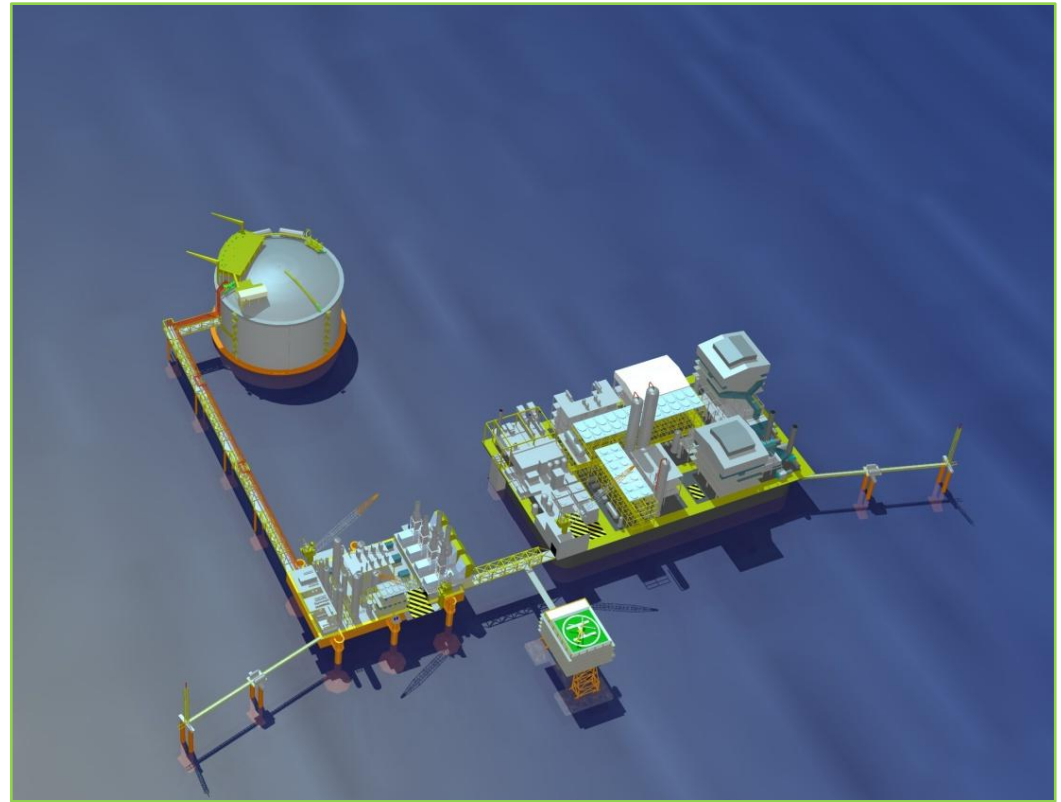


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Presentation to SPE Melbourne:

## **The Tassie Shoal Methanol and LNG Projects**

### **- Monetising stranded Timor Sea gas**

17<sup>th</sup> June 2009

John Robert, Development Engineering Manager



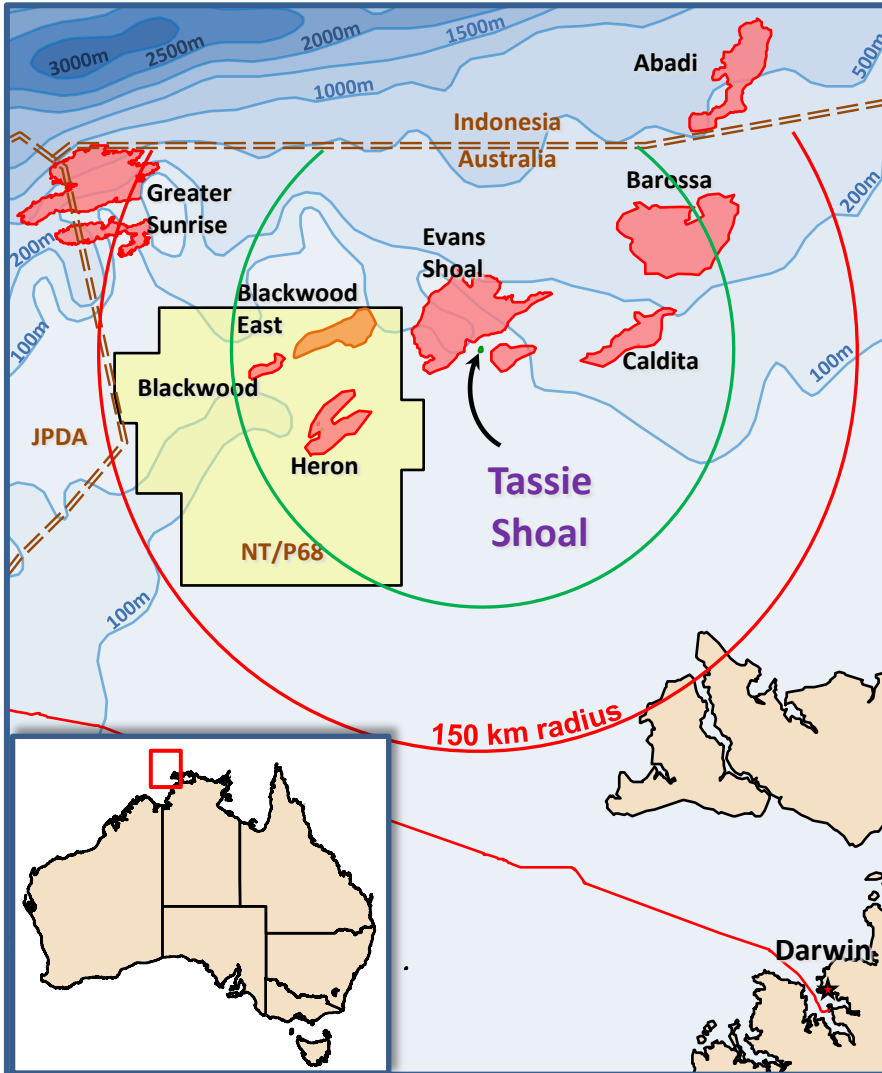
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# Bonaparte Basin gas fields

~25 Tcf is stranded due to location &/or gas quality issues

Most have CO<sub>2</sub> & distance issues



**Evans Shoal**  
(Santos, Shell, Petronas, Osaka Gas)

~6+Tcf	25% CO <sub>2</sub>	4 bbl/MMscf
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**Barossa/Caldita**  
(ConocoPhillips/Santos)

~3.4 Tcf	12% CO <sub>2</sub>	5 bbl/MMscf
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Others just distance

**Greater Sunrise (FLNG? Land?)**  
(WPL/Shell/ConocoPhillips/Osaka Gas)

~5.4 Tcf	4% CO <sub>2</sub>	40 bbl/MMscf
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**Abadi (FLNG?)**  
(Inpex/Pertamina)

~10 Tcf	8% CO <sub>2</sub>	20 bbl/MMscf
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MEO discoveries, NT/P68

**Blackwood**  
(MEO – 100%)

Appraisal planned 2010

**Heron**  
(MEO – 90%)

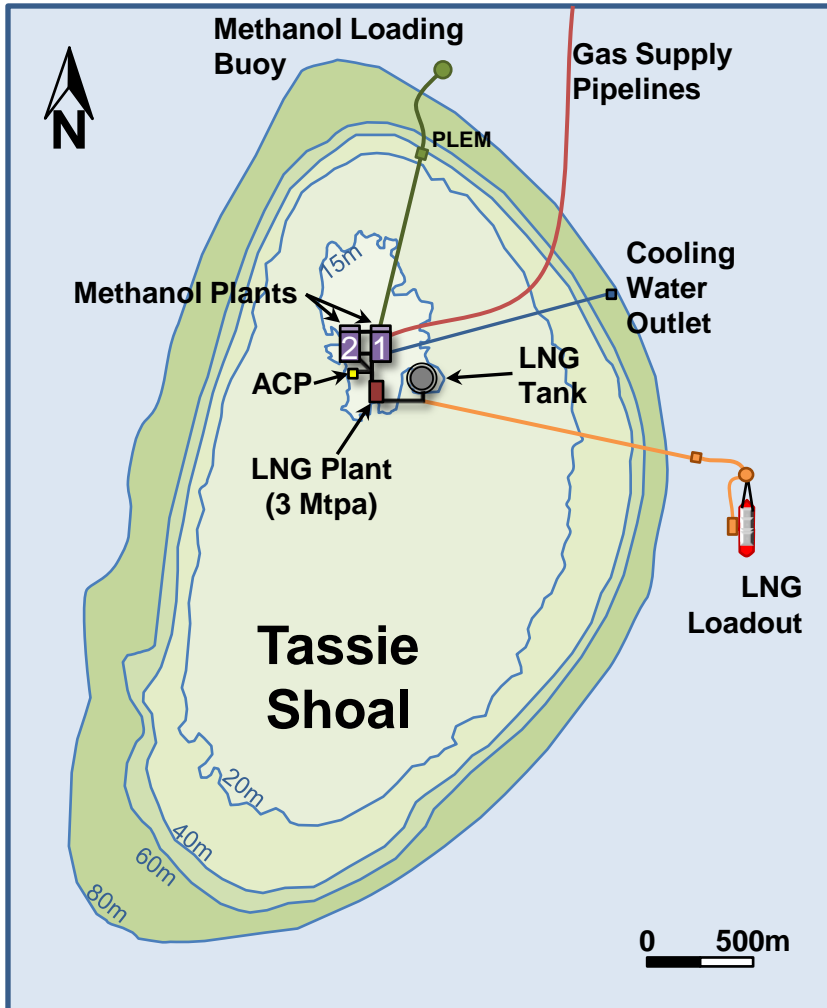
Appraisal planned 2010

# Tassie Shoal – a natural hub

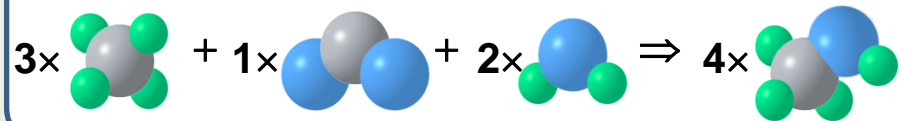
## Solution to location & gas quality issues

### Tassie Shoal

- Relatively mild metocean conditions
- 25 Tcf of undeveloped gas within 150km
- Eliminates long pipelines to shore
- CO<sub>2</sub> sequestered into Methanol derivatives



Methane + CO<sub>2</sub> + Steam ⇒ Methanol



Methanol Production absorbs 25% CO<sub>2</sub>

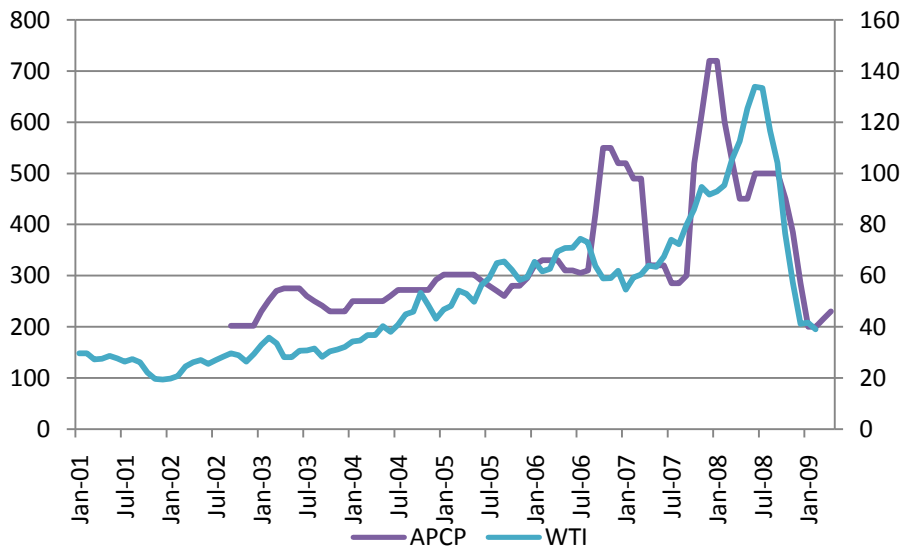
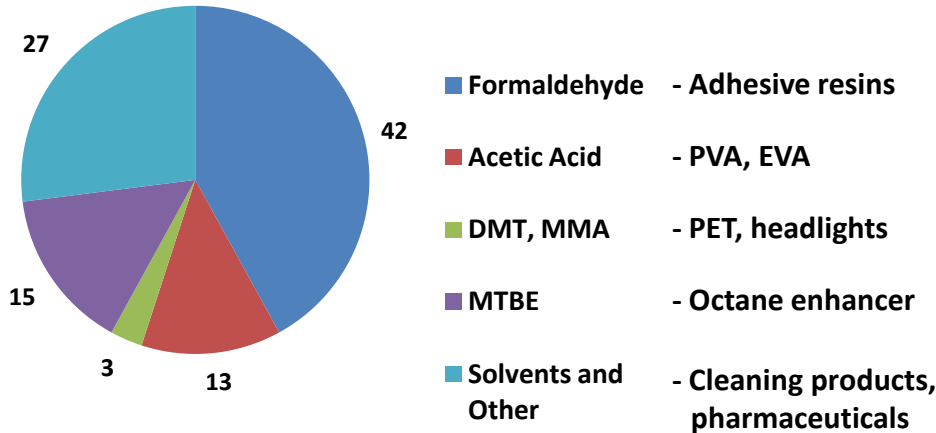
### Environmental approvals secured

- 1 x 3 Mtpa (expandable to 3.5 Mtpa) LNG plant
- 2 x 5,000 tpd (1.75 Mtpa) Methanol plants
- MPF status granted until Dec 2011

# Why Methanol?

Can be made from high CO<sub>2</sub> gas

**Methanol Derivatives %**



## Methanol Demand

- **Global demand ~40 Mt/y**
- **Growth historically @ GDP + 1%**
- **Diverse predominantly non-fuel uses**
- **Significant growth potential**
- **Usually premium over fuel value**
- **Price correlates with energy prices**
- **Coal-based production (China) sets floor price**

# Tassie Shoal Methanol Project (TSMP)

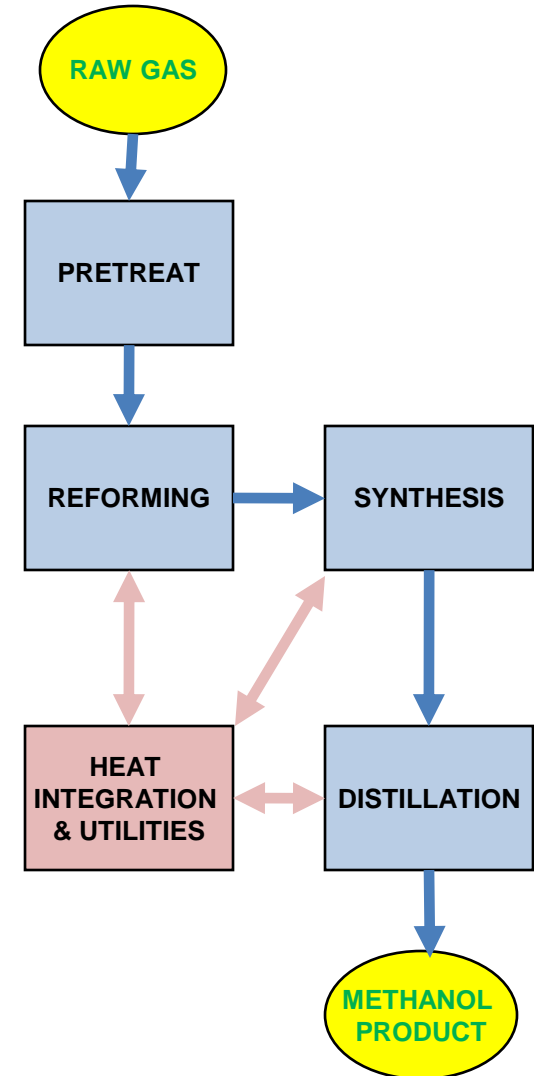
## Main Elements

- **Methanol Storage inside CGS**
- **Product loadout via SPM avoids jetty and tugs**
- **Separate structure for Accommodation and Control**
- **Ready for FEED studies in 2010 once gas supply confirmed**
- **All potentially re-locatable, subject to water depth**



# TSMP Process Features

- **Condensate, water, sulphur removed from raw gas**
- **DPT Steam Methane Reforming (SMR) Process**
  - not O<sub>2</sub> based so can consume CO<sub>2</sub>
  - 3 column distillation saves air cooler plot area
- **Robust power generation, steam, nitrogen and thermal desalination systems**





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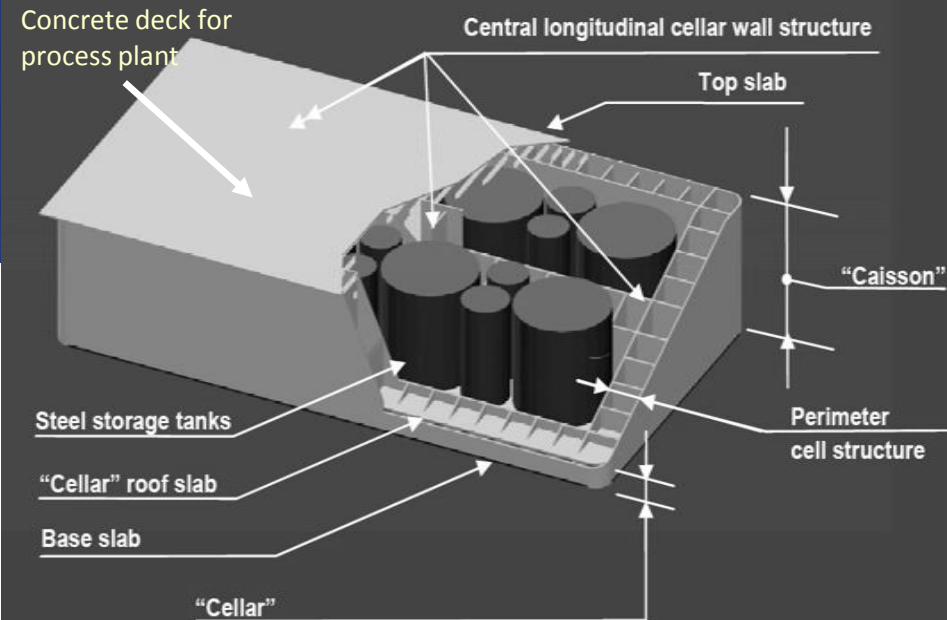
# Methanol topsides, sub-structure & storage

## Proven Technology



- Substructure CGS: ~200,000 t
- Base: 170m x 93m x 35m height
- Process deck: 180m x 100m (wave deflection)
- Installed by ballasting in 14m water depth
- Storage in steel tanks for 20 days final product

- Methanol capacity: 5,000 tpd, 1.75 Mt/y
- Topsides 35,000 t
- Total height CGS & topsides 95m
- Enhanced 'stick-build' on deck





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# Substructure Precedent

ExxonMobil Adriatic LNG Re-gas terminal constructed by Aker Kvaerner in Spain



Very similar footprint to TSMP but higher structure due to greater water depth at Adriatic site



# LNG Project Elements

- **3 Mt/y LNG Production Module**
  - Standard pretreat section: CO<sub>2</sub>, H<sub>2</sub>O & Hg removal
  - Air Products (APCI) DMR chilling and liquefaction
  - Fractionation plant for refrigerant makeup
  - Utilities: power gen, steam, water cooling systems
- **Production ACE self-installing barge platform**
  - 100m x 50m, on six caisson legs
- **LNG Storage – 170,000m<sup>3</sup> conventional tank on CGS**
- **LNG Load out Jetty or Hi-Load semi-sub**
- **Separate structures for ACP and possibly flare**

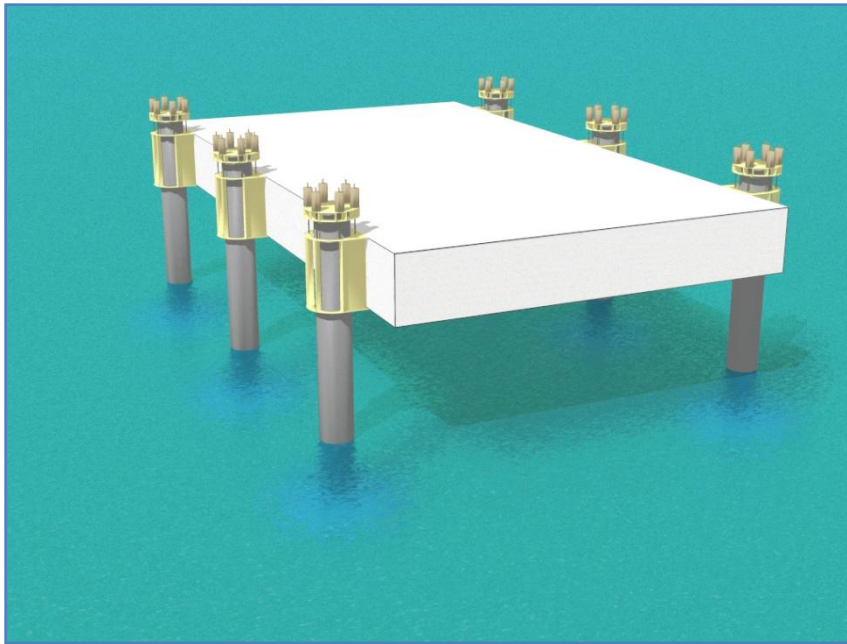




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# LNG Substructure

Production ACE platform for LNG process equipment

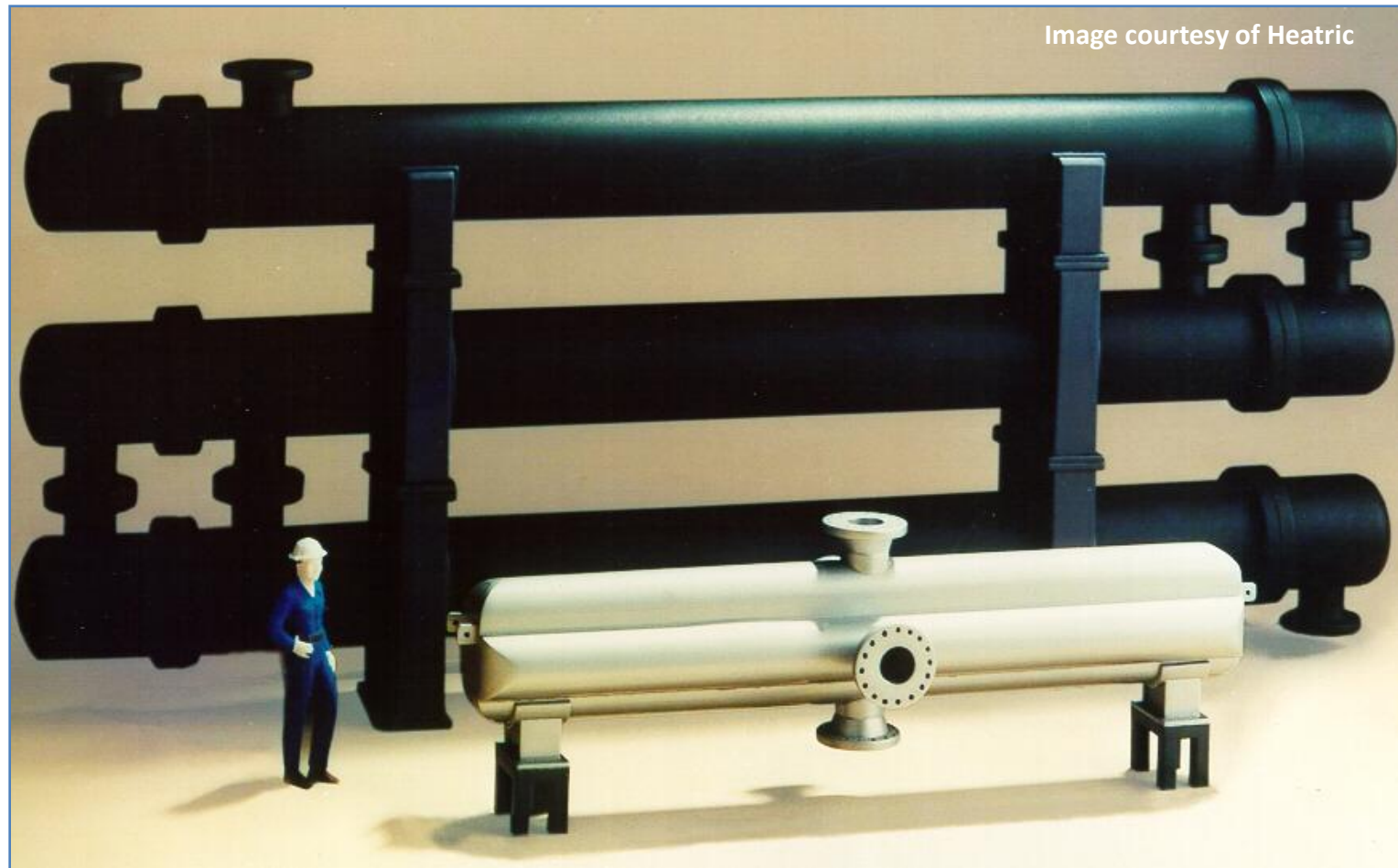


Similar to Hang Tuah Compression platform for ConocoPhillips, Indonesia



# Compact Water Cooled Exchangers

- Indirect seawater cooling with closed loop circuit
- Extensive use of compact printed circuit heat exchangers (PCHEs) – up to 1 / 25<sup>th</sup> plot area of air coolers



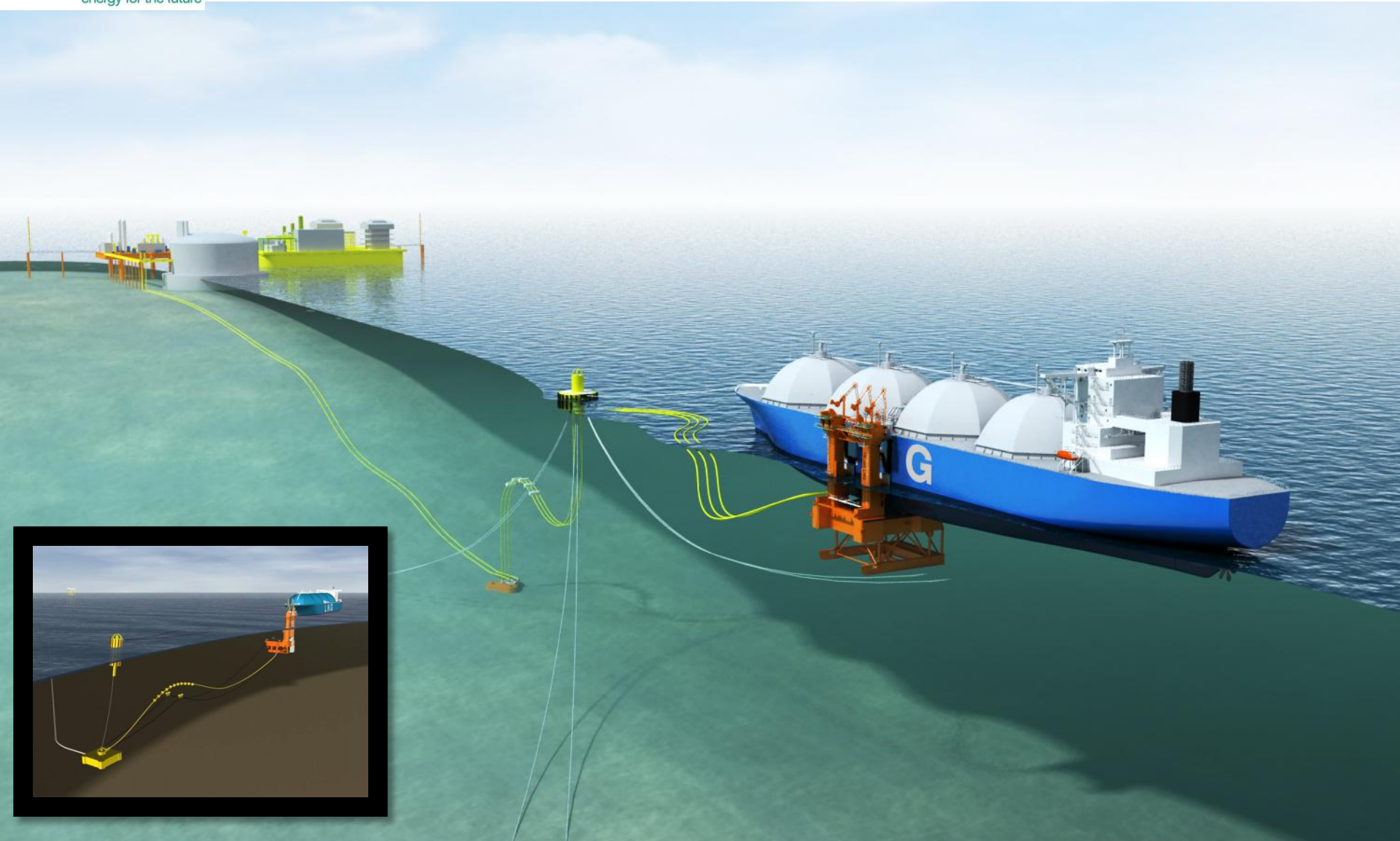




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# Possible *HiLoad* LNG Loading System

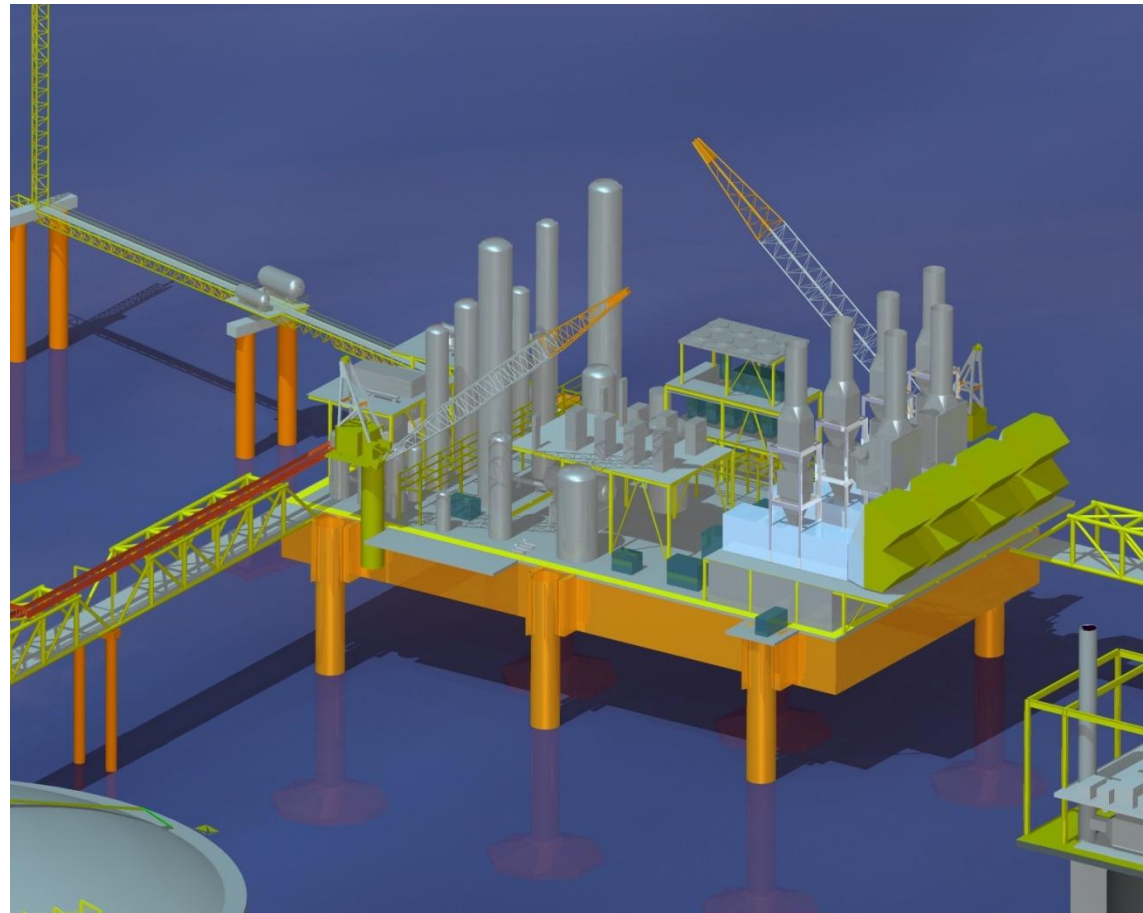
Replaces Jetty and Tugs service



# Timor Sea LNG Project

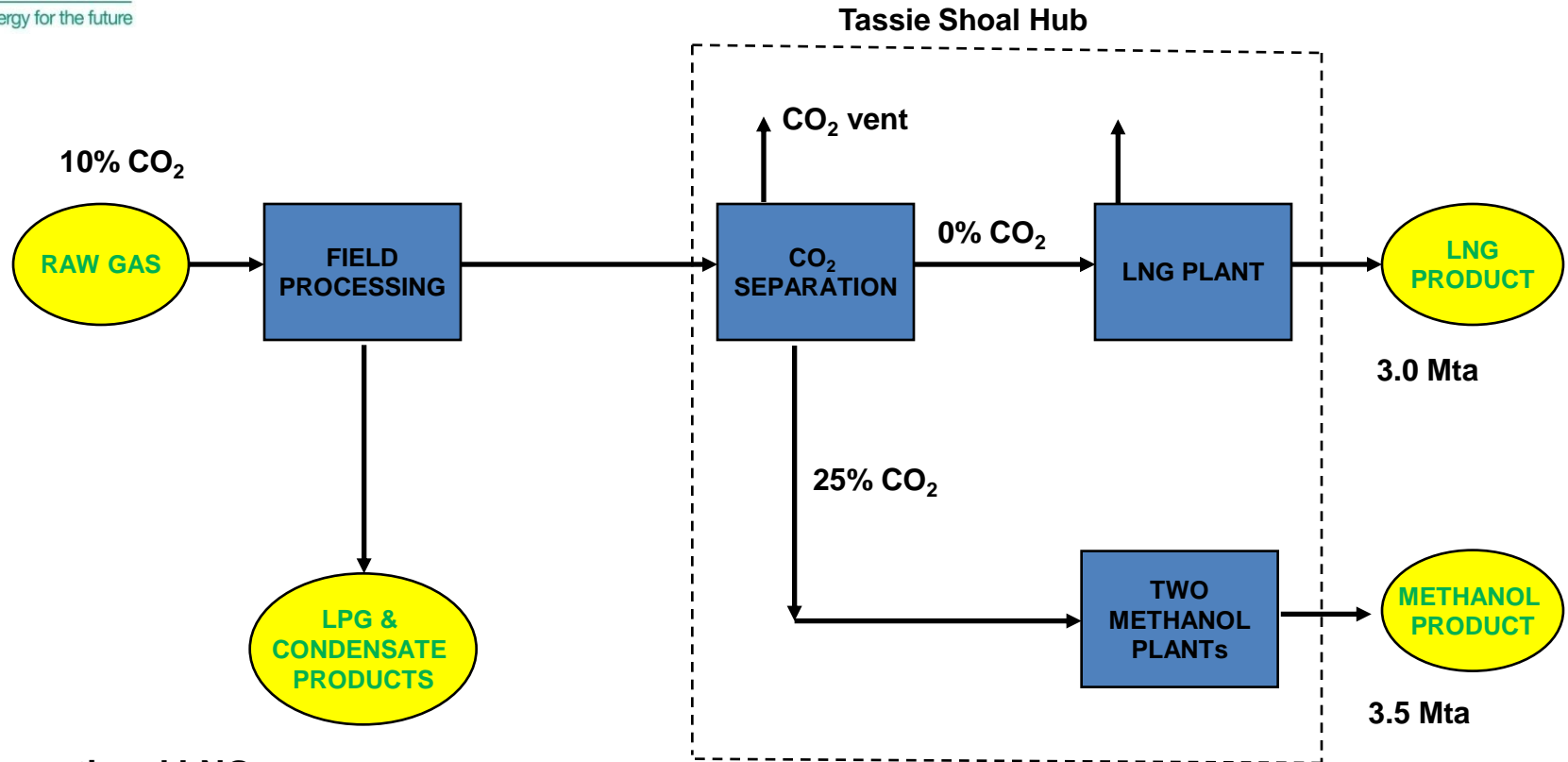
## Continued Innovations

- **Indirect seawater PCHE cooling**
  - dramatically reduces plot area
- **Electric drives with N+1 power island**
  - increases service factor
- **Aero-derivative gas turbines**
  - increased efficiency and uptime
- **APCI DMR process**
  - approaches onshore plant efficiency
  - compact and avoids propane hazards
- **Single module built on ACE platform**
  - LNG tank on CGS caisson
- **HiLoad system for LNG offloading**
  - eliminates need for tugs
  - avoids close vessel approaches to facilities



# Tassie Shoal Projects

## LNG from 10% CO<sub>2</sub> gas



### Conventional LNG

- Total emissions = 0.5 tonnes CO<sub>2</sub> per tonne of LNG (100% reservoir CO<sub>2</sub> vented)

### With One Methanol Plant

- Total emissions = 0.35 tonnes CO<sub>2</sub> per tonne of LNG (50% reservoir CO<sub>2</sub> vented)

### With Two Methanol Plants

- Total emissions = 0.20 tonnes CO<sub>2</sub> per tonne of LNG (0% reservoir CO<sub>2</sub> vented)

# Tassie Shoal Projects

– a regional gas commercialisation solution

- **Conservative technologies**
  - innovative combinations
- **Competitive delivered cost of product**
- **Strategically located**
  - access to Asian growth markets
- **Environmental approvals in place**
- **Rapid gas commercialisation path**
- **Ready for FEED studies pending gas supplies**





# The Tassie Shoal Projects

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June 2009

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