HOW LNG PROJECT IS PREPARED
(STUDY CASE TANGGUH TRAIN 3 DEVELOPMENT)

6’TH ANNUAL LNG TRANSPORT, HANDLING 7 STORAGE
FORUM BALI 15 SEPTEMBER 2016

AGOES SAPTO RAHARDJO
HEAD OF TANGGUH TRAIN3 PROJECT ACCELERATION
UNIT
TRAIN-3 PROJECT DEVELOPMENT

- Scope of expansion project
- Capital investment management model
- Project contracting strategy
- Environment license (AMDAL)
- Financing
- LNG sales (market)
- National and domestic content (TKDN)
- Multiplier effect (Nation & local)
TRAIN-3 PROJECT SCOPE

On Shore Facilities

- Bulk Offloading Facilities (BOF)
- New jetty
- New TRAIN – 3 & Utilities

Offshore facilities & pipelines

Off Shore Facilities

Legend:
- Offshore
- Shore
- 1st Phase Platform
- 2nd Phase Platform
- Existing Platform/Facility
- Existing Pipeline
- Proposed Pipeline

Bintuni Bay, West Papua

PRIVATE AND CONFIDENTIAL
TANGGUH TRAIN-3 EXPANSION PROJECT MILESTONE

- Location
- Basic engineering design
- Environment issues
- Social concerns

FID
Final Investment Decision
Q2 2016

Capex
Finance
Market

TRAIN - 3
On STREAM
2020

Environmen
License
(AMDAL)
2013 - 2014

Plant Of
Development
Q4 2012

Pre- FEED
2012

FEED
2014 - 2016

➢ Capex
➢ Finance
➢ Market

➢ Conceptual Design (BOD)
➢ Market assessment for FEED + EPC
➢ Tender for FEED + EPC

➢ Duplication of train 1 & 2
➢ Enhancement performance from operating lesson learn

Permit
71 Onshore
46 Offshore

EPC
2016 -
2019

➢ Dual FEED + EPC
➢ Q4 2014 start FEED

Permit
71 Onshore
46 Offshore

Project Scope
### CAPITAL INVESTMENT MANAGEMENT MODEL

**Business Opportunities Identification**
- Assess
- Select
- Design
- Construct
- Operate
- Evaluate

**Equity Sunk Cost**
- Many Business Options... Single Business
- Many Design Options... Fixed Design
- Many Ways to Construct... Certain Ways to Construct
- Many Ways to Operate... Certain Ways to Operate

**Front End Loading (FEL) to Avoid Changes**
- No Changes

**Equity and/or Loan**
- Was The Selected Business Good?
- Was The Selected Design Good?
- Was The Selected Construction Good?
- Was The Operation Good?

**PRIVATE AND CONFIDENTIAL**
PROJECT CONTRACTING STRATEGY

Dual FEED + EPC Contracting Strategy
• Allows the award of the execution of the project to the winning FEED contractor after FEED completion
• Competition on EPC commercial proposal between two contractors
• Saving project schedule
• Minimize the potential change order
• Extra cost involved due to paying two FEED design (produced by both contractors)
• Contractor are expected to propose optimization accordance to project standardization philosophy. *(Based on existing train 1 & 2 facility and operation lesson learns)*

Requirement
• The FEED + EPC work shall be performed by experiences contractor
• Contractor shall accommodate several given selected technology
DUAL FEED + EPC CONTRACTING STRATEGY

Objective
✓ EPC price competition
✓ Design optimization
✓ Accelerate process
✓ Minimizing change order

Requirement
✓ The consortium contractor lead by Indonesia company
✓ The National content is 35%

Embedded Owner Team A
Bidders A → Develop FEED Technology X, Y, Z → EPC Commercial Proposal

Bidders C → Develop FEED Technology X, Y, Z

Embedded Owner Team C

EPC Contract Winner C
More than 50% of flaws originate from the development phases.

Ref. Shell FPD - Flawless® Project Delivery

THE POSSIBLE RISK OF PROJECT SCOPE DEFINITION

- Planning cost is relatively low compared to total project cost
- But Planning has the highest impact on project cost
- Design, engineering and construction have less impact to project cost
- Bad planning & un-clear project definition will impact to cost overrun & project delay
DETERMINING THE PROJECT CAPITAL EXPENDITURE

LNG Capex in USD/MTPA LNG?

1. The real cost will be subject to
   - Green field or brown field project
   - Complexity of design (FEED)
   - Location
   - Infrastructure availability
   - Labor Productivity
   - Logistic
   - Contractor experience
   - Market competition

2. Several techniques of estimating
   - Analogous
   - Parametric
   - Bottom up

Ref. KBR Presentation, typical LNG plant capex
PLN will require approx. 23.3 MMSCFD gas to support electricity program for West Papua, and approx. 56.7 MMSCFD gas for the whole Papua.

The similar program for Maluku will require approx. 53.5 MMSCFD gas.

Study now is being conducted to identify the optimum & efficient strategy to distribute the LNG for the several definitive locations (decided by PLN).

The study will give an infrastructure development road map to support the electricity program,

- Developing jetty & other required infrastructure
- Developing small size re-gas terminal
- Developing small size LNG carriers
- Proposing location for LNG Hub
THANK YOU