LNG DEMAND AND INFRASTRUCTURE TO SUPPORT POWER GENERATION

BATAM REGASIFICATION PROJECT
ENSURING FUEL SECURITY FOR BATAM OPERATIONS
MEDCO POWER INDONESIA

15 September 2016
Medco’s contribution in Indonesia’s energy mix

**Block A:** Monetization of 400 BCF gas for industry and electricity. Upsides potential of 10 TCF (80% CO₂ content) in Kuala Langsa

**Nunukan:** Medco operates two coal mining areas and supplies high caloric coal to meet energy demand

**Simenggaris:** Monetization of 150 BCF of stranded gas through Mini LNG project. Exploration continues with upside potential up to 100 MMBOE

**Sarulla Geothermal:** Development of 330 MW, the single largest geothermal contract in the world. Upside potential up to 1,000 MW

**Rimau:** EOR (Enhanced Oil Recovery) project to recover approx. 60 MMBO with surfactant and polymer

**Senoro Toili:** Monetization of 2 TCF gas through LNG development, where upstream and LNG plant are two separate business entities for the first time. Commissioning completion targeted by Jun 2015

Medco contributes approx. US$ 1 billion per year to Government of Indonesia from tax and oil/gas profit split in the last 13 years
Medco expanding in MENA countries to look for more hydrocarbon

Medco in Tunisia:
Acquired 8 new E&P blocks to enhance producing asset portfolio

Block 82, 9 (Yemen):
Continue adding assets and developing the existing producing block

Area 47 (Libya):
18 out 20 exploration wells with discovery (90% success rate). To date, technical resources up to 600 MMBOE. Commenced development of 50,000 BOPD facilities from 6 discovered fields to be slated by 2017 (Phase-1). Exploration and appraisal continue to capture more upside potentials on remaining 10 discovered fields (Phase-2)

KSF (Oman):
Triple-up production rate. Secondary Waterflood started and EOR is understudy. Exploration will continue to discover more oil

In addition, MedcoEnergi adding more blocks in Oman (Block 56), Papua New Guinea (PPL 470) and looking for other E&P opportunity
Indonesia LNG Regasification Projects

### Indonesia LNG Regas Infrastructures

- Intervention of Minister of State Owned Enterprise (ESDM) have provided a greater clarity to the outlook for regasification infrastructure development within Indonesia
  - Conversion of of Arun liquefaction facility to a regasification terminal
  - Redeployment FSRU (PGN) from Belawan, Medan to Lampung South Sumatera to open Java gas market.
  - Java Regas Terminal (Pertamina-PGN) and Central Java Regas Terminal (Pertamina) should supply to PLN Power Plant
  - LNG Facilities / Receiving Terminal for power plant in in eastern area of Indonesia.

### Arun LNG Conversion
- ARUN Regasification & Landed Terminal
- Capacity: 1.5 MTPA

### FSRU Central Java
- Capacity: 3 MTPA
- Project Owner: Pertamina
- On stream Target: 2015
- Main Consumer: PLN Power Plants
- LNG Source: Domestic / other source

### FSRU West Java (Nusantara Regas -1)
- Capacity: 3 MTPA (Golar LNG)
- Project Owner: JV Co., PT. Nusantara Regas Pertamina (60%) – PGN 940%
- On stream Target: 2012
- Main Consumer: To connect to existing SSWJ I and II for Java Market (Cilegon and Bekasi)

### Small Scale LNG for eastern Indonesia
- Location: Maros-Tanjung Batu (LNG Trucking), Likupang, Halmahera, Pomalaa, Pesanggaran
- Total Capacity: 1 MTPA
- Main Consumer: PLN
- Project Owner: Pertagas (65%) dan Indonesia Power (35%)
BATAM Overview

ENERGI LISTRIK BATAM

Mitra Energi Batam
Dalle Energi Batam
Batam Island – Projected Gas Demand

Current Fact:
• Batam electricity capacity is about 451 MW, included Industrial Area
• Current Gas Consumption in Batam: 81 MMSCFD
• MPI supplies 300 MW (estimated 64% of total electricity supply in Batam) and committed to supply 120 MW by next year

Projection:
• Additional capacity will be around 380 MW, thus will require additional 61 MMSCFD of Gas
• Another potential gas market will be from conversion of PLN & Industrial PLTD, estimated about 29 MMSCFD
## Gas Fuel Demand in Batam

### Attachment-1 Natural Gas Demand Projection In Batam

<table>
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<tr>
<th>No</th>
<th>Company</th>
<th>Type</th>
<th>Unit</th>
<th>Location In Batam</th>
<th>COD</th>
<th>Capacity and Gas Demand by year</th>
<th>Remarks</th>
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<td>PLTGU</td>
<td>Panarai I</td>
<td>A</td>
<td>2004</td>
<td>82 82 82 82 82 82 82 82 82</td>
<td>60MW (Gas Turbine) + 22MW (Combine Cycle)</td>
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<td>PLTGU</td>
<td>Panarai II</td>
<td>A</td>
<td>2005</td>
<td>82 82 82 82 82 82 82 82 82</td>
<td>60MW (Gas Turbine) + 22MW (Combine Cycle)</td>
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<td>4</td>
<td>UBE (MPI)</td>
<td>PLT5</td>
<td>UBE</td>
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<td>2015</td>
<td>70 70 100 100 100 100 100 100 100</td>
<td>will be converted to PLTGU in 2017</td>
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**Subtotal**

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**Total**

|        |        |        |        |        | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    |
|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|        | 172    | 172    | 172    | 172    |        | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    |
|        |        |        |        |        |        | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    |
|        | 474    | 474    | 474    | 474    |        | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    | MW    |

### Gas Demand by Area in Batam

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<td>113</td>
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<td>142</td>
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**Notes:** The Power Line GRID Transmission Batam to Rintam Island will be ready in Q3 2016. Max./Min. flow rate is +/- 6% of the average daily rate in the above table.
CONCLUSIONS

- In 2016, gas demand of Batam Power, Batam Captive and Industry will reach 125 MMCFD while the supply from contracted and committed gas from South Sumatera and Natuna is about the same at 125 MMCFD level.
- Since 2016, the gas supply is decline while the demand increase.
- In 2020 the South Sumatera corridor gas contract in Batam expires.

ENSURING GAS SUPPLY TO BATAM

Gas Supply Security

To secure gas supply in Batam and our power plant asset (that supply more than 60% electricity in Batam),
1. There is a strong need to built “own gas supply facility in Batam
2. Maximize nearby gas usage as per DMO Obligation, such as:
   - Gajah Baru field
   - Potential of ARUN LNG Receiving Terminal

Provide LNG Regas Terminal

- By providing LNG to Batam and LNG Regas Terminal, will ensure gas sustainability in Batam and fuel security for Batam Power assets.
- LNG Regas Terminal can be:
  - Landed based LNG Regasification
  - FSRU / Floating Storage Regasification Unit
- Since land cost is no issue, hence Landed based LNG Regasification will be the choice.
Indonesia Gas Demand
- With an average GDP forecast growth rate of 5.2% over the next decade, Indonesia is positioned to expand rapidly in its energy demand.
- In the near term, gas demand in power sector is forecast to grow strongly, going up by more than 40% by 2016.

Arun
- Capacity: 12.3 MTPA (design) – 6 trains
- Current Operation: 1 – 2 trains
- Production: 1978 – now
- PSC Gas Producer: Exxon Mobil Oil Indonesia (EMOI)

Badak
- Capacity: 22.5 MTPA (design) – 8 trains
- Current Operation: 6 – 7 trains
- Production: 1977 – now
- PSC Gas Producer: Total, VIOO, Chevron

Tangguh
- Capacity: 7.6 MTPA
- Current Operation: 2 trains
- Production: 2009 – now
- PSC Gas Producer: BP Berau et. al.

Masela
- Capacity: 2.5 MTPA
- Project Status: POD Approved
- Start-up plan: 2016

Donggi Senoro
- Capacity: 2 MTPA
- Project Owner: Sulawesi LNG Development Ltd. (59.9%), PT. Pertamina Hulu Energi (29%) and PT. Medco LNG Indonesia (11.1%)
- Status: EPC
- Start Up Plan: End of 2014

FSRU West Java
- Capacity: 3 MTPA
- Project Owner: JV Co. PT. Nusantara Regas Pertamina (60%) – PGN 940%
- On stream Target: 2012
- Main Consumer: PLN Power Plants (Tanjung Priok dan Muara Karang)

FSRU Central Java
- Capacity: 3 MTPA
- Project Owner: Pertamina
- On stream Target: 2012
- Main Consumer: PLN Power Plants
- LNG Source: Domestic / other source

Future Modification of LNG Liquefaction Plant in Arun into LNG receiving Terminal.
Planned: 1.5 MTPA Regas Term

Natuna D Alpha
- Remaining gas reserve: 46 Tcf (exclude CO2)
- Scheme: LNG / Pipeline gas
- Supplying field participants: Pertamina – 100%
  (Partner selection process)
Batam LNG Regasification Project

- MPI
- PLN Batam
- Investors

**JV Company**

**Batham LNG Regasification**

- LNG Supplier
- LNG Transport Provider
- O&M Services Regas and Pipeline
- EPC Pipeline
- OFFTAKER
  - MPI
  - PLN
  - IPP
  - Industrial
Concept of the LNG Receiving Terminal

Hub & Spoke Concept

LNG from Various Sources

Indonesia

USA

Qatar

Heterogeneous LNG – Sources

LNG Receiving Terminal (Hub)

LNG Marine Transportation

LNG Shuttle Tanker (Spoke)

Surrounding Islands

Power Plants

LNG Satellite

Pipeline (Spoke)

Batam Island

Power Plants
Kabil Industrial Area in Batam

Kabil Site Map of MPI FS

25 August 2015

JFE Engineering
Cross Section
LNG Receiving Terminal concept

- LNG TANKER
- JETTY HEAD (50 x 300 x 6) m
- TRESTLE / LNG KRYO PIPING / WALKWAY
- DRAFT 12–15 m
- LNG Tank & Regas
- Offloading Arm Facility
- Onshore LNG Receiving Terminal
- OPEN SEA
- JETTY PILLING
- SEA BED
- Anchoring Handling
# Project Schedule

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**MPI Conceptual Study +FS**

- MOU: 2015.06, 2015.12

**MPI FEED (Spec for EPC)**

- 2016.07: ITB
- 2017.05: EPC Contractor Selection
- 2018.02: ...

**MPI EPC (Batam)**

- 2020.12
Current Status

Completed Feasibility Study:

- Phasing and Process Case Study
- Natural Gas Demand Projection
- Site Selection
- Plot Plan Study
- Selection of LNG Tank Type
- FS Schedule
- EPC Schedule
- Permit Acquisition Strategies
- Process Flow Diagram
- Equipment List
- Risk Analysis
- Economics Model
- Class V OPEX and CAPEX
- Project IRR projection
THANK YOU
BATAM GAS SUPPLY

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**BATAM GAS MARKET BALANCE**

- In 2016, contracted gas will be insufficient to meet demand and more gas must be allocated in this market.
- A similar situation crops up in 2020, as South Sumatera Corridor gas expires. All the power plant that currently depend on this block will need to be replaced, LNG regasification.
- Beyond 2025 additional gas supplies from Natuna or other field is required or LNG supply to supplement the demand.

LNG Potential Supply

LNG Plant in South East Asia and Australia

[Map showing locations of LNG plants in South East Asia and Australia such as Brunei LNG, M-LNG, Badak LNG, Sulawesi/DS-LNG, Tangguh LNG, Arun LNG, Natuna LNG, Masela LNG, Sunrise LNG, Prelude LNG, Darwin LNG, Pluto LNG, Ichthys LNG]