Submission No 70

Inquiry into Australia's Relationship with Timor-Leste

Organisation: MEO Australia Ltd

Joint Standing Committee on Foreign Affairs, Defence and Trade
Foreign Affairs Sub-Committee

Inquiry into Australia's relationship with Timor-Leste

Tassie Shoal LNG – an initiative to support economic outcomes for Timor-Leste

MEO Australia Limited

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Executive Summary

MEO Australia Limited ("MEO") acknowledges the invitation by the Joint Standing Committee on Foreign Affairs, Defence and Trade to make a submission to the inquiry into Australia's relationship with Timor-Leste.

MEO has developed and communicated a plan to develop the Sunrise gas resource via its proposed Tassie Shoal LNG project and potentially provide gas to Timor-Leste by shipping LNG from the Tassie Shoal site to an associated regasification terminal, where the gas is used as fuel for gas fired power stations and as feedstock for industrial fertiliser plants to create an economic outcome consistent with the objectives outlined in the *Strategic Development Plan* launched by Prime Minister Gusmao on his Official Visit to Australia in 2012.

The plan provides estimated capital savings on the Sunrise development of at least US$2 billion compared with an onshore LNG processing plant and at least US$4 billion compared with a floating LNG (FLNG) solution. It also avoids a technically challenging pipeline. Coupled with the proposed infrastructure development, it provides the ability for Timor-Leste to source gas from multiple suppliers, underpins industrial development in the power and fertiliser industries and creates substantial employment opportunities for the Timorese people, assisting in alleviating poverty.

The Tassie Shoal LNG development concept ("TSLNG") was originally based on processing low CO_2 gas from the Sunrise resource. Being only 170kms from Sunrise in a shallow water (14m) area, it was developed as a means of improving the economic viability of a Sunrise development against the onshore alternatives being considered at the time. The TSLNG development concept was originally granted Australian federal environmental approval under the EPBC Act in 2004 and its approval was renewed in 2012.

Figure 1: Tassie Shoal LNG Project

The savings available from a TSLNG development benefits all stakeholders by reducing capital costs, thereby increasing net returns to the resource owners.

To date, the TSLNG development option has not been seriously considered, notwithstanding the significant economic benefits relative to the established options which do not address the needs of all stakeholders.

Tassie Shoal Projects Overview

The Tassie Shoal Projects are three projects comprising two 1.75 million tonnes per annum (MTA) methanol plants designed to process high CO_2 regional gas ("**TSMP$_1$**" & "**TSMP$_2$**") to be built in two stages and a ~3MTA LNG plant designed to process low CO_2, dry gas from the Sunrise field ("**TSLNG**"); all sited on Tassie Shoal.

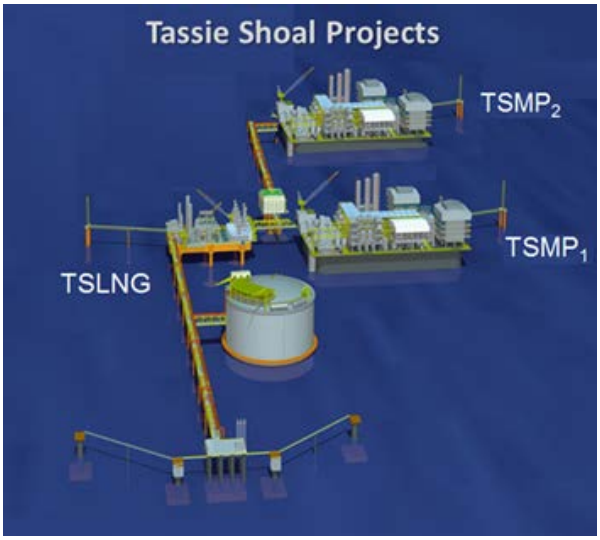

Figure 2: Tassie Shoal Projects

The Tassie Shoal LNG development concept ("TSLNG") was based on processing low CO_2 gas from the Sunrise resource. It was developed as a means of improving the economic viability of a Sunrise development against the onshore alternatives being considered at the time. The TSLNG development concept was granted Australian federal environmental approval under the EPBC Act in 2004 and its approval was renewed in 2012.

TSLNG has been designed in conjunction with leading industry experts including WorleyParsons and Arup, with input from APCI. It has a design capacity of 3 million tonnes per annum (MTA) and is expandable to 4MTA with incremental capital investment. The potential exists for multiple TSLNG facilities with opportunities for commensurate reductions in unit capital and operating costs.

Figure 3: Tassie Shoal LNG Project

Location

The Tassie Shoal Projects are situated on Tassie Shoal, a shallow water offshore site 275kms north of Darwin. Surrounding the Tassie Shoal site is approximately 25TCF of undeveloped stranded high CO_2 gas resources, including the Evans Shoal, Barossa, Caldita, Blackwood and Heron gas fields. Within 170kms of the site are the low CO_2 Greater Sunrise area gas fields.

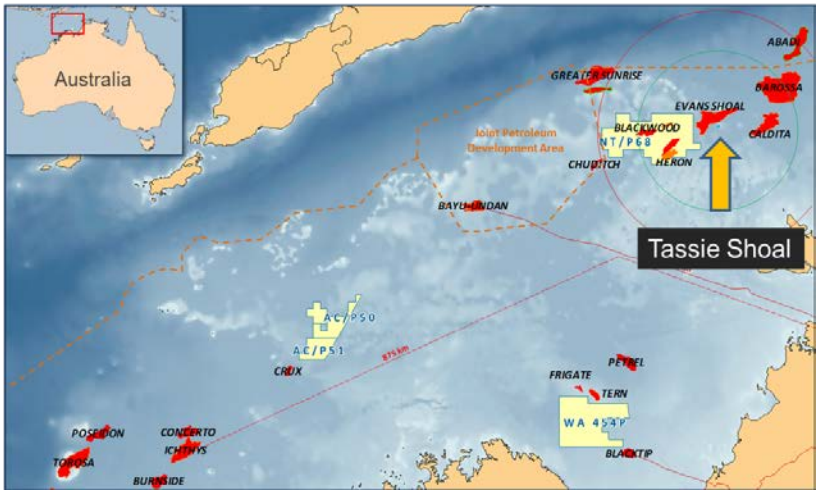

Figure 4: Location of Tassie Shoal Projects

The Tassie Shoal site was selected as being the most environmentally suitable shallow water area in the region for an offshore development. The shoal has over 400 hectares of area with less than 20 metre water depth and also offers the benefit of benign water conditions, minimising development costs.

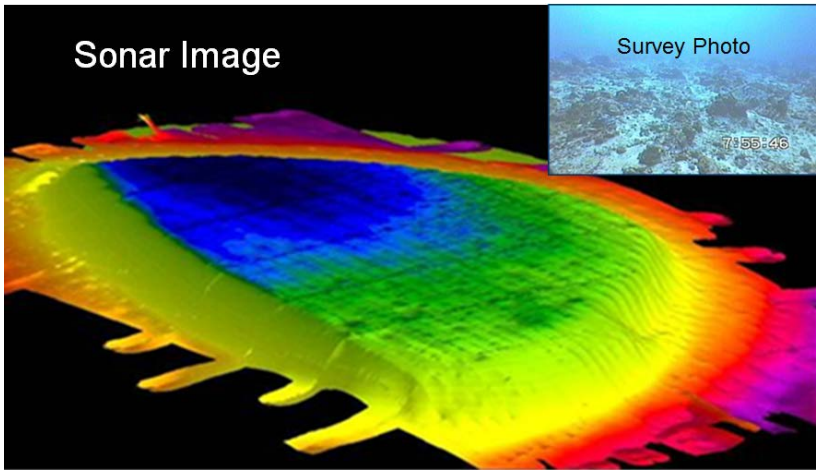

Figure 5: Sonar image of the Tassie Shoal with survey photo (inset)

The location of the $TSMP_1$, $TSMP_2$ and TSLNG plants is at the highest point of the shoal which is approximately 14 metres water depth. The overall layout plan of the Tassie Shoal projects is depicted in Figure 6.

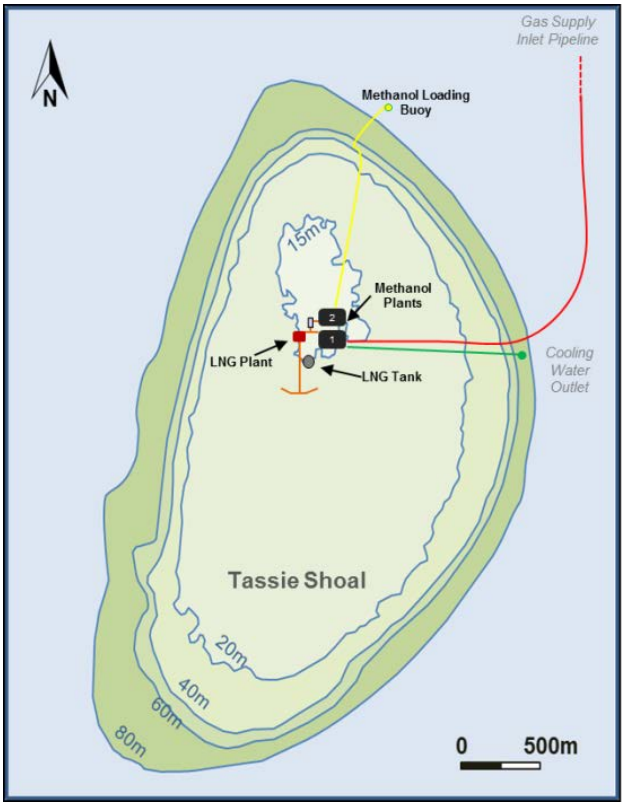

Figure 6 – Tassie Shoal Projects - layout of key facilities

Environmental Approvals

TSLNG was assessed by the Federal Government under the Environment Protection and Biodiversity Conservation Act 1999 and Environmental Approval was granted in 2004 and renewed in 2012.

Major Project Facilitation Status

TSLNG has been granted Major Project Facilitation status. The MPF service endeavours to ensure that Commonwealth approval processes and other services are coordinated with relevant state and territory government authorities.

Tassie Shoal LNG Plant - the Lowest Cost Development Path

The innovative TSLNG design marries proven technologies of an APCI processing technology developed for FLNG applications with an Arup designed ACE steel jack up platform as its base and offers a US$2 Billion cost saving vs an onshore LNG processing plant (using Darwin as an example) and at least a $4 Billion cost saving vs a floating LNG (FLNG) processing facility. A breakdown of estimated cost savings holding the field development costs constant, are provided in the following Figure 7:

Estimated Costs (US$M)	Onshore Darwin LNG	FLNG	 TSLNG	TSLNG Vs Onshore Darwin	TSLNG Vs FLNG	
Plant	2,665	7,240	1,345	1,320	5,895	
FPSO Liquids Removal	1,000	-	1,000		-1,000	~$2B saving vs Darwin Onshore
Pipeline from Sunrise	1,300	-	440	860	-440	
LNG Tank	425	-	410	15	-410	
Jetty Structure/Topsides	300	-	410	-110	-410	
Project Development & Owners Costs	250	360	175	75	185	~ $4B saving vs FLNG
Upstream	2,500	2,500	2,500			
Total	8,440	10,100	6,280	2,160	3,820	
Unit Cost $/tpa	2,344/t	2,806/t	1,744/t	600/t	1,061/t	

- Estimate by WorleyParsons, Arup and APCI for LNG Plant at Tassie Shoal scaled for 3.6MTA and 4% CO_2 to compare costs for functionally similar LNG liquefaction plant at Darwin
- FLNG costs extrapolated from Prelude published data, reduced on relative CO_2, GOR , repeat build savings, etc.

Figure 7: Estimated TSLNG vs FLNG and Onshore Cost Benefit

The savings available by a TSLNG development would benefit almost all stakeholders by reducing capital costs and hence tax deductions, therefore increasing net returns to resource owners, being the Australian and Timor-Leste governments and by extension, their citizens.

Infrastructure to meet Timor-Leste social objectives

The Timorese government has also clearly documented social development objectives to diversify the local economy and develop local job skills, national infrastructure, agricultural capability and fertiliser production. The Timorese government has focussed on achieving these objectives by requiring a raw gas pipeline to be built to Timor-Leste to process the Sunrise raw gas production and the flow on effects of such a development.

MEO has proposed that similar objectives can be satisfied by ensuring that gas, in the form of LNG, is delivered to Timor-Leste. This can be achieved by combining a TSLNG development with national LNG import infrastructure to import the equivalent of 0.5MTA of Sunrise LNG into Timor-Leste as shown in Figure 8. In this case, hydrocarbon liquids are

removed at the Sunrise field and gas is piped the 170kms to TSLNG where it is processed and liquefied for shipping to markets including Timor-Leste. Appropriately sized vessels transport the LNG to Timor-Leste where a small scale regasification facility stores the LNG in liquid form then regasifies it to meet market demand from power generation and fertiliser industries. Broader decentralised development by shipping LNG, piped gas or via power grid infrastructure is a potential extension of the concept to further satisfy social objectives.

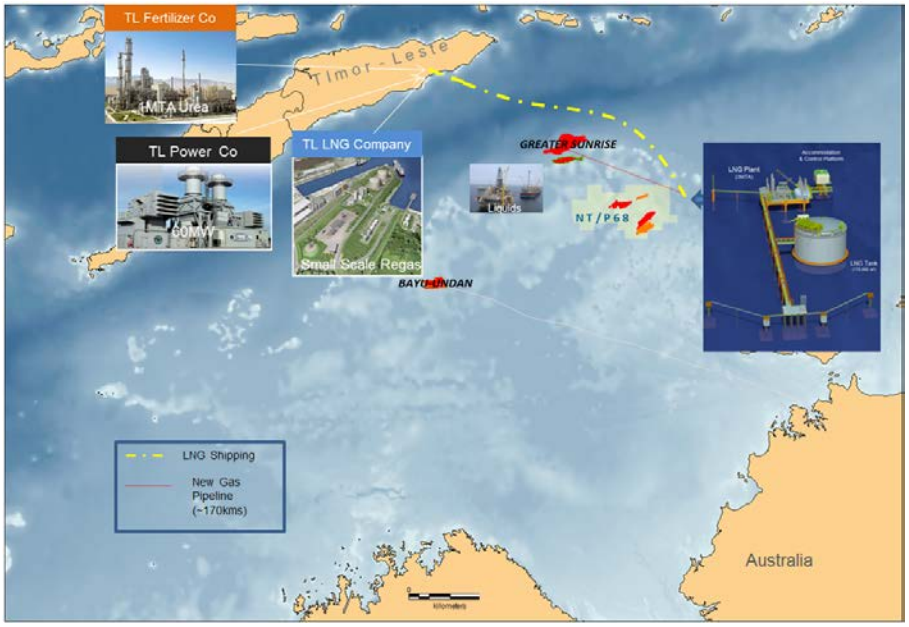

Figure 8: TSLNG development with LNG import infrastructure and industrial development

Such a series of integrated developments will assist Timor-Leste to achieve multiple objectives, including diversifying its economy, broadening its tax base, improving agricultural practices by access to locally produced fertiliser, and providing long term jobs for Timorese nationals.

MEO has received multiple expressions of interest in co-operatively pursuing such infrastructure developments from multinational companies with access to further expertise in these areas.

Lower development costs can benefit stakeholders

The benefits of lower development costs of a TSLNG solution can be distributed by multiple means, including lowering the LNG price to selected markets (such as Timor-Leste), providing increased revenue to enable cross subsidy of downstream infrastructure or using the cost savings to invest in the TSLNG facility itself to produce national income.

Figure 9 shows a potential overall stakeholder tax jurisdiction outcome and an indicative conceptual model, based on screening level economic modelling, where the potential exists for commercial enterprises to be established in Timor-Leste for LNG liquefaction, LNG regasification, power generation and fertiliser production. Fertiliser production may require some gas price subsidy versus LNG value however it may be independently economic (ignoring LNG value on an opportunity cost basis) by usual industry metrics.

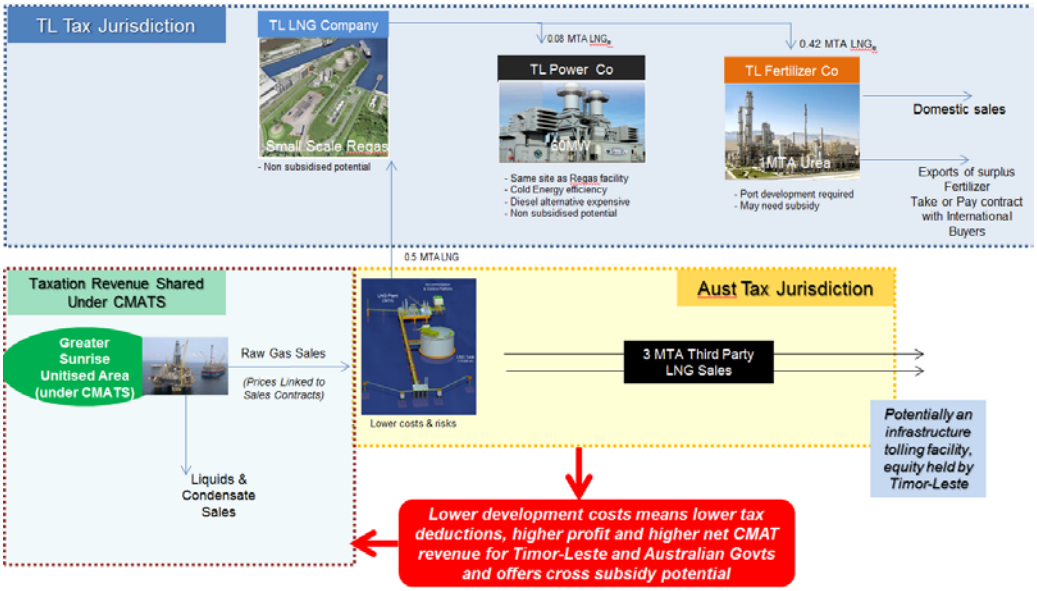

Figure 9: TSLNG development with LNG import infrastructure and industrial development

MEO submits that the estimated US$2 - 4+ billion capital cost savings made by pursuing a TSLNG upstream development when compared with an onshore or FLNG development could be used to invest in in-country infrastructure with potentially no net cost to the Timorese or Australian resource owners. Agricultural aid projects utilising Australian expertise in fertilizer application and weed control could further contribute to the food self-sufficiency objectives of the Timor-Leste Government.

Employment estimates by consultants engaged by Timor-Leste and MEO have estimated that the level of Timorese employment generated by the development of the suite of infrastructure projects detailed in Figure 8 have concluded that there will be almost 3 times the number of long term jobs generated versus having a standalone LNG processing facility onshore on Timor-Leste.

This provides an opportunity for a positive outcome for all stakeholders.

Supplement

Background on

Tassie Shoal LNG Plant

Tassie Shoal LNG Project Description

TSLNG has been designed in conjunction with leading industry experts including WorleyParsons (topsides, utilities), Arup (LNG tank, jetty) with input from APCI (processing plant). It has a design capacity of 3MTA and with incremental investment is expandable to 4MTA. The potential for multiple TSLNG facilities exists, subject to relevant government approvals, with commensurate unit cost reduction potential due to economies of scale.

The innovative TSLNG design marries proven technologies of an APCI processing technology developed for FLNG applications with an Arup designed ACE steel jack up platform as its base.

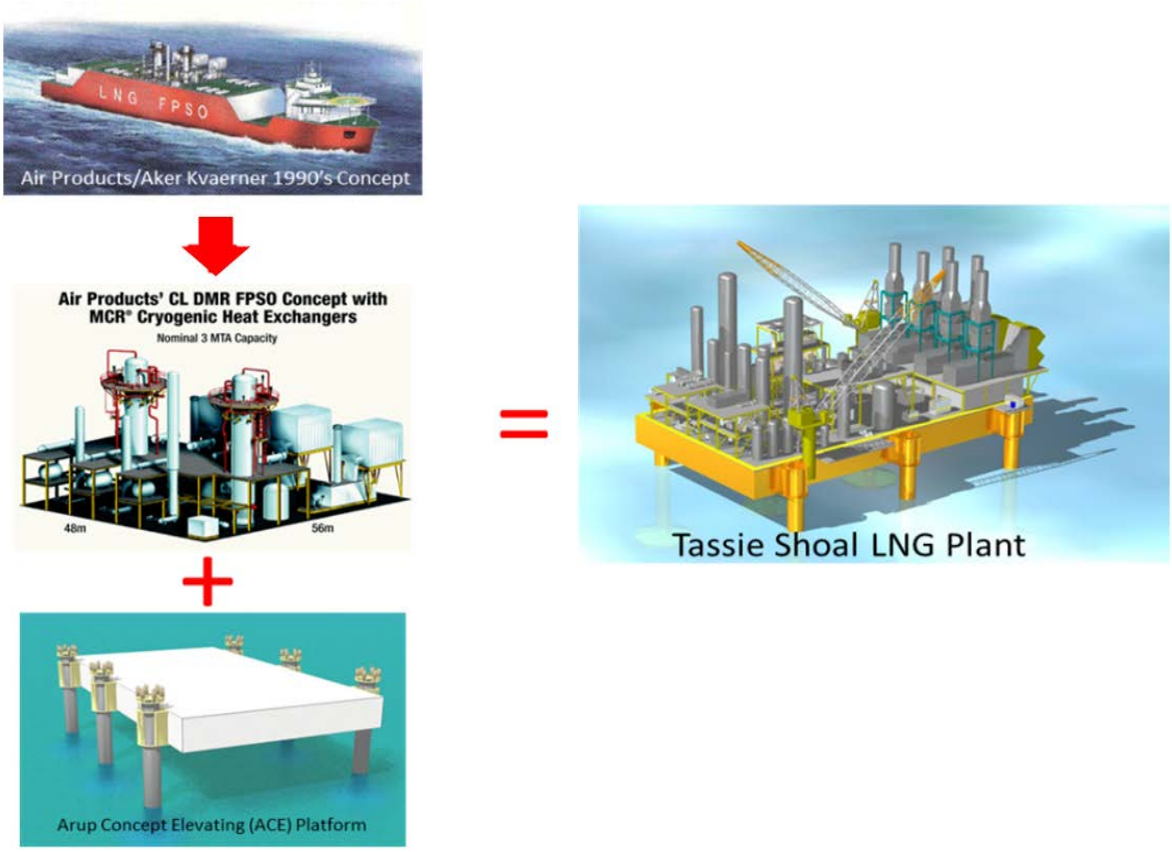

Figure 10 – Innovative design using proven technology

LNG Production Plant

The TSLNG topsides utilises APCI's Dual Mixed Refrigerant (DMR) process technology. DMR is the preferred choice of process for offshore applications, including FLNG. The capacity of the LNG train is ~3MTA with potential to expand up to 4MTA with additional capital investment.

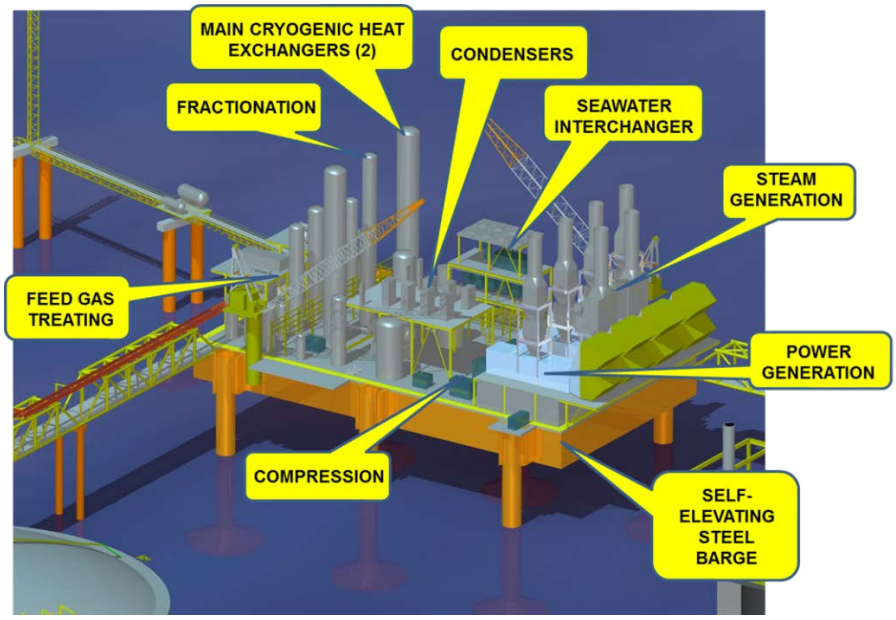

Figure 11 – LNG plant key components

The APCI technology allows for development of a compact design. The DMR process minimizes the inventory of propane and minimizes the liquefier footprint in comparison to traditional propane pre-cooling. The major space saving is from the use of indirect seawater cooling and compact heat exchangers which require 1/25th the plot area of normal air based heat exchangers as utilised in on-shore applications. This enables the LNG plant and utilities to fit on the 100m x 50m deck area of the ACE Platform.

The TSLNG plant process design features the dry, low CO_2 raw gas being delivered by pipeline from the resource and then pre-treated to remove impurities prior to going through the liquefaction process and then storage for offloading. Condensate is removed prior to the entry to the TSLNG plant by an FPSO located at the resource itself or potentially on a separate structure located on Tassie Shoal.

A low CO_2 feedgas stream of between 460-610MCFD (million standard cubic feet per day) is required to enable the production of between 3-4MTA of LNG.

Capital cost estimates

The TSLNG technology and cost estimates were reviewed and updated in 4Q2012 by WorleyParsons, Arup with input from APCI.

A high level breakdown of the cost estimates is provided in Figure 12 and includes total contingency of $300M or 24%. All cost estimates are on a +/-25% basis, consistent with the pre-FEED status of the TSLNG project.

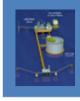 TSLNG Component	Capital Cost Estimate (US$M)	Company
Plant Costs – Topsides including Utilities	920	WorleyParsons with input from APCI
Substructure (ACE Platform)	133	ARUP
Accommodation & Control Platform	92	WorleyParsons
LNG Tank	365	ARUP
Jetty Structure/Topsides	410	ARUP/WorleyParsons
Project Development & Owners Costs	120	MEO estimate with input from APCI and Fluor
Total (US$Million)	2,040	
Unit Cost $/tpa	680/t	

Figure 12 – High level capital cost breakdown and estimate provider

The capital cost advantage for TSLNG (scaled up to 3.6MTA) when compared to other development paths of onshore (using Darwin as a proxy) or FLNG is summarised in Figure 13.

Estimated Costs (US$M)	Onshore Darwin LNG	FLNG	 TSLNG	TSLNG Vs Onshore Darwin	TSLNG Vs FLNG	
Plant	2,665	7,240	1,345	1,320	5,895	
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- FLNG costs extrapolated from Prelude published data, reduced on relative CO_2, GOR , repeat build savings, etc.

Figure 13 – TSLNG development costs compared with onshore and FLNG alternatives

List of Figures