LNG Power Plant (Ahlone) Project in Yangon, Myanmar

October 29th, 2018
Objective

- To introduce the Project and the ESIA Team.
- To present the Project information.
- To present the ESIA Process including scope of work for ESIA Study.
- To present the Stakeholder Engagement Process.
- To obtain your insights and feedback on the Project including ESIA and Stakeholder Engagement Process.
TTCL Power Myanmar Company Limited (TPMC)

TPMC
TPMC is a project company set up by TTCL Public Company Limited. TPMC was established to carry out the Development, Operation & Maintenance of this proposed project.

TTCL
- TTCL Public Company Limited (TTCL) is the first integrated Engineering, Procurement and Construction company in Thailand as well as an investor especially in power sector.
- Established in 1985 by Toyo Engineering Corporation (TEC), a leading Engineering Company from Japan.
- 8 Subsidiary and Affiliate Companies in 3 continents around the world.
- Its experience in Myanmar include:
  - Aviation Fuelling System for the Mandalay International Airport in 1997.
  - 121MW Combined Cycle Gas Turbine Power Plant in Ahlone, Yangon in 2012.
  - Oil & Gas Terminal Construction in Thilawa Industrial Zone in 2018
TTCL’s Business

Engineering  – 2,700 staffs, Offer all areas of engineering fields.

Procurement  – 30 years experience, Strong network with suppliers.

Construction  – 230 successful projects, Proven work quality records.

Investment  – 7 projects worldwide, especially in power sector
TTCL is trusted by many leading international company around the world.
The ESIA Team

ERM is the certified independent third party consultant responsible for conducting the Environmental and Social Impact Assessment (ESIA) for this project.

ERM’s Selected Project Experience – Power Sector:

1. Scoping and High-level Environmental and Social Impact Assessment (ESIA) ESIA - 1,280 MW Thermal (Coal) Power Plant - Mon State
2. Initial Environmental Evaluation (IEE) - 500 MW Thermal (Combined Cycle Gas) Power Plant - Ayeyarwady Region
4. ESIA – 300 MW HFO Power Plant - Yangon
5. IEE – 50 MW HFO Power Plant – Bago Region
6. ESIA – 1280 MW Thermal (Coal) Power Plant – Kayin State
7. ESIA – 200 MW Thermal (Gas) Power Plant - Tanintharyi Region
8. EIA – 60 MW HFO Power Plant – Bago Region
9. ESIA – FSRU, 1,200 MW Thermal (Gas) Power Plant and 400km 500kV Transmission Line - Tanintharyi Region
10. ESIA – FSRU, 1,000 MW Thermal (Gas) Power Plant and 135 km 500kV Transmission Line – Yangon Region
11. ESIA – FSRU and 2,300 MW Thermal (Gas) Power Plant and 500km 500kV Transmission Line – Rakhine State
12. ESIA – 230 MW Hydropower Plant – Shan State
13. EIA - Gas to Power Plant Project - Yangon Region
14. ESIA - Power plant, Gas Pipeline and LNG Terminal - Yangon Region
15. ESIA - 113 MW Wind Farm and 58km Transmission Line - Magway Region
16. ESIA - 50 MW Wind Farm and 115km Transmission Line - Magway Region
17. ESIA - 50 MW Wind Farm and 19km Transmission Line - Magway Region
18. ESIA - 50 MW Wind Farm and 49km Transmission Line - Magway Region
The ESIA Team

For this Project, ERM has teamed up with Sustainable Environment Myanmar Co., Ltd (SEM).

SEM is the Myanmar EIA license holder supporting ERM on the development of the ESIA.

ERM Key Personnel involved in Preparation of the Scoping Study

<table>
<thead>
<tr>
<th>Name</th>
<th>Project Role</th>
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<tbody>
<tr>
<td>Ms. Kamonthip Ma-oon</td>
<td>Partner in Charge</td>
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<tr>
<td>Dr. Robin Kennish</td>
<td>Project Technical Director</td>
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<tr>
<td>Mr. Vincent Lecat</td>
<td>Project Manager and Social Specialist</td>
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<tr>
<td>Mr. Chris Brown</td>
<td>Soil / Water Specialist</td>
</tr>
<tr>
<td>Mr. David Nicholson</td>
<td>Biodiversity Specialist</td>
</tr>
<tr>
<td>Mr. Edmund Taylor</td>
<td>Air Quality Specialist</td>
</tr>
<tr>
<td>Ms. Khinsusu Naing</td>
<td>Public Consultation Specialist</td>
</tr>
<tr>
<td>Ms. Sarinya Rangsipatcharayut</td>
<td>GHG Specialist</td>
</tr>
<tr>
<td>Ms. Sylvia Jagerroos</td>
<td>Marine Specialist</td>
</tr>
<tr>
<td>Ms. Mandy To</td>
<td>Noise Specialist</td>
</tr>
<tr>
<td>Ms. Peggy Wong</td>
<td>Cultural Heritage Specialist</td>
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<tr>
<td>Ms. Kanokphorn Chaivoraphorn</td>
<td>Health Specialist</td>
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SEM Key Personnel involved in Preparation of the Scoping Study

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Mr Zaw Naing Oo</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Mr Maung Chit</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Ms Nan Cherry</td>
<td>Social Specialist</td>
</tr>
<tr>
<td>Daw Naing Naing Win</td>
<td>Local Ecology Expert</td>
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</table>
Project Components

- 388MW Combined Cycle Gas Turbine Power Plant.
- Fuel is imported Liquefied Natural Gas (LNG).
- Fuel is transported by LNG Carrier to LNG Receiving Terminal.
- LNG receiving Terminal, and natural gas (NG) pipeline to Power Plant.
- 230 kV Transmission line
- The generated electricity from the project will supply to Yangon Region through Myanmar Grid sold to the Myanmar Grid.
Project Overview and Location

LEGEND

- LNG Terminal
- Pipeline (Tentative route)
- Power Plant
LNG Power Plant (Ahlone) Project CCGT

LEGEND

- Yangon River
- Water Tank
- Extension of switch yard
- Cooling Tower and Water System
- Gas and Steam Turbines
- Stack
What is LNG?

- Liquefied Natural Gas (LNG) is natural gas that has been converted into liquid form.
- Takes up 1/600th the volume of natural gas.
- -160 degrees Celsius, for ease of transportation.
LNG Value Chain

Transportation

Regasification Process

Power Generation
LNG Terminal & Mooring System

Key Components:

- Jetty – Single Birth
- 2x LNG Tanks (Full containment type double wall tank)
  - Capacity (per tank): 19,000 m³
- Regasification Unit (RU)
- Open Rack Vaporizers (ORV)
- Intermediate Fluid Vaporizers (IFV)
Natural Gas Pipeline (Tentative Design)

Key Components:

- Carbon steel material pipe (Dia 14 inches)
- Design pressure of approximately 52.6 barG.
- Health & Safety System
  - Pressure detection
  - Emergency shutdown system
  - Main block valve stations between LNG Terminal & Power Plant
  - Cathodic Protection System for pipe line

LEGEND

- Pipeline
Pipeline Construction Method

**Open Cut** – A method that involves excavating down to a specified depth, to place pipeline line underground. Excavated material is then backfilled, and warning signs are places along the pipeline path. The backfilled area is also remediated back to its natural condition.

**Boring** – A method used to install pipes below physical obstructions such as rivers, roads, buildings, infrastructure, and other obstacles. Involves excavating at each end of where the pipe will enter and exit. Drilling equipment is lowered into one of the excavated areas, and will on the pipeline alignment. Pipes can then be inserted into the drilled hole.

**Horizontal Directional Drilling (HDD)** – A method used for installing pipes below physical obstructions, by a guidable drill head. This method is effective for large physical obstructions (approximately 500-2,000 meters), or when open cut method is not practical.
Pipeline Construction: Open cut design

1.5 M (MIN) GROUND LEVEL
EXCAVATED SOIL COMPACTION IN LAYERS OF 0.20 M
PVC PIPELINE WARNING SIGN
CONCRETE SLAB
(MIN) SAND
(MIN) PADDING SAND

1.5 M
0.2 M
0.5 M
0.3 M
0.15 M
Pipeline Construction

LEGEND

- Pipeline sections that will use HDD method
- Pipeline
- Power plant
Indicative EIA and Project Schedule

- **Screening/Scoping:** March 2018
- **Baseline studies:** Apr 18 — Sep 18
- **Impact assessment:** November 2018
- **Management measures:** December 2018
- **Reporting:** Jan 2019

**Public Participation Meetings:**
- **Meeting 1:** Start of Construction: Middle of 2019
- **Meeting 2:** Start of Operation: TBC

**Key Dates:**
- **Completion of ESIA:** First Quarter of 2019
- **Start of Construction:** Middle of 2019
- **Start of Operation:** TBC
Environmental and Social Impact Assessment (ESIA) Study

An environmental and social impact assessment is being undertaken to better understand the potential impacts associated with the project.

The assessment is being undertaken in line with both Myanmar requirements and international standards, such as International Finance Corporation (IFC), World Bank Group, and other associated guidelines.
ESIA Process Scoping

Scoping report is the means to ensure that there is a focus on the issues that are most important for the Project, which defines the scope of the ESIA study.

**Baseline Studies** are undertaken to establish an understanding of the existing environment to cover rainy and dry seasons.

**Impact Assessment** identifies what impacts are likely to occur as a result of the Project – i.e. how will the baseline change.

**Management Measures** are designed to minimise the likely negative impacts and enhance the positive benefits.

**Reporting** will be monitored to ensure they are effective in minimising the impacts.
Study Area

- **Power Plant** – 5 km
- **LNG terminal** – 5 km
- **Pipeline** – 500 m each side
Baseline survey

Within the study area, baseline surveys have been conducted during the dry season, and wet season. The baseline surveys involve monitoring the following aspects.

- Surface water
- Sediment
- Ground water
- Soil quality
- Air quality
Proposed Studies: Power Plant

<table>
<thead>
<tr>
<th>Phase</th>
<th>Proposed Studies</th>
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<tbody>
<tr>
<td>Construction</td>
<td>■ Air</td>
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<tr>
<td></td>
<td>■ Noise</td>
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<tr>
<td></td>
<td>■ Traffic</td>
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<tr>
<td>Operation</td>
<td>■ Air</td>
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<tr>
<td></td>
<td>■ Thermal discharge</td>
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<td></td>
<td>■ Surface water</td>
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## Proposed Studies: Natural Gas Pipeline

<table>
<thead>
<tr>
<th>Phase</th>
<th>Proposed Studies</th>
</tr>
</thead>
</table>
| Construction | ■ Air  
                      ■ Noise  
                      ■ Surface water & sediment for HDD |
| Operation | ■ Public health & safety  
                      ■ Unplanned events |
## Proposed Studies: LNG Terminal/Mooring System

<table>
<thead>
<tr>
<th>Phase</th>
<th>Proposed Studies</th>
</tr>
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</table>
| Construction | Surface Water  
|          | Aquatic  
|          | River traffic  
|          | Air  
|          | Noise  |
| Operation | Cold water discharge  
|          | Surface Water  
|          | Aquatic  
|          | Sedimentation  
|          | Air  
|          | Public health & safety  
|          | Unplanned events |
Stakeholder Engagement Process

The objectives of stakeholder engagement include to:

- provide information as well as ensure that stakeholders have access to information regarding the proposed Project;
- incorporate stakeholder knowledge and experience into the ESIA studies, and enable stakeholders to input into the development of impact management and mitigation measures; and
- meet Myanmar and international requirements for Impact Assessments.
Stakeholder Engagement

Engagement will continue throughout the duration of the ESIA and the life of the Project. Next steps include:

- Deployment of the grievance mechanism
- Social Baseline (engagement with local communities and authorities)
- Public Participation meeting No.2 for the presentation of the draft ESIA
- Disclosure of the final ESIA
Grievance Mechanism

A part of the engagement process, a grievance mechanism has been established.

- The Grievance Mechanism is available to all stakeholders.
- You can use it if you have any issue, concern, comment or question on the ESIA process.
- Details included in the brochure provided.

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Thank you