



ASX:EEG



Oil & Gas from the McArthur - Beetaloo Basins



NAPE Conference Presentation, Houston, February 2020

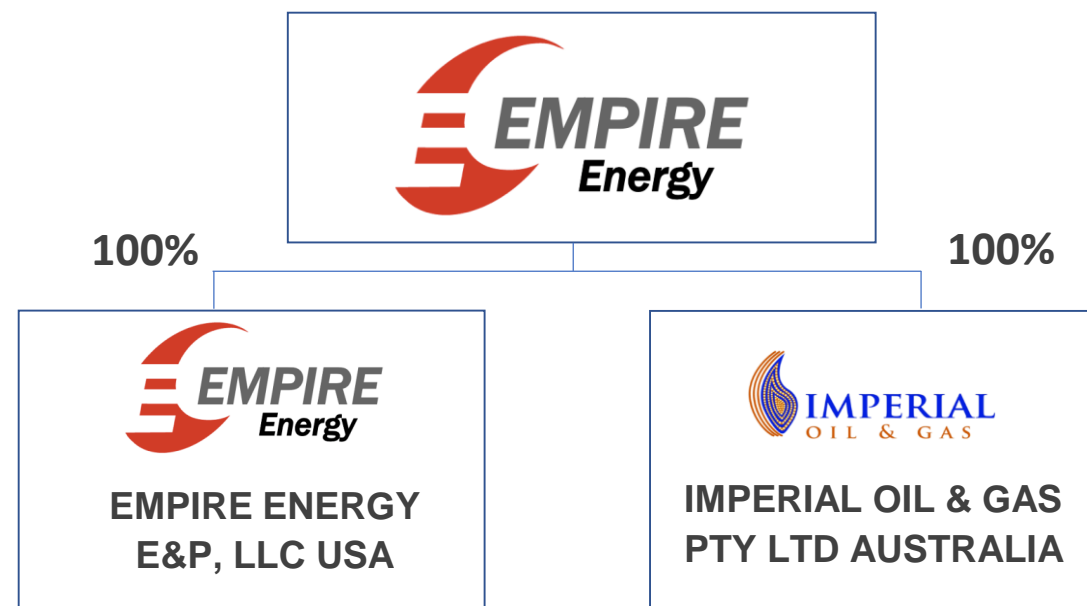
Corporate Snapshot



Capital Structure

Shares on issue ¹	263m
Share price	A\$0.395
Market cap	A\$104m
Net (debt) / cash ²	A\$3m
Enterprise value	A\$101m
Cash at bank	A\$14m

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 & Management³

↑ 7.3%

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. Empire has a US\$7.5 million debt facility with Macquarie Bank maturing in December 2024 which is secured against the Company's USA gas production assets. Total debt has been reduced by over 80% since 2018.
3. Board shareholding excludes options and MD Share Rights. Empire Directors have invested more than A\$4.25 million in cash over the last two years

Empire Board & Management Team



Empire Energy's mission is to safely, responsibly and economically progress the exploration, appraisal and development of our world class shale oil and gas assets for the benefit of our shareholders

Board of Directors:



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
- Non-Executive Director of Aurelia Metals Limited



Alex Underwood – CEO & 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



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

Management:



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



Ben Johnston – Vice President Business Development

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

Empire has Led the US Shale Revolution to Australia



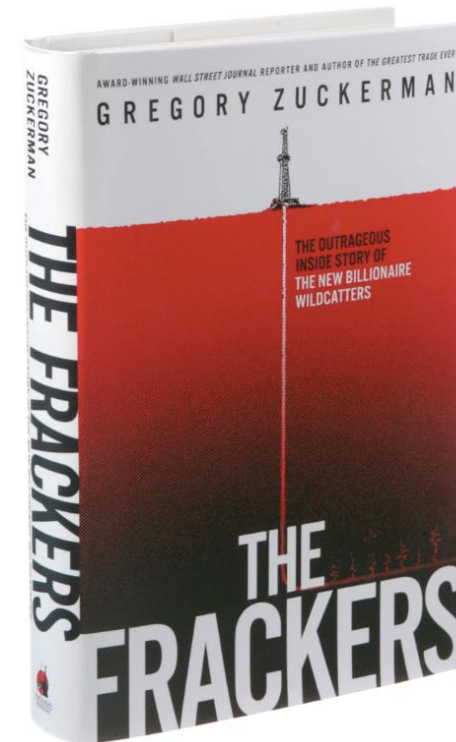
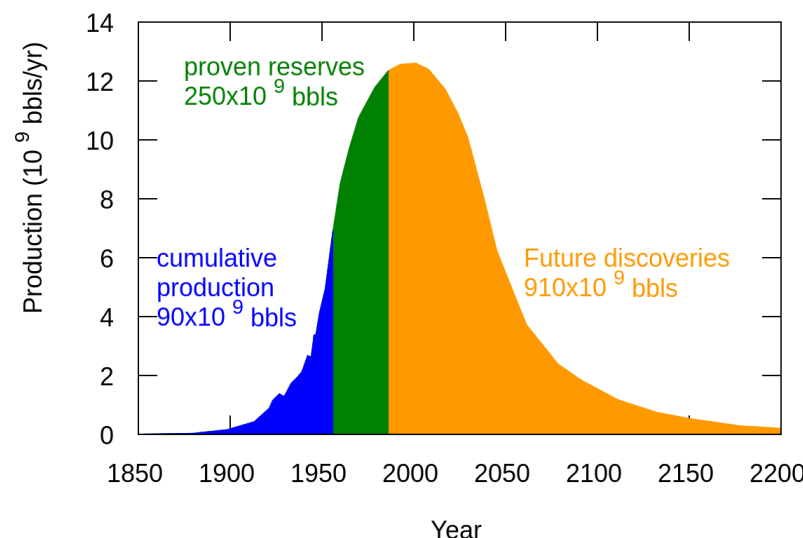
Pennsylvania USA – home of the now famous Marcellus Shale



Empire leaders Bruce McLeod (late) and Prof John Warburton

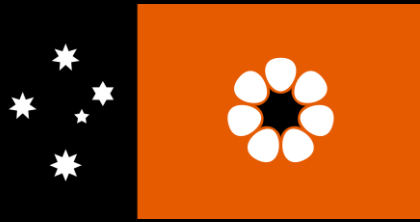


Against earlier fears of 'Peak Oil' and energy crisis, the Fracking Revolution has turned the USA into an energy exporter

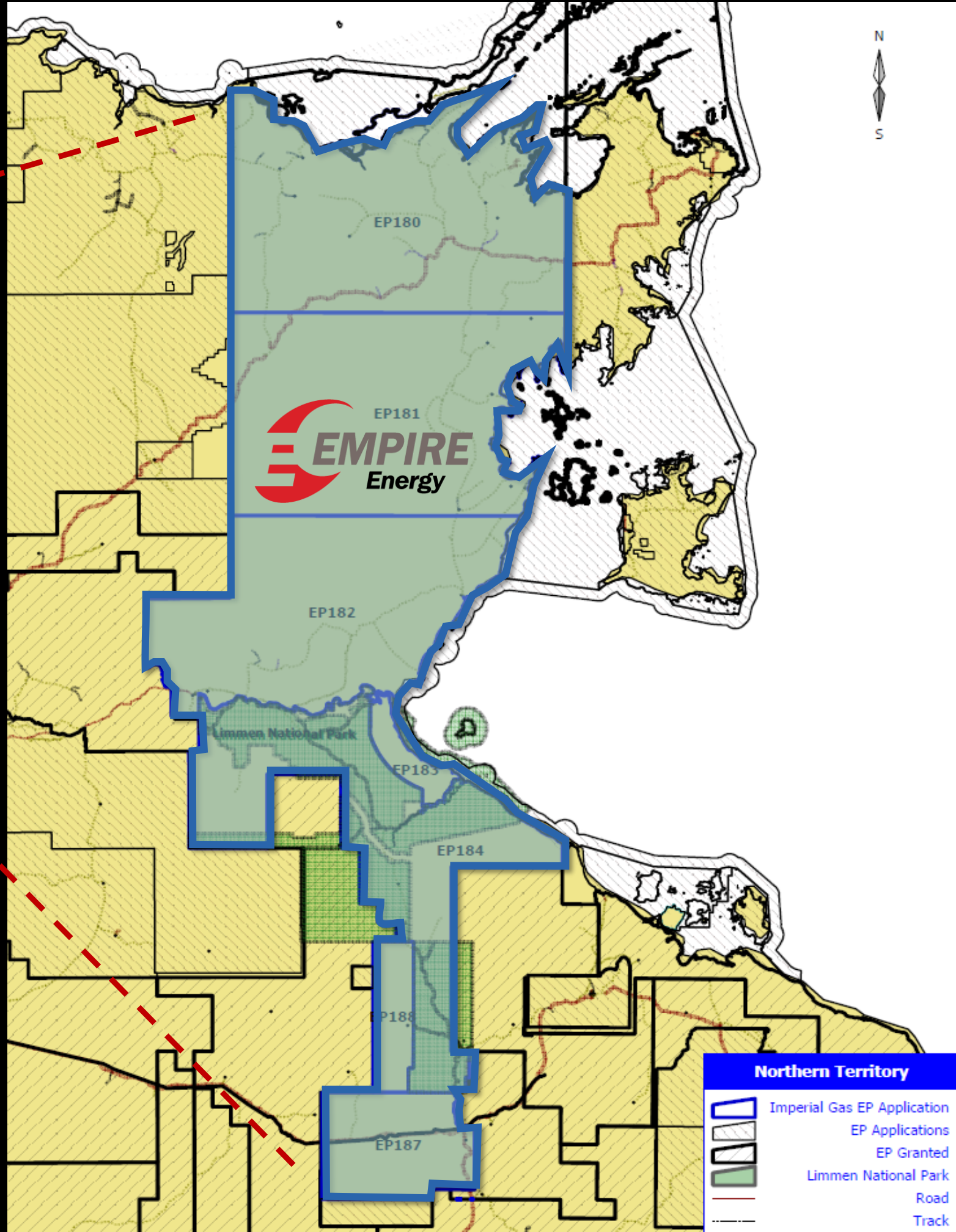


Empire Energy MD Alex Underwood once banked Empire Energy at Macquarie Bank and now leads the company





Major holdings across both McArthur and Beetaloo basins in NT's new hydrocarbon frontier



Empire's independently certified NT Prospective Resource Estimate

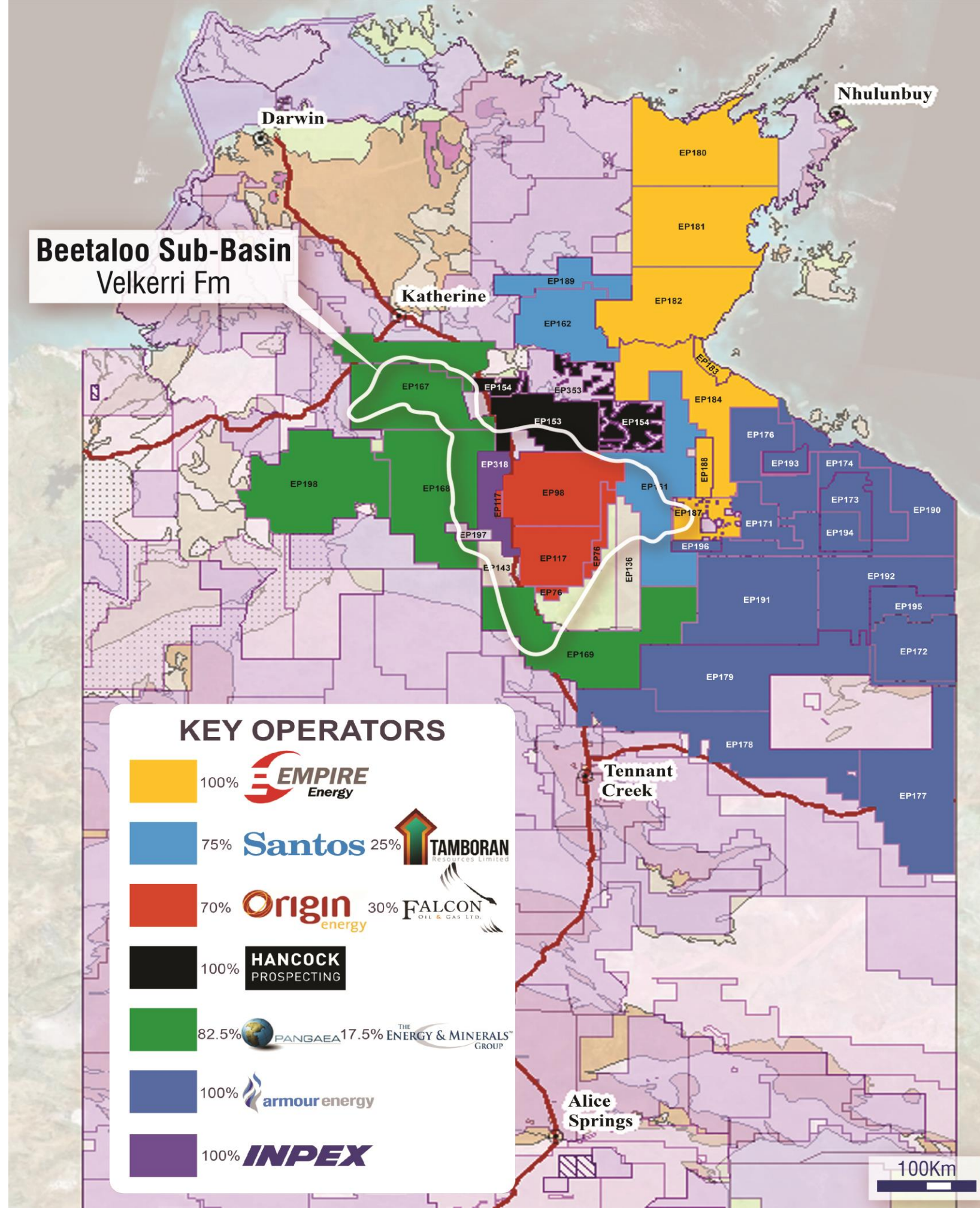


Formation	Permits	Geological factor discount	Area in acres	Units	P90	P50	PV10
Barney Creek	EP 184, EPA180, 181, 182, 183, 188	50-90%	3,559	Bcf	3,304	8,699	20,172
		50-90%		MMBO	66	174	403
Velkerri	EP184, 187, EPA 188	50%	315	Bcf	383	1,192	3,086
		50%		MMBO	8	24	62
Wollogorang	EP 184, 187, EPA 188	90%	1,384	Bcf	524	1,185	2,371
		90%		MMBO	10	24	47
Total				MMBOe	851	2,238	5,183

Empire's P(50) resource is 13 Tcf eq

Conversion Factor: 5.485 Mcf : 1 Bbl

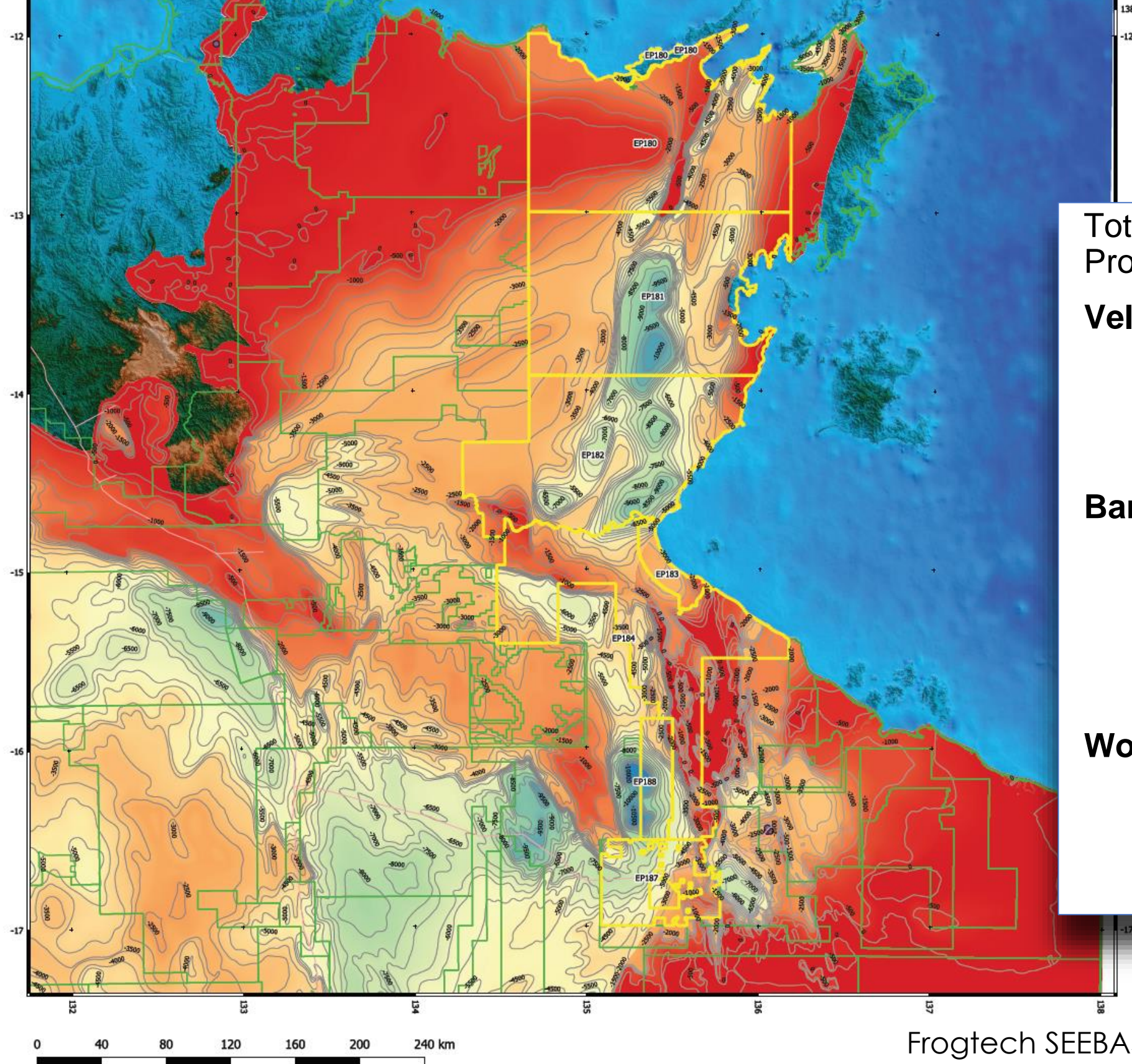
Northern Territory Resources by: Muir & Associates P/L and Fluid Energy Consultants



The watershed moment has arrived – major players drilling throughout 2020

- Large independent and major oil and gas companies hold substantial acreage positions in the Greater McArthur Basin
- Origin drilling 2 fracked horizontal wells in 2019 / 20 testing Velkerri Shale and Kyalla Formation
- Santos to drill 2 fracked horizontal wells in 2020 testing Velkerri Shale
- Hancock Prospecting has indicated it may invest A\$150m - A\$200m in exploration
- INPEX and Santos, exporters of LNG from Darwin, in the Basin

Productive Units of the McArthur Basin & Beetaloo sub-Basin



Total 33,867 km² (8.4mm acres) of identified shale for Independent Prospective Resource identification

Velkerri Shale / Kyalla (Beetaloo sub-Basin)

- 628,000 acres (>2,500km²), up to 600m thick
- Independent Prospective Resource (P50) 1.2TCF gas + 24 mmbbls oil / condensate

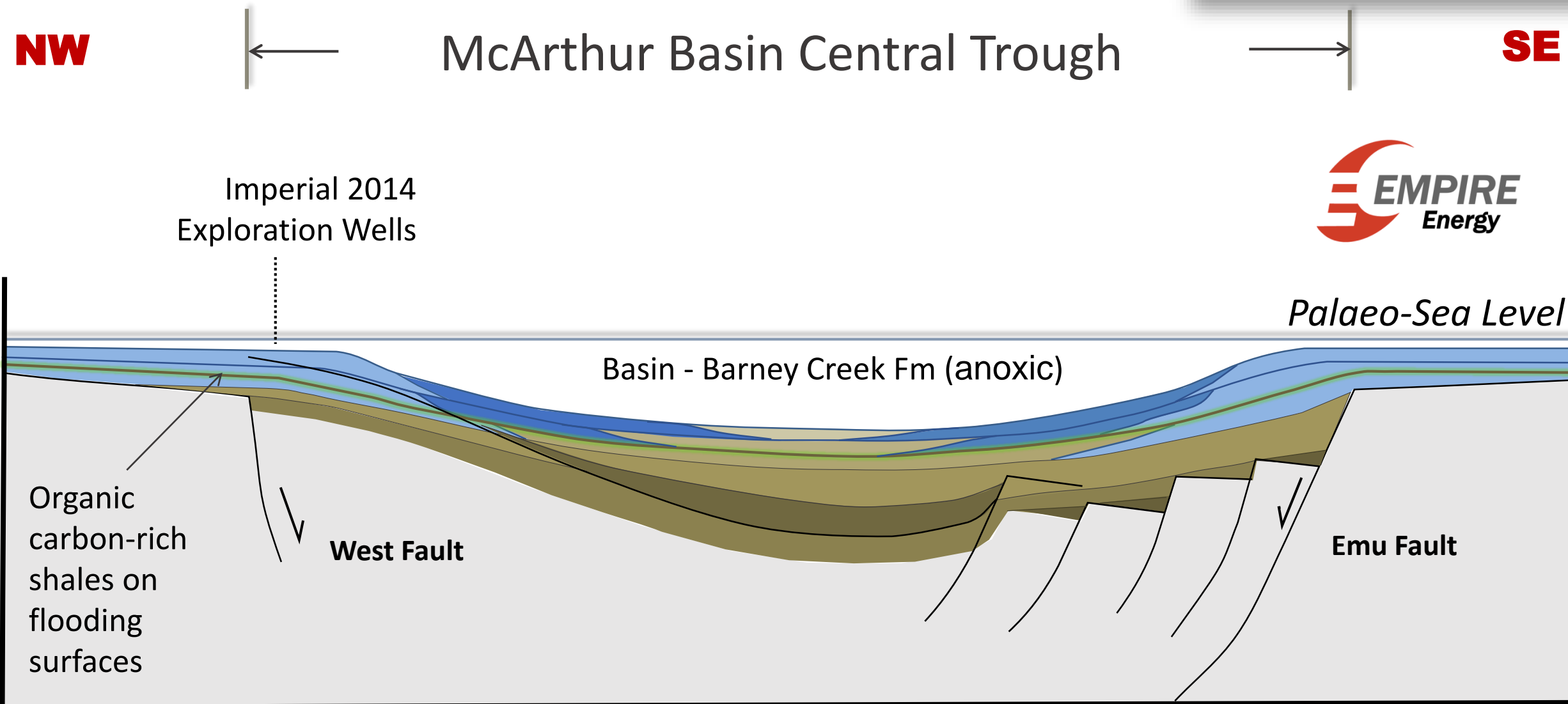
Barney Creek Shale (McArthur Basin)

- 6.2mm acres (>25,000km²), up to 900m thick
- Independent Prospective Resource (P50) 8.7TCF gas + 174 mmbbls oil / condensate
- Shales up to 3km thick

Wollogorang Formation (McArthur Basin)

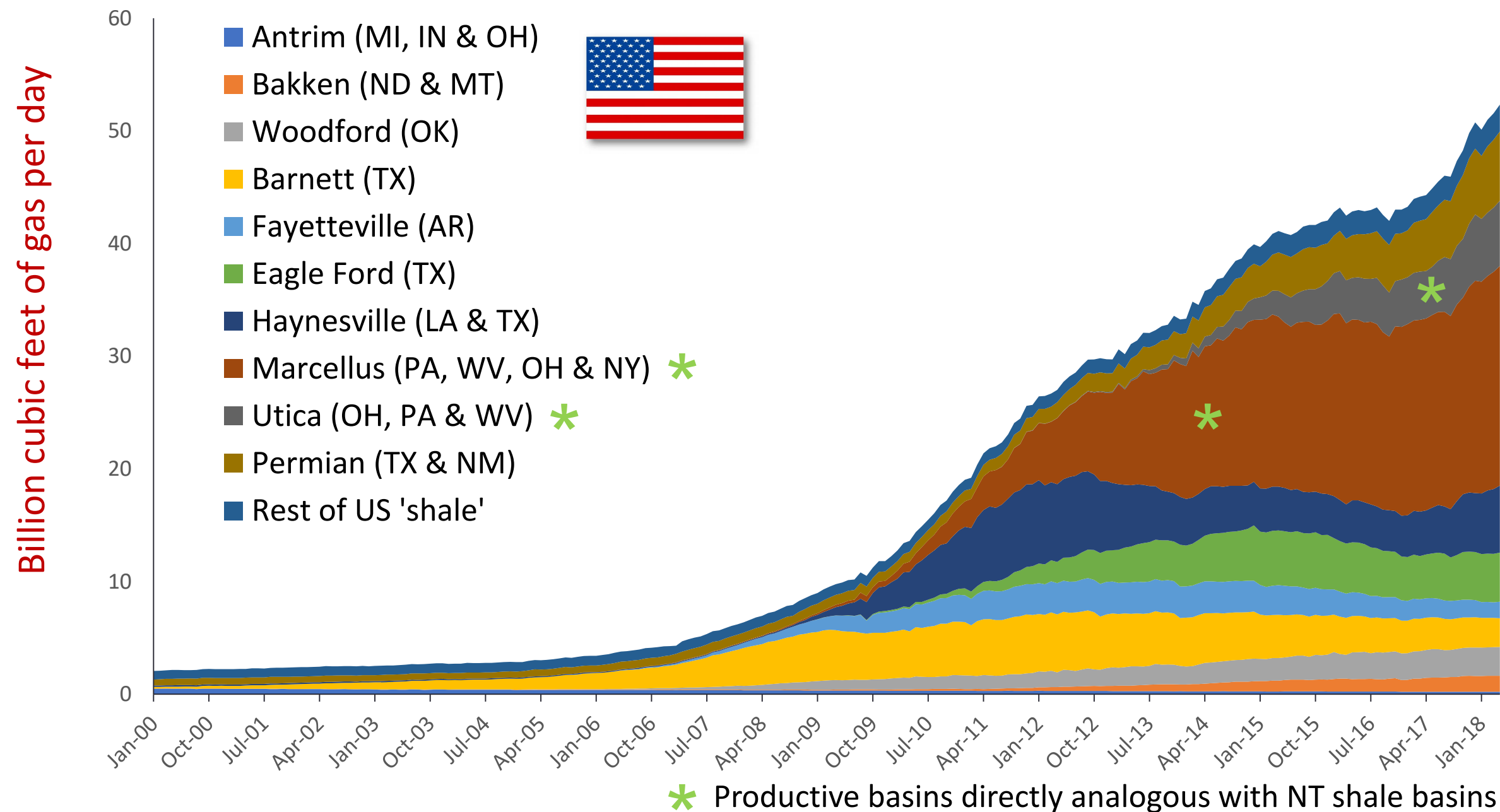
- 1.5mm acres (>6,000km²), up to 100m thick
- Independent Prospective Resource (P50) 1.2TCF gas + 24 mmbbls oil / condensate

Lesser known, but the McArthur Basin may yield more



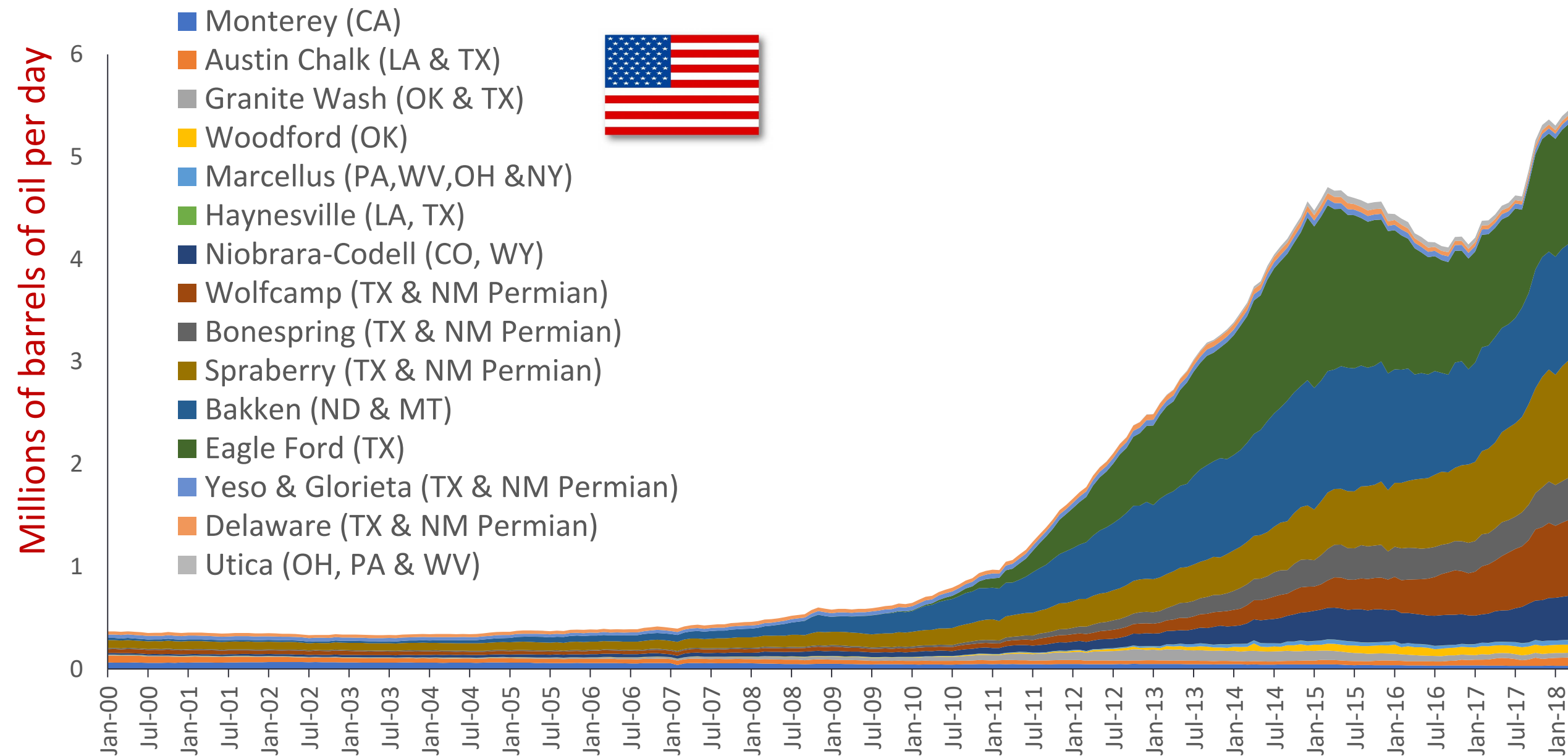
Horizontal drilling and fracking shale gas has transformed the US energy market, and its geopolitics

Monthly US shale gas production figures since 2000
coloured by shale formation

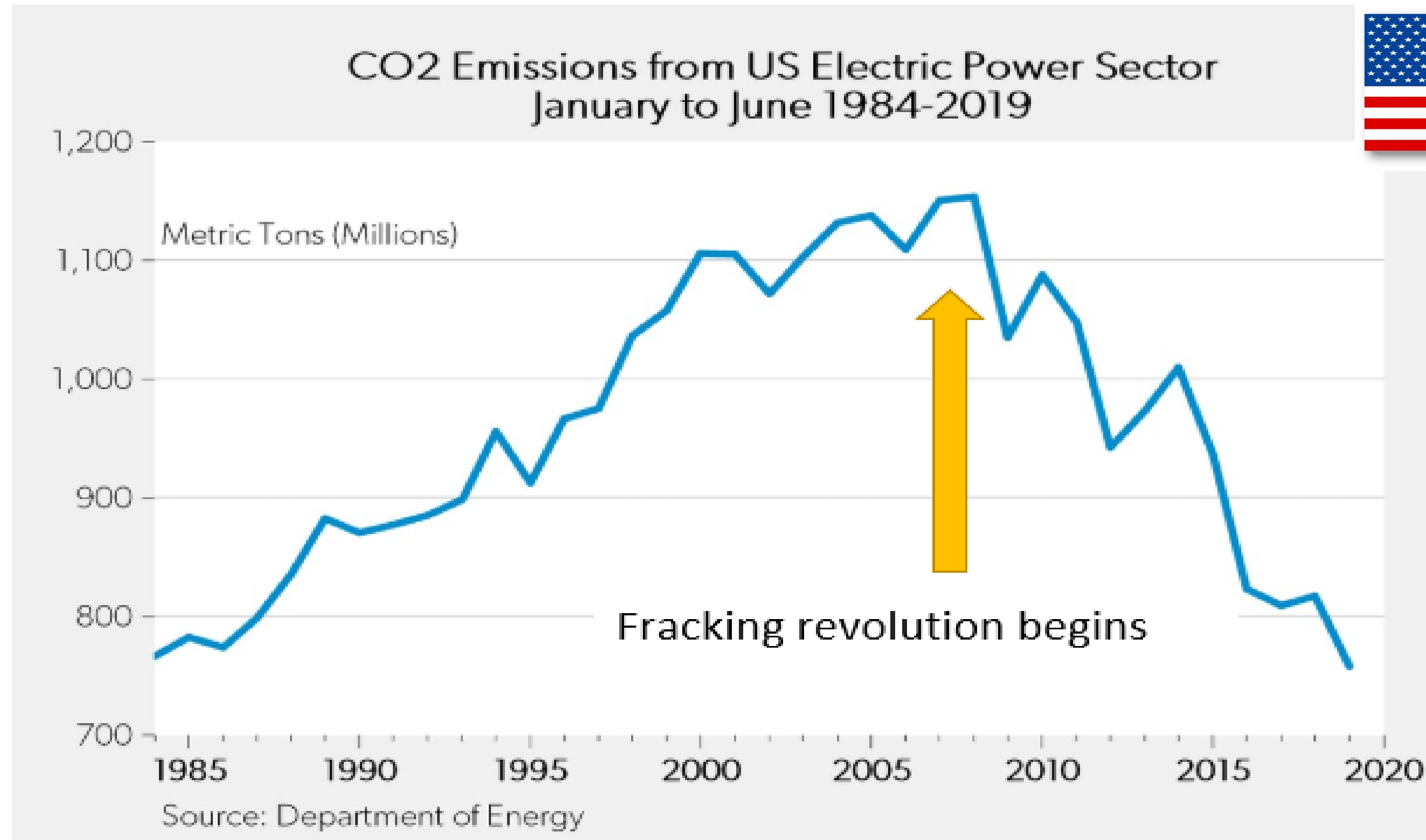


Horizontal drilling and fracking shale oil has transformed the US energy market, and its geopolitics

Monthly US shale oil production figures since 2000
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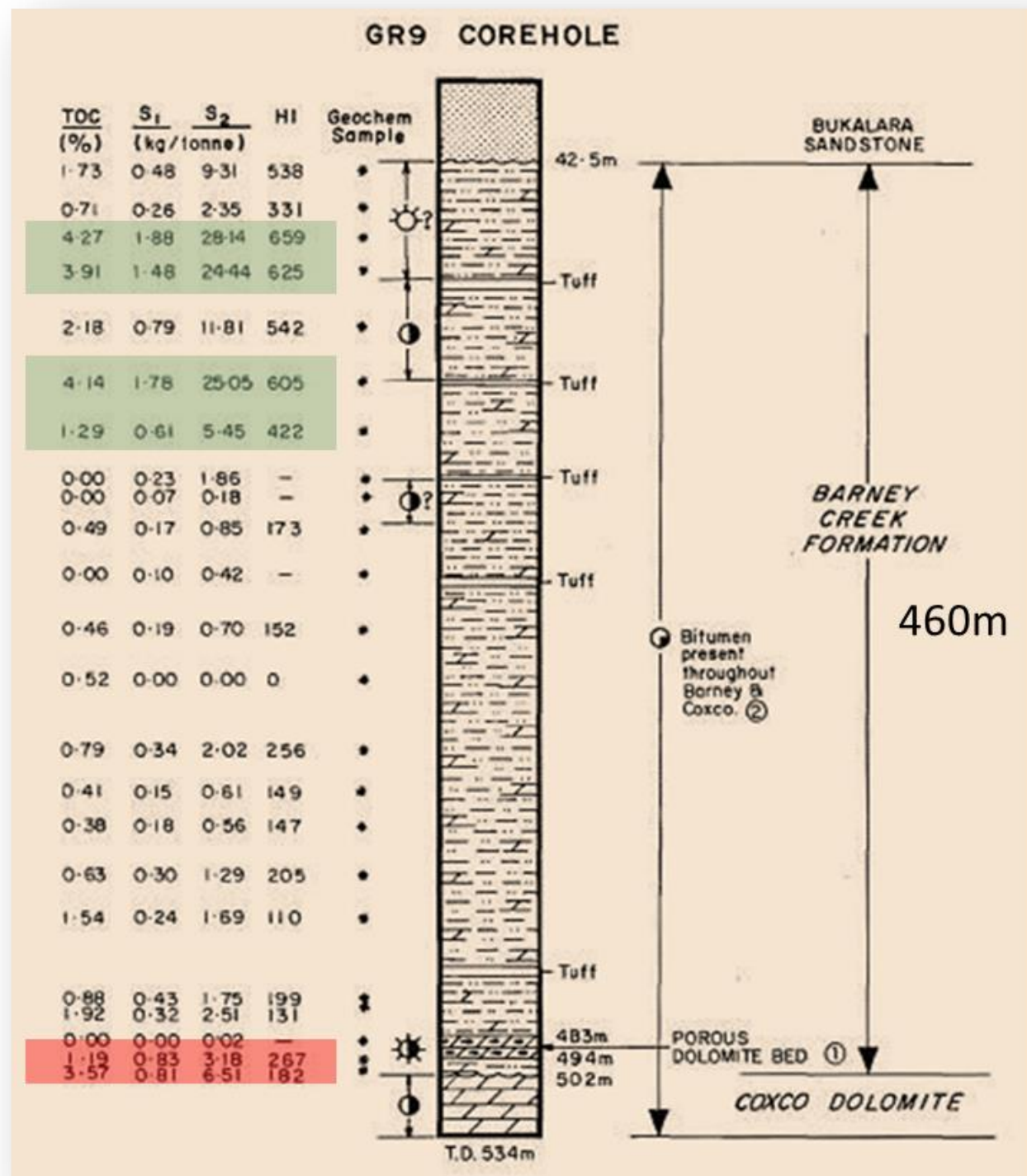


US emissions are dramatically falling as cost-effective shale gas replaces coal for base load power



Where the NT shale story begins...

A Gas Strike in an April 1980 mineral drillhole



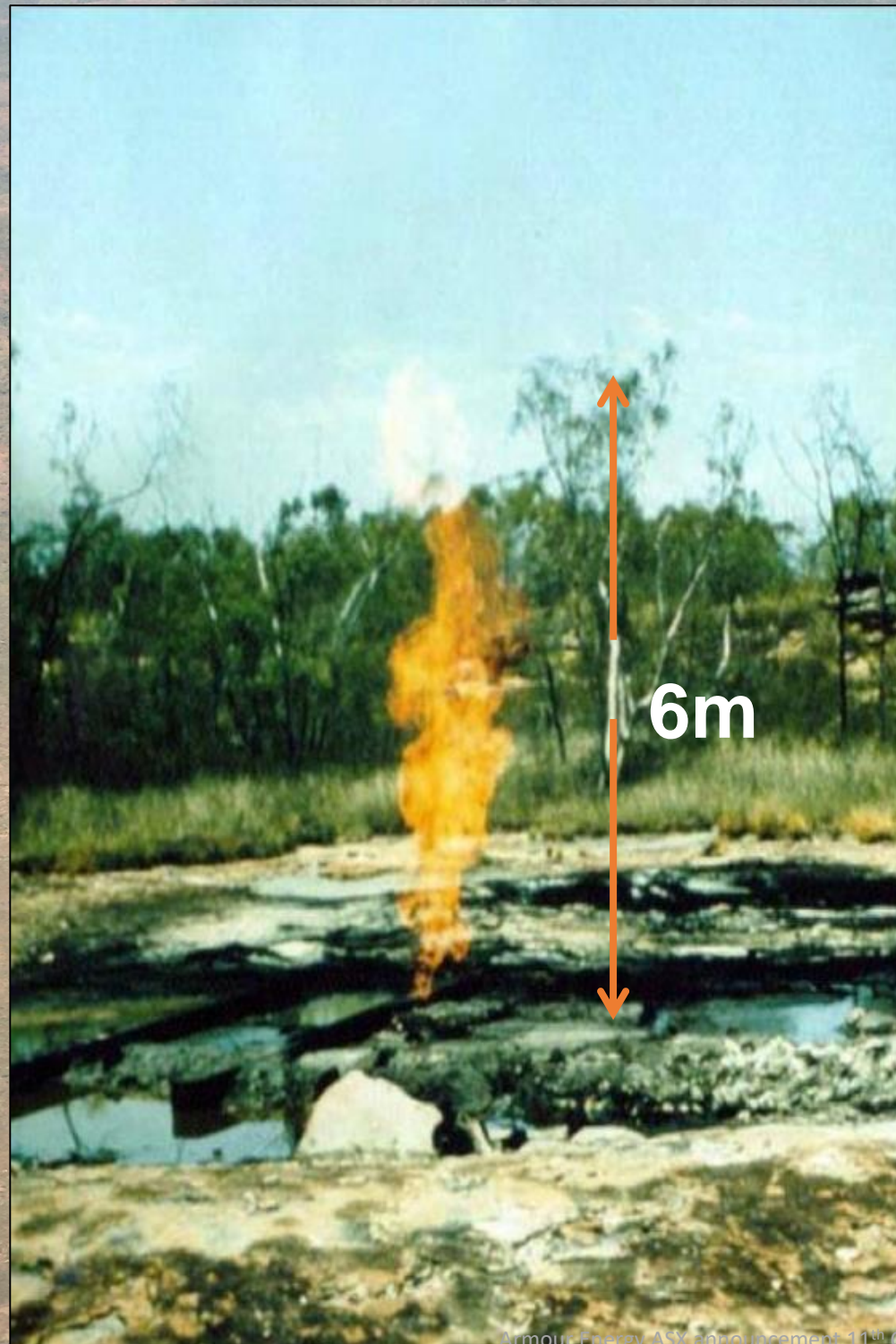
The most spectacular indication of live hydrocarbons encountered to date in the McArthur Group was in the Kennecott-Amoco mineral exploration corehole GR 9, drilled in the Glyde area. A summary log of this drillhole is shown as Figure 5, and the location is shown in Figure 2. Upon unintentional swabbing 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.



In 1980 Amoco Mineral's GRNT-09 mineral core drillhole ignited unexpectedly... little attention paid back then



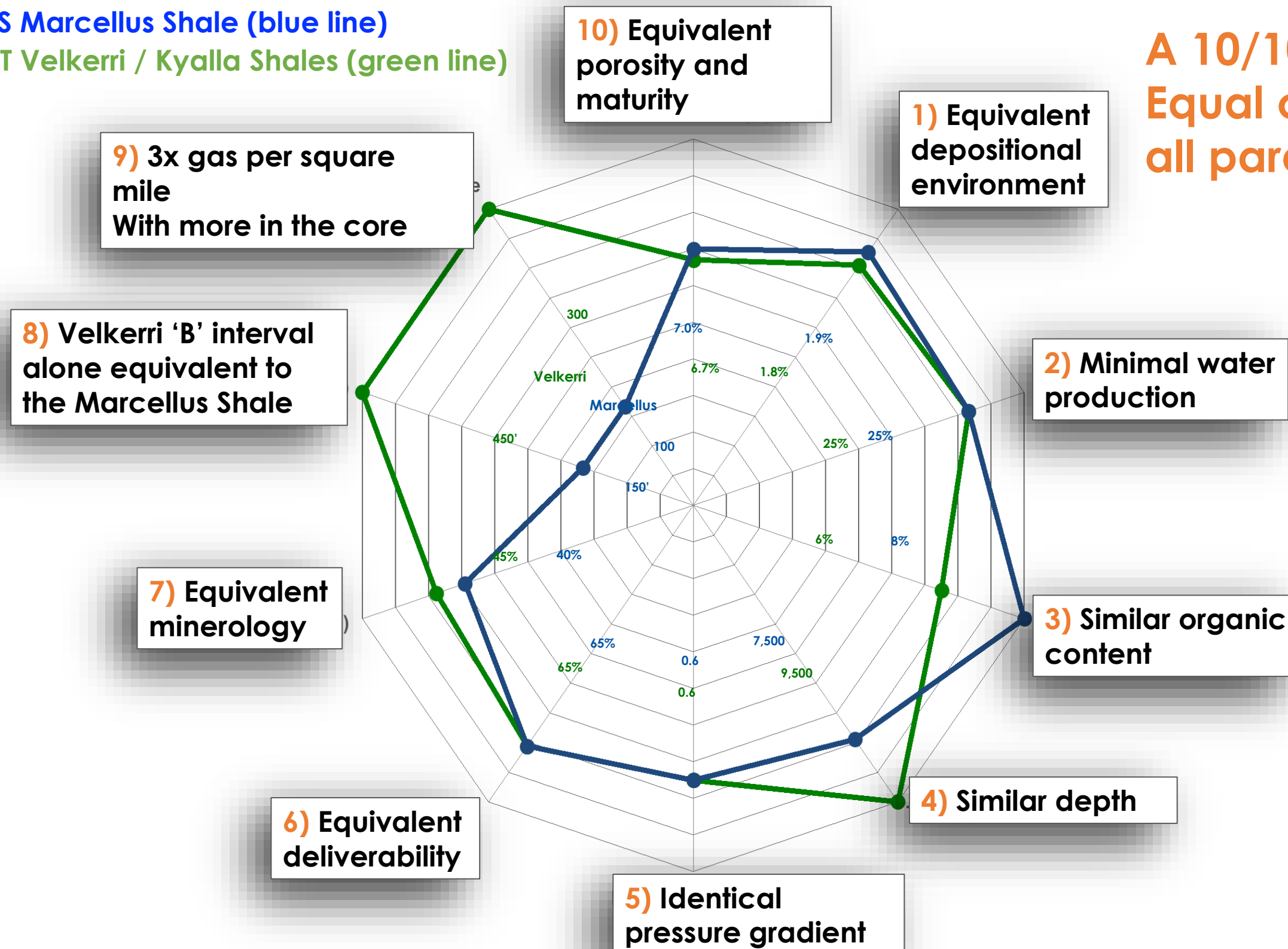
Armour Energy ASX announcement 11th October 2010

- Beneath a 6 metre flame it flowed at a phenomenal 140psi for 6 months at ~ 6 mmcfpd, for ~2Bcf/yr
- Over 30 hydrocarbon wells have been drilled since
- Today over \$800m is committed to exploring this new hydrocarbon province

Clear USA shale analog with **Velkerri/ Kyalla Shales** with original gas in place equal to **three** stacked **Marcellus Shale** plays

US Marcellus Shale (blue line)

NT Velkerri / Kyalla Shales (green line)



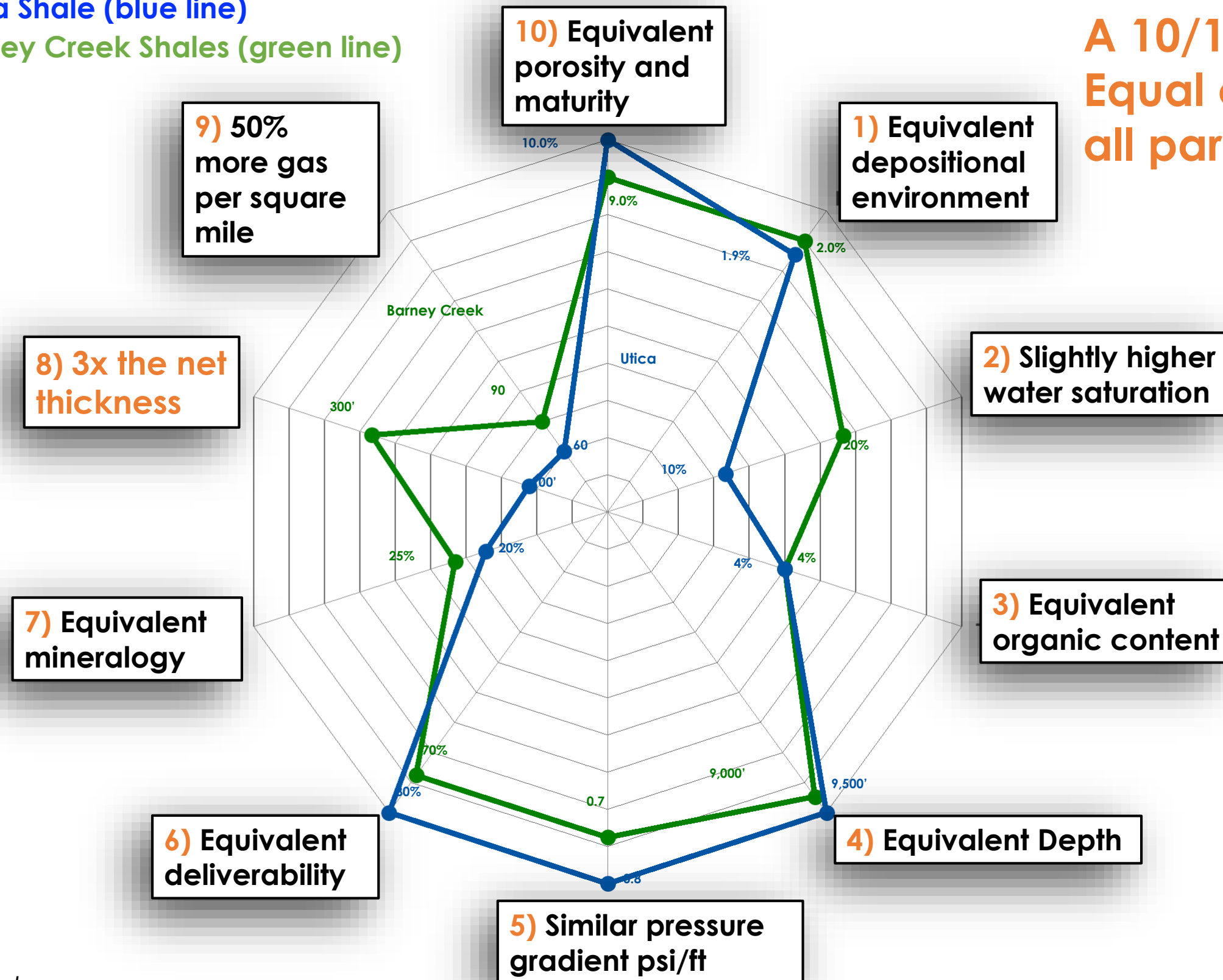
**A 10/10 Match
Equal or better in
all parameters**

Clear USA shale analog of **Utica Shale** identified in the Northern Territory's **Barney Creek Shale** – with 50% more gas equivalent

US Utica Shale (blue line)

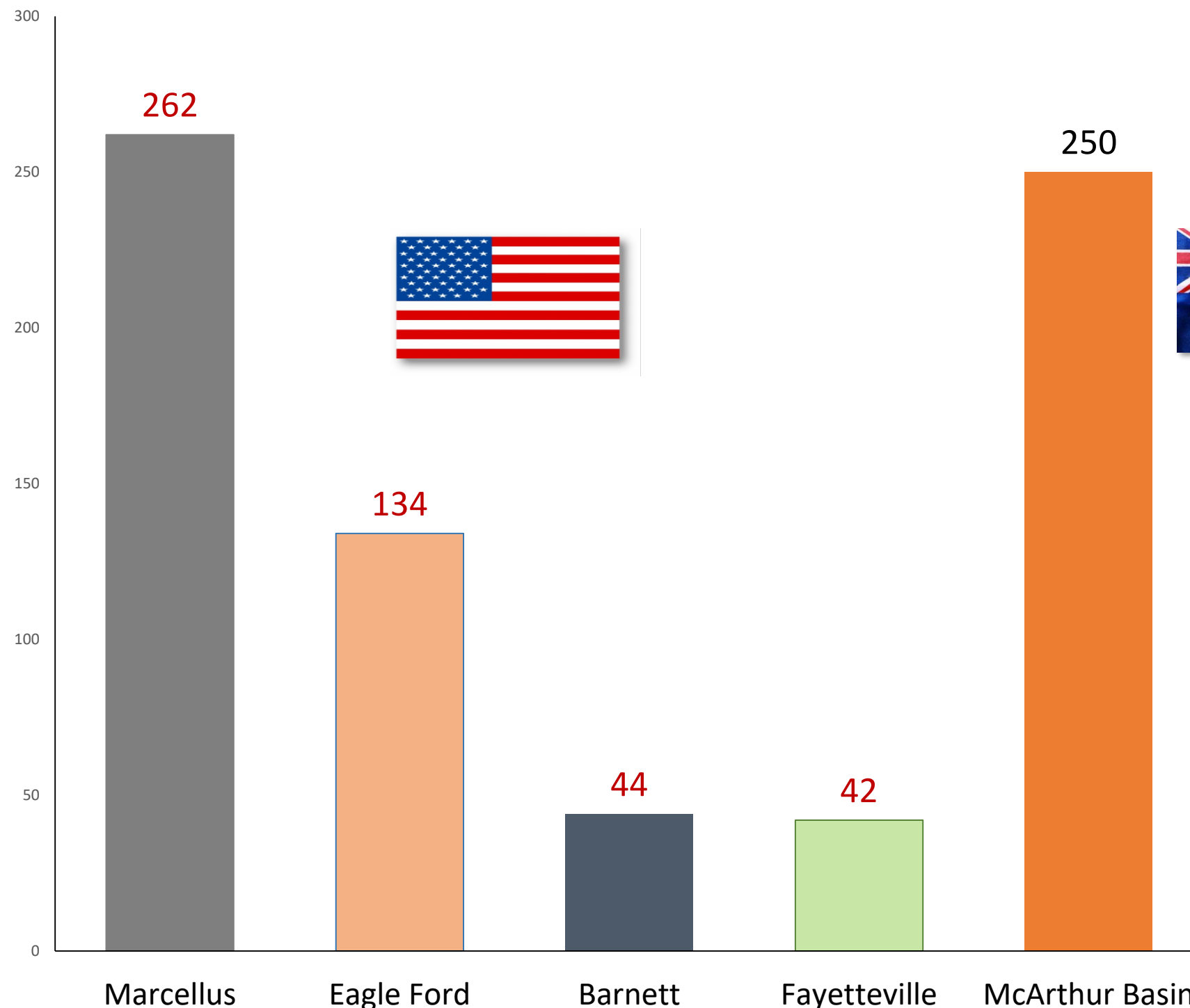
NT Barney Creek Shales (green line)

**A 10/10 Match
Equal or better in
all parameters**



NT Shale Gas Resources rival the prolific US Marcellus Shale

Trillion Cubic Feet (Tcf) unit comparison



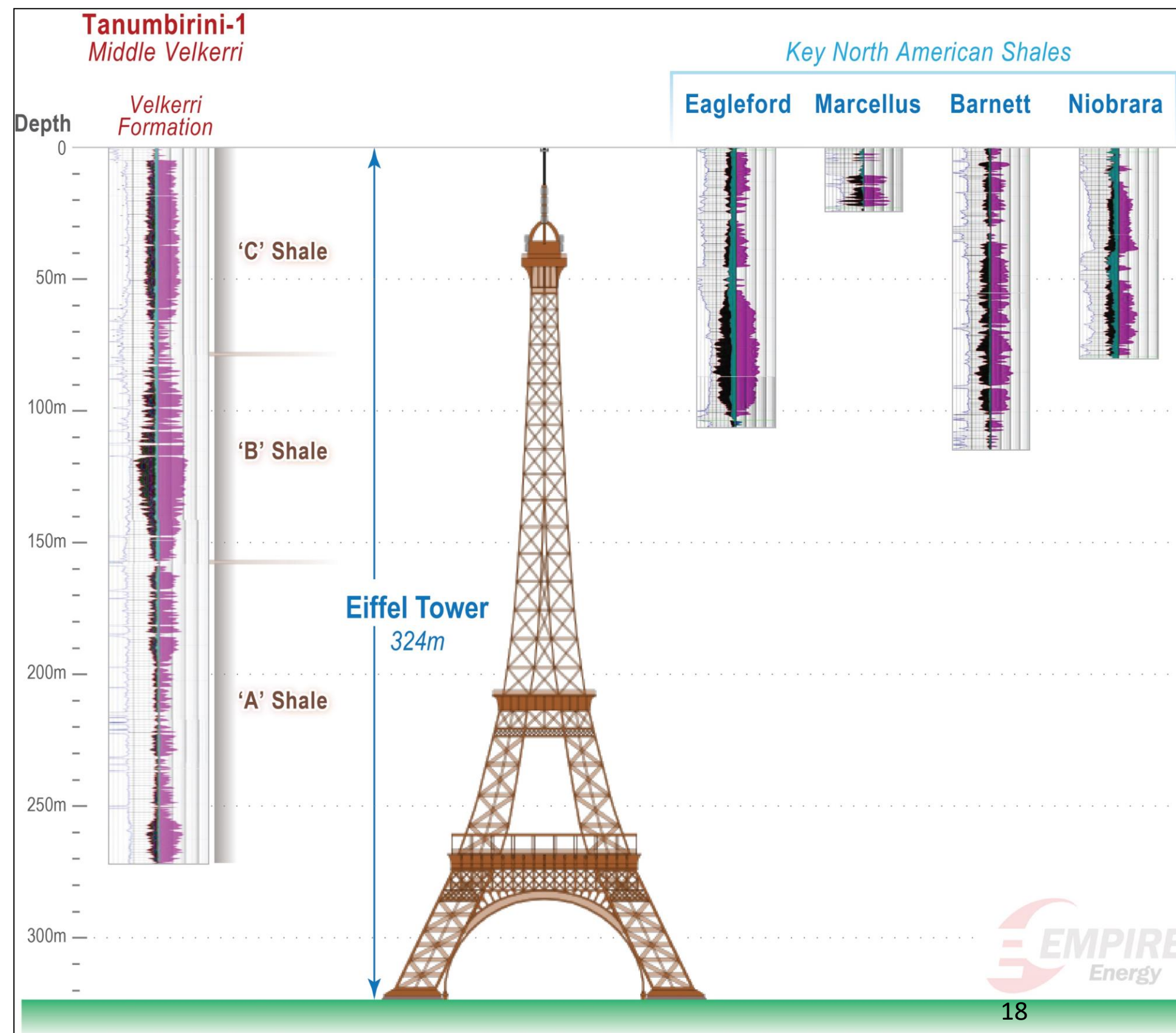
McArthur Basin rivals the Resource Potential of the USA's Marcellus Shale

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

Australia's Beetaloo Shales vs US producing units

Key attributes of the Beetaloo shales

- Wherever it is thermally mature, the Velkerri B Shale source rock reservoir is a continuous gas accumulation across the entire Greater Beetaloo Sub Basin (GBSB)
- Depositional style and the relatively unstructured basin configuration at the time of its deposition.
- The Velkerri B Shale is the most consistent and well-developed shale interval in the basin with well penetrations intersecting a stratigraphic section of similar thickness and petrophysical characteristics for hundreds of miles across the GBSB
- Most of the regional intra-formational thickness variations occur above and below target horizons



Amungee & Tanumbirini partial wells giving big hits...



Origin Energy's 2015 Amungee well (flawed 4-5 stage frack) produced at
1.1 mmscf / day over 57 days

The Santos 2020 Tanumbrini-1 vertical frack is reported producing over
1.2 mmscf / day

These flows compare closely with the SH Griffin #4 well by Mitchell Energy
that first launched the US shale revolution
1.3 mmscf / day

The S.H. Griffin #4 produced 1.3 million cubic feet of natural gas per day for the first 90 days, an unbelievable amount for the time.³⁶ Steinsberger, in an interview with The Atlantic, said,

*"This was the 'aha moment' for us, it was our best well ever in the Barnett, and it was a slick water frack. And it was my baby!"*³⁷

This was a revolutionary moment, marking the beginning of modern-day fracking in shale as we know it. Since the S.H. Griffin, more than a hundred thousand wells have been fracked in the United States, and most of them use a technique similar to what was first done in the Barnett Shale.³⁸ Steinsberger had finally figured out how to get shale rock formations to give up their natural gas and do so in an economical way.

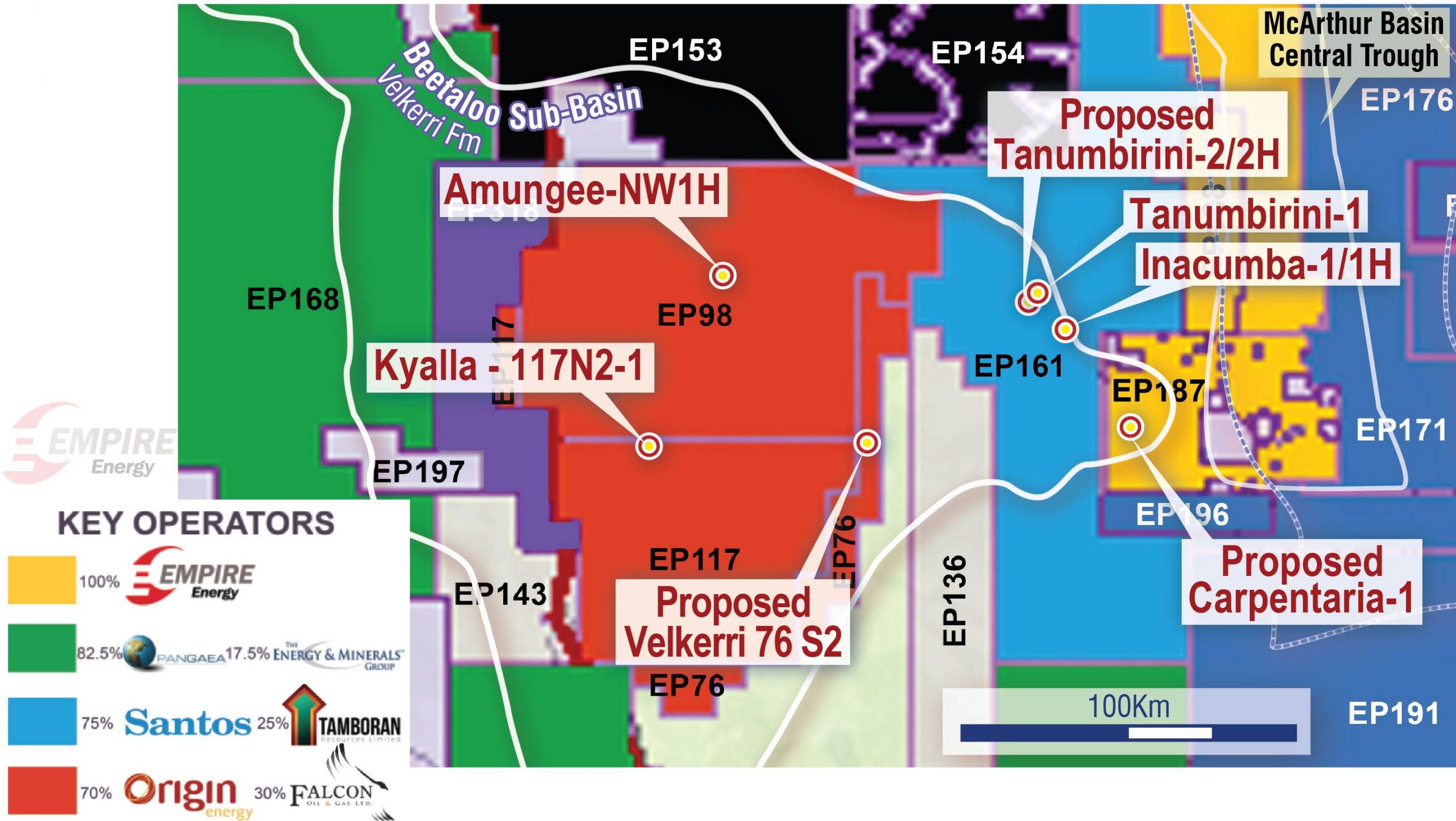
Extract page 7 - An Energy Fracking Revolution: 35 Years of Fracking in the Barnett Shale – How North Texas Fracking Turned America Into an Energy Superpower (1 June 2016)

McArthur Beetaloo 2020 Drilling Season Opens Strongly

- The Australian energy and stock markets are waking up to tight shale gas
- Santos January announcement that vertical frack test exceeds expectations with an 'outstanding' > 1.2mmtcfd
- Origin Energy has started its fracked horizontal drilling program on Kyalla 117
- Both companies plan more fracked horizontal wells in the McArthur's Beetaloo sub-basin this year
- Fresh results from Empire's 231km seismic demonstrate cross-basin continuity
- Empire funded for drilling in EP187 this year
- Action in Beetaloo sub-Basin is pathfinding for the greater McArthur Basin



McArthur Beetaloo 2020 Drilling Season activity



Santos tells shareholders early positive Beetaloo results...

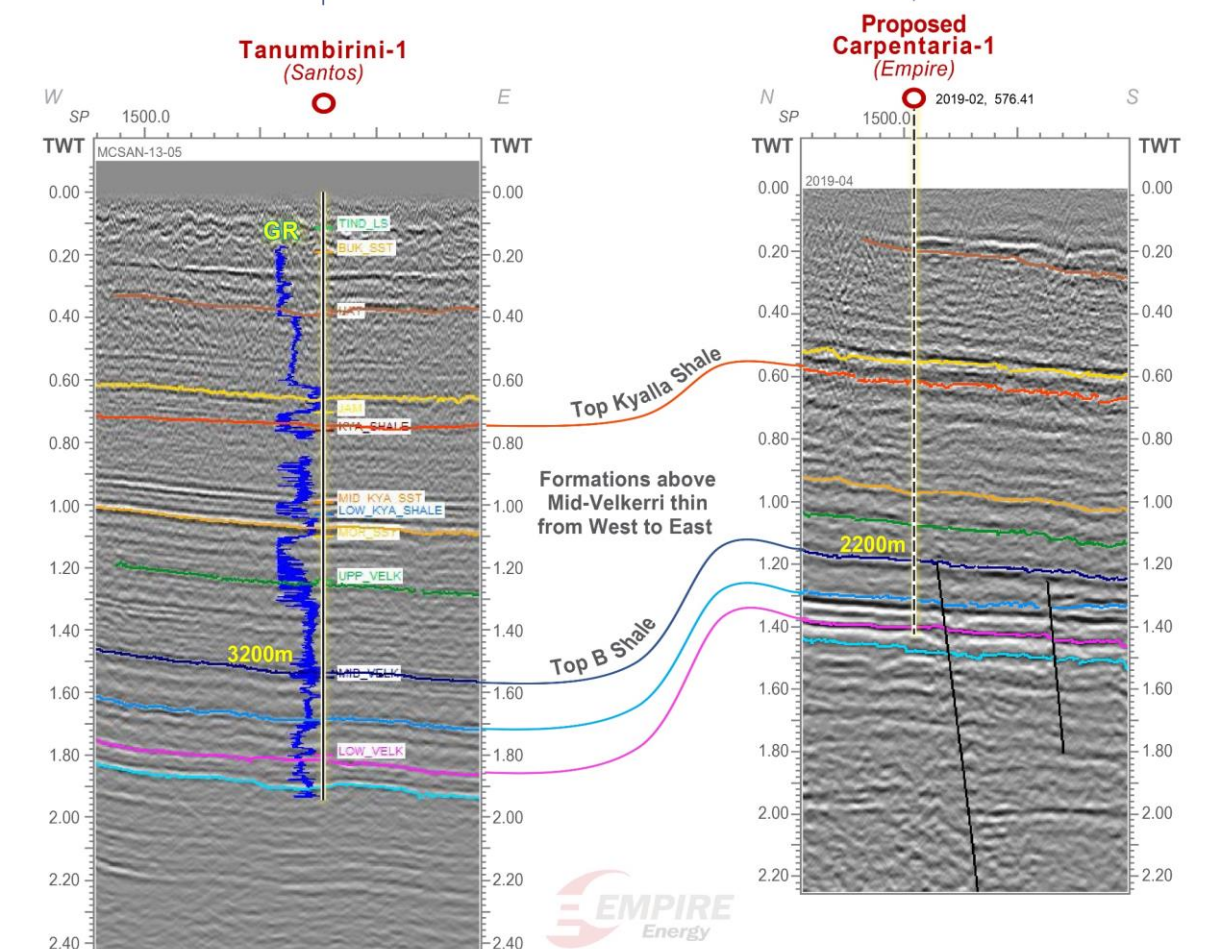
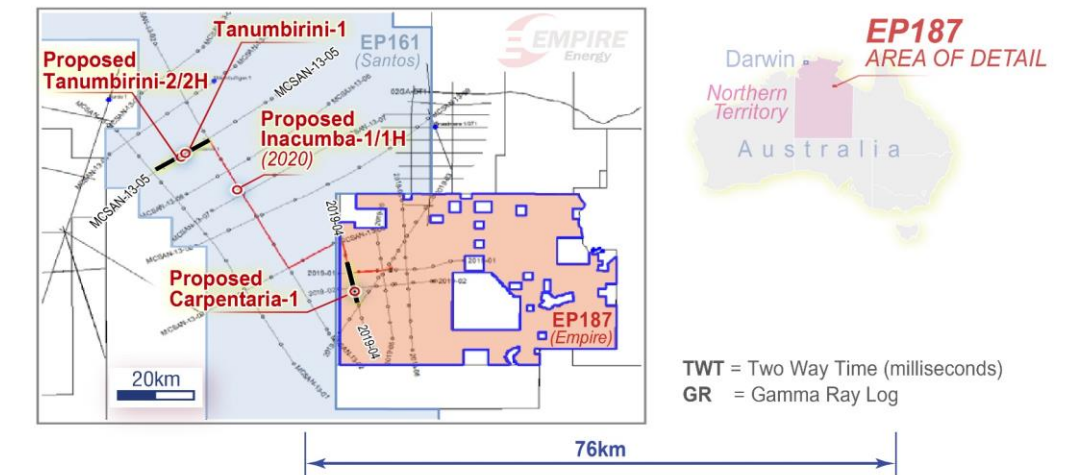
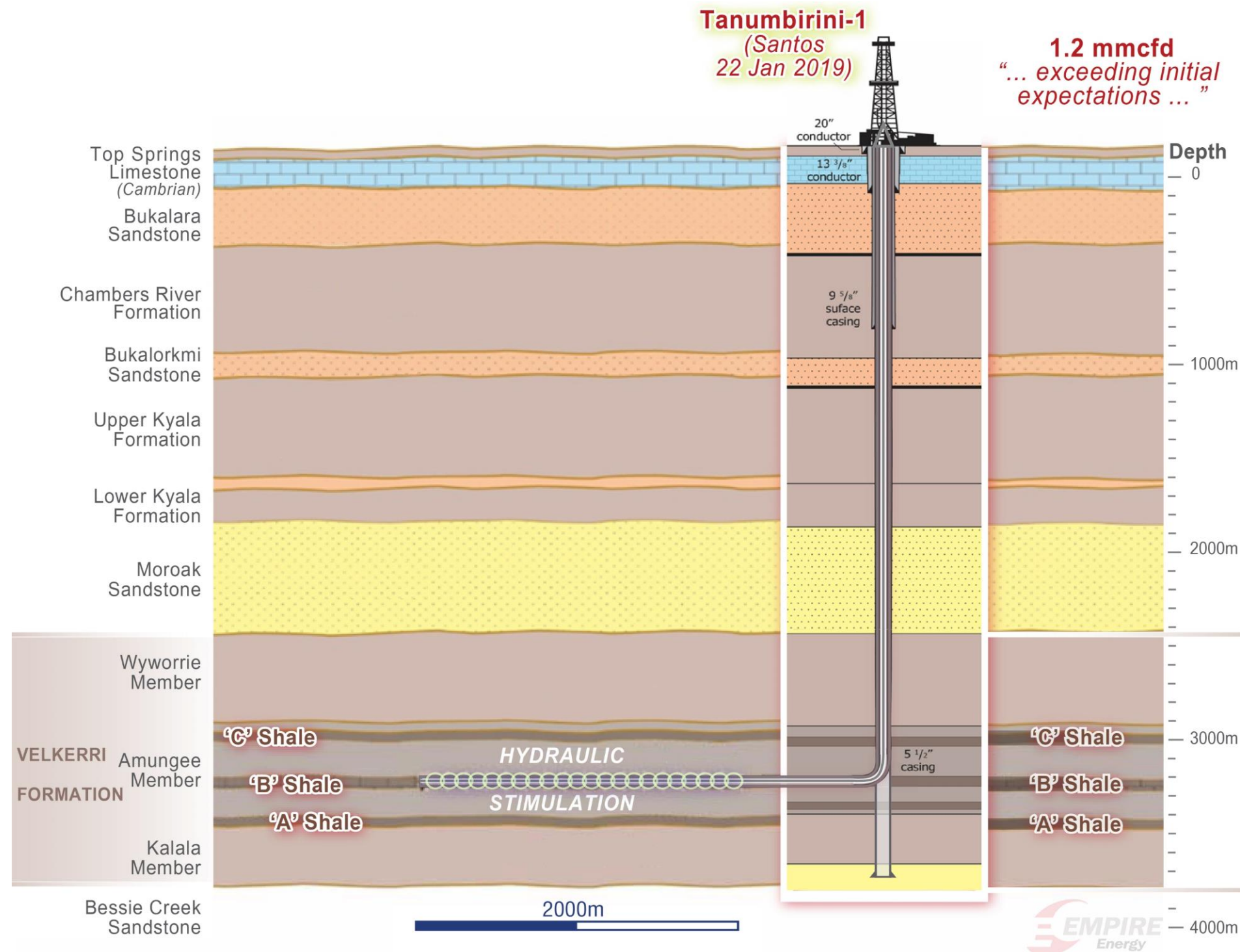
Santos' 4 stage stimulation in vertical Tanumbrini-1: 'Production testing is ongoing, with test results confirming a gas discovery in the **Middle Velkerri shale gas play**. Gas flow rates of over 1.2 mmscf / day have been recorded, exceeding initial expectations for the vertical well. Preliminary gas composition analysis indicates >90% methane, less than 5% total inert content and 3% ethane. The results at Tanumbrini-1 provide critical data to inform the next phase of appraisal, which is expected to include the drilling and multi-stage stimulation of two horizontal wells commencing in the first half of this year.', **Jan 2020 Santos quarterly reporting**.

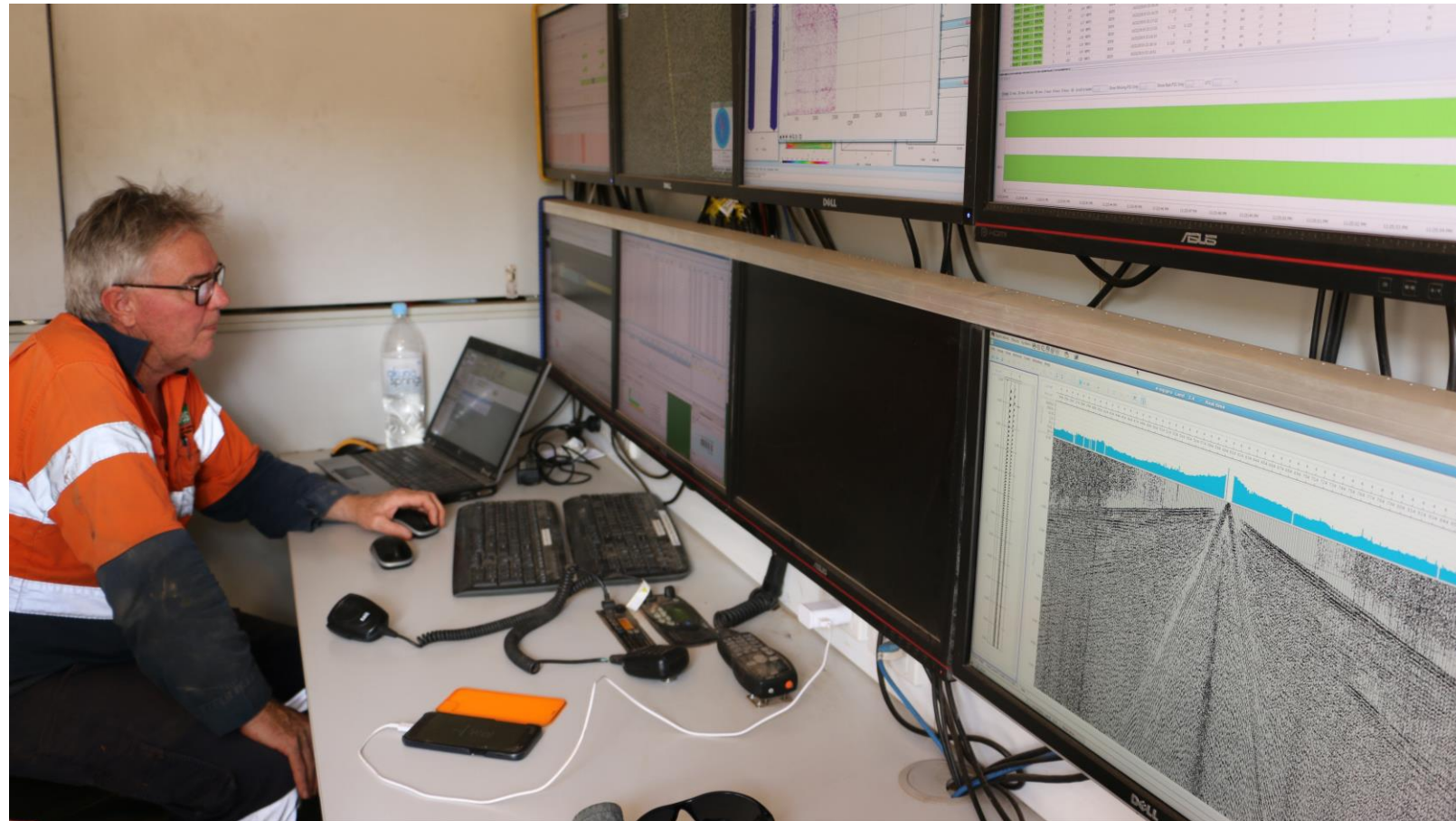


Tanumbirini-1 results are a basin opener for Empire...



...with Empire's recent seismic success pushing the known Beetaloo Basin boundaries further to the East





- New seismic processing and interpretation confirms **Empire holds a substantial Beetaloo Sub-Basin acreage** position within its 100%-owned and operated tenements
- **Large EP187 area identified containing thick continuous Velkerri and Kyalla Shales**, clearly undistributed by faulting, and adjoining Santos EP161 Tanumbrini-1 with strong recent gas flow results
- Empire's EP187 **Velkerri and Kyalla Shales** exist at **shallower depths than in adjoining blocks and with equivalent thickness**, offering reduced development costs and increasing the potential for both gas and liquid hydrocarbons
- The **Kyalla Shale** was identified at **greater depth and thickness than previously anticipated** opening up a new secondary target in EP187 overlying the **Velkerri Shale**
- Carpentaria-1 well location optimised and de-risked ahead of mid-2020 drilling

2020 drilling season Beetaloo key news flow


Tanumbirini-1
Vertical frack
Santos

Tanumbirini-1 H/2H
Fracked horizontal
Santos

Inacumba-1
Fracked horizontal
Santos

Kyalla-117
Fracked horizontal
Origin
energy

Velkerri-76
Fracked horizontal
Origin
energy

EP187
2D Seismic


Carpentaria-1
Vertical core & log


Q1

Q2

Q3

Q4

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With Kansas asset sale complete and balance sheet strengthened, Empire Energy is the Australian 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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