

# MEO Australia

energy for the future

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## Building in LNG and Methanol

15<sup>th</sup> Asia Upstream Conference: April 21<sup>st</sup> - 22<sup>nd</sup>, 2010

Jürgen Hendrich, Managing Director & Chief Executive Officer

# Australian LNG provinces

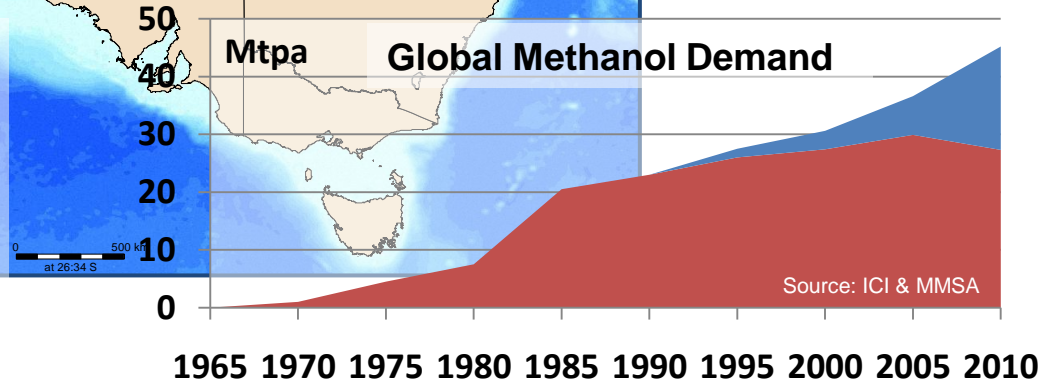
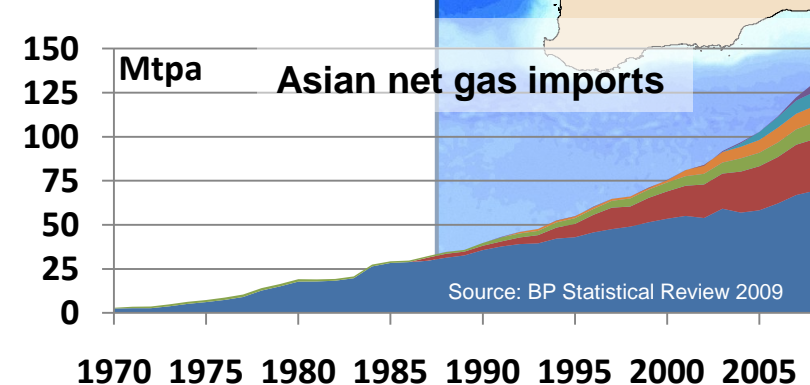
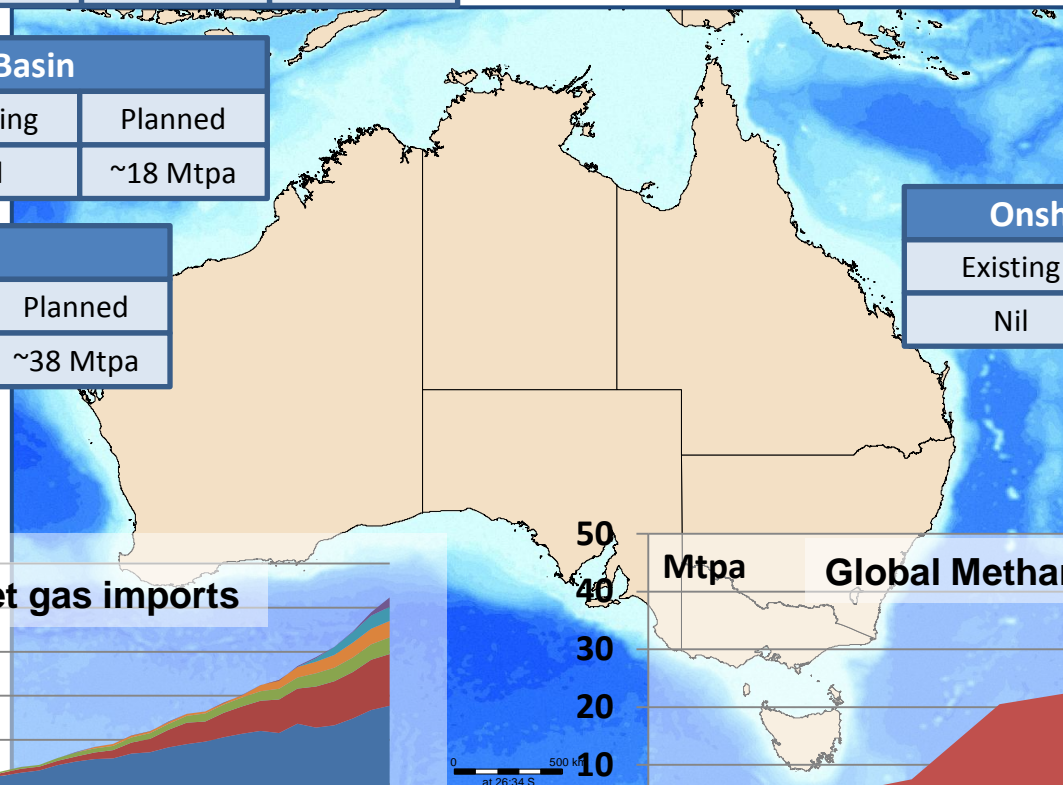
MEO operates in basins with existing LNG infrastructure

Bonaparte Basin		
Existing	Building	Planned
3.5 Mtpa	Nil	~ 10 Mtpa

Browse Basin		
Existing	Building	Planned
Nil	Nil	~18 Mtpa

Carnarvon Basin		
Existing	Building	Planned
16.3 Mtpa	14.3 Mtpa	~38 Mtpa

Onshore Queensland - CSG		
Existing	Building	Planned
Nil	Nil	~12 Mtpa

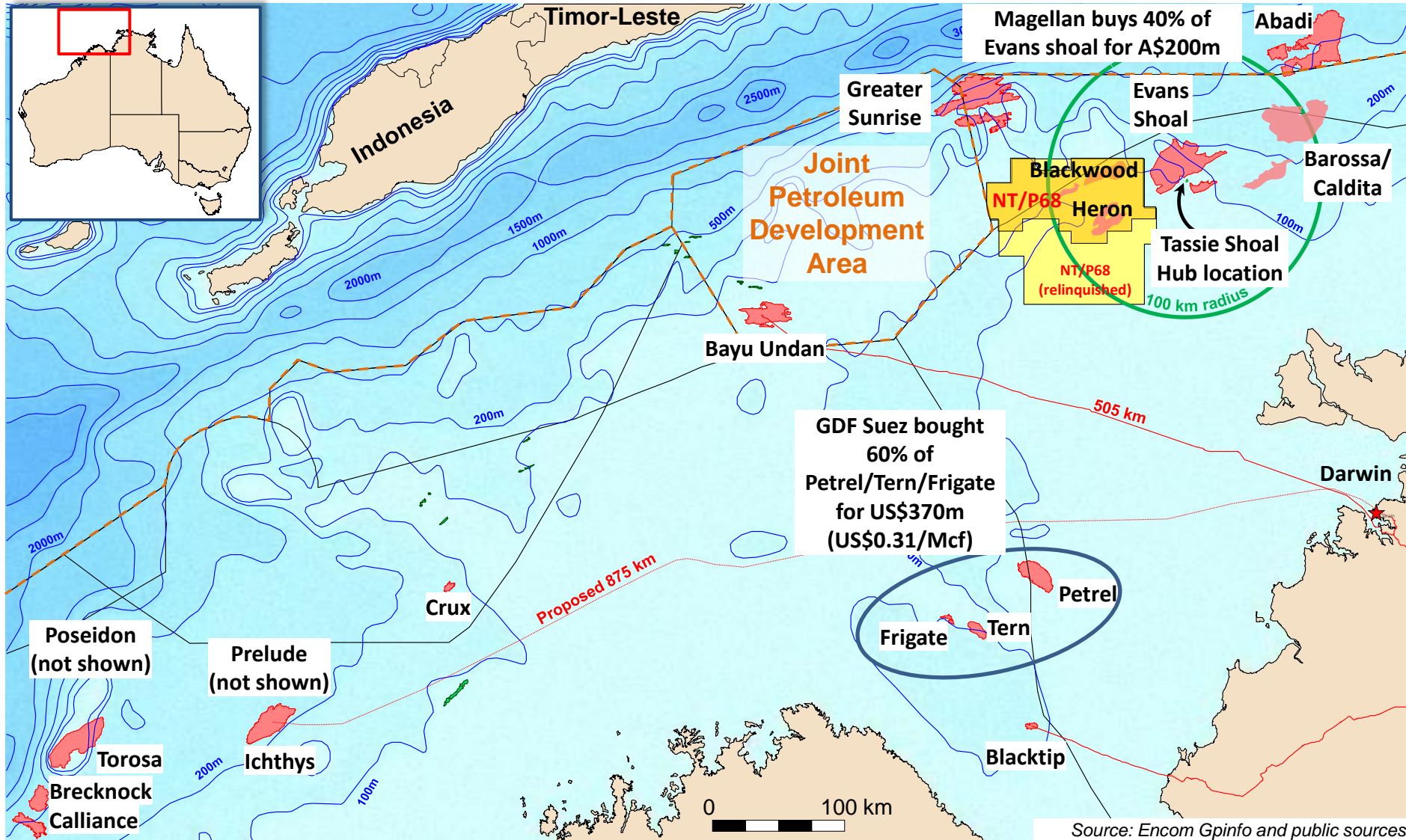


- Japan
- South Korea
- Taiwan
- Other
- India
- China

- Rest of World
- China

# Bonaparte & Browse Basins

1 existing LNG project (3.5 Mtpa) – remoteness/quality issues











































# Economic considerations

## Resource Value Enhancing Options

- Resource size → • Cooperative development?
- Hydrocarbon liquids
  - condensate & LPG→ • Accelerated liquids production?
  - eg Bayu-Undan liquids stripping
- Contaminants
  - CO<sub>2</sub>, H<sub>2</sub>S, mercury→ • Removal & sequestration
  - eg Gorgon CO<sub>2</sub> sequestration
- Development costs
  - Water depth, reservoir quality→ • Technology improvements
- Distance to processing
  - environmental issues
  - political issues
  - pipeline terrain→ • Move the processing location?
  - resolve issues
  - seek compromises (mutual benefits?)
  - Avoid complex/high risk traverses
- Certainty
  - reservoir
  - development concept→ • Improve technical confidence
  - reservoir studies and appraisal drilling
  - use proven development technology
- Market for product → • Diversify?

# Bonaparte Basin Development Drivers

MEO gas discoveries have clear path to market

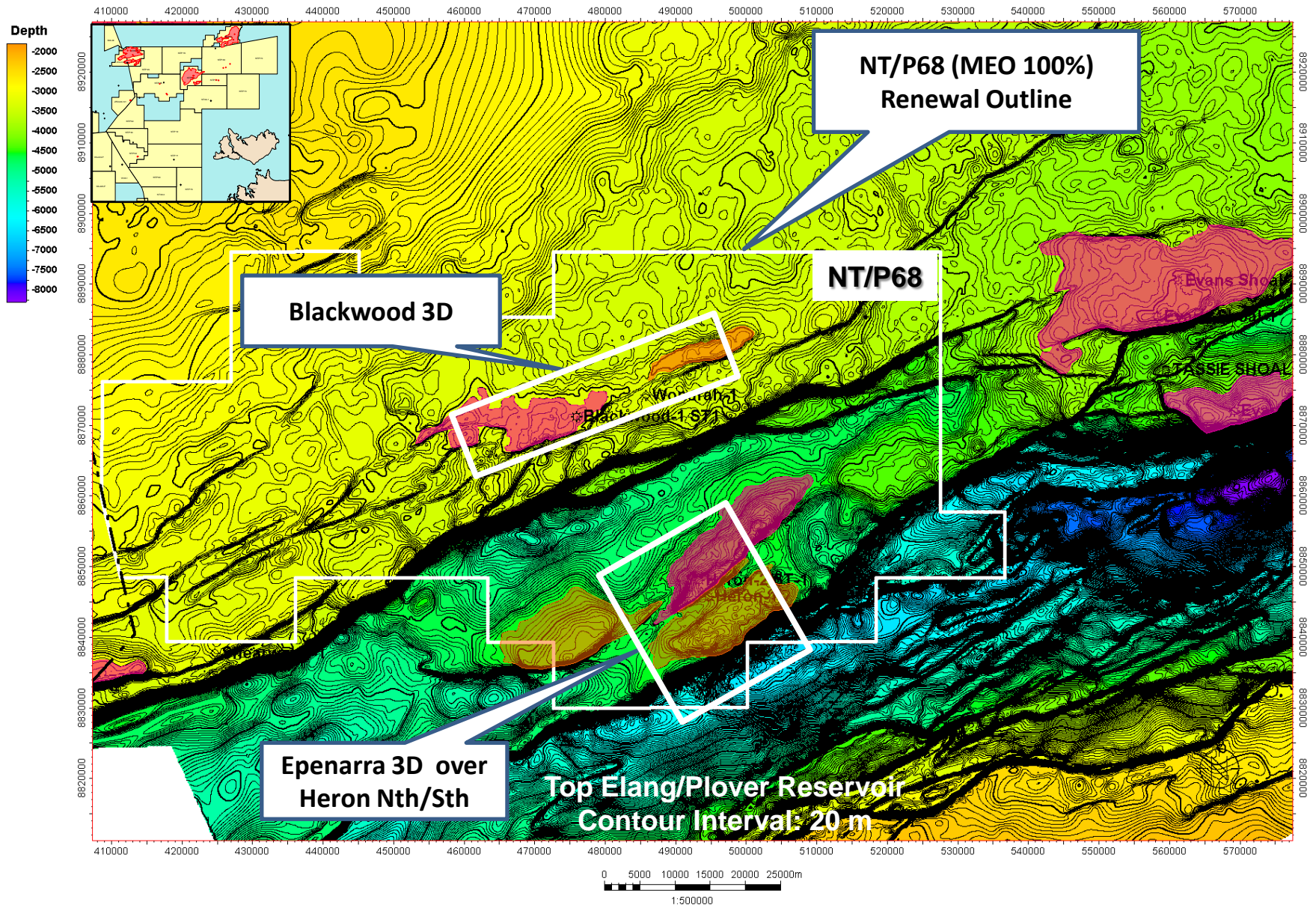
Project	Discovery	Production Gas/LNG/MeOH	Distance	Deep	Dry	Dirty	Disputed
Bayu-Undan	1995	2001/2006					
Blacktip	2001	2009/no LNG					
<b>Blackwood (MEO 100%)</b>	<b>2008</b>	<b>FID + 3.5 yrs</b>					
<b>Heron (MEO 100%)</b>	<b>2008</b>	<b>FID + 3.5 yrs</b>					
Greater Sunrise	1975	?					
Petrel/Tern /Frigate	1969	?					
Evans Shoal	1988	?					
Barossa / Caldita	1973/2005	?					

- Disputed: - jurisdiction related complexities



# MEO gas discoveries (100%) & 3D seismic

Permit renewal accepted, acreage award pending

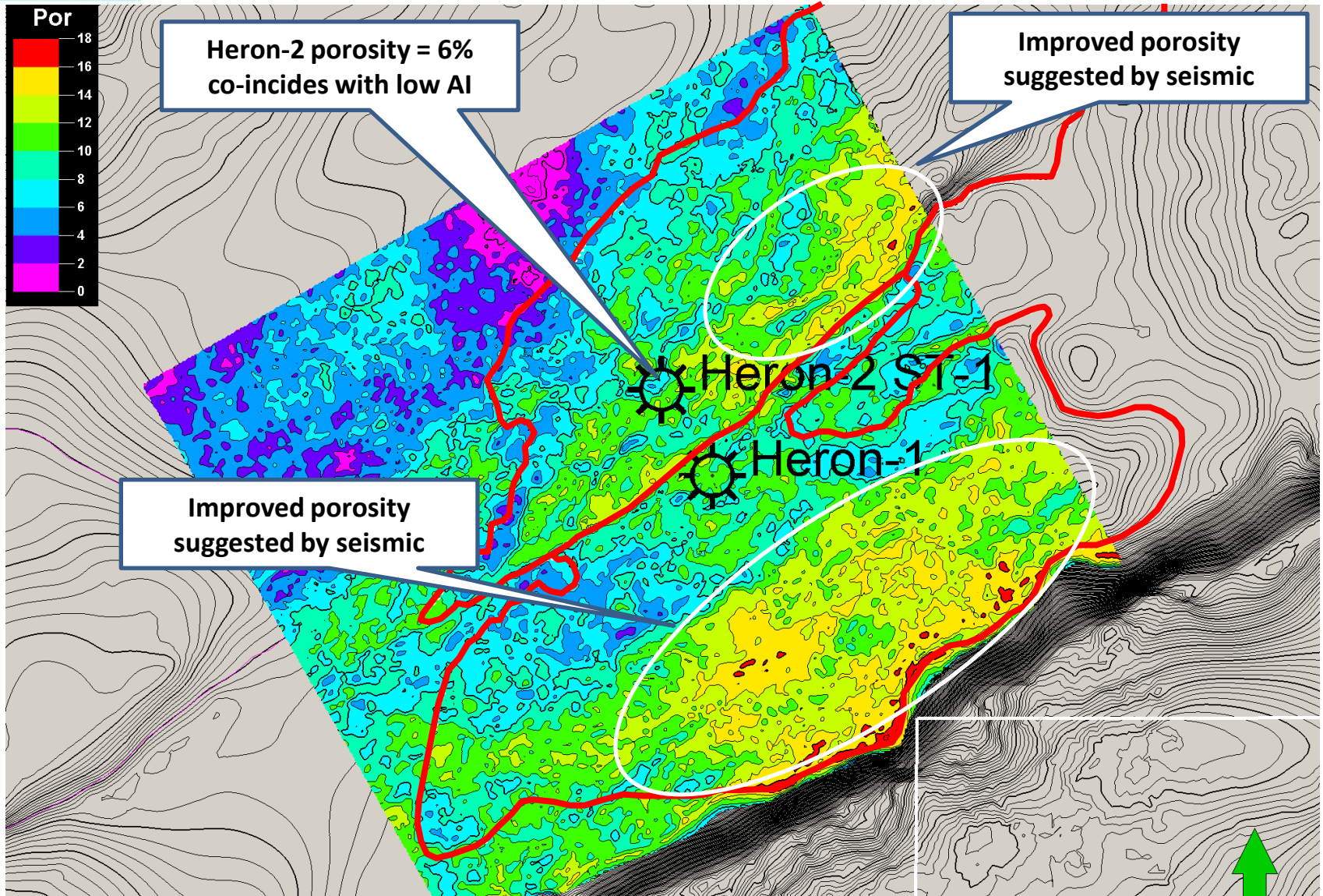




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# Advanced seismic processing

Acoustic impedance (AI) studies to predict reservoir sweet spots





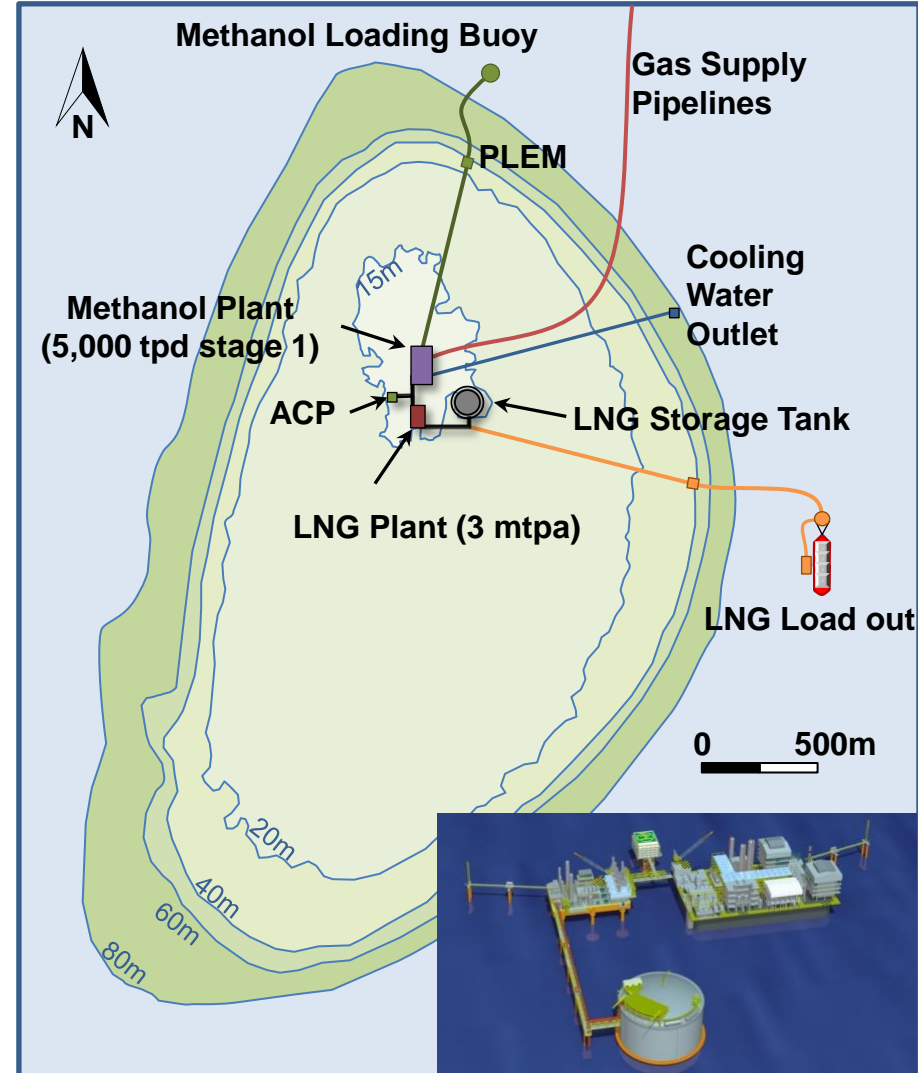
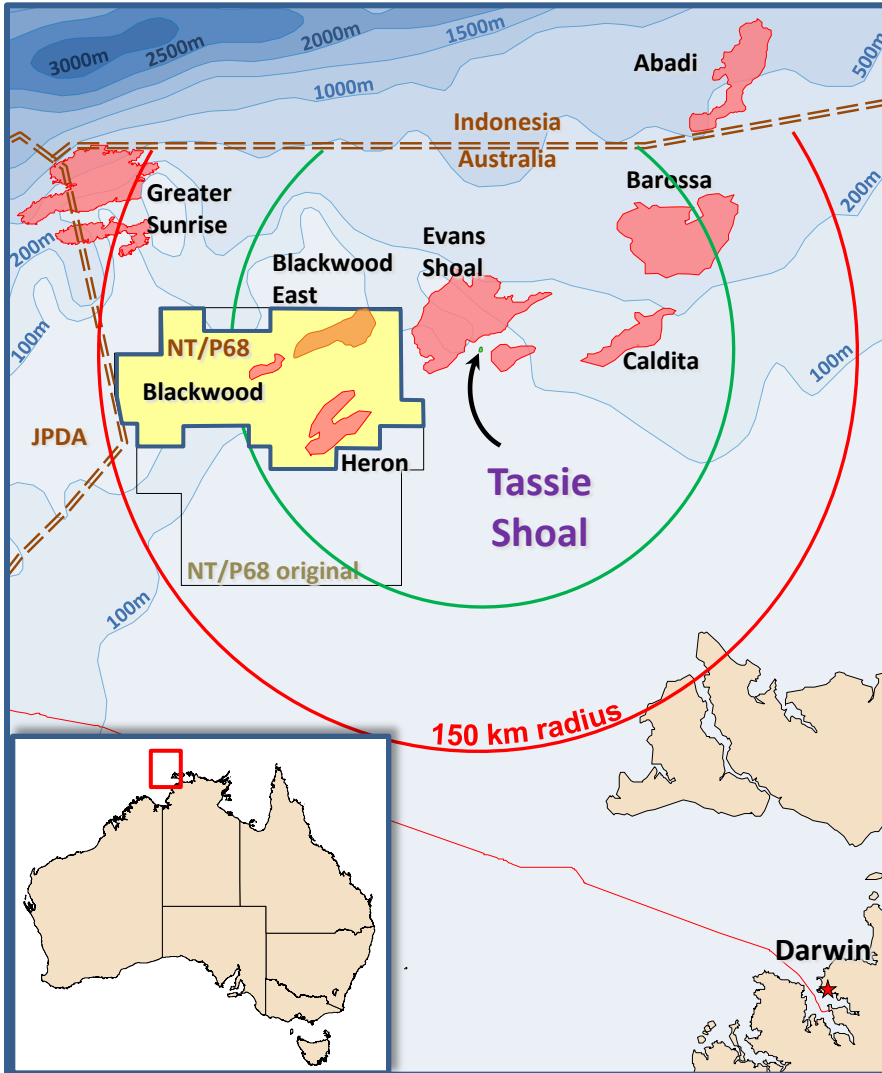


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# Tassie Shoal – a natural hub location

Solves remoteness & gas quality ( $\text{CO}_2$  sequestered into methanol)







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# Tassie Shoal Projects – Single Modules

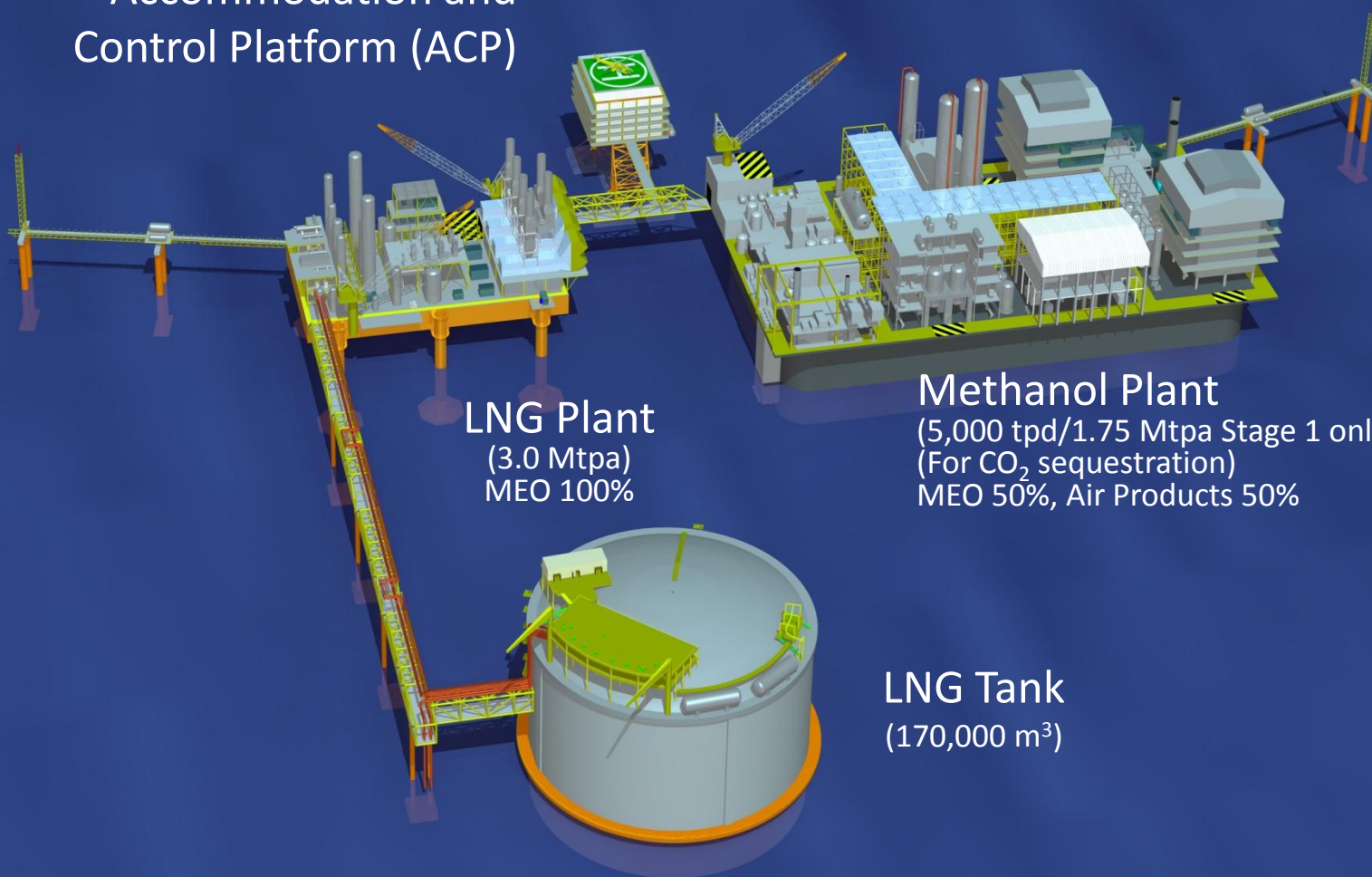
Environmental approvals secured – pending gas supplies

Accommodation and  
Control Platform (ACP)

LNG Plant  
(3.0 Mtpa)  
MEO 100%

Methanol Plant  
(5,000 tpd/1.75 Mtpa Stage 1 only)  
(For CO<sub>2</sub> sequestration)  
MEO 50%, Air Products 50%

LNG Tank  
(170,000 m<sup>3</sup>)

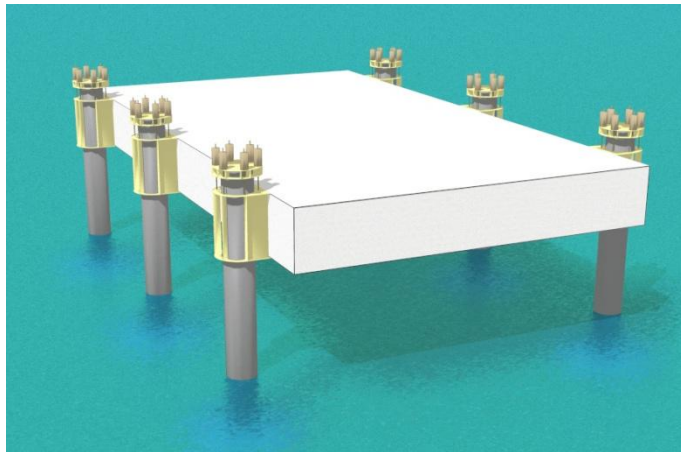
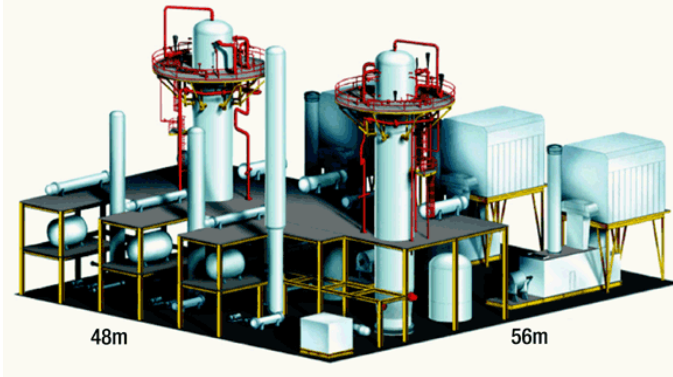


# Timor Sea LNG Project

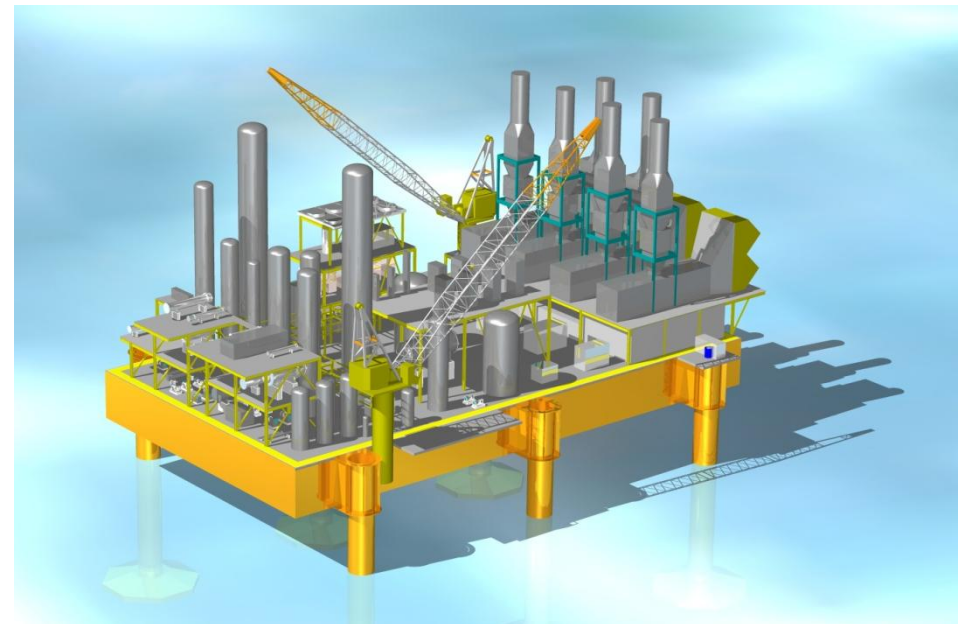
Combines two established designs

**Air Products' CL DMR FPSO Concept with MCR® Cryogenic Heat Exchangers**

Nominal 3 MTA Capacity



Arup Concept Elevating (ACE) Platform (100m x 50m)



Timor Sea LNG Plant – one module



Air Products/Aker Kvaerner 1990's Concept





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# 170,000 m<sup>3</sup> LNG Storage

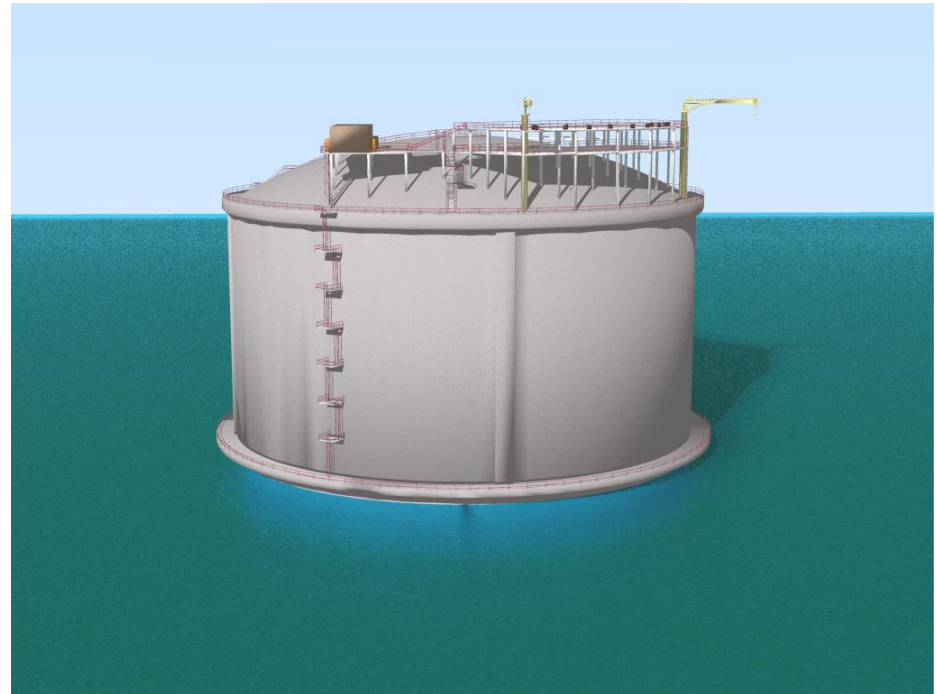
Combines two proven technologies



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# Methanol plant on concrete GBS

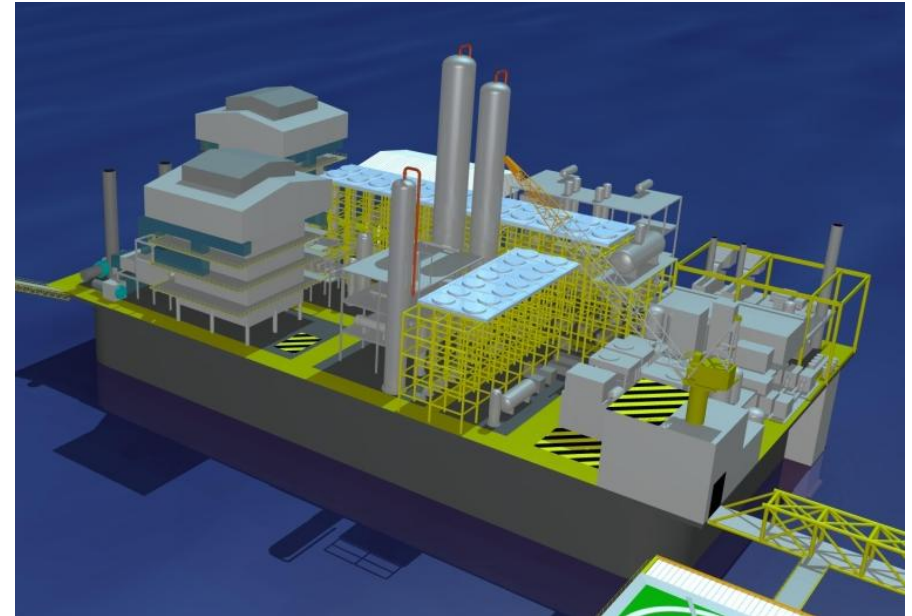
Combines two proven technologies



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- Plant based on Davy Process Technology M5000 plant operating in Trinidad
- GBS builds on the experience from ExxonMobil's Adriatic Re-gas terminal





# Economic enhancements

MEO's plan to enhance resource value

- Cooperative development? → • Tassie Shoal development hub
- Accelerated liquids production? → • Hub lowers threshold economics
- Economic disposal of contaminants → • Sequestration into methanol
  - Sequestration revenue stream
- Lower development costs → • Single module facilities
  - Pre-fabricated and pre-commissioned
- Reduce distance to processing → • Tassie Shoal development hub
  - resolve environmental issues
  - seek compromises (mutual benefits?)
  - environmental approvals in place
  - willing to share infrastructure
- Improve technical confidence → • Advanced seismic processing
  - reservoir studies and appraisal drilling
  - use proven technology
  - Acoustic impedance studies
  - Tassie Shoal LNG and Methanol
- Diversify Markets → • LNG and methanol products

# Tassie Shoal saves >US\$1bn in capex

Study compared similar land based LNG plant

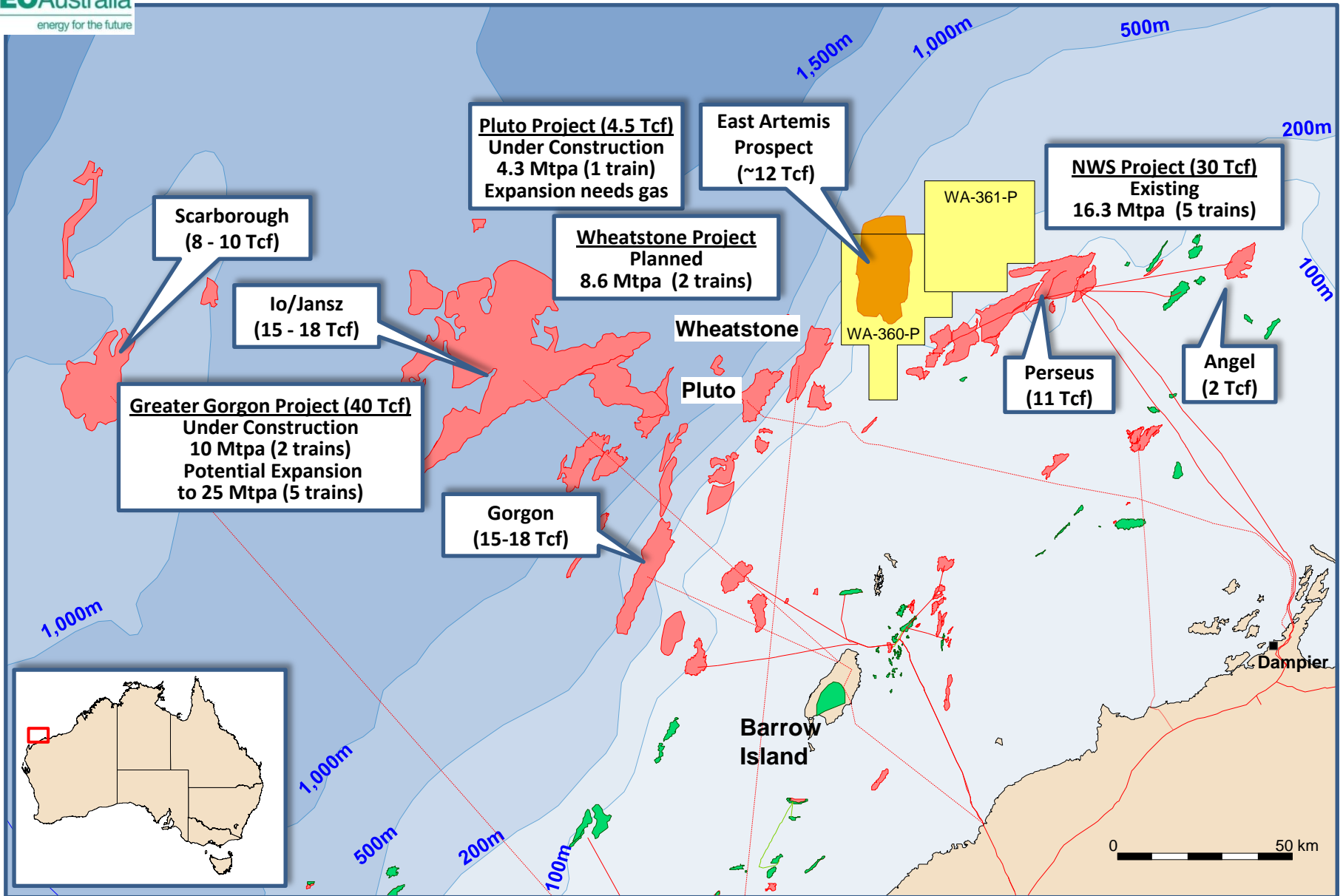
Estimated costs (US\$M)	Darwin LNG	Tassie Shoal LNG	Potential Savings
Plant Costs	1,549 <small>(WorleyParsons est)</small>	1,090 <small>(WorleyParsons est)</small>	<b>459</b>
Pipeline *	943 <small>(WorleyParsons data)</small>	288 <small>(WorleyParsons data)</small>	<b>655</b>
LNG Tank	300 <small>(MEO est)</small>	330 <small>(Arup est)</small>	<b>(30)</b>
Loadout/Jetty	200 <small>(MEO est)</small>	277 <small>(TORP est)</small>	<b>(77)</b>
Project Development & Owners Costs (6.25%)	188 <small>(same % as TSLNGP)</small>	106 <small>(Fluor/APCI/MEO est)</small>	<b>82</b>
<b>Total Project Cost</b>	<b>\$3,180m</b>	<b>\$2,091m</b>	<b>\$1,089m</b>

- Plant costs savings driven by lower SE Asian construction costs
- Pipeline cost savings estimates are distance related

\* Based on pipeline from Greater Sunrise to Tassie Shoal vs Greater Sunrise to Darwin

# Carnarvon Basin – THE LNG address!

MEO's acreage is located on trend with recent discoveries



# Carnarvon Basin Development Drivers

Location, size & gas quality drives economics

Project	Capacity Mtpa	Discovered	Production Gas/LNG	Distance	Dry	Dirty	Deep
NWS Gas Project	16.3	1971	1984/1989	●	●	●	●
Pluto I (in construction)	4.3 + 2? x 4.3	2005	2010/2011 2013, 2014	●	●	●	●
Greater Gorgon (in construction)	10 + 3 x 5	1981	2014	●● ↻	●	●● ↻	●
Wheatstone (in FEED – FID 2011)	10	2004	2016 ?	●	●	●	●
<b>Artemis Prospect (MEO 20%)</b>	?	<b>2010?</b>	?	●	●	●	●
Scarborough	6?	1979	?	●	●	●	●

- Distance: - long distance from suitable processing site
- Deep: - significant water depth &/or reservoir depth
- Dry: - lack of significant hydrocarbon liquids
- Dirty: - presence of contaminants (e.g. CO<sub>2</sub>)

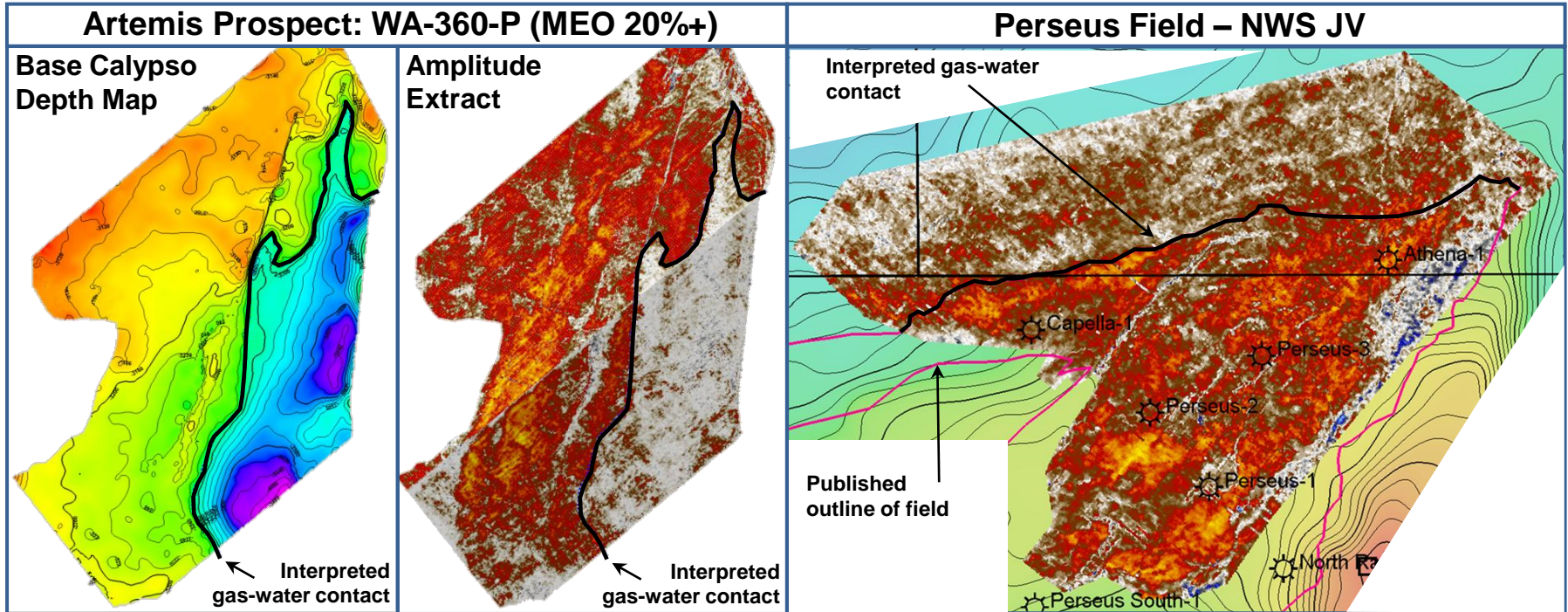




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# New 3D's revealed ~12 Tcf\* Artemis Prospect

DHI conformable with structure – similar to Perseus field



- \* Estimated mean prospective recoverable resource
- + Post farm-out of 50% interest to Petrobras, subject to regulatory approvals
- Estimated Geological Chance of Success (GCOS) = 32%
- Gas quality expected to be similar to Pluto & Wheatstone
- Multiple monetisation options

# Summary

Tailor the project to address the key development drivers

- **Discovering** gas in Australia is NOT the issue - **monetising** discovered gas IS
- **Challenge paradigms** - innovation does not automatically mean increased risks
- Consider **alternative markets** – LNG is not the only option
- **Mitigate risks**
  - Look to nature for solutions
  - Use existing/proven technology
  - Comprehensive studies before significant capital expenditure
- **Collaboration** can build a bigger pie for all stakeholders
- **Accelerating** developments enhances value for all stakeholders
- **Sequestration** is multi-dimensional eg geo/bio/chemical (eg methanol)
- **Tailor** solutions to address the geo-circumstances (including geo-political)