

ASX:EEG

Carpentaria-1 Core Results

2 February 2021



Level 19, 20 Bond Street
Sydney NSW 2000

Empire Energy Group Limited (“Empire”) is pleased to update shareholders on the results of its formation evaluation program incorporating lab analysis recently received from W. D. Von Gonten & Co (“WDVG”), and to outline the implications for resource estimates and add details for Empire’s forward work programs.

Comments from Managing Director Alex Underwood:

It was rewarding to report results of the Carpentaria-1 well in Q4 2020, particularly that we had encountered the thickest Velkerri Shale sequence in the Beetaloo Sub-basin. We also proved the existence of value-adding liquids-rich gas on the Beetaloo’s depositional flanks.

The core results recently received from WD Von Gonten & Co reinforce our view that the Velkerri Shale, and particularly its liquids-rich window within EP187, has world class potential and could replicate the transformative positive impact the shale gas industry had on the US economy and its energy position.

The lab core analysis results demonstrate that the rock characteristics of the Velkerri Shale in our EP187 tenement are comparable to, and in many cases better than, those of the premier US shale plays.

All the key technical attributes required for a potential commercial development are present as detailed in this announcement.

Netherland Sewell and Associates has commenced analysis to update its independent resource assessment using the latest results.

The principal goal of our upcoming fracture stimulation and flow testing program will be to flow hydrocarbons to surface, to measure which of the four target zones is likely to be the best producer, and the individual gas vs liquid hydrocarbon composition.

The US shale experience shows that every basin is unique, requiring developed approaches to drilling and completion design. We expect this will also be the case for the Beetaloo, particularly given its geological age. To assist we are calling in the expertise of world-leading technical and operational experts to help us build our understanding of the resource in-house. We believe that this approach will drive the Company’s operating capability and maximise the extent of future commercial success.

Our team is working hard as we prepare for the upcoming fracture stimulation and flow testing program. We look forward to updating our fellow shareholders as the updated independent resource assessments are delivered, and as we execute the appraisal program.

Core Analysis Results

WDVG has now completed a series of laboratory tests on the core samples across the Middle Velkerri Shale sequences taken from Empire's recently drilled Carpentaria-1 well.

The results (detailed further in the attached presentation) confirm that the Middle Velkerri Shale targets in Empire's EP187 have world class-rock characteristics and compare favourably to the premier US shale basins.

Porosity, hydrocarbon saturation, non-clay component and total organic carbon all compare favourably, and the thermal maturity levels estimated demonstrate strong potential for liquids-rich gas production, particularly in the shallower zones. The target formation thicknesses measured in Carpentaria-1 were large compared to the major US shale plays and comparable to the Velkerri target shale thickness in the Tanumbirini-1 well drilled by Santos in the neighbouring tenement.

The analyses focused on the Middle Velkerri A, Intra A/B, B and C shales, the zones Empire's technical team assess as having the greatest potential for commercial gas and liquids flows.

A wider array of tests was done than initially anticipated, to allow Empire's technical team to better understand the gas and liquid hydrocarbon content of the core samples and the corresponding rock properties.

Empire's technical team continues to analyse these results and incorporate them into its developing geotechnical model of the Middle Velkerri Shale within EP187.

Updated Resource Assessment

The core results are being collated with the downhole data gathered in the logging of Carpentaria-1 to feed into resource estimates for EP187.

Netherland, Sewell & Associates, Inc. ("NSAI") has been engaged to generate an updated independent prospective resource estimate for EP187 incorporating all of these results.

Empire expects to update shareholders on the results of NSAI's assessment later in Q1 2021.

2021 Work Program

The NT regulatory approval process for the hydraulic stimulation and flow testing of Carpentaria-1 across numerous target zones of the Middle Velkerri Shale is progressing well, with final approvals expected later in Q1 2021.

Empire has also started the tendering process for the program and discussions are underway with several services companies. Shareholders will be advised as preferred contractors are selected.

Detailed technical analysis using the full results of the Carpentaria-1 formation evaluation program to assess the optimal fracture stimulation and flow testing design is underway, and that program will test Empire's thesis that the Middle Velkerri Shale in EP187 can produce commercial hydrocarbons.

Empire presently anticipates commencing the fracture stimulation and flow testing program in Q2 2021. The program will be funded from existing cash at bank.

This ASX release has been authorised by the Managing Director.

For queries about this release, please contact:

Alex Underwood, Managing Director

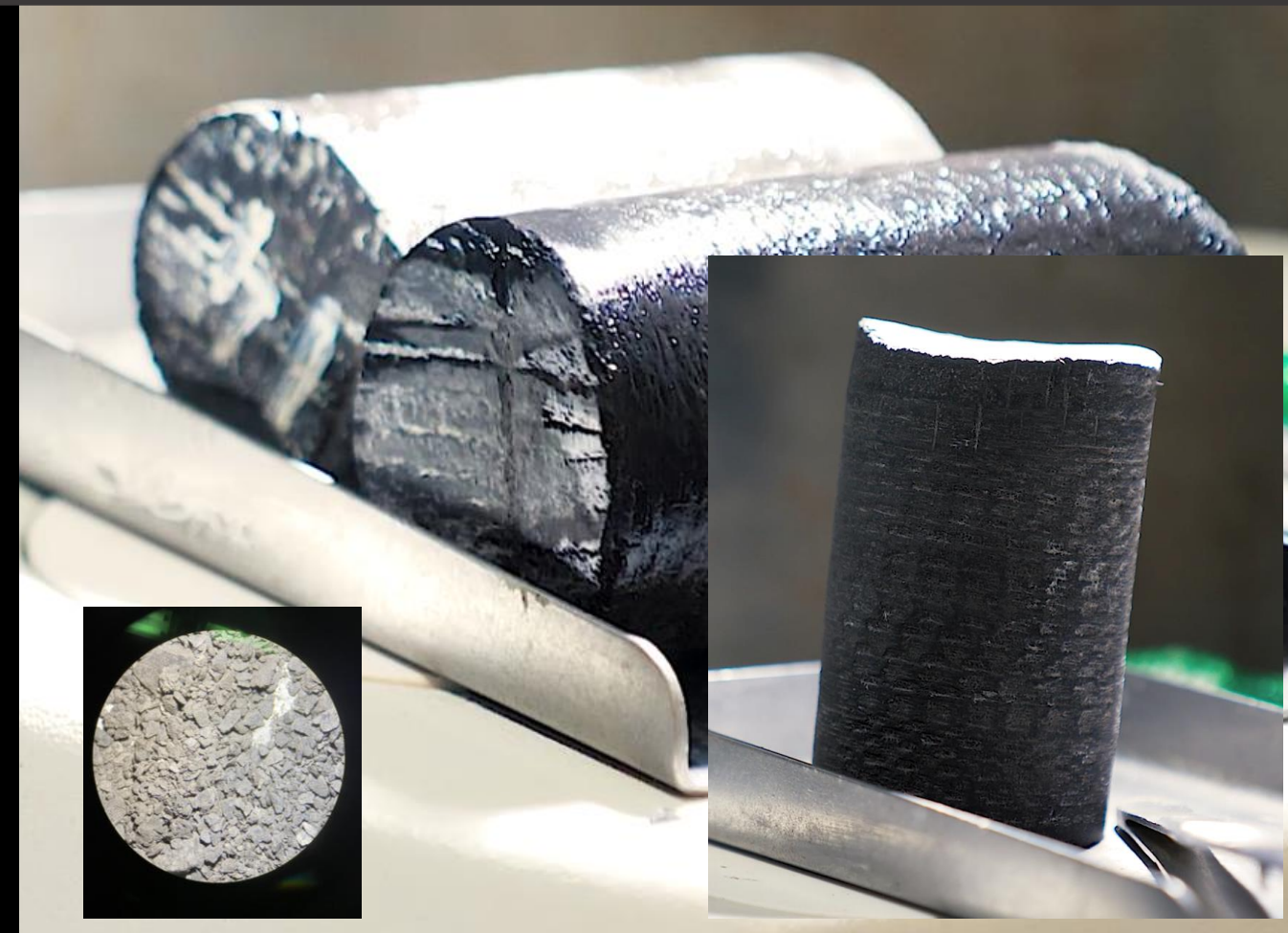
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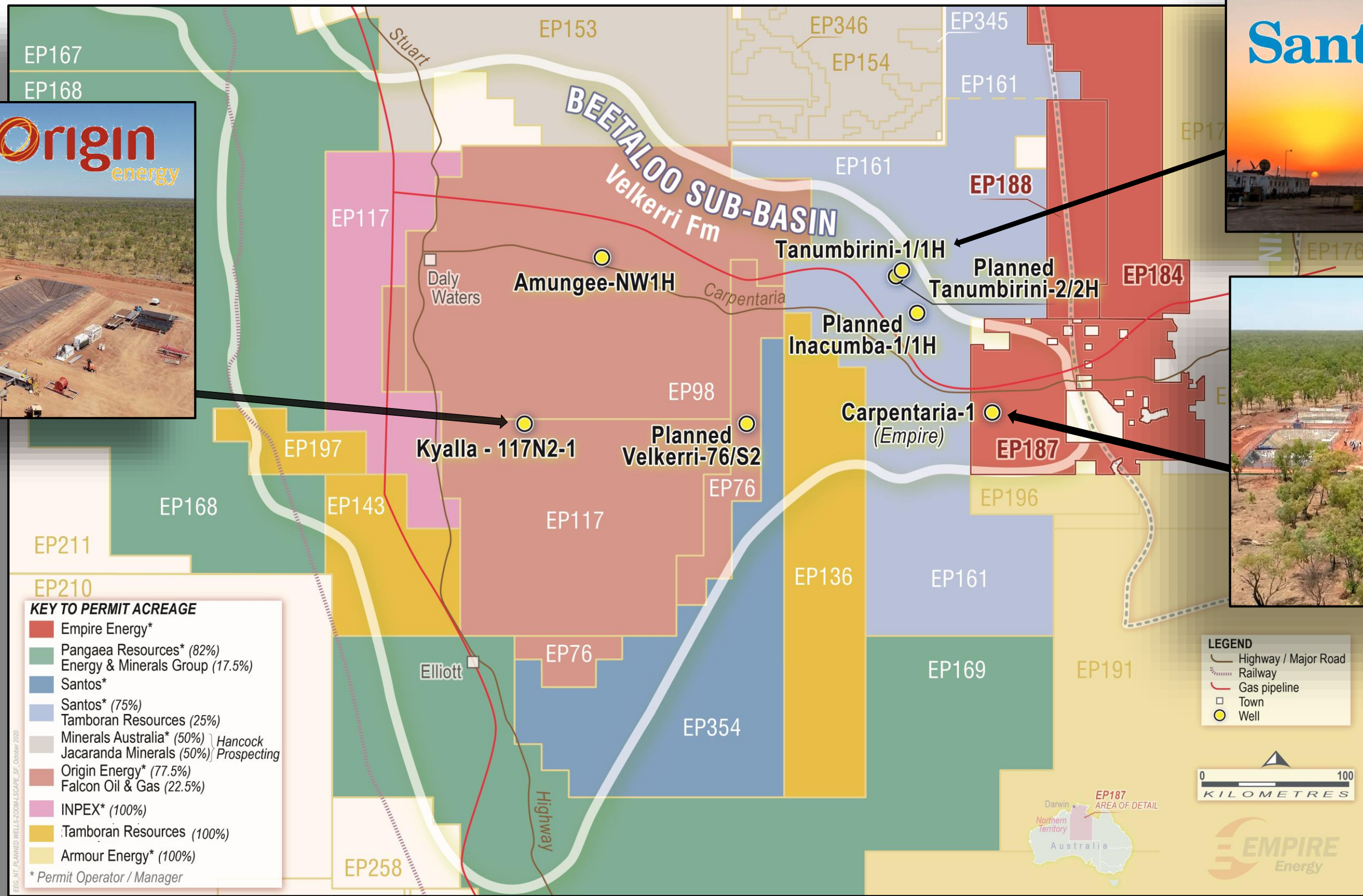
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Carpentaria-1 Core Testing Results

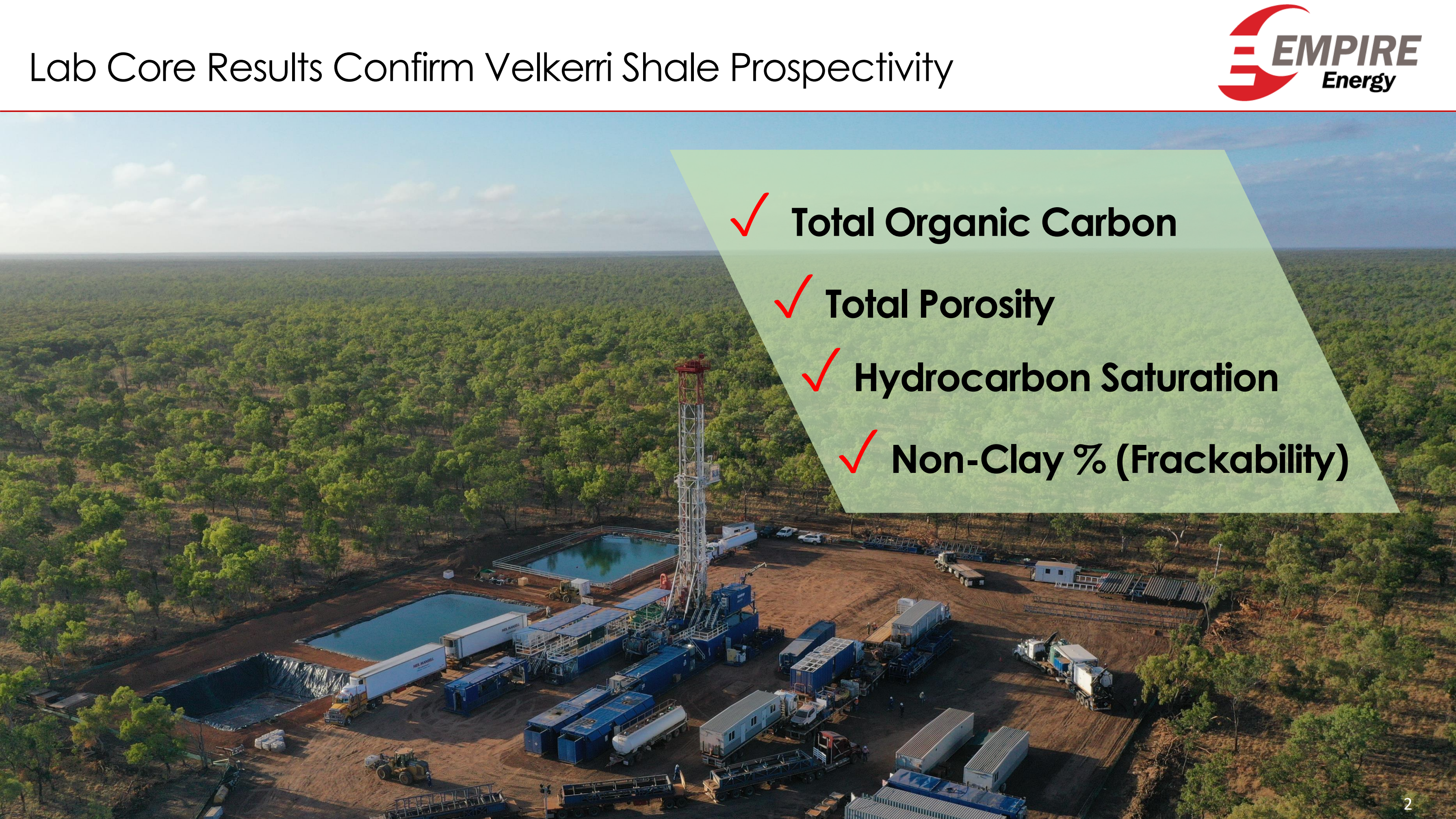


February 2021

Current Drilling Programs in the Beetaloo



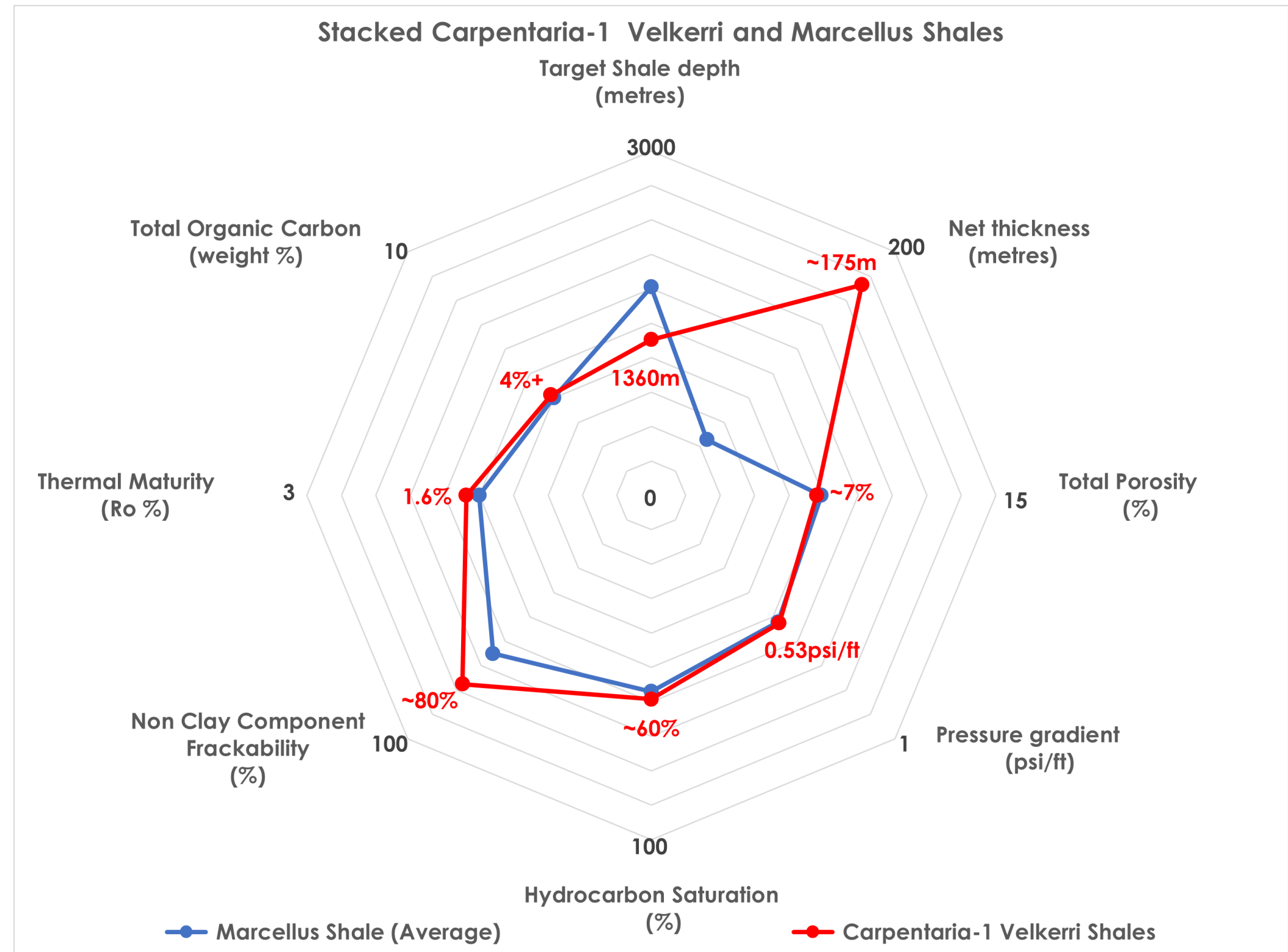
Lab Core Results Confirm Velkerri Shale Prospectivity

- 
- ✓ **Total Organic Carbon**
 - ✓ **Total Porosity**
 - ✓ **Hydrocarbon Saturation**
 - ✓ **Non-Clay % (Frackability)**

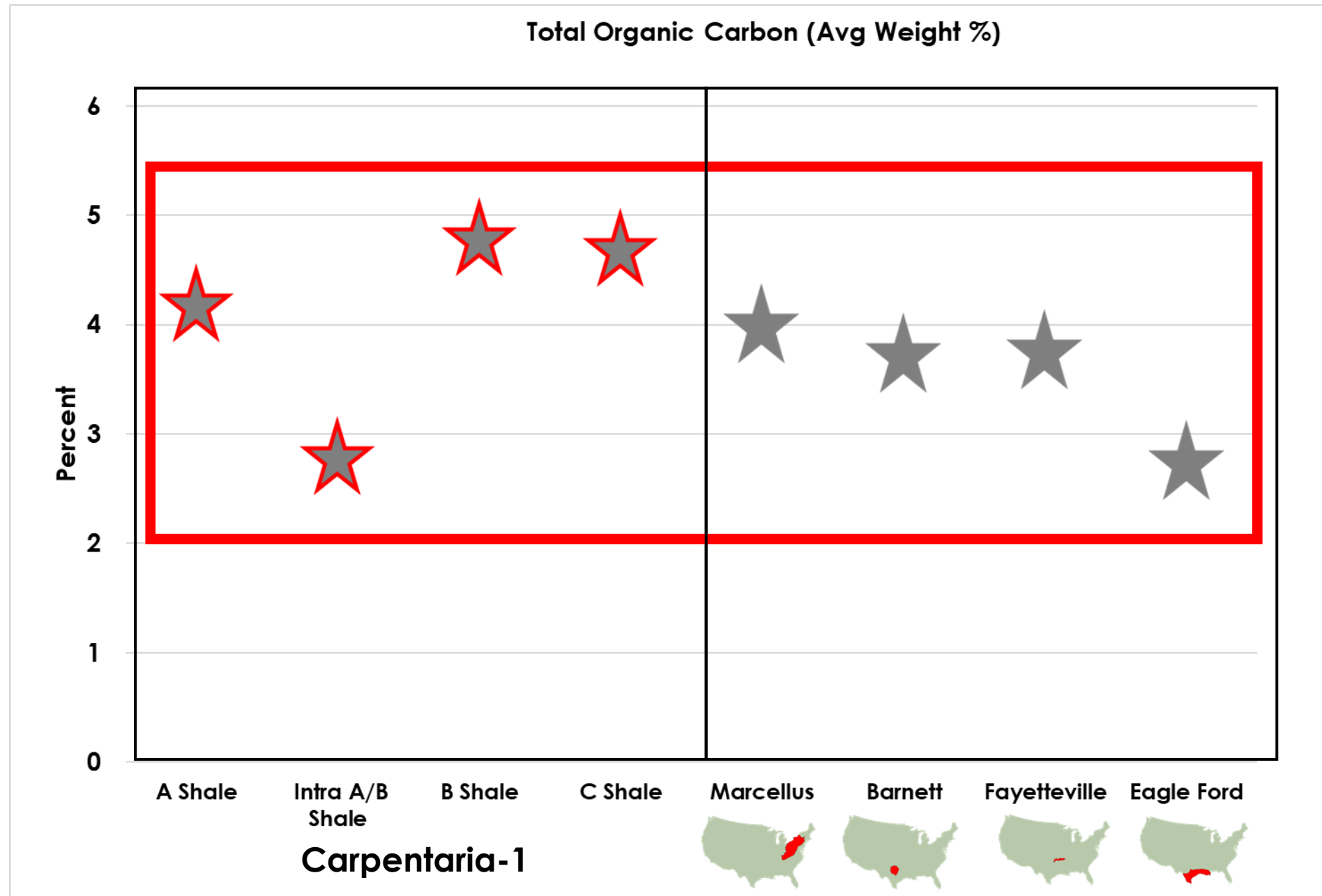
EP187 has the Key Factors to Produce Gas

Technical Comparison of Carpentaria-1 to USA's Marcellus Shale

- ✓ Velkerri Formation has four thick stacked pay zones
- ✓ Brittle formation facilitates fracture propagation
- ✓ Thermal maturity in the liquids-rich gas window
- ✓ Excellent porosity, hydrocarbon saturation and thickness drive gas in place
- ✓ Over pressured

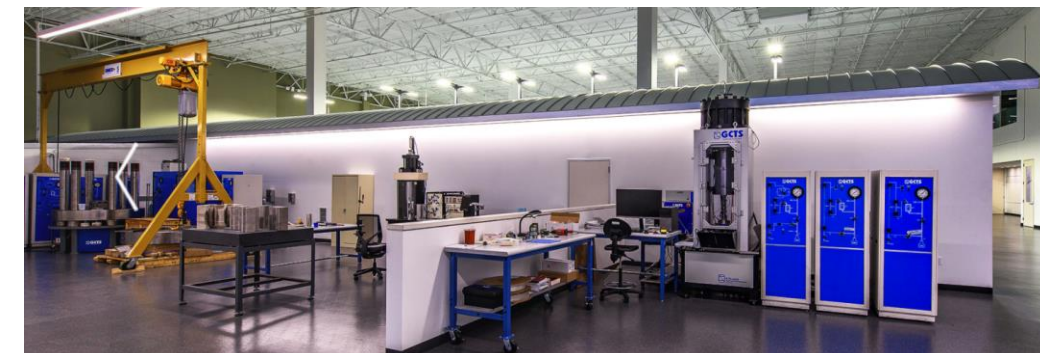


Total Organic Carbon

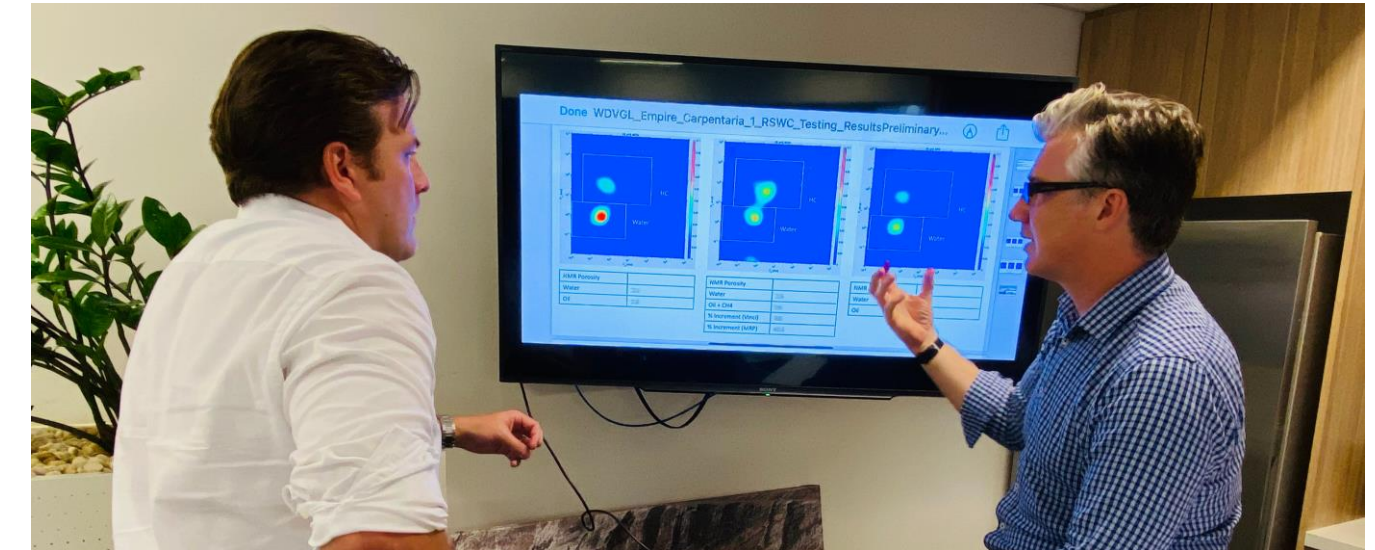
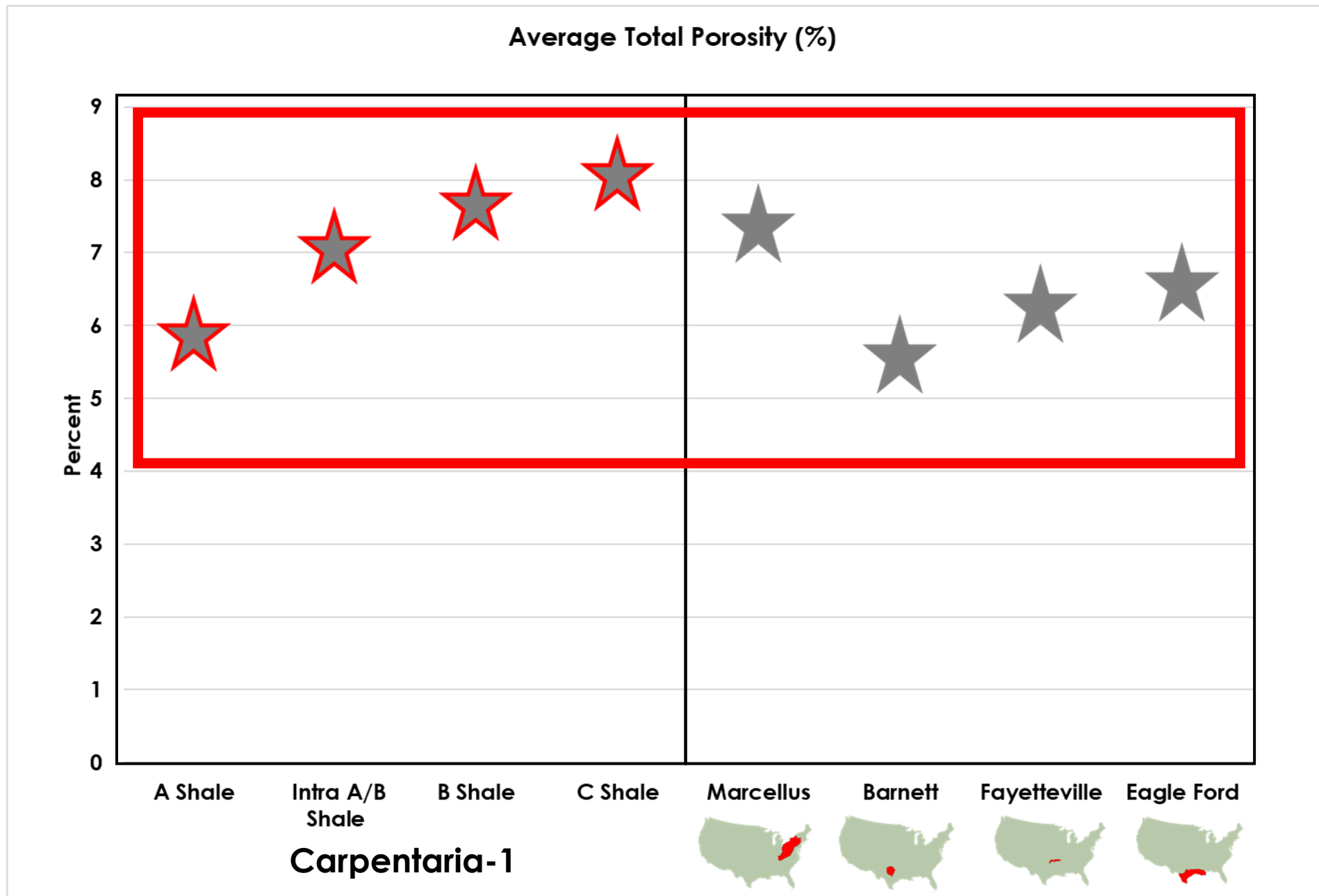


The marine total organic carbon is the source of gas and liquids generated - results compare favourably with major North American productive shales

W D Von Gonten Laboratories, LLC



Total Porosity



Porosity is the space between rock grains that can hold hydrocarbons – good porosity figures like these mean more space to hold gas and liquids and aid flow rates

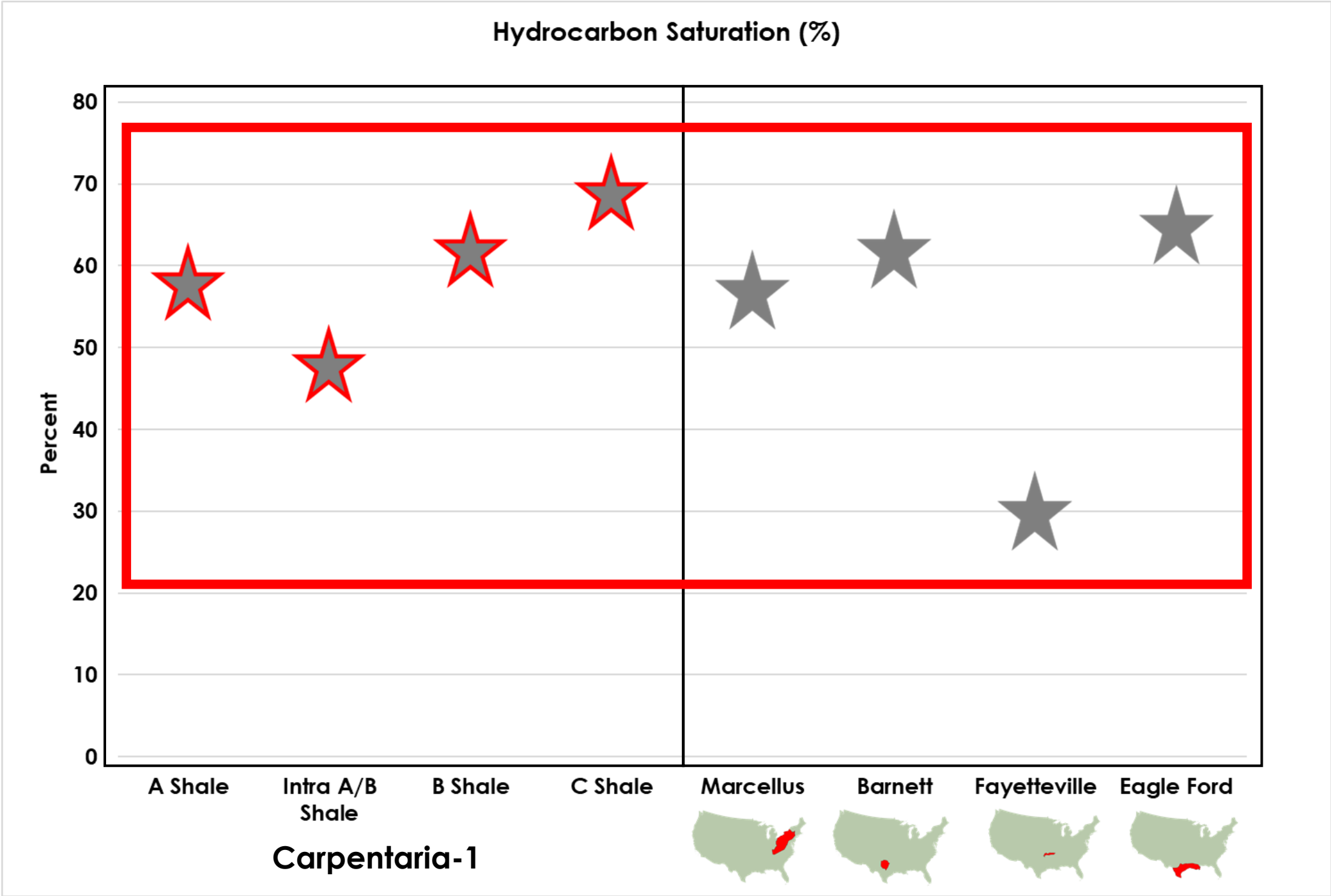
Non-Clay Component (Frackability)



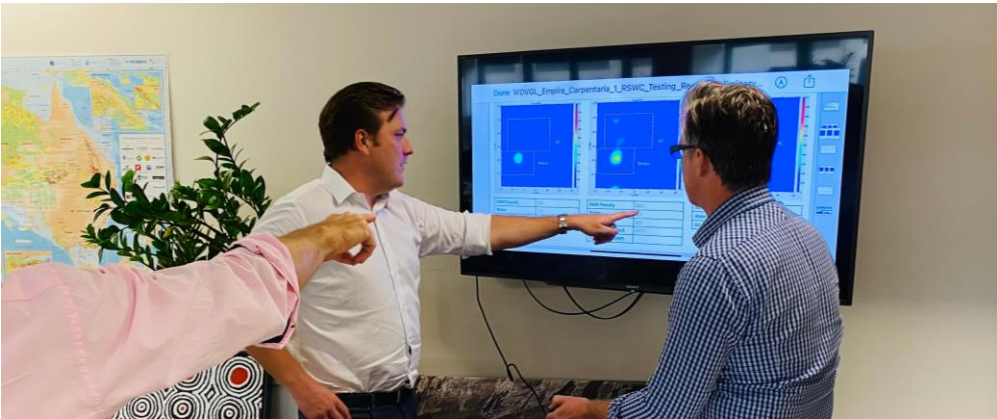
Empire’s EP187 Middle Velkerri Formation shales have low clay content - this makes the rock ‘brittle’ and better for hydraulic fracturing

Jarvie DM, 2012. Shale Resource Systems for Oil and Gas: Part 1—Shale-gas Resource Systems: in Breyer JA (editor). 'Shale Reservoirs: Giant Resources for the 21st Century'. AAPG Memoir 97, 69–87.
Smye, K. M., H. S. Hamlin, R. Eastwood, and G. McDaid, 2019, Variability of geologic properties in shale gas and tight oil plays: GeoGulf Transactions, v. 69, p. 627–628.
Marcellus Center For Outreach and Research, EIA, Company Reports

Hydrocarbon Saturation

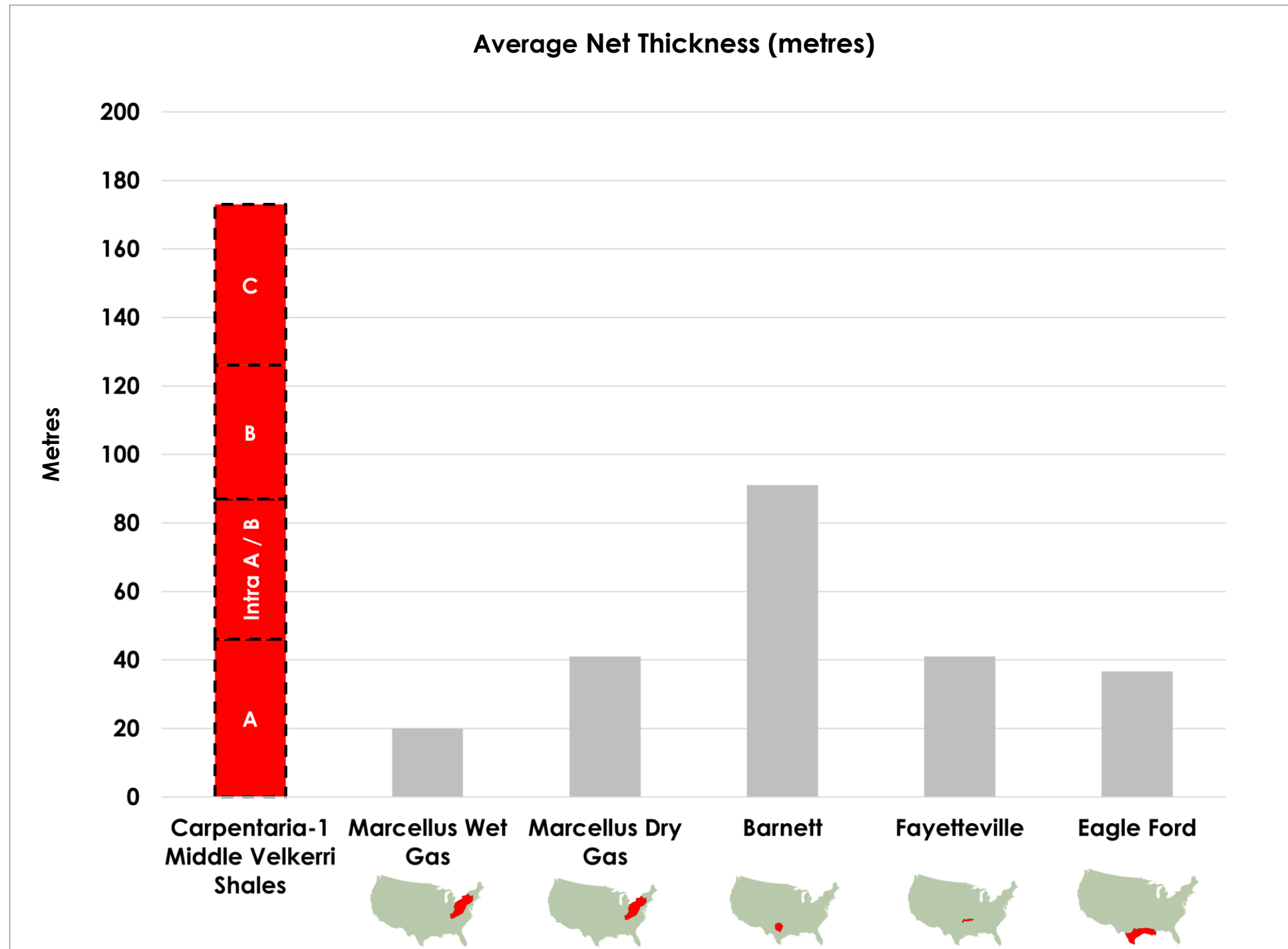


Hydrocarbon saturation measures the amount of pore space containing hydrocarbons – good saturation figures like this enhance economics



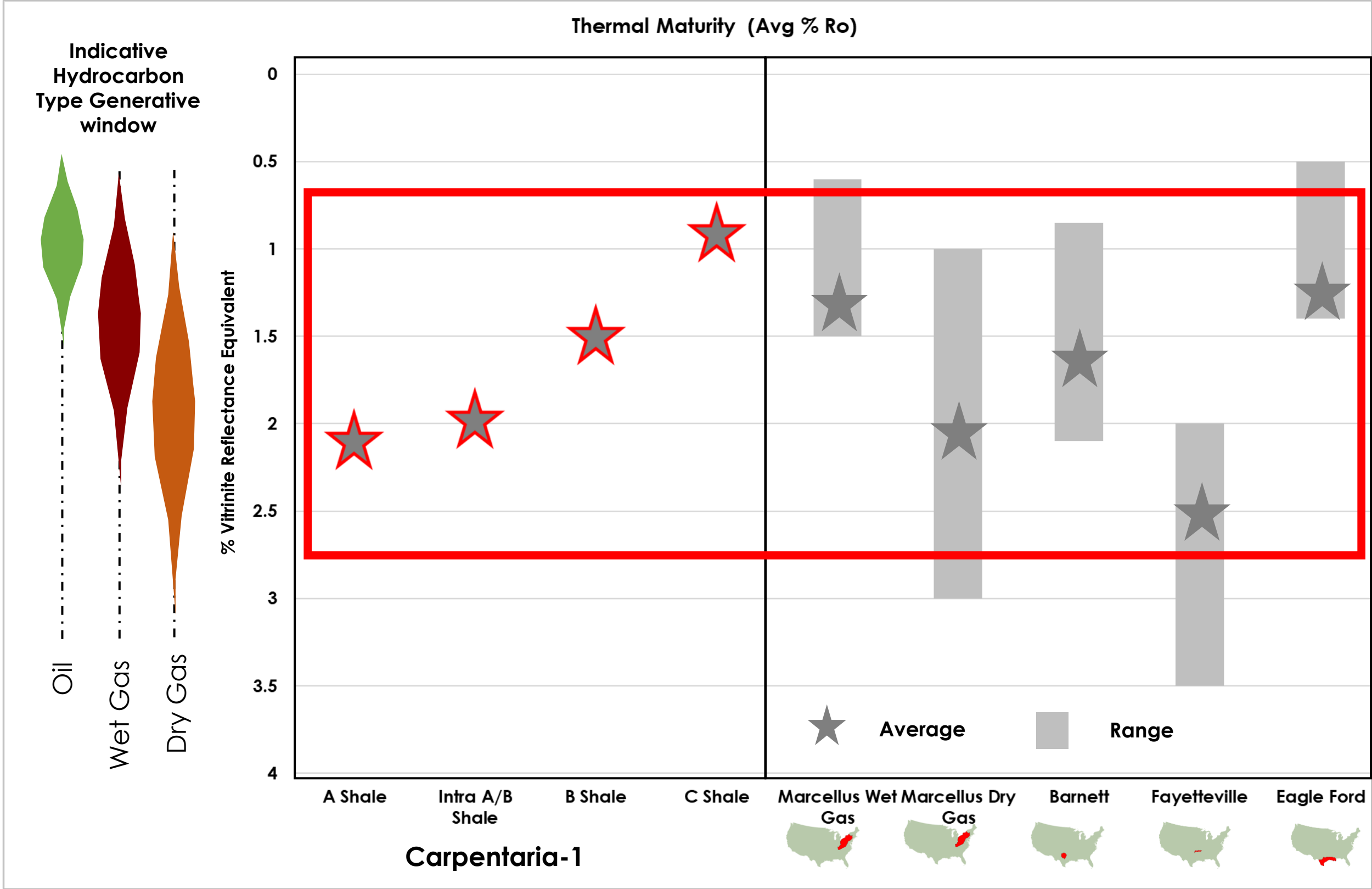
Jarvie DM, 2012. Shale Resource Systems for Oil and Gas: Part 1—Shale-gas Resource Systems; in Breyer JA (editor). 'Shale Reservoirs: Giant Resources for the 21st Century'. AAPG Memoir 97, 69–87
Close DJ, Baruch ET, Altmann CM, Cote AJ, Faiz M Mohinudeen FM, Richards B and Stonier S, 2016. Unconventional gas potential in Proterozoic source rocks: Exploring the Beetaloo Sub-basin; in 'Annual Geoscience Exploration Seminar (AGES) Proceedings, Alice Springs, Northern Territory 15–16 March 2016'. Northern Territory Geological Survey, Darwin. 91-94.

Velkerri Shale Targets are Thick and 'Stacked'



Empire's Velkerri offers thick 'stacked pay' zones – thicker shales contain greater gas volumes

Thermal Maturity

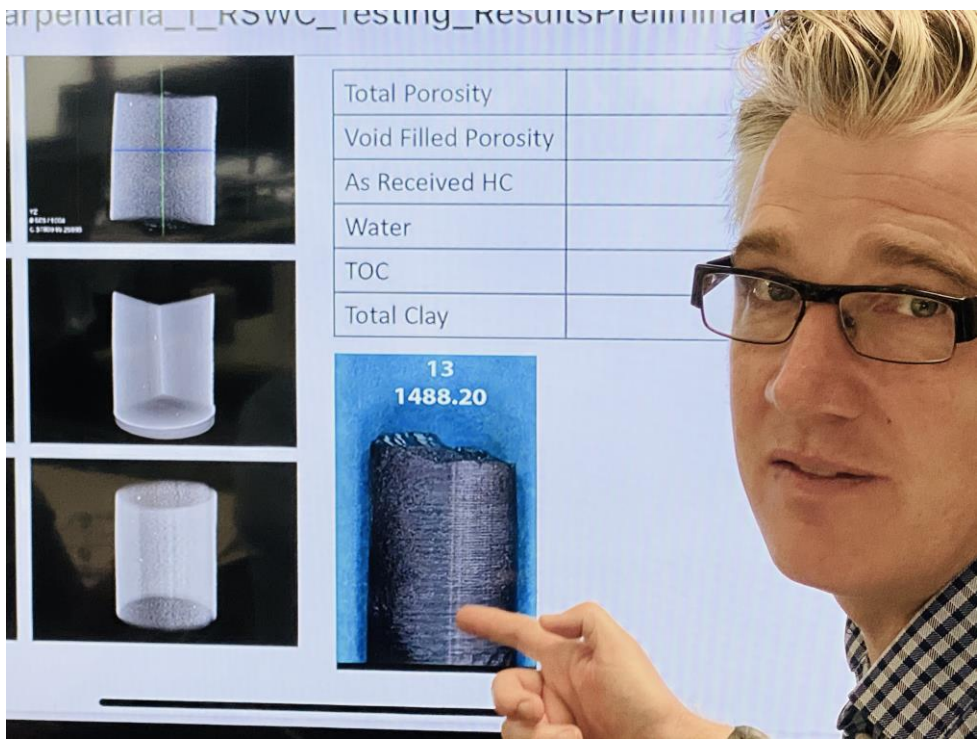
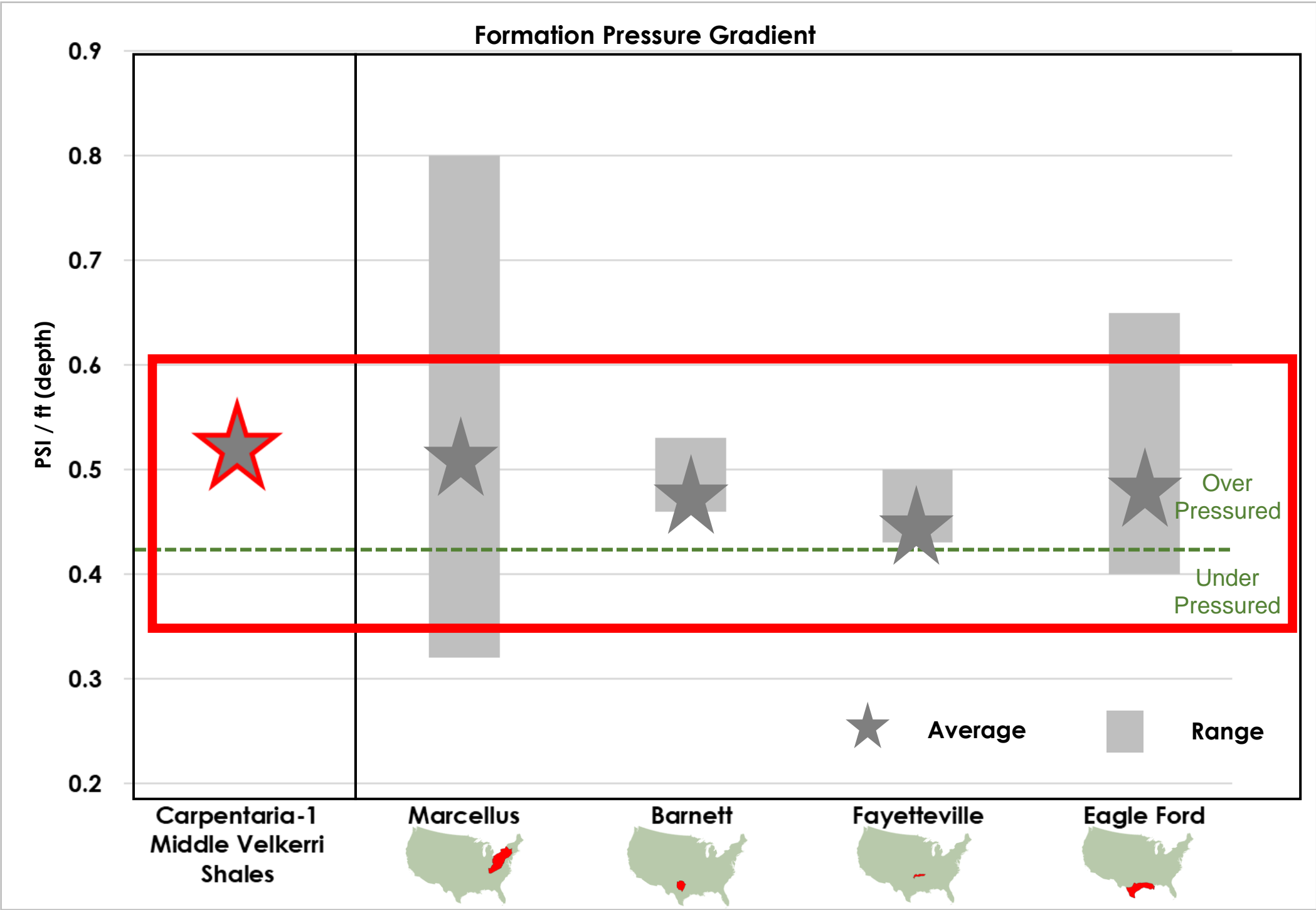


Carpentaria-1 has proven the existence of a liquids-rich gas window in the Velkerri Formation middle shales

Different thermal maturities across Empire's targets give us numerous development options

Jarvie DM, 2012. Shale Resource Systems for Oil and Gas: Part 1—Shale-gas Resource Systems: in Breyer JA (editor). 'Shale Reservoirs: Giant Resources for the 21st Century'. AAPG Memoir 97, 69–87.
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Marcellus Center For Outreach and Research, EIA, Company Reports

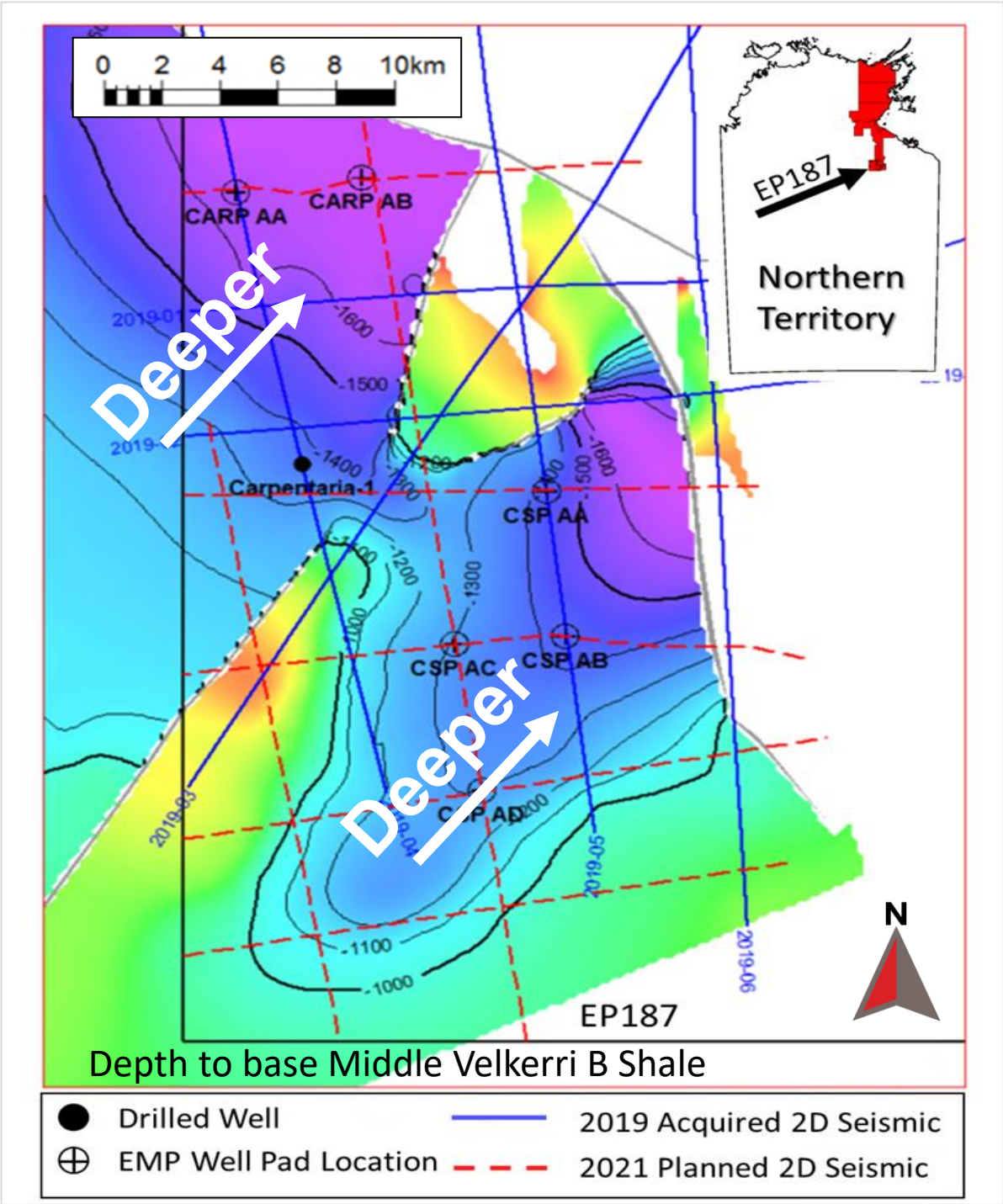
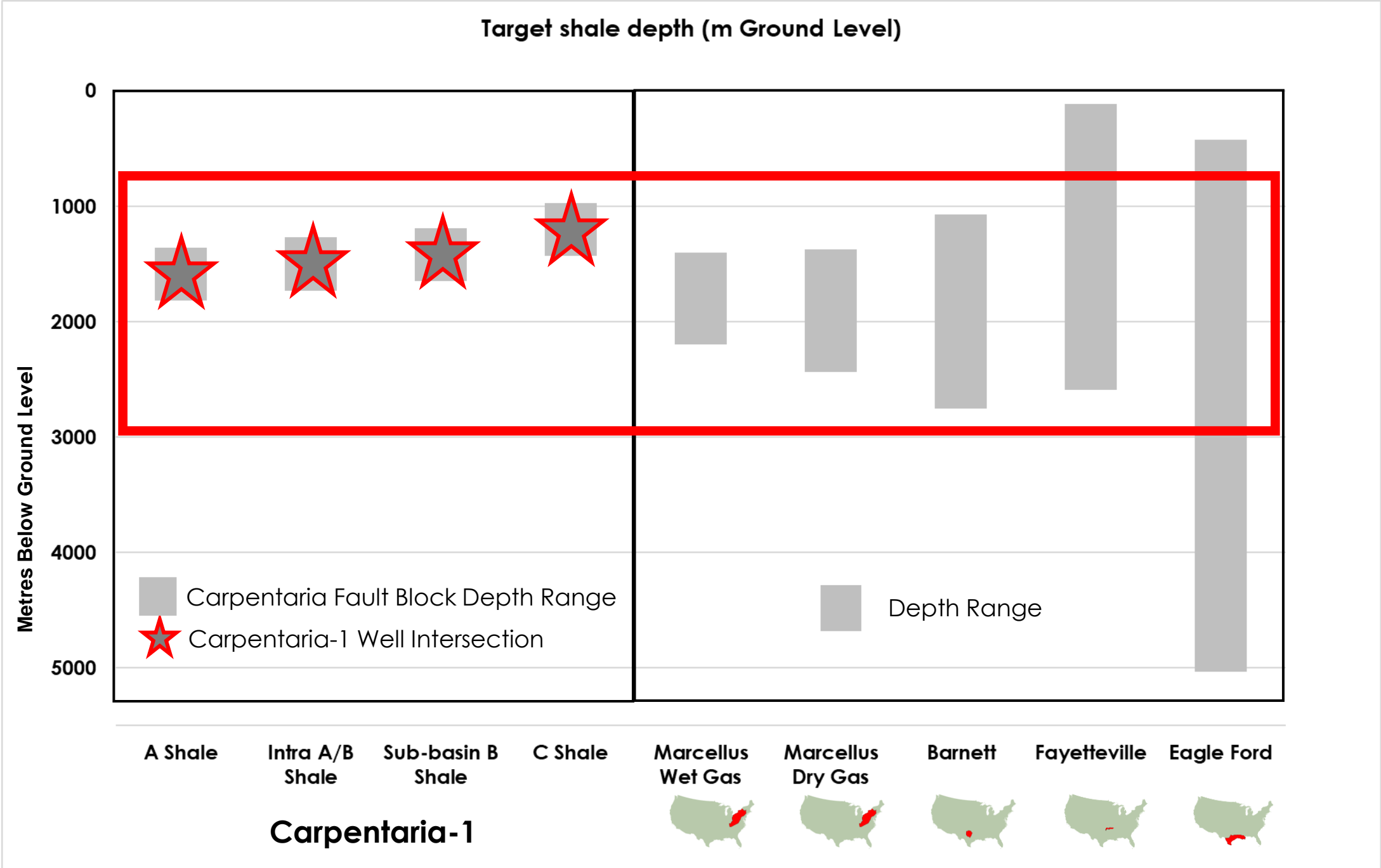
Formation Pressure Gradient



Velkerri Shale is over pressured as a result of hydrocarbon generation which drives flow rates

Jarvie DM, 2012. Shale Resource Systems for Oil and Gas: Part 1—Shale-gas Resource Systems: in Breyer JA (editor). 'Shale Reservoirs: Giant Resources for the 21st Century'. AAPG Memoir 97, 69–87.
Marcellus Center For Outreach and Research, EIA, Company Reports, AAPG Wiki

Depth to Shale

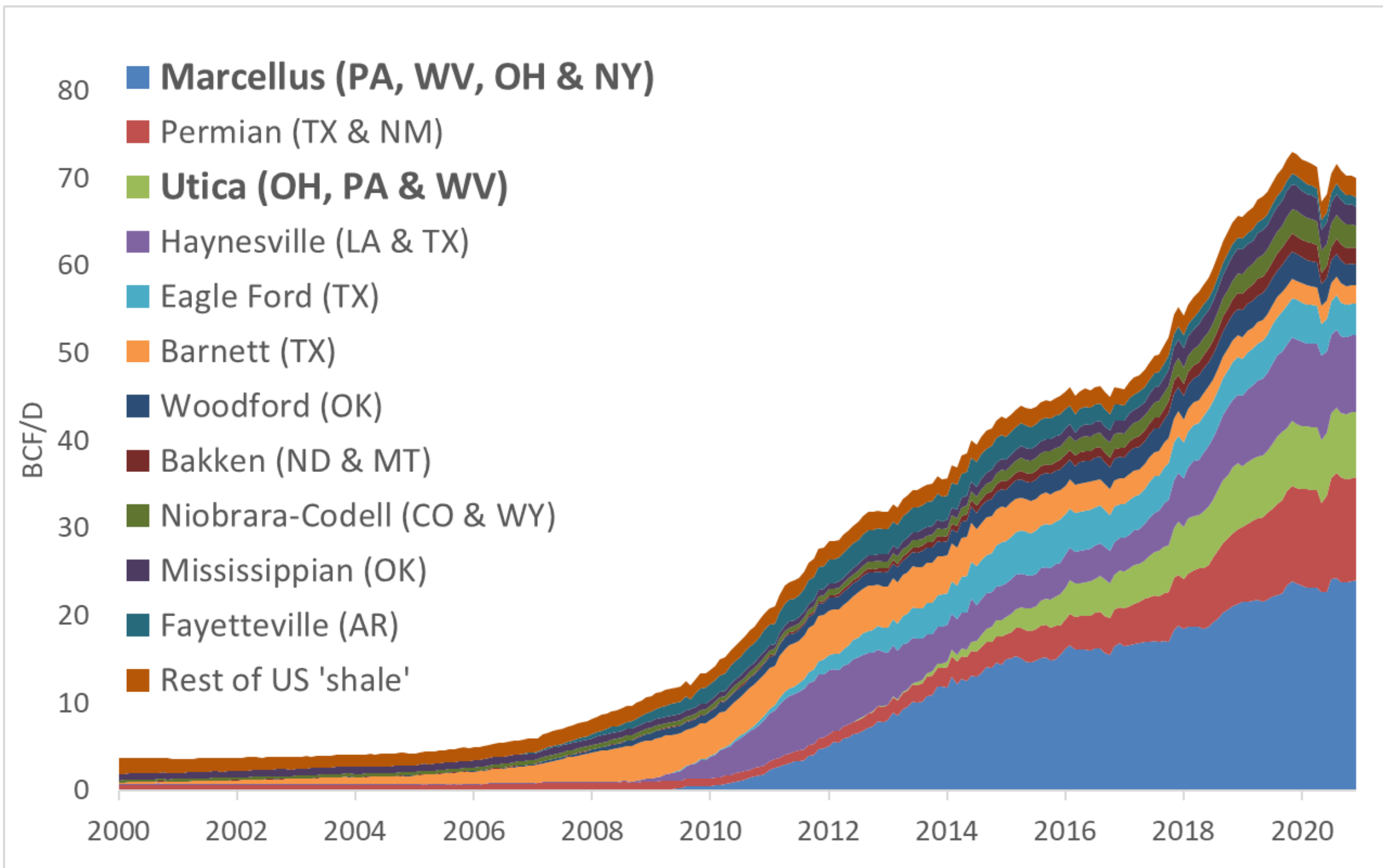


Velkerri is liquids-rich and offers reduced drilling costs

Carpentaria-1 drilled shallow in the block offering a range of future depth windows

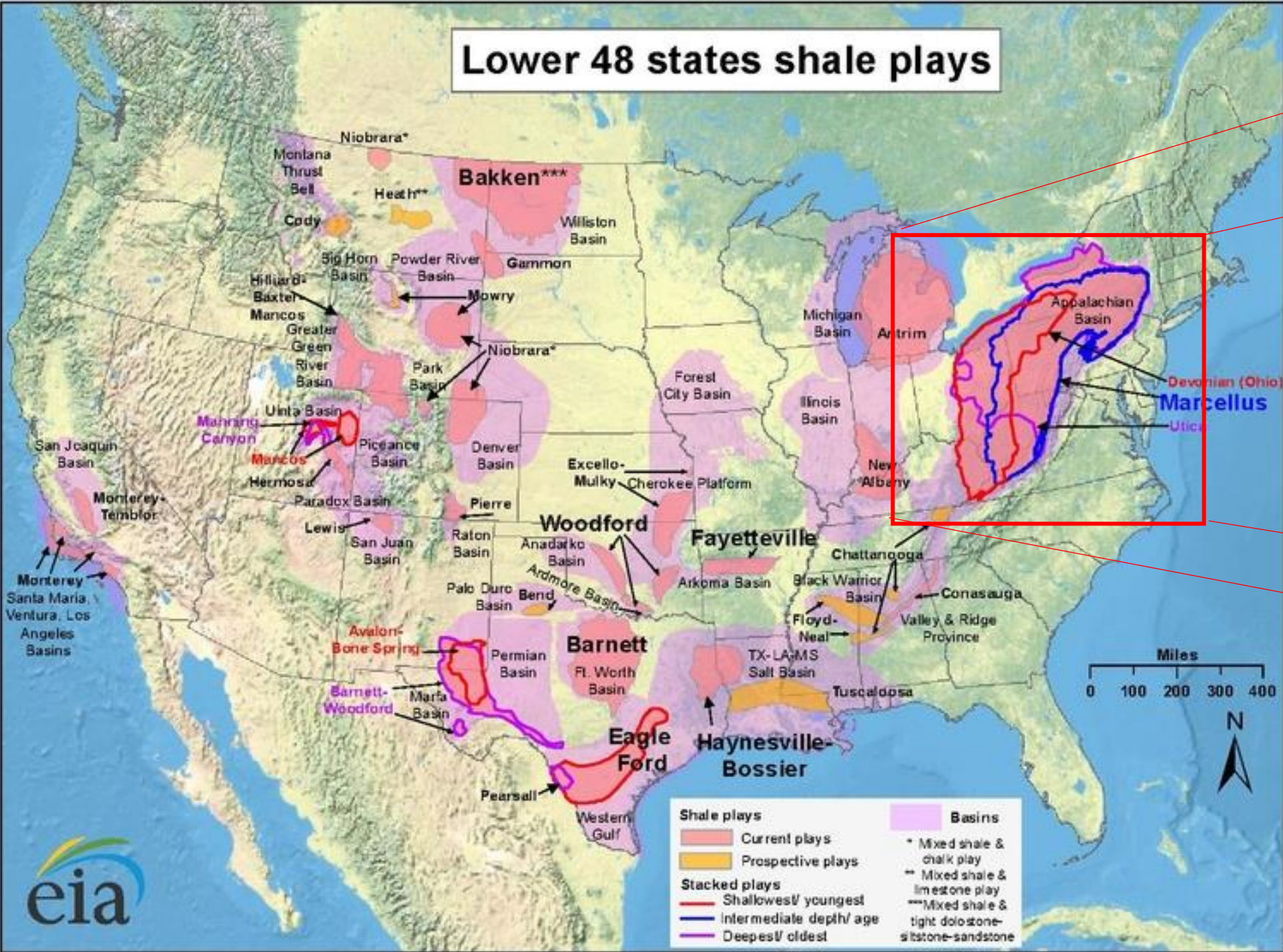
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Marcellus Center For Outreach and Research, EIA, Company Reports, nrcan.gc.ca

The USA's Marcellus Shale in Context



Q4 2020 the Marcellus accounted for 34% of all US dry gas production

Why We Compare With the Marcellus Shale

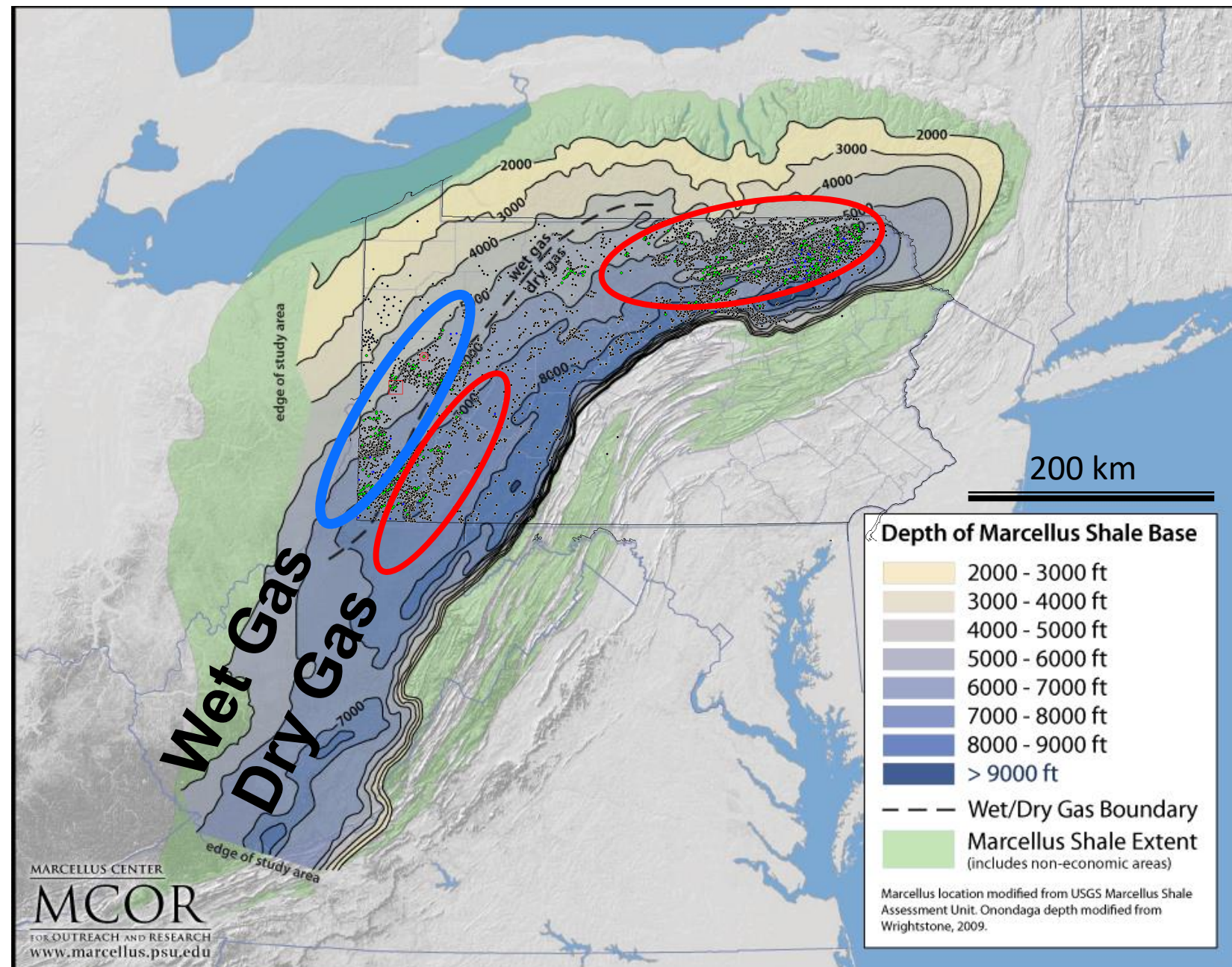


Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

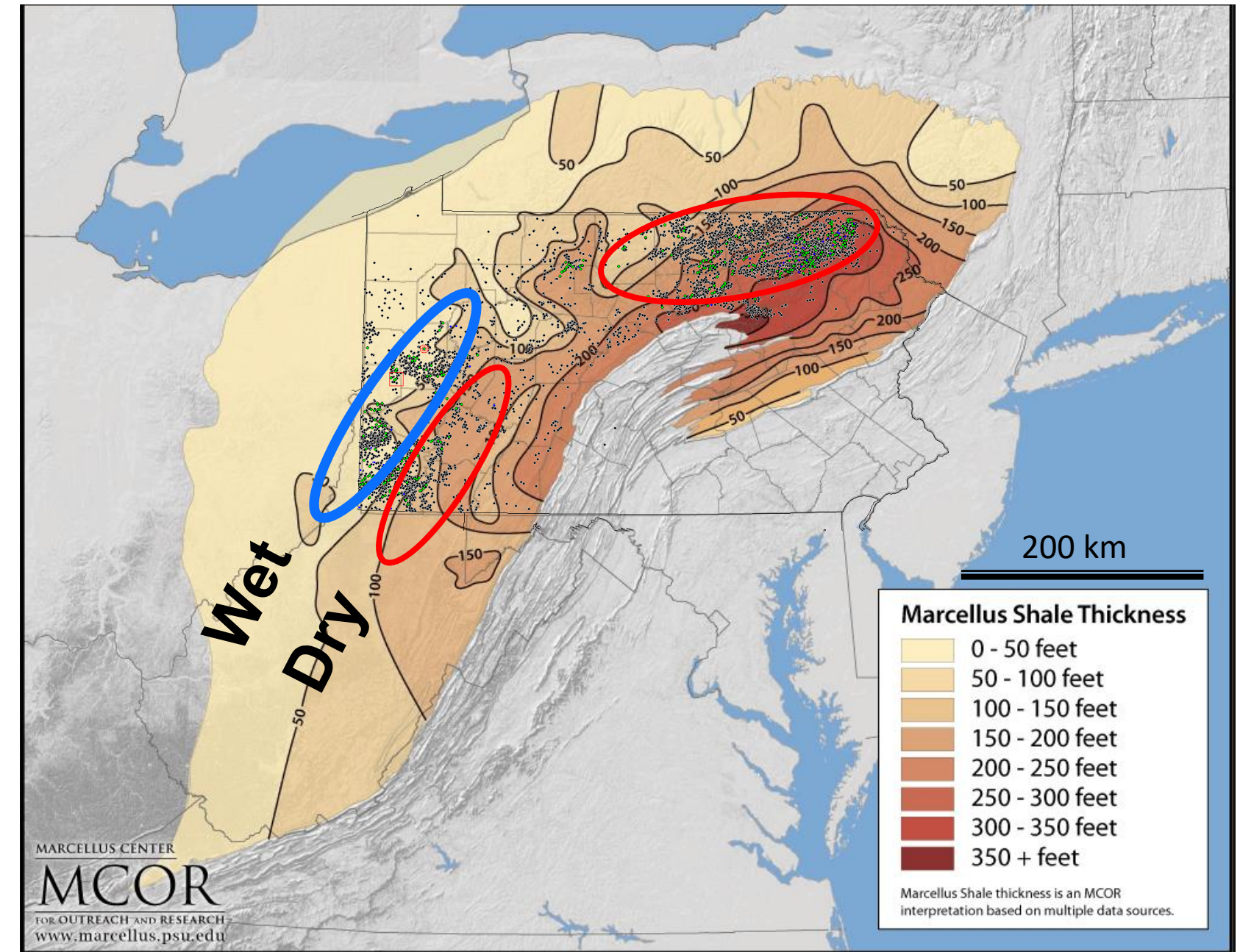


Marcellus Shale with Empire Acreage size comparison

The Marcellus has Dry and Wet Gas Play Corridors like the Beetaloo

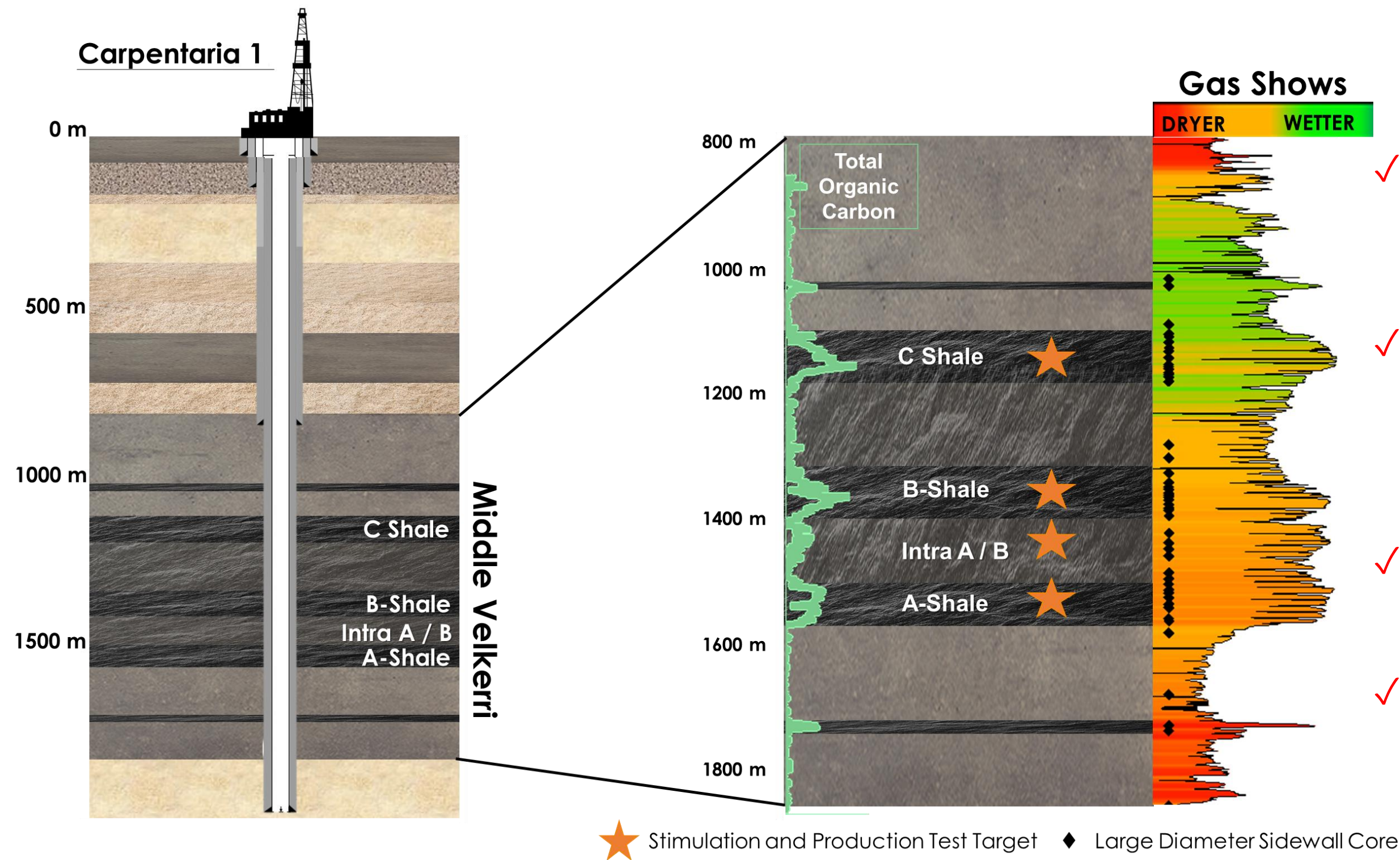


Marcellus Wet Gas wells are at comparable depth to Empire's EP187 middle Velkerri Shale target



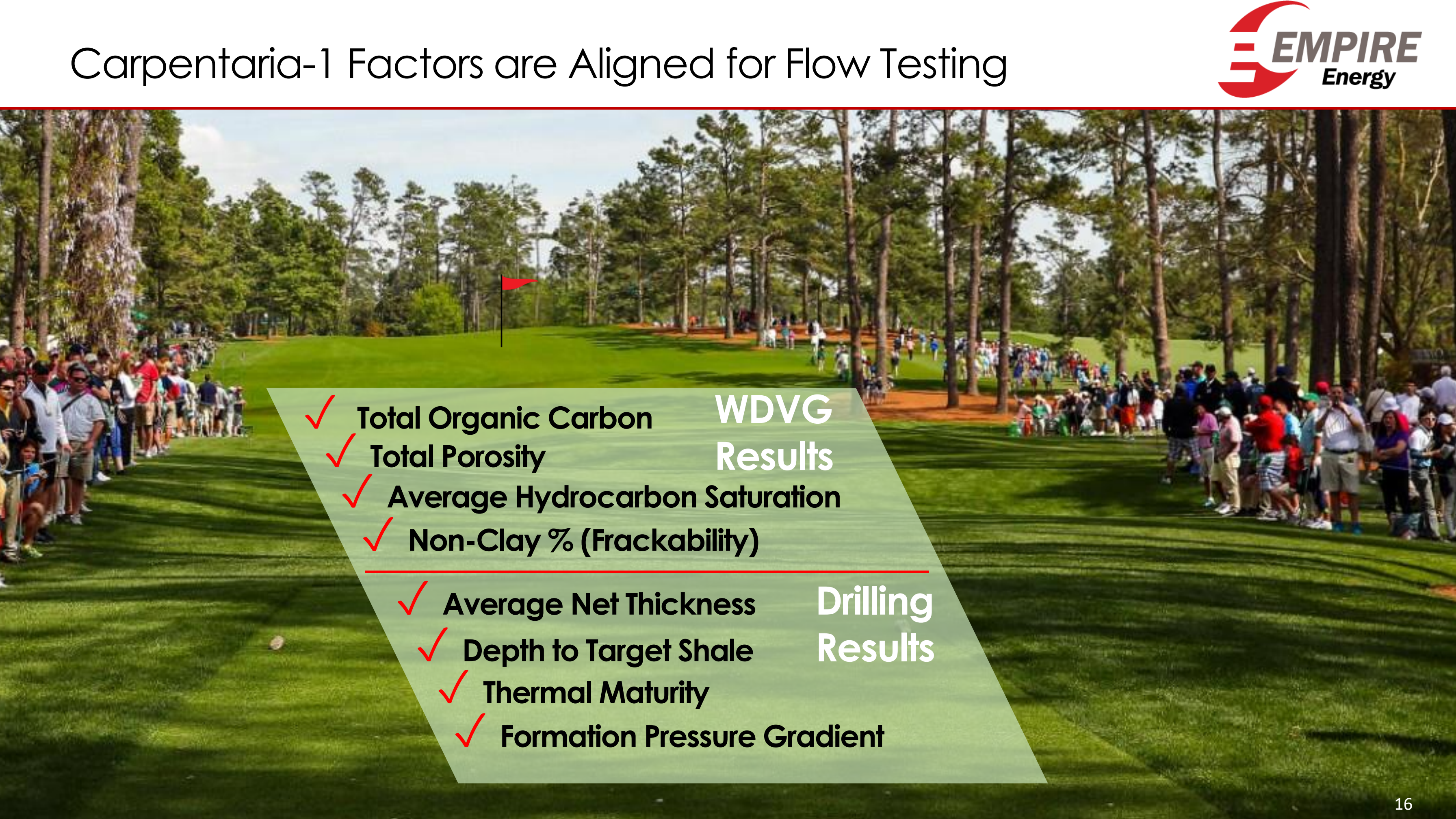
Drilling activity proliferates where the Marcellus Shale thickens

Empire Forward Program



- ✓ Prospective Resource re-estimation will factor in fresh understanding including liquids
- ✓ Empire is on track for vertical fracture stimulation and production test of Carpentaria-1 in Q2 2021
- ✓ Carpentaria-1 frack and flow test fully funded
- ✓ Commercialisation planning underway

Carpentaria-1 Factors are Aligned for Flow Testing

- 
- ✓ Total Organic Carbon
 - ✓ Total Porosity
 - ✓ Average Hydrocarbon Saturation
 - ✓ Non-Clay % (Frackability)

**WDVG
Results**

- ✓ Average Net Thickness
- ✓ Depth to Target Shale
- ✓ Thermal Maturity
- ✓ Formation Pressure Gradient

**Drilling
Results**



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