

**ASX:EEG**

## Transformational Acquisition of Pangaea Resources

14 April 2021



Level 19, 20 Bond Street  
Sydney NSW 2000

Empire Energy Group Limited (“**Empire**” or “the **Company**”) is pleased to announce that it has signed a binding Sale and Purchase Agreement with Pangaea (NT) Pty Ltd as trustee of the Pangaea (NT) Unit Trust (“**Pangaea**” or “**Vendor**”) to acquire Pangaea’s Beetaloo Sub-basin portfolio for a combination of cash, ordinary shares and unlisted options in Empire as set out in the attached presentation. Empire is also carrying out a capital raising. Further details about the capital raising will follow in due course.

### Highlights

- **Empire to acquire an operated 82.5% interest in five tenements across the Beetaloo Sub-basin onshore Northern Territory**
- **Empire’s best estimate Prospective Resources have more than doubled to ~41 TCFe comprising 37 TCF gas and 657 MMbbls liquids (condensate and oil)**
- **Empire’s 2C Contingent Resources have increased by more than 350% comprising 171 BCF gas and 2.9 MMbbls liquids**
- **\$5 million cash payable and 140 million Empire shares to be issued to Pangaea upon completion of the transaction. Pangaea will also be issued 8 million unlisted Empire options with an exercise price of \$0.70 per share**
- **Transaction materially enhances Empire’s early commercialisation plans for the Beetaloo and provides Empire with multiple drill-ready targets**
- **The acquisition is subject to Empire shareholder and Northern Territory Government approvals. Completion is expected to occur in June 2021**

#### Comments from Empire Managing Director Alex Underwood:

“This acquisition confirms Empire’s position as the leading Beetaloo independent. The transaction significantly increases Empire’s operated acreage, Prospective Resources and Contingent Resources in this key region. Empire now controls a globally significant gas resource which strengthens our early commercialisation strategies. Pangaea’s tenements overlap the Amadeus Gas Pipeline, which in addition to the McArthur River Mine Gas Pipeline that crosses EP187, provides Empire with multiple pathways to market utilising existing infrastructure.

We are delighted to welcome Pangaea and Mr Paul Fudge to the Empire shareholder register and to our Board. The development of these resources is crucial to meeting the energy needs of Australia and the Asian region.”

### Completion

Completion of the transaction is subject to standard Northern Territory Ministerial approvals and Empire shareholder approval as mentioned above. Empire will seek shareholder approval for the issuance of shares and options under this transaction at an EGM to be convened as soon as practicable. The notice of shareholder meeting will contain an Independent Expert's Report.

### Advisors

**amicaa** is acting as financial advisor and **Baker McKenzie** is acting as legal advisor to Empire on the transaction.

**Morgan Stanley** is acting as financial advisor and **Herbert Smith Freehills** is acting as legal advisor to Pangaea on the transaction.

**Blue Ocean Equities** and **Morgans Financial** are acting as Joint Lead Managers to the capital raising.

This ASX release has been authorised by the Managing Director.

For queries about this release, please contact:

Alex Underwood, Managing Director

Ph: (02) 9251 1846

[info@empiregp.net](mailto:info@empiregp.net)





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# Empire Energy Group Limited (ASX:EEG)

## Transformational Acquisition of Pangaea's Beetaloo Assets

Investor Presentation, April 2021



# Key acquisition highlights

## Transformational Deal

- Best Estimate Prospective Gas Resource increased by **157%** to **37 Tcf**
- Best Estimate Prospective Liquids Resource increased by **2,334%** to **657 MMbbls**
- 2C Contingent Gas Resource increased by **317%** to **171 Bcf**
- **Maiden** 2C Contingent Liquids Resource booking of **2.9 MMbbls**
- Empire's NT net acreage position increased by **81%** to **~26 million**



## Consideration Payable

- **A\$5m** cash payable to Pangaea
- Pangaea to own a circa **30%** interest in the combined business (pre capital raising)
- 8 million options with an exercise price of **A\$0.70** per share





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# 1. Transaction Overview



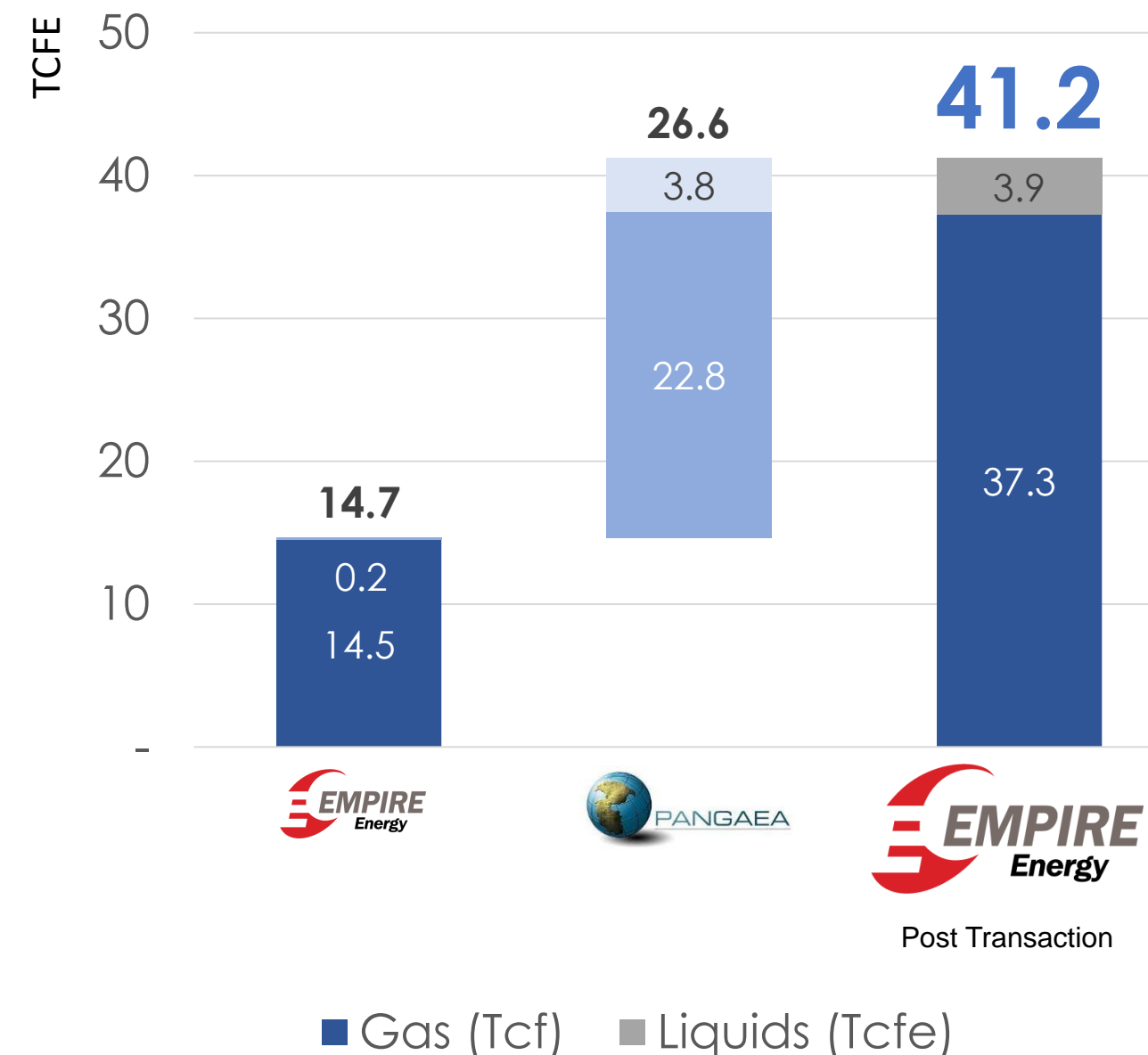
# Empire Energy to acquire Pangaea's Onshore NT Assets



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1. Empire Energy Group Limited ("**Empire**") has signed definitive agreements to acquire Pangaea NT Pty Ltd's ("**Pangaea**") assets, comprising an 82.5% interest in five Beetaloo Basin tenements. Pangaea is controlled by successful veteran resources explorer Mr Paul Fudge
2. Pangaea (net to its 82.5% interest) has Best Estimate Prospective Resources of over 22 Tcf **gas** and over 630 MMbbls **liquids**
3. Empire to issue Pangaea 140 million Empire shares, grant 8 million A\$0.70c options and pay A\$5 million cash for its 82.5% interest. Mr Fudge (with Ms Jacqui Clarke as alternate) to join the Empire Board on completion
4. Empire may move to 100% of the assets following further discussions with the Energy and Minerals Group of Texas, USA ("**EMG**") who hold the remaining 17.5% interest in the assets
5. Transaction delivers Empire **control of a world-class strategic resource** with the company well positioned to drive development of new gas resources for the Australian and global markets

**Combined Best Estimate Prospective Resources (Tcfe)**



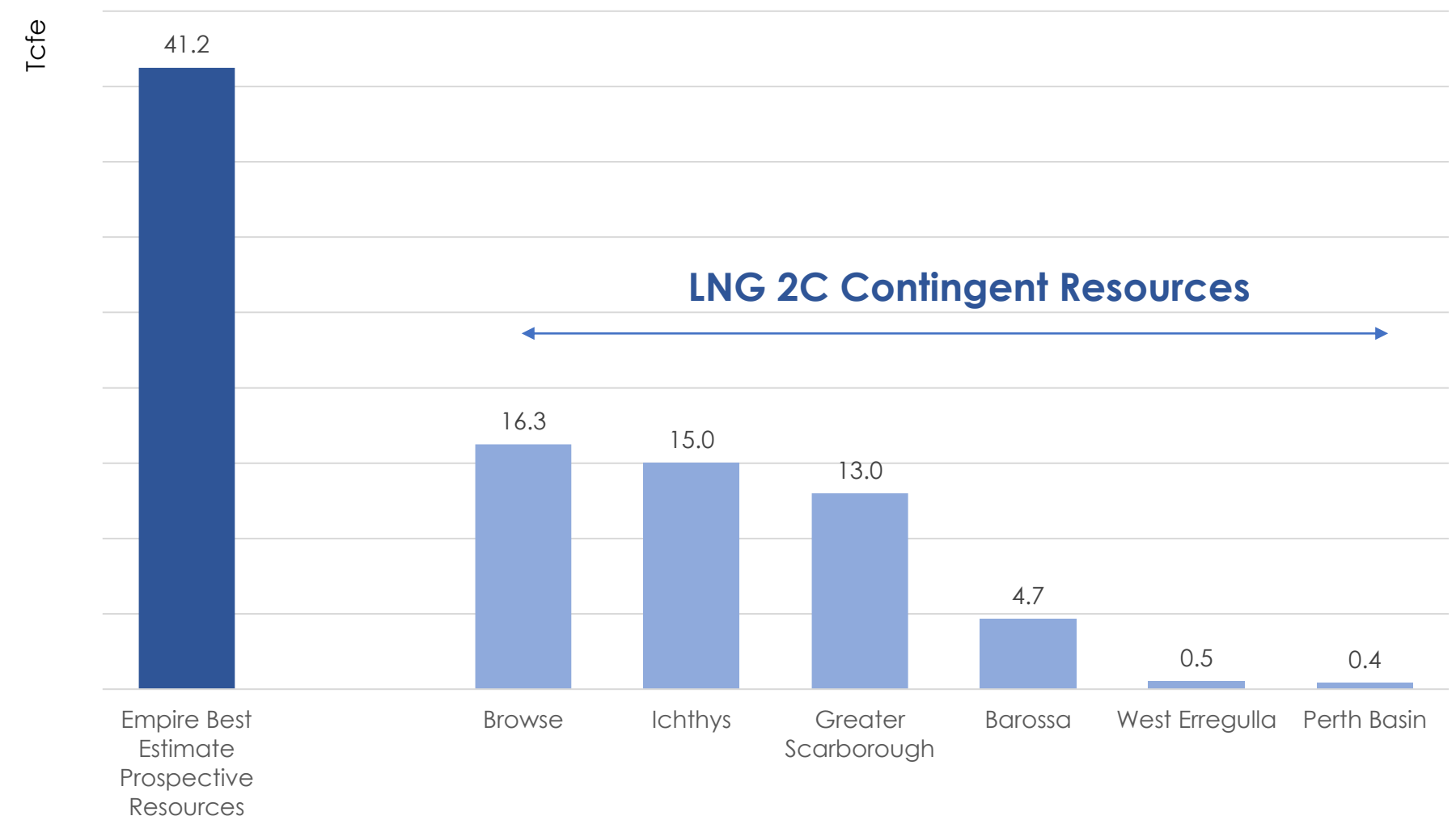
**New combined NSAI certified best estimate Prospective Resource of more than 37 Tcf Gas and 650 MMbbls liquids**

# Empire's Prospective Resource in Context



- Certified Prospective Resource base suggests the potential for a world-class gas resource capable of supplying domestic and international markets for many decades
- Significant appraisal work still to be carried out across Empire's expansive Prospective Resource base
- Empire has a market leading management team and highly experienced Board with which to drive the early commercialisation of our resource endowment

## Empire's Prospective Resource relative to LNG Scale Resources



**Source:** EnergyQuest "EnergyQuarterly March 2021". Ichthys resource from the INPEX website (<https://www.inpex.com.au/projects/ichthys-lng/>)

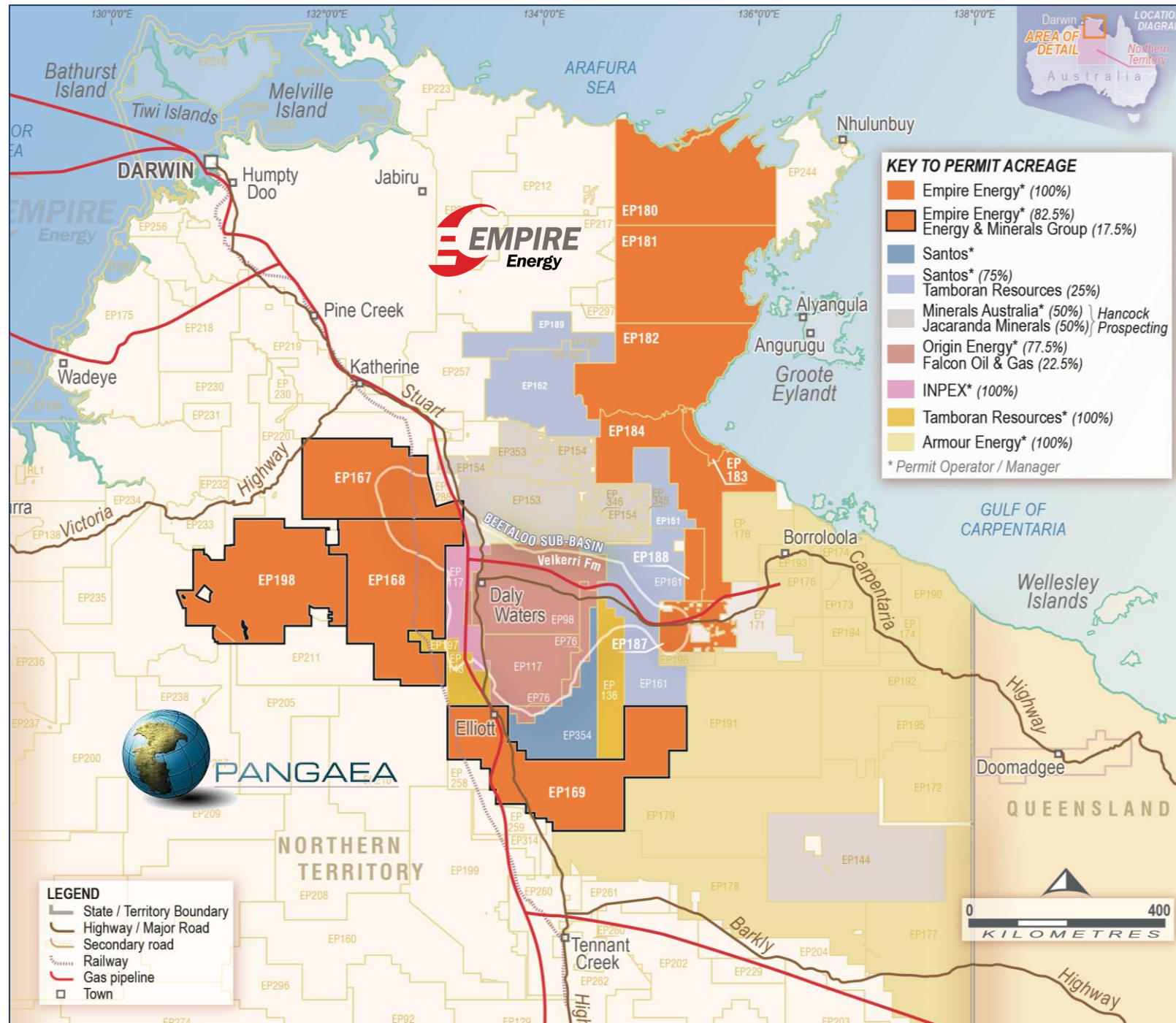
*Note: prospective and contingent resources have been combined where applicable.*

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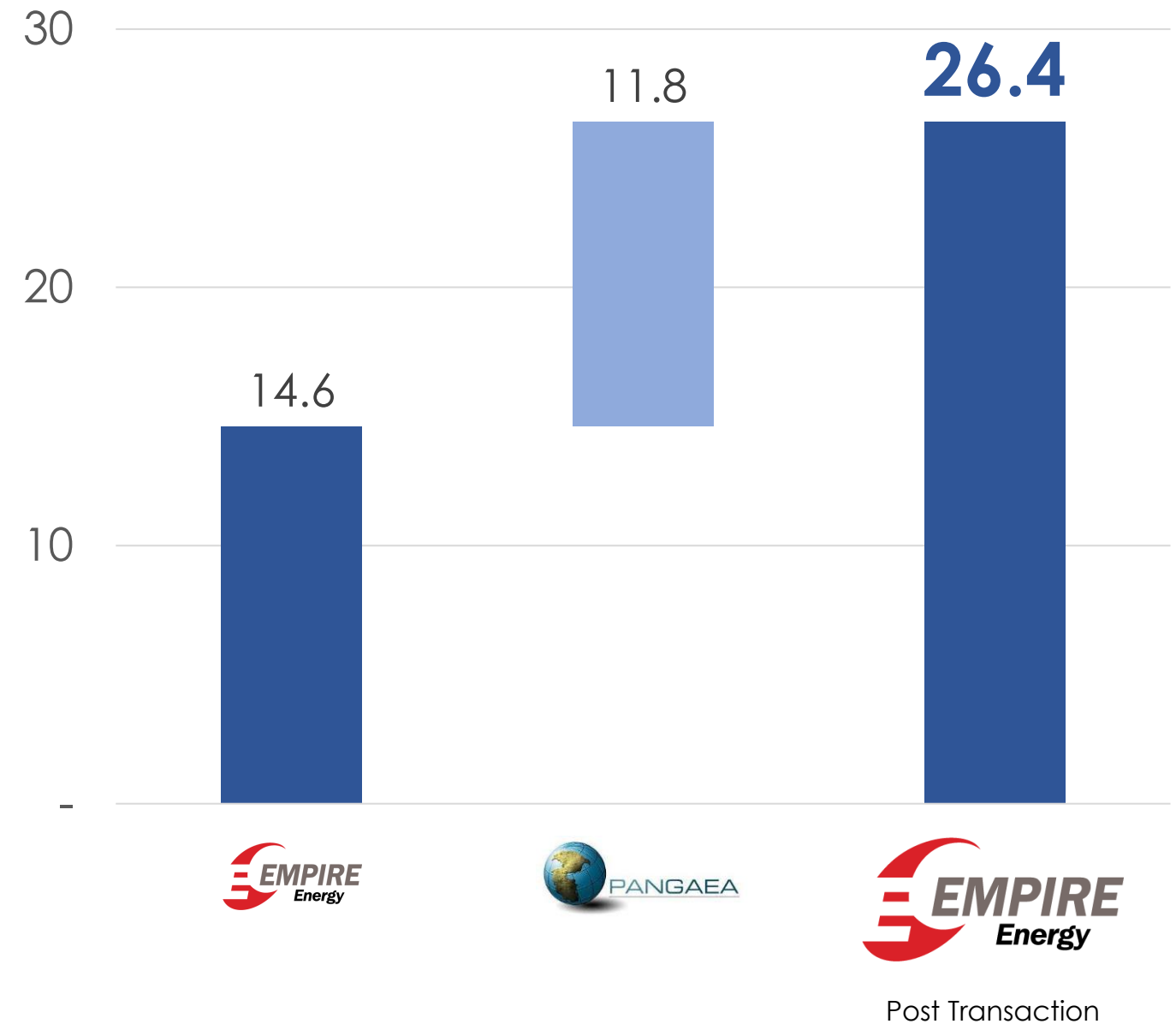
# Creation of the Leading Onshore NT Energy Company



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Net Acres (millions, Equity Interest)





# Empire Energy in the Beetaloo



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- 1. Empire is the Leading Onshore NT Energy Company**
  - Empire's acquisition of Pangaea's onshore Northern Territory assets increases Empire's Best Estimate Prospective Resource by more than 22 Tcf gas and more than 630 MMbbls liquids (condensate plus oil)
  - 2C Gas Contingent Resource has increased by more than 300% to 171Bcf, and Empire will book a maiden 2C Liquids Contingent Resource of 3 MMbbls
  - Empire's Beetaloo gas has low in-situ CO<sub>2</sub>, critical in an economy moving toward carbon-efficient energy supply
- 2. Material Investment Being Made in the Basin**
  - Excellent results being seen by the Santos operated acreage at Tanumburini-1, Origin operated acreage at Amungee NW-1H and Empire's Carpentaria-1. Further appraisal drilling, fracture stimulation and flow testing is planned by these operators in 2021 and into 2022
  - The Australian Government recently announced the \$224m Beetaloo Strategic Basin Plan. The plan includes \$50 million in grants to support \$200m of exploration expenditure before June 2022 and \$174 million in new NT infrastructure funding including road and rail to increase road access during the wet season
  - To date more than \$400 million has been invested in exploration in this world-class basin
- 3. Gas Supply-Demand Outlook Highly Supportive**
  - Eastern Australia remains critically short of domestic gas supplies and is approaching crisis point as coal-fired power generation is retired and renewables bring grid instability. Demand for LNG in the Asian region continues to grow as countries seek a transition path to reliable and clean fuel sources
  - The Beetaloo Sub-Basin is ideally positioned to service both Australian customers via existing and planned pipeline infrastructure and international customers via Darwin and Gladstone LNG export terminals
- 4. Multiple Rapid Pathways to Market**
  - Pangaea's assets are located adjacent to the Amadeus Gas Pipeline, which connects into the Northern Gas Pipeline. This provides a highly strategic path to market which complements Empire's plans to produce gas from its Carpentaria Project into the McArthur River Mine Gas Pipeline
  - Pangaea's acreage is in close proximity to existing road and rail infrastructure, which materially enhances accessibility for development work
- 5. Leading Board and Management Team**
  - Empire's Board and Management team are the key differentiating factor, with a proven track record of operatorship in the Beetaloo, extensive Australian oil & gas experience and access to world leading US shale gas expertise. Empire's team includes inGauge Energy, the leading consultants to the Australian petroleum sector
  - Our Board continues to strengthen, and our Directors bring a range of expertise across energy finance, upstream operations, downstream operations and large scale gas and LNG sales

# Key Sale & Purchase Agreement Terms



## Transaction Overview

- Empire has signed a binding Sale and Purchase Agreement with Pangaea (NT) Pty Ltd as trustee of the Pangaea (NT) Unit Trust to acquire an 82.5% interest in EP167, EP168, EP169, EP 305 and EP198 located onshore Northern Territory (the "Vendor Tenements").

## Consideration Payable

- A\$5m cash and 140m shares in Empire
- 8m options with an exercise price of A\$0.70 which will expire 3 years from their issue date
- Shares issued to Pangaea represent an interest of ~30% in Empire at the date of this announcement, prior to any capital raise
- If Pangaea's joint venture partner EMG tags or otherwise joins the deal, a further A\$1.06 million cash, 29.7 million EEG shares and 1.7 million EEG \$0.70 options may be payable to EMG

## Conditions Precedent

- Empire shareholder approval by way of an ordinary resolution to be considered at an Extraordinary Meeting of Empire shareholders (expected to be held prior to the end of June). As part of this approval Empire will commission an Independent Expert's Report on the transaction
- Approval of the Northern Territory Minister for Mining and Industry for the transfer of the Vendor Tenements pursuant to section 96 of the Petroleum Act 1984 (NT)
- Other industry standard conditions precedent
- Empire is targeting transaction close by the end of June 2021

## Other Key Terms

- **Board Representation:** Mr Paul Fudge to join the Empire Energy board with Ms Jacqui Clarke joining as his alternative
- **Escrow:** Pangaea has entered into voluntary escrow arrangements covering 125 million shares. 55 million shares shall be escrowed for no less than 12 months and 75 million shares for no less than 24 months
- **EMG Rights:** under the Joint Venture Operating Agreement ("**JVOA**") between Pangaea and EMG, EMG and Pangaea have certain "drag and tag" rights. Empire will engage with EMG in relation to their position. Should EMG join the transaction, Empire will acquire their 17.5% interest in the Vendor Tenements on the terms set out above



# Expanding Empire's Board



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## Proposed Pangaea Representatives



**Paul Espie AO**

**Chairman & Non-Executive Director**

- Founding principal of Pacific Road Capital, a resources investing manager of private equity funds
- Former Chairman of Oxiana Ltd during the development of the Sepon copper/gold project in Laos
- Former Chairman of Cobar Mines Pty Limited after a management buyout
- Former Head of Bank of America operations in Australia, New Zealand and PNG

**Alex Underwood**

**Managing Director**

- Associate Director Energy Markets Division of Macquarie Bank Limited (Sydney and Singapore)
- Director Natural Resources Division of Commonwealth Bank of Australia (Singapore)
- Financial Analyst BHP Billiton Petroleum (Perth)
- Experience investing debt and equity in the upstream oil and gas sector and identification of value creation opportunities for upstream oil and gas development / production assets

**Peter Cleary**

**Non-Executive Director**

- Distinguished 29-year career representing Santos, the North West Shelf Venturers and BP in Asia. His executive career was in LNG, pipeline gas and chemicals operations
- Member of the Executive Committee of the Australia Japan Business Co-operation Committee and the Australia Korea Business Council

**Louis Rozman**

**Non-Executive Director**

- Former Managing Director of CH4 Gas which merged with Arrow Energy and later acquired by PetroChina and Shell
- Founding principal of Pacific Road Capital, a resources investing manager of private equity funds
- Former Chief Operating Officer of AurionGold Limited
- Chairman of the VALMIN Code Committee for the AusIMM and Australian Institute of Geoscientists

**Prof. John Warburton**

**Non-Executive Director**

- Highly regarded petroleum geoscientist experienced in big fields
- 30 years technical & leadership experience in leading E&P companies including BP, LASMO-Eni and Oil Search
- Previously Chief of Geoscience & Exploration Excellence for Oil Search
- Non-Executive Director of Senex Energy

**Paul Fudge**

**Non-Executive Director**

- Controlling shareholder of Pangaea
- Significant investment experience in onshore Australian oil & gas, including being an early mover in the Queensland Coal Seam Gas industry and in the Beetaloo Sub-Basin
- Paul brings significant business and investment experience to the Board of Empire

**Jacqui Clarke**

**Alternative Director**

- Currently Non-Executive Director and Co-Founder of Maxima Private.
- 30 years professional services experience, with just over 15 years as a Partner at Deloitte. Jacqui is an experienced executive and business professional with a track record for transforming performance, building a performance culture, driving profitable growth, developing and executing on strategy and delivering results. Jacqui is a clear and direct communicator with the ability to explain complex issues simply
- Jacqui is a Chartered Accountant and Fellow of the Institute of Chartered Accountants, Graduate of AICD (Australian Institute of Company Directors), Chartered Tax Advisor and Justice of the Peace.

# Industry Leading Management and Operational Team



**Kylie Arizabaleta**  
Financial Controller

- Longest serving Empire management team member
- Prior to joining the Company, Kylie worked in the Audit division of Chartered Accounting firms as a senior and lead external auditor where she gained broad experience in Audit and other Assurance Services

**Dr Alex Bruce**  
Chief Geoscientist

- PhD from the University of New South Wales (2001) in machine learning applications to geology
- 20 years experience across onshore and offshore projects from exploration to development and conventional and unconventional oil & gas
- Has held similar positions with other ASX oil & gas mid-caps including Drillsearch (acquired by Beach), AWE (now Mitsui), Roc Oil (now FOSUN) and Bridgeport Energy (part of New Hope Corporation)

**Ben Johnston**  
Vice President Business Development

- Director, Natural Resources & Energy, Commonwealth Bank of Australia
- Vice President, RBC Capital Markets energy investment banking team
- Chartered Accountant and MBA (Australian Graduate School of Management)
- Energy sector specialist across M&A, ECM and debt / project finance transactions

**Charles Dack**  
Environmental and Compliance Reporting Officer

- Environmental manager with qualifications in environmental engineering and environmental law.
- Extensive experience as the environmental regulator of the petroleum industry for the NT Government
- +6 years at the Northern Territory Government, employed as the lead Environmental Engineer for the NT Government to regulate the upstream petroleum industry.

**Dr Simon Hann**  
Principal Engineer

- Founding partner of inGauge and a well engineering professional with over twenty years' operational experience including conventional oil and gas, geothermal, HPHT, and coal seam gas drilling and completions.
- Fourteen years' management experience with Santos, Woodside and Shell including roles as Operations Manager, Drilling Team Leader, Drilling and Completions Manager and Production Manager;

**Qualifications**

- PhD Materials Science University of Queensland, 1998
- Masters of Engineering Science, Qualifier University of Queensland, 1993
- Bachelor of Engineering, Manufacturing and Materials, University of Queensland, 1992
- Shell International Exploration & Production (SIEP) Round I and Round II Well Engineering Competency Certification SIEP

**Kelvin Wuttke**  
Principal Engineer

- Over 24 years of industry experience ranging from conventional onshore oil & gas to CSG and international offshore operations at Santos and Chevron.
- Technical expertise includes drilling & completions design, workovers, well testing, artificial lift, pipelines and surface facilities, across conventional and CSG environments.
- Experience includes managing combined drilling, completion and stimulation projects, remediation workovers, snubbing, fracture stimulation, underbalanced operations, and a wide variety of artificial lift projects.

**Qualifications**

- Registered Professional Engineer of Queensland, Mechanical & Petroleum
- Chartered Professional Engineer (MIE Aust CP Eng), Mechanical
- MBA, Queensland University of Technology, 2003
- Bachelor of Engineering, Mechanical, University of South Australia, 1992

**Jordan Bunning**  
Principal Engineer

- Founding member of inGauge. Over 17 years' operational experience at Santos, Oil Search, Roc Oil and Origin in complex well execution and project management, this includes projects in conventional oil and gas, HPHT, coal seam gas and deep water bores.
- Jordan has experience in roles such as Drilling Manager, Drilling Team Leader, Senior Drilling Engineer and Drilling & Completion Engineer.
- Has been the lead in some of inGauge Energy's most successful projects including as in situ Drilling Manager for Westside Corporation, Comet Ridge and most recently Empire Energy's Northern Territory Carpentaria 1 well.

**Qualifications**

- Bachelor of Engineering, Petroleum Engineer (Hons), University of New South Wales, 2003

**Jon Bennett**  
Project & Construction Manager

- Jon has 25 years operational experience, including twelve years management experience at Santos in roles such as Pre-Development Manager, Construction Manager, Civil Construction Manager and several management roles in large scale Agriculture.
- Jon is an experienced professional with a strong focus on business outcomes. Offering experience in planning, design, and construction of gathering, power, well-pad, civil and other CSG facilities. Proven strengths in business and project management and driving efficiencies through innovation and simplification over a range of industries.
- In his management roles Jon has proudly achieved and maintained industry leading EHS performance across operations.

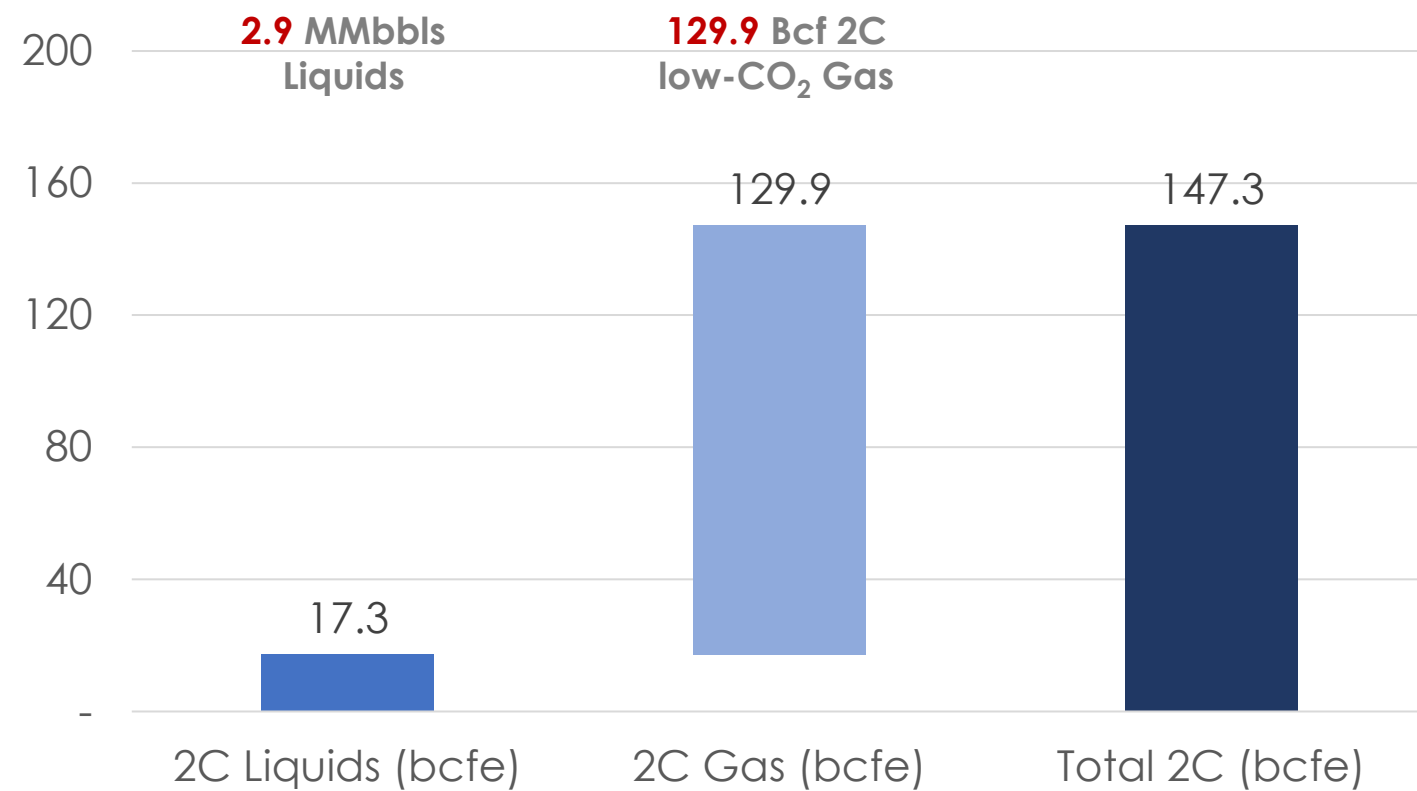
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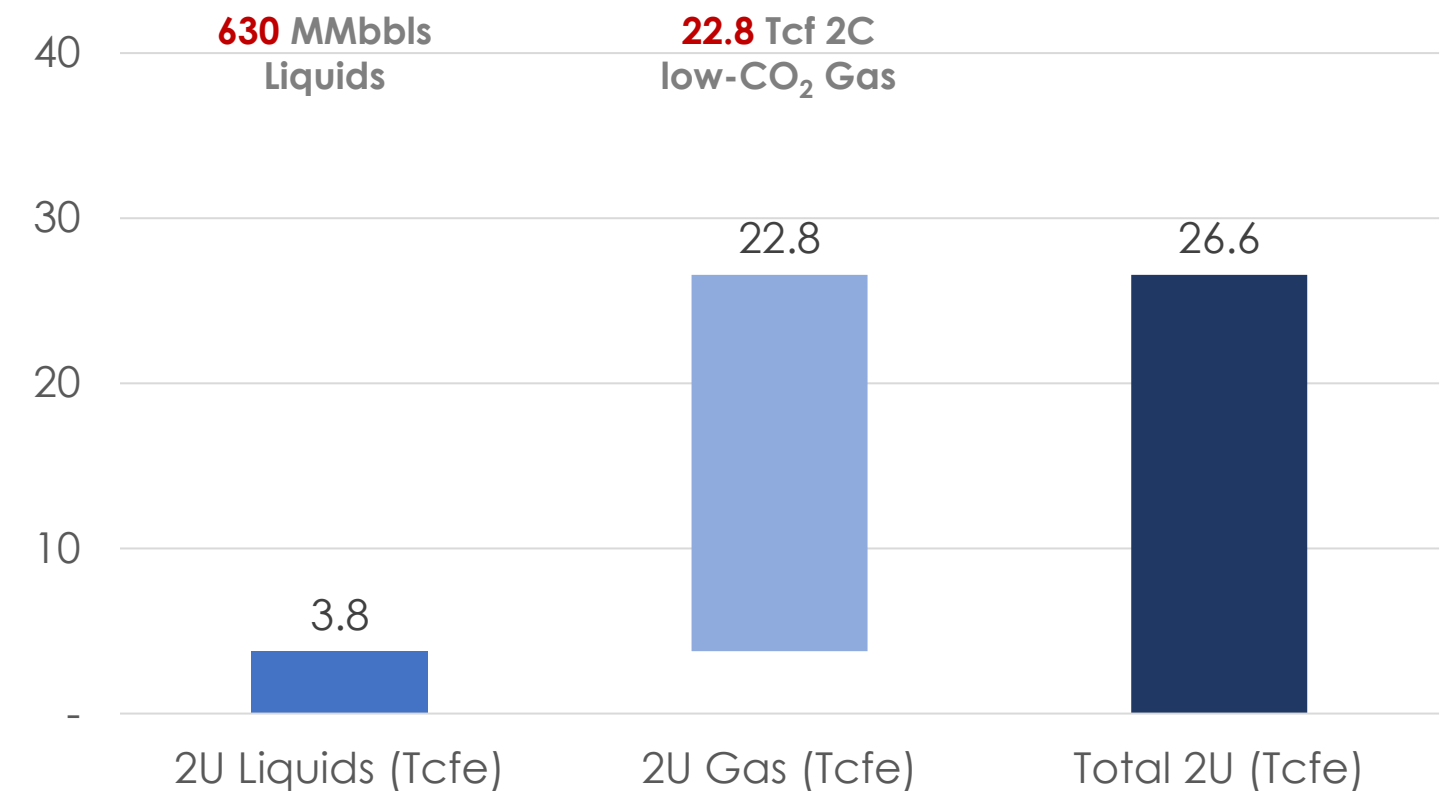
# Acquired Pangaea Resource Base: Summary Overview



## 2C Contingent Resources (Bcfe)



## Best Estimate Prospective Resources (Tcfe)



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# NSAI Certified Prospective Resources



**2,300% and 157% increase in Empire's best estimate liquids and gas Prospective Resources, respectively.**

Shale Unit	Pre Acquisition						Net to 82.5% Interest Acquired						Post Completion					
	Unrisked Prospective Resource (Liquids)			Unrisked Prospective Resource (Gas)			Unrisked Prospective Resource (Liquids)			Unrisked Prospective Resource (Gas)			Unrisked Prospective Resource (Liquids)			Unrisked Prospective Resource (Gas)		
	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)
	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf
Kyalla	-	-	-	-	-	-	73	312	1,296	152	707	4,035	73	312	1,296	152	707	4,035
Mid Velkerri	4	27	99	1,990	3,446	7,091	63	319	1,599	6,742	22,084	66,531	67	346	1,698	8,732	25,530	73,622
Barney Creek	-	-	-	1,633	11,053	45,380	-	-	-	-	-	-	-	-	-	1,633	11,053	45,380
<b>Total</b>	<b>4</b>	<b>27</b>	<b>99</b>	<b>3,623</b>	<b>14,499</b>	<b>52,471</b>	<b>135</b>	<b>630</b>	<b>2,895</b>	<b>6,894</b>	<b>22,791</b>	<b>70,566</b>	<b>139</b>	<b>657</b>	<b>2,994</b>	<b>10,517</b>	<b>37,290</b>	<b>123,037</b>

**Empire's P(50) Prospective Resource is 37 Tcf gas and 657 mmbbls liquids**

\*Note: Refer to EEG announcements dated 18 May 2020 and 22 February 2021 for Netherland, Sewell & Associates, Inc. contingent and prospective resources



# NSAI Certified Contingent Resources



317% increase in Empire's 2C gas Contingent Resource and maiden 2C liquids Contingent Resource.

Shale Unit	Pre Acquisition						Net to 82.5% Interest Acquired						Post Completion					
	Contingent Resource (Liquids)			Contingent Resource (Gas)			Contingent Resource (Liquids)			Contingent Resource (Gas)			Contingent Resource (Liquids)			Contingent Resource (Gas)		
	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)
	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf	mmbbls	mmbbls	mmbbls	bcf	bcf	bcf
Kyalla	-	-	-	-	-	-	0.7	2.5	9.2	0.7	3.7	22.9	0.7	2.5	9.2	0.7	3.7	22.9
Mid Velkerri	-	-	-	-	41.0	86.0	0.1	0.4	2.5	47.2	126.2	320.2	0.1	0.4	2.5	47.2	167.2	406.2
Barney Creek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	<b>41.0</b>	<b>86.0</b>	<b>0.7</b>	<b>2.9</b>	<b>11.6</b>	<b>47.9</b>	<b>129.9</b>	<b>343.0</b>	<b>0.7</b>	<b>2.9</b>	<b>11.6</b>	<b>47.9</b>	<b>170.9</b>	<b>429.0</b>

Empire's 2C Contingent Resource is **171 Bcf gas** and **2.9 mmbbls liquids**

\*Note: Refer to EEG announcements dated 18 May 2020 and 22 February 2021 for Netherland, Sewell & Associates, Inc. contingent and prospective resources



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## 2. Overview of the Pangaea Assets

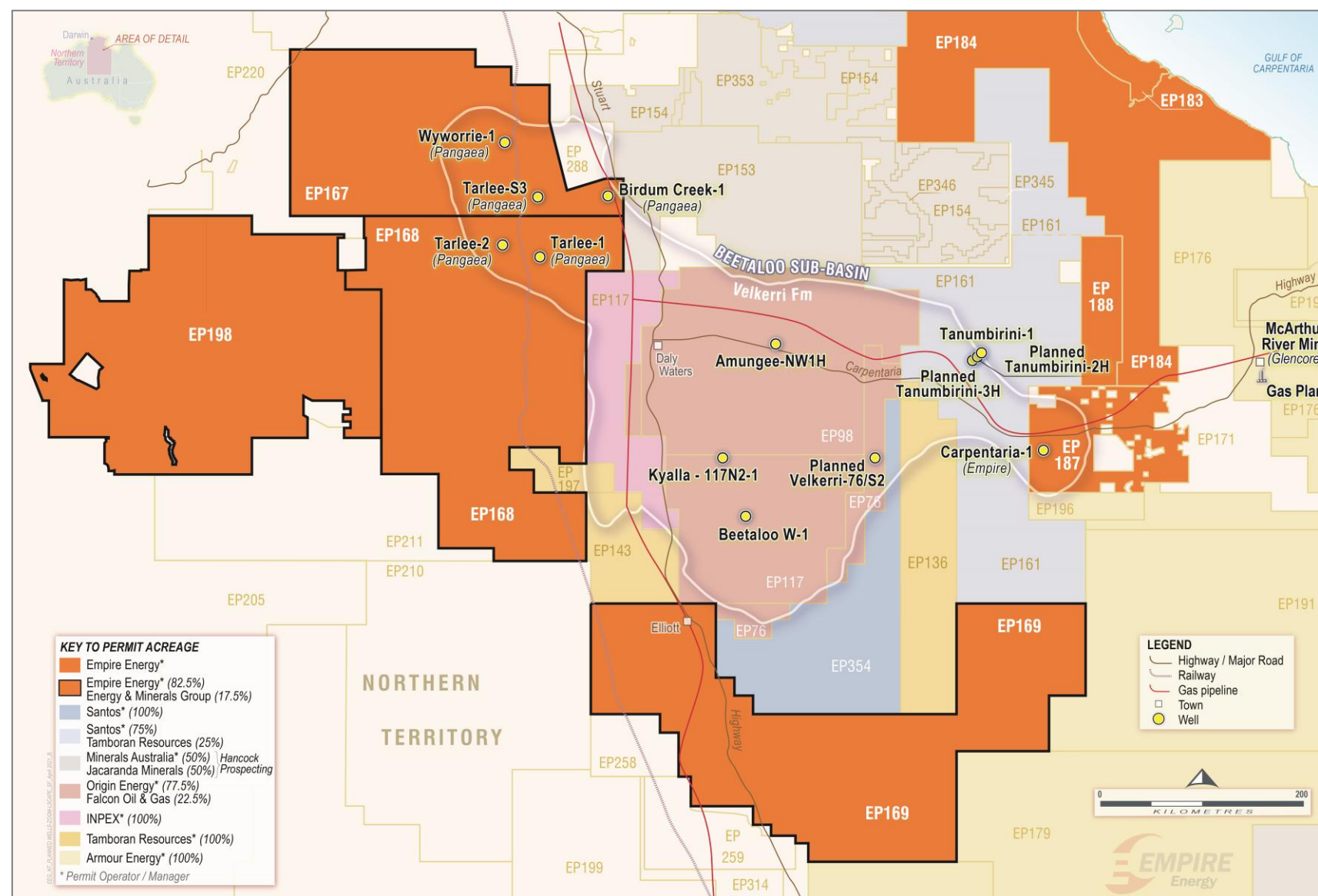


# Overview of Acquired Assets

## Asset Overview

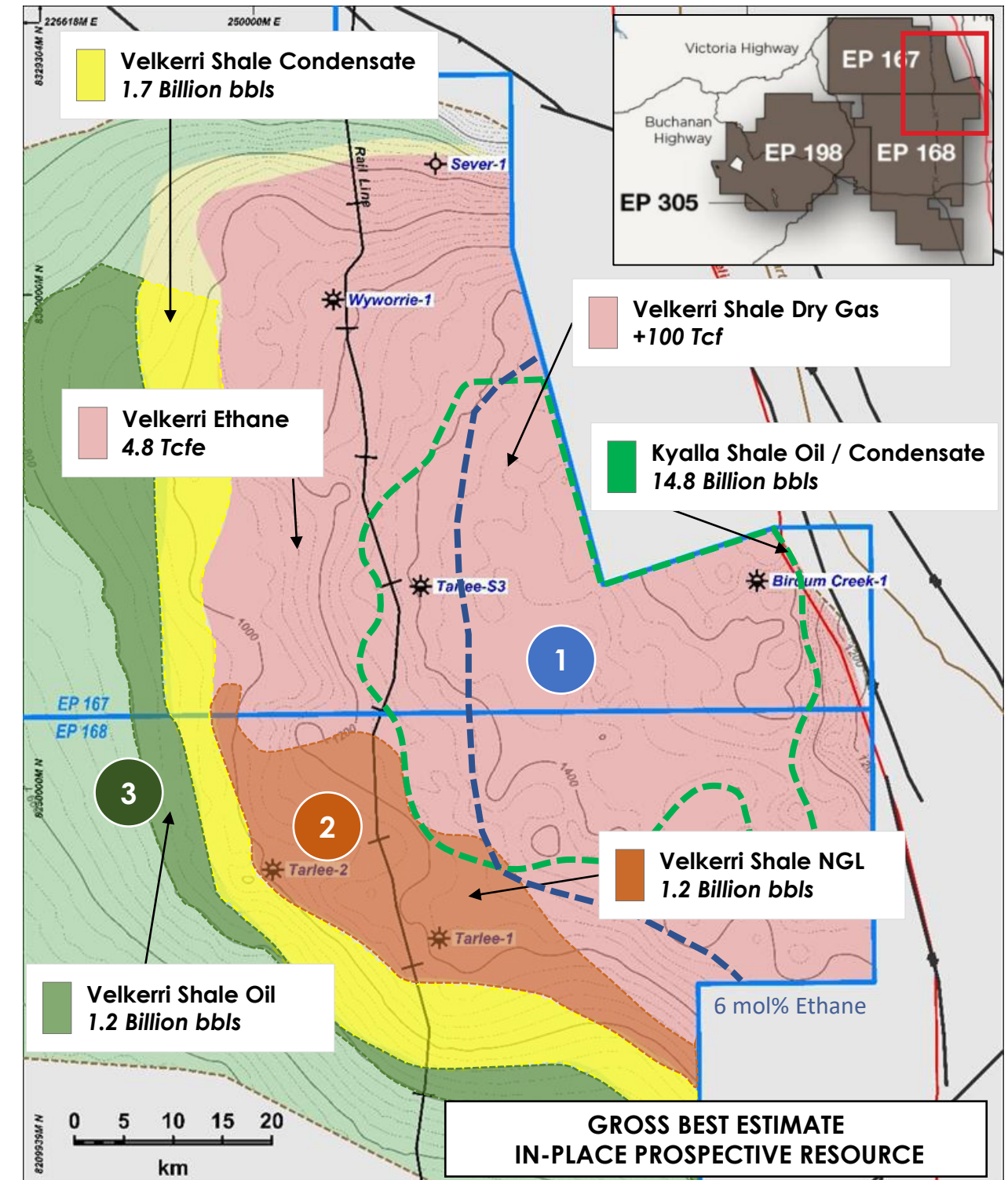
- NSAI certified best estimate Prospective Resources 22.8Tcf gas and 630 MMbbls liquids (net to Pangaea's 82.5% interest)
- NSAI certified 2C Contingent Resources of 130 Bcf gas and 2.9 MMbbls liquids (net to Pangaea)
- ~12 million acres (~48,000km<sup>2</sup>) net to Empire in the onshore Northern Territory, including key areas of the Beetaloo Sub-basin
  - Empire land holding post acquisition: ~26 million acres
- ~A\$110 million of capital expenditure by Pangaea and EMG between 2013 and 2016, including
  - 5 wells drilled (1 exploration and 4 appraisal wells)
  - 2 stratigraphic holes drilled
  - ~1,800km of 2D seismic acquired
  - 29,000km of airborne surveys
  - +3,500m of core samples analysed
- Appraisal program paused in 2016 due to the NT moratorium which was subsequently lifted
- Horizontal drilling locations and production systems development ready

## Tenements and Well Locations



# Beetaloo is a Prolific Play with High Resource Concentration

- Middle Velkerri B Shale is a potentially prolific play, with high resource concentrations and reservoir properties similar to those seen in the United States
- Pangaea Resources permits hold multiple hydrocarbon windows identified in core focus areas
  - 1 Velkerri Dry Gas - highest GIP, deepest shale
    - Kyalla Oil / Condensate
  - 2 NGL and Condensate (A - B Shale) – highest porosity & permeability
  - 3 Velkerri Oil (A - B Shale) – high porosity & permeability
- Thick TOC rich shales have been identified and confirmed across the Vendor tenements
  - TOC levels of between ~4% in the Mid Velkerri B shale unit confirmed by drilling
- Relatively shallow depth and excellent reservoir properties will be important in demonstrating the economic viability of the resource
- Initial production testing undertaken by Pangaea and EMG demonstrated gas flow to surface



Source: Pangaea Analysis

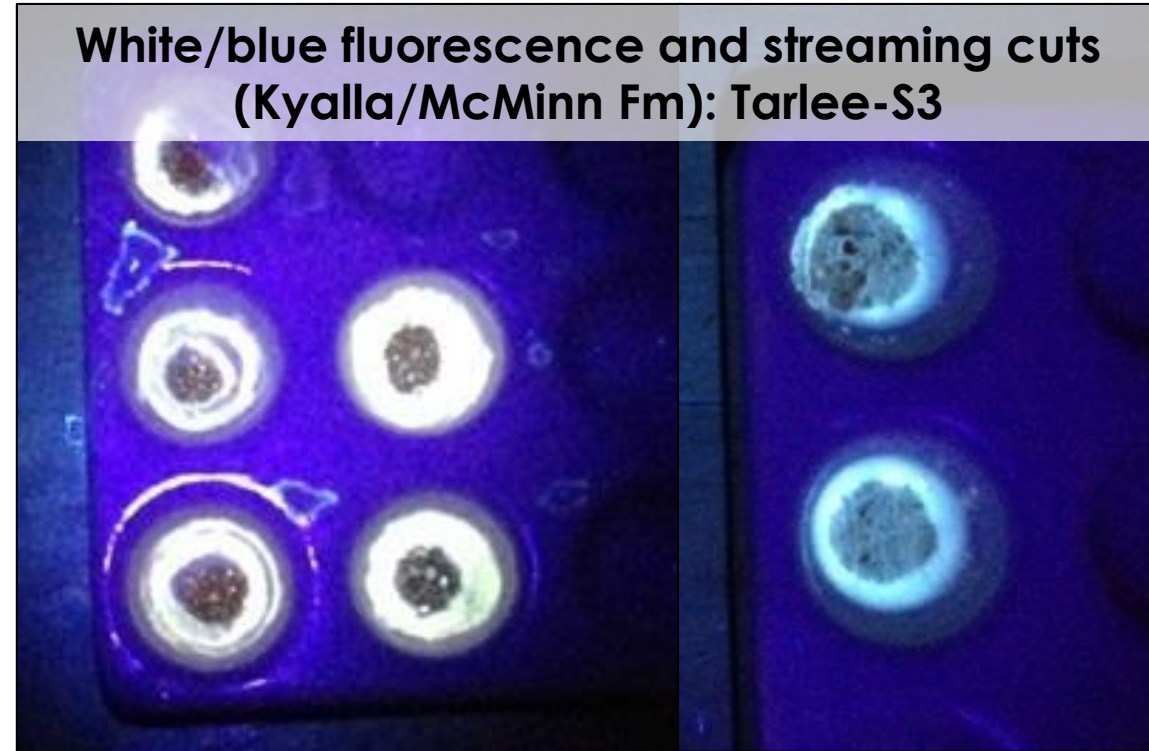


# Empire Leveraging the Pangaea & EMG \$110m Data Set

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Live Oil (Kyalla) – Tarlee-1



White/blue fluorescence and streaming cuts (Kyalla/McMinn Fm): Tarlee-S3



Middle Velkerri B Shale Gas Bleeds: Tarlee-S3



Bleeding gas was seen from all carbonaceous intervals within M. Velkerri Shale: Tarlee-S3

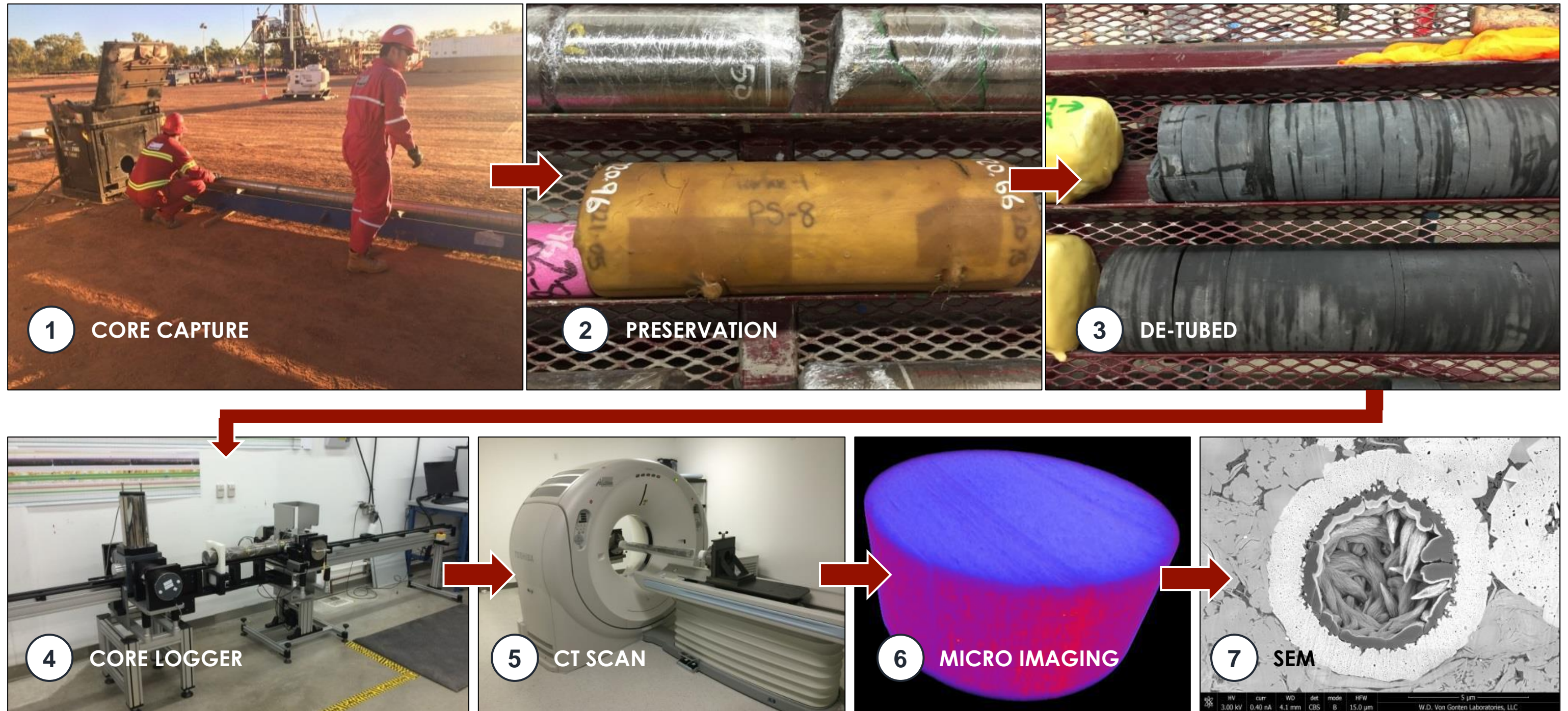


Live Oil (Kyalla) – Tarlee-1



# Empire and Pangaea utilize USA's leading shale expertise

WD Von Gonten & Co, a global leader in unconventional reservoir evaluation, was engaged by Pangaea in 2015 and has been engaged by Empire for its Carpentaria-1 program

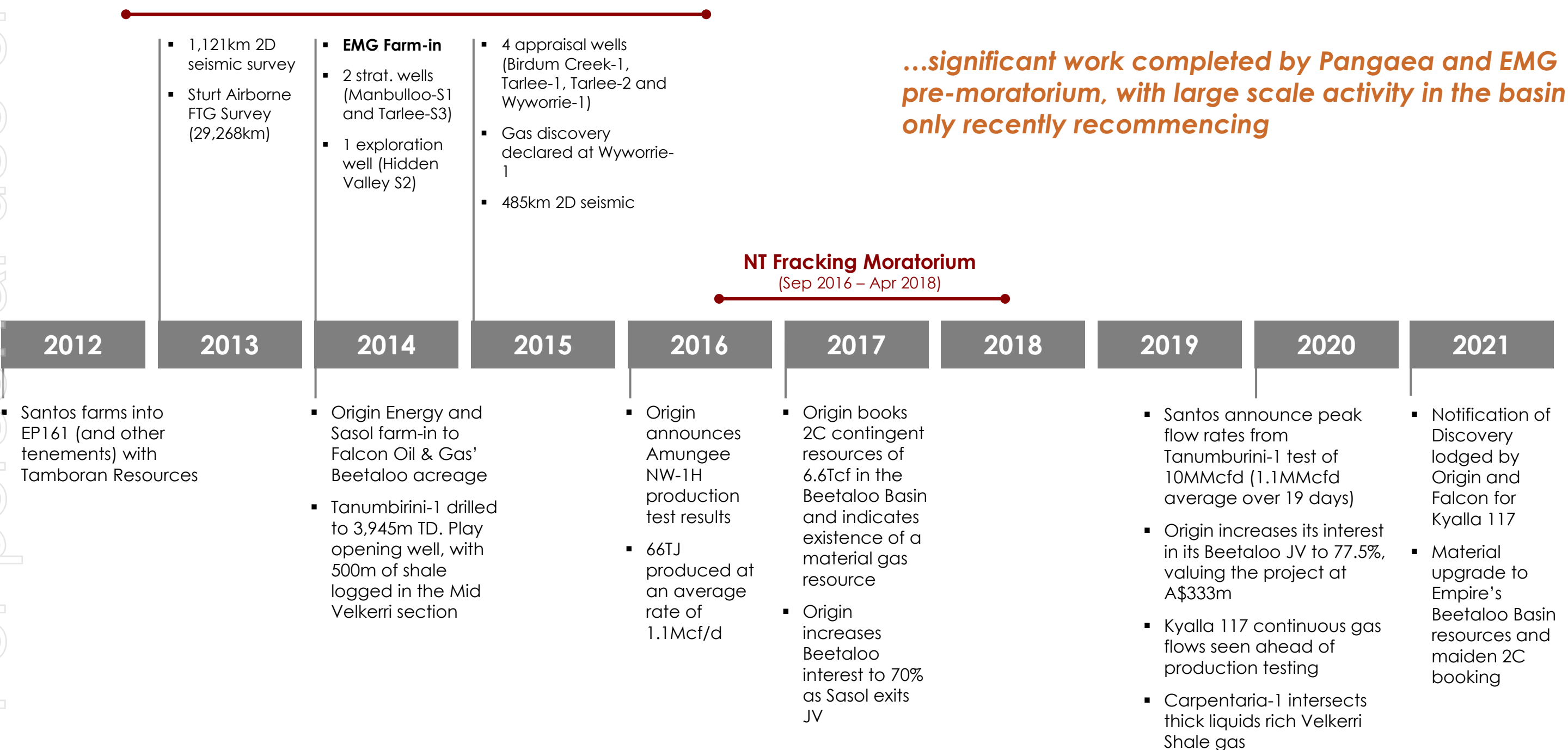


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# Early Mover Advantage Benefits Empire

## Pangaea and EMG's Work to Date

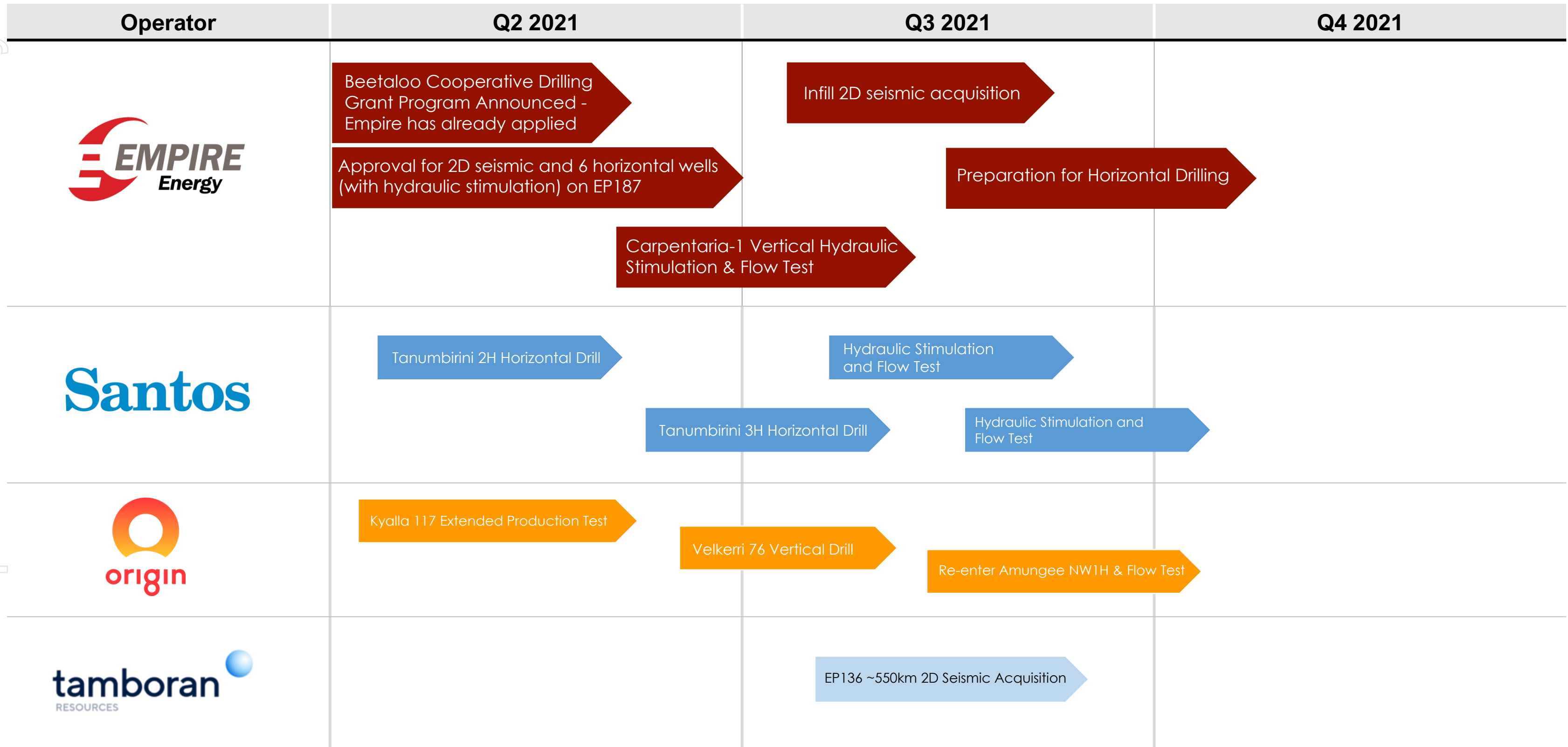


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# Beetaloo Sub-basin Projected 2021 Operations



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Source: company disclosures and regulatory filings



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McArthur River Mine

16°47'40.2"S 135°07'23.0"E



Pipeline

Carpentaria Highway

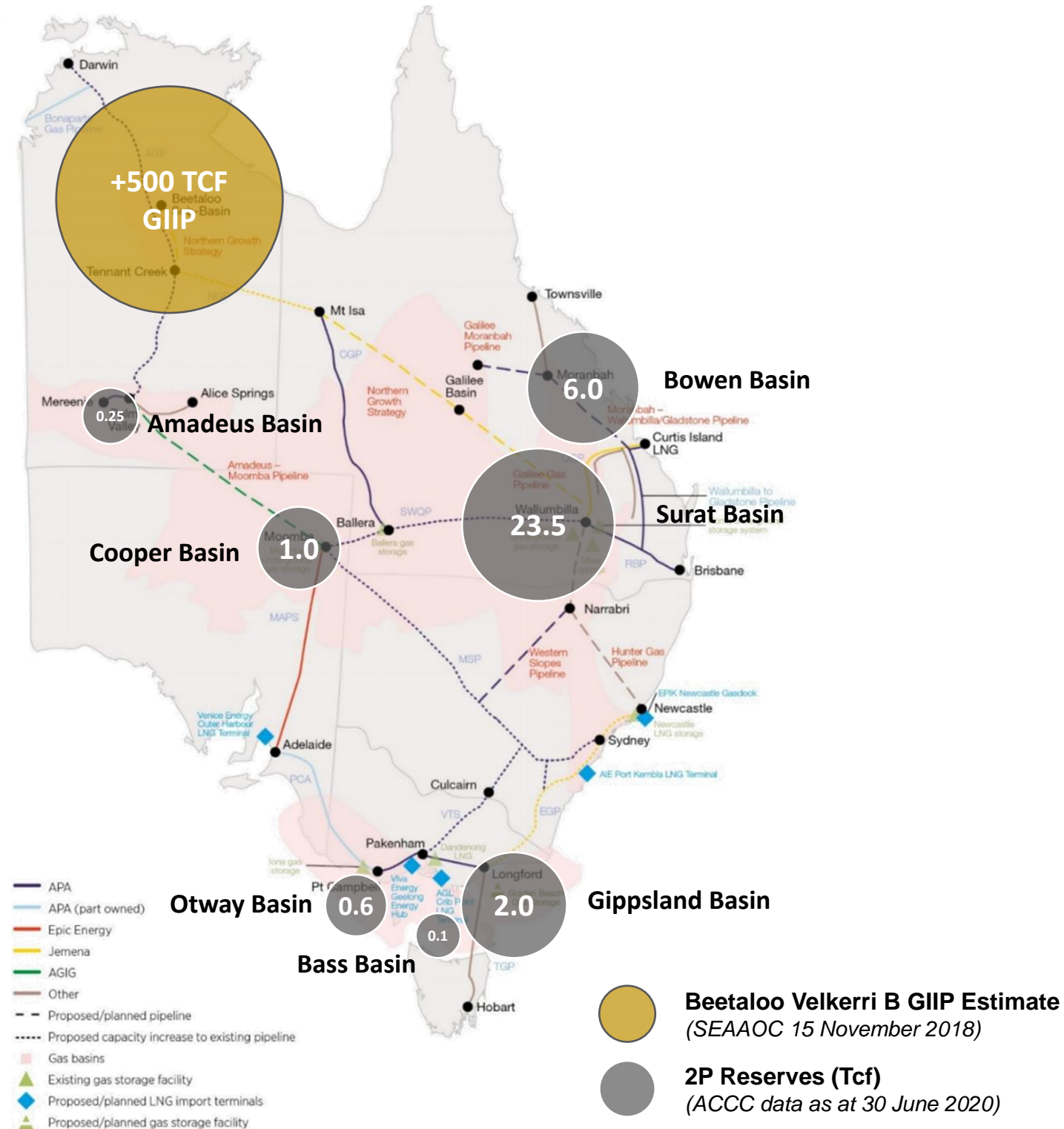


### 3. Empire's Plan to be First to Market



# Beetaloo Basin - Australia's Largest Undeveloped Gas Resource

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- Total potential prospective resources in the Velkerri B shale unit of between 50 Tcf and 100 Tcf based on Government estimates of 500 Tcf gas-in-place (assuming recovery factors of between 10% and 20%)
- This doesn't include upside from other shale units we know to be present (Velkerri A and C, Kyalla) or contained liquids, which can greatly enhance project economics

Per the Australian Federal Government on 14 January 2021:

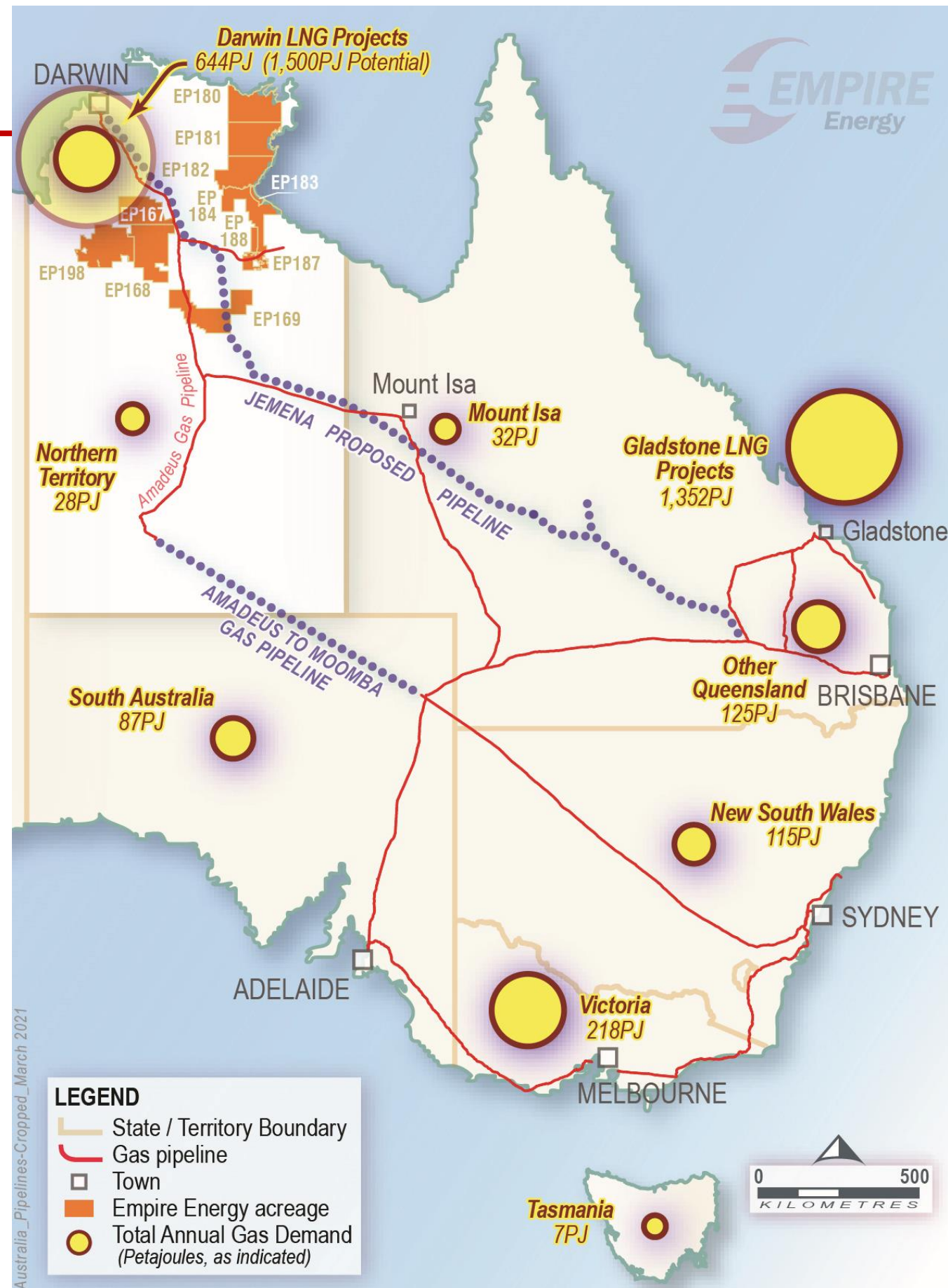
- *“The Beetaloo Sub-basin has the potential to rival the world’s biggest and best gas resources. The Beetaloo Strategic Basin Plan outlines how we can realise this potential as soon as possible.*
- *The \$224 million Beetaloo Strategic Basin Plan sets out bold, innovative and cooperative actions. These actions will help us seize the opportunities presented by the natural resources in the Beetaloo.”*



# Empire's gas markets

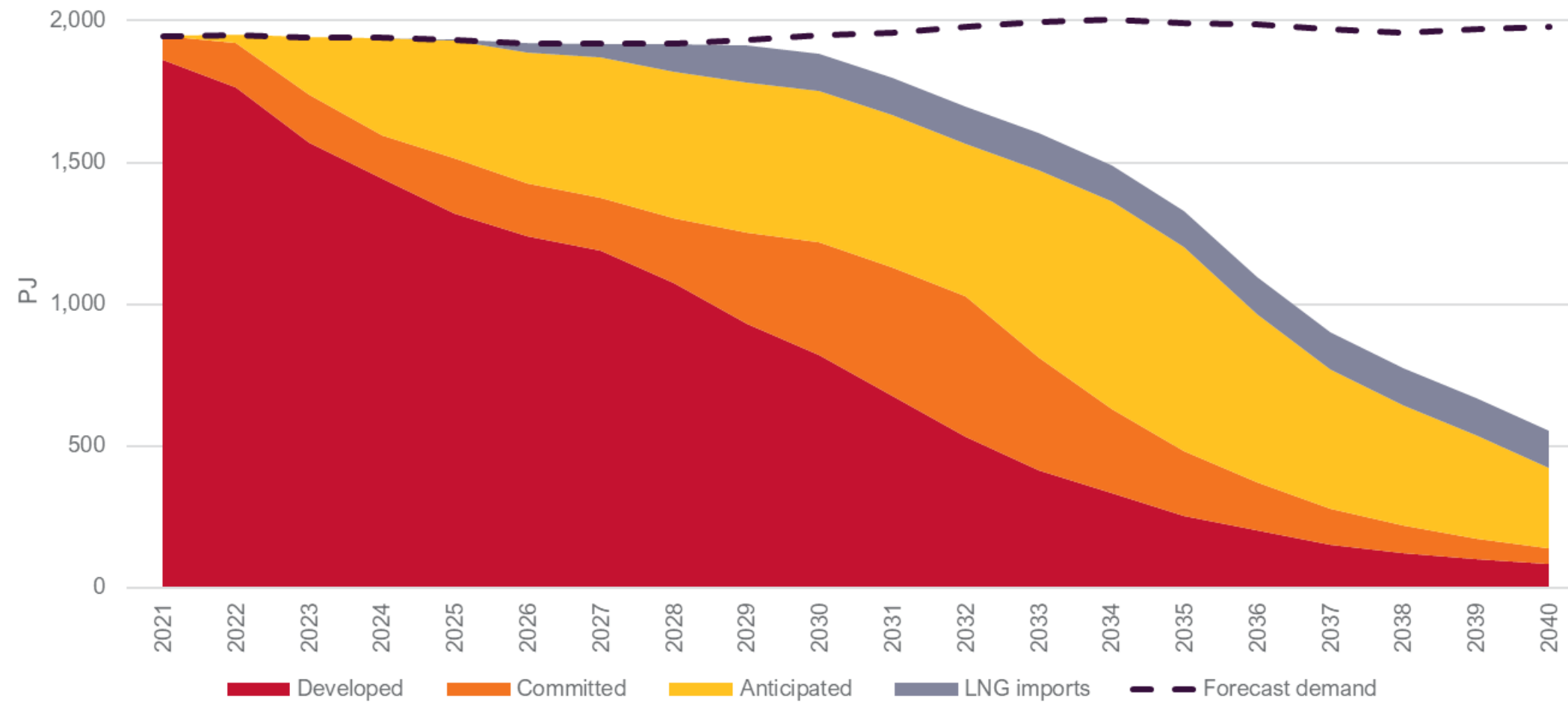
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1. **Local NT Markets using existing infrastructure:** Local and North Queensland mining operations and power markets
2. **East Coast:** Domestic power and industrial markets and Gladstone LNG terminals via existing and anticipated pipelines
3. **Darwin LNG export and liquids for downstream manufacturing:** Backfill or expansion gas for LNG and downstream petrochemical manufacturing
  - Ichthys LNG (INPEX): current 2 trains totaling 8.9 Mtpa / potential for 4 trains totaling 17.8 Mtpa
  - Darwin LNG (Santos): current 3.7 Mtpa / potential for 10.0 Mtpa. FID taken on Barossa on 30 March 2021



# Looming East Coast gas crisis

## AEMO – Projected Eastern Australian Gas Production (LNG and Domestic)



- Beetaloo Sub-Basin is well positioned to meet this challenge given the resource size and existing infrastructure
- Empire's Beetaloo gas has low CO<sub>2</sub> (~1%) and high calorific content
- Australian Federal Government demonstrating strong support through its Beetaloo Strategic Basin Plan committing \$220 million (including \$50 million to support exploration and appraisal drilling by Beetaloo operators)

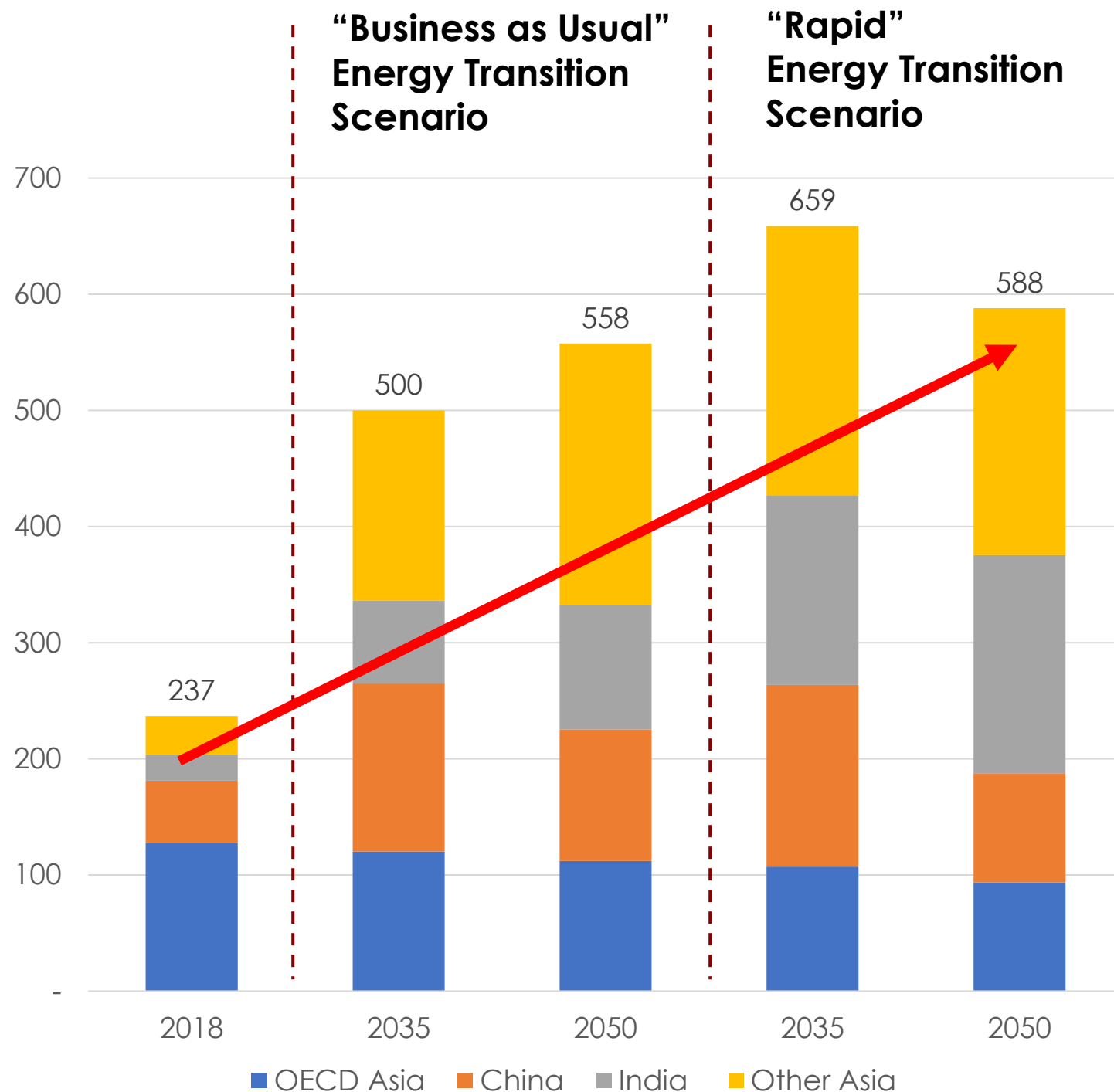
Australian Energy Market Operator 2021 Gas Statement of Opportunities

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# Asian LNG Demand increasing dramatically

## Forecast Asian LNG Imports - BP



- Growing LNG demand in decarbonising hard to abate sectors e.g. heavy industry, shipping, road logistics
- Asian LNG demand expected to increase from 237 Mtpa in 2018 to up to 659 Mtpa by 2035, led by China, India, Bangladesh, Pakistan and ASEAN nations
- This equates to ~32 Tcfe of annual LNG demand
- On buying a US\$2.5 bn interest in Queensland Curtis LNG's infrastructure facilities from Shell (Dec 2020), Global Infrastructure Partners stated that:

*"Global LNG demand is expected to outpace total demand for energy and the QCLNG venture is crucial in helping Shell meet the world's growing energy needs"*



# Enhancing Empire's Rapid Commercialisation Plan



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<b>Increased Paths to Market</b>	<ul style="list-style-type: none"> <li>▪ Pangaea's acreage is ideally positioned close to existing gas infrastructure (Amadeus Gas Pipeline which connects into the Northern Gas Pipeline), which together with the McArthur River Mine Gas Pipeline provide Empire with multiple potential paths to market</li> <li>▪ Rail and road access through Pangaea tenements will improve logistics for early development</li> </ul>
<b>Certified Contingent Resource with Huge World Class Running Room</b>	<ul style="list-style-type: none"> <li>▪ Material prospective resource established by Pangaea highlights the development potential of the region and allows operators to consider both early commercialisation plans and long term global-scale production</li> </ul>
<b>Capital Efficient Development Optionality</b>	<ul style="list-style-type: none"> <li>▪ Empire has identified several drill-ready prospects across Pangaea's acreage, adding to the horizontal targets already identified by Empire at Carpentaria</li> <li>▪ Additional drilling inventory provides Empire with significant flexibility to optimise its appraisal and development plans beyond Empire's Carpentaria-1 well and EP187 acreage</li> </ul>
<b>Multiple Play Targets</b>	<ul style="list-style-type: none"> <li>▪ Work to date has established potential for multiple hydrocarbon windows from dry gas, to liquids rich gas (similar to that discovered at Carpentaria-1) and oil and condensate</li> <li>▪ Presence of liquids-rich gas can significantly enhance development economics</li> </ul>
<b>Significant Historical Capital Spend</b>	<ul style="list-style-type: none"> <li>▪ Pangaea and EMG have invested significantly in their Beetaloo Sub-Basin acreage</li> <li>▪ Pangaea assets appraised and ready for horizontal drilling and commercial development</li> </ul>



# Glossary



<b>2C</b>	Best estimate of contingent resources
<b>2D</b>	Two dimensional
<b>2U</b>	Best estimate of prospective resources
<b>AAPG</b>	American Association of Petroleum Geologists
<b>ASX</b>	Australian Securities Exchange
<b>Bcf</b>	Billion cubic feet of gas
<b>Bcfe</b>	Billion cubic feet of gas equivalent
<b>BCM</b>	Billion Cubic Metres
<b>CO2</b>	Carbon dioxide
<b>Contingent Resources</b>	Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by the application of development project(s) not currently considered to be commercial owing to one or more contingencies
<b>EEG or Empire</b>	Empire Energy Group Limited
<b>EMG</b>	Energy and Minerals Group
<b>EP</b>	Exploration Permit
<b>FID</b>	Final Investment Decision
<b>GIIP</b>	Gas Initially in Place. The total gas content of the shales calculated with reference to porosity, permeability and gas saturation
<b>km</b>	Kilometres
<b>LNG</b>	Liquified Natural Gas
<b>LR</b>	Listing Rule
<b>m</b>	Metres or millions
<b>MMbbls</b>	Million barrels
<b>Mt</b>	Million tonnes
<b>Mtpa</b>	Million tonnes per annum
<b>NGL</b>	Natural gas liquids
<b>NSAI</b>	Netherland, Sewell & Associates, Inc.
<b>NT</b>	Northern Territory
<b>Pangaea (NT) Pty Ltd</b>	Trustee of the Pangaea (NT) Unit Trust, also Vendor
<b>PJ</b>	Petajoules
<b>PRMS</b>	Petroleum Resource Management System
<b>Prospective Resources</b>	Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by the application of future development projects. Prospective Resources have both an associated chance of geologic discovery and a chance of development. Prospective Resources are further categorized in accordance with the range of uncertainty associated with recoverable estimates, assuming discovery and development, and may be sub-classified based on project maturity.
<b>SPE</b>	Society of Petroleum Engineers
<b>Tcf</b>	Trillion cubic feet of gas
<b>Tcfe</b>	Trillion cubic feet of gas equivalent
<b>TOC</b>	Total Organic Carbon. The concentration of organic material in source rocks as represented by the weight percent of organic carbon
<b>Vendor</b>	Pangaea NT Pty Ltd as trustee of the Pangaea (NT) Unit Trust
<b>Vendor Tenements</b>	EP 167, EP 168, EP 169, EP 198, and EP 305

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# Disclaimer: Resource Disclosures



- LR 5.25.1** Contingent and Prospective Resource estimates for Pangaea Resources' EP167, EP168 and EP169 were assessed as of 25 May 2020. Contingent and Prospective Resource estimates for Empire's existing Northern Territory permits: EP180, EP181, EP182, EP183, EP184, EP187 and EP188 are set out in Empire's ASX releases dated 18 May 2020 and 22 February 2021. Empire confirms that it is not aware of any new information or data that materially affects the information included and that all the material assumptions and technical parameters supporting the estimates continue to apply and have not materially changed.
- LR 5.25.2** Petroleum resources are classified in accordance with the Petroleum Resource Management System (PRMS) sponsored by the Society of Petroleum Engineers (SPE)
- LR 5.25.5** Pangaea Resources NSAI report was prepared on a gross economic interest basis (see Appendix – A). Empire has adjusted NSAI's estimates to be on an 82.5% economic interest basis reflecting Pangaea's interest in EP167, EP168 and EP169 as required by 5.25.5. Empire's existing Northern Territory permits are 100% owned and operated by Empire.
- LR 5.25.6** The probabilistic method was used to prepare the estimates of contingent and Prospective Resources in the NSAI report. These estimates are presented herein using arithmetic aggregation as required by the PRMS. The aggregate of 1C and 1U may be a conservative estimate and the aggregate 3C and 3U may be an optimistic estimate due to the portfolio effect of arithmetic summation.
- LR 5.25.7** Contingent and Prospective Resources were not reported in units of equivalency. When Empire reports Contingent and Prospective Resources in units of equivalency, it uses a conversion factor of 6,000 cubic feet of gas per barrel of oil equivalent
- LR 5.27.1** Contingent Resources have been categorised and reported as 1C, 2C and 3C
- LR 5.27.3** An arithmetic summation by category (that is 1C, 2C and 3C) has been used to represent Contingent Resources.
- LR 5.28.2** Prospective Resources reported are the estimated Prospective Resource quantities of petroleum that may potentially be recovered by the application of future development projects related to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially moveable hydrocarbons.
- LR 5.33.1** The Contingent Resource is contained within Empire's 100% owned and operated EP187 exploration permit and the EP167 and EP168 permits to be acquired as part of the Pangaea Resources transaction. All permits are located onshore in the Northern Territory.
- LR 5.33.2** The basis for confirming the existence of a significant quantity of potentially moveable hydrocarbons and the determination of a discovery in the Pangaea Resources permits was production testing at the Wyworrie-1 and Birdum Creek-1 wells within the Velkerri Formation and core analysis at Tarlee-1 Kyalla Formation. EP187 Contingent Resource has been disclosed previously.
- LR 5.33.3** Contingent Resources have been estimated through probabilistic methods. The key contingencies that prevent the Contingent Resources from being classified as petroleum reserves are: (i) demonstration of the economic viability of project development; (ii) successful completion of work commitments prior to expiration of the leases; and (iii) commitment to develop the resources. Further appraisal drilling and evaluation work to be undertaken to assess the potential for commercial recovery and to progress the material oil and gas project includes, future horizontal drilling, hydraulic stimulation and production flow testing (subject to Government approvals), ongoing discussions with potential customers for Empire's hydrocarbons and ongoing analysis of the surface infrastructure and processing requirements for the sale of hydrocarbons from across the permits.
- LR 5.33.4** Empire is actively undertaking research and development to adapt existing technologies to the Beetaloo Sub-basin, being the adaptation of hydraulic stimulation and flow testing techniques utilised in shale gas basins in other parts of the world. A pilot for that technology (being the hydraulic stimulation and flow testing of Carpentaria-1), is currently planned to commence in Q2 2021, budgeted and fully funded. The technology has been demonstrated to be commercially viable in other reservoirs, particularly in the United States of America, but requires adaptation to the Beetaloo Sub-basin.
- LR 5.33.5** The Empire Energy EP187 Contingent Resource has been disclosed in a previous ASX release. The basis of the Contingent Resources (1C, 2C and 3C) in the Pangaea Resources permits is a total of 54 well locations at 1 km horizontal well spacing. Nine Contingent Resource horizontal well locations are offset per existing wellbore (six) throughout the permits. Hydrocarbon liquid and gas yield varies spatially, deeper dry gas area wells have ~8 BCF 2C per well assigned.
- LR 5.34.1** The material revision in the Contingent Resources of Empire reflects the addition of Pangaea to the Empire portfolio.
- LR 5.34.2** The enlarged Empire will comprise Pangaea's 82.5% operated interests in EP167, EP168 and EP169 which are located in the Beetaloo Sub-basin, onshore Northern Territory to the existing Empire portfolio. NSAI who have assessed Empire's existing portfolio were separately engaged by Pangaea management to assess its resources as at 25 May 2020
- LR 5.36.1** Empire released an independent Prospective Resource assessment generated by NSAI on 22 February 2022. The Prospective Resource assessment has changed materially since that time due to the proposed additional of the Pangaea Resources assets to the portfolio.
- LR 5.36.2** Total exploration and appraisal expenditures of ~\$110 million (gross) have been incurred to date over the Pangaea properties encompassing seismic acquisition and interpretation, drilling, core analysis and flow testing. Technical analysis and interpretation of results has been used to generate the estimates contained in the report.
- LR 5.41** The estimates of Contingent and Prospective Resources on the existing Empire properties contained in this report were prepared in accordance with the SPE-PRMS guidelines and are based on, and fairly represent, information and supporting documentation under the supervision of Geoscientist Dr Alex Bruce, Chief Geoscientist, Empire Energy Group Limited, a qualified person as defined under ASX Listing Rule 5.11. Dr Bruce has consented to the use of the resource estimates figures in the form and context in which they appear in this release. Dr Bruce is a full-time employee of Empire Energy Group Limited. Dr Bruce earned a Bachelor of Science with majors in Geology and Environmental Geography from the University of Sydney, Australia, and first-class honours in Geology / Geophysics from the University of New South Wales, Sydney. Dr Bruce holds a PhD from the University of New South Wales in Geology and Artificial Intelligence and holds a Graduate Certificate in Geostatistics from Edith Cowan University, Perth, Australia. Dr Bruce is a member of the American Association of Petroleum Geologists (AAPG). Furthermore, Dr Bruce has over 20 years of relevant experience in operating oil and gas companies with much of that time in resource estimation, and as such has sufficient experience to qualify as a Reserves and Resources Evaluator as defined in Chapter 19 or the ASX Listing Rules.
- LR 5.42** The estimates of contingent and Prospective Resources on the Pangaea Resources' properties contained in this report were prepared by Netherland, Sewell & Associates Inc, qualified resource evaluators. The resource assessment was independently carried out by Mr John G. Hattner, Senior Vice President, and Mr Joseph M. Wolfe, Vice President, of Netherland, Sewell & Associates, Inc. in accordance with the SPE-PRMS guidelines. Messrs Hattner and Wolfe meet the requirements of Qualified Petroleum Reserve and Resource Evaluator as defined in Chapter 19 of the ASX Listing Rules. Mr Hattner is a Licensed Professional Geophysicist in the State of Texas, USA and Mr Wolfe is a Licensed Professional Engineer in the State of Texas, USA. Messrs Hattner and Wolfe have consented to the use of the resource estimates figures in the form and context in which they appear in this release. Mr Hattner has over 39 years of relevant experience. His qualifications include an MBA from Saint Mary's College of California, Master of Science in Geological Oceanography, Florida State University, and a Bachelor of Science in Geology from University of Miami. Mr Wolfe has over 15 years of relevant experience. His qualifications include a Master of Petroleum Engineering from Texas A&M and a Bachelor of Science in Mathematics from Northwestern State University.



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