



22 August, 2014

Companies Announcements Office  
Australian Securities Exchange Limited  
10<sup>th</sup> Floor, 20 Bridge Street  
SYDNEY NSW 2000

Dear Sir/Madam

**Company Presentation**  
SEAAOC Conference, Darwin

MEC Resources Ltd (ASX: MMR) is pleased to provide a copy of the presentation at the SEAAOC Conference.

A copy of the presentation is attached.

Yours faithfully,

A handwritten signature in black ink that reads "D. Breeze".

David Breeze  
Executive Director  
MEC Resources Ltd  
PO Box 317  
North Perth WA 6906  
Tel: +61 8 9328 8477

**About MEC Resources**

ASX listed MEC Resources (ASX: MMR) invests into exploration companies targeting potentially large energy and mineral resources. The Company has been registered by the Australian Federal Government as a Pooled Development Fund enabling most MEC shareholders to receive tax free capital gains on their shares and tax free dividends.

**About Advent Energy**

Advent Energy Ltd is an unlisted oil and gas exploration company held by major shareholders MEC Resources (ASX: MMR), BPH Energy (ASX: BPH), Grandbridge (ASX: GBA) and Talbot Group Investments. Advent holds a strong portfolio of near term development and exploration assets spanning highly prospective acreage onshore and offshore Australia in proven petroleum basins. Advent Energy's asset base also incorporates both conventional and unconventional petroleum targets.

*Notes: In accordance with ASX listing requirements, the geological information supplied in this report has been based on information provided by geologists who have had in excess of five years experience in their field of activity.*

*MEC is an exploration investment company and relies on the resource and ore reserve statements compiled by the companies in which it invests. All Mineral Resource and Reserve Statements have been previously published by the companies concerned. Summary data has been used. Unless otherwise stated all resource and reserve reporting complies with the relevant standards. Unless specified, resources quoted in this report equal 100% of the resource and may not represent MEC's investees' equity share.*

**MEC Resources Ltd**

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ADVENT ENERGY LIMITED

# SEAAOC- BONAPARTE BASIN

August, 2014

*Strictly private & confidential*





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# If Chevron 1000 ft is winning the lottery what is 5000 ft in Advents Bonaparte basin shale plays?!

## Shale Rock Samples



Source: "The Energy Lab"  
A comparative Study of the Mississippian  
Barnet Shale, Fort Worth Basin, Devonian  
Marcellus Shale, Appalachian Basin

Source: "The Utica-  
Point Pleasant  
Shale Play of Ohio"  
Point Pleasant  
Actual Core



ADVENT ENERGY  
Actual Core Rock Samples from  
Bonaparte and Vienta



(above) Basal contact  
at 7499.4 feet of  
calcareous black  
shale with the  
underlying limestone  
and gray calcareous  
shale of the  
Onondaga Limestone;  
(bottom) close up of  
organic-rich shale,  
MERC-1, Monongalia  
County, West Virginia



Argentina wins shale lottery  
Monday, 26 May 2014

**ARGENTINA has won the shale "lottery" with a 1000-foot-thick Vaca Muerta formation, according to Chevron.**

While commercial layers of shale formations may just be slithers of a broader sandwich of unproductive rock, Chevron spokesman Kent Robertson told Reuters that Argentina "kind of won the geological lottery" with its uniquely thick Vaca Muerta find.

**"Vaca Muerta is like one big cake, 1000 feet [305 metres] thick in places, which means one well can be much more productive," Robertson reportedly said.**

The region is tipped to host other advantages. "One of the unique things about Vaca Muerta from an international perspective is that it is in an area where you've already got oil industry activity," Robertson told the newswire.

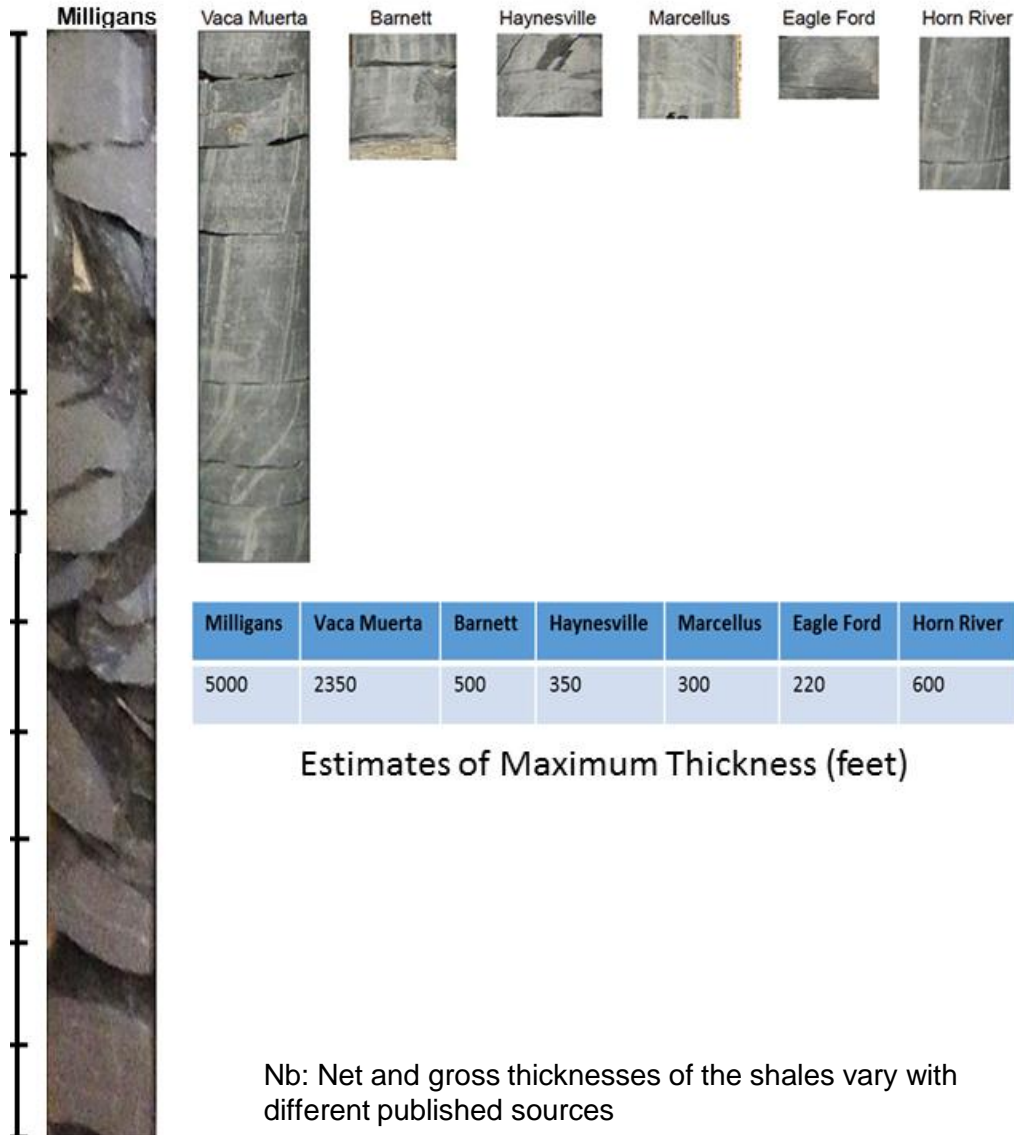
"There is already an established oil industry in the region where the shale is. You've got service companies, you've got pipelines and infrastructure. "You've got existing assets that do not need to be recreated. Plus, you've also got a head start in that you have knowledge of the rocks." Chevron last month agreed to invest \$US1.6 billion (\$A1.73 billion) in Argentinian shale development, including to drill 170 wells in the Vaca Muerta with joint venture partner YPF.





# Further Information on Advent Energy's Bonaparte Basin Unconventional Assets:

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- The depositional environment in Australia is predominantly terrestrial vs. marine in North America. The predominant source rocks are coal and lacustrine shales as opposed to marine shales in North America. ***Advent Energy's Milligans Formation (primary shale resource target) is shallow marine depositional source material.***
- The estimated shale resource potential in Australia appears massive with proximity to robust Asia-Pacific LNG markets. Activity in Australian unconventional plays will build momentum. (Circa 1400 TCF)





# ADVENT Gas Projects

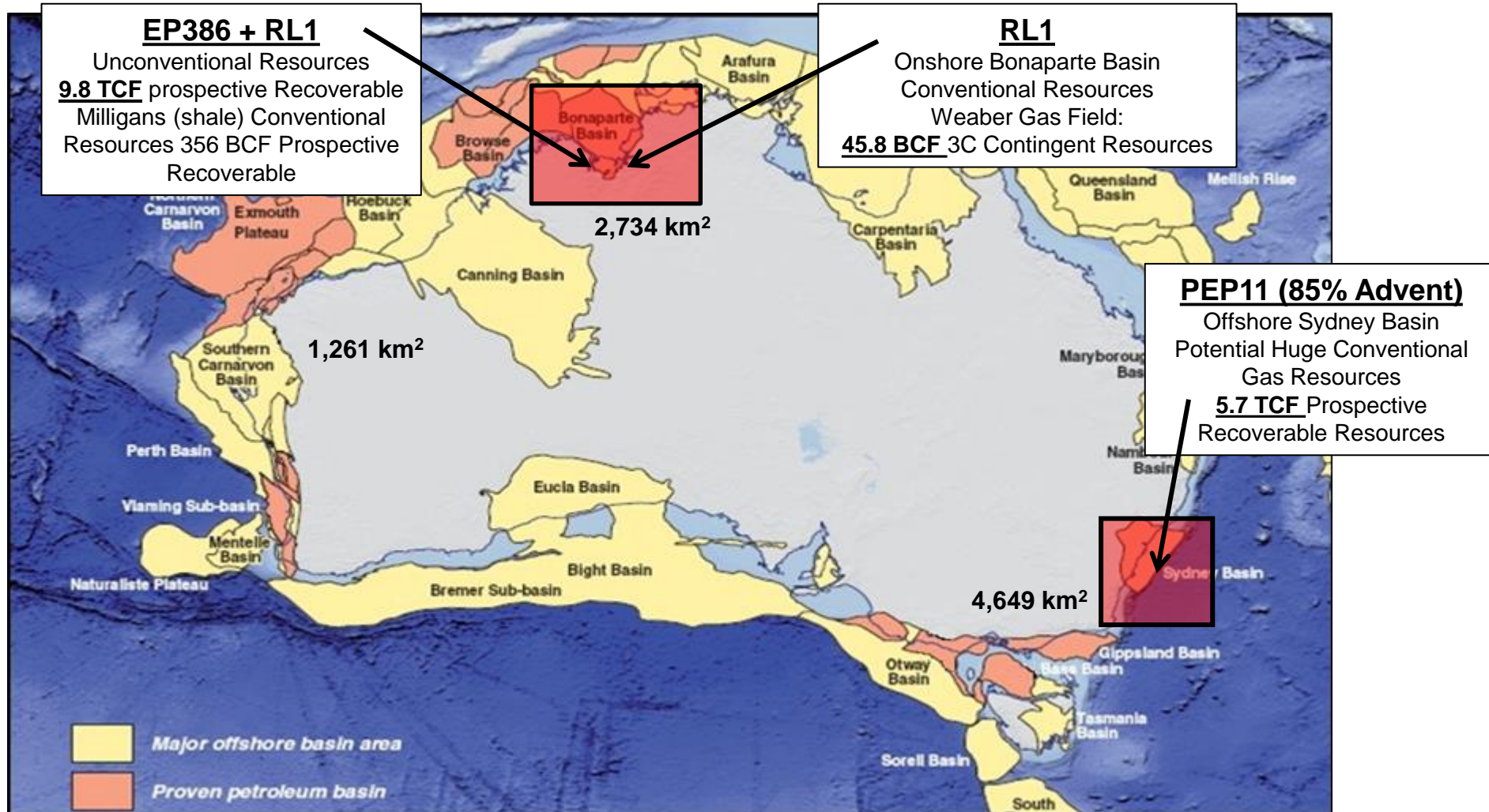


Figure 3.7: Map of gas resources in Australia



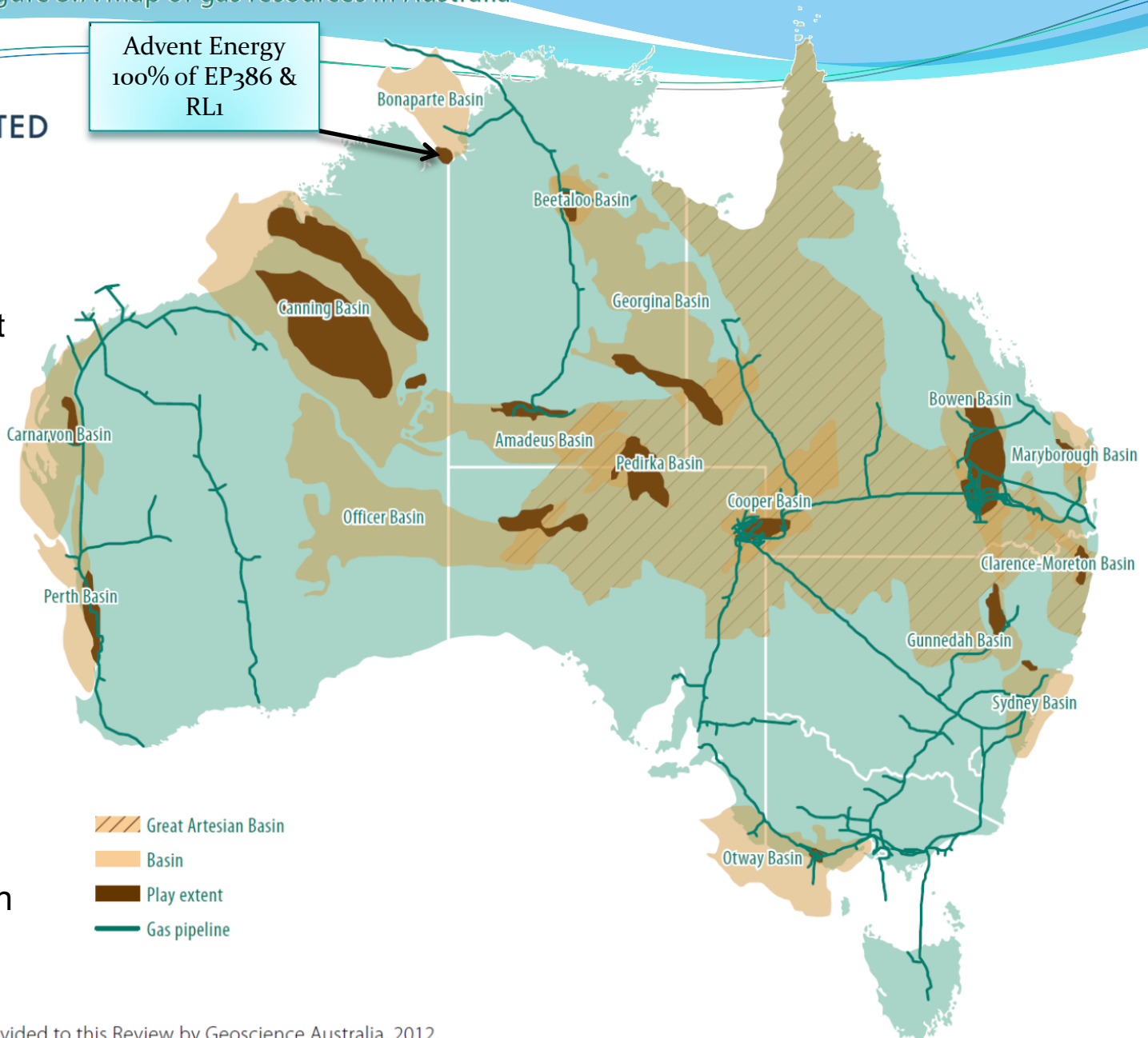
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Advent Energy  
100% of EP386 &  
RL1

***Advent Note:***

The reservoir thickness from which the estimated 6 Tcf in the ACOLA report was based was 36m (120ft) of average net shale thickness in the Bonaparte Basin.

The thickness estimated from Advent's well logs shows elevated gas levels from between 300m and 1700m indicating substantial prospective upside in shale gas resource for Advent's Bonaparte Basin areas.



Provided to this Review by Geoscience Australia, 2012.

Source: Cook, P, Beck, V, Brereton, D, Clark, R, Fisher, B, Kentish, S, Toomey, J and Williams J (2013). *Engineering energy: unconventional gas production*. Report for the Australian Council of Learned Academies, [www.acola.org.au](http://www.acola.org.au)

**Table 3.4: Prospective resource estimates for Australian shale gas plays that meet screening criteria**

Basin	Play	Gas Pod	Area (km <sup>2</sup> )	Best Estimate Recoverable Resource (tcf)	BOE volume (MMbbls)	BOE/km <sup>2</sup>	Recoverable Resource bcf/km <sup>2</sup>
Amadeus	Horn Valley	Dry	7,267	16	2777	0.38	2.19
Beetaloo	Kyalla	Dry	898	3	467	0.46	2.62
	Velkerri	Dry	6,092	16	2796	0.46	2.62
<b>Bonaparte</b>	<b>Milligans</b>	<b>Dry</b>	<b>2,752</b>	<b>6</b>	<b>1090</b>	<b>0.40</b>	<b>2.18</b>
Bowen	Black Alley	Dry	51,252	97	16979	0.33	1.89
Canning	Goldwyer	Wet	147,305	409	71306	0.48	2.77
		Dry	139,321	387	67444	0.48	2.77
	Laurel	Wet	48,285	106	18459	0.38	2.19
		Dry	28,704	63	10973	0.38	2.19
Carnarvon	Byro Group	Dry	6,162	9	1575	0.25	1.46
Clarence-Moreton	Koukandowie	Dry	4,407	11	1901	0.43	2.48
	Raceview	Dry	4,407	10	1677	0.38	2.19
Cooper	Roseneath, Epsilon, Murteree (REM)	Wet	3,604	14	2385	0.66	3.79
		Dry	9,106	35	6026	0.66	3.79
Eromanga	Toolebuc	Dry	93,263	82	14244	0.15	0.87
Georgina	Arthur Creek	Dry	14,433	50	8731	0.51	2.91
Gunnedah	Watermark	Dry	8,631	13	2185	0.25	1.46
Maryborough	Cherwell	Dry	3,264	7	1289	0.41	2.33
McArthur	Barney Creek	Wet	2,867	7	1304	0.51	2.91
		Dry	158	0.44	72	0.51	2.91
Otway	Eumeralla	Dry	4,109	9	1563	0.38	2.19
Pedirka	Purni	Dry	29,357	43	7470	0.25	1.46
Perth	Kockatea	Wet	5,818	7	1184	0.20	1.17
		Dry	14,123	16	2874	0.20	1.17

Source: Report to this Review by AWT International, 2013.

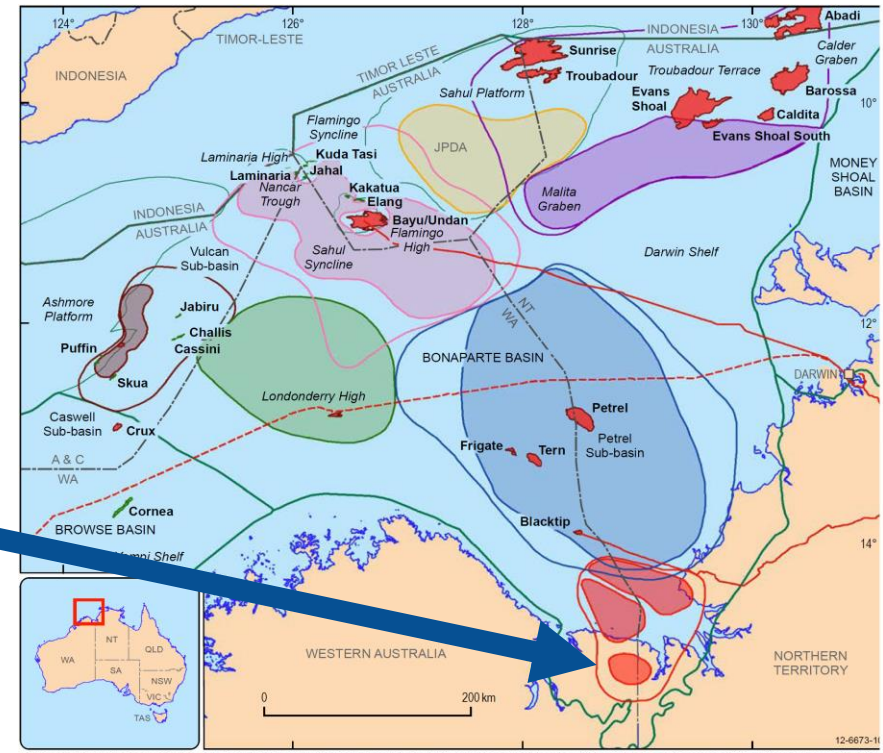
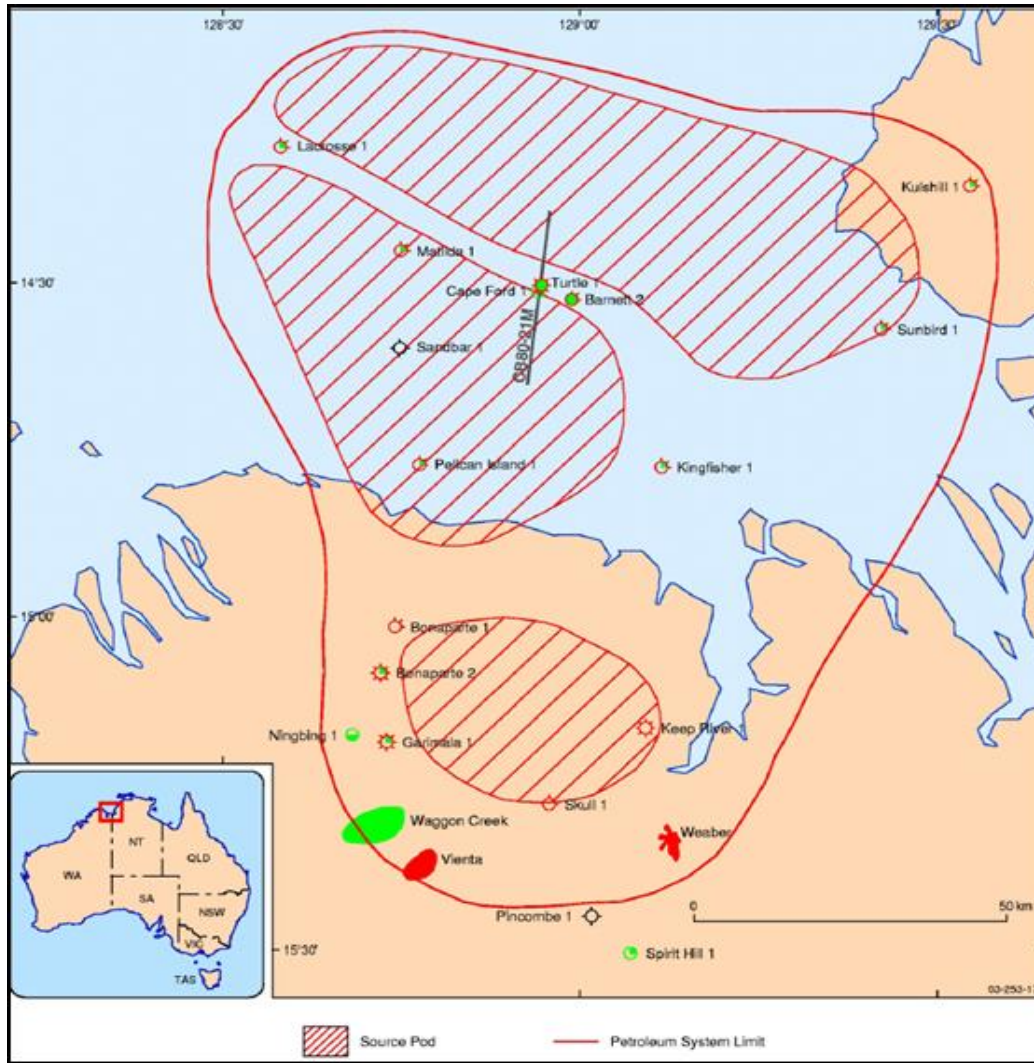
Source: Cook, P, Beck, V, Brereton, D, Clark, R, Fisher, B, Kentish, S, Toomey, J and Williams J (2013). *Engineering energy: unconventional gas production*. Report for the Australian Council of Learned Academies, [www.acola.org.au](http://www.acola.org.au)





# EP386 + RL1 Summary

The Bonaparte Basin is a proven hydrocarbon producing basin representing 19% of Australian liquids and 17% of gas (2005 GA report). EP 386 and RL 1 are located on the southern, onshore part of the Bonaparte Basin. EP386 covers 2568km<sup>2</sup> in Western Australia and RL1 covers 166km<sup>2</sup> in the Northern Territory.



Well symbol information is sourced either from "open file" data from titleholders where this is publicly available as at 1 December 2012 or from other public sources. Field outlines are provided by Enco GPlnto, a Pitney Bowes Software (PBS) Pty Ltd product. Whilst all care is taken in the compilation of the field outlines by PBS, no warranty is provided re the accuracy or completeness of the information, as it is the responsibility of the Customer to ensure, by independent means, that those parts of the information used by it are correct before any reliance is placed on them.

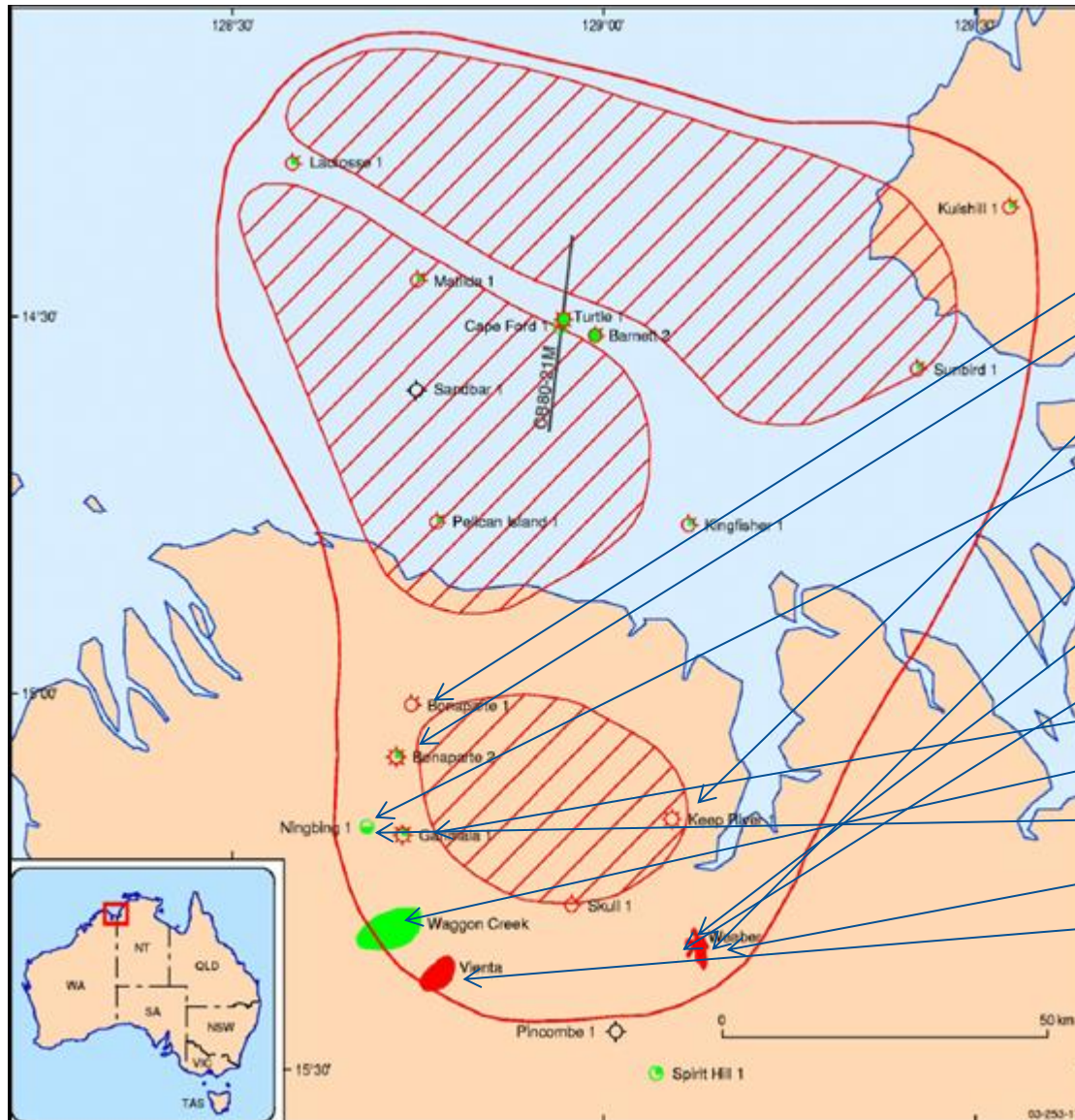
Source Pods	Petroleum System limit	
Vulcan-Plover(!)		
Elang-Elang(!)		
Permian-Hyland Bay(?)		
Hyland Bay-Hyland Bay(?)		
Plover-Plover(.)		
Hyland Bay/Keyling-Hyland Bay(.)		
Milligans-Kuriyippi/Milligans(!)		
		Oil field
		Gas field
		Basin boundary
		Sub-basin boundary
		Scheduled area boundary (OPGSSA 2006)

Source:  
Geoscience Australia

Figure 10 Petroleum systems of the Bonaparte Basin (modified after Barrett et al, 2004; Earl, 2004)

# EP 386 & RL/1:

This is an active hydrocarbon system  
7 conventional gas discovery wells –  
Onshore High Technical Success Rate



Well	Well Classification	Flow Rates Observed (unstimulated)
Bonaparte-1	Oil & gas shows	
Bonaparte-2	Gas Discovery	1.5 MMscf/d
Keep River-1	Gas Discovery	3.0 MMscf/d
Ningbing-1	P & A (Oil & gas shows)	
Weaber-1	P & A (Bypassed pay)	
Weaber-1 (re-entry)	Gas Discovery	4.5 MMscf/d
Weaber -2a	P & A (Gas shows)	
Garimala-1	Gas Discovery	0.75 MMscf/d
Waggon Creek-1	Gas Discovery	1.3 MMscf/d
Ningbing-2	P & A (Gas show)	
Weaber-4	Suspended (Gas)	2.1 MMscf/d
Vienta-1	Gas Discovery	2.1 MMscf/d

Source:  
Geoscience Australia

Source Pod

Petroleum System Limit

*“...organic-rich oil-prone anoxic marine mudstones are present, suggesting that similar units with good source potential may be developed in depocentres adjacent to the Turtle-Barnett High and in the Carlton Sub-basin.”*  
(Australian Geological Survey Organisation)



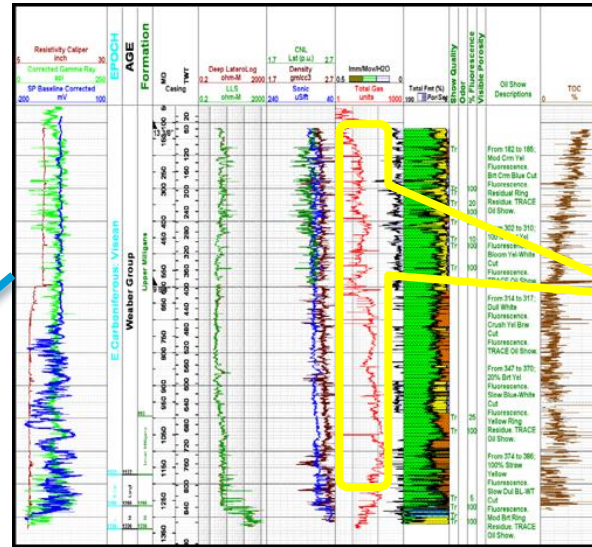


# Bonaparte Basin (WA/NT) EP 386 / RL-1

## Shale and tight gas exploration

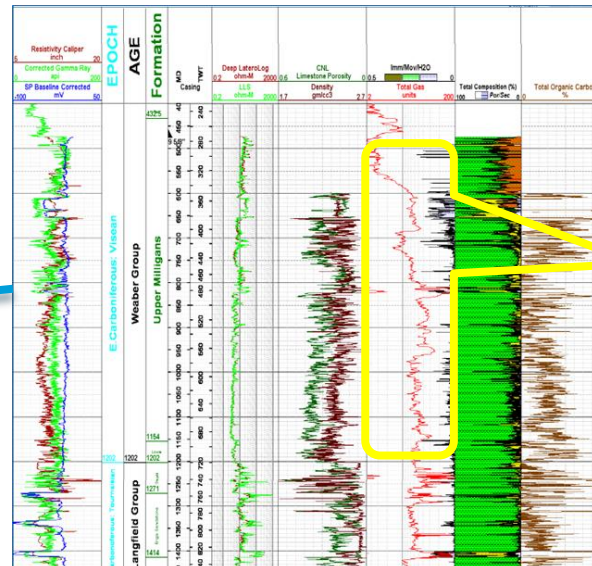
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#### Ningbing-2: Elevated Gas Shows over Lower Milligans-Langfield Section



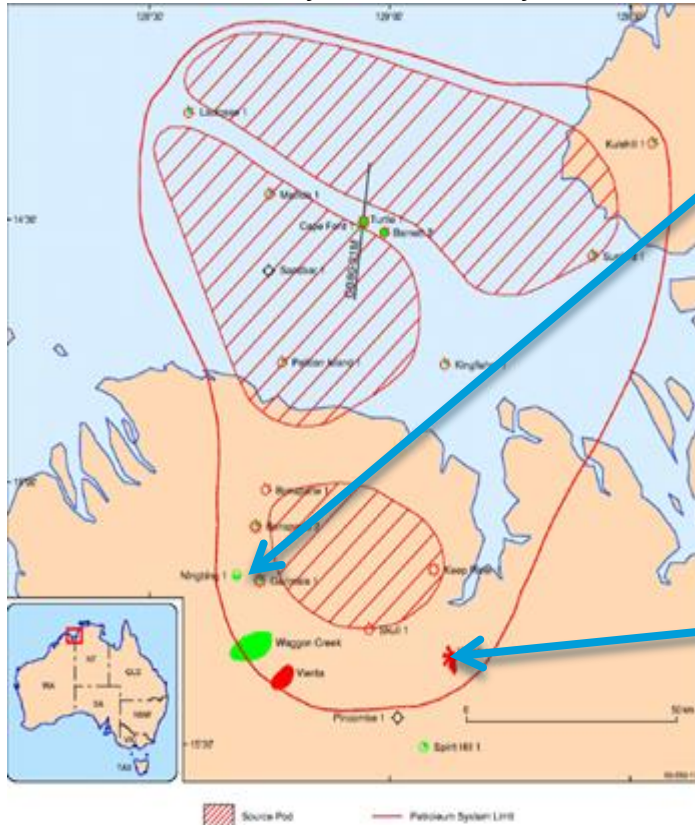
Elevated gas shows over 900m in shale/siltstone section. TOC from Lab matched well with computed value from logs and maximum TOC value can be up to 5% (right column).

#### Weaber-4 (RL1): Elevated Gas Shows over Upper & Lower Milligans Section



Elevated gas shows over 600m in shale/siltstone section. TOC from Lab matched well with computed value from logs and maximum TOC value can be up to 5% (right column).

This is an active hydrocarbon system







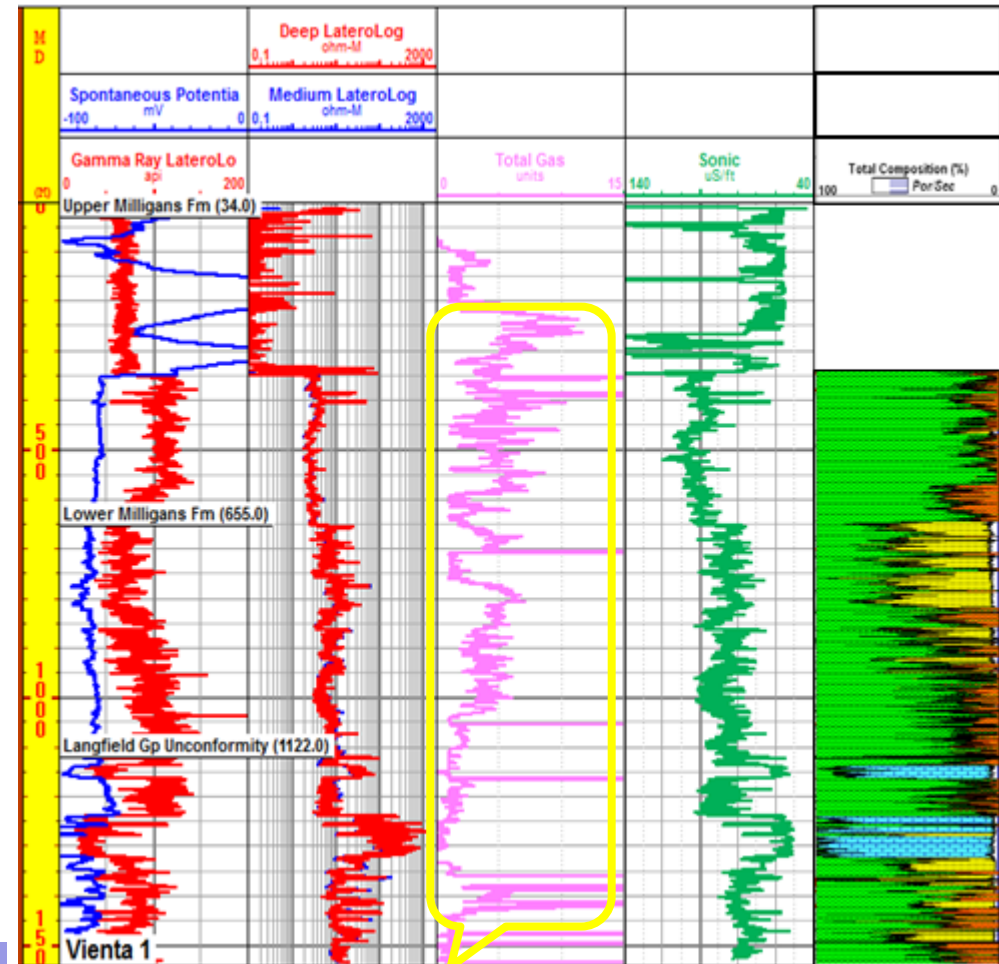
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# Bonaparte Basin (WA/NT) EP 386 / RL-1

## Shale and tight gas exploration

- Multiple petroleum targets are present in EP 386 & RL1 area:
  - Proven conventional gas charged sandstone reservoirs in nearshore marine area of the Milligans Formation (Prospective Resources in EP386 increased to mean 556 Bcf), with potential for deeper prospective shales;
  - Unconventional gas-condensate shale play in the shallow marine areas of Lower Milligans Formation;
  - Unconventional tight gas sandstone and limestone reservoirs in the Langfield, Ningbing & Cockatoo groups below the Milligans Formation.
- Lower Milligans Formation shale is prospective for shale gas play with considerably large upside potential:
  - Marine shale with moderate organic richness: TOC of over 4% from samples in wells within or in close proximity of EP 386. Higher TOC could be present in the area in the north & northeast of EP 386;
  - Source rocks are mature for gas and oil generation: Ro range 0.44-2.42% & Tmax range from 430 to 480;
  - Limited geochemical data indicates source rocks at depth shallower than c. 1400m are mature for gas/wet gas and oil generating windows, but overmature and in the dry gas generating window at depth below 1400m.
  - The thickness of the prospective shale gas play is varied from 300m to over 1500m. This would provide significant upside in prospective shale gas resources

### Vienta-1: Elevated Gas Shows over mid-Upper & Lower Milligans Section



Unrisked OGIP for EP 386 & RL 1 could be in the range from c. 19 TCF to 141 TCF

Elevated Gas Shows Over Shaly & Silty Section of approximately 850 m

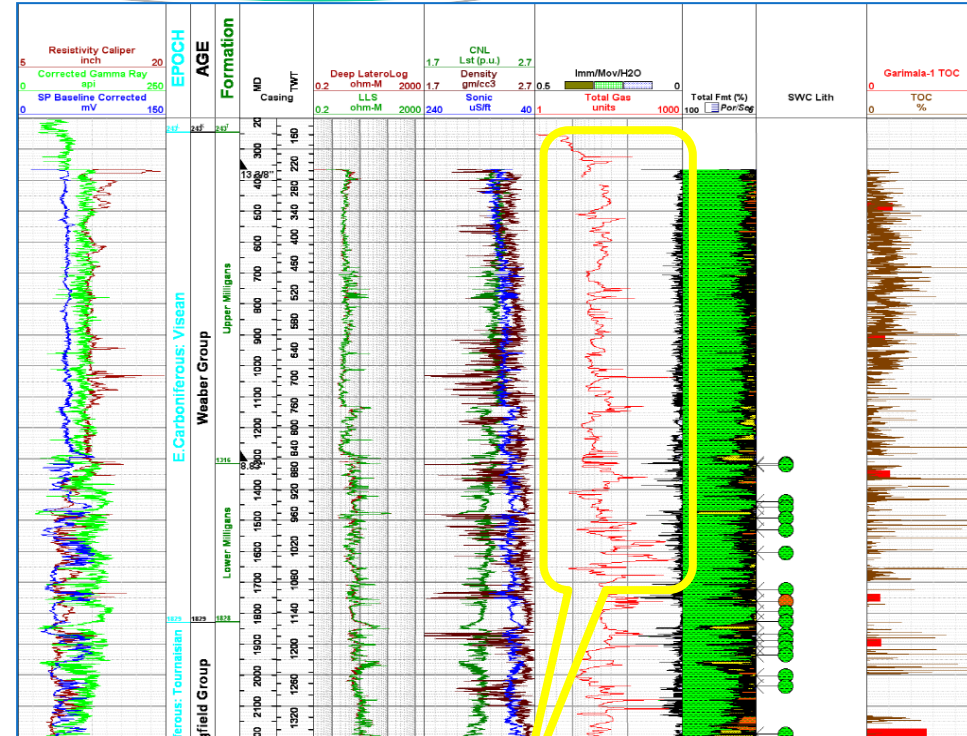
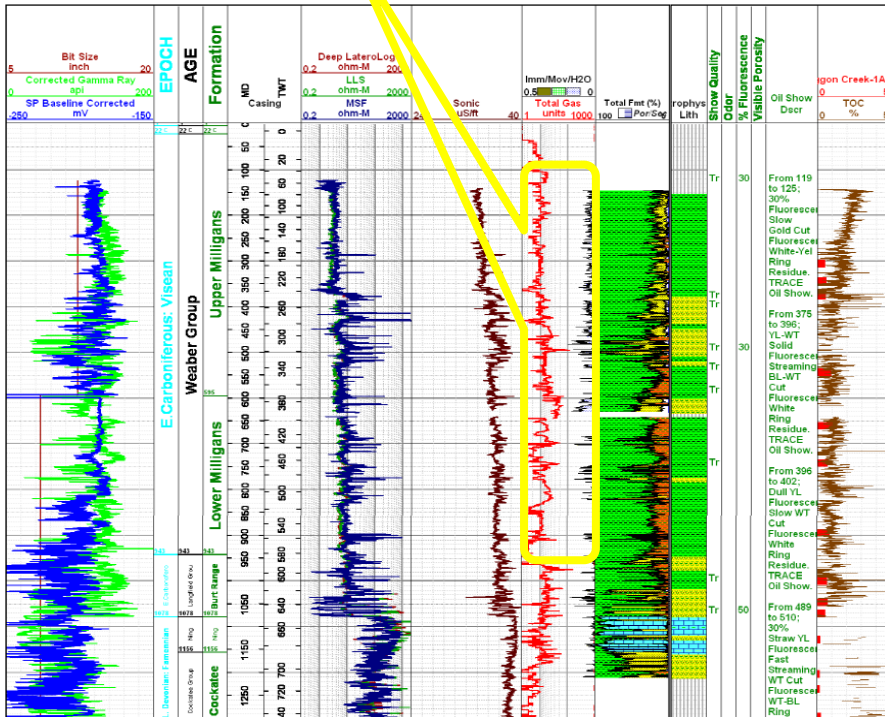


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# Garimala-1: Elevated Gas Shows over Milligans-Langfield Section

## Waggon Creek-1A: Elevated Gas Shows over Milligans Section

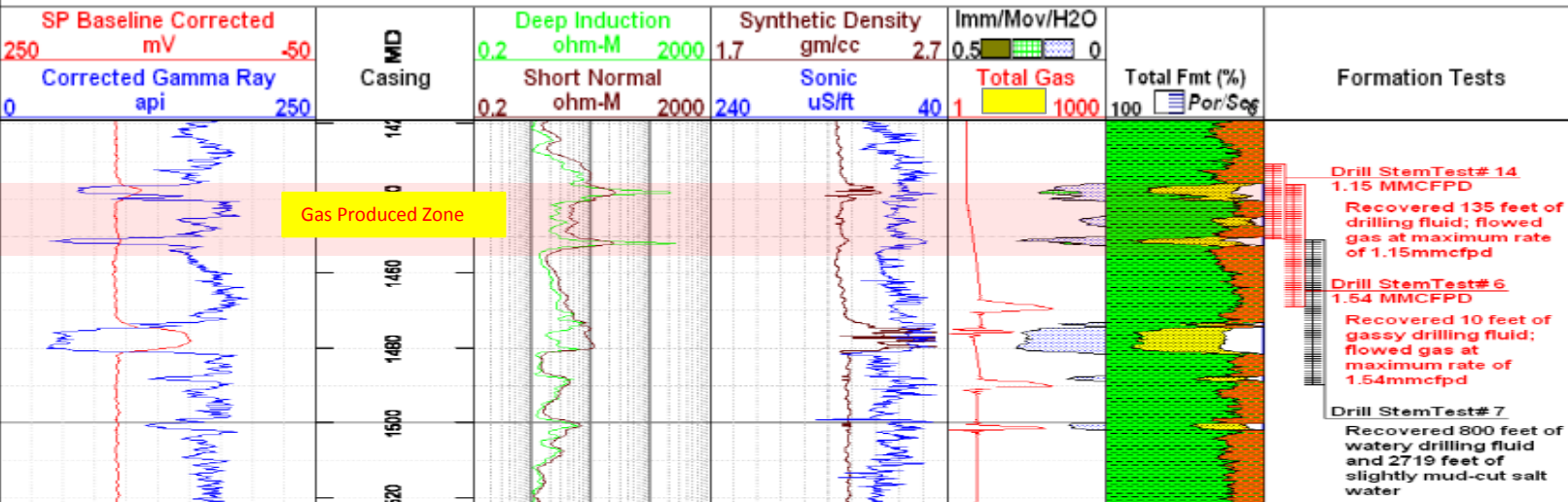
Elevated gas shows over 800m in shale/siltstone section. TOC from Lab matched well with computed value from logs and maximum TOC value can be up to 5% (right column).



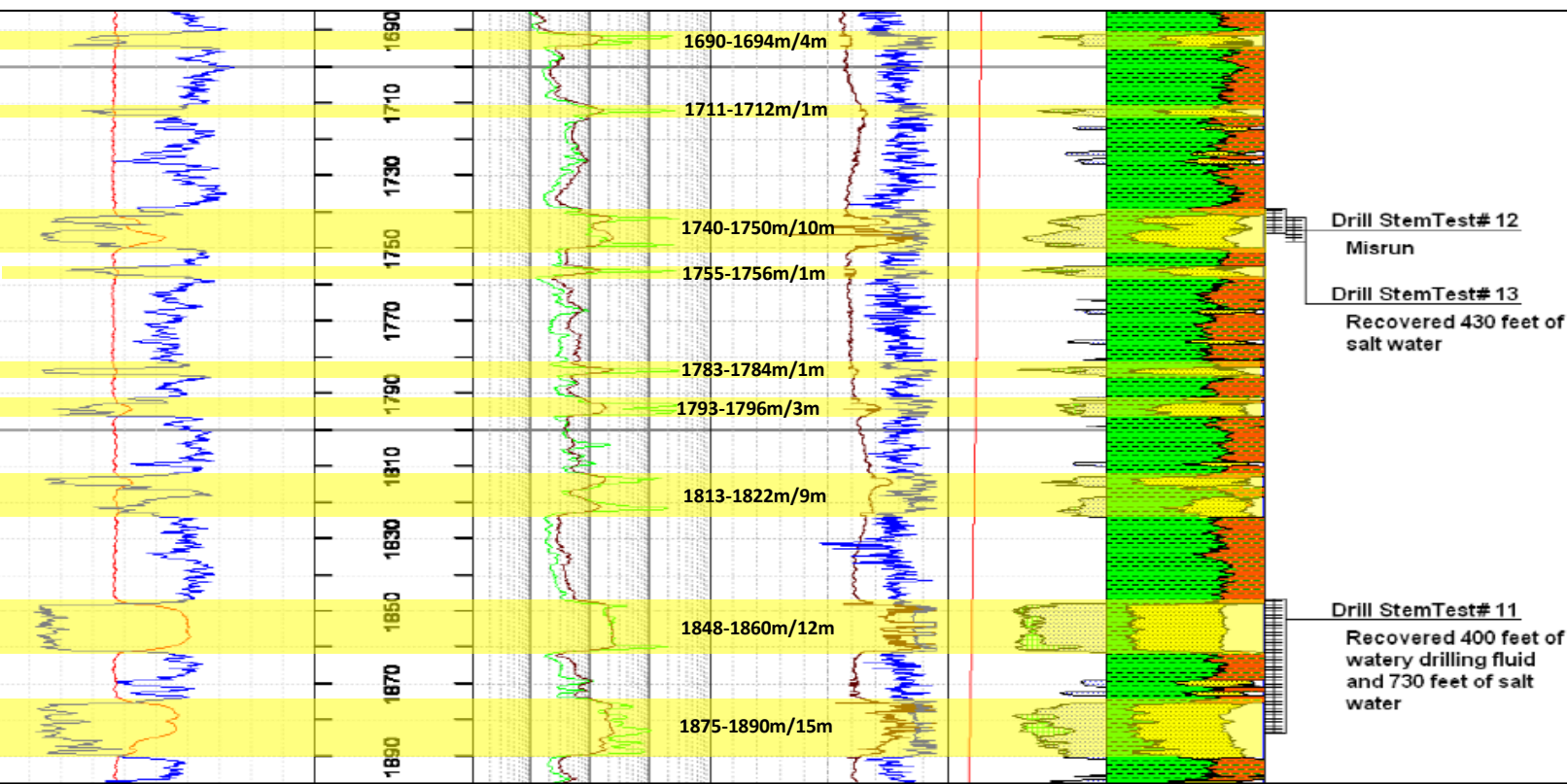
Elevated gas shows over 1700m in shale/siltstone section. TOC from Lab matched well with computed value from logs and maximum TOC value can be up to 5% (right column).

# Bonaparte-2

SCALE 1:1000 Meters MD/KB



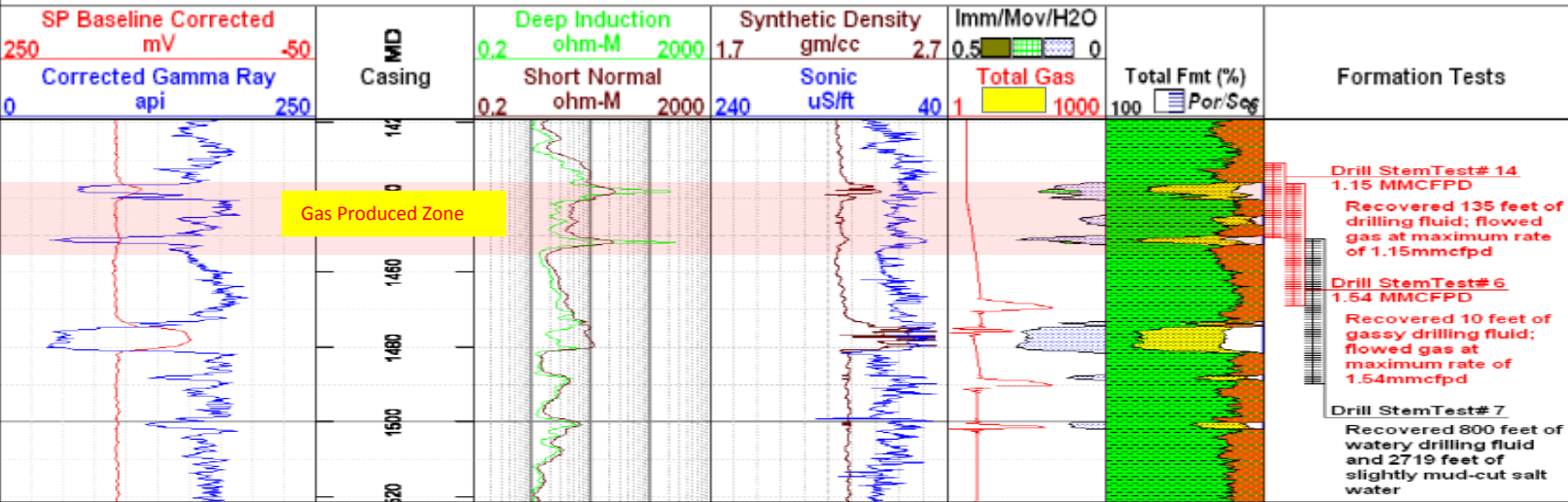
**Gas Producing Zone:**  
Sandstone with low GR, higher density, Rt-deep > Rt-nor,



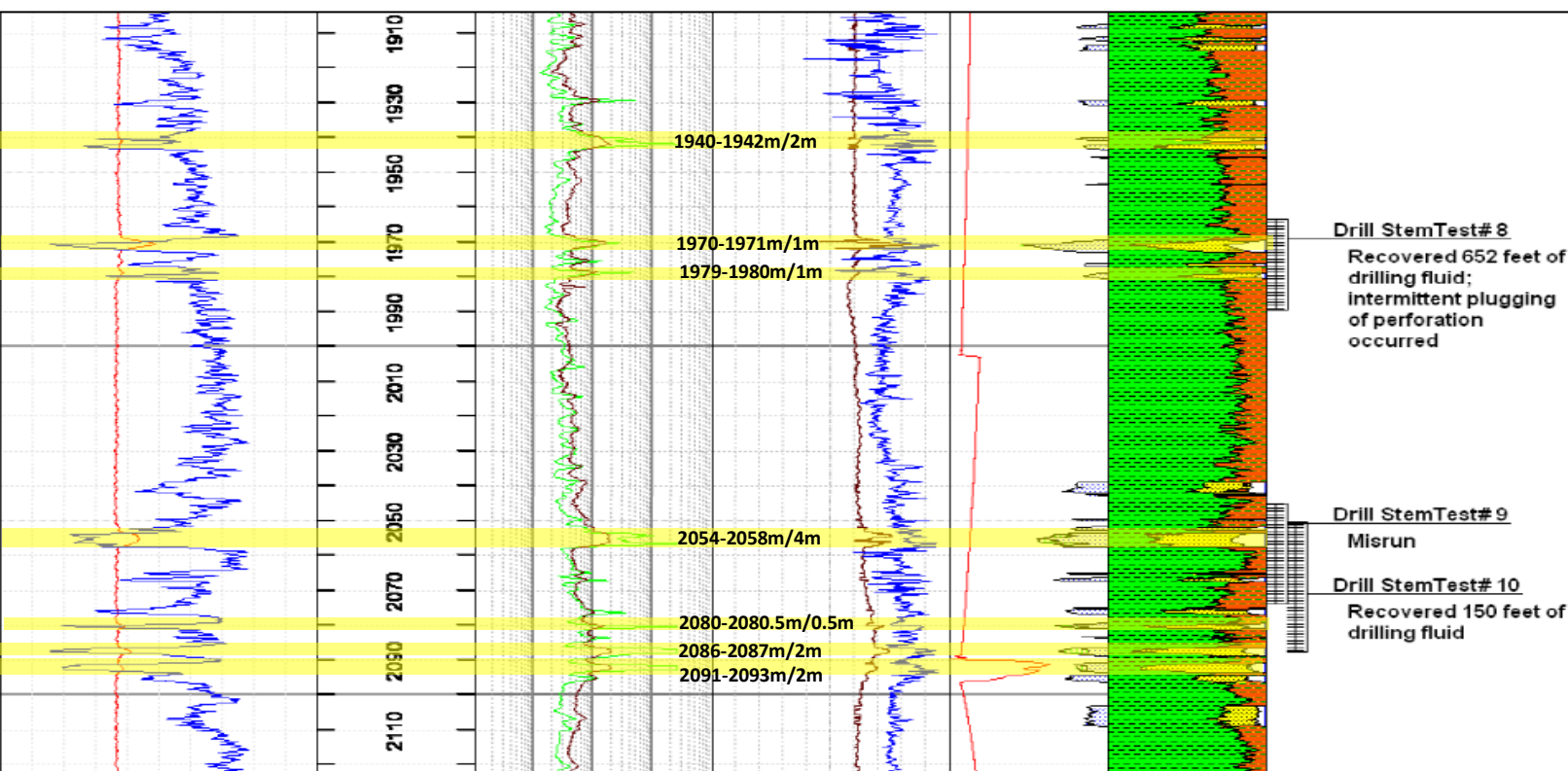
**Potential Zones need further investigation:**  
 1: Similar Log properties to the gas producing zone  
 2: Reservoir been contaminated by drilling mud and DST tests not thoroughly conducted



SCALE 1:1000 Meters MD/KB



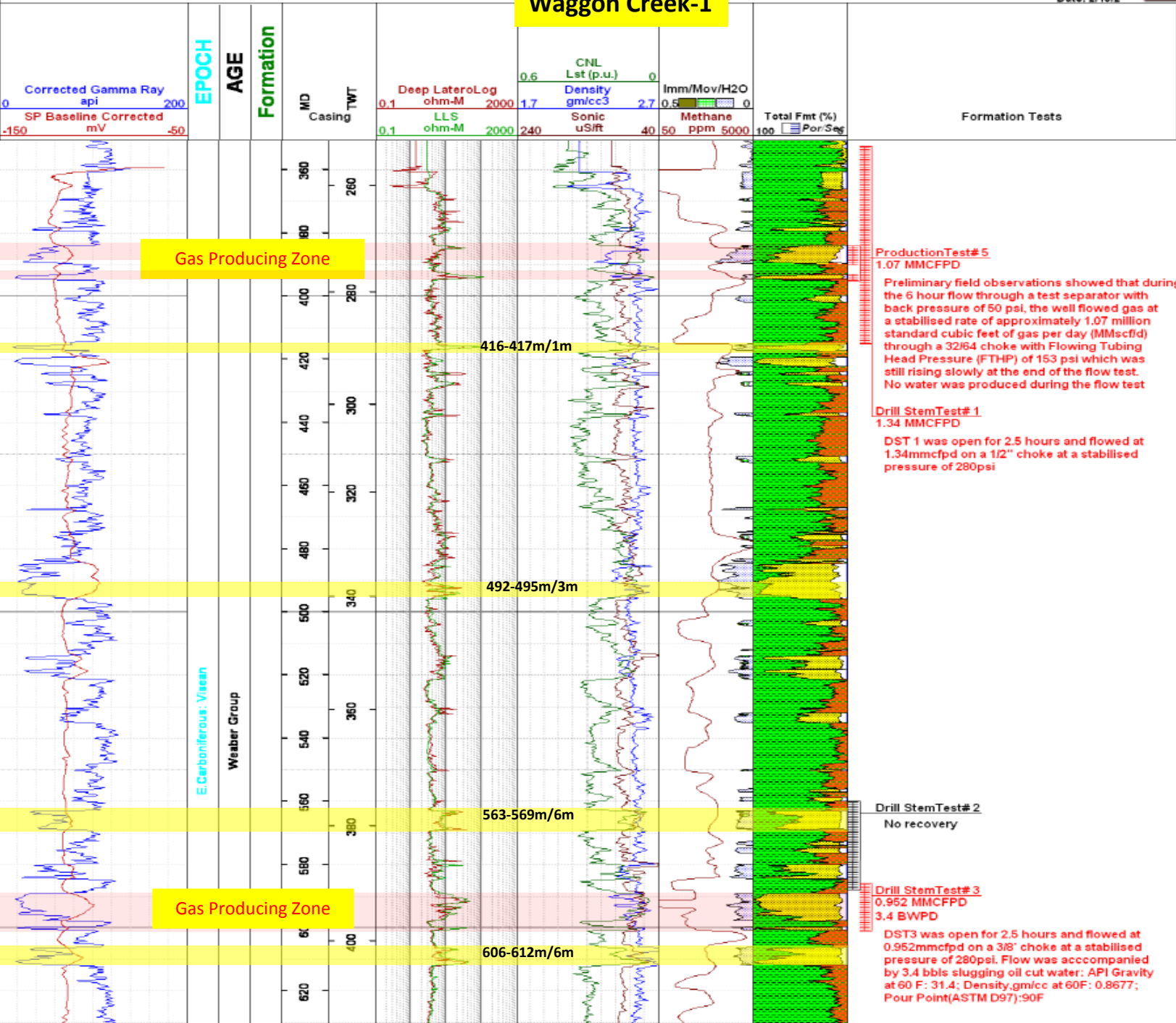
Gas Producing Zone:  
Sandstone with low GR, SP higher density, Rt-deep > Rt-nor,



Potential Zones need further investigation:  
 1: Similar Log properties to the gas producing zone  
 2: Reservoir been contaminated by drilling mud and DST tests not thoroughly conducted



# Waggon Creek-1



Gas Producing Zone

416-417m/1m

492-495m/3m

563-569m/6m

Gas Producing Zone

606-612m/6m

Gas Producing Zone:  
Sandstone with low GR, higher density, Rt, SP anomaly

Potential Zones need further investigation:  
Similar Log properties to the gas producing zone

**ProductionTest# 5**  
1.07 MMCFPD

Preliminary field observations showed that during the 6 hour flow through a test separator with back pressure of 50 psi, the well flowed gas at a stabilised rate of approximately 1.07 million standard cubic feet of gas per day (MMscf/d) through a 32/64 choke with Flowing Tubing Head Pressure (FTHP) of 153 psi which was still rising slowly at the end of the flow test. No water was produced during the flow test.

**Drill StemTest# 1**  
1.34 MMCFPD

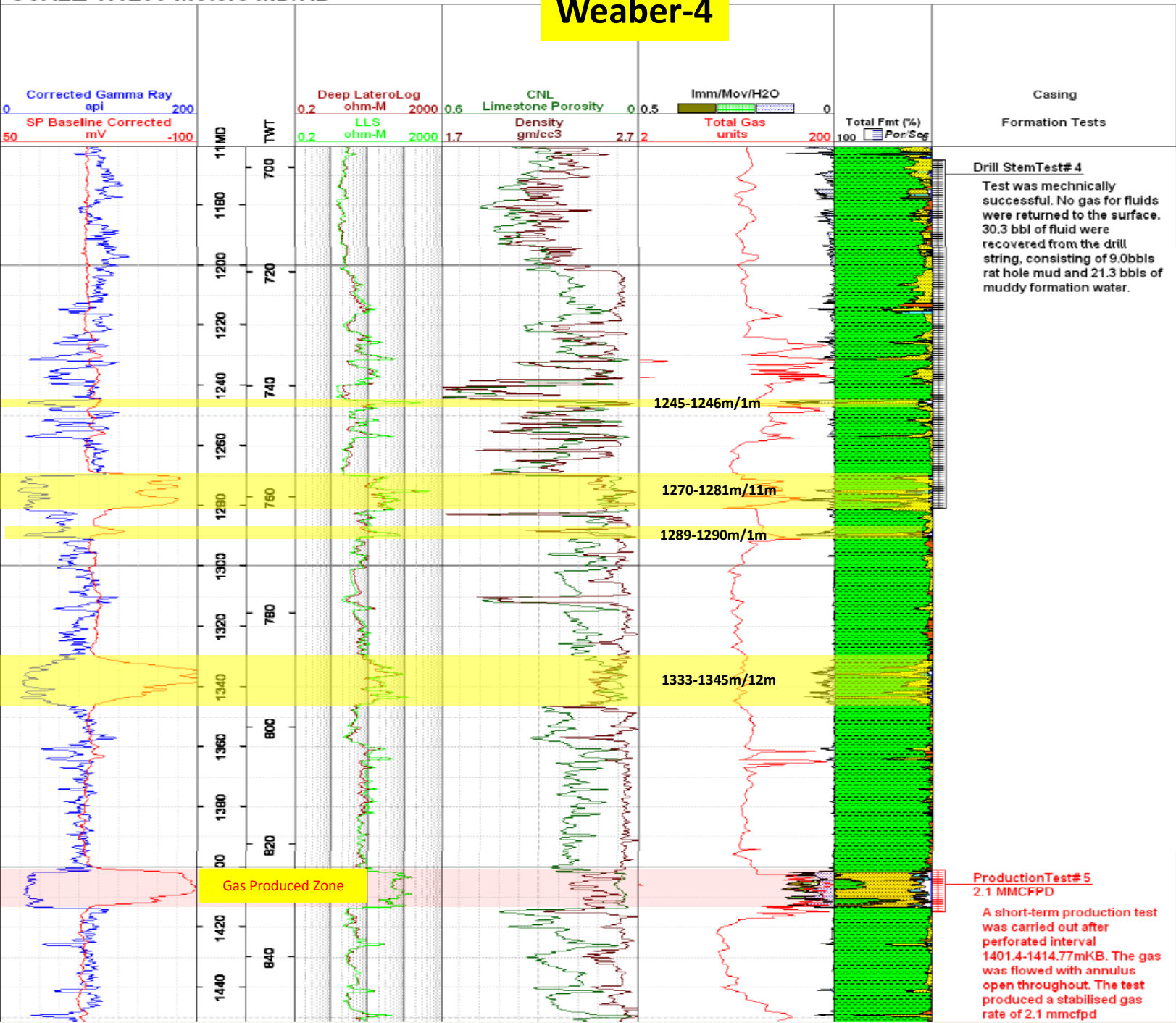
DST 1 was open for 2.5 hours and flowed at 1.34mmcfpd on a 1/2" choke at a stabilised pressure of 280psi

**Drill StemTest# 2**  
No recovery

**Drill StemTest# 3**  
0.952 MMCFPD  
3.4 BWPD

DST3 was open for 2.5 hours and flowed at 0.952mmcfpd on a 3/8" choke at a stabilised pressure of 280psi. Flow was accompanied by 3.4 bbls slugging oil cut water; API Gravity at 60 F: 31.4; Density, gm/cc at 60F: 0.8677; Pour Point(ASTM D97):90F

# Weaber-4

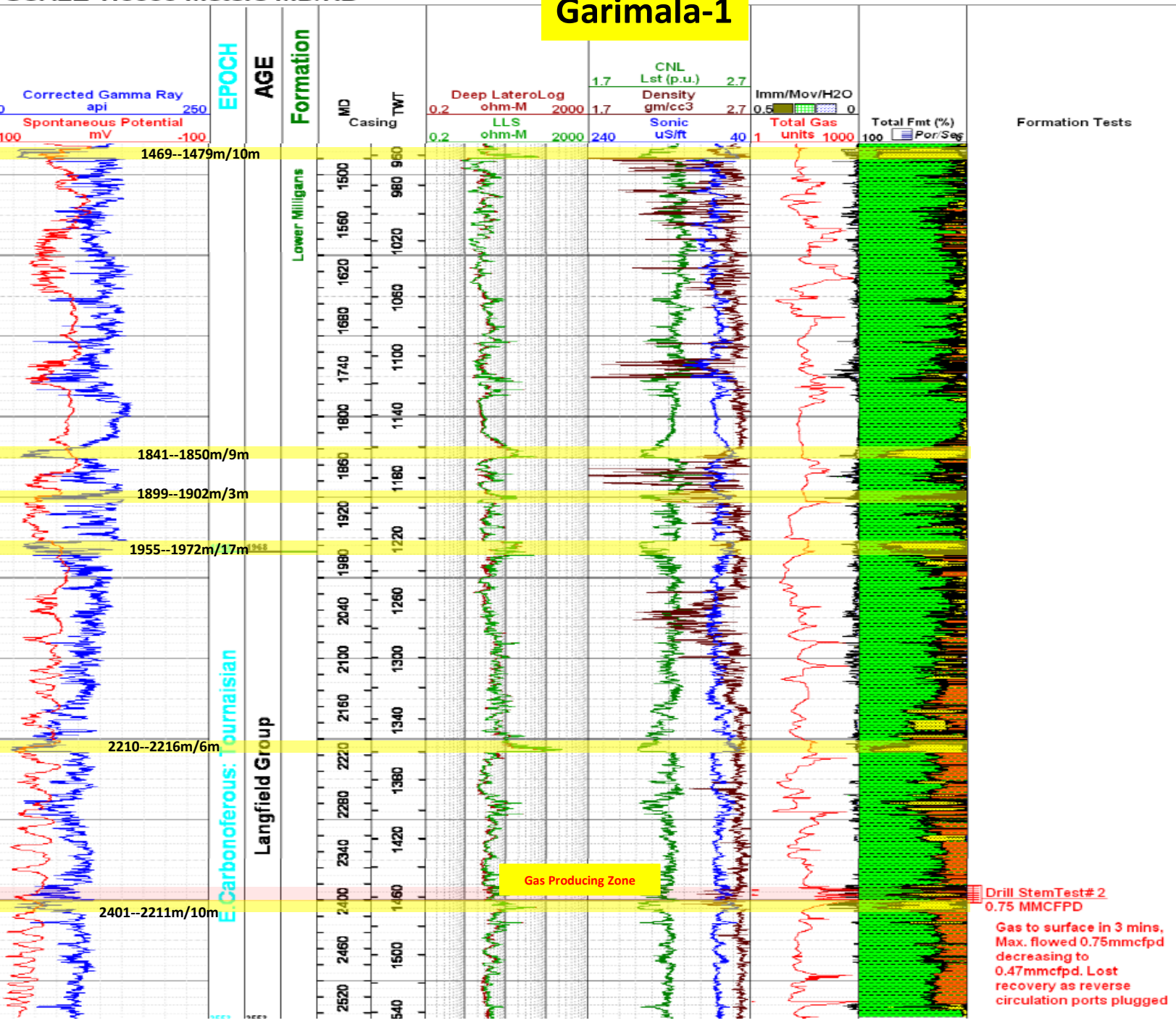


**Gas Producing Zone:**  
Sandstone with low GR, higher density, Rt, SP anomaly

Potential Zones need further investigation:  
Similar Log properties to the gas producing zone



# Garimala-1



Gas Producing Zone:  
 Sandstone with low GR, higher  
 density, Rt

Potential Zones need further  
 investigation:  
 Similar Log properties to the gas  
 producing zone

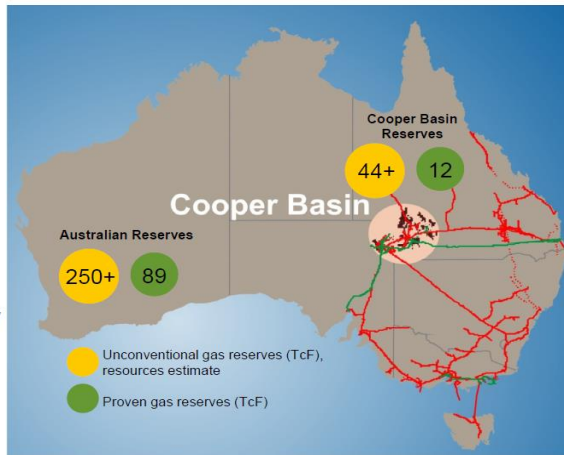


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## The Cooper Basin - Australia's Petroleum Heartland

### Cooper Basin in context

- Australia's largest onshore oil and gas basin.
- Production began from the first discovery in 1963.
- Major oil & gas production & transmission hub serving Eastern Australia and international markets.
- Underexplored - low exploration drilling density – only 1 well for every 20km<sup>2</sup>.
- Total wells drilled 768 exploration, 459 appraisal and 752 development wells



Source: BP Statistical Review 2009, Oil & Gas Journal, PCF Energy "Full IOC Access" countries.

Drillsearch

10

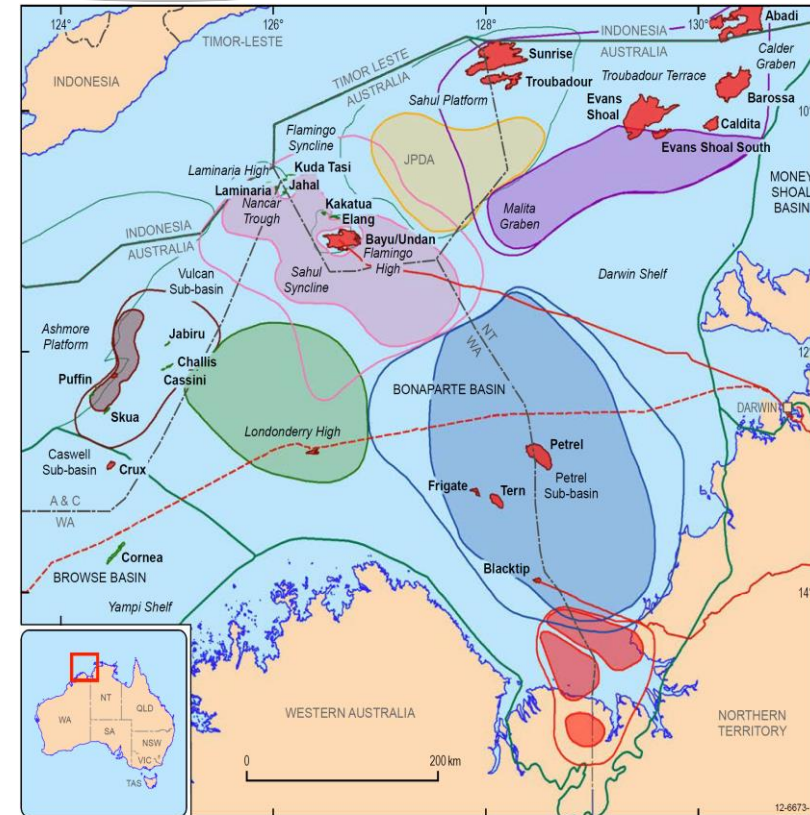
### Bonaparte Basin:

The Bonaparte Basin is currently Australia's third most prolific offshore hydrocarbon-producing basin. A proven hydrocarbon producing basin representing 19% of Australian liquids and 17% of gas (2005 Geoscience Australia report). EP386 and RL1 are located on the southern, onshore portion of the Bonaparte Basin. EP386 covers 2568km<sup>2</sup> in Western Australia and RL1 covers 166km<sup>2</sup> in the Northern Territory.

Production development offshore was established since the 1980s at the Challis-Cassini, Jabiru, Laminaria, Laminaria East, Corallina, Buffalo, and Elang-Kakatua oilfields. The Bayu-Undan field is the key driver of the NT's LNG export boom. ([source](#))

Advent's acreage is underexplored – 14 wells in 2,734km<sup>2</sup> – only 1 well for every 195km<sup>2</sup>.

# Bonaparte Basin



Well symbol information is sourced either from "open file" data from titleholders where this is publicly available as at 1 December 2012 or from other public sources. Field outlines are provided by Enco GPRto, a Petros Systems Software (PSS) Pty Ltd product. Whilst all care is taken in the compilation of the field outlines by PSS, no warranty is provided re the accuracy or completeness of the information, as it is the responsibility of the Customer to ensure, by independent means, that those parts of the information used by it are correct before any reliance is placed on them.

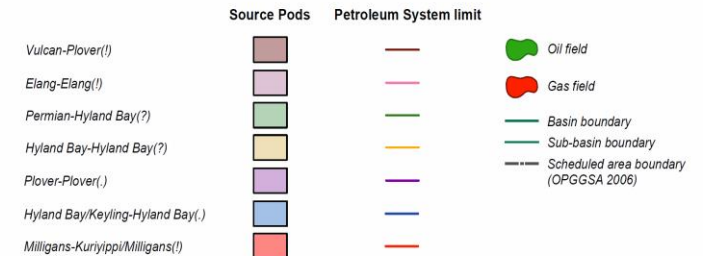
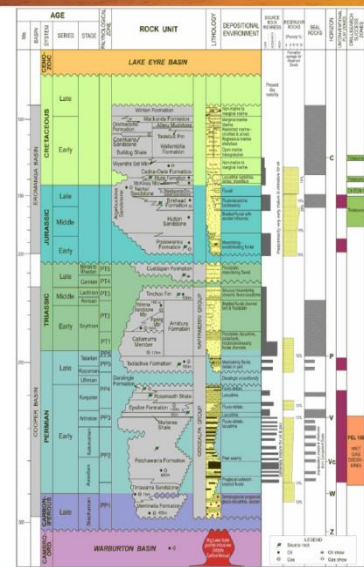


Figure 10 Petroleum systems of the Bonaparte Basin (modified after Barrett et al, 2004; Earl, 2004)

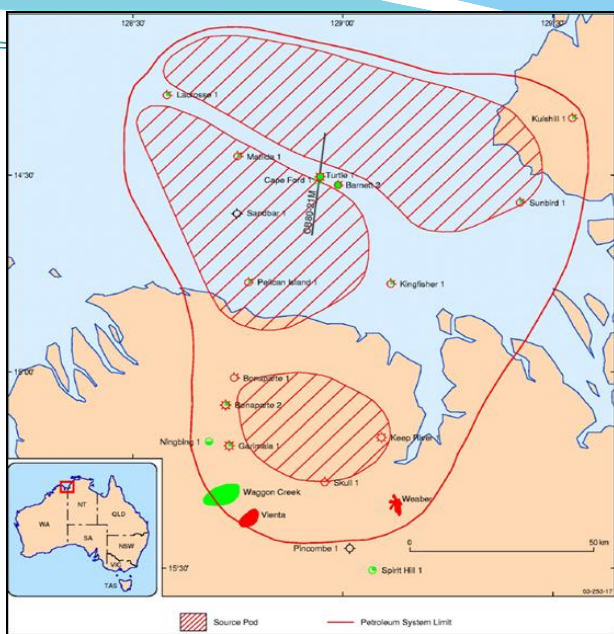


## Cooper Basin – The Unconventional Building Blocks



- Well-understood basin with readily available extensive dataset of digital well and seismic
- Known thick accumulations of coal and shale mature source rocks
- Multiple unconventional play types – tight gas, tight oil, shale gas & CSG
- Good gas indications on mudlogs throughout unconventional reservoirs
- Existing infrastructure
- Strong commercial viability
- Lower exploration risk than normally associated with oil and gas

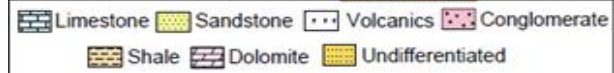
# Bonaparte Basin



## Bonaparte Basin:

- Well-understood basin with readily available database of digital well and seismic.
- Known very thick accumulations of shale mature source rocks (up to 5000 feet).
- Multiple unconventional play types – tight gas, tight oil, shale gas and shale oil.
- Good gas indications on mudlogs throughout unconventional reservoirs.
- Significant resources assessed by Advent Energy.
- Strong commercial viability
- Excellent technical historic drilling success rates for hydrocarbons (65%).
- Existing infrastructure

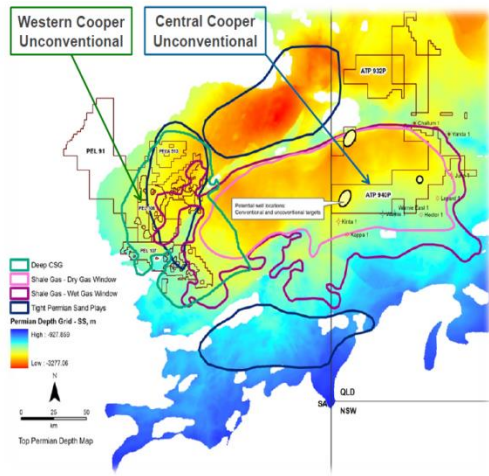
AGE	STRATIGRAPHIC UNITS	LITHOLOGY	SHOWS
PERMIAN	Keep Inlet Formation		
CARBONIFEROUS	WEABER GROUP	Fannurra Formation	
		Point Spring Sandstone	
		Burwill Formation	
LATE DEVONIAN	BONAPARTE FORMATION	Uting Calcarenite	☼ Bonaparte 1 & Ningbing 1
		Waggon Creek Formation	☼ Waggon Creek
		Milligans Formation	
		Zimmerman Sandstone	☼ Weaber 1
FRASNIAN	LANGFIELD GROUP	Septimus Limestone	
		Enga Sandstone	
		Burt Range Formation	
EARLY ORDOVICIAN	CARLTON GROUP		● Ningbing 1
			● Ningbing 1
			☼ Garimla 1
PROTEROZOIC	Undifferentiated		



**BONAPARTE BASIN PALAEOZOIC STRATIGRAPHY COLUMN**

## Cooper Basin Unconventional – The Sleeping Giant

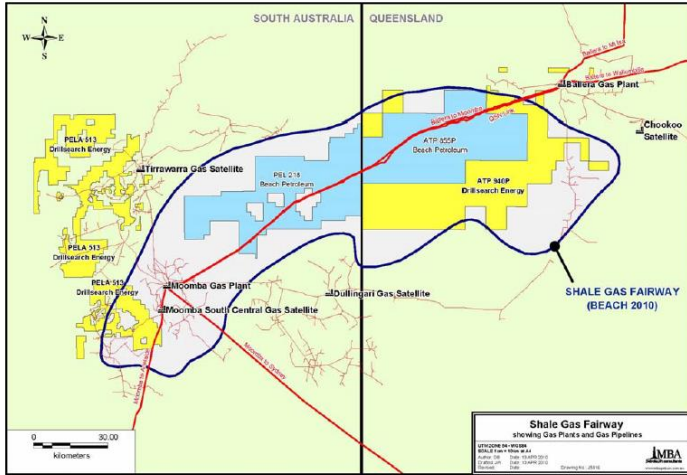
- Known thick accumulations of coal and shale mature source rocks
- Multiple unconventional play types – tight gas, tight oil, shale gas & deep CSG
- Good gas indications on mud logs obtained from conventional drilling throughout unconventional reservoirs
- Significant Reserves and Resources being booked by other participants in the Basin
- Close to existing infrastructure
- Lower exploration risk than normally associated with oil and gas plays







## Cooper Basin Shale Gas Fairway – The Nappamerri Trough



- Extensive database on shale distribution
- Rich, thermally mature shale source packages throughout basin
- Potentially both wet & dry shale gas plays throughout basin
- Play fairway covers approximately 15,000km<sup>2</sup>
- Potential gas-in-place estimates range up to 20-100 BCF/km<sup>2</sup>
- Early exploration, coring & appraisal drilling underway

Drillsearch

### Bonaparte Basin:

Database on shale distribution.

Thermally mature shale source packages throughout basin.

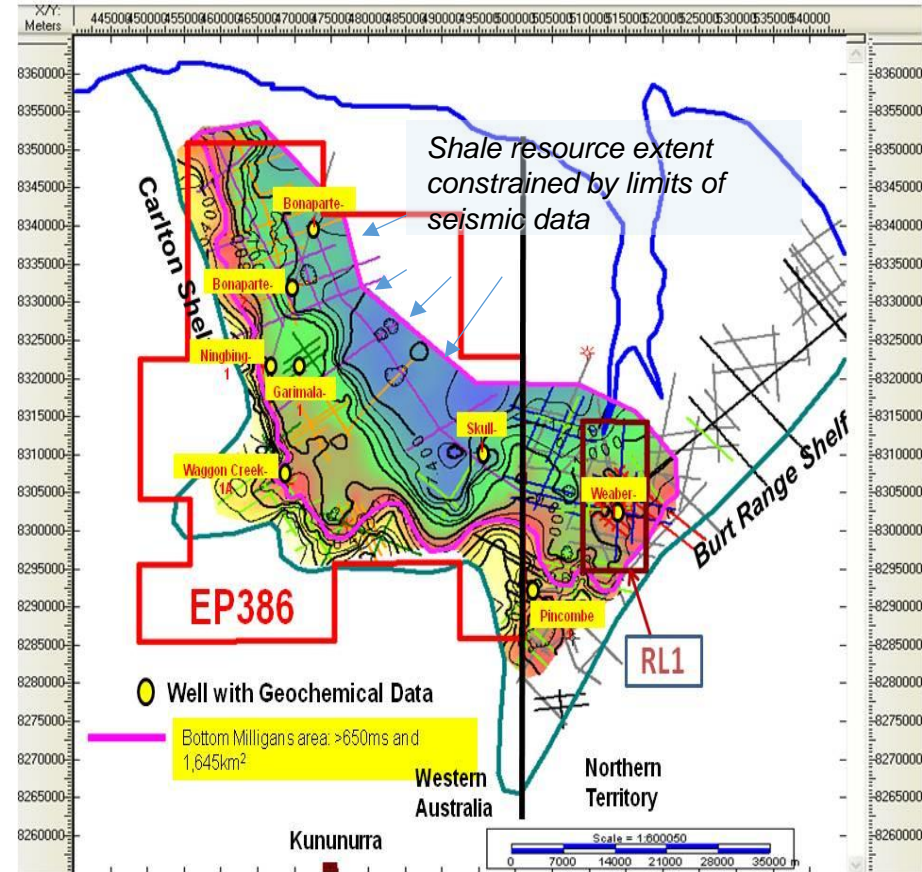
Potentially both wet & dry shale gas plays throughout basin.

Advent Energy holds 2734km<sup>2</sup> of prospective acreage at 100%.

Gas-in-place Prospective Resources range from 24 - 101 Bcf/km<sup>2</sup>.

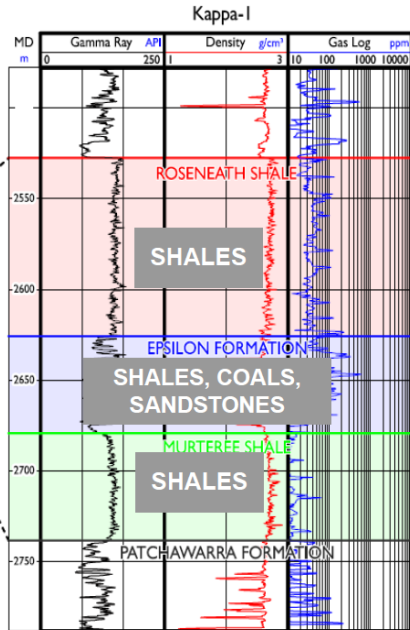
Exploration & appraisal programme in place

## Lower Milligans : Shale Gas Potential Area





## REM - the Target Shale

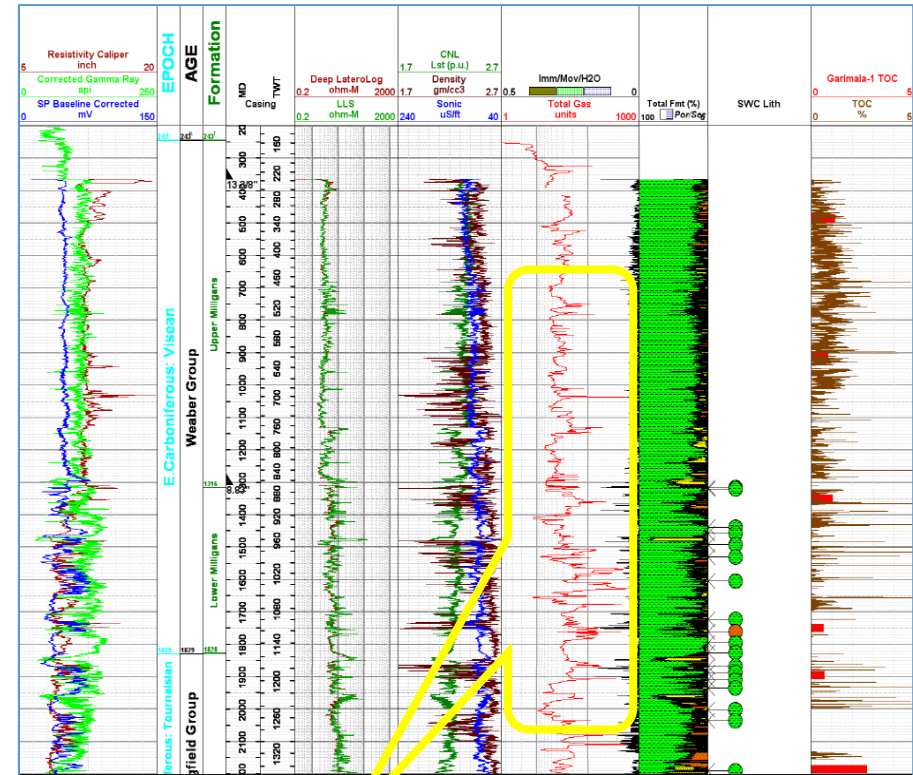


- “REM” Shale Gas Play:
  - Roseneath Shale
  - Epsilon Fm
  - Murteree Shale
- REM sequence 120-400m thick across the fairway
- “Oreo” Concept similar to Bakken Fm
  - “Sweet” productive zone sandwiched between source rich shales
- Target REM Shale zone very likely free of water
  - Confirmed at Encounter-1 as announced by Beach
- Liquids potential from shales and tight sandstones on flanks of central shale gas fairway
- Additional “Basin-centred” gas potential in conventional gas reservoirs above & below REM



Drillsearch

18



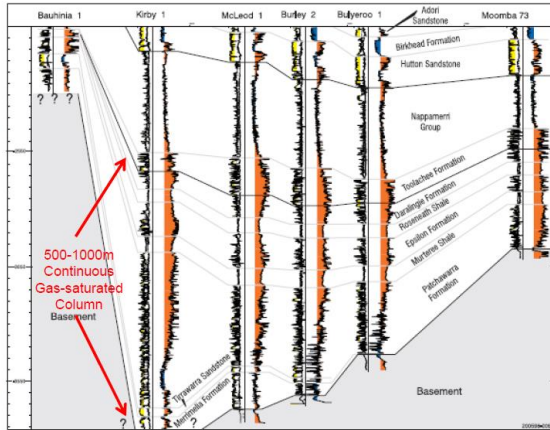
**Garimala-1:** Elevated gas shows over 1700m in shale/siltstone section. TOC from Lab matched well with computed value from logs and maximum TOC value can be up to 5% (right column).

## Bonaparte Basin:

- Lower Milligans Formation shale is prospective for shale gas play with considerably large upside potential;
- Marine shale with moderate organic richness: TOC of over 4% from samples in wells within or in close proximity of EP 386. Higher TOC could be present in the area in the north & northeast of EP 386;
- Source rocks are mature for gas and oil generation: Ro range 0.44-2.42% & Tmax range from 430 to 480;
- Limited geochemical data indicates source rocks at depth shallower than c. 1400m are mature for gas/wet gas and oil generating windows, but overmature and in the dry gas generating window at depth below 1400m.
- The thickness of the prospective shale gas play is varied from 300m to over 1500m. This would provide significant upside in prospective shale gas resources

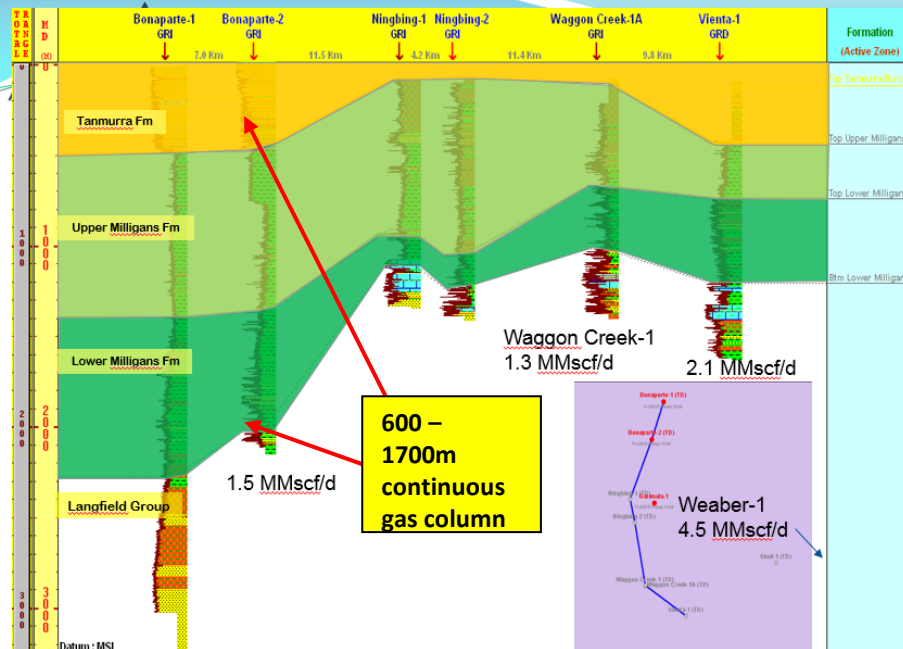


- Long recognised as major play throughout Cooper Basin
- Multiple tight gas zones & discoveries throughout basin
- Extensive through out basin in structural, stratigraphic & continuous accumulations
- Historically ignored due to traditional pay cut-off definitions
- Includes Basin-centred gas play potential in deep central basin
- Frequently present in combination with other unconventional plays – Shale Gas & Deep CSG
- Major programs underway to convert tight gas resources to reserves through additional completions in tight zones of existing conventional discoveries



### Drillsearch

26

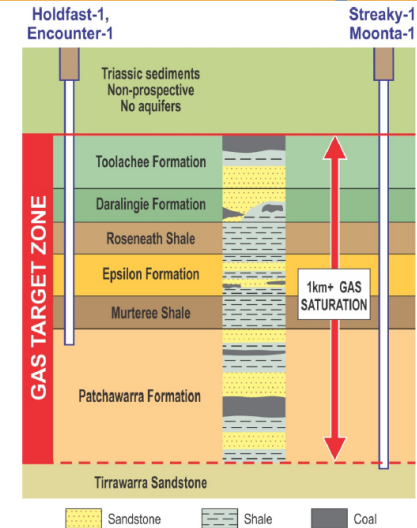


**600 – 1700m continuous gas column**

### Program highlights to date



- Holdfast-1, Encounter-1 proved up the shale play with flow rates at up to 2.1 MMscfd
- Moonta-1 proved up the basin centred gas concept throughout the Patchawarra, with gas flow rates at up to 2.6 MMscfd
- Holdfast-2 horizontal well drilling ahead laterally though the Murreee Shale
- March/April batch stimulation to include Streaky-1, Boston-1, Marble-1, Nepean-1 and Holdfast-2
- Halifax-1 vertical exploration well in ATP 855 reached total depth at ~4,300 metres
- Initial constrained gas flows from Halifax-1 at 2.2 MMscfd through a 24/64" choke



**300+ Tcf of gas in place estimated for PEL 218**

March 2013

Slide 20

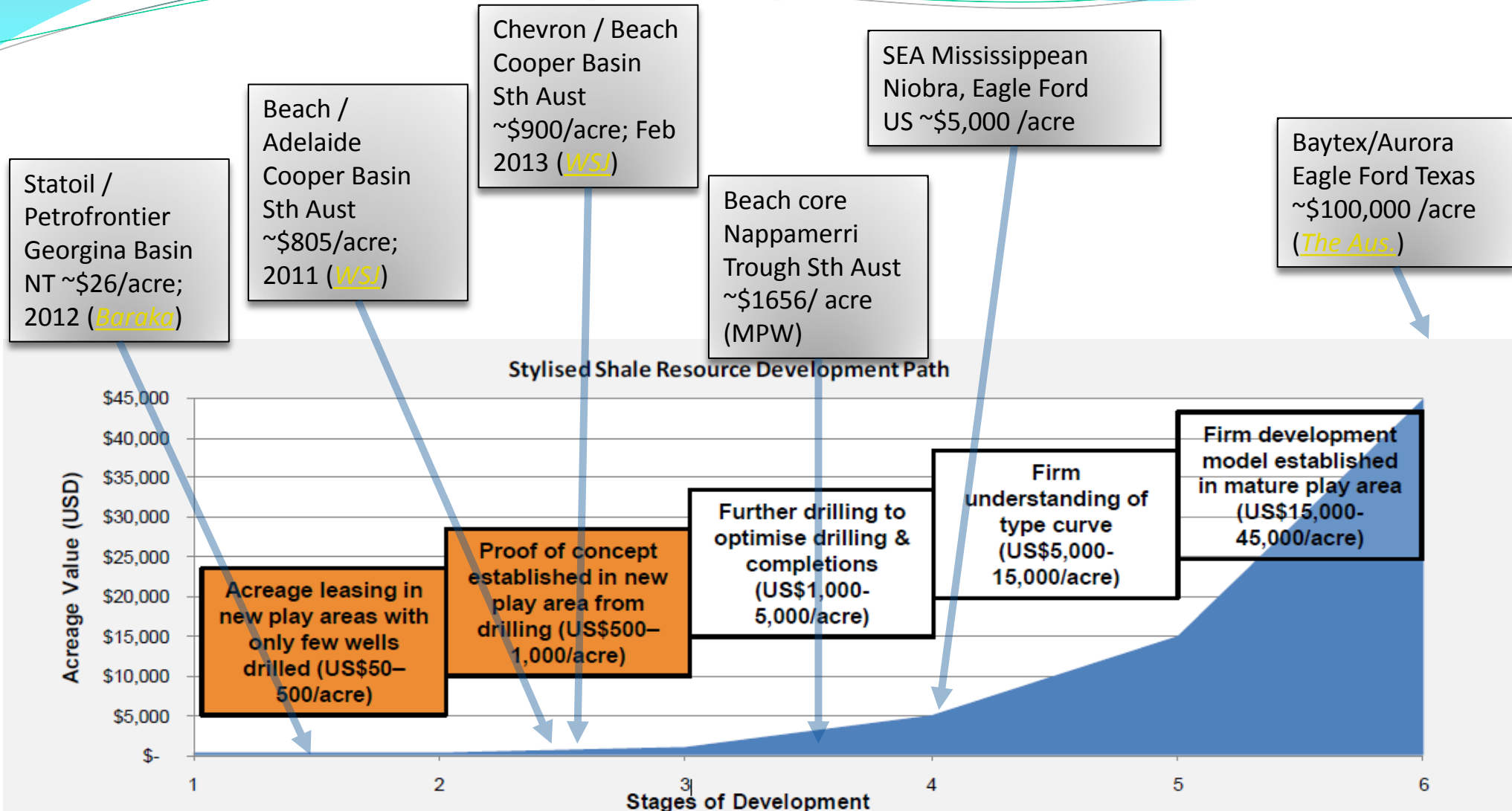
- Tight gas recognised as a major play in onshore basin (Geoscience Australia).
- Multiple tight gas & oil zones and discoveries in structural, stratigraphic and continuous accumulations





	Advent Energy's Bonaparte Basin EP386 & RL1 Unconventional Assets	Cooper Basin (source: Drillsearch, Beach Energy, Chevron)
<b>Contribution to Australian Petroleum</b>	A proven hydrocarbon producing basin representing 19% of Australian liquids and 17% of gas (2005 Geoscience Australia report).	Australia's largest onshore Oil & Gas Basin
<b>Exploration Density</b>	Advent's acreage is underexplored – 14 wells in 2,734km <sup>2</sup> – only 1 well for every 195km <sup>2</sup>	1 well per 20km <sup>2</sup>
<b>Data</b>	Well understood basin with readily available database of digital well and seismic	Well understood database of digital well and seismic
<b>Hydrocarbon Source</b>	Milligans formation up to 5000 feet thick (1500m+)	"REM" Shale Gas Play sequence 120-400m thick across the fairway
<b>Risk</b>	Excellent technical historic drilling success rates for hydrocarbons (65%)	Lower exploration risk than normally associated with oil and gas
<b>Maturity</b>	Potentially both wet & dry shale gas plays throughout basin	Potentially both wet & dry shale gas plays throughout basin
<b>Resource Density</b>	Gas-In-Place Prospective Resources range from 24-101 Bcf/km <sup>2</sup>	Potential gas-in-place estimates range up to 20-100 Bcf/km <sup>2</sup>

# Unconventional oil and gas conceptual value curve-USA reference



**References:**

- Redfork Energy Feb 2014, IFM 2014, and Pawnee Energy Ltd
- MPW: Macquarie Private Wealth
- Baraka: Baraka Petroleum website, accessed 20/03/2014
- WSJ: Wall Street Journal, accessed 20/03/2014
- The Aus.: The Australian, accessed 20/03/2014

Figure 3.7: Map of gas resources in Australia

# ACOLA Shale Gas Report



## ADVENT ENERGY LIMITED

### Advent Energy's 100% Owned Bonaparte Basin Acreage:

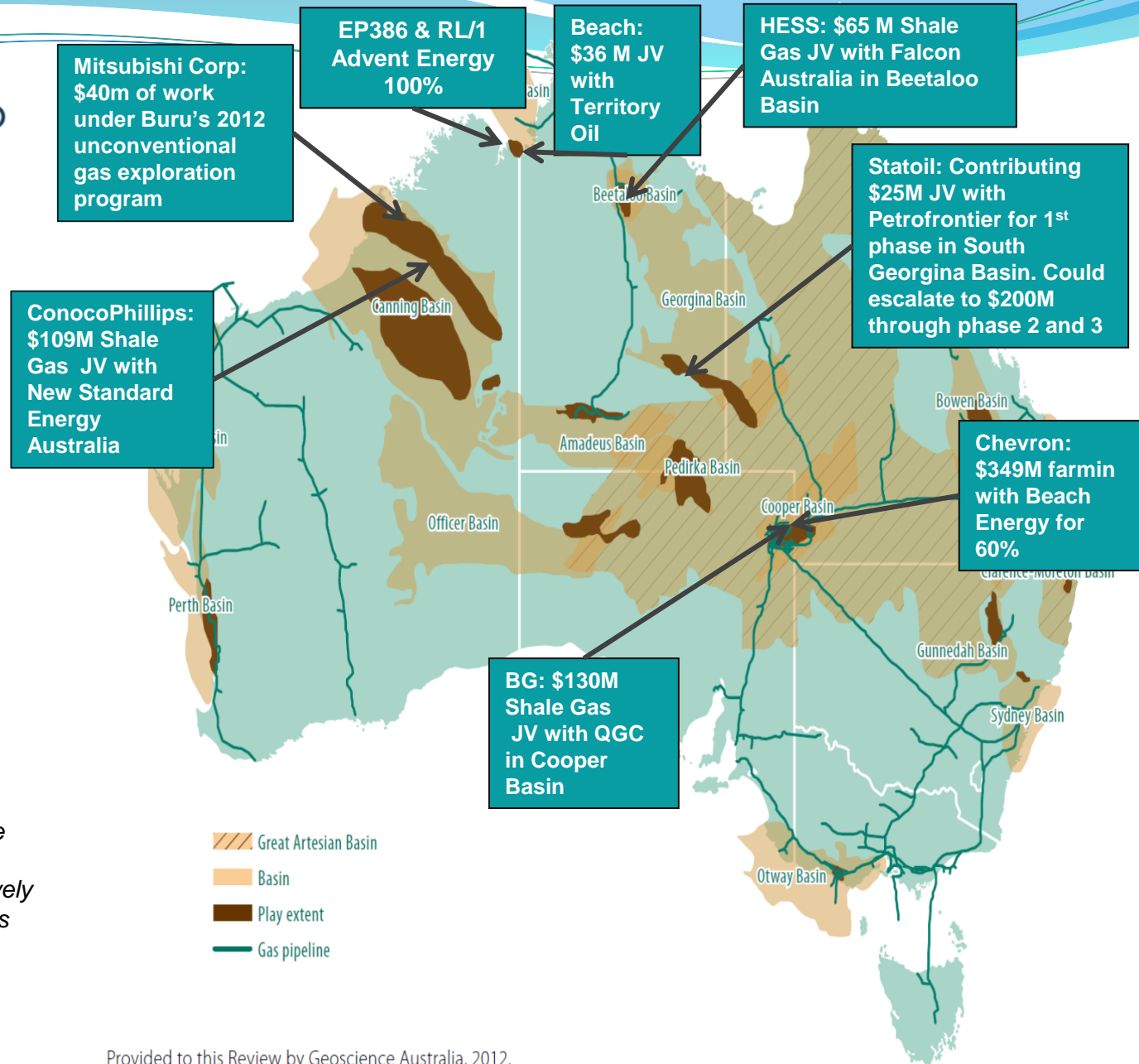
- **EP 386:** 634,567 Acres = 2568 km<sup>2</sup>
- **RL 1:** 41,019 Acres = 166 km<sup>2</sup>
- Thermally Mature, Thick Source Rock (>500m)
- Large Unconventional Resources Complex (Gas & Oil)
- Many Large Structures With Conventional Gas and Oil Discoveries

### •ACOLA study confirms play extent in Bonaparte

#### Morgan Stanley June 2011:

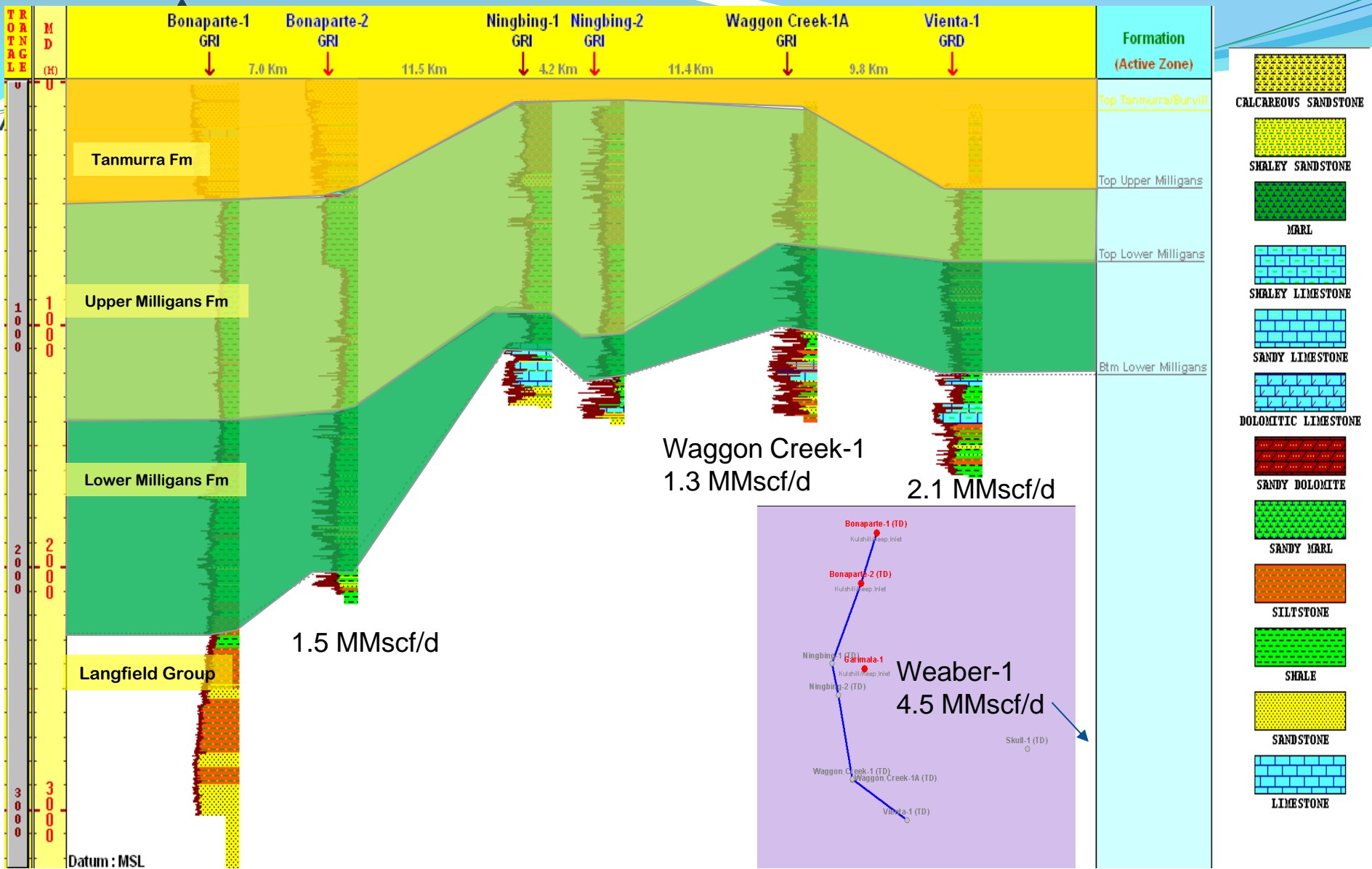
"86 acreage transactions in the US since 2009 shows an average price per acre of US\$5,500."

"two dozen companies are collectively intending to spend >US\$500mn this year"



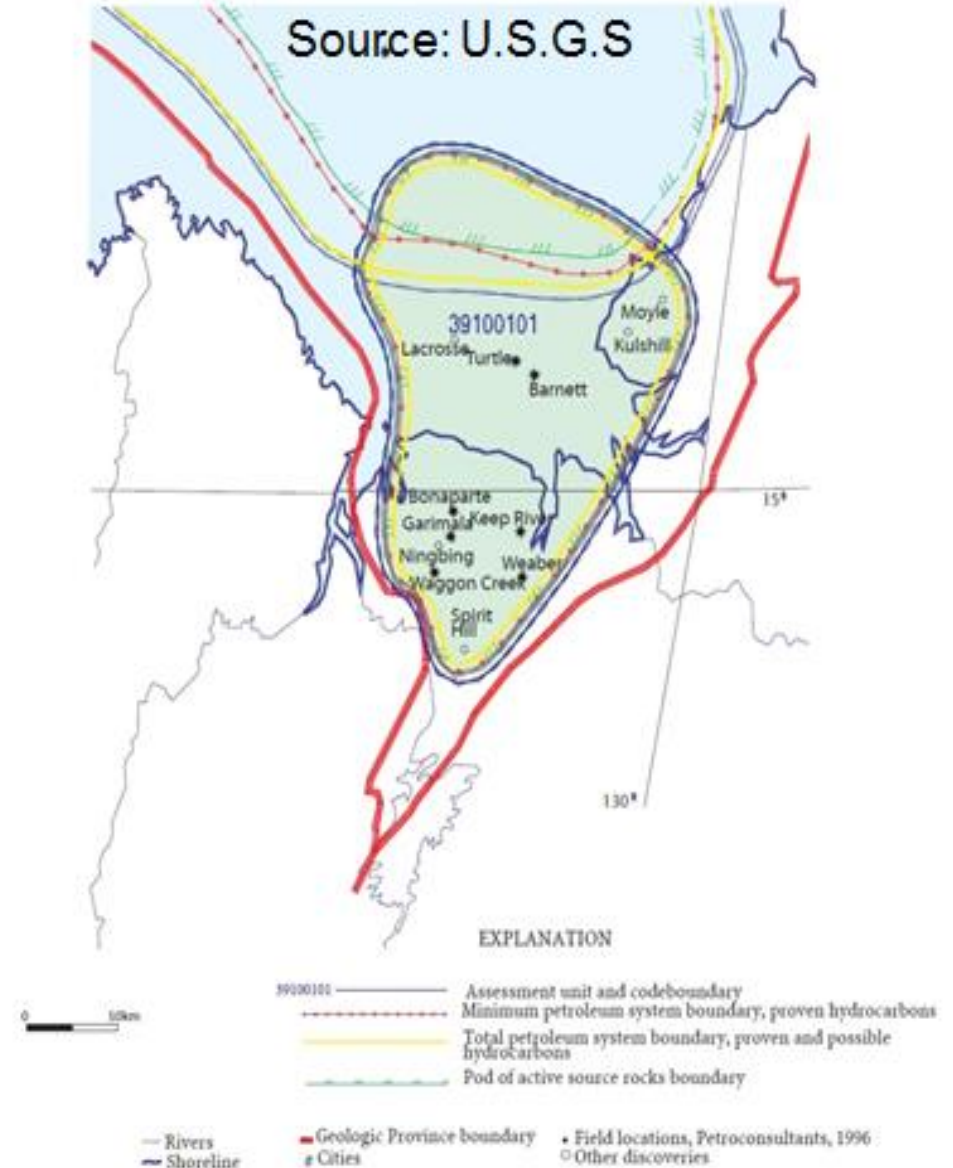
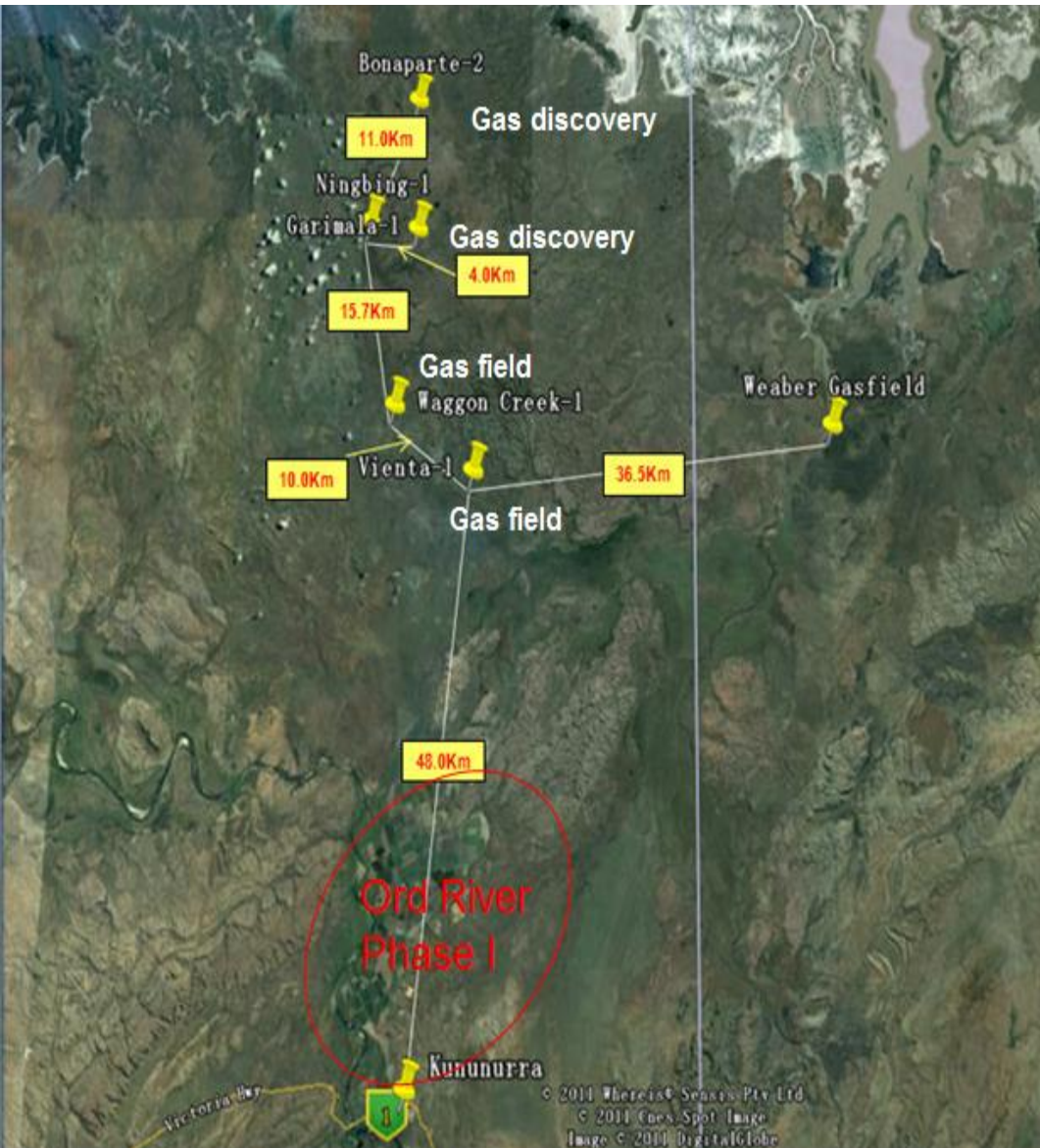
Provided to this Review by Geoscience Australia, 2012.





# EP 386: Well-Well Correlation in EP386

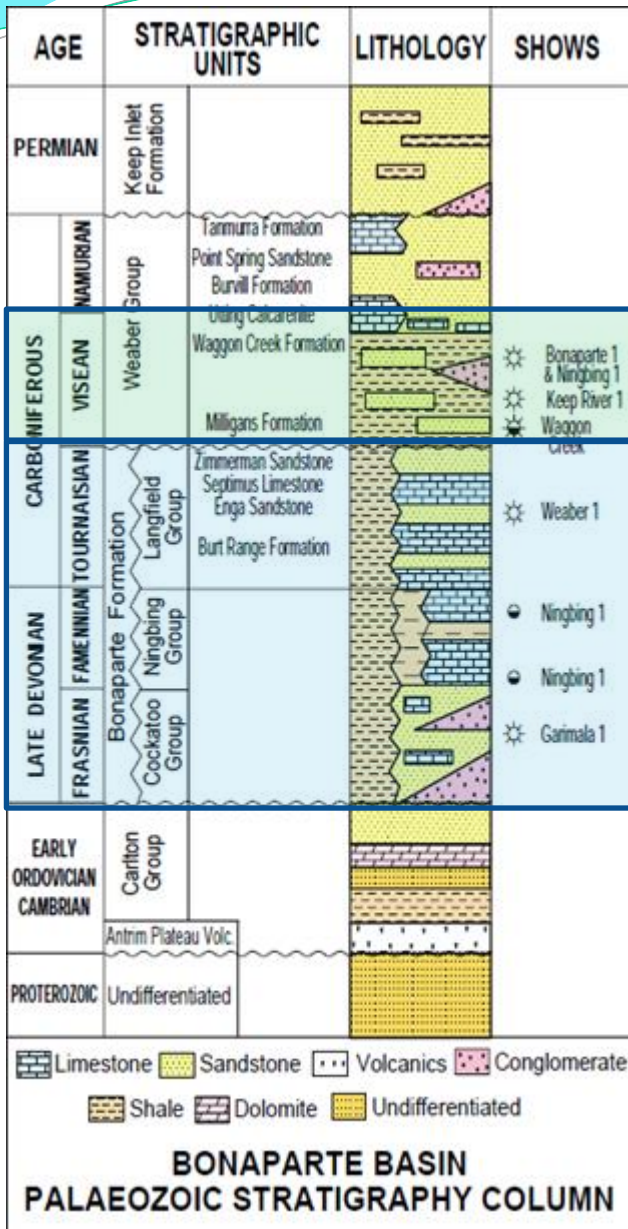
**U.S.G.S - Advent's conventional / unconventional gas area / existing wells in EP386 / RL1 and U.S.G.S. inset showing "pod of Active Source Rocks Boundary"- U.S.G.S. onshore mean 56 MMBO (oil) and 460 B.C.F Gas Undiscovered Resource – Conventional Resource Assessment**



**U.S. Geological Survey**



# Bonaparte Basin: Key Information



## Carboniferous Milligans Formation: Tight Gas, Shale Gas & Liquid Hydrocarbon Potential

- ▶ Key gas-prone source rocks
- ▶ Over 500m marine shale/mudstone
- ▶ TOC up to 4.3%
- ▶ Mature for oil and gas generation
- ▶ Elevated gas shows while drilling through the shaly and silty section
- ▶ Gas produced in conventional sandstone reservoirs from Waggon Creek-1 & Bonaparte-2 in EP386
- ▶ Oil recovered from Waggon Creek-1 on DST

## Carboniferous Langfield Grp + Devonian Ningbing Grp & Cockatoo Grp: Tight Gas & Liquid Hydrocarbon Potential

- ▶ Stacked-carbonate and sandstone reservoirs
- ▶ Devonian source rock mature for oil and gas generation
- ▶ Gas produced from Weaber gas field in RL1 and Ningbing-1, Vienta-1 and Garimala-1 wells in EP386
- ▶ Oil sample extracted from core of Ningbing-1



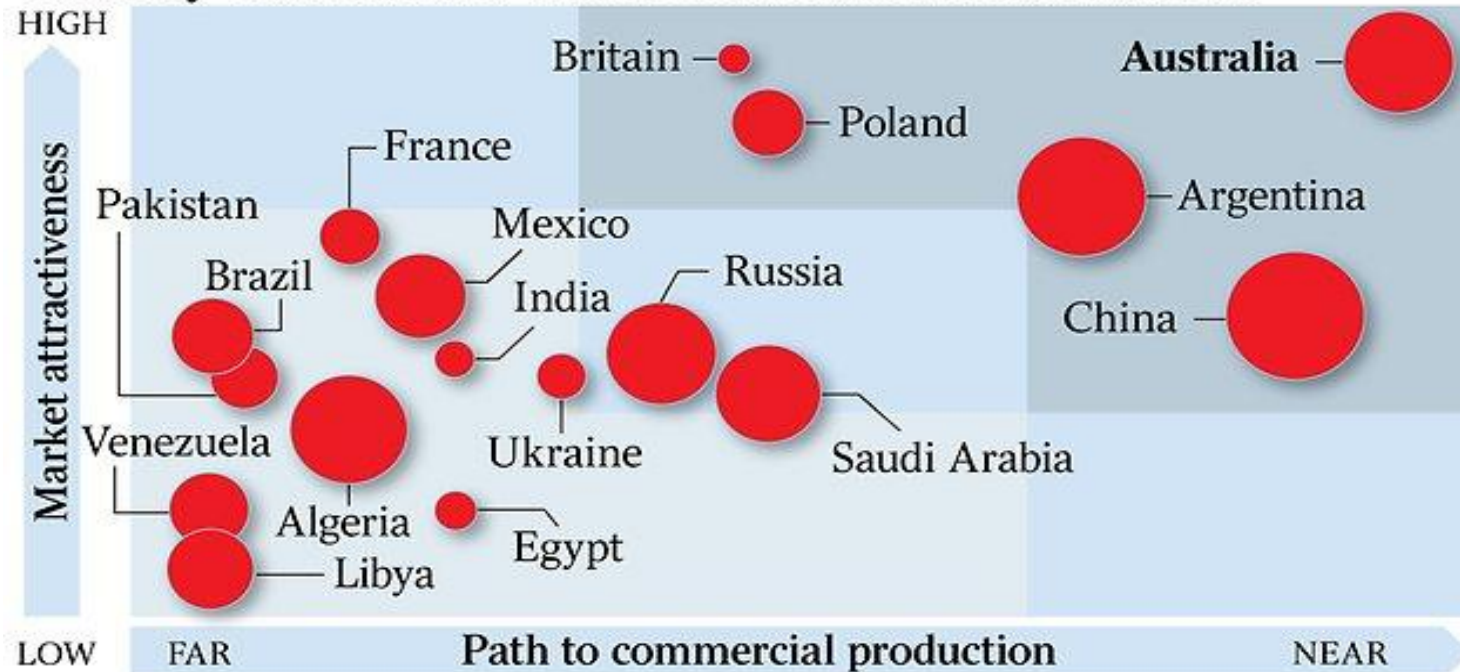


# Australia tipped to overtake China in shale boom

MATT CHAMBERS, *THE AUSTRALIAN*, JANUARY 20, 2014

ADVENT ENERGY LIMITED

## Country market and commercialisation assessment



Source: luxresearch

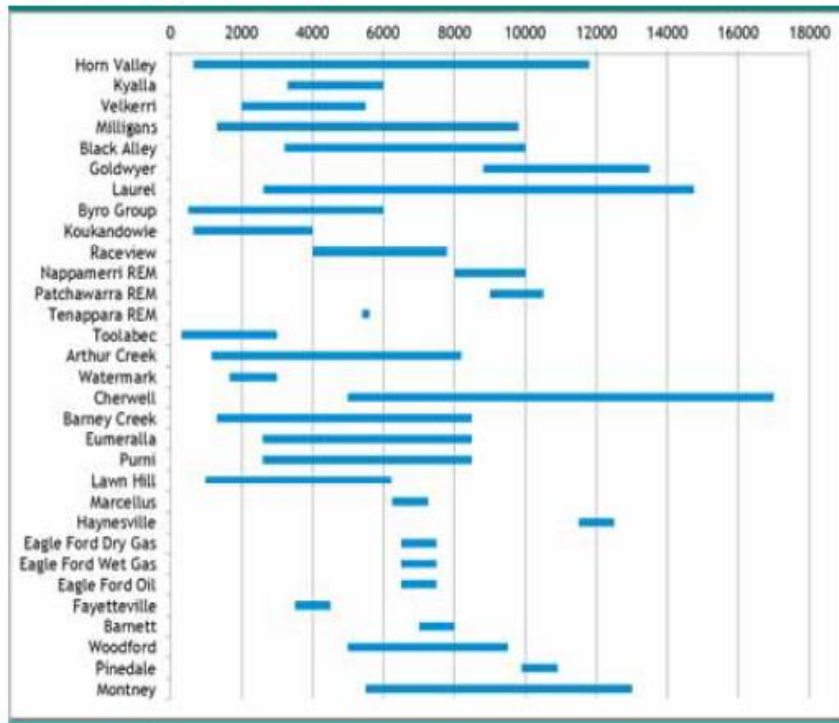
**AUSTRALIA** is being touted as the place most able to replicate the shale gas and oil success of the US, overtaking **China**, where exploration is struggling to gain traction, and other nations that pose too much regulatory risk. Boston consultant Lux Research has issued a study declaring Australia "the next big energy market" for shale ahead of China, which was once seen as having similar potential to the US. Australia beats other nations with potential shale and other unconventional resources because of know-how and government stability, Lux says.

**Table 4: Summary of Attributes of Australian and North American Plays**

Basin	Play	Gas-in-place conc (Bcf/mi <sup>2</sup> )	Liquids-in-place conc (Mmbbl/mi <sup>2</sup> )	Avg TOC (%)	Vitrinite reflectance (Ro)	Reservoir pressure (psi/ft)	Clay content (%)	Avg net shale thickness (ft)	Aerial extent (million acres)	Avg depth (ft)
<b>Australian plays</b>										
Amadeus	Horn Valley			4.5	1.0-1.8	Normal	Low	100	1.8	650-11800
Beetaloo	Kyalla	37-50	36	2.5	1.15-1.6	Moderate over-pressure	Low	130	0.2	3300-6000
	Velkerri	30-42	22	4.0	1.15-1.6	Moderate over-pressure	Low	100	1.5	2000-5500
Bonaparte	Milligans			1.8	0.8-1.8	Unknown	Low	120	0.7	1300-9800
Bowen	Black Alley			4.0	1.2-1.8	Moderate over-pressure	Low	165	12.7	3200-10000
Canning	Goldwyer	67-110	51	3.0	1.15-1.4	Normal	Low	250	70.8	8800-13500
	Laurel			1.5	0.8-2.0	Moderate over-pressure	Low	100	19.0	2625-14750
Camarvon	Byro Group			4.0	1.2-2.0	Unknown	Low	100	1.5	490-6000
Clarence-Morton	Koukandowie			3.0	1.2-1.6	Normal	Low	165	1.1	650-4000
	Raceview			3.0	1.2-1.6	Normal	Low	260	1.1	4000-7800
Cooper-Eromanga	Nappamerri REM	88-100	37	2.6	2.0-4.0	Moderate to high over-pressure (0.7)	Low (20)	300	2.6	8000-10000
	Patchawarra REM	16-19	14	2.6	1.0-2.0	Normal	Low (20)	60	0.8	9000-10500
	Tenappara REM		22	2.6	0.7-1.0	Normal	Low (20)	135	0.1	5500
Eromanga	Toolabec			2.0	0.6-0.8	Low	Very low	50	23.0	300-3000
Georgina	Arthur Creek	17.5-29	23	3.0-5.5	0.85-1.5	Normal	Low	70	3.6	1150-8200
Gunnedah	Watermark			5.0	1.2-1.6	Normal	Low	65	2.1	1650-3000
Maryborough	Cherwell	111		2.0	1.5	Moderate over-pressure	Low	250	0.8	5000-15000 8000-17000
McArthur	Barney Creek			2.0	0.4-1.4	Moderate over-pressure	Low	130	0.7	1300-8500
Otway	Eumeralla			1.0	1.2-2.3	Moderate over-pressure	Low	400	1.0	2600-8500
Pedirka	Purni			4.0	1.2-1.8	Moderate over-pressure	Low	150	7.3	2600-8500
Perth	Kockatea	59	25	5.6	1.15	Normal	Low	160	4.9	
	Carynginia	94		4.0	1.4	Normal	Low	250		
South Nicholson	Lawn Hill			8.0	0.8-2.0	Normal	Low	75	1.4	985-6230
<b>North American plays</b>										
Appalachian	Marcellus	80-120		5.3-7.8	1.6	Normal to moderate over-pressure (0.46-0.52)*	Low (10-35)	125	60.7	6750
Haynesville	Haynesville	120-200		3.0-5.0	1.72-2.6	High over-pressure (0.85-0.95)	Low (27)	250	3.7	12000
Maverick & East Texas	Eagle Ford Dry Gas	100		4.3	0.9-1.2	Normal to high over-pressure (0.6-0.8)	Very low (8)	200	0.1	7000
	Eagle Ford Wet Gas	80-90		4.3	0.9-1.2	Normal to high over-pressure (0.6-0.8)	Low	200	0.6	7000
	Eagle Ford Oil		30-50	4.3	0.9-1.2	Normal to high over-pressure (0.6-0.8)	Low	200	1.4	7000
Arkoma	Fayetteville	30-60		4.0-9.6	1.2-3.0	Normal to moderate over-pressure (0.42)		110	5.8	4000
Fort Worth	Barnett	150-200		4.5	1.2	Normal to moderate over-pressure (0.42-0.526)	Low (27)	300	4.1	7500
Anadarko, Ardmore, Arkoma & Chautauqua	Woodford	60-120		4.0-6.5	0.5-2.5	Normal to moderate over-pressure(0.48)		200	3.0	5000-9500
Green River	Pinedale	80-140			0.7-1.0	High over-pressure (0.9)	Very low		0.2	10400
Western Canada Sedimentary	Montney	138-175		0.5-4.0	1.2-1.4	Moderate to high over-pressure (0.57-0.75)	Very low (5-15)	150	0.7	5500-13000

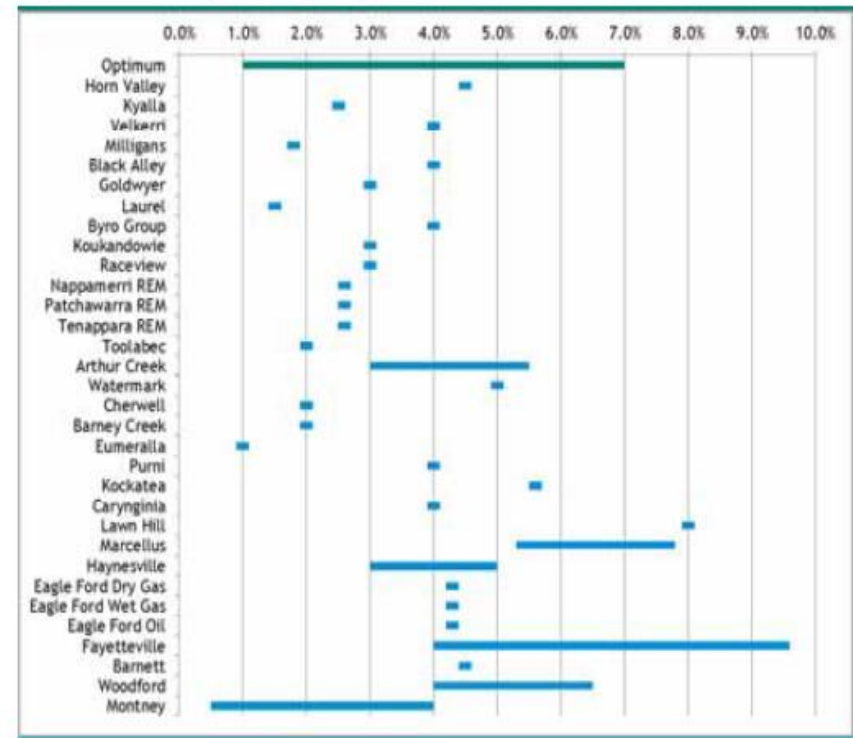
\*Large areas of play under-pressured; Source: AWT International, Oil & Gas Journal, DOE, SPE, MBA Petroleum Consultants, USGS, Canada National Energy Board, RFC Ambrian estimates

Figure 15: Depth Ranges (ft)



Source: RFC Ambrian

Figure 16: Average TOC (wt%)



Source: RFC Ambrian

For shale gas, TOCs should ideally be between 2.0% by weight (wt%) and 7.0wt%.  
 A value of approximately 0.5wt% is considered the minimum for an effective conventional source rock.

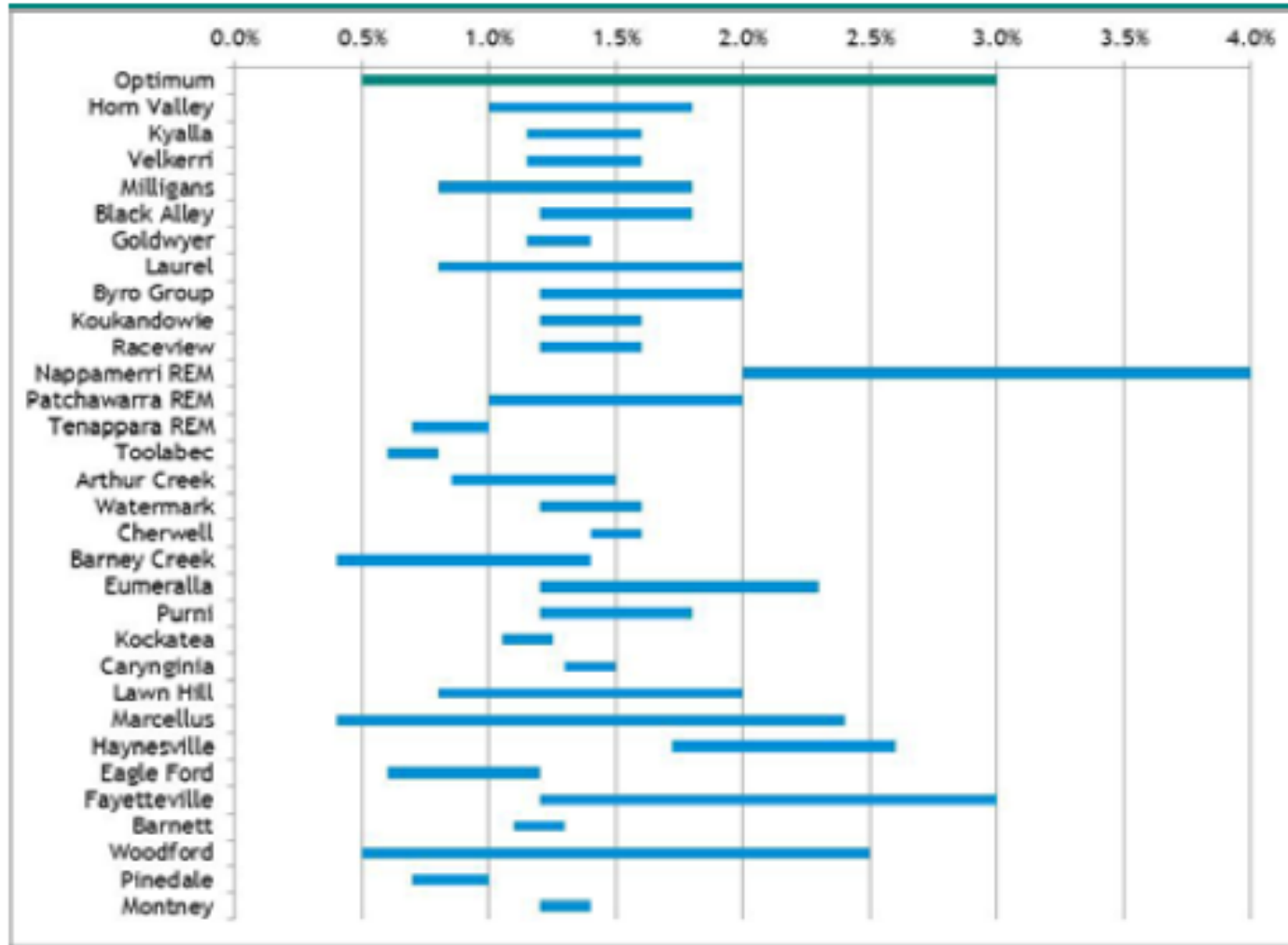
Many of the North American plays have TOC values that exceed the ideal range, whilst most Australian plays fall comfortably within the optimum range.





The graph below shows that the average vitrinite reflectance values for most of the plays fall into the optimum range of 1.0-3.0%.

Figure 17: Vitrinite Reflectance (%)



Source: RFC Ambrian



ADVENT ENERGY

# Geoscience Australia Report

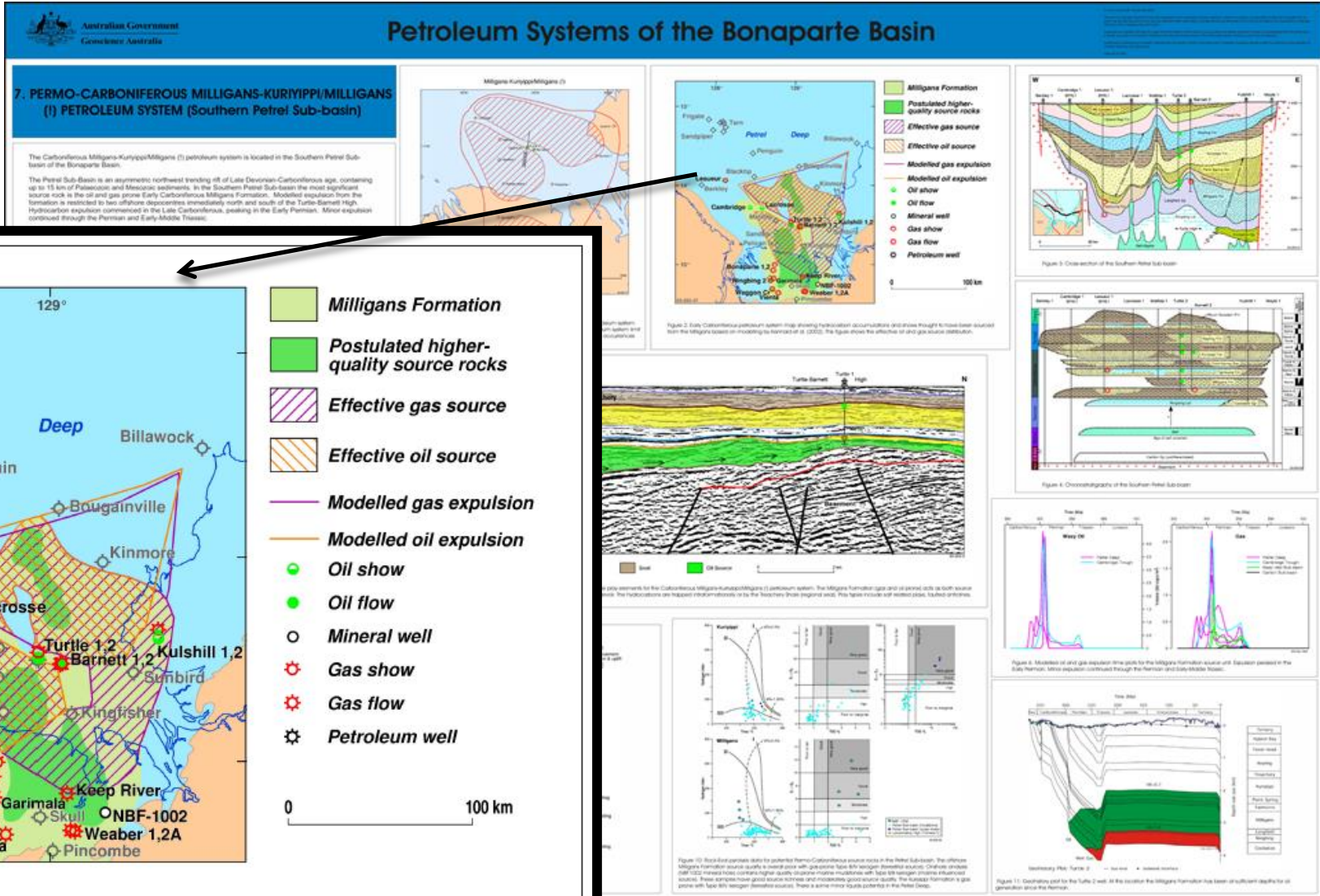


Figure 2: Early Carboniferous petroleum system map showing hydrocarbon accumulations and shows thought to have been sourced from the Milligans based on modelling by Kennard et al. (2002). This figure shows the effective oil and gas source distribution.





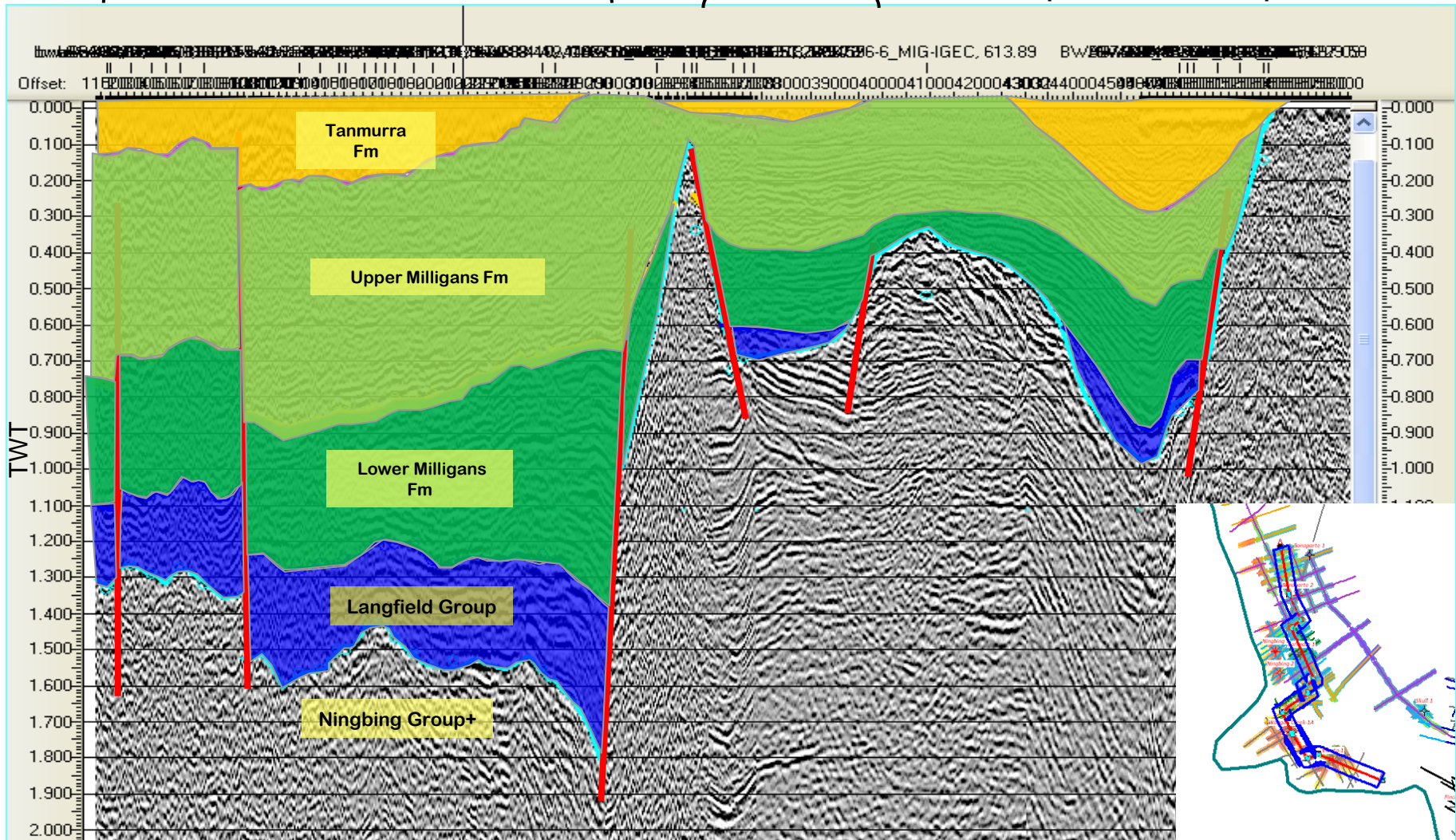
# EP 386: Key Deposition Centres in EP386

ADVENT ENERGY LIMITED

Moogarooga Deep

Waggon Creek Deep

Vienta Deep







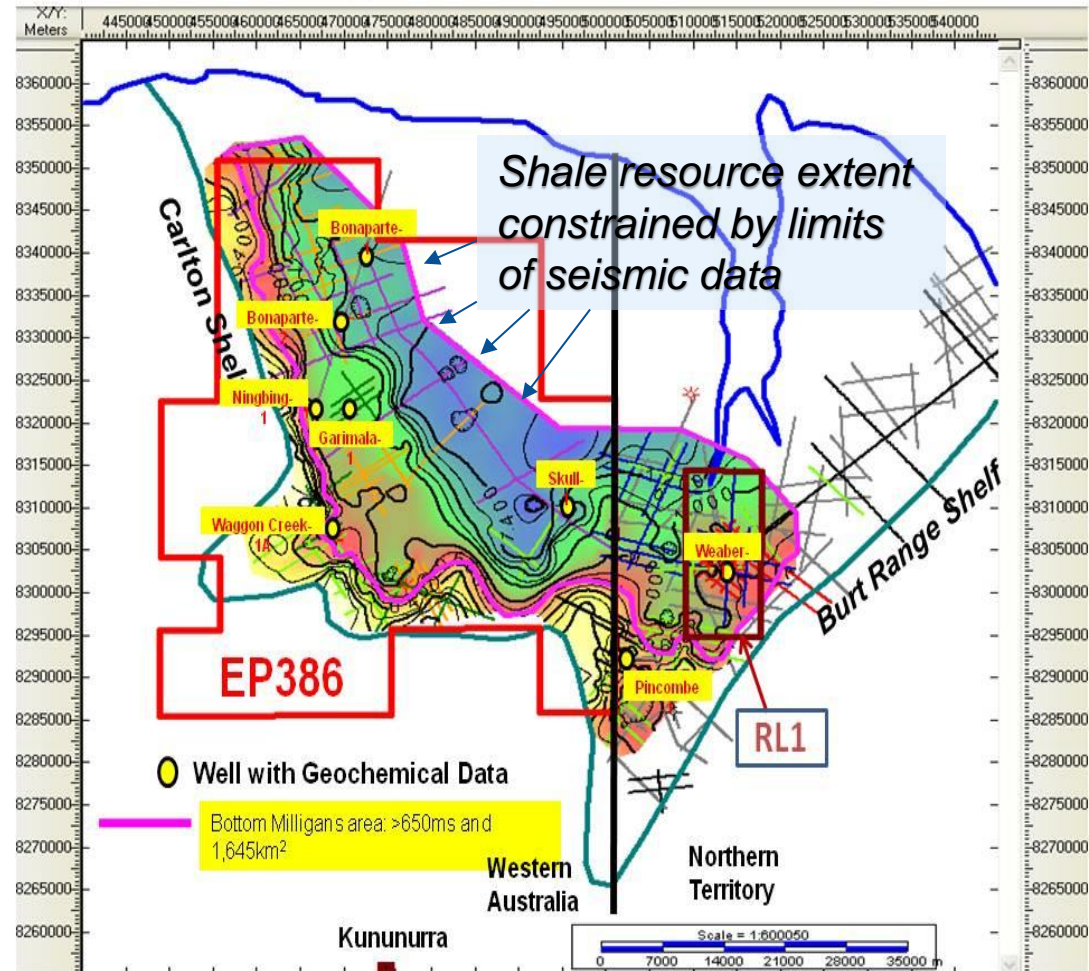
# Bonaparte Basin (WA/NT) EP 386 / RL-1

## Shale and tight gas exploration

### EP 386 Shale Gas Unrisked Prospective Resource Estimates

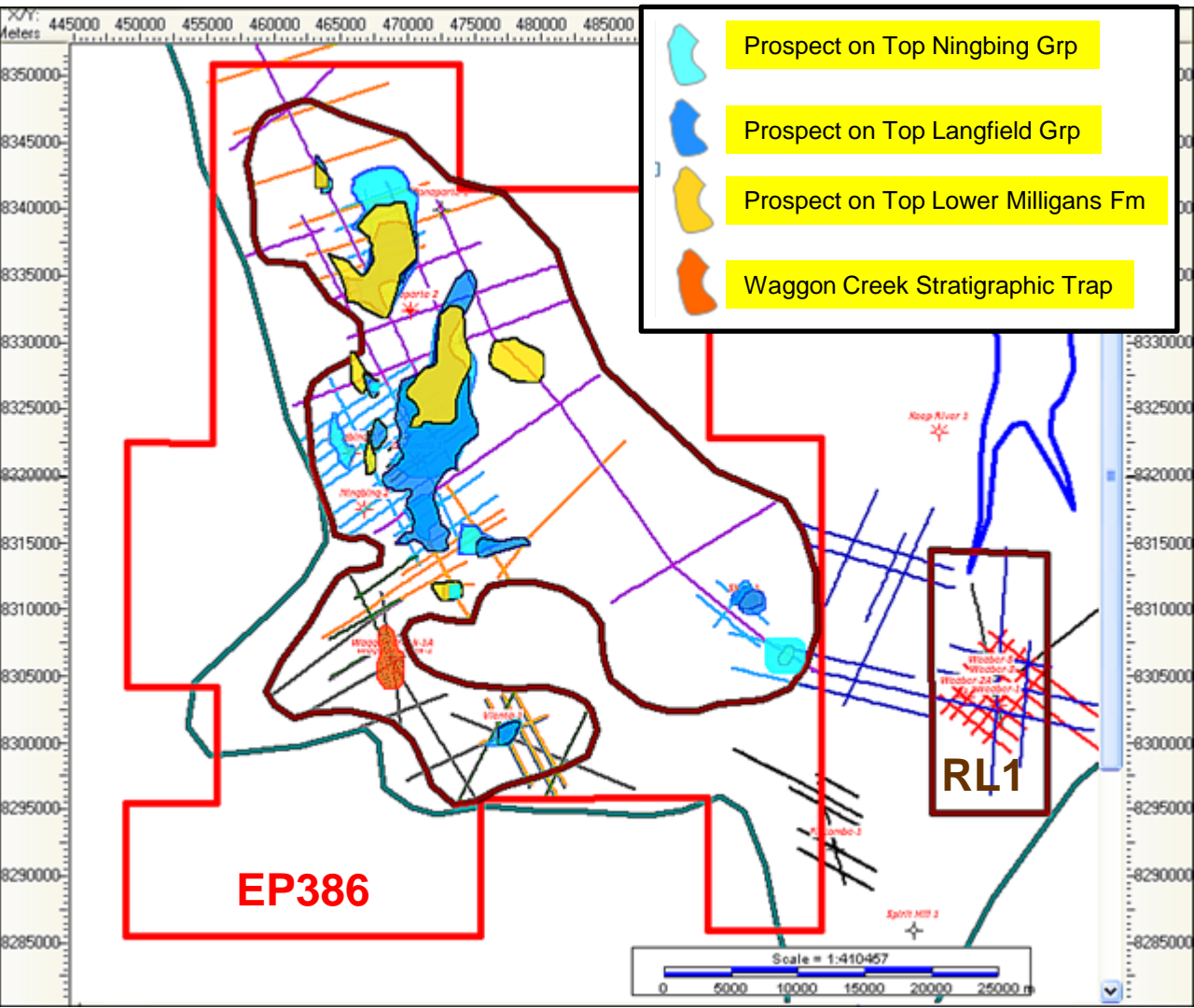
Lower Milligans Fm EP 386 & RL 1				
Parameters	Unit	Low	Best	High
Area - A	Acres	197,683	296,525	345,946
Pay Thickness -h	Ft	1310	1640	1968
Net to Gross Ratio - r	Dec. fraction	0.6	0.6	0.6
Effective Matrix Porosity - $\Phi_m$	Dec. fraction	0.02	0.03	0.04
Fracture porosity - $\Phi_f$	Dec. fraction	0.04	0.05	0.06
Formation Volume Factor - FVF		70	75	75
Matrix Water Saturation - $S_{wm}$	Dec. fraction	0.6	0.58	0.55
Water saturation of the fracture porosity - $S_{wf}$	Dec. fraction	0.5	0.4	0.3
Adsorbed Gas Storage Capacity - Gs	Scf/Ton	15	30	50
Shale Density - $\rho$	G/cm <sup>3</sup>	1.9	2.1	2.2
<b>Original Gas In Place - OGIP</b>	<b>BCF</b>	<b>19,287</b>	<b>65,603</b>	<b>141,170</b>
OGIP per sq.miles (per Section)	BCF	62	142	261
Assumed Recovery Factor	%	10	15	18
<b>Prospective Gas Resources</b>	<b>BCF</b>	<b>1,929</b>	<b>9,840</b>	<b>25,411</b>
Average Prospective Gas Resources per sq.km.	BCF	2.4	8.2	18.2
Average Prospective Gas Resources per sq.miles	BCF	6.2	21.2	47.0

### Lower Milligans : Shale Gas Potential Area



# EP 386 & RL/1: Prospects/Lead Summary (showing Seismic lines)

- mean conventional recoverable 556 BCF



## Unrisked OGIP & Prospective Recoverable Conventional Hydrocarbon Resources in EP386

	Low Estimate (BCF)	Best Estimate (BCF)	High Estimate (BCF)	Swanson's Mean (BCF)
OGIP	88.9	548	1,895	814.21
Recoverable Gas	53.3	355.9	1,326.3	556.27
Recoverable Condensate (MMbbl)	0.53	7.12	39.79	14.94

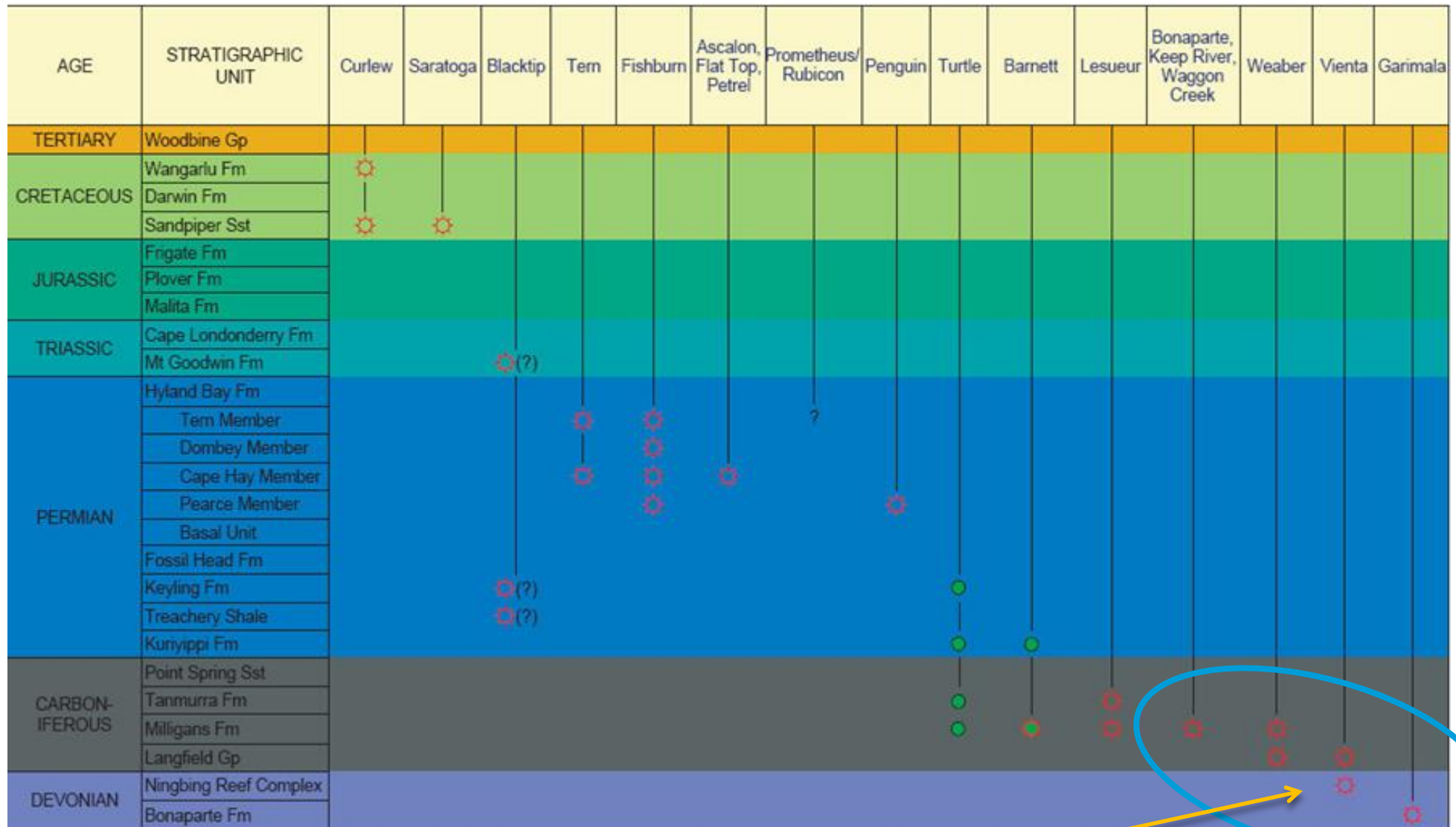
## Independently Assessed Contingent Resources in RL1: Weaber Gas Field

Weaber Field	1C	2C	3C	Mean
Gas Initially In Place (Bcf)	0.33	13.9	54.1	21.9
Contingent Resources (Bcf)	0.25	11.5	45.8	18.4





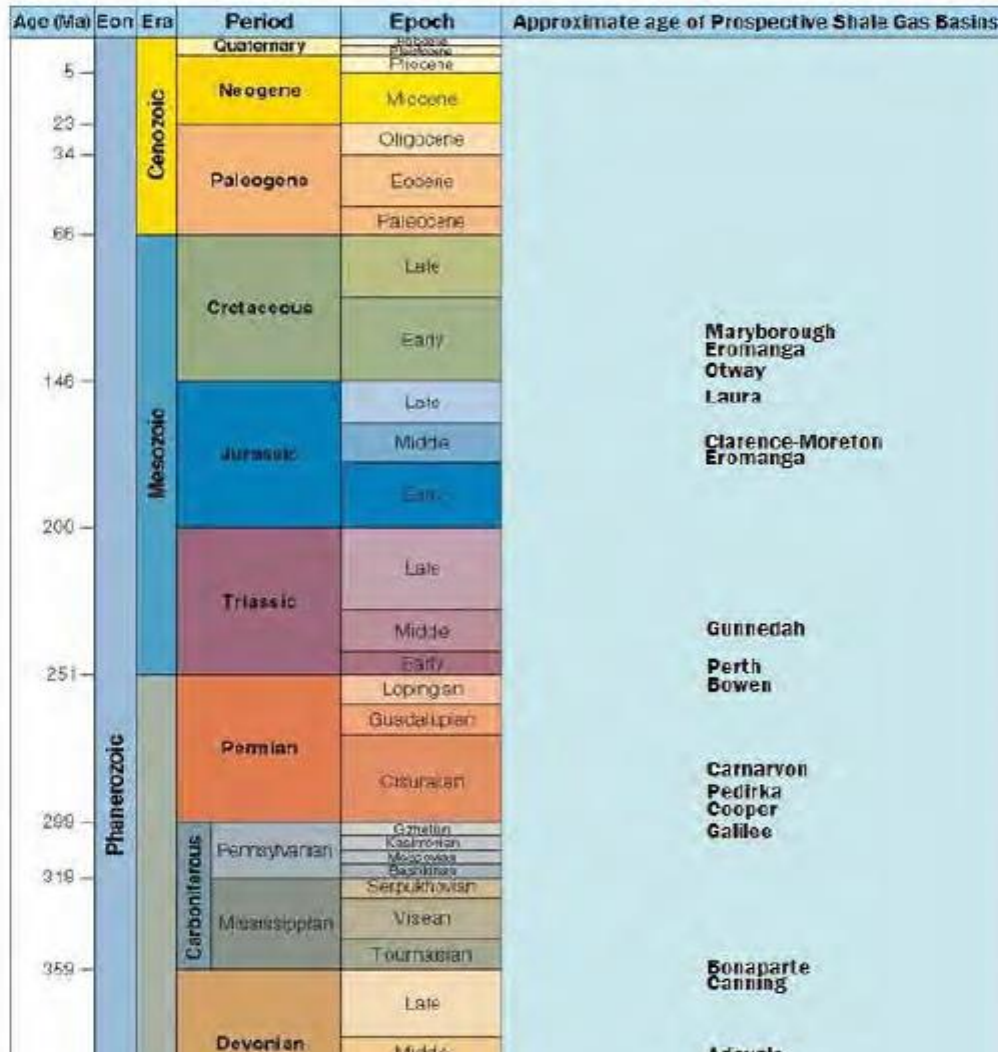
# Bonaparte Basin- A Proven Hydrocarbon Producing Basin



EP386 & RL1 Gas Reservoirs

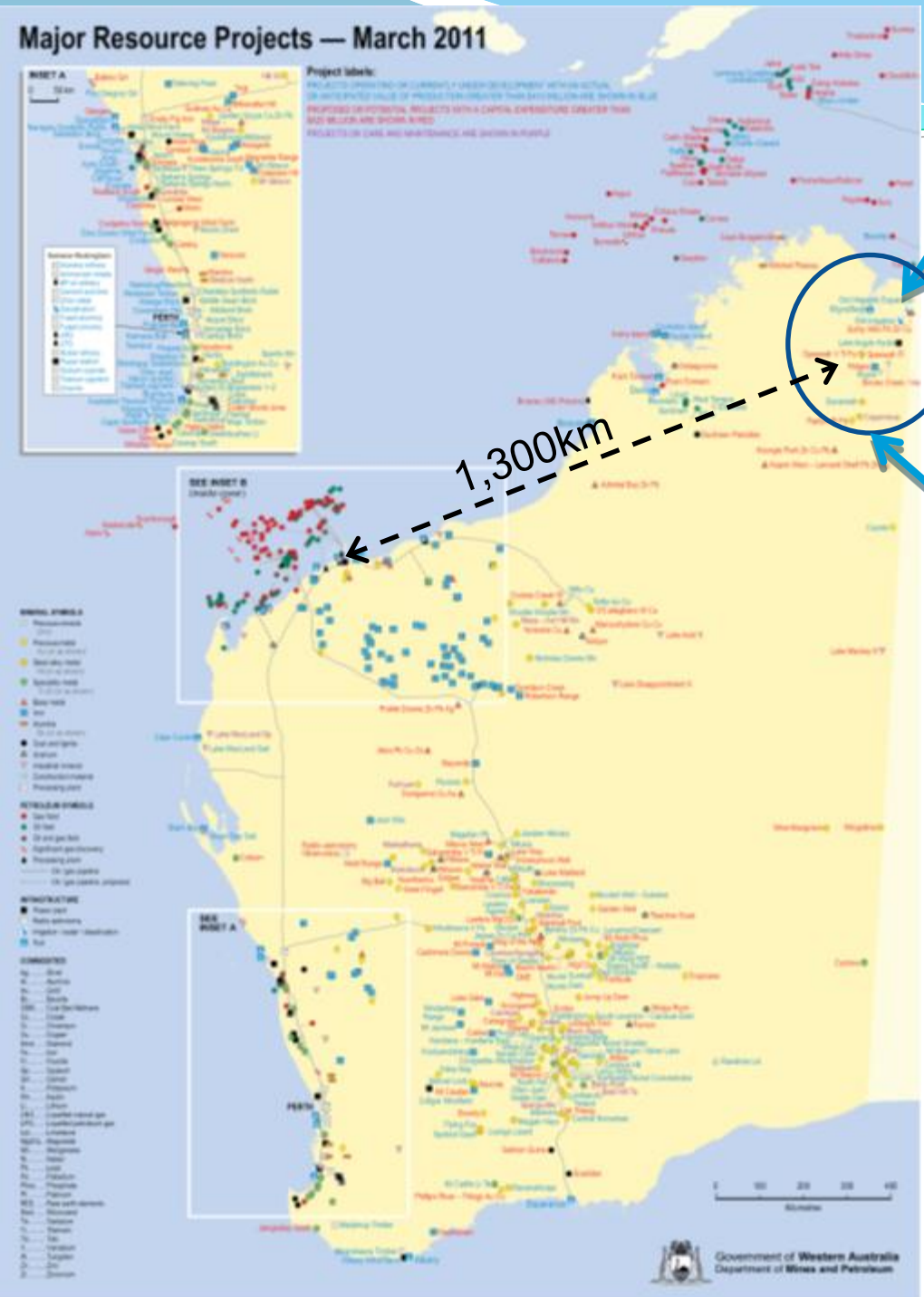


Geological Epochs with ages of the prospective shale gas basins shown (after Geoscience Australia).



# State of Western Australia

- Economy of Western Australia is equal to 50<sup>th</sup> biggest country globally underpinned by resources including LNG, Iron Ore, Diamonds, Coal, Agriculture, Gold and Aluminium
- Australia forecast to be world's largest LNG exporter
- "WA exports more than half the value of all of the USA's merchandise exports to China. WA by itself matters in China" *WA Premier Colin Barnett*



Onshore Bonaparte Basin Advent gas project area

Resource projects proximal to Advent gas project area

Argyle Diamond Mine





# Lake Argyle



## Lake Argyle:

Surface area of 1,000 square km (18 times the size of Sydney Harbour)

Storage capacity of 10,763,000 ML

Largest reservoir in Australia

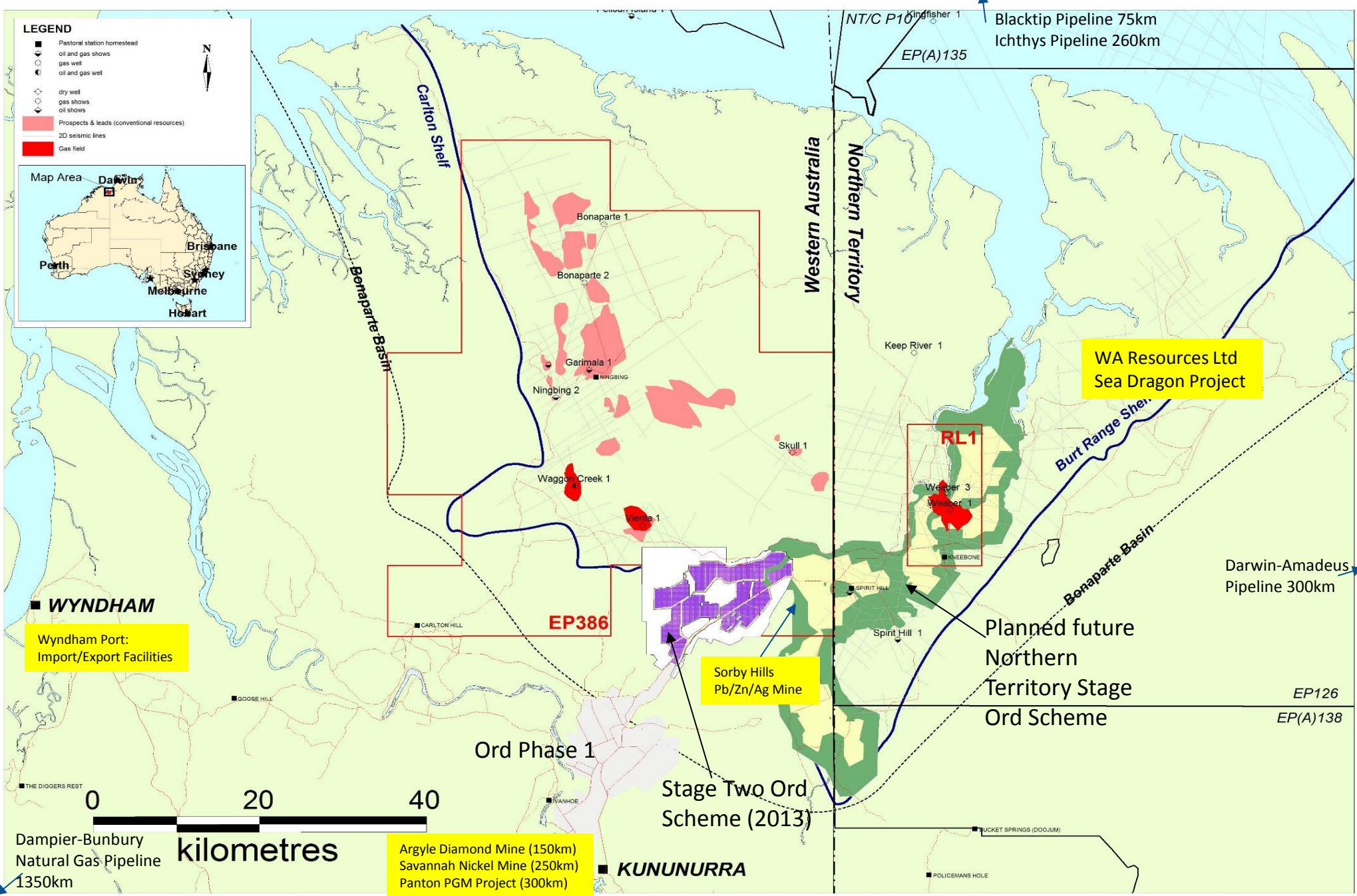
## Ord Irrigation Area

- ▶ Stage Two of the Ord River scheme has significantly enhanced road access to the Vienta Gas Field
- ▶ Stage Two Ord roads capable of road train access are to be constructed during 2012/2013 - allows for construction CNG /MINI LNG
- ▶ WA Govt. is completing construction of infrastructure for Stage Two of the Ord scheme and expects to complete key roadworks by 2013

# Ord Irrigation Area Phase II







**EP386 & RL1 – Onshore Bonaparte Basin, Northern Australia**





## Adjacent Port of Wyndham:

Wyndham Port is the only deep-water port between Broome and Darwin. Exports include oil, iron ore, live cattle and nickel. Imports include fuel oil, ammonium nitrate for the mining industry (in particular Argyle Diamond Mine) and general cargo. The port is predominantly for servicing of commercial and trade vessels and is a designated maritime security facility. LNG tankers can access Wyndham Port.





## Snøhvit

Process barge in Cadiz, Spain



## LNG Plants



Our LNG production facility in Snurrevarden, Norway, fully fitted with remote monitoring and control capabilities, was the first free-standing small scale LNG plant in Northern Europe.

<http://www.wartsila.com/en/oil-gas/onshore/applications/lng-terminals>



In-docking of  
process barge

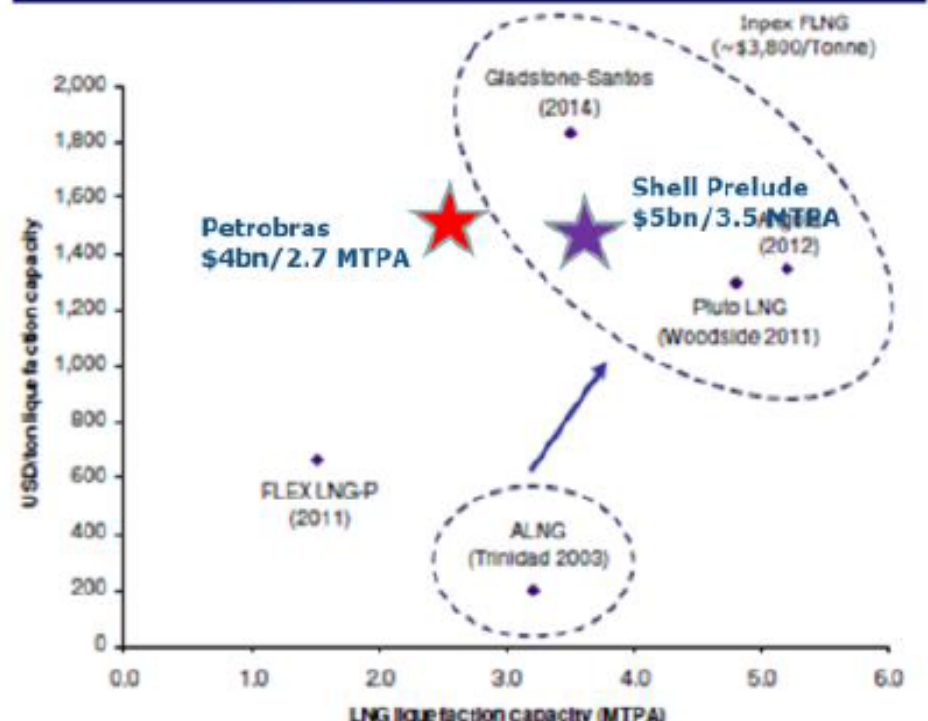
- 💧 CAPEX Metrics – care not all LNG-FPSOs are created equal!
- 💧 OPEX
- 💧 Production Cost \$/MMBTU
- 💧 LNG Value Chain
- 💧 Options to Improve economics

RG | 23 October 2013

## FLOATING LIQUEFACTION ADVANCEMENTS



### New paradigm for the LNG industry



Background Graph courtesy of FlexLNG





# LNG

Production,  
Storage,  
Distribution  
& Use



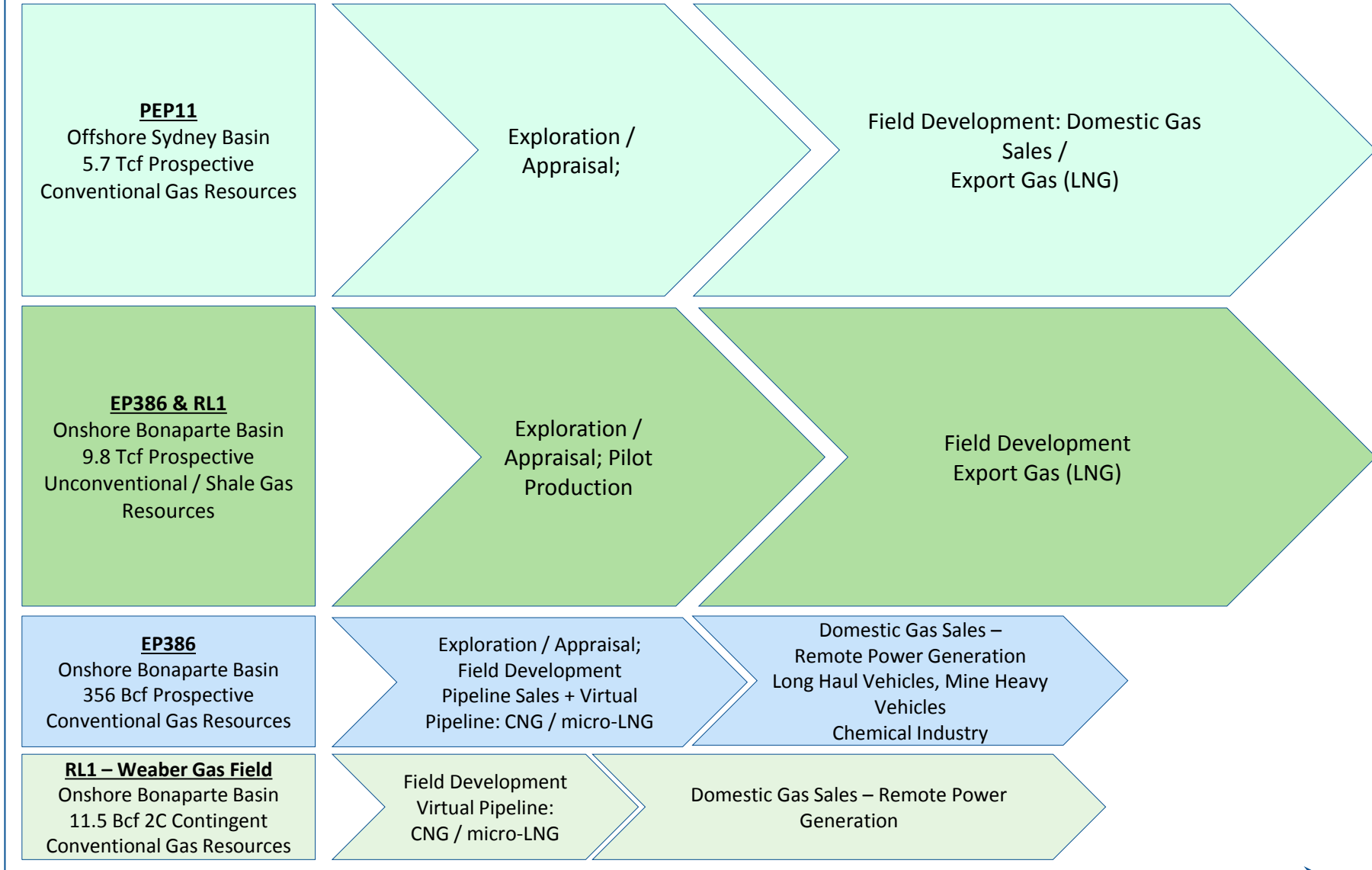




# Advent Growth Strategy

ADVENT ENERGY LIMITED

Contribution to Value



Short Term

Mid Term

Long Term



## ADVENT Energy Ltd. – Summary

Late stage Exploration with early stage Production wells

Low-risk, high-return pipeline 4 petroleum titles and 20 validated wells

Focus on low-entry-cost projects with massive deposits

Booming demand for gas and shortage of supply in Asia

Experienced and high-demand management team in place

- ▶ ADVENT's four key petroleum titles contain all the elements seen in other producing, world class petroleum basins, and have an aggregate Prospective recoverable Resources of over 15 TCF (Best Estimate).
- ▶ The aggregate area of all four permits exceeds 6,800 km<sup>2</sup>
- ▶ Multiple petroleum targets are present in EP386 & RL1 – Lower Milligans Fm shale is prospective for shale gas play with considerably large upside potential. All wells have been independently validated for gas/methane content.
- ▶ The thickness of the prospective shale gas play varies from over 300 m to over 1,500 m.
- ▶ Unconventional OGIP for EP386 & RL1 estimated in the range from 19 TCF to 141 TCF in Milligans Formation shales, with additional potential in deeper prospective shales. Conservative independent assessments for the region provide a 6 TCF Prospective Resource
- ▶ Federal and State Government investment into the Kununurra/East Kimberley region exceeding \$500 million and will bring infrastructure within 15 km of the Vienta gas discovery.
- ▶ Management & board members hold over 75 years combined oil industry experience, mainly from Schlumberger Asia.
- ▶ Exceptional advisory panel with international oil industry experience.



ADVENT ENERGY LIMITED

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