



ASX:EEG

# The Shale Gas Revolution Takes Hold in Australia



2020 Annual General Meeting Managing Director's Address



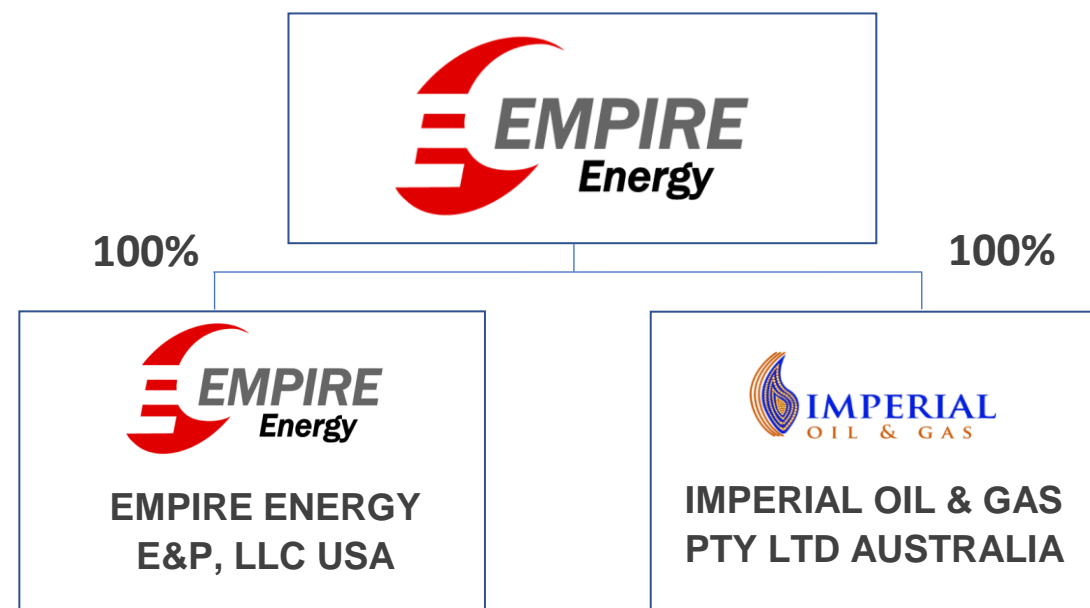
# Corporate Snapshot



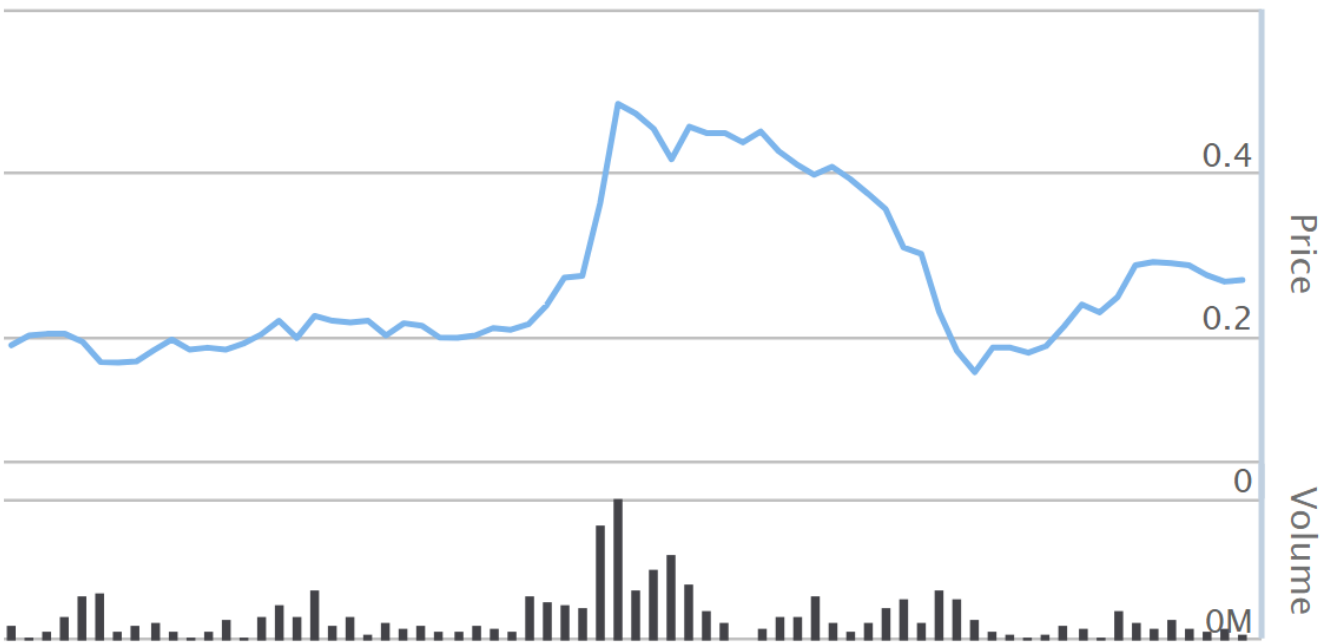
## Capital Structure

Shares on issue <sup>1</sup>	263.3m
Share price	A\$0.27
Market cap	A\$71m
Cash at Bank <sup>2</sup>	A\$10.3m
Debt <sup>3</sup>	A\$9.6m
Enterprise Value	A\$70m

## Corporate Structure



## ASX Share Price



## Top Shareholders

Macquarie Bank Limited	10.0%
Global Energy and Resources Development Limited	9.8%
Elphinstone Holdings Pty Limited	5.0%
Board of Directors <sup>4</sup>	7.0%

1. Empire has ~56m unlisted options on issue with an average exercise price of <A\$0.32 per share. The majority (36.2m) expire in September 2020 with an exercise price of A\$0.30 per share. In addition, there are 5.4m Share Rights on issue to members of the management team. The majority of Share Rights have performance hurdles tied to total shareholder return.

2. Unaudited as at 8<sup>th</sup> July 2020

3. Empire has a US\$7.5 million debt facility (drawn to US\$6.675 million) with Macquarie Bank maturing in September 2024 which is secured against the Company's USA gas production assets. Total debt has been reduced by over 80% since 2018. Debt excludes a US\$552,600 loan which has been approved and received under the US Paycheck Protection Program. Empire assumes that the loan will be forgiven in accordance with the US CARES Act.

4. Board shareholding excludes options and MD Rights. Empire Directors have invested more than A\$4.35 million in cash over the last two years.

# Empire Board & Management Team



John Warburton  
Alex Underwood  
**Board of Directors**

John Gerahty  
Paul Espie  
Peter Cleary



David Evans  
Kylie Arizabaleta  
Alex Bruce  
Ben Johnston  
**Management**

**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

**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

**John Gerahty – Non-Executive Director**

- Founding Director of Macquarie Bank
- Former investment banker with wide experience in commerce and business
- Former director of numerous public companies including Chairman of AFP Group PLC and MPI Mines Ltd
- Chairman of Associated Media Investments Pty Limited and AMI Advertising Media Pty Limited

**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

**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

**David Evans – Chief Operating Officer**

- Chief Operating Officer at Elk Petroleum Limited
- Chief Technical Officer and Acting Chief Operating Officer Drillsearch Energy Limited
- 30 years global upstream oil & gas exploration, development and production experience with significant exposure to Australian and North American unconventional plays
- 2014 East Coles Corporate Performance Awards Best Operational Management, Energy

**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

# 2019 – The Year in Review



*Empire is executing its strategy for shareholder value creation*

- Started 2019 with US\$26 million debt
- The Kansas assets were sold for US\$19.25m in a competitive sales process
- The sale reduced debt to US\$7.5 million by year end (now US\$6.7 million)
- Empire was the first smaller company to receive work program approvals under the new NT regulatory framework
- 2D seismic program across EP187 completed and interpreted
- Board and management team further developed, positioning for growth
- US overheads reduced to match smaller operational footprint
- A\$12 million raised in a placement at 40c per share
- **Total Shareholder Return for the year was 197%**



# 2020 – News in the Year to Date



- COVID-19 dramatically impacted international energy markets
- Empire entered the downturn with debt reduced and cash increased
- Empire took further pro-active steps to protect the balance sheet
- The impact of low US gas prices was partly mitigated by hedging
- Netherland, Sewell & Associates assessed a total best estimate prospective resource for our Northern Territory properties of 13.46 TCF
- Site selected for Carpentaria-1 drilling location
- NT Government approvals received to drill Carpentaria-1 in EP187
- The well engineering design is complete, and a preferred drilling contractor has been selected
- **Expecting to sign drilling contract soon and commence drilling this quarter**



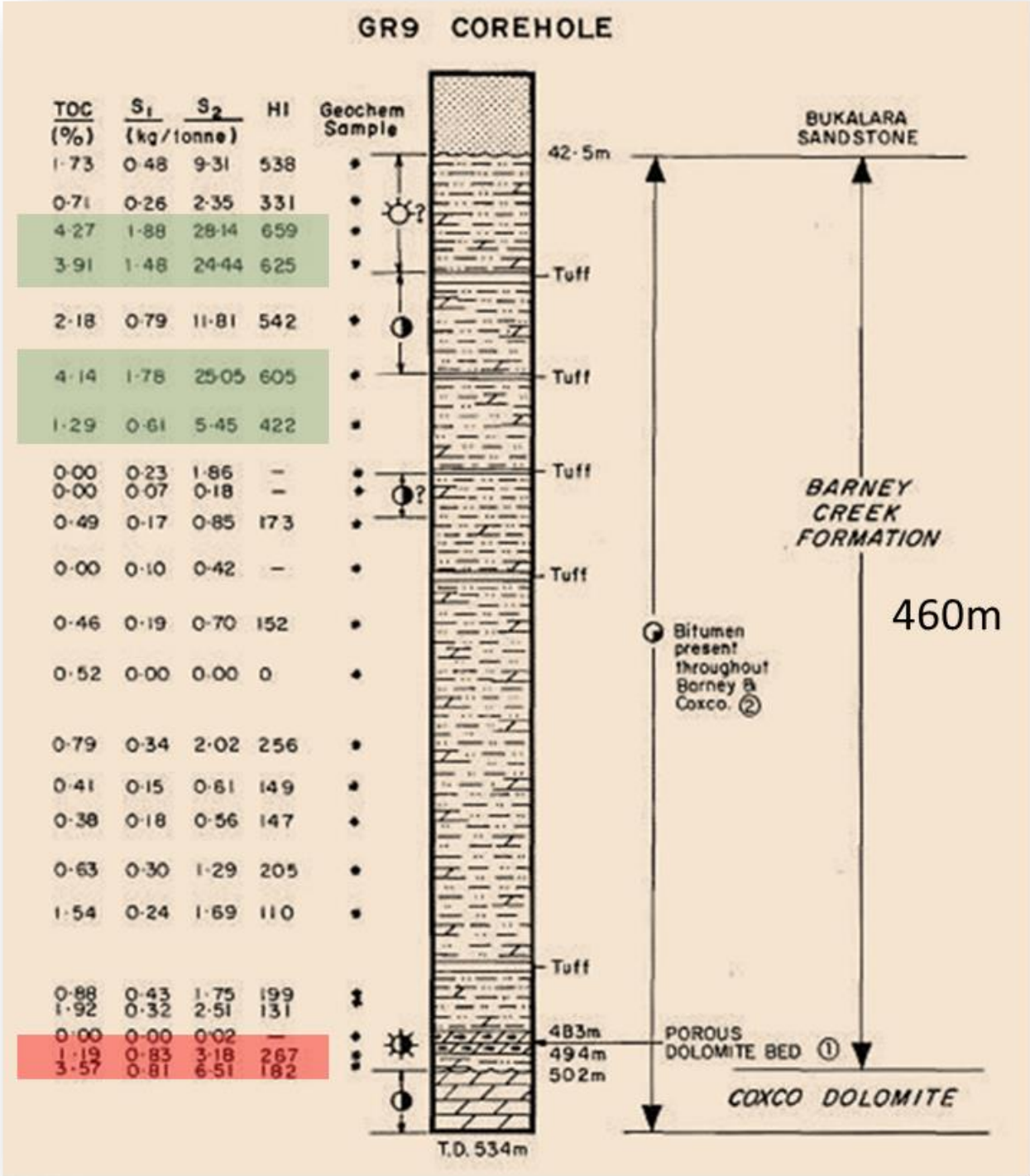
# Discovered in the records

In Dec 1979 gas was encountered and ignited in a mineral drill hole

The most spectacular indication of live hydrocarbons encountered to date in the McArthur Group was in the Kennecott-Amoco mineral exploration corehole GR 9, drilled in the Glyde area. A summary log of this drillhole is shown as Figure 5, and the location is shown in Figure 2. Upon unintentional swabbing at the end of drilling (in December 1979), the corehole experienced a gas blow-out which yielded a 5-6m (15-20 ft) long flame. Condensate flow accompanying the gas, was indicated by the bright orange-yellow colour of the flame, and by an accompanying sooty tail. The hole flowed gas for an indeterminate period during the immediately following "Wet" season. By the end of the "Wet" the hole was filled with water and the gas flow had degenerated to a series of gas bubbles percolating through hydrostatic head. A sample of the gas taken at this stage yielded the following analysis:-

Methane	74.25%
Ethane	10.25%
Propane	3.25%
Iso-Butane	0.175%
N-Butane	0.60%
N-Pentane	0.105%
Hexane	0.165%
Heptane	0.08%
Nitrogen	10.75%
Carbon Dioxide	0.20%

The hole was plugged with cement in April 1980.





# The yellow flame indicated gas + condensates



- The core hole experienced a gas blow out that burned with a 6 metre flame
- Over 30 hydrocarbon wells have been drilled since
- Several hundred million is currently planned to be invested exploring the McArthur-Beetaloo



# Productive Units of the McArthur Basin & Beetaloo sub-Basin



John Warburton staked a total 33,867 km<sup>2</sup> (8.4 million acres) of prospective shale formations

This year an Independent Prospective Resource (P50) of **13.46Tcf** was assessed

## **Velkerri Shale / Kyalla Shale (Beetaloo Sub-basin)**

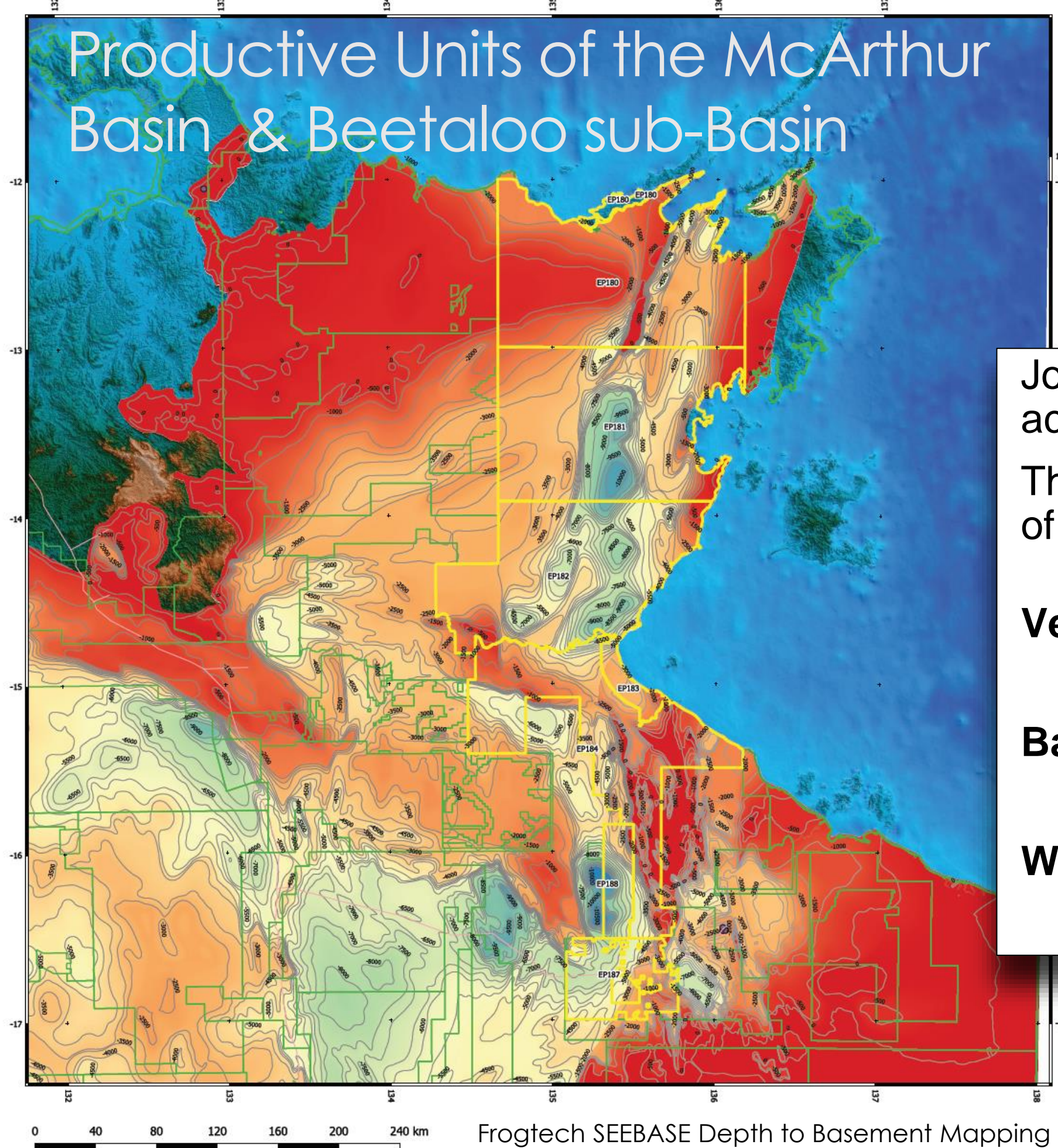
- 628,000 acres (>2,500km<sup>2</sup>), up to 600m thick

## **Barney Creek Shale (McArthur Basin)**

- 6.2mm acres (>25,000km<sup>2</sup>), up to 900m thick

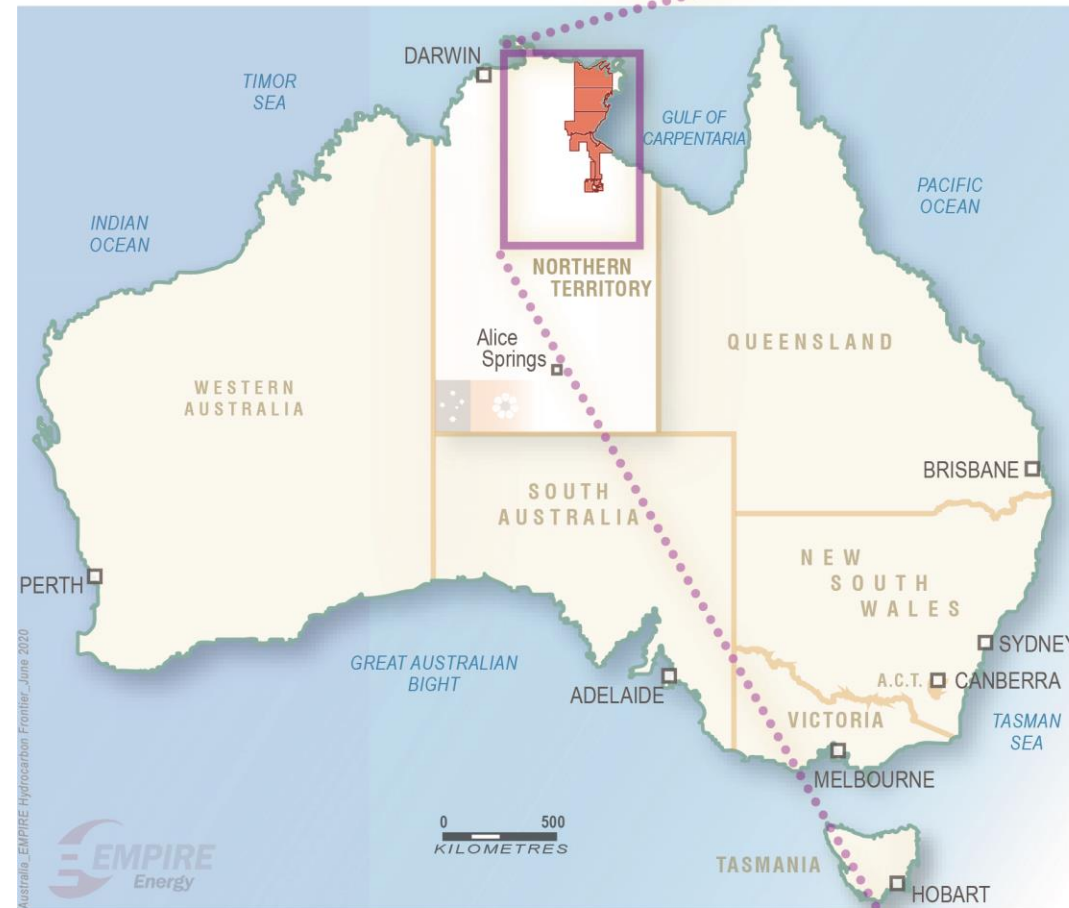
## **Wollogorang Formation (McArthur Basin)**

- 1.5mm acres (>6,000km<sup>2</sup>), up to 100m thick

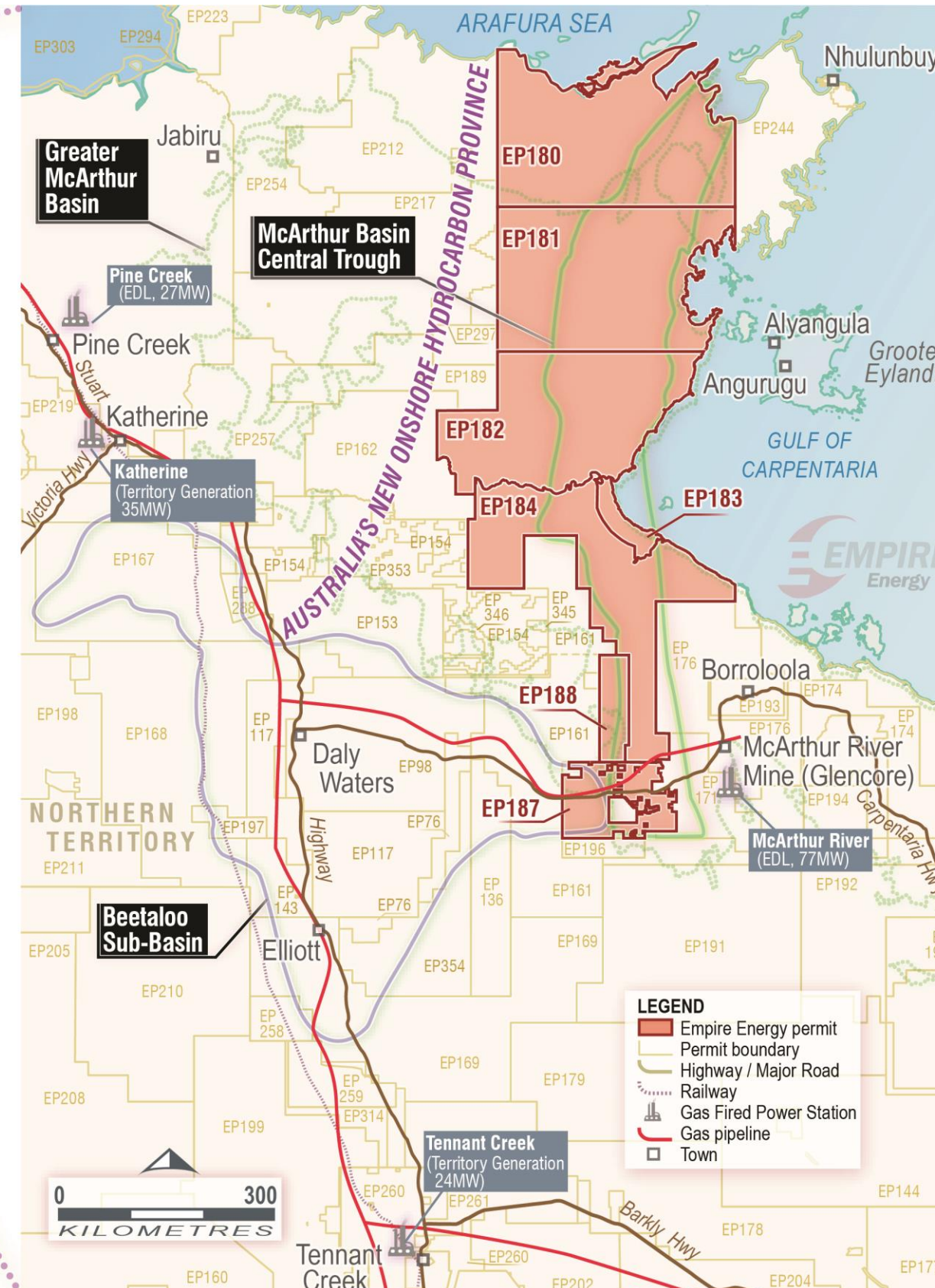




# Empire Energy Progressing in Australia's New Onshore Hydrocarbon Province



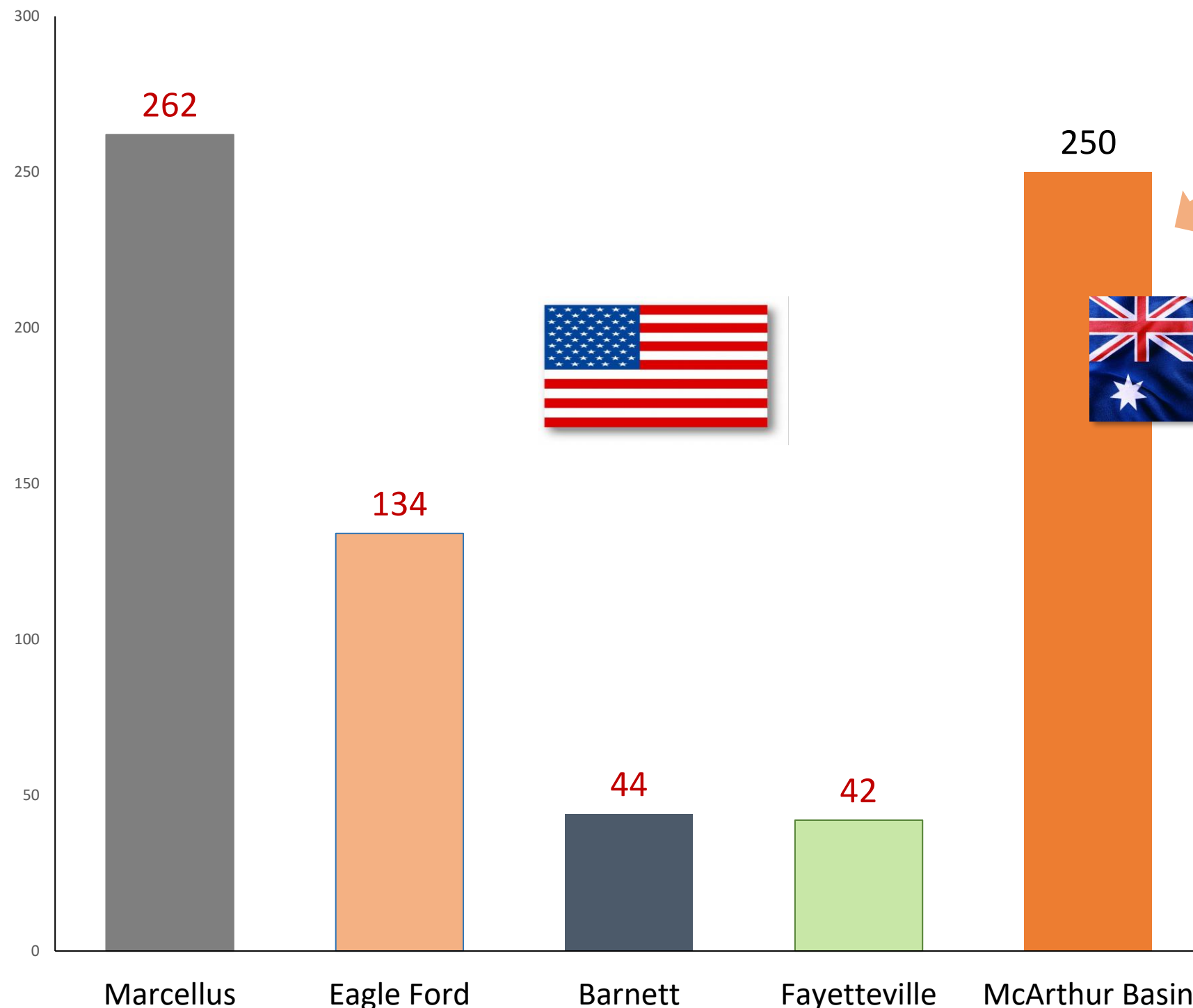
A land position of **58,000** sq km of  
McArthur Basin &  
Beetaloo Sub-basin





# NT Shale Gas Resources rival the prolific US Marcellus Shale

Trillion Cubic Feet (Tcf) comparison



The Resource potential of the **Beetaloo-McArthur Basin** rivals the USA's premier Marcellus Shale

**“Prospective Resource”** is the estimated quantities of petroleum that may potentially be recovered by the application of a future development project(s) 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.

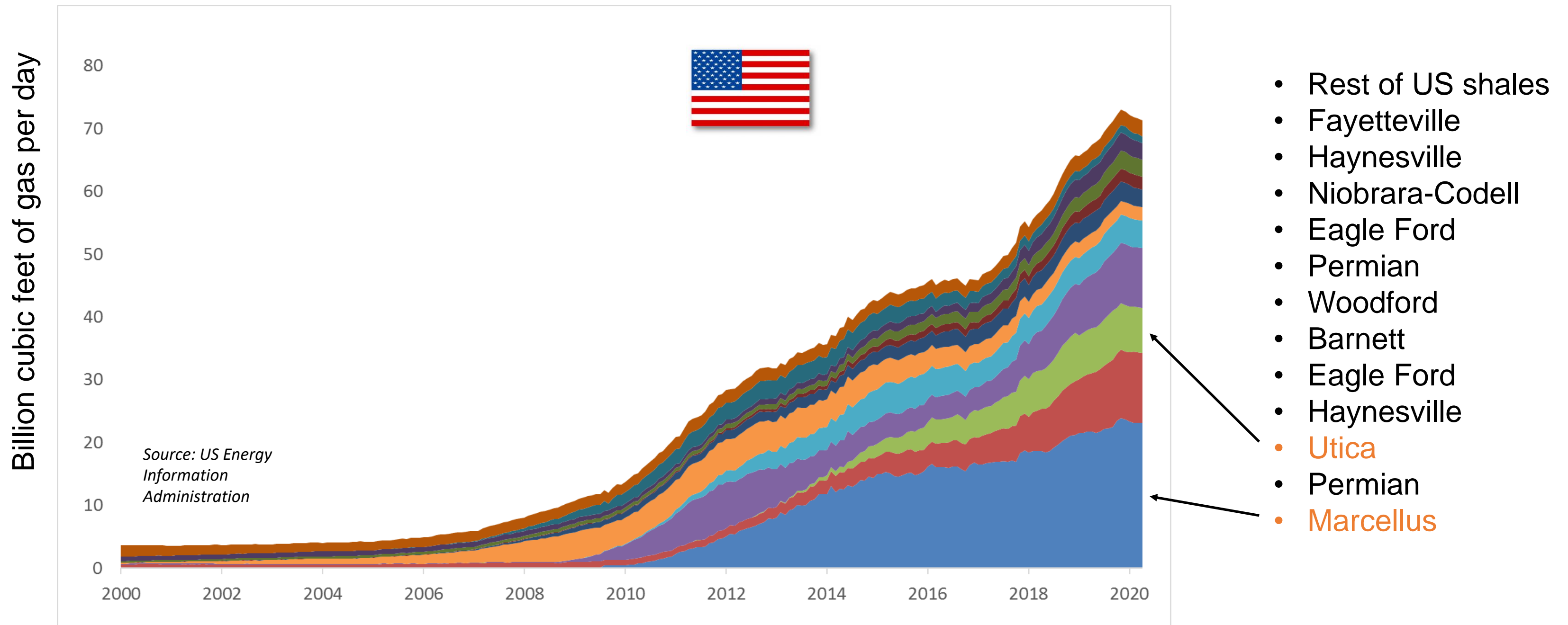
Sources:

1. US Department of Energy, Modern Shale Gas Development in the United States: A Primer
2. US Gulf Coast Petroleum Systems Project Assessment of Undiscovered Oil and Gas Resources in the Eagle Ford Group and Associated Cenomanian–Turonian Strata, U.S. Gulf Coast, Texas, 2018
3. US Energy Information Administration, Technically Recoverable Shale Oil and Gas Resources: Australia September 2015



Horizontal drilling, fracking and the shale gas industry have transformed the USA energy market and its global geopolitics

The **Utica** and **Marcellus Basins** are directly analogous with the Beetaloo-McArthur



Monthly USA shale gas production coloured by shale basin



# Direct analog with the major USA production units

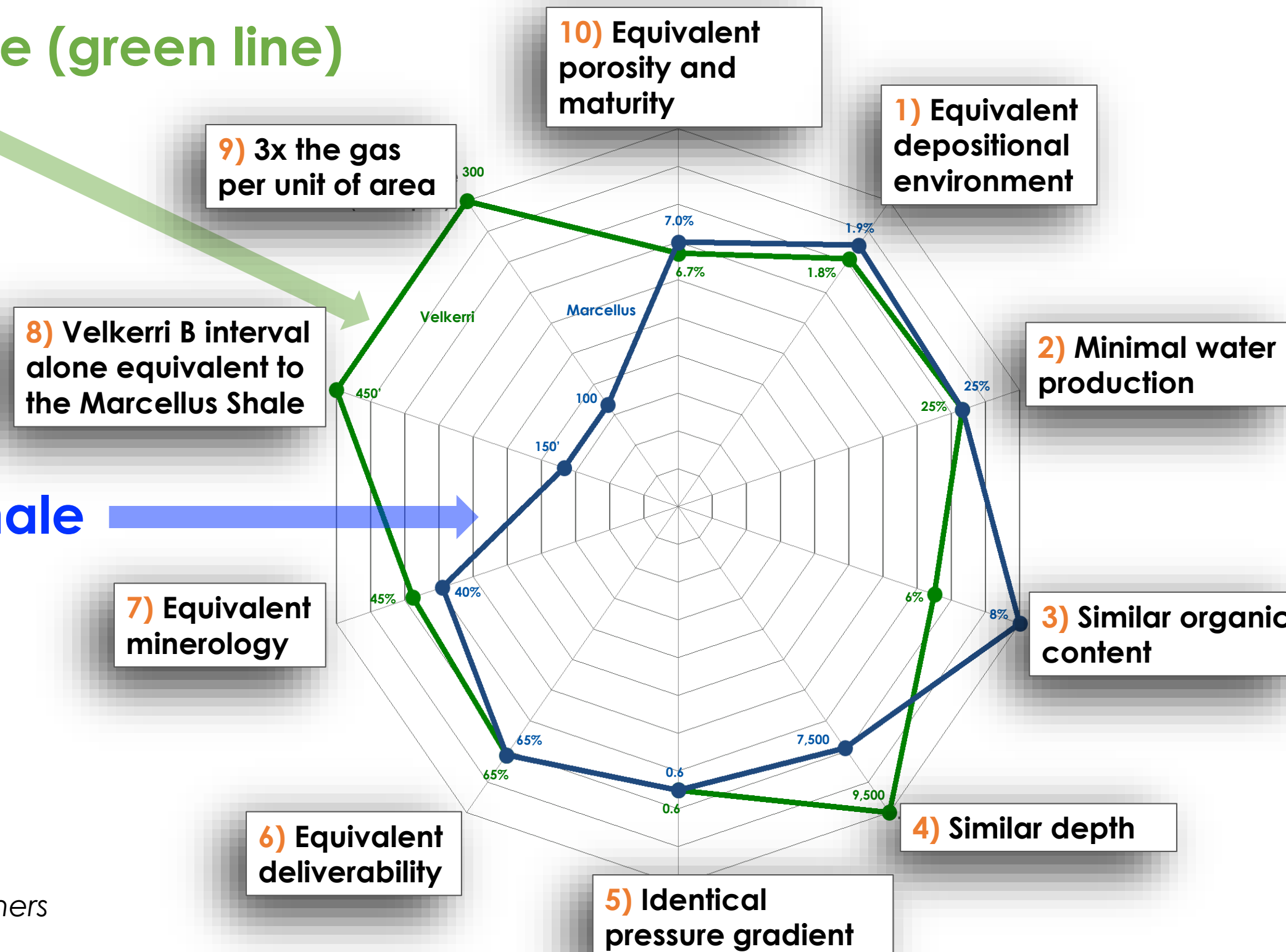
## NT Velkerri Shale (green line)

## US Marcellus Shale (blue line)

Endowment equivalent to three stacked Marcellus shales



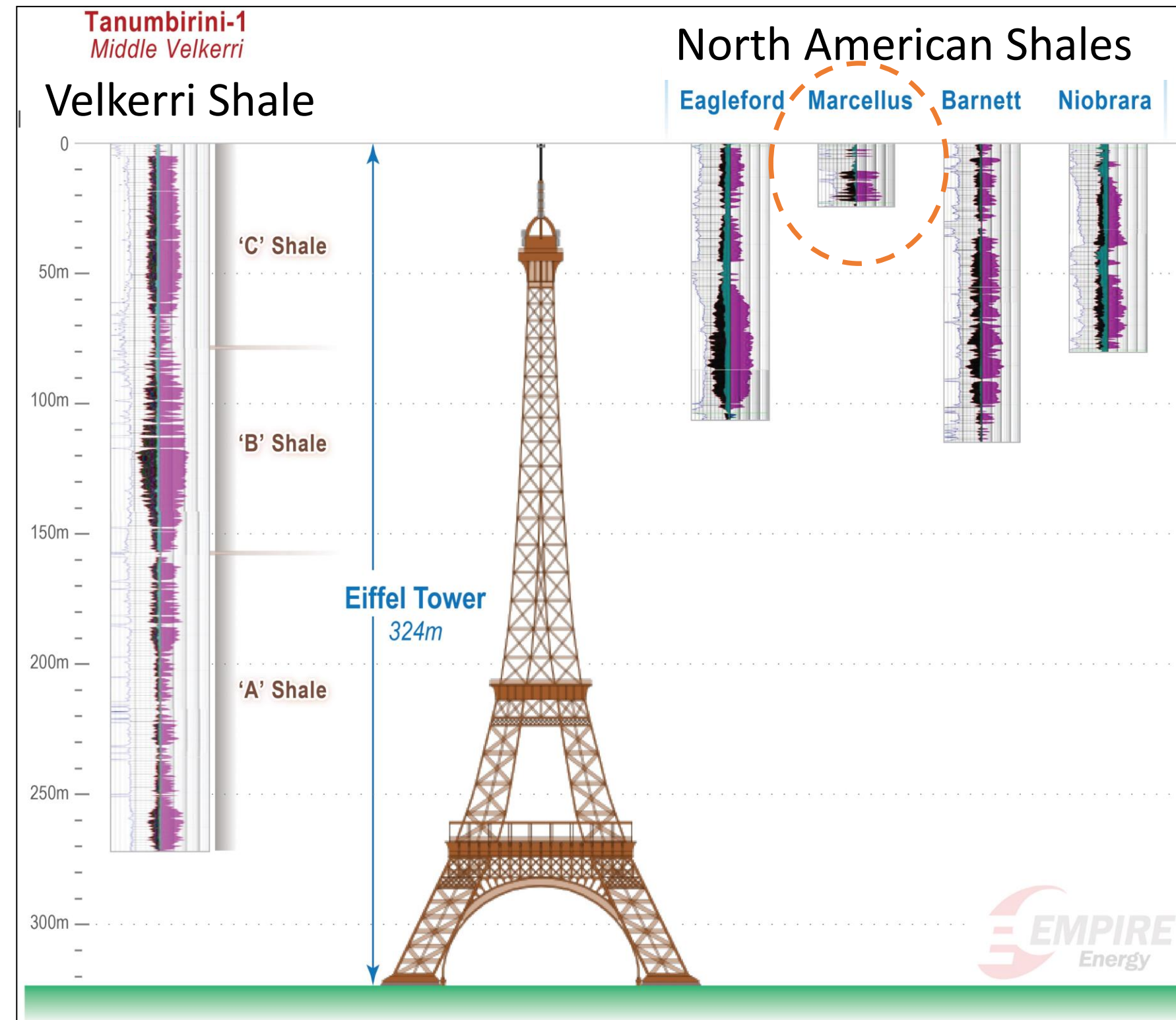
Source: American Energy Partners





# Beetaloo Shales thicker than US top producers

- The Velkerri B Shale source-reservoir is a continuous gas accumulation across the Greater Beetaloo Sub-basin (GBSB) and gas bearing (where thermally mature)
- The Velkerri B Shale is the most consistent and shale interval in the basin with well penetrations intersecting a stratigraphic section of similar thickness and petrophysical characteristics across hundreds of kilometres of the GBSB
- Epicontinental depositional environment during global innoxia preserved shales





# Empire's **NSAI** certified NT Prospective Resource Estimate



Reservoir	Undiscovered Original Gas-in-Place (BCF)			Unrisked Gross (100%) Prospective Gas Resources (BCF)			Unrisked Gross (100%) Prospective Oil Equivalent Volumes (MMBOE)		
	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)
<b>Lower Kyalla</b>	496	724	1,073	24	72	161	5	14	34
<b>Middle Velkerri</b>	9,303	12,516	16,597	1,283	2,339	4,751	215	397	825
<b>Barney Creek</b>	17,667	59,652	155,058	1,633	11,053	45,380	274	1,886	8,011
<b>Total*</b>	<b>27,466</b>	<b>72,892</b>	<b>172,728</b>	<b>2,940</b>	<b>13,464</b>	<b>50,292</b>	<b>494</b>	<b>2,297</b>	<b>8,870</b>

Empire's P(50) Resource is

**13.46 Tcf eq**

Refer to Empire Energy ASX announcement dated 18 May 2020 for Prospective Resource estimate

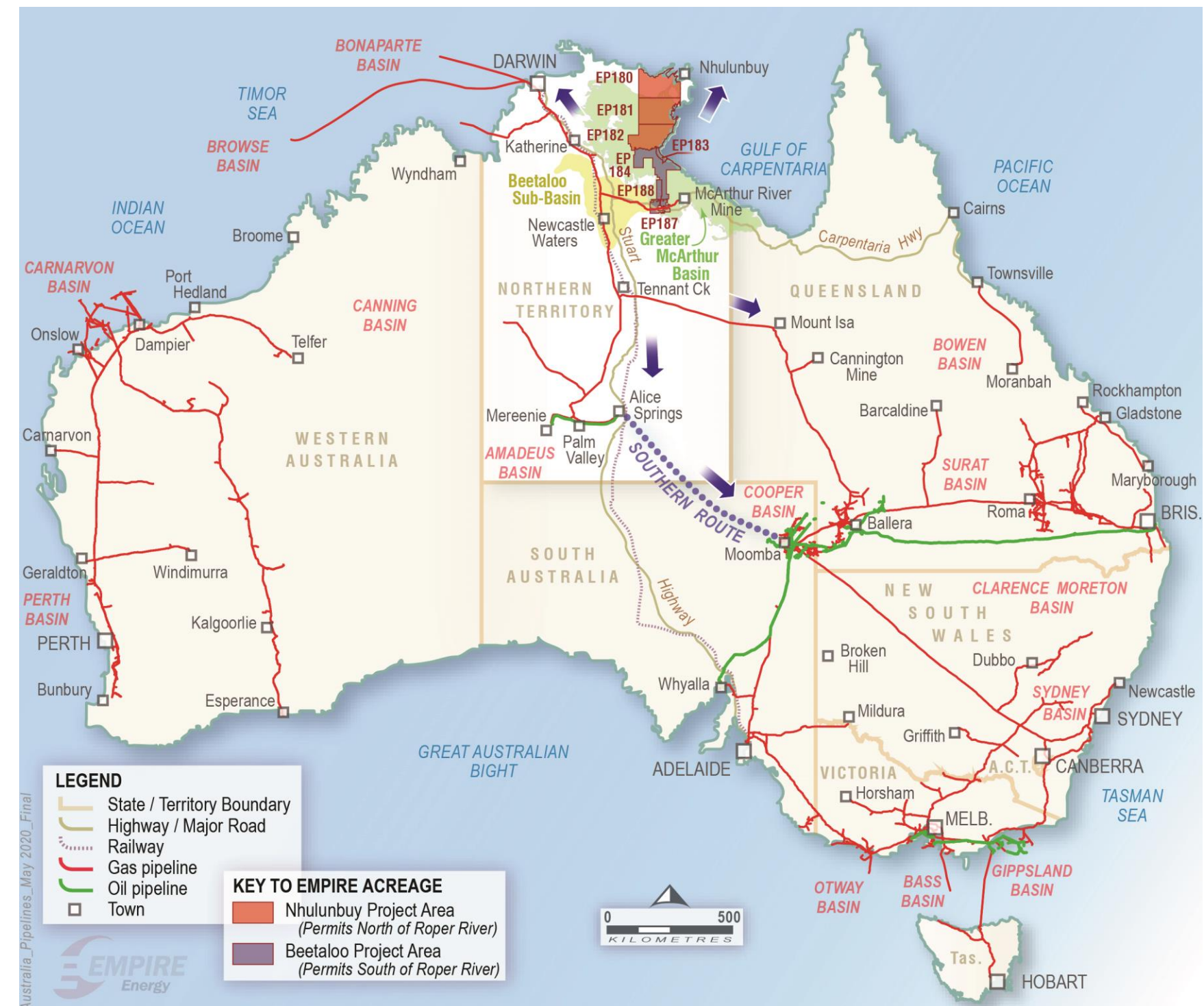
\*Note: Empire has aggregated the OGIP and prospective resources estimated by **Netherland, Sewell & Associates, Inc.** by arithmetic summation 15 May 2020



# Potential markets for Empire's gas and liquids

- **LNG Export from Darwin** via backfill or expansion at Ichthys LNG (INPEX) / Darwin LNG (Santos)
- **Downstream / Petrochemicals at Darwin** including proposed Coogee Methanol Facility, Darwin Clean Fuels Refinery
- **Northern Australia Gas Market** incl. Power and Water Corp, McArthur River Mine (EDL/Glencore), Cannington Mine, Diamantina Power Station, Mt Isa Mines, Phosphate Hill
- **East Coast Domestic Gas Markets** via existing Northern Gas Pipeline or the missing "Southern Route"
- **Nhulunbuy Petrochemical / LNG Hub** approved gas pipeline easement to Nhulunbuy across Empire's northern tenements
- **Liquids Production via Road/Rail to Darwin**

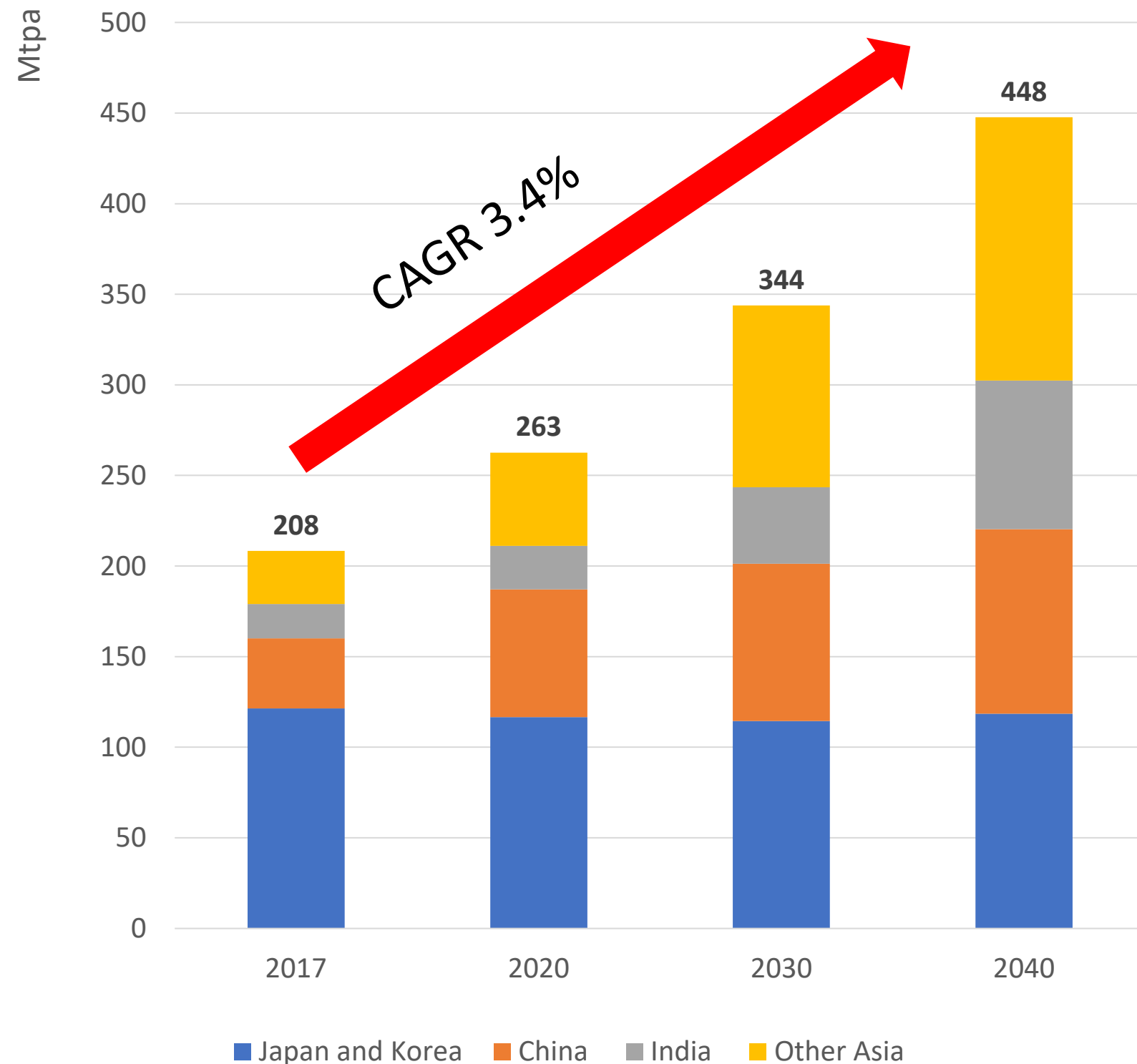
## Australian Gas Pipeline Network





# Asian LNG imports forecast to increase to ~17 Tcf a year

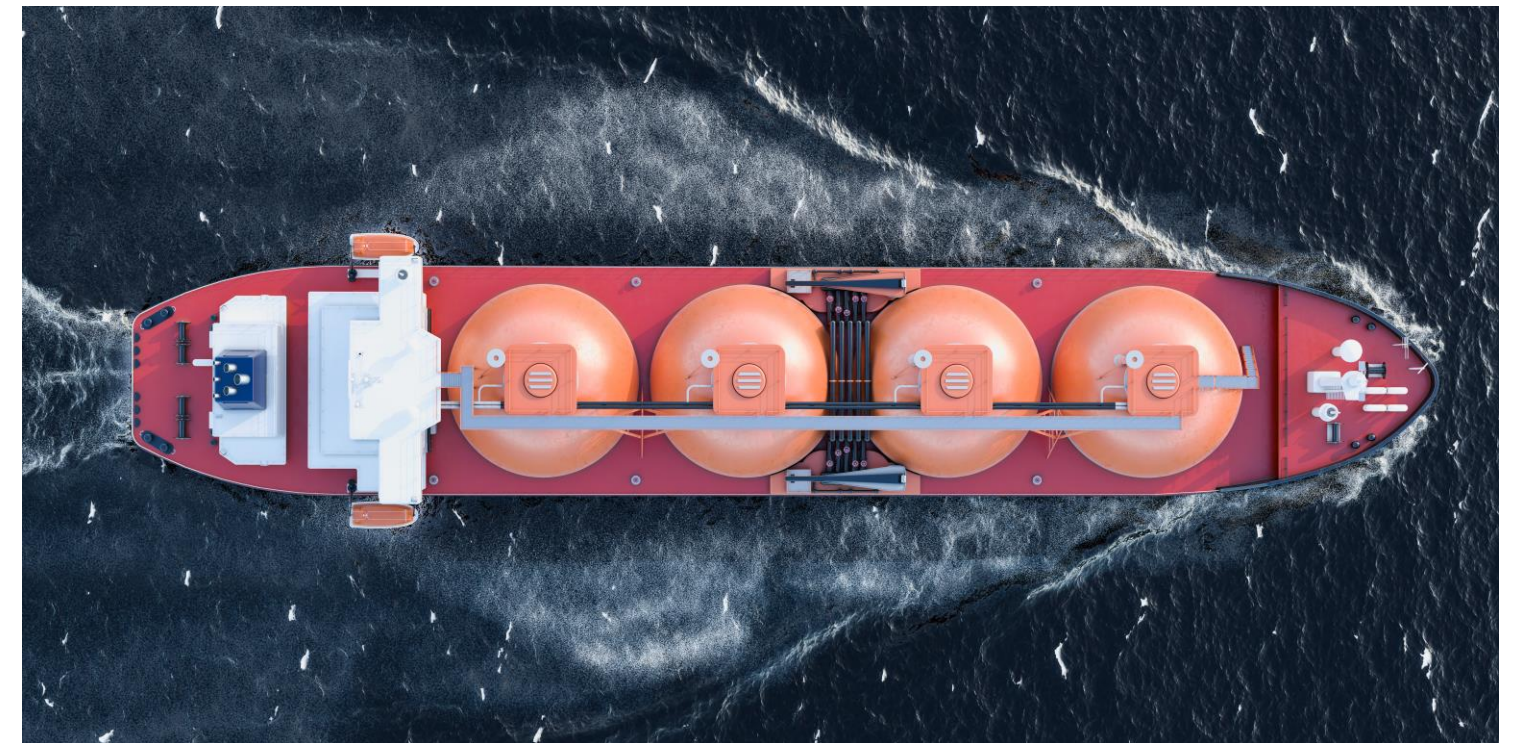
## BP Energy Outlook 2019 – Forecast Asian LNG Imports



Asian LNG demand to increase to 344Mt (BP est.) and 368Mt (Oxford Energy Forum est.) by 2030.

**This equates to ~17.0Tcf of annual LNG demand**

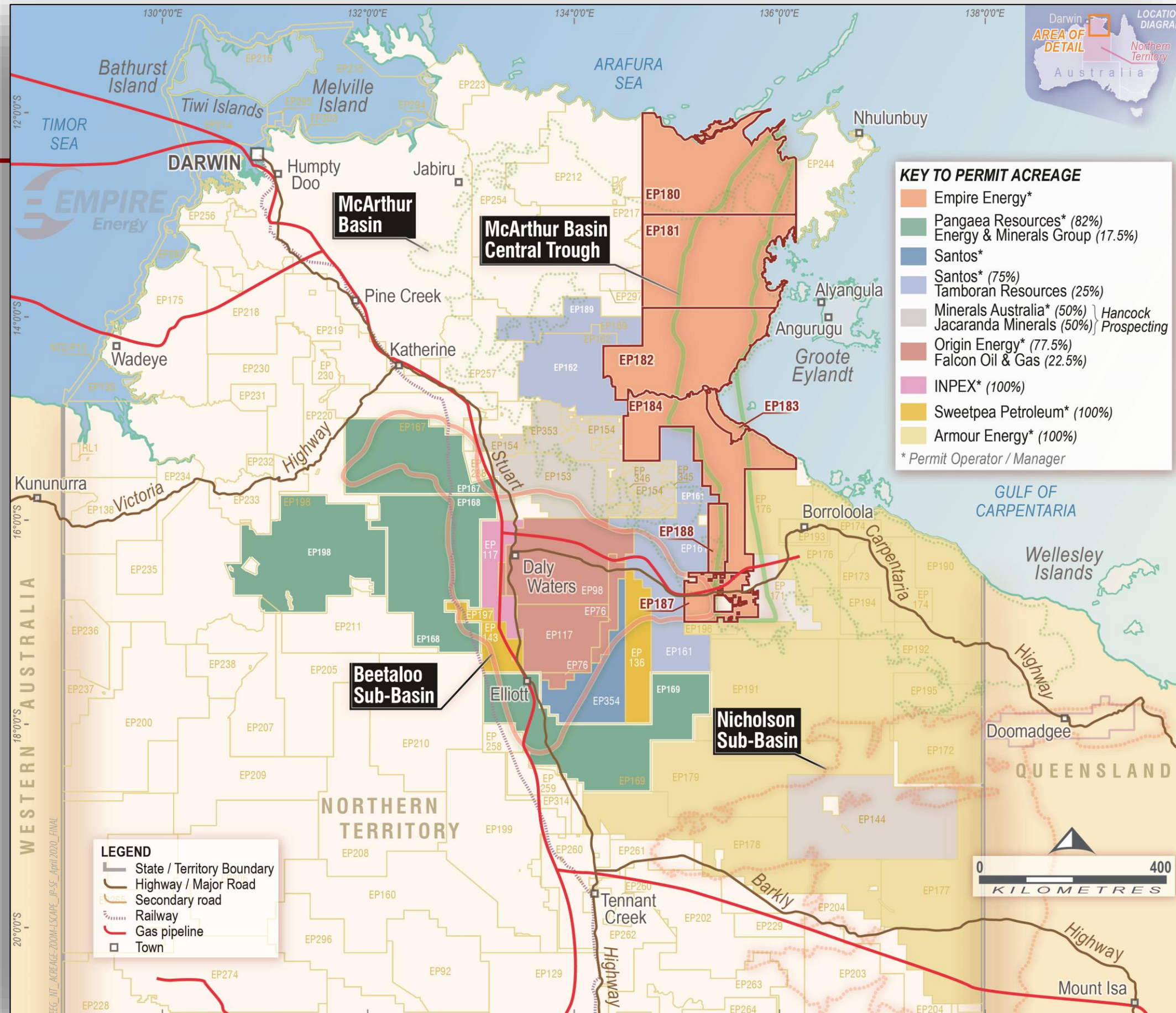
Demand growth leaders: ASEAN nations, Bangladesh, Pakistan, China, India



\*BP and Oxford Energy Forum forecasts stated as 1 BCM = 0.735Mt LNG



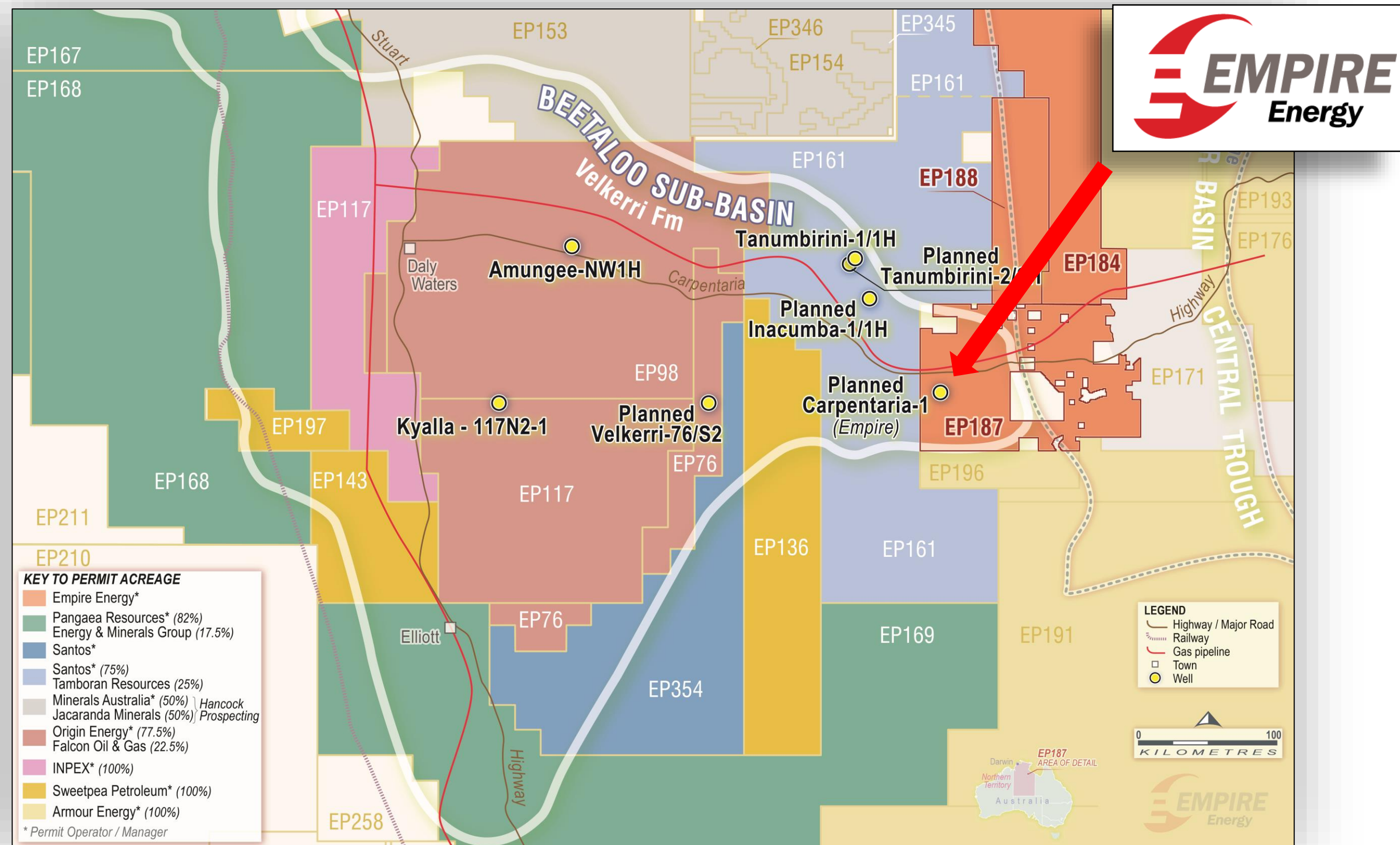
# NT Shale Gas Players



- **Major oil and gas companies** hold substantial acreage positions in the Beetaloo Sub-basin McArthur Basin
- **Origin** drilling 2 fracked horizontal wells in 2020 / 21 testing Velkerri Shale and Kyalla Shale
- **Santos** to drill 2 fracked horizontal wells in 2021 testing Velkerri Shale
- **Hancock Prospecting** has indicated it may invest A\$150m - \$200m in exploration
- **INPEX** and **Santos**, exporters of LNG from Darwin, in the Basin



# Zooming in – Position of Empire’s upcoming well Carpentaria-1





# Beetaloo 2020 Season an eye-opener for Australian shale gas

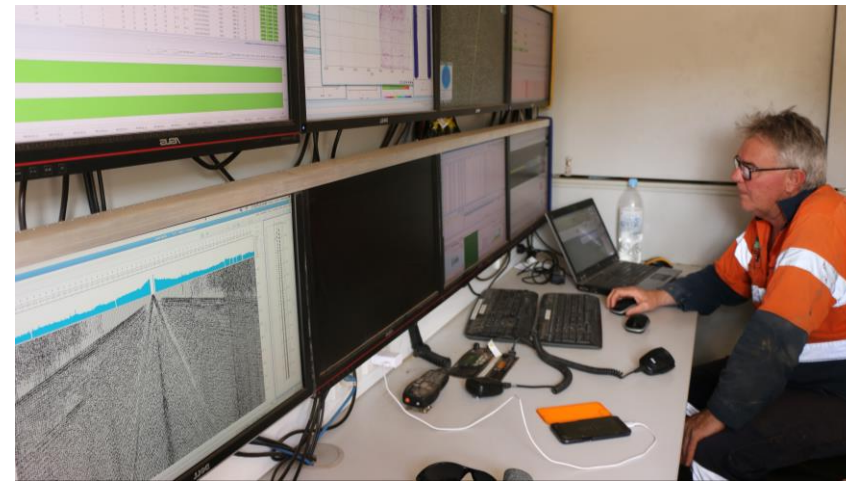
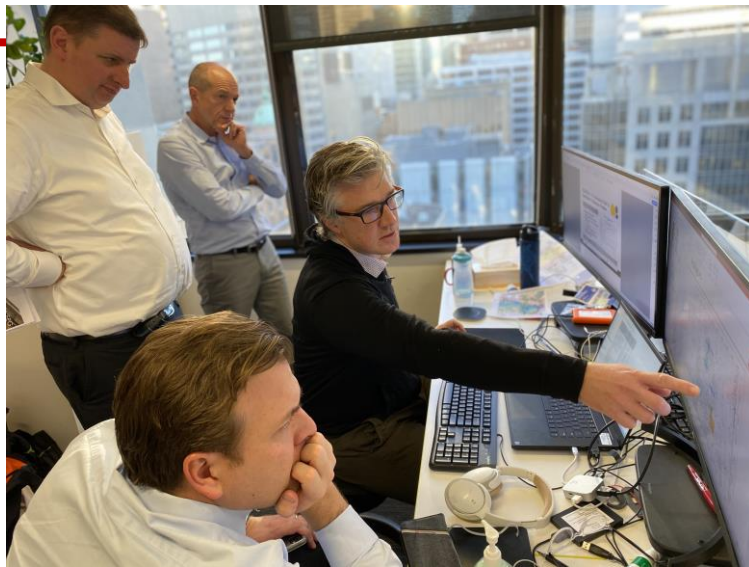
- Santos' Tamburini-1 January frack test exceeded expectations with flow rates  $> 1.2\text{mmcf / day}$
- $>90\%$  methane, less than 5% total inert content and ethane
- Origin Energy has started its fracked horizontal drilling program on Kyalla 117
- Fresh results from Empire's 231km seismic demonstrate extensive cross-basin continuity of productive units
- Empire expects to drill this quarter



Velseis vibroseis vehicles acquiring 2D seismic data for Empire Energy Jan 2020



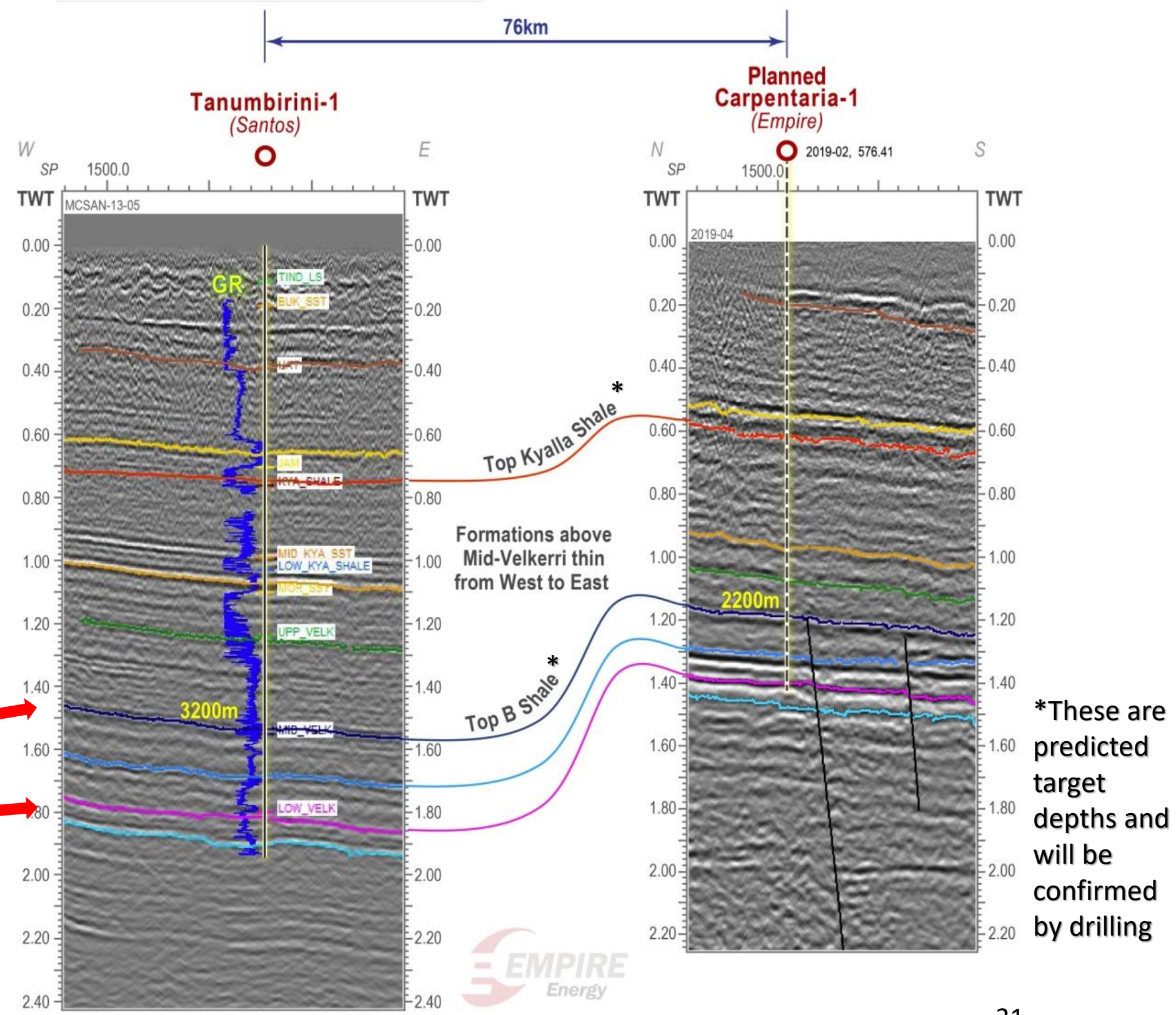
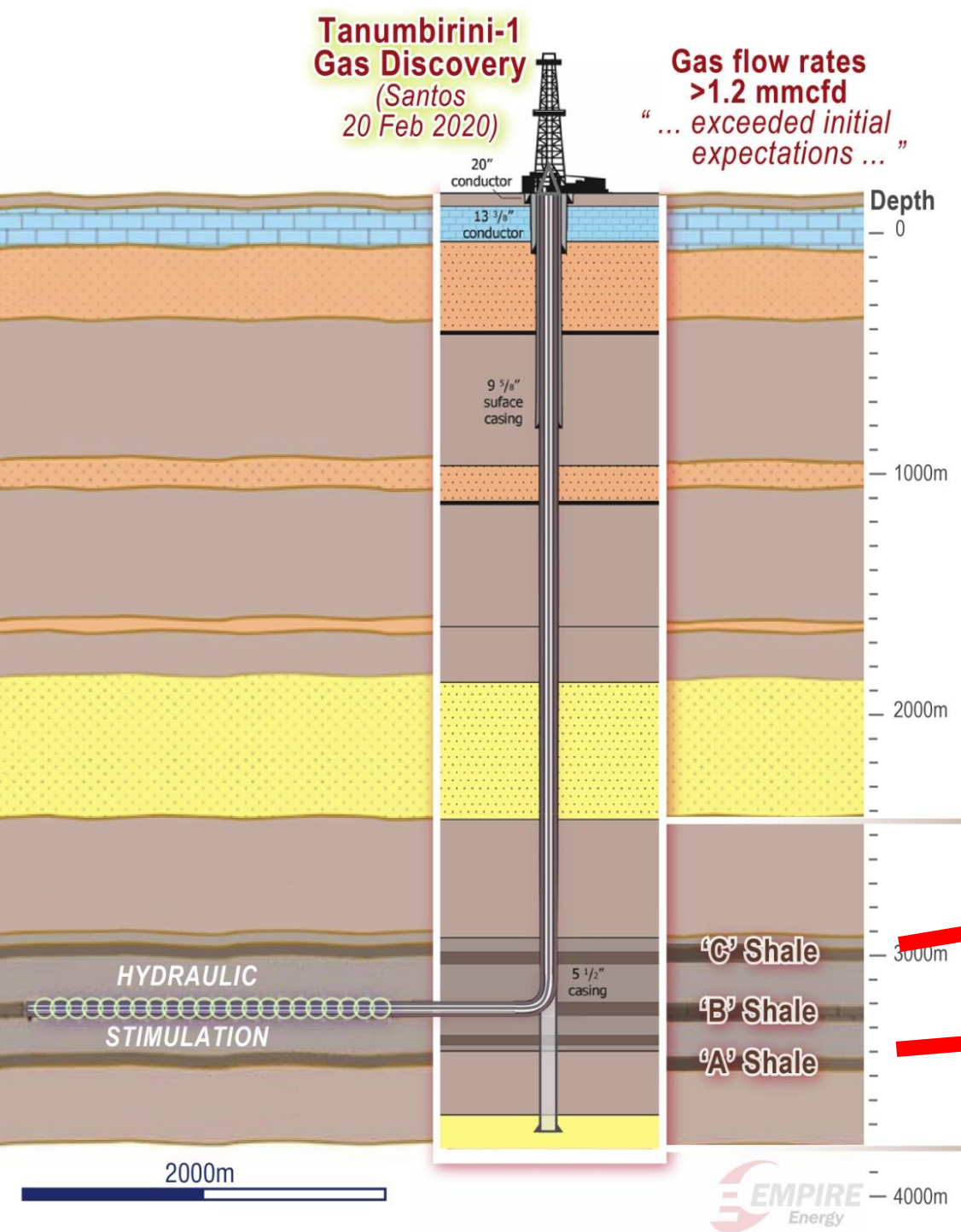
# Empire's 2020 Seismic – informing Empire's Q3 drilling



- Large EP187 area identified containing thick continuous targets predicted to be Velkerri and Kyalla Shales, clearly undisturbed by faulting.
- These are the productive units also now in appraisal by adjoining Santos and Origin
- Target formations predicted to be at shallower depths with equivalent thickness to the acreage of neighbouring operator
- This offers reduced development costs and enhanced potential for both gas and liquid hydrocarbons
- The Kyalla Shale predicted to be at greater depth and thickness than previously thought opening it as an additional 'stacked target' in EP187 overlying the Velkerri Shale
- Empire's proposed Carpentaria-1 well location was optimised and de-risked using the 2D data



# Santos results a basin opener for Empire...



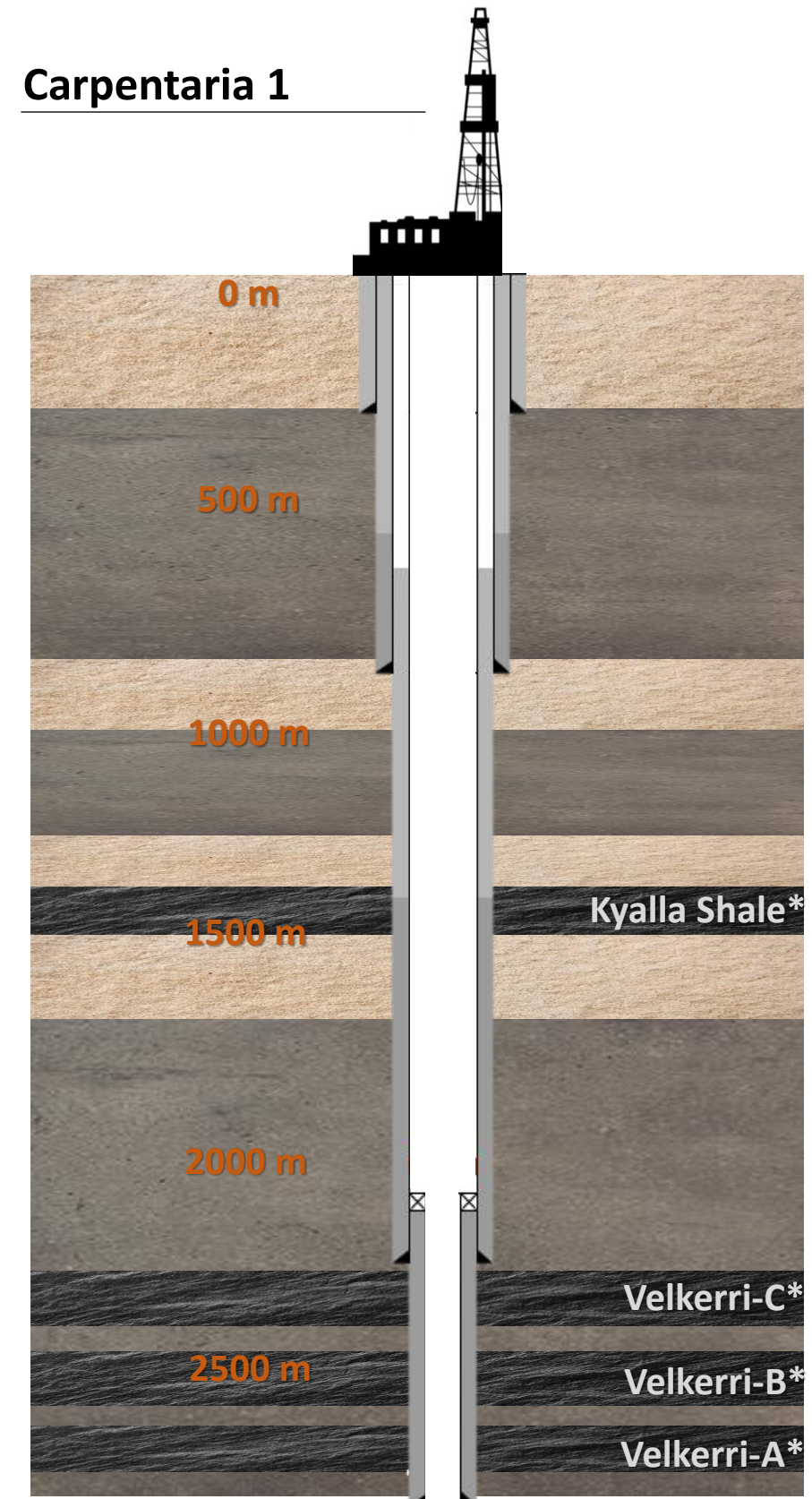


# Carpentaria 1 well objectives and design

## Well Objectives to Define Success

- **Prove and Identify** the extension, depth and thickness of target shales (Kyalla and Velkerri) in Empire's EP187.
- **Understand** rock properties, hydrocarbon content, formation permeability and reservoir pressure
- **Gather data** for future hydraulic stimulation planning and execution
- **High-grade** the target shale intervals for vertical hydraulic stimulation and testing, followed by future horizontal well placement and extended production testing
- **Refine** seismic interpretation, the prospective resource estimate and associated hydrocarbons

## Carpentaria 1



\*These are predicted target depths and will be confirmed by drilling



# ASX:EEG

Shale Gas Takes Hold in Australia - Empire Energy is the ASX-listed hydrocarbon player offering the most direct market exposure to the exciting future of both the McArthur and Beetaloo Basins in the Northern Territory



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This presentation has been authorised for release to the ASX by the Managing Director.  
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