formulation
     - Installation of high efficiency boiler in factory
       - Solar Power Project in YCDC’s property

FY2017
- JICA technical assistance
- JICA grassroots prj.
- JCM subsidy prj.

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

[item to be checked in FS] - Availability, applicable load, generation and energy supply plan, grid connection, ownership, tariff, cost benefit, budgeting by YCDC etc.
2-1. Invitation to Kawasaki City and Kitakyushu Seminar

- Objective of invitation to KAWASAKI City
  - To discuss about Action Plan for low carbon society
  - To discuss about 2nd MoU
  - To visit to Nagasawa water treatment plant as the model of PV system
  - To visit to companies in Kawasaki for energy efficient technology

- Objective of invitation to KITAKYUSHU Seminar
  - To attend the seminar organized by Ministry of Environment in Japan, and share knowledge and experience of other JCM city-to-city collaboration
  - To give presentation on city to city collaboration between Yangon city and Kawasaki city

2-2. Invitation to Kawasaki City and Kitakyushu Seminar

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

Detailed schedule in the above is subject to be changed.

- **Two (2) YCDC staffs** from Pollution Control and Cleansing Dept and/or City Planning and Land Administration Dept who are in charge of JCM activities and low carbon action plan.
- At the international conference in Kitakyushu, the presentation on JCM activities and low carbon action plan. **Presentation is kindly requested in English.**
3-2. Options of PV System Concept

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

2.0 MW PV array in YCDC water treatment plant

Power conditioners
DC -> AC

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

Battery and power conditioner

Control panel, switch, meter, etc.

0.4/6.6kV

6.6/0.4kV

YCDC pump

YESC 33 kV Grid

2.0 MW PV array in YCDC water treatment plant

Power conditioners
DC -> AC

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

2.0 MW PV array in YCDC water treatment plant

Power conditioners
DC -> AC

Control panel, switch, meter, etc.

YCDC pump

YESC 33 kV Grid

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

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

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

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

- PV output fluctuates but demand load is stable
  - Battery is costly
  - DG consumes fossil fuel and maintenance cost is high
- **OPTION:** If PV can be fed to YESC Grid, grid can absorb PV fluctuation (up to 10% of grid capacity)
  - It is necessary to confirm regulation in YESC for grid connection for net metering or PPA
3-6. Solar PV Implementation structure as JCM model project

**Representative Participant:**
- JAPANESE company
  - Management of JCM Model Project
  - Monitoring report submission to MoEJ
  - Receive of subsidy and distribution in consortium

**Information, reporting, coordination**

**Partner Participant:**
- Yangon City Development Committee (YCDC)
  - Procurement of equipment
  - Monitoring, reporting

- **Consultant**
  - Support for application of JCM Model Project
  - Support for preparation of Methodology and PDD

- **EPC contractor/ Supplier**
  - Supply and installation of Solar System

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

---

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

**Sep-Oct 2016**
- Preparation of system component and specification
- Cost estimation
- Economic and financial evaluation
  - Challenges: low tariff late, necessity of battery cost

**Nov 2016**
- 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**

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

### 3-8. Schedule and each task

<table>
<thead>
<tr>
<th>Item</th>
<th>2016</th>
<th>2017</th>
<th>Player</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jun</td>
<td>Jul</td>
<td>Aug</td>
</tr>
<tr>
<td>Schedule for City-to-city Collaboration Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance to high-level conference (if requested from MoEJ)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working group meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop in Japan (invitation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop in Yangon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule for Solar PV Pilot Project Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirmation of candidate PV site with area and distribution line layout and site visit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirmation of YCDC load to be supplied by PV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determination of candidate site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design and preparation of equipment specification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost estimation of PV system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study of tariff and financial feasibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination with YESC about net-metering</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarification of procedure for budgeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Documentation for budgeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Internal procedure for budget allocation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Approval of budget</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Report submission to MoEJ</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KWSK: Kawasaki, NK: Nippon Koei, FFEC: Fuji-Furukawa E&C  
xx: Key responsibility, x: support
4. Schedule for preparation of Low carbon action plan

- **Sep 16**: Proposal for draft Yangon City Low Carbon Action Plan for YCDC by Kawasaki city referring Kawasaki Eco Action Plan

- **Oct 16**: Discussion on the draft Low carbon action plan for YCDC between YCDC and Kawasaki city during invitation in Japan in October 17th or 18th

- **Nov 16**: Consideration of incorporation between reviewing JICA’s master plan and low carbon action plan

- **2017**: Finalizing low carbon action plan aiming for formulation of the plan next fiscal year
1. Overview of the 2nd 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

JCM project formulation with regional government’s support

Japanese company
[Project participant]

Equipment manufacturer
[Supplier]

Equipment manufacturer
[Supplier]

JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city
2. YCDC Low Carbon Action Plan (LCAP)

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

→ Please see separate papers...
  - Input of YCDC’ vision and ideas for the above
  - Approval process from government

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

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

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

PV site and Pump room in Nyaung Hnit Pin

Pump Layout in Nyaung Hnit Pin

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

- **Nov 2016**
  - Proposal for draft Yangon City Low Carbon Action Plan for YCDC
  - Formulation of pilot projects

- **Dec 2016**
  - Discussion on the draft Low carbon action plan and revision MoU for YCDC between YCDC and Kawasaki city in **Courtesy call to Mayor (26-28 Dec)**

- **Jan 2017**
  - Consideration of incorporation between reviewing JICA’s master plan and low carbon action plan
  - Invitation to **Tokyo JCM seminar by MoEJ on 23-25 Jan**: Head of Dept.
  - Finalizing low carbon action plan aiming for formulation of the plan next fiscal year

- **Feb 2017**
  - **High-level meeting in Yangon** for low carbon action plan (Late Feb)
  - **Conclusion of revised MoU**
  - Final report
  - Formulation of next JCM city-to-city collaboration in the fiscal year
5-2. Schedule and each task

<table>
<thead>
<tr>
<th>Schedule for City-to-city Collaboration Activity</th>
<th>2016</th>
<th>2017</th>
<th>Player</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Jun</td>
<td>Jul</td>
<td>Aug</td>
</tr>
<tr>
<td>Working group meeting</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Workshop in Japan (invitation)</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Workshop in Yangon</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Preparation of YCDC low carbon action plan</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MoU revise</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Schedule for Solar PV Pilot Project Planning

<table>
<thead>
<tr>
<th>Item</th>
<th>2016</th>
<th>2017</th>
<th>Player</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation of candidate PV site with area and distribution line layout and site visit</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Confirmation of YCDC load to be supplied by PV</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Determination of candidate site</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Design and preparation of equipment specification</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cost estimation of PV system</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Study of tariff and financial feasibility</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Coordination with YESC about net-metering</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Implementation plan</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Documentation for budgeting</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Approval of budget</td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Final Report submission to MoEJ

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

xx : Key responsibility, x: support

5-3. Way forward and requests to YCDC

Solar PV pilot project plan

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

Low Carbon Action Plan

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

MoU Revise

- Procedure for MoU revise
- Arrangement for the Courtesy call to mayor and secretary in late Dec 2017
The study is conducted by collaboration between Yangon city and Kawasaki city aiming for introduction of low carbon technologies in Yangon city under JCM scheme1) and development of low carbon action plan from 2015 and now ongoing.

I ) Implementation body

<table>
<thead>
<tr>
<th>Yangon City (YCDC)</th>
<th>City of Kawasaki Economic and Labor Affairs Bureau</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pollution control &amp; Cleansing Dept.</td>
<td>• City-to-city collaboration regarding the JCM project formulation</td>
</tr>
<tr>
<td>• City Planning &amp; Land administration Dept.</td>
<td></td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Project Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Investment cost</td>
</tr>
<tr>
<td>Solar Irradiation</td>
</tr>
<tr>
<td>Planned capacity</td>
</tr>
<tr>
<td>Annual generation energy</td>
</tr>
<tr>
<td>Annual saving</td>
</tr>
<tr>
<td>Recovery years</td>
</tr>
<tr>
<td>CO2 reduction</td>
</tr>
</tbody>
</table>

1) JCM scheme: Joint crediting mechanism (JCM) is a GHG (Green house gas) mitigation activity proposed by Japanese government as a means to facilitate the diffusion of leading low-carbon technologies, systems, and so forth in developing countries. Under JCM scheme, the subsidy is prepared by MOEJ which subsidy at most 50% of the project cost.
### Schedule on Third Trip (November 2016)

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

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

Kawasaki City
- Economic and Labor Affairs Bureau

City-to-city collaboration regarding the JCM project formulation

JCM model project formulation
- Solar power project to install public facilities in YCDC
- Installation of high efficiency boiler in the factory
- Energy efficiency project in YCDC facilities
- JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city

Japanese entities (Project participant)
- Japanese entity
- Japanese entity
- Japanese entity

Myanmar entities (Project participant)
- Myanmar entity
- Myanmar entity
- Myanmar entity

Japanese Private entities

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

2. Chronology of City-to-city Collaboration

Before 2015
- Formulation of JICA Master Plan
- JCM project formulation: Waste-to-energy plant by JFE Engineering

FY 2015
- Commencement of JCM city to city collaboration between YCDC and Kawasaki
- 1st Visit to Kawasaki city and Kawasaki chamber of commerce
- 1st Workshop on city-to-city collaboration in Yangon
- Feasibility study for JCM model projects

FY 2016
- 2nd Visit to Kawasaki city and JCM seminar in Kitakyushu, Japan
- Preparation of draft Low carbon action plan
- Feasibility study of Solar power (JCM model) project on YCDC facilities
3. Proposed JCM Model Project: Solar Power Project (2/2)

Proposed Project Sites

![Map of Proposed Project Sites]

PV site and Pump room in Nyaung Hnit Pin

![Image of PV site and Pump room]

Pump Layout in Nyaung Hnit Pin

![Image of Pump Layout]

4. Further Actions

1) Conclusion of MOU

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

2) Low Carbon Action Plan (LCAP)

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

3) Solar Power Project in YCDC Facility

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

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

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
Kawasaki Eco-town

December 2016

Economic and Labor Affairs Bureau
Kawasaki-city

Kawasaki city & Waterfront Area

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

Accumulation of Heavy Industries

Kawasaki Waterfront Area
Location of facilities for the site visit

1. **YAMANAKA**
   - Recycling of waste automobile

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

3. **TAKEEI**
   - Recycling of mixed waste generated from demolition site

Steel Industry Area
Logistics Area
Refine & Petrochemical complex Area

Kawasaki Waterfront Area (1950s-60s)
Rapid Economic growth & Industrial Pollution in Kawasaki (1960-70)

Economic Growth Rate in Japan

Economic Growth Rate (Average 9.1% : 1956 – 1973)
Factories nearby Residential Area in Kawasaki (1970)

Tama-River (1970)
Air Pollution over Kawasaki Waterfront Area (1960)

Current Landscape of Tama-River (2016)
Current Landscape over Kawasaki Waterfront Area (2016)

Efforts to overcome Pollution Problems

**Local Business**
- Investment for pollution control
- Development of pollution control technologies

**Citizen**
- Civil action against pollution
- Public awareness for environment

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

"Sharing of Roles" & "Cooperative Action"

Improvement of Environmental Problems
Kawasaki Eco-town Project

Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」
①Promotion of environmental industries on locally accumulated technologies
②Formation of resources recycling economy and society through reducing waste generation and promoting waste recycling on site

Scheme of system (1997～)

- Approval
- Eco-town plan made by local governments
- Subsidies for survey, planning etc. (～ 2004)
- L.G. : subsidize
  - Install advanced recycling facilities
  - Establish R&D facilities
- L.G. : implement business
  - Dissemination, supply information etc.
- Implement business, invest
- Participate in business

Local companies

Citizens

Resource Recycling Facilities in Kawasaki Eco-town

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

- DC CO., LTD.
  Recycling cement production

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

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

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

Kawasaki Zero Emissions Industrial Park

Radius of circle 1.5 km
Companies’ Collaboration in Kawasaki Eco-town

Material production for blast furnace
Non ferrous scrap
Iron scrap
Used electric Appliances
Used electric appliances recycling equipments
Used PET bottles
Waste plasctics
construction sludge
Sewage sludge
Used paper
Sewage treatment center
Treated sewage water

Non ferrous metal production furnace
Non ferrous metal
Ferrous metal
frame material
Ammonia
PET bottle
Cement
Toilet paper

JFE group
SHOWA DENKO K.K.
SAN-EI REGULATOR CO.,LTD.

Material production for blast furnace
Construction board production
Material for ammonia production

PET REFINE TECHNOLOGY CO.,LTD
DC CO.,LTD.

Companies’ Collaboration in Kawasaki Eco-town

Many different types of industries have been accumulated into Kawasaki Waterfront area, and then
Recycle facilities in Eco-town functioning to process industrial wastes as a raw materials for other industries.

Among approved 26 Eco-towns in Japan, Kawasaki Eco-town promotes recycles at a high standard;
Showcase of Resource recycling business and technologies
Visit to Kawasaki city mayor

Photo with Kawasaki city mayor, chairman of city council, and chairman of Kawasaki Chamber of Commerce and Industry
Eco-town related facilities tour ①

YAMANAKA: Industrial waste management company of waste automobile

Eco-town related facilities tour ②

TAKEEI: Industrial waste management company of Mixed waste from demolition site
Eco-town related facilities tour

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

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

Thank you for your attention!
2. Low Caron Action Plan
1. Policies and plans related to promotion of "Low-carbon Action Plan"

Urban Development Programme in the Greater Yangon (Under preparation)

Connection between Urban development programme and low carbon action plan

Yangon City’s Low Carbon Action Plan

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

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

Basic Concept

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

Target year for Low Carbon Action Plan

This Low Carbon Action plan set target year as short, mid, and long term;
- Short term: Up to 2020
- Mid term: Up to 2030
- Long term: Up to 2040

Implementation body of the plan

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


I. Reduction of greenhouse gas emission from industrial activities

- Industry

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

II. Utilization of renewable energy resources

- Energy

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

III. Creation of low-carbon city

- Urban City

1. Encourage construction of highly energy efficient buildings
2. Introduction of energy efficient technology into public sector
3. Promotion of energy efficient technology to private sector

IV. Creation of recycling-oriented society

- Waste Management

1. Encourage construction of highly energy efficient buildings
2. Introduction of energy efficient technology into public sector
3. Promotion of energy efficient technology to private sector

V. Introduction of low carbon technique in the transportation Sector

- Transportation

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

VI. Introduction of Low carbon technique in the transportation Sector

- Transportation

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

VII. Introduction of international technology through city to city corporation

- International Corporation

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

VIII. Research and development of environmental technologies

- MRV

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

※<PP:Pilot Project>: it indicates idea of pilot project
3. Seminar and workshop in Japan
   3-1 Workshop Presentation material (YCDC JICA study group)
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.

Current situation of potential sectors

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

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

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

**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.

**City-to-city collaboration**

- **Yangon city**
  - Support on environmental technology and industrial development collaborate with member of Kawasaki green innovation cluster etc.
  - Low CO2 Kawasaki brand entity certified
  - Japanese private company
  - Japanese private company
  - Nippon Koei

- **Kawasaki city**
  - Study/support of JCM project formulation between Japanese and Myanmar companies

**JCM project formulation with regional government’ support**

- **Private entities in Yangon city**
  - Myanmar company [Project participant]
  - Myanmar company [Project participant]
  - Myanmar company [Project participant]

- **Japanese company** [Project participant]
- **Equipment manufacturer** [Supplier]
- **Equipment manufacturer** [Supplier]

JCM needs identification of ESCO Project, Renewable energy project, Solid waste, Transportation infrastructure, Low carbon city planning/development, Low carbon industrial park in Myanmar, especially Yangon city
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. The scheme involves collaboration with projects supported by JICA and other governmental-affiliated financial institutes. Government of Japan provides a finance part of an investment cost (less than half), while International consortiums (which include Japanese entities) conduct MRV and expected to deliver at least half of JCM credits issued.

- Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO2 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.

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:

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

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

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

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

- 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

**Nov 2016**
- 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**

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

- To contribute to sustainable development and realize low carbon society in Yangon
- To formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.
- To implement Clean Development Mechanism (CDM) including clean air, clean land and clean water.
- To cooperate and obtain carbon credit project with Kawasaki City according to JCM Scheme.


**Action Plan**

<table>
<thead>
<tr>
<th>FY2013</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JICA Programme</strong></td>
<td><strong>MOEJ Programme</strong></td>
<td><strong>Collaboration</strong></td>
</tr>
<tr>
<td>JICA Master Plan, in 2013</td>
<td>YCDC Information Collection and Verification Survey, supported by JICA</td>
<td>Incorporate low carbon development action plan of MOEJ Prj</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JICA technical assistance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JICA grassroots prj.</td>
</tr>
<tr>
<td>Low Carbon Action Plan under JCM city-to-city collaboration, supported by Kawasaki city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Preparation of low carbon action plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* See Kawasaki’s plan as reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) JCM project formulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Installation of high efficiency boiler in factory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Solar Power Project in YCDC’s property</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Feasibility Study on JCM solar power project in YCDC’s facility, such as water treatment plant, ex-dumping site etc. | | }

[item to be checked in FS]: Availability, applicable load, generation and energy supply plan, grid connection, ownership, tariff, cost benefit, budgeting by YCDC etc.
## Menu of City-to-City Collaboration from Kawasaki City

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

### <Low Carbon Society Sector>

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

- Three major items for the 2nd Year project
  1. Preparation for low carbon action plan supported by Kawasaki city
     - Introduction of Kawasaki city’s low carbon plan
  2. JCM project formulation for PV generation project in YCDC
     - Introduction of Solar project in Kawasaki city
  3. JCM project formulation for High-efficiency Drum-less Boiler in Factories
Selection of Solar PV Generation Pilot Project of YCDC Facility

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

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

Options of Photo Voltaic (PV) System Concept

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

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

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

Electric room (PV-related equipment can be stored)

Pump room

Candidate PV module area

Planned Water Resources for 2040
Recommendation

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

General information about Kawasaki-city: Location
City profile

- Population: APPROX 1.47 million population (2014)
- Area: 144.35 Km2
- 7 wards: Kawasaki, Saiwai, Nakahara, Takatsu, Miyamae, Tama, Asao

Experience of industrial pollution (1960-70)
Tama-river (1970)
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.

Current situation of potential sectors
[Power] Unstable power supply, stand-by (back-up) power system in industrial park/commercial facilities etc.
[Transportation] Heavy traffic jam, demand of mass rapid transit (MRT) system, insufficient parking lots, lack of consolidated logistics system etc.
[Water supply & sewerage] Decrepit water supply/sewerage facilities, expansion of the facilities in the suburb etc.

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

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

MOU between Kawasaki city and YCDC (2016)

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

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

1. Both parties shall be committed to promote city-to-city collaboration for achievement of low carbon society in Yangon and to 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 on the idea of both cities on equal terms and equal relationship.

2. In order to achieve the aforementioned objectives, both parties shall cooperate on the following:
(a) Executing and supporting of low-carbon projects utilizing joint cooling 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 no limitation to have exchanges and study visits in both cities.

4. This MOU shall become effective on the signed date and remain valid for three years. If one country wants to terminate the MOU, they shall inform in writing before one month, otherwise the MOU will be continued automatically.

5. The contents of this MOU can be amended in accordance with a written agreement of both parties.

6. Any disagreement which arises from interpretation of the MOU shall be solved in a friendly way based on both parties’ consent and discussions.

7. This MOU shall be made in two original copies in English.

Mo. Norikazu Pakota
Mayor of Kawasaki

August 2015: Start of city-to-city collaboration
October 2015: 1st Visit to Yangon-city
December 2015: Discussion on Draft MOU at Yangon-city
January 2016: Workshop on City-to-city collaboration at Yangon-city
March 2016: Concluding MOU between Kawasaki city and YCDC

Workshop for city-to-city collaboration at Yangon
**JCM City-to-city collaboration project (2017)**

**Yangon City (YCDC)**

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

**Kawasaki City**

Economic and Labor Affairs Bureau

City-to-city collaboration regarding the JCM project formulation

**JCM project formulation with regional government’s support**

- Myanmar company [Project participant]
- Japanese company [Project participant]
- Equipment manufacturer [Supplier]
- Equipment manufacturer [Supplier]

- Installation of high efficiency boiler in the factory
- Solar power project to install public facilities in YCDC
- Energy efficiency project in YCDC facilities

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

**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

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

**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

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Food factory in Yangon</td>
</tr>
<tr>
<td>Efficiency</td>
<td>94%</td>
</tr>
<tr>
<td>Capacity</td>
<td>2 ton/h x 6 nos</td>
</tr>
<tr>
<td>Investment</td>
<td>0.81 mil USD</td>
</tr>
<tr>
<td>Annual saving</td>
<td>257 kL/yr, 0.14 mil US$/yr</td>
</tr>
<tr>
<td>CO2 Reduction</td>
<td>674 ton/year</td>
</tr>
</tbody>
</table>

- Item Value
- Location
- Efficiency
- Capacity
- Investment
- Annual saving
- CO2 Reduction

- Cascading high-efficiency reciprocating refrigerators can reduce electricity consumption and CO2 emissions.
- 28% electricity reduction.

- High-efficiency once-through oil boiler reduces fossil fuel and CO2 emissions.
- Co-benefit of reduction of air pollutants.
- 9.6% fuel reduction.

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

- Item Value
- Location
- Efficiency
- Capacity
- Investment
- Annual saving
- CO2 Reduction

- High-efficiency once-through oil boiler reduces fossil fuel and CO2 emissions.
- Co-benefit of reduction of air pollutants.
- 9.6% fuel reduction.

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Food factory in Yangon</td>
</tr>
<tr>
<td>Efficiency</td>
<td>94%</td>
</tr>
<tr>
<td>Capacity</td>
<td>2 ton/h x 6 nos</td>
</tr>
<tr>
<td>Investment</td>
<td>0.81 mil USD</td>
</tr>
<tr>
<td>Annual saving</td>
<td>257 kL/yr, 0.14 mil US$/yr</td>
</tr>
<tr>
<td>CO2 Reduction</td>
<td>674 ton/year</td>
</tr>
</tbody>
</table>

- Cascading high-efficiency reciprocating refrigerators can reduce electricity consumption and CO2 emissions.
- 28% electricity reduction.

- High-efficiency once-through oil boiler reduces fossil fuel and CO2 emissions.
- Co-benefit of reduction of air pollutants.
- 9.6% fuel reduction.
Ongoing JCM model project (2017):
Installation of solar power generation device in public facility in Yangon

Detail of Nagasawa water purification plan in Kawasaki

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

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


Basic Concept
Establish a sustainable low-carbon society through
1) Harmonization of green environment and economy
2) Creation of their good cycles, so that the good natural environment can be maintained for the next generation

Target year for Low Carbon Action Plan
This Low Carbon Action plan set target year as short, mid, and long terms

- Short term: Up to 2018
- Mid term: Up to 2020
- Long term: Up to 2030

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

Linkage with JCM

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

Pilot Project for short term
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 Km²
- **City budget:** APPROX 10 billion US$ (2015)

![Map of Kawasaki-city](image1)

- **Highest elevation:** 148.0m (above sea level)
  - Asao-Ward Kurokawa area
- **Lowest elevation:** -0.365m (above sea level)
  - Kawasaki-ward Oshima area

---

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

![Industrial Pollution](image2)
Economic Growth Rate in Japan

Factories nearby Residential Area in Kawasaki (1970)
Water Pollution at Tama-River (1970)

Tama-River covered by full of Garbage (1970)
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
Meet Environmental Standard of $SO_2$

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

Meet Environmental Standard of $NO_2$

- Major source of $NO_2$ is automobile.
- $NO_2$ will cause respiratory disease.
BOD in River Water and Sewer Diffusion Rate from 1987 - 2014

Current Landscape of Tama-River (2016)
About Yangon-city, Myanmar

- Population: APPROX 5.2 million population (2014)
- Area: 598.8 Km²
- Economic Growth Rate 7.8 % (2016: Estimated by World Bank)
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.

**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.

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.

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

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

Building up “Trust” and “Mutual Understanding”

City-to-city collaboration workshop held in Yangon city hall
Achievement: MOU between Kawasaki and Yangon (2015)

**August 2015:** Start of city-to-city collaboration

**October 2015:** 1st Visit to Yangon-city

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

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

**March 2016:** Concluding MOU between Kawasaki city and YCDC
JCM City-to-City Collaboration Project (2016)

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

City-to-city collaboration regarding the JCM project formation

Kawasaki City
- Economic and Labor Affairs Bureau

JCM project formulation with regional government’s support

Japanese company [Project participant]
- Installation of high efficiency boiler in the factory

Equipment manufacturer [Supplier]
- Solar power project to install public facilities in YCDC

Equipment manufacturer [Supplier]
- Energy efficiency project in YCDC facilities

Myanmar company [Project participant]

Installation of high efficiency boiler in the factory

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

Myanmar company [Project participant]
- Private entities in Kawasaki city

Private entities in Yangon city

Japanese company [Project participant]
- Private entities in Kawasaki city

Installation of high efficiency boiler in the factory

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

Japanese company [Project participant]

Equipment manufacturer [Supplier]

Equipment manufacturer [Supplier]
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

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

Pilot Project Site: Nyaung Hnit Pin Water Purification Plant

- Electric Room (PV-related Equipment can be stored)
- Pump Room
- Candidate PV Module Area
Photo Voltaic (PV) System Concept

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

![Diagram of PV system](image)

2.0 MW PV Array in YCDC Water Purification Plant

Power Conditioners
DC -> AC

Control Panel, Switch, Meter, etc.

YESC Grid

YCDC pump

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


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

Target year for Low Carbon Action Plan
This Low Carbon Action plan set target year as short, mid, and long term:
- Short term: Up to 2018
- Mid term: Up to 2020
- Long term: Up to 2030

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

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

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

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

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

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

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

Low Carbon Society

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

Monitoring

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

Solid Waste

- Planning/implementation of solid waste collection system
- Planning/implementation of garbage separation program
- Planning/implementation of compost promotion program
- Knowledge sharing of industrial waste management
- Establishment of solid water database etc.
### Potential of City-to-City Collaboration (2)

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

### 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 8th, 2016  

Economic and Labor Affairs Bureau  
Kawasaki-city

Kawasaki city & Waterfront Area

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

Accumulation of Heavy Industries
Location of facilities for the site visit

1. YAMANAKA
   - Recycling of waste automobile

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

3. TAKEEI
   - Recycling of mixed waste generated from demolition site

Steel Industry Area
Logistics Area
Refine & Petrochemical complex Area

Kawasaki Waterfront Area (1950s-60s)
Rapid Economic growth & Industrial Pollution in Kawasaki (1960-70)

Economic Growth Rate in Japan

Economic Growth Rate
(Average 9.1% : 1956 – 1973)
Factories nearby Residential Area in Kawasaki (1970)

Tama-River (1970)
Air Pollution over Kawasaki Waterfront Area (1960)

Current Landscape of Tama-River (2016)
Current Landscape over Kawasaki Waterfront Area (2016)

Efforts to overcome Pollution Problems

**Local Business**
- Investment for pollution control
- Development of pollution control technologies

**Citizen**
- Civil action against pollution
- Public awareness for environment

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

“Sharing of Roles” & “Cooperative Action”

Improvement of Environmental Problems
Kawasaki Eco-town Project

Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」
① Promotion of environmental industries on locally accumulated technologies
② Formation of resources recycling economy and society through reducing waste generation and promoting waste recycling on site

Scheme of system (1997～)

<table>
<thead>
<tr>
<th>METI</th>
<th>MOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvement</td>
<td>Eco-town plan made by local governments</td>
</tr>
</tbody>
</table>

Eco-town plan made by local governments

- Subsidies for equipments and facilities (~ 2005)
- L.G. : subsidize
- L.G. : implement business

< Hard sector >

- Install advanced recycling facilities
- Establish R/D facilities

Implement business, invest

< Soft sector >

- Dissemination, supply information etc.

L.G. : implement business

Participate in business

Local companies

Citizens

Resource Recycling Facilities in Kawasaki Eco-town

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

DC CO., LTD.
Recycling cement production

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

JFE group companies

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

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

Kawasaki Zero Emissions Industrial Park

Radius of circle 1.5 km
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
YAMANAKA: Industrial waste management company of waste automobile

TAKEEI: Industrial waste management company of Mixed waste from demolition site
Eco-town related facilities tour

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

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

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 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. Overview

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

Kawasaki City
Economic and Labor Affairs Bureau

City-to-city collaboration

Task I: Development of Low Carbon Action Plan

YCDC
Development of LCAP
Low Carbon Action Plan
Kawasaki City
Support based on City’s knowledge and experiences

Task II: JCM project formulation with regional government’ support

Private entities in Yangon city

Myanmar company [Project participant]
Installation of one-through boiler in the factory

Myanmar entity [Project participant]
Solar power project to install public facilities

Acecook [Project participant]
Kawasaki Green innovation cluster member company [Project participant]

Private entities in Kawasaki city
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.

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

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

- Short term: Up to 2020
- Mid term: Up to 2030
- Long term: Up to 2040

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

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

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

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

| Introduced technology | • One-through Boiler, 2 t/h x 6 units = 12 t/h (rated capacity)  
| | • The boiler has the nature of low NOx as well as energy saving |
| Estimated GHG emission reduction | 674[tCO2 per year] |
| Implementation period | Initiated from October 2016 |
3. Project 1 /Introduction of Once-through Boiler -Implementation structure-

- **International Consortium**
  - **Representative Participant:** Acecook co., ltd
    - Management of JCM Model Project
    - Monitoring report submission to MoEJ
    - Receive of subsidy and distribution in consortium

- **Partner Participant:** Acecook Myanmar Co., Ltd
  - Procurement of equipment
  - Monitoring and reporting

- **Myanmar Investment Committee**
  - Application for investment

- **Thilawa SEZ Management Board**
  - Permission for boiler license

- **Yangon Economic Special Zone (YESC) 33 kV Grid**
  - Supply of boilers

- **EPC contractor**
  - Coordination and supervision

- **Boiler Supplier**
  - Supply

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

**Outline of PV System in YCDC Facility**

- 2.0 MW PV array in YCDC water treatment plant
- Power conditioners DC -> AC
- Battery and power conditioner
- Control panel, switch, meter, etc.
- YCDC pump

**Project Summary**

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

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

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

Basic information of Nyaung Hnit Pin WTP
- Located at 44km from Yangon city center
- Water pump 560kw x 6unit, 800kw x 4 unit
- Power consumption at Peak time 7MW, at off-peak 6.8 MW
- Operation 24 hours

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

International Consortium
Representative Participant:
Japanese company
- Management of JCM Model Project
- Monitoring report submission to MoEJ
- Receive of subsidy and distribution in consortium

Partner Participant:
Yangon City Development Committee (YCDC)
- Procurement of equipment
- Monitoring, reporting

EPC contractor/ Supplier
Supply and installation of Solar System

Consultant
- Support for application of JCM Model Project
- Support for preparation of Methodology and PDD

MOEJ
Subsidy

Coordination and supervision
Reporting monitoring data etc.
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

EPCB
BOILER BROCHURE

EAST POWER

Local Sole Agent
UEEG Limited
Unit #320, Block C-3rd Floor, Pearl Condo, Kabaraye Pagoda Road
Yangon, Myanmar
Ph: +95 9 965 855 682, +95 9 972721090
Email: UEEGlimited@outlook.com

Qingdao East Power Industry Equipment Co., Ltd
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, Parisian, 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 pavel 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.
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 backhaul oil (gas)-fired boiler parameter

<table>
<thead>
<tr>
<th>Item/Model</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
<th>WHNS-1.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (t/h)</td>
<td>850</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
<td>2000</td>
<td>2500</td>
<td>3000</td>
</tr>
<tr>
<td>Capacity (t/h)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated working pressure (MPa)</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.4</td>
</tr>
<tr>
<td>Rated steam temperature (°C)</td>
<td>109</td>
<td>109</td>
<td>109</td>
<td>109</td>
<td>109</td>
<td>109</td>
<td>109</td>
</tr>
<tr>
<td>Design efficiency (%)</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

### Fuel consumption

- Light oil
  - High: 37, 70, 97, 144, 146, 210, 285, 32, 55, 105, 130, 155
  - Low: ...
- Heavy oil
  - High: ...
  - Low: ...
- Cryogenic gas
  - High: ...
  - Low: ...

### Dimensions

- Main steam outlet diameter (mm): DN600, DN650, DN800, DN800, DN1000
- Feed water inlet diameter (mm): DN25, DN35, DN40, DN45
- Blowdown outlet diameter (mm): DN100, DN125, DN200
- Safety valve diameter (mm): DN100, DN125, DN150
- Chemical water outlet (mm): DN100, DN125, DN150
- Grate size (mm): L 1500, W 1600, H 2000
- Rated supply water temperature (°C): | | | 90/70, 97/90, 97/90, 85/90, 90/97, 90/97
- Reheater outlet temperature (°C): | | | 12, 24, 36, 48, 72, 90

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

### Product Description

- Flue gas in the high temperature furnace stay a long residence time. After several times wind distribution, fully burning, fuel efficiency is high without black smoke.
- Soot carbon dioxide, sulphur dioxide, such as the environmental indicators is better than the national discharge standard, and conform to the current international emission reduction policies.
- Fuel burning continuous, stable working condition, can guarantee the steam output.
- Manual feeding, remove slag, simple operation, without cumbersome procedures, start quickly.
- Boiler Capacity 1-4 Ton (0.1-2.8 MW)

### DZG series Fixed Grate Steam Boiler

<table>
<thead>
<tr>
<th>Item/Type</th>
<th>DZG-30-0.7-10</th>
<th>DZG-30-0.7-16</th>
<th>DZG-30-0.7-25</th>
<th>DZG-30-0.7-35</th>
<th>DZG-30-0.7-45</th>
<th>DZG-30-0.7-65</th>
<th>DZG-30-0.7-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (t/h)</td>
<td>6.5</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>Rated steam pressure (MPa)</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.4</td>
</tr>
<tr>
<td>Rated steam temperature (°C)</td>
<td>170/150, 170/150, 170/150, 170/150, 170/150, 170/150, 170/150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed water temperature (°C)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Heated area (m²)</td>
<td>2.316</td>
<td>2.316</td>
<td>2.316</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable fuel type</td>
<td>soft coal, biomass, coke, bituminous coal, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler heat efficiency (%)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Fuel consumption (kg/h)</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Effective area of grate (mm)</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation size of boiler (mm)</td>
<td>2970</td>
<td>3760</td>
<td>4307</td>
<td>6240</td>
<td>2970</td>
<td>3760</td>
<td>4500</td>
</tr>
<tr>
<td>Weight of largest parts of boiler transportation (t)</td>
<td>8.08</td>
<td>11.17</td>
<td>15.67</td>
<td>10.17</td>
<td>2.4</td>
<td>8.3</td>
<td>11.5</td>
</tr>
</tbody>
</table>

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

- All components marked with UL, CAS, CE safety certification identifications, fully dip electric heat producing components are fastened on the flange, which make it is easy to replace.
- The heat producing components is made of erosion resistance stainless steel, heating tube and INCOLOY800 alloy steel, it possesses the property of long continuous operating endurance, erosion resistance, relief dirty and low surface load;
- The circuit is design with 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 avoid the component from interfering and heat producing components from aging.
- Dynamical digital control is applied to the control system, is has the functions of PID adjustment, pump interlock, heat producing work alternately, real time parameter display.
LHS Series Oil / Gas Fired Boiler

Product Description

- Flow interturbines are set in the fire tube to slow down the rate of the heat efficiency.
- The air flow 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

<table>
<thead>
<tr>
<th>Item/Model</th>
<th>LHS0.1-0.4/0.7-QY</th>
<th>LHS0.2-0.7-QY</th>
<th>LHS0.3-0.4/0.7-QY</th>
<th>LHS0.5-0.4/0.7-QY</th>
<th>LHS0.5-0.7/1-QY</th>
<th>LHS0.8-0.7/1-QY</th>
<th>LHS1.0-0.7/1-QY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heat capacity kw</td>
<td>70</td>
<td>105</td>
<td>140</td>
<td>210</td>
<td>350</td>
<td>560</td>
<td>700</td>
</tr>
<tr>
<td>Rated heat efficiency %</td>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Rated working pressure MPa</td>
<td>0.4/0.7</td>
<td>0.7</td>
<td>0.4/0.7</td>
<td>0.4/0.7</td>
<td>0.7/1.0</td>
<td>0.7/1.0</td>
<td></td>
</tr>
<tr>
<td>Saturated steam temperature (°C)</td>
<td>152/170</td>
<td>170</td>
<td>152/170</td>
<td>152/170</td>
<td>170/184</td>
<td>170/184</td>
<td></td>
</tr>
<tr>
<td>Design heat efficiency %</td>
<td>&gt;90</td>
<td>&gt;90</td>
<td>&gt;89</td>
<td>&gt;89</td>
<td>&gt;89</td>
<td>&gt;89</td>
<td>&gt;89</td>
</tr>
<tr>
<td>Heating area m²</td>
<td>2.65</td>
<td>4.9</td>
<td>5.08</td>
<td>8.2</td>
<td>12.7</td>
<td>18.4</td>
<td>23.1</td>
</tr>
<tr>
<td>Boiler water capacity L</td>
<td>360</td>
<td>360</td>
<td>510</td>
<td>930</td>
<td>1040</td>
<td>1620</td>
<td>2760</td>
</tr>
<tr>
<td>Plus diameter mm</td>
<td>Φ160</td>
<td>Φ250</td>
<td>Φ250</td>
<td>Φ250</td>
<td>Φ300</td>
<td>Φ400</td>
<td>Φ500</td>
</tr>
<tr>
<td>Feed water diameter DN</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Main steam tube diameter DN</td>
<td>25</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>Safety valve diameter DN</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>2x40</td>
<td>2x40</td>
<td>2x40</td>
</tr>
<tr>
<td>Blowdown tube diameter DN</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light oil kg/h</td>
<td>7.0</td>
<td>10.4</td>
<td>13.8</td>
<td>22.5</td>
<td>34.5</td>
<td>51.5</td>
<td>68.2</td>
</tr>
<tr>
<td>Natural gas Nm³/h</td>
<td>8.0</td>
<td>12.4</td>
<td>16.5</td>
<td>24.0</td>
<td>40.3</td>
<td>60.5</td>
<td>80.6</td>
</tr>
<tr>
<td>Liquid gas Nm³/h</td>
<td>3.2</td>
<td>4.6</td>
<td>6.4</td>
<td>10.4</td>
<td>16.0</td>
<td>23.8</td>
<td>31.6</td>
</tr>
<tr>
<td>Coal gas Nm³/h</td>
<td>18.0</td>
<td>27.9</td>
<td>37.4</td>
<td>54.0</td>
<td>90.7</td>
<td>136.0</td>
<td>178.2</td>
</tr>
<tr>
<td>Transportation weight kg</td>
<td>&gt;600/420</td>
<td>&gt;850</td>
<td>&gt;1200/700</td>
<td>&gt;1200/1000</td>
<td>&gt;1200</td>
<td>&gt;1800/2200</td>
<td>&gt;2600/2730</td>
</tr>
<tr>
<td>Outdoor size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L m</td>
<td>800</td>
<td>900</td>
<td>1000</td>
<td>1200</td>
<td>1200</td>
<td>1430</td>
<td>1600</td>
</tr>
<tr>
<td>W m</td>
<td>750</td>
<td>850</td>
<td>960</td>
<td>1150</td>
<td>1150</td>
<td>1380</td>
<td>1550</td>
</tr>
<tr>
<td>H m</td>
<td>1610</td>
<td>1620</td>
<td>1640</td>
<td>2060</td>
<td>2300</td>
<td>2600</td>
<td>2790</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Item/Model</th>
<th>WNS2-0.85/1-QY</th>
<th>WNS2-1.0/1-QY</th>
<th>WNS2-1.25/1-QY</th>
<th>WNS2-1.6/1-QY</th>
<th>WNS2-2.0/1-QY</th>
<th>WNS2-2.5/1-QY</th>
<th>WNS2-3.0/1-QY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity kw</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>5000</td>
<td>6000</td>
<td>7000</td>
<td>8000</td>
</tr>
<tr>
<td>Capacity MW</td>
<td>1.4</td>
<td>2.1</td>
<td>2.6</td>
<td>4.2</td>
<td>5.6</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Rated working pressure MPa</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>Rated supply water temperature (°C)</td>
<td>90/70</td>
<td>90/70</td>
<td>90/70</td>
<td>90/70</td>
<td>90/70</td>
<td>90/70</td>
<td>90/70</td>
</tr>
<tr>
<td>Design efficiency %</td>
<td>90</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>Boiler circulation water amount m³/h</td>
<td>48</td>
<td>72</td>
<td>96</td>
<td>144</td>
<td>192</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Fuel consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light oil kg/h</td>
<td>146</td>
<td>210</td>
<td>285</td>
<td>424.4</td>
<td>590</td>
<td>840</td>
<td>1168</td>
</tr>
<tr>
<td>Natural oil kg/h</td>
<td>153.5</td>
<td>225.1</td>
<td>303.5</td>
<td>453.3</td>
<td>600.2</td>
<td>850.2</td>
<td>1190.1</td>
</tr>
<tr>
<td>City gas Nm³/h</td>
<td>547.7</td>
<td>500.1</td>
<td>678.6</td>
<td>911.3</td>
<td>1333.5</td>
<td>1501.1</td>
<td>2164.3</td>
</tr>
<tr>
<td>Natural gas Nm³/h</td>
<td>174.3</td>
<td>250.7</td>
<td>340</td>
<td>507.1</td>
<td>668.6</td>
<td>767.2</td>
<td>1588.3</td>
</tr>
<tr>
<td>Supplementary water tube diameter mm</td>
<td>ΦDN125</td>
<td>ΦDN125</td>
<td>ΦDN125</td>
<td>ΦDN150</td>
<td>ΦDN150</td>
<td>ΦDN200</td>
<td>ΦDN200</td>
</tr>
<tr>
<td>Blowdown tube diameter mm</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
<td>2xΦ140</td>
</tr>
<tr>
<td>Safety valve tube diameter mm</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
<td>2xΦ40</td>
</tr>
<tr>
<td>Chimney diameter mm</td>
<td>340</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>Flame length</td>
<td>2100</td>
<td>2900</td>
<td>2900</td>
<td>2900</td>
<td>2900</td>
<td>2900</td>
<td>2900</td>
</tr>
<tr>
<td>Rupture steam temperature °C</td>
<td>194</td>
<td>194</td>
<td>194</td>
<td>194</td>
<td>194</td>
<td>194</td>
<td>194</td>
</tr>
</tbody>
</table>

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).
EAST POWER

Qingdao East Power Industry Equipment Co., Ltd

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.
**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

<table>
<thead>
<tr>
<th>Item/Type</th>
<th>DZL1.4-2.5/1.6(A)</th>
<th>DZL1.4-3.0/1.6(A)</th>
<th>DZL1.8-2.5/1.6(A)</th>
<th>DZL2.5-2.5/1.6(A)</th>
<th>DZL7.0-4.2/1.6(A)</th>
<th>DZL7.6-6.0/1.6(A)</th>
<th>DZL7.6-6.0/1.8(A)</th>
<th>DZL7.6-6.0/2.0(A)</th>
<th>DZL7.6-6.0/2.6(A)</th>
<th>DZL14-16/1.8(A)</th>
<th>DZL15-16/1.8(A)</th>
<th>DZL16-16/1.8(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (t/h)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Rated steam pressure (MPa)</td>
<td>0.71/0.75</td>
<td>0.71/0.75</td>
<td>0.71/0.75</td>
<td>0.71/0.75</td>
<td>1.0/1.0</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Rated steam temperature (°C)</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td>170/194/194</td>
<td></td>
</tr>
<tr>
<td>Heated area (m²)</td>
<td>4.69/1.2</td>
<td>6.23/1.5</td>
<td>7.8/1.5</td>
<td>9.25/1.8</td>
<td>10.8/1.5</td>
<td>12.3/1.8</td>
<td>20.7/2.0</td>
<td>31.5/1.8</td>
<td>31.5/2.0</td>
<td>31.5/2.0</td>
<td>31.5/2.0</td>
<td></td>
</tr>
<tr>
<td>Radiation/convection</td>
<td>6.22/1.5</td>
<td>7.8/1.8</td>
<td>9.5/2</td>
<td>10.8/2.1</td>
<td>12.5/2.3</td>
<td>20.7/2.8</td>
<td>31.5/2.8</td>
<td>31.5/2.8</td>
<td>31.5/2.8</td>
<td>31.5/2.8</td>
<td>31.5/2.8</td>
<td></td>
</tr>
<tr>
<td>Boiler thermal efficiency (%)</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Fuel consumption (kg)</td>
<td>167</td>
<td>190</td>
<td>210</td>
<td>230</td>
<td>250</td>
<td>270</td>
<td>290</td>
<td>310</td>
<td>330</td>
<td>350</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td>Effective area of grate (m²)</td>
<td>1.8</td>
<td>2.3</td>
<td>2.8</td>
<td>3.4</td>
<td>3.9</td>
<td>4.4</td>
<td>4.9</td>
<td>5.4</td>
<td>5.9</td>
<td>6.4</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Transportation size of boiler (mm)</td>
<td>length 4576</td>
<td>5200</td>
<td>5830</td>
<td>6460</td>
<td>7090</td>
<td>7720</td>
<td>8350</td>
<td>9380</td>
<td>10410</td>
<td>11440</td>
<td>12470</td>
<td></td>
</tr>
<tr>
<td>width 1500</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td>2240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>height 2750</td>
<td>3200</td>
<td>3300</td>
<td>3400</td>
<td>3500</td>
<td>3600</td>
<td>3700</td>
<td>3800</td>
<td>3900</td>
<td>4000</td>
<td>4100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of largest part (t)</td>
<td>1.73/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td>1.85/0.3</td>
<td></td>
</tr>
</tbody>
</table>

### 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 devided 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).
### EPCB Your reliable choice

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

<table>
<thead>
<tr>
<th>Item Type</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
<th>SZL6-1.25-AI</th>
<th>SZL6-2.5-AII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity t/h</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>Rated steam pressure MPa</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
<td>1.25/1.6</td>
</tr>
<tr>
<td>Rated steam temperature °C</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
<td>194/204</td>
</tr>
<tr>
<td>Feed water temperature °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Heat area of radiant connection m²</td>
<td>15.0/112</td>
<td>21.5/152</td>
<td>25.0/175</td>
<td>29.5/224</td>
<td>33.0/274</td>
<td>37.5/324</td>
<td>42.0/374</td>
<td>46.5/424</td>
<td>51.0/474</td>
<td>55.5/524</td>
<td>60.0/574</td>
<td>64.5/624</td>
<td>69.0/674</td>
<td>73.5/724</td>
<td>78.0/774</td>
<td>82.5/824</td>
</tr>
<tr>
<td>Boiler thermal efficiency %</td>
<td>81</td>
<td>82</td>
<td>83</td>
<td>84</td>
<td>85</td>
<td>86</td>
<td>87</td>
<td>88</td>
<td>89</td>
<td>90</td>
<td>91</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>Fuel consumption kg/h</td>
<td>658</td>
<td>1090</td>
<td>1336</td>
<td>1683</td>
<td>2030</td>
<td>2377</td>
<td>2724</td>
<td>3071</td>
<td>3418</td>
<td>3765</td>
<td>4112</td>
<td>4459</td>
<td>4806</td>
<td>5153</td>
<td>5499</td>
<td>5846</td>
</tr>
<tr>
<td>Effective area of grate m²</td>
<td>6.4</td>
<td>7.8</td>
<td>10.4</td>
<td>11.8</td>
<td>17.1</td>
<td>22.4</td>
<td>27.7</td>
<td>33.0</td>
<td>38.3</td>
<td>43.6</td>
<td>48.9</td>
<td>54.2</td>
<td>59.5</td>
<td>64.8</td>
<td>70.1</td>
<td>75.4</td>
</tr>
<tr>
<td>Transportation size of boiler mm</td>
<td>length</td>
<td>7010</td>
<td>7350</td>
<td>7690</td>
<td>7950</td>
<td>8210</td>
<td>8470</td>
<td>8730</td>
<td>8990</td>
<td>9250</td>
<td>9510</td>
<td>9770</td>
<td>10030</td>
<td>10290</td>
<td>10550</td>
<td>10810</td>
</tr>
<tr>
<td></td>
<td>width</td>
<td>2750</td>
<td>2990</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
<td>3100</td>
</tr>
<tr>
<td></td>
<td>height</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
</tr>
<tr>
<td>Weight of largest parts t</td>
<td>31.03</td>
<td>34.6</td>
<td>38.1</td>
<td>41.6</td>
<td>45.1</td>
<td>48.6</td>
<td>52.1</td>
<td>55.6</td>
<td>59.1</td>
<td>62.6</td>
<td>66.1</td>
<td>69.6</td>
<td>73.1</td>
<td>76.6</td>
<td>80.1</td>
<td>83.6</td>
</tr>
</tbody>
</table>

* Notes: This font only for your reference, if any changes please refer to factory technical documents.

### SHL series coal-fired steam boiler

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

<table>
<thead>
<tr>
<th>Item Type</th>
<th>SZL2.6-0.715/T0.7-A</th>
<th>SZL2.6-0.715/T0.7-A</th>
<th>SZL2.6-0.715/T0.7-A</th>
<th>SZL2.6-0.715/T0.7-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity t/h</td>
<td>2.3</td>
<td>6.2</td>
<td>9.4</td>
<td>12.6</td>
</tr>
<tr>
<td>Rated steam pressure MPa</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Supply water temperature °C</td>
<td>95</td>
<td>115</td>
<td>135</td>
<td>155</td>
</tr>
<tr>
<td>Feed water temperature °C</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Circulation flow m³/h</td>
<td>96</td>
<td>106</td>
<td>116</td>
<td>126</td>
</tr>
<tr>
<td>Heated area m²</td>
<td>15.6/112</td>
<td>21.9/152</td>
<td>27.3/192</td>
<td>32.7/232</td>
</tr>
<tr>
<td>Boiler thermal efficiency %</td>
<td>81</td>
<td>82</td>
<td>83</td>
<td>84</td>
</tr>
<tr>
<td>Fuel consumption kg/h</td>
<td>658</td>
<td>1090</td>
<td>1336</td>
<td>1683</td>
</tr>
<tr>
<td>Effective area of grate m²</td>
<td>6.4</td>
<td>7.8</td>
<td>10.4</td>
<td>13.0</td>
</tr>
<tr>
<td>Transportation size of boiler mm</td>
<td>length</td>
<td>7010</td>
<td>7350</td>
<td>7690</td>
</tr>
<tr>
<td></td>
<td>width</td>
<td>2750</td>
<td>2990</td>
<td>3100</td>
</tr>
<tr>
<td></td>
<td>height</td>
<td>3624</td>
<td>3624</td>
<td>3624</td>
</tr>
</tbody>
</table>

* Notes: This font only for your reference, if any changes please refer to factory technical documents.

####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.
# EPCB Your reliable choice

## SHL series coal-fired steam boiler technique parameter

<table>
<thead>
<tr>
<th>Item Type</th>
<th>SHL20-1.6-AI</th>
<th>SHL25-2.5-AII</th>
<th>SHL30-2.5-AIII</th>
<th>SHL35-2.5-AIV</th>
<th>SHL40-4.2-MAI</th>
<th>SHL45-4.2-MBII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity t/h</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>Rated pressure MPa</td>
<td>1.62/50.5</td>
<td>1.62/50.5</td>
<td>1.62/50.5</td>
<td>1.62/52.5</td>
<td>1.62/52.5</td>
<td>1.62/52.5</td>
</tr>
<tr>
<td>Saturated steam temperature °C</td>
<td>204/202/190</td>
<td>204/202/190</td>
<td>204/202/190</td>
<td>204/202/190</td>
<td>204/202/190</td>
<td>204/202/190</td>
</tr>
<tr>
<td>Feed water temperature °C</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Boiler thermal efficiency %</td>
<td>82.77</td>
<td>82.2</td>
<td>80.38</td>
<td>80.38</td>
<td>80.38</td>
<td>80.38</td>
</tr>
<tr>
<td>Heated area m²</td>
<td>493</td>
<td>560</td>
<td>626.2</td>
<td>723.8</td>
<td>791.5</td>
<td>791.5</td>
</tr>
<tr>
<td>Chamber area m²</td>
<td>154</td>
<td>167</td>
<td>159</td>
<td>170</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Emitter m²</td>
<td>448</td>
<td>557.5</td>
<td>507.6</td>
<td>538</td>
<td>569</td>
<td>569</td>
</tr>
<tr>
<td>Air preheater m²</td>
<td>443</td>
<td>557</td>
<td>538.6</td>
<td>580</td>
<td>620</td>
<td>620</td>
</tr>
<tr>
<td>Design fuel</td>
<td>Soft coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consumption way</td>
<td>Fire-grate fixing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel consumption kg/h</td>
<td>2890</td>
<td>3280</td>
<td>4250</td>
<td>4630</td>
<td>5880</td>
<td>5880</td>
</tr>
<tr>
<td>Effective area of grate m²</td>
<td>22.6</td>
<td>20.85</td>
<td>30.1</td>
<td>32.5</td>
<td>36.1</td>
<td>36.1</td>
</tr>
<tr>
<td>Basic size mm</td>
<td>15490</td>
<td>15490</td>
<td>15490</td>
<td>15490</td>
<td>15490</td>
<td>15490</td>
</tr>
<tr>
<td>Upper grate height mm</td>
<td>11350</td>
<td>11350</td>
<td>11350</td>
<td>11350</td>
<td>11350</td>
<td>11350</td>
</tr>
<tr>
<td>Left upper front corner of boiler mm</td>
<td>4220</td>
<td>4850</td>
<td>5480</td>
<td>5480</td>
<td>5480</td>
<td>5480</td>
</tr>
<tr>
<td>Boiler length</td>
<td>4000</td>
<td>5100</td>
<td>5885</td>
<td>5885</td>
<td>5885</td>
<td>5885</td>
</tr>
</tbody>
</table>

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

## DZL series Biomass-fired steam boiler

- **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 3900 ~ 5100 kcal / kg, not only can replace the coal and other fuels, and its low heat, 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).**
**EPCB Your reliable choice**

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

<table>
<thead>
<tr>
<th>Item/Type</th>
<th>DZL1.4-M</th>
<th>DZL1.25-M</th>
<th>DZL1.25-M</th>
<th>DZL1.25-M</th>
<th>DZL1.25-M</th>
<th>DZL1.25-M</th>
<th>DZL1.25-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (t/h)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Rated steam pressure (MPa)</td>
<td>1.01/1.25</td>
<td>1.01/1.25</td>
<td>0.97/1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>Rated steam temperature (°C)</td>
<td>184/184</td>
<td>184/184</td>
<td>170/194</td>
<td>194</td>
<td>194</td>
<td>194</td>
<td>194</td>
</tr>
<tr>
<td>Feed water temperature (°C)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Heated area (m²)</td>
<td>610.12</td>
<td>455/32.1</td>
<td>95/50.6</td>
<td>95/50.6</td>
<td>95/50.6</td>
<td>95/50.6</td>
<td>95/50.6</td>
</tr>
<tr>
<td>Boiler thermal efficiency (%)</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Fuel consumption (kg/h)</td>
<td>170</td>
<td>168</td>
<td>168</td>
<td>168</td>
<td>168</td>
<td>168</td>
<td>168</td>
</tr>
<tr>
<td>Effective area of grate (m²)</td>
<td>1.8</td>
<td>3.04</td>
<td>3.34</td>
<td>5.14</td>
<td>6.12</td>
<td>10.8</td>
<td>12</td>
</tr>
<tr>
<td>Transportation size of boiler (mm)</td>
<td>4074</td>
<td>5290</td>
<td>5360</td>
<td>5250</td>
<td>6000</td>
<td>7400</td>
<td>7000</td>
</tr>
<tr>
<td>length</td>
<td>1600</td>
<td>2240</td>
<td>2240</td>
<td>2700</td>
<td>3150</td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td>width</td>
<td>2873</td>
<td>3400</td>
<td>3400</td>
<td>3814</td>
<td>4196</td>
<td>3660</td>
<td>4000</td>
</tr>
<tr>
<td>Height</td>
<td>19.0/4.2</td>
<td>22.0/1.9</td>
<td>22.103</td>
<td>29</td>
<td>32</td>
<td>36</td>
<td>47</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Item/Type</th>
<th>DZL1.7-0.75/0.25-M</th>
<th>DZL1.4-0.75/0.25-M</th>
<th>DZL1.25-0.75/0.25-M</th>
<th>DZL2.0-0.75/0.25-M</th>
<th>DZL2.5-1.0/1.015/0.75-M</th>
<th>DZL3.0-1.015/0.75-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (MW)</td>
<td>0.7</td>
<td>1.4</td>
<td>2.1</td>
<td>2.8</td>
<td>4.2</td>
<td>5.6</td>
</tr>
<tr>
<td>Rated working pressure (MPa)</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Supply water temperature (°C)</td>
<td>96</td>
<td>96</td>
<td>95</td>
<td>95</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>Return water temperature (°C)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Circulation flow (m³/h)</td>
<td>24</td>
<td>48</td>
<td>72</td>
<td>98</td>
<td>80</td>
<td>106</td>
</tr>
<tr>
<td>Heated area (m²)</td>
<td>4.58/0.12</td>
<td>7.64/1.5</td>
<td>9.59/5.6</td>
<td>11.97/9.6</td>
<td>17.4/16.8</td>
<td>23.5/17.1</td>
</tr>
<tr>
<td>Boiler thermal efficiency (%)</td>
<td>80</td>
<td>80</td>
<td>81</td>
<td>81</td>
<td>83</td>
<td>85</td>
</tr>
<tr>
<td>Fuel consumption (kg/h)</td>
<td>179</td>
<td>268</td>
<td>331</td>
<td>577</td>
<td>603</td>
<td>748</td>
</tr>
<tr>
<td>Effective area of grate (m²)</td>
<td>1.8</td>
<td>3.04</td>
<td>3.34</td>
<td>5.14</td>
<td>6.12</td>
<td>10.8</td>
</tr>
<tr>
<td>Transportation size of boiler (mm)</td>
<td>4076</td>
<td>5290</td>
<td>5360</td>
<td>5250</td>
<td>6000</td>
<td>7400</td>
</tr>
<tr>
<td>length</td>
<td>1800</td>
<td>2240</td>
<td>2240</td>
<td>2700</td>
<td>3150</td>
<td>3200</td>
</tr>
<tr>
<td>width</td>
<td>2873</td>
<td>3400</td>
<td>3400</td>
<td>3814</td>
<td>4196</td>
<td>3660</td>
</tr>
<tr>
<td>Height</td>
<td>19.0/4.2</td>
<td>22.0/1.9</td>
<td>22.103</td>
<td>29</td>
<td>32</td>
<td>36</td>
</tr>
</tbody>
</table>

*Notes: This form only for your reference. If any change, please refer to factory technical documents.*
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

<table>
<thead>
<tr>
<th>Item/Model</th>
<th>EPO-D55/5.A</th>
<th>EPO-D65/6.A</th>
<th>EPO-D75/6.A</th>
<th>EPO-D85/6.A</th>
<th>EPO-D95/6.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated evap. capacity /t</td>
<td>95</td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Rated evap. pressure /MPa</td>
<td>3.8/2.4</td>
<td>3.8/2.4</td>
<td>3.8/2.4</td>
<td>3.8/2.4</td>
<td>3.8/2.4</td>
</tr>
<tr>
<td>Rated steam temperature /℃</td>
<td>420/350</td>
<td>420/350</td>
<td>420/350</td>
<td>420/350</td>
<td>420/350</td>
</tr>
<tr>
<td>Feed water temperature /℃</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Boilers' heated area /㎡</td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Radiation heating surface</td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Convection heating surface</td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Superheater</td>
<td>93</td>
<td>90</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Economizer</td>
<td>83</td>
<td>81</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Air preheater</td>
<td>12.5</td>
<td>17</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Fluidized bed area /㎡</td>
<td>1.75</td>
<td>1.75</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td>Available coal</td>
<td>Soft coal, Lean coal, Anthracite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design thermal efficiency %</td>
<td>90.3</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Available size of coal mm</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Gran size of desulfurizer mm</td>
<td>62</td>
<td>62</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Desulfurization efficiency %</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>CaO/S Ratio</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Hot air temperature (primary/secondary air) /℃</td>
<td>130/120</td>
<td>145/135</td>
<td>200/190</td>
<td>230/220</td>
</tr>
<tr>
<td></td>
<td>Exhaust smoke temperature /℃</td>
<td>156</td>
<td>156</td>
<td>156</td>
<td>156</td>
</tr>
<tr>
<td></td>
<td>Transportation weight of Min. parts (kg)</td>
<td>19436</td>
<td>19436</td>
<td>19436</td>
<td>19436</td>
</tr>
<tr>
<td></td>
<td>Outside dimension of after-installed (L×W×H) m</td>
<td>2.7×3.2×14.9</td>
<td>3.3×3.5×16.25</td>
<td>4.3×3.1×20.3</td>
<td>24.7×23×48.9</td>
</tr>
</tbody>
</table>

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, flue heat exchanger, especially for medium and large sized boiler.

Horizontal oil (gas)-fired steam boiler parameter

<table>
<thead>
<tr>
<th>Item/Type</th>
<th>WNS4-2.5/1.6-A</th>
<th>WNS4-2.5/1.6-A</th>
<th>WNS4-2.5/1.6-A</th>
<th>WNS4-2.5/1.6-A</th>
<th>WNS4-2.5/1.6-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity /t</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Rated working pressure /MPa</td>
<td>0.71/0.65</td>
<td>0.71/0.65</td>
<td>0.71/0.65</td>
<td>0.71/0.65</td>
<td>0.71/0.65</td>
</tr>
<tr>
<td>Design efficiency %</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Light oil kg/h</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Heavy oil kg/h</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Natural gas Nm³/h</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Chimney diameter</td>
<td>φ750</td>
<td>φ750</td>
<td>φ750</td>
<td>φ750</td>
</tr>
<tr>
<td></td>
<td>Lengest transportation size (L/mm)</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3400</td>
<td>3400</td>
<td>3400</td>
<td>3400</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LHS-0.15</th>
<th>LHS-0.20</th>
<th>LHS-0.25</th>
<th>LHS-0.30</th>
<th>LHS-0.35</th>
<th>LHS-0.40</th>
<th>LHS-0.45</th>
<th>LHS-0.50</th>
<th>LHS-0.55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power (kW)</td>
<td>130</td>
<td>135</td>
<td>140</td>
<td>145</td>
<td>150</td>
<td>155</td>
<td>160</td>
<td>165</td>
<td>170</td>
</tr>
<tr>
<td>Rated steam capacity (t/h)</td>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
<td>0.4</td>
<td>0.45</td>
<td>0.5</td>
</tr>
<tr>
<td>Rated working pressure (MPa)</td>
<td>0.6</td>
<td>0.65</td>
<td>0.7</td>
<td>0.75</td>
<td>0.8</td>
<td>0.85</td>
<td>0.9</td>
<td>0.95</td>
<td>1.0</td>
</tr>
<tr>
<td>Saturated steam temperature (°C)</td>
<td>182/179</td>
<td>192/198</td>
<td>202/208</td>
<td>212/218</td>
<td>222/228</td>
<td>232/238</td>
<td>242/250</td>
<td>252/258</td>
<td>262/268</td>
</tr>
<tr>
<td>Design efficiency (%)</td>
<td>&gt;80</td>
<td>&gt;85</td>
<td>&gt;90</td>
<td>&gt;95</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Heated area (m²)</td>
<td>2.55</td>
<td>4.9</td>
<td>5.05</td>
<td>6.2</td>
<td>7.3</td>
<td>8.4</td>
<td>9.4</td>
<td>10.4</td>
<td>11.4</td>
</tr>
<tr>
<td>Boiler water capacity (L)</td>
<td>300</td>
<td>300</td>
<td>310</td>
<td>330</td>
<td>340</td>
<td>360</td>
<td>380</td>
<td>400</td>
<td>420</td>
</tr>
<tr>
<td>Dia. (mm)</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Main steam tube diameter (DN)</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
<td>DN80</td>
</tr>
<tr>
<td>Safety valve diameter (DN)</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
</tr>
<tr>
<td>Blowdown valve diameter (DN)</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
<td>DN40</td>
</tr>
</tbody>
</table>

**Notes:** This form only for your reference, any changes 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 gas flow 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 prevents (±3°C) and good combustion effect.
- Automatic control functions, to extend the service life of equipment while saving human resources.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated thermal power</td>
<td>1000</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>5000</td>
<td>6000</td>
<td>7000</td>
<td>8000</td>
<td>9000</td>
</tr>
<tr>
<td>Design efficiency (%)</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Rated working pressure (MPa)</td>
<td>0.6</td>
<td>0.65</td>
<td>0.7</td>
<td>0.75</td>
<td>0.8</td>
<td>0.85</td>
<td>0.9</td>
<td>0.95</td>
<td>1.0</td>
</tr>
<tr>
<td>Max. working temperature (°C)</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Thermal oil capacity (m³/h)</td>
<td>0.3</td>
<td>0.35</td>
<td>0.4</td>
<td>0.45</td>
<td>0.5</td>
<td>0.55</td>
<td>0.6</td>
<td>0.65</td>
<td>0.7</td>
</tr>
<tr>
<td>Circulation oil capacity (m³/h)</td>
<td>0.35</td>
<td>0.4</td>
<td>0.45</td>
<td>0.5</td>
<td>0.55</td>
<td>0.6</td>
<td>0.65</td>
<td>0.7</td>
<td>0.75</td>
</tr>
<tr>
<td>Efficiency (KWh/kg)</td>
<td>2.3</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Diesel (KWh)</td>
<td>2.3</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Natural gas (KWh)</td>
<td>2.3</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Unleaded petrol (KWh)</td>
<td>2.3</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
</tr>
</tbody>
</table>

**Notes:** This form only for your reference, any changes please refer to factory technical documents.
**Horizontal Coal-fired Thermal oil Boiler**

**Product Description**

- Low steel consumption, high air leakage efficiency, high coal leakage volume, suitable for burning 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 security and reliability.
- Fast temperature rise, high thermal efficiency, overload capacity at a certain degree to ensure output of boiler.

**Horizontal Chain Grate Coal-fired Thermal oil Boiler**

<table>
<thead>
<tr>
<th>Model</th>
<th>1Y9-100/9.8-110</th>
<th>1Y10-100/9.8-110</th>
<th>1Y11-100/9.8-110</th>
<th>1Y12-100/9.8-110</th>
<th>1Y13-100/9.8-110</th>
<th>1Y14-100/9.8-110</th>
<th>1Y15-100/9.8-110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power (kW)</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
<td>2400</td>
<td>2600</td>
<td>2800</td>
<td>3000</td>
</tr>
<tr>
<td>Rated thermal efficiency (%)</td>
<td>279</td>
<td>279</td>
<td>279</td>
<td>279</td>
<td>279</td>
<td>279</td>
<td>279</td>
</tr>
<tr>
<td>Rated working pressure (MPa)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max working temperature (°C)</td>
<td>290</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>Thermal capacity (t/h)</td>
<td>1.5</td>
<td>3.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Circulating oil capacity (m³/h)</td>
<td>165</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Main valve size DN50</td>
<td>DN50</td>
<td>DN50</td>
<td>DN50</td>
<td>DN50</td>
<td>DN50</td>
<td>DN50</td>
<td>DN50</td>
</tr>
<tr>
<td>Whole system power kw</td>
<td>35</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Average fuel</td>
<td>AL, AL, AL or soft coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>21500</td>
<td>25000</td>
<td>24000</td>
<td>25500</td>
<td>26000</td>
<td>27000</td>
<td>28000</td>
</tr>
</tbody>
</table>

*Notes: This form only for your reference. Any changes, 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 Tons (0.7-2.8 MW)

**DZG series Fixed Grate Steam Boiler**

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>DZG3-0.71/0.7-J</th>
<th>DZG1-0.7/0.7-J</th>
<th>DZG2-0.7/1.25-J</th>
<th>DZG4-0.7/1.25-J</th>
<th>DZG5-0.7/1.25-J</th>
<th>DZG6-0.7/1.25-J</th>
<th>DZG7-0.7/1.25-J</th>
<th>DZG8-0.7/1.25-J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity (kW)</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
<td>2400</td>
<td>2600</td>
<td>3000</td>
<td>3200</td>
<td>3500</td>
<td>3800</td>
</tr>
<tr>
<td>Rated steam pressure (MPa)</td>
<td>0.71/0.7</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>Rated steam temperature (°C)</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>Feed water temperature (°C)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Heated area (M²)</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
<td>2.3/3.6</td>
</tr>
<tr>
<td>Suitable fuel type</td>
<td>Soft coal, biomass, coke, coal, oil, gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler heat efficiency (%)</td>
<td>76</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>Fuel consumption (kg/h)</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Effective area of grate (M²)</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
<td>3.96</td>
</tr>
<tr>
<td>Transportation length (m)</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
</tr>
<tr>
<td>Transportation width (m)</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
</tr>
<tr>
<td>Transportation size (m²)</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
<td>3782</td>
</tr>
<tr>
<td>Weight of the largest parts of the boiler (t)</td>
<td>8.3/8.4</td>
<td>11/11.1/11.5</td>
<td>15/15.5/18</td>
<td>24</td>
<td>8.3</td>
<td>11</td>
<td>15.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>No.</th>
<th>Specification</th>
<th>Max. Design Pressure (Mpa)</th>
<th>Working Pressure (Mpa)</th>
<th>Design Temperature (°C)</th>
<th>Working Temperature (°C)</th>
<th>Medium</th>
<th>Dia. (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62×11</td>
<td>1.4</td>
<td>1.3</td>
<td>198.34</td>
<td>194.13</td>
<td>Satinust steel</td>
<td>22.1±29±2.273</td>
</tr>
<tr>
<td>2</td>
<td>62×11×1.5</td>
<td>1.6</td>
<td>1.5</td>
<td>203</td>
<td>200</td>
<td>Satinust steel</td>
<td>33.2±4.4±3.44</td>
</tr>
<tr>
<td>3</td>
<td>62×11×1.5</td>
<td>1.6</td>
<td>1.5</td>
<td>203</td>
<td>200</td>
<td>Satinust steel</td>
<td>40.95±4.8±4.35</td>
</tr>
<tr>
<td>4</td>
<td>63×6×8×8</td>
<td>1.6</td>
<td>1.6</td>
<td>205</td>
<td>205</td>
<td>Satinust steel</td>
<td>27.4±3.55±4.504</td>
</tr>
<tr>
<td>5</td>
<td>63×6×8×8</td>
<td>1.6</td>
<td>1.6</td>
<td>205</td>
<td>205</td>
<td>Satinust steel</td>
<td>40.95±3.55±4.504</td>
</tr>
</tbody>
</table>

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

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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Design Pressure (Mpa)</th>
<th>Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.6-3.2</td>
<td>14~1320</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Tubular Heat Exchanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
</tr>
<tr>
<td>Diameter</td>
</tr>
<tr>
<td>Exchange area</td>
</tr>
<tr>
<td>Working pressure</td>
</tr>
<tr>
<td>Working temperature</td>
</tr>
<tr>
<td>Max. Loading Capacity</td>
</tr>
</tbody>
</table>

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, tight industry, power system, mine, pharmaceutical and central heating, etc.

<table>
<thead>
<tr>
<th>Plate Heat Exchanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
</tr>
<tr>
<td>Diameter</td>
</tr>
<tr>
<td>Exchange area</td>
</tr>
<tr>
<td>Working pressure</td>
</tr>
<tr>
<td>Working temperature</td>
</tr>
<tr>
<td>Max. Loading Capacity</td>
</tr>
</tbody>
</table>
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.

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

Local Sole Agent
UEEG Limited
Unit #320, Block C-3rd Floor, Pearl Condo, Kabaraye Pagoda Road
Yangon, Myanmar
Ph: +95 9 965 655 682, +95 9 972721090
Email: UEEGLimited@outlook.com
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% O2. The Fulton Low Emissions Burner is also under 20 ng NOx/kWh 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 for any application. Fulton’s custom built, factory skid mounted and pre-piped equipment save a tremendous amount of time and work on the job site.
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 turn upward in the secondary flue passage, traveling over the load 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.

The Fulton Difference

Pipe vs. Tube

Sixty years after creating the vertical tubeless category of boilers, Fulton has introduced another innovation—the Pipeline Boiler. Constructed of Schedule 80, heavy wall pipes, the Pipeline Boiler 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 samples of our "Pipe vs. Tube."
### Project References (2015-2016)

#### 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

### Our Company Services
2. Steam Plant Designing Services.
5. Boiler Accessories Fabrication Services.
7. Piping Services (steam, hot water & oil).
8. Valves Supply & Install.
11. Hot Water Solution for Hotel & Factory
13. One Stop Solution/Turn key Supplier.

### United Expertise Engineering Group

Contact us:
Unit #320, 3rd Floor, Building C, Pearl Condo,
Corner of Sayasan Road & KabaAye Pagoda Road, Yangon, Myanmar.
Phone: +9595055682, +95972721090,
Office: +95965055682,
Mail: ueeclimited@outlook.com
EPCB (QingDao East Power Industry)

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)

Fulton (Hangzhou Thermal equipment)

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 convention 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 duel fuel automatic high/flow 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.

SECA Valve

- 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