



The Malampaya Moment

Keeping the lights on in the Philippines

Antoine Blik
Project Manager, Malampaya 2&3

Malampaya Asset

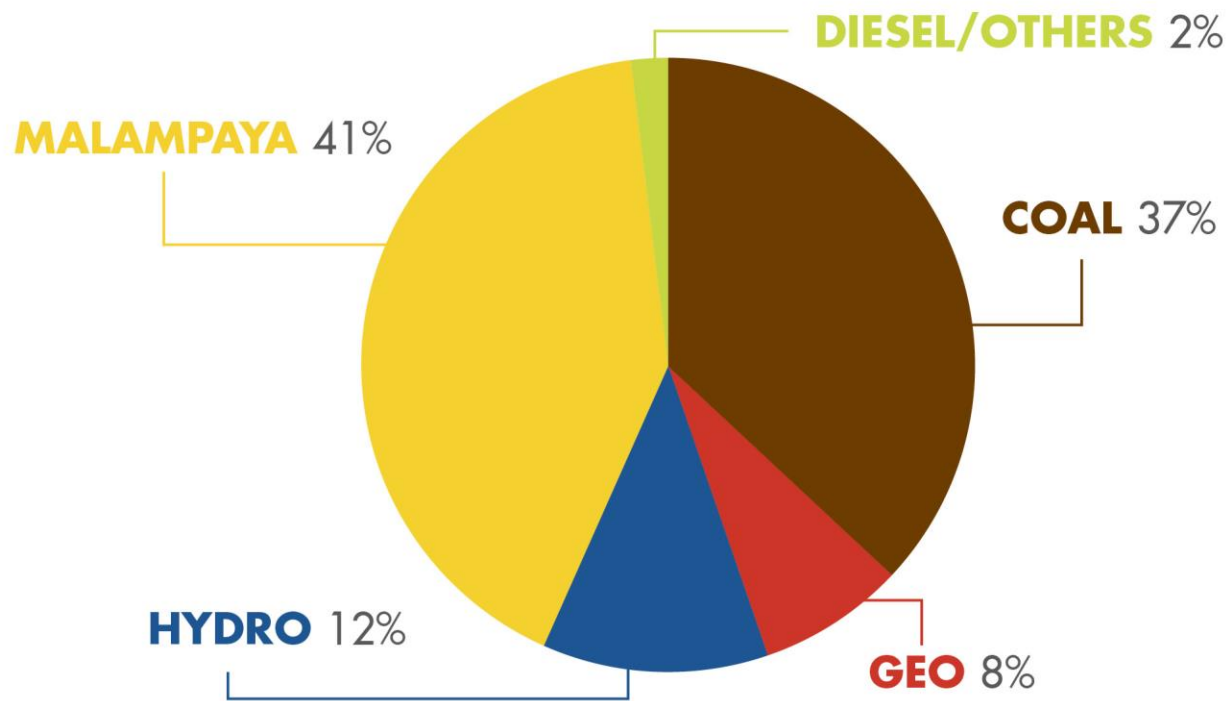
Overview:

- Reservoir : Deep water, gas carbonate
- Wells : 5 subsea wells in 820m water
- Flowlines : 2 x 28km CRA flowlines
- Platform : Concrete gravity base platform in 43m water, offshore dehydration, continuous MeOH injection, 2x26 MW gas turbine driven export compressors, condensate stabilized offshore stored in the gravity base structure, export via CALM buoy, remote control from Onshore Gas Plant
- Pipeline : 504 km 24" gas export pipeline
- Gas plant : Onshore treatment plant uses amine process to sweeten and mole sieves to dehydrate the landed sour gas. Currently operating in Dry Gas Mode (i.e. low H₂S)
- Customers: Gas sold to 3 power stations (design 2700 MW)
- Capacity : 528 MMscfd of gas 32,800 bbl/d of condensate
- Reserves : 2.6 Tcf proven and 3.3 Tcf expectation

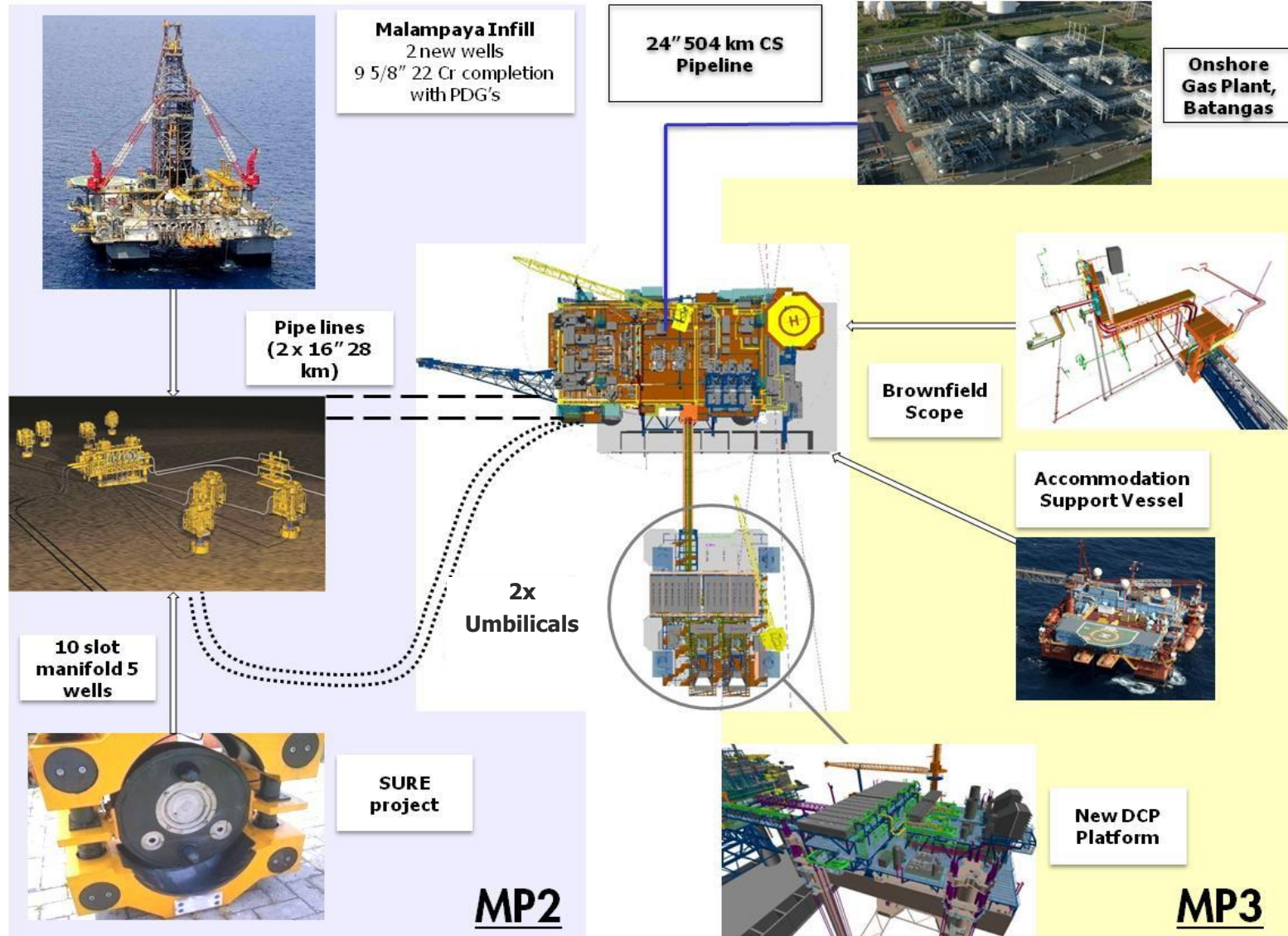


Power Make-up

Malampaya meets 40-50% of Luzon's power generation requirements, total of 2,700 megawatts



Malampaya Phase 2 and 3 Scope



MP3 in Numbers

11,763,053 Exposure hours to date

1,332,935 LTI free Kilometres driven

89,074 Safety Observations

3,239 Goal Zero days

399 Goal Zero Days @ One Island

95 audits & reviews

4 years from FEED to RFSU**

Reported HSSE data until Nov 2015

***Aug 2015*

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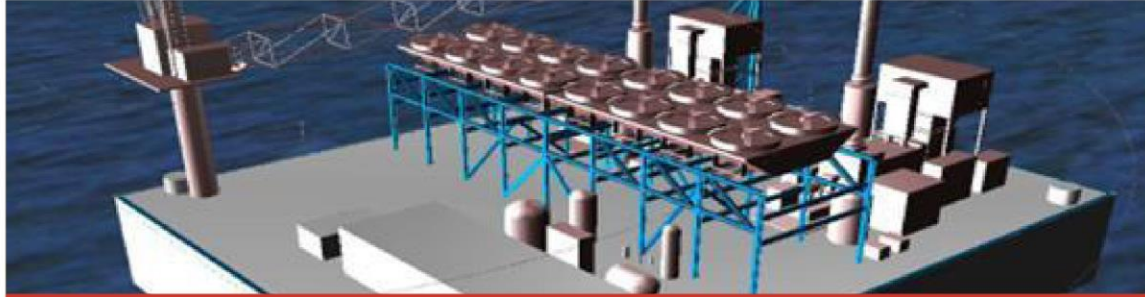




Engineering

Section 1

Engineering At a Glance



Select

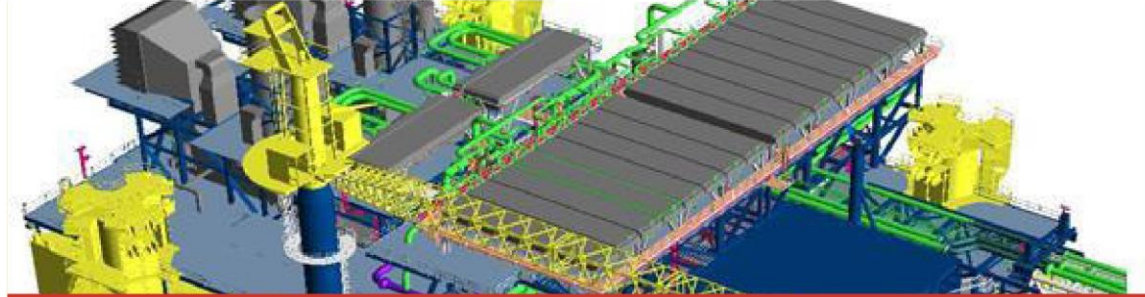
Self Installing Platform selected:

- Minimised reliance on specialist installation vessels
- Minimised tie-in/brownfield work on SWP so minimising interruption to supply



Detail Engg

- Arup selected as the specialist substructure contractor
- All procured items delivered at site before required date.
- All construction work packs delivered on time to the fabrication yard



Define

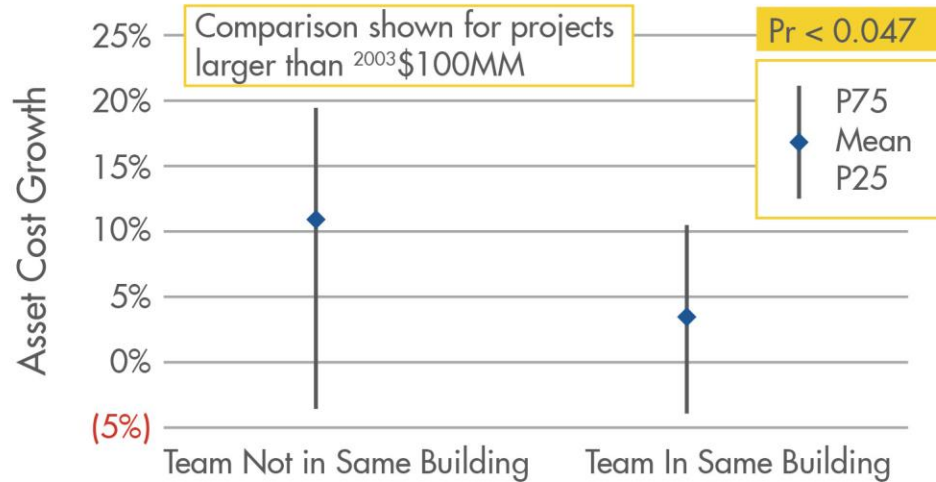
- Action shifted to Manila, maximize local content
- Integrated team and co-located
- FEED contract negotiated with Fluor



As Built

- 1117 STQ raised, turnaround 48 hours
- DCP Sail away with no A punches
- Details engineering - Total Man hours - 468213

Engineering: Key Success Factor



What is a Robust Team?

- An integrated team with all the functions represented
- A team with highly involved owner members - No “hands off” approach and major issues are not left for the contractor to handle
- A team that is adequately staffed- no “lean-staffing” strategy
- Team is aligned on process and path forward

Courtesy of IPA

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Integrated

- Shell Team integrated with Fluor

Co located

- Co-located with engineering contractor and Asset/Project team

Empowered

- 90% of TA2 part of Project Team
- Package Engineers as mini project managers – single point accountable from design, through procurement, delivery, installation and commissioning

Agile

- Regular presence of engineering support to yard construction activities was extremely beneficial



Procurement
Section 2

Procurement: Key Success Factor

- Long lead items (GT/GC) committed prior to FID
- Early interface with Engineering, CP, and QA/QC
- Early planning with Brownfield Team, Fabrication Yard, CP, CX
- Proactive engagement with permit authorities (BOC-Subic, PEZA Subic, PEZA Manila, DOF) resulted facilitated smooth sail out. Full time resource hired by project to focus on permit & regulations
- EFA based contracts





Yard Fabrication

Section 3

Keppel Yard at Subic



Yard Development

Yard development works: Dock head extension for “grand assembly area”



Site office under construction



Covered fabrication yard under construction



Fabrication & Assembly

1500MT Crane was built to accomplish final assembly of DCP in dry dock



The first of the four upper tubular legs, weighing 478T, 65m long and 3.8m in diameter, was safely installed into the Depletion Compression Platform



Spools to be used for the Turnaround being loaded out from Subic

DCP Final Tow Out



Assembled DCP

All Assembled and ready for tow out



JV partners and jubilant team celebrating the completion



Can do attitude...finally did it



Tow Out

Out in open waters on its way to offshore location



Flooded dry dock and DCP inching its way to open water



Out of Keppel yard and ready for tow

Yard Fabrication: Key Success Factor

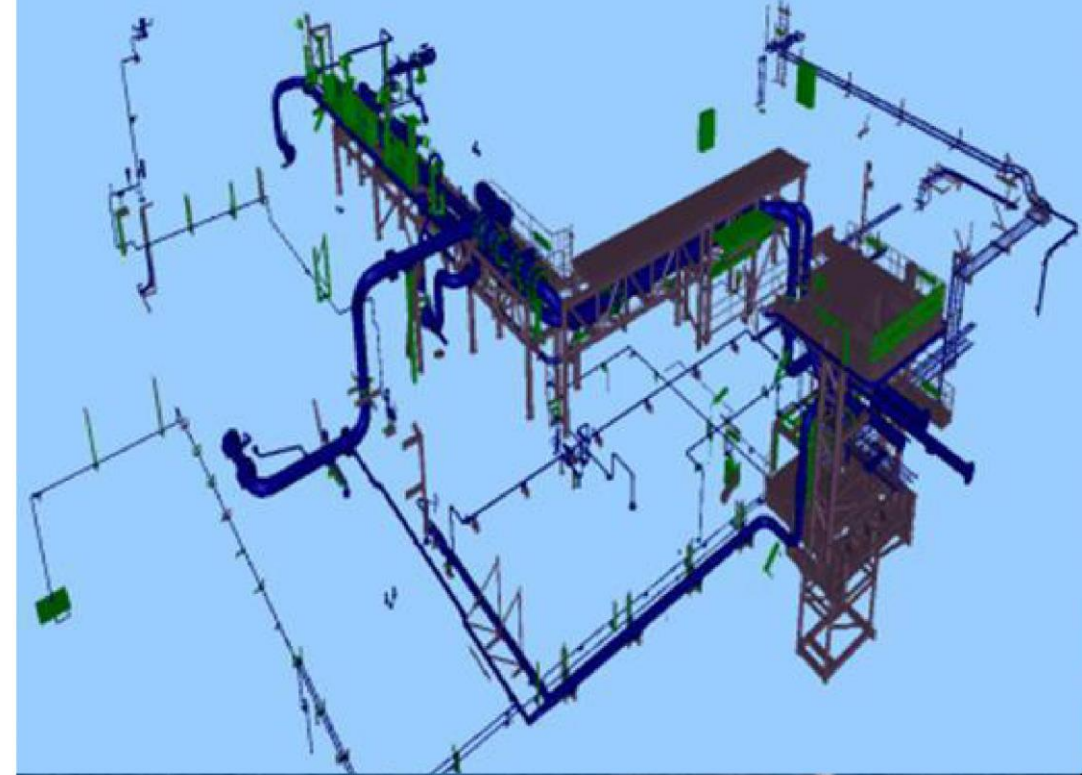
- Early engagement with the Fabrication Yards (+12 months prior to ITT issue)
- High quality Constructability Reviews in FEED
- Contract model: Direct to Shell = LS Prelims + Bills of Quantities + Incentive
 - Direct contract gave control to Shell. Resulted in comparatively higher owners cost but at all times were in control and able to engage Keppel at the highest level directly. In doing so Shell took on risk but had direct leverage with Keppel to incentivize and make quick decisions at key stages.
- Malampaya HSE Training Centre, Clark
- Use of Sponsors to assist in scope delivery and decisions
 - Weekly Sponsor call initiated after 9 months of commencement of works to assist in driving short term actions.
- Assigning Module Champions (Shell/Keppel) to own the construction delivery
- Switch from Area construction to System delivery 4-6 weeks after module installation worked very well and was the right time, key point is the integration of piping and cabling.



Brownfield Execution – Offshore
Section 4

Offshore Brownfield Work Dimensions

- 5-Yearly 30- day Turnaround in March'15
- 160,000 offshore (Direct & Indirect) man hours
- 13 months offshore campaign (Aug'14-Aug'15)
with accommodation support vessel at site
- Combined campaign with Asset



TA & Brownfield Execution: Key Success Factor

- Agreement on One Island concept for all offshore construction activities with reference to HSSE governance
 - For ONE ISLAND see next slide
- Comprehensive and complete work packs.
- Clarity in reporting of accomplished and balance works
- The sequence and the priority of the MP3 TA scope was well understood and the use of nightshift to maintain progress on critical scopes was essential.
- Collaboration with asset and construction management contractor ensured full coverage for both shifts for 30 days, enhancing productivity

OCC HSSE Case

(Offshore construction and commissioning HSSE case)
– 1 ISLAND

- Offshore Construction and Commissioning Case Live
 - Operationalizing One Island Concept
 - Offshore Emergency Response Management
 - SIMOPS management
 - Includes ASV & CSV Bridging Documents



