

Natural Gas: Reservoir to Export Breakfast

25 September 2019

South
Australian
Chamber
Of
Mines &
Energy

Rebecca Knol

Chief Executive Officer

Natural Gas Breakfast
25 September 2019

Cooper Basin, SA

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Activism



Electricity

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GLNG, Curtis Island, QLD

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Pipelines

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Natural Gas

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Natural Gas: Reservoir to Export Breakfast

25 September 2019

Graeme Bethune CEO & Founder EnergyQuest

Natural Gas Breakfast
25 September 2019

SACOME Natural Gas Forum

Graeme Bethune
Chief Executive Officer
EnergyQuest

25 September 2019



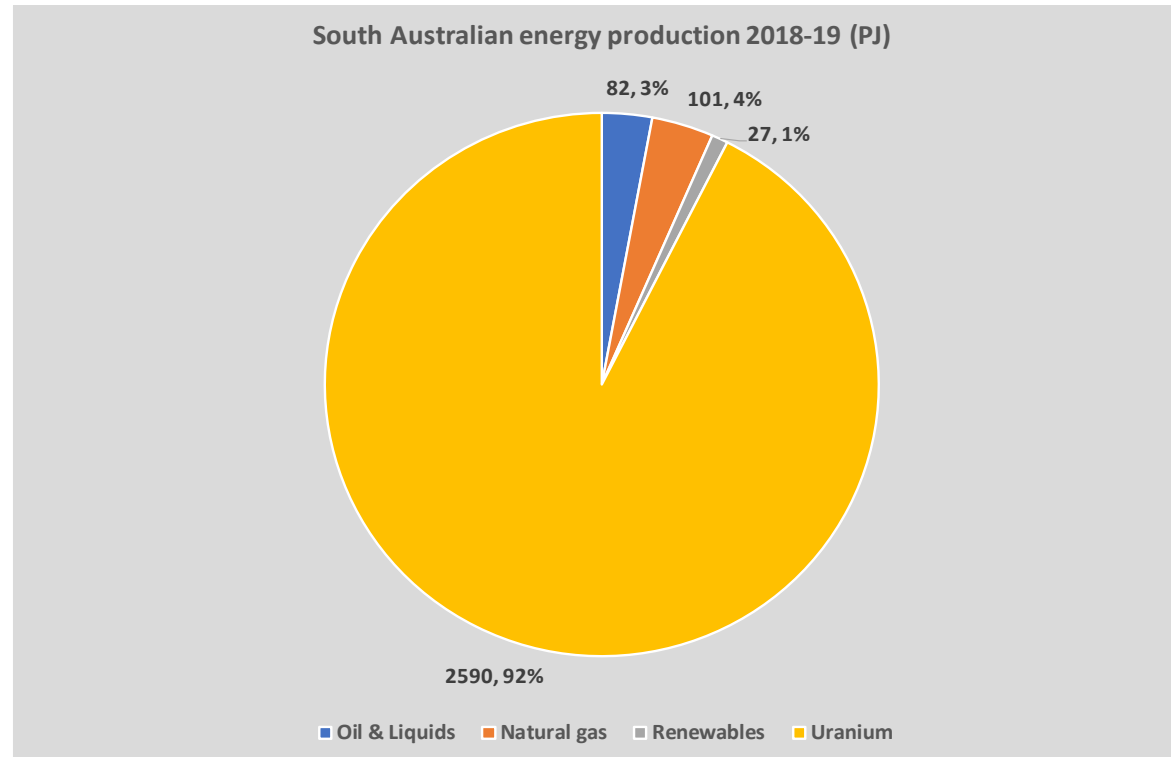
Moomba at twilight courtesy Santos

EnergyQuest

- Adelaide-based energy advisory firm, providing independent energy market analysis and strategy for energy companies, energy buyers, investors and governments around Australia and around the world.
- Founded in 2005 by Graeme and Susan Bethune
- Graeme is also Chair of the Australian Gas Industry Trust, member of the Executive Committee of the International Gas Union and IGU Regional Coordinator for North Asia and Australasia.
- AGIT is supporting the Future Fuels CRC and IGU members are at the forefront of EU target of zero net emissions by 2050.



SA energy 101: production

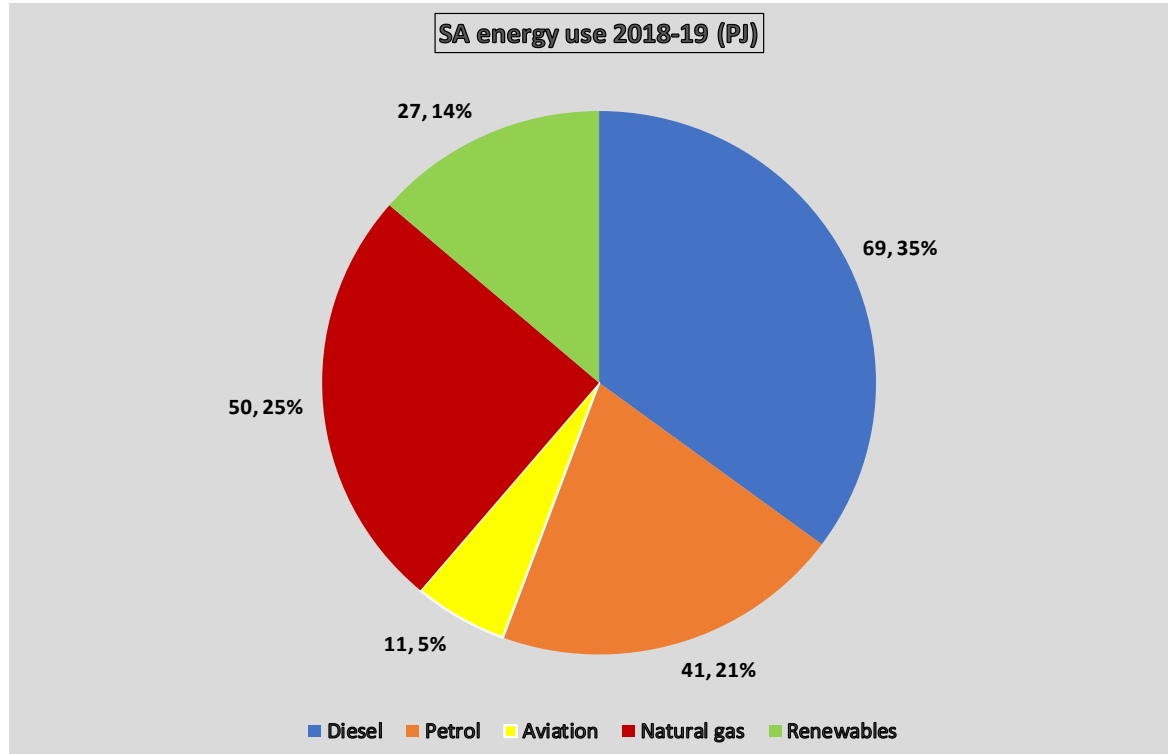


Sources: EnergyQuest, Dept of Environment and Energy

- Uranium dominant form of SA energy production. All exported. Reduces GHG emissions in the US, EU and Asia.



SA energy 101: consumption

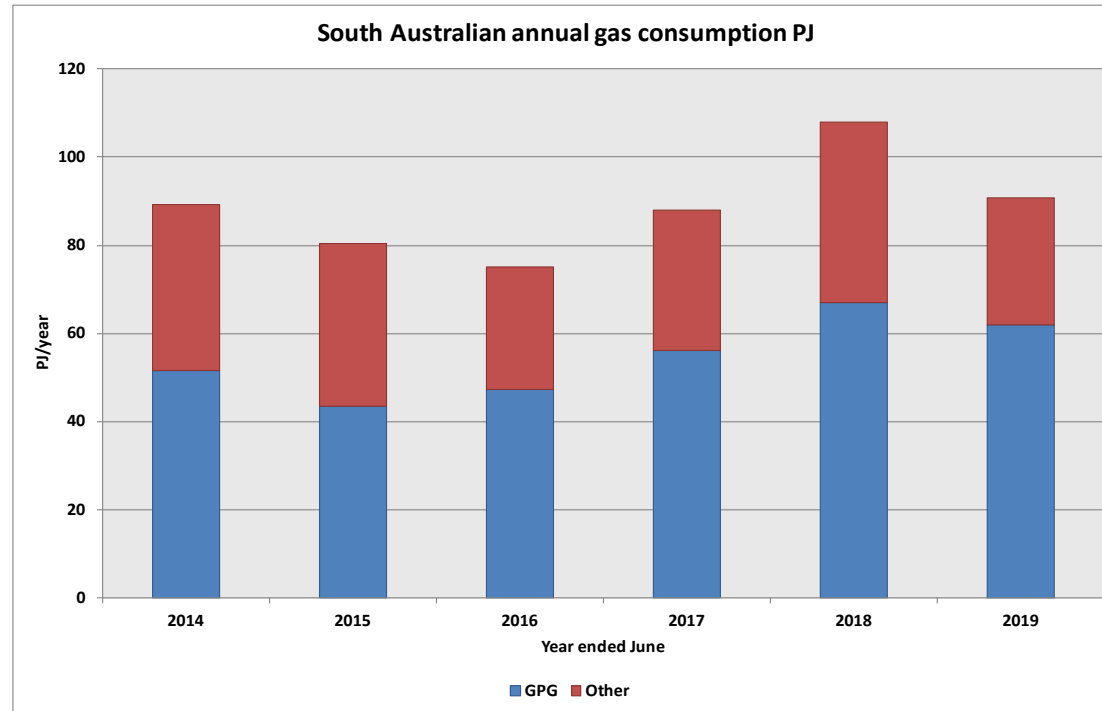


Sources: EnergyQuest, Dept of Environment and Energy

- Transport fuels dominate consumption (~60%). All imported. Natural gas the 2nd most important. Around 20% imported from Qld and Vic. Renewables 14%. Would need to increase renewables 7x to reach 100% renewable.



SA natural gas consumption (PJ)



Major industrial users e.g.

Adbri

GFG

Orora

O-I

Kimberly Clark

etc

Commercial

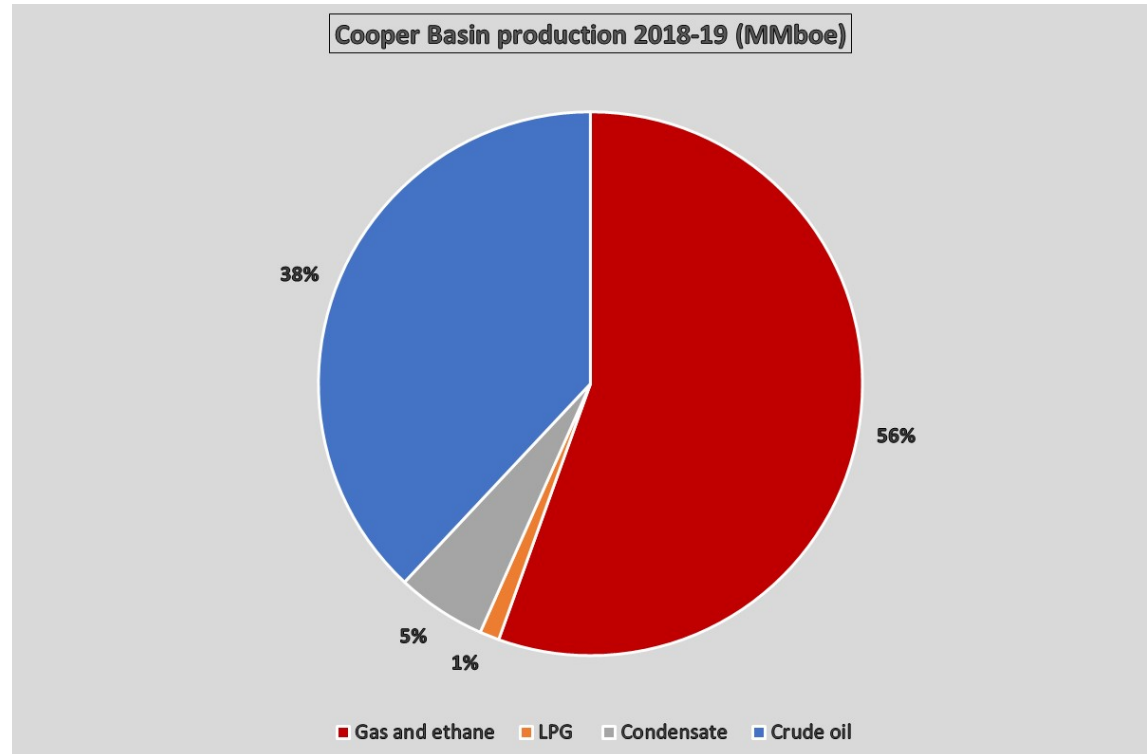
Retail

Source: EnergyQuest

- Nearly 70% of gas consumed in SA is for power generation, critical resource backing up renewables. Gas-use for power has increased with higher renewables. Gas also critical for industrials, commercial and retail.



What does the Cooper Basin produce?

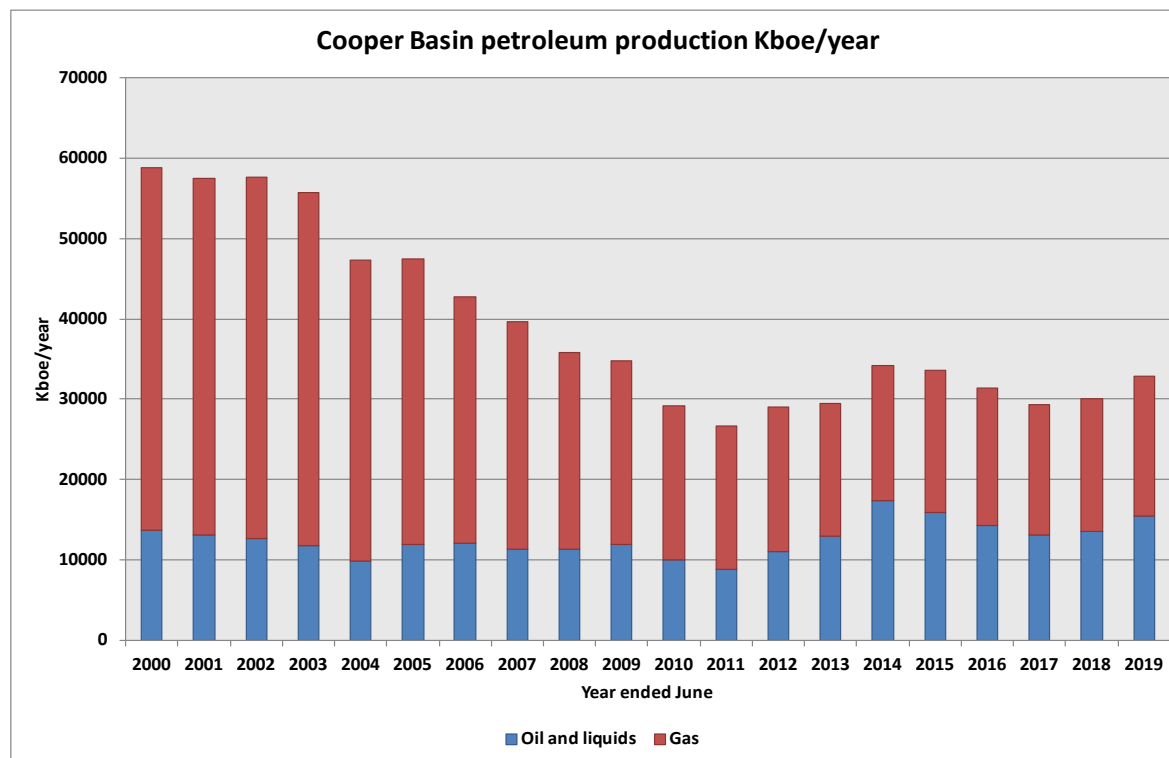


Source: EnergyQuest

- CB produces almost all SA gas and oil. Operated by Santos with Beach. About half gas production from the Queensland side of the CB. Conventional rock reservoirs (not coal seam gas), long and successful history of fracking.



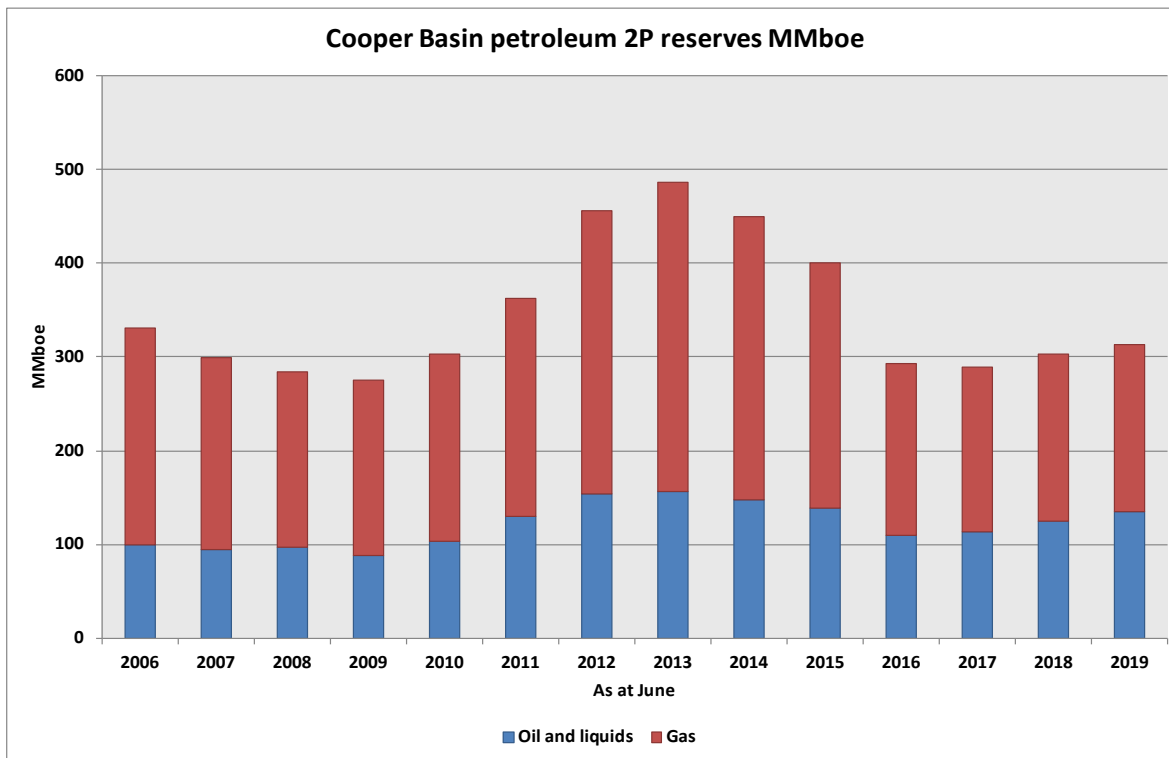
Cooper Basin production stabilising



Source: EnergyQuest

- Oil production growing, gas steady with potential to grow. However CB production currently insufficient to meet SA needs. Costs have increased significantly as the basin matures but Santos doing a good job of increasing production restraining cost pressures.

Cooper Basin reserves stabilising

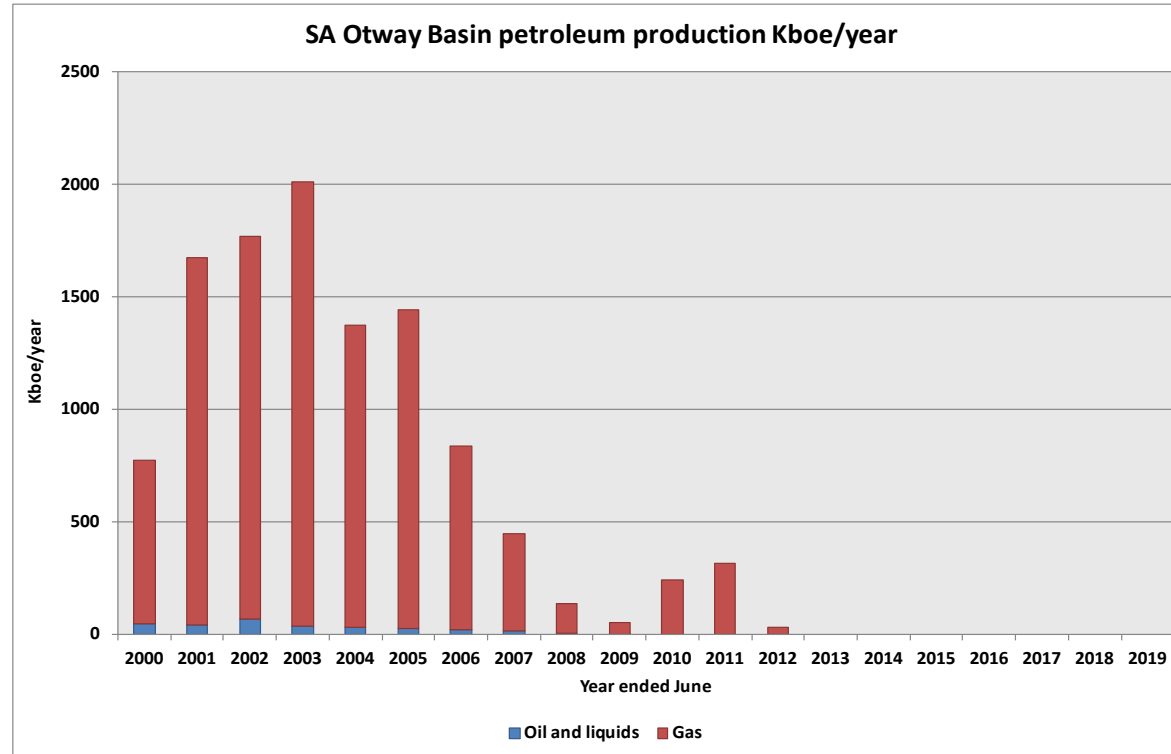


Source: EnergyQuest

- 2P reserves have fallen but now stabilising and Santos expects them to increase.



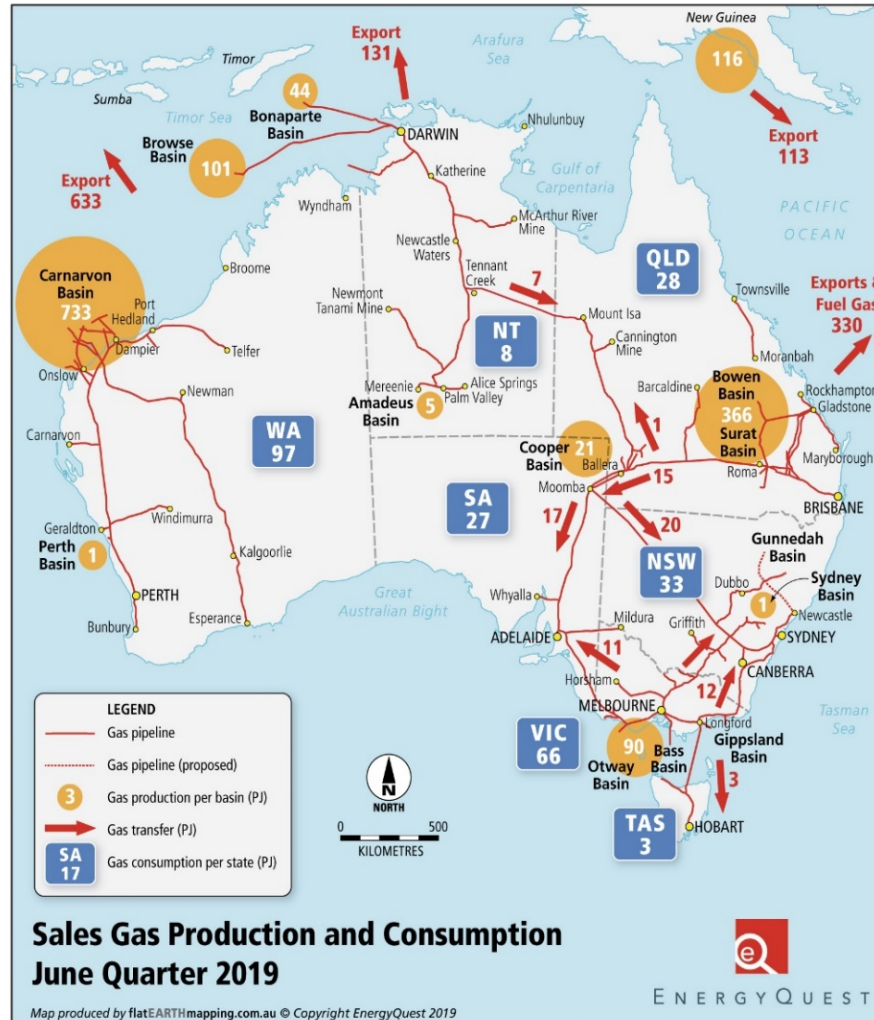
South East onshore production



Source: EnergyQuest

- A long history of South East onshore production. Small compared to CB but seeing a revival of interest with successful Beach exploration, opened up by PACE scheme. More potential. Well located, close to pipeline and buyers, cheap to produce. Fracking banned but not necessary.

East coast gas outlook



Qld: now the major east coast gas producer. Exports LNG (\$19b pa export revenue, 27% of Chinese LNG). Produces more than it exports as LNG. Also exports to SA/NSW (15 PJ in Q2).

SA cannot meet its own gas needs. Deficit of 6 PJ (22%) in Q2. Imported 26 PJ from Qld and Vic, exported 20 PJ to NSW. Produced 21 PJ but consumed 27 PJ. Vic offshore declining, unable to meet own demand within 5 years let alone supply SA and NSW. Also Qld expected to peak by mid next decade.

NSW: >10,000 PJ CSG resource but virtually no production. All gas imported from SA/Qld and declining Victorian fields. Possible LNG imports. Also Santos Narrabri project.

Victoria: onshore exploration not allowed. Possible LNG imports but heavy red tape.

Conclusion

- Gas continues to be important energy source for SA, backing up renewables and supplying industry and homes.
- However SA not meeting its own needs and east coast outlook uncertain.
- Uncertainties include federal policy, whether Arrow Energy project is developed in Queensland, whether Santos is able to develop Narrabri in NSW and whether LNG import projects are developed in NSW and Victoria.
- Critical to maximise gas development in SA in Cooper and South East. Companies helping. PACE scheme has worked well. Other potential state government initiatives?



Thank you



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SACOME Natural Gas Forum

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Chief Executive Officer



September 2019

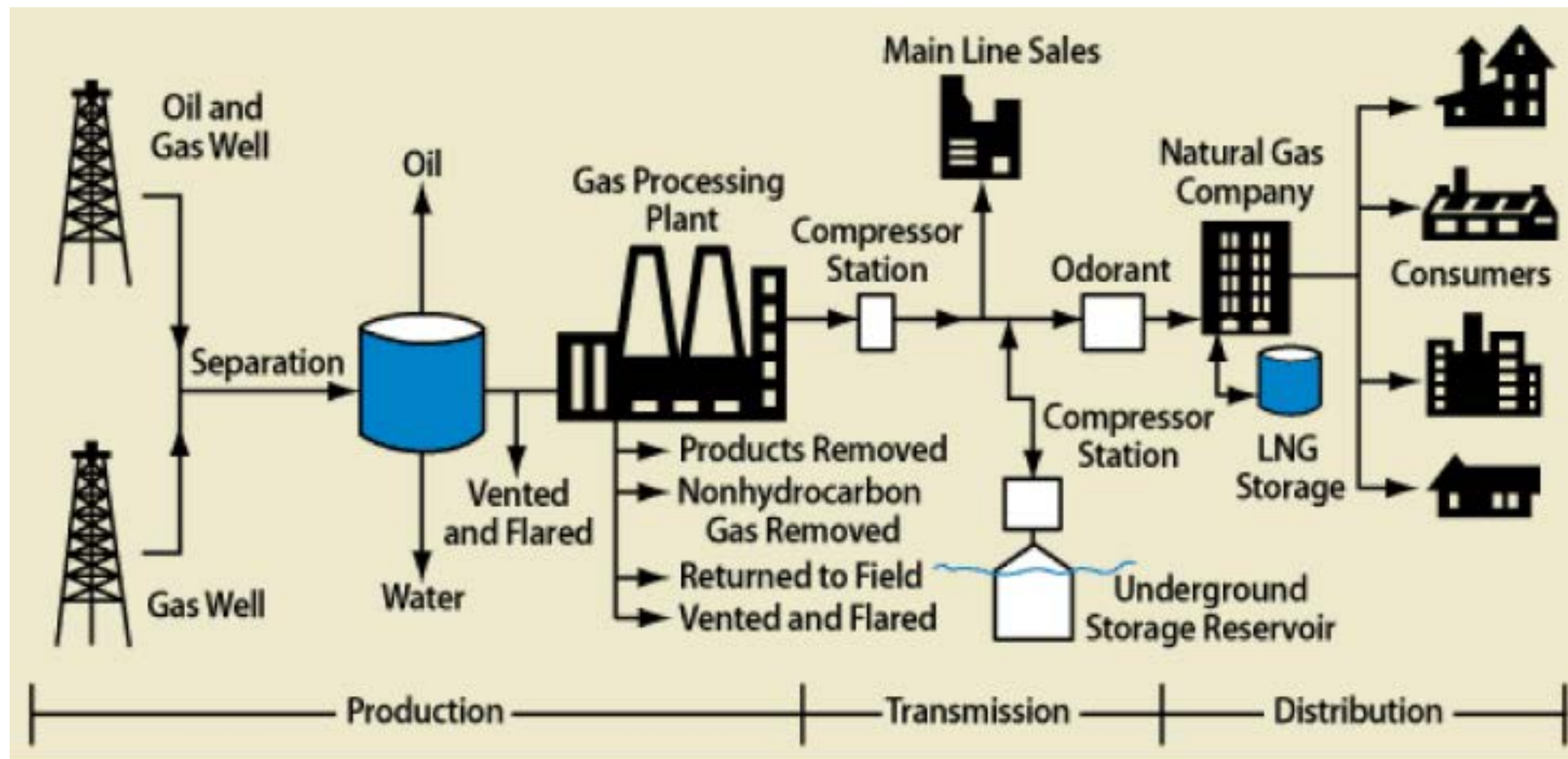
Overview

- APGA
- Pipeline infrastructure in Australia
- Natural gas task
- Price
- Pipeline markets
- Future of gas

The Australian Pipelines and Gas Association

- Peak body representing Australia's gas transmission industry.
- 230 members drawn from across the pipeline industry: owners, operators, designers, constructors, service providers and suppliers
- Over 46,000km of high-pressure, steel pipelines across Australia
 - 39,000km dedicated to transporting natural gas
- Advocacy activity focused on energy policy, economic and technical regulation.
- Most committees focused on collaboration and cooperation on safety, environment and research issues.

The Gas Supply Chain



MAJOR PIPELINE SYSTEMS OF AUSTRALIA

Compiled and published by Great Southern Press Pty Ltd

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Pipeline information and graphic design © Great Southern Press 2019.

This map is a schematic representation only and shows the approximate location of major Australian pipelines. It does not show exact pipeline courses. Route, length and capacity information is approximate and intended as a guide only, and is correct as at June 2019.

This map is intended as a general source of information only.

Notes: The coloured sections on this map are gas-producing basins of Australia. They are approximate in size and the varying colours are not representative of estimated reserves or developed infrastructure.

THE AUSTRALIAN

Pipeliners

Official Publication of the Australian Pipeline and Gas Association

NAME	OWNER	PRODUCT	LENGTH (km)
N11: Perseus Gas Pipeline	APA Group	Gas	1,058 km
N12: Daly Waters - Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N13: Mulumba River Branch Gas Pipeline (Browne/Browne)	Browne	Gas	376 km
N14: Palmer North - Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N15: Daly Waters - Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N16: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N17: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N18: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N19: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N20: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N21: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N22: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N23: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N24: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N25: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N26: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N27: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N28: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N29: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N30: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N31: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N32: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N33: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N34: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N35: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N36: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N37: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N38: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N39: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N40: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N41: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N42: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N43: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N44: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N45: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N46: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km
N47: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	503 km
N48: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	1,058 km
N49: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	288 km
N50: Mulumba River Main Gas Pipeline	Perseus and Wale Corporation	Gas	140 km



One petajoule (PJ) explained



The joule is the standard unit of energy in general scientific applications. One joule is the equivalent of one watt of power radiated or dissipated for one second.

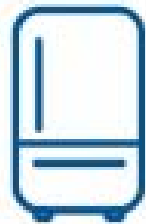
One petajoule is 10^{15} joules (1 million billion) or 278 gigawatt hours.

43,500



The electricity used
by 43,500 households
in a year¹

695,000



The electricity used by
695,000 refrigerators
in a year²

868,750



The electricity used by
868,750 televisions
in a year³

483 million



The number
of kilometres a car
can drive on 29 million
litres of petrol⁴

¹The average home uses approximately 33 gigajoules of electricity in 2017–18

²A typical 3 star fridge uses 400 kWh of electricity per year

³A 55 inch 5 star label television uses 320 kWh of electricity per year

⁴A car consuming 6 litres of unleaded petrol per 100 kilometres

Gas is a major source of energy for Australia

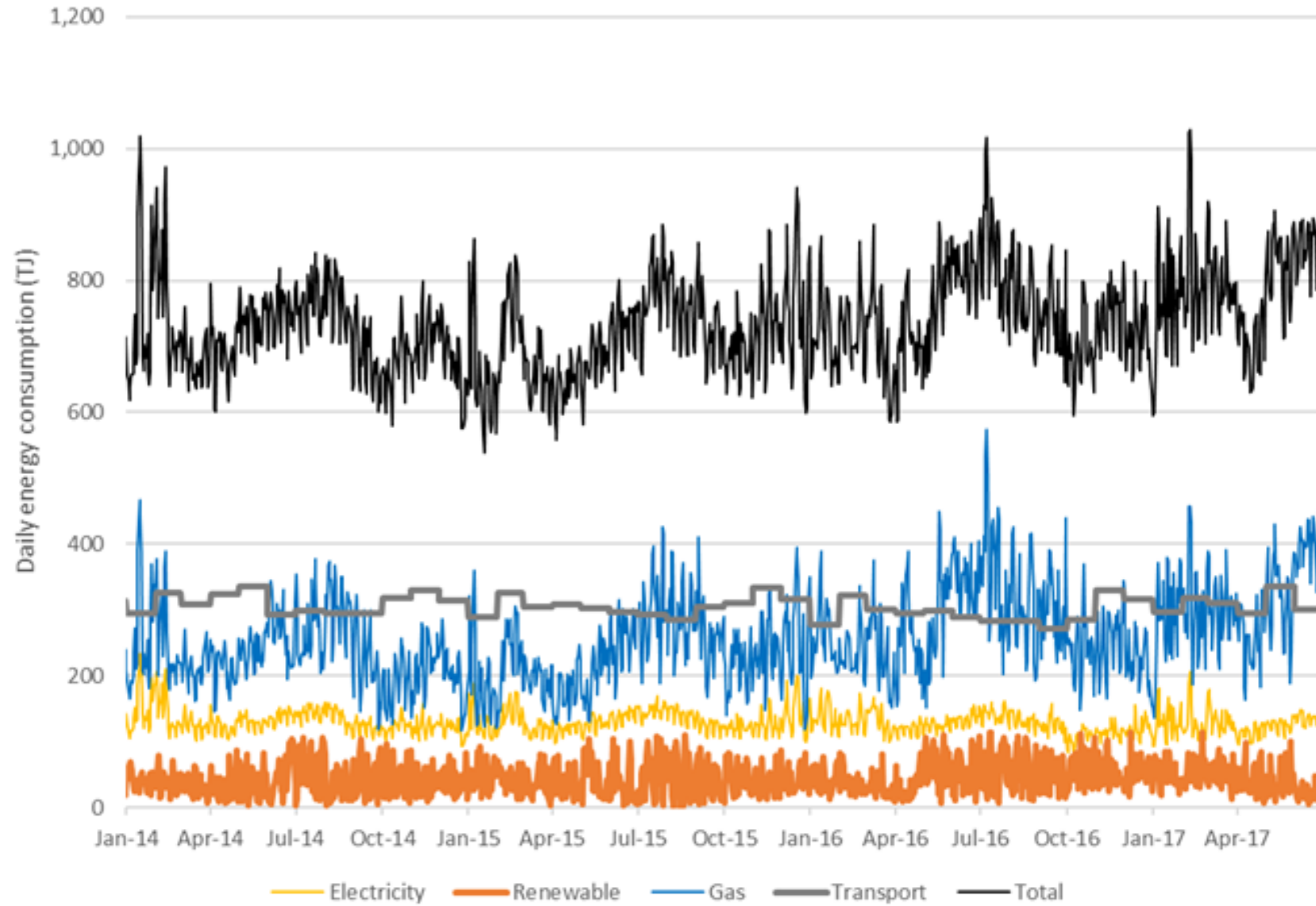
Table 2.8: Australian total final energy consumption, by fuel

	2017–18		Average annual growth	
	PJ	share (per cent)	2017–18 (per cent)	10 years (per cent)
Coal	117.8	2.7	-0.3	-1.7
Refined products	2,263.9	52.1	3.2	2.0
Gas	943.0	21.7	4.0	2.9
Electricity	835.4	19.2	1.7	0.9
Renewables	185.6	4.3	-6.3	2.5
Total	4,345.7	100.0	2.5	1.9

Notes: Excludes fuels used for electricity generation and other conversion.

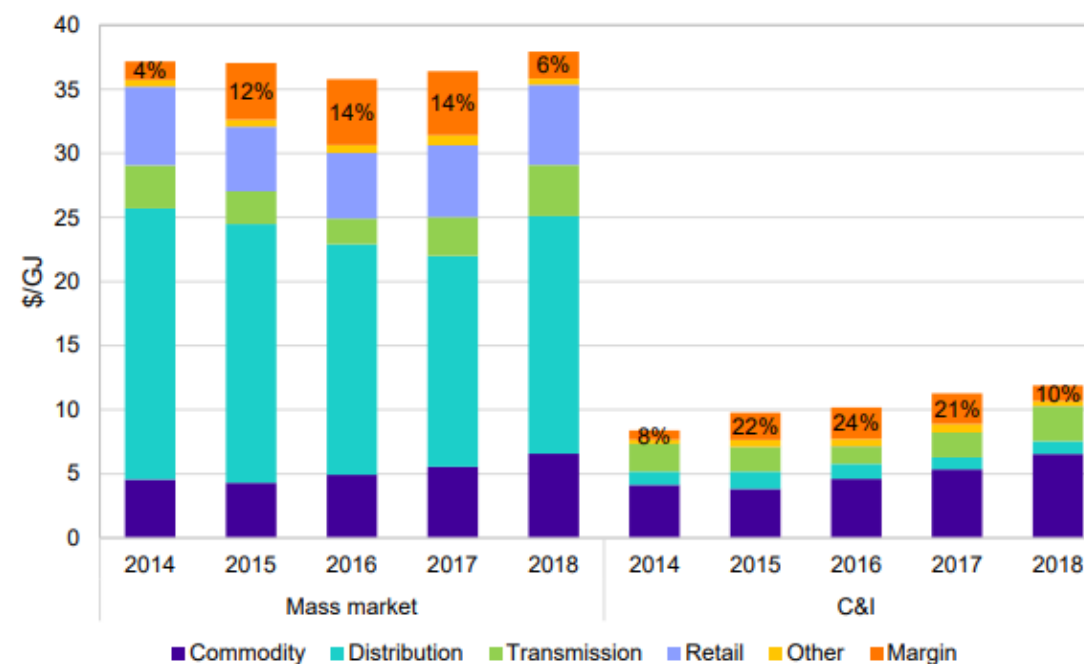
Source: Department of the Environment and Energy (2019) *Australian Energy Statistics*, Table H

Energy Consumption for SA



Delivered Gas Price

Chart 4.6: Cost stacks for South Australia, mass market and C&I



Source: ACCC analysis of information provided by the major retailers

Note: Costs are allocated to the mass market and C&I customer segments, and margins are estimated, based on the methodology outlined in section 4.4.2 above. See section 4.4.3 for caveats in relation to these estimates.

Pipeline capacity markets

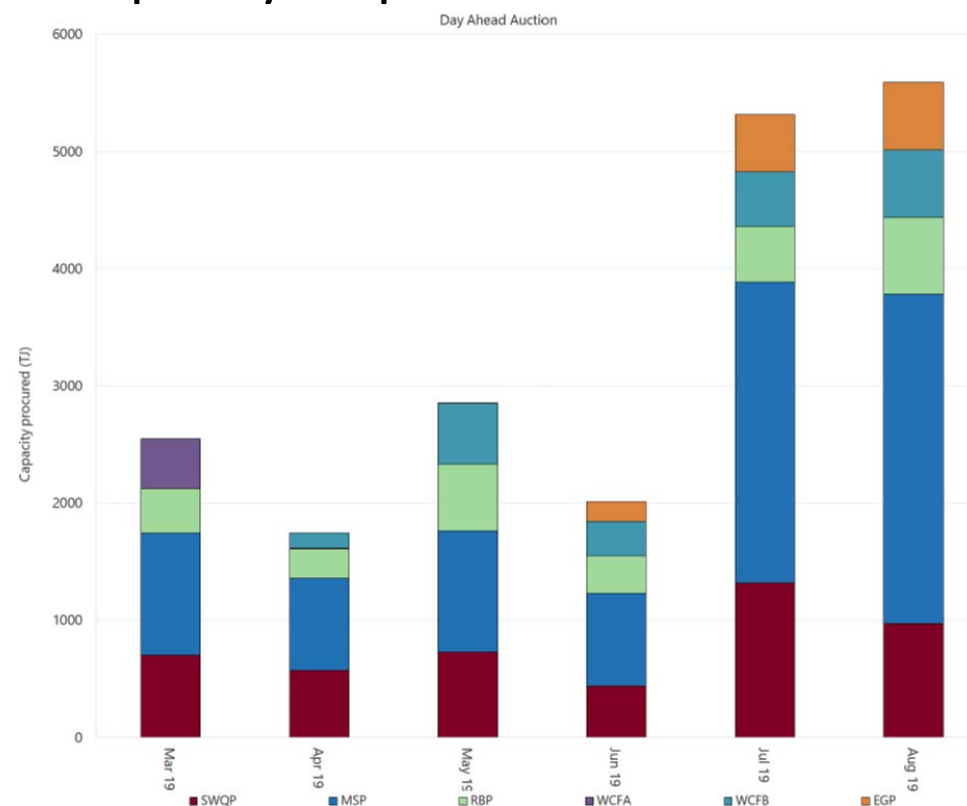
- National Gas Law 2008 provides the regulatory framework for pipeline markets.
- Negotiate-arbitrate regime.
- Customer-driven escalating levels of regulatory oversight.
- Regime oversees commercial negotiation delivering bespoke outcomes for customers
- Increasing regulation challenges flexibility

Pipeline Market Reforms

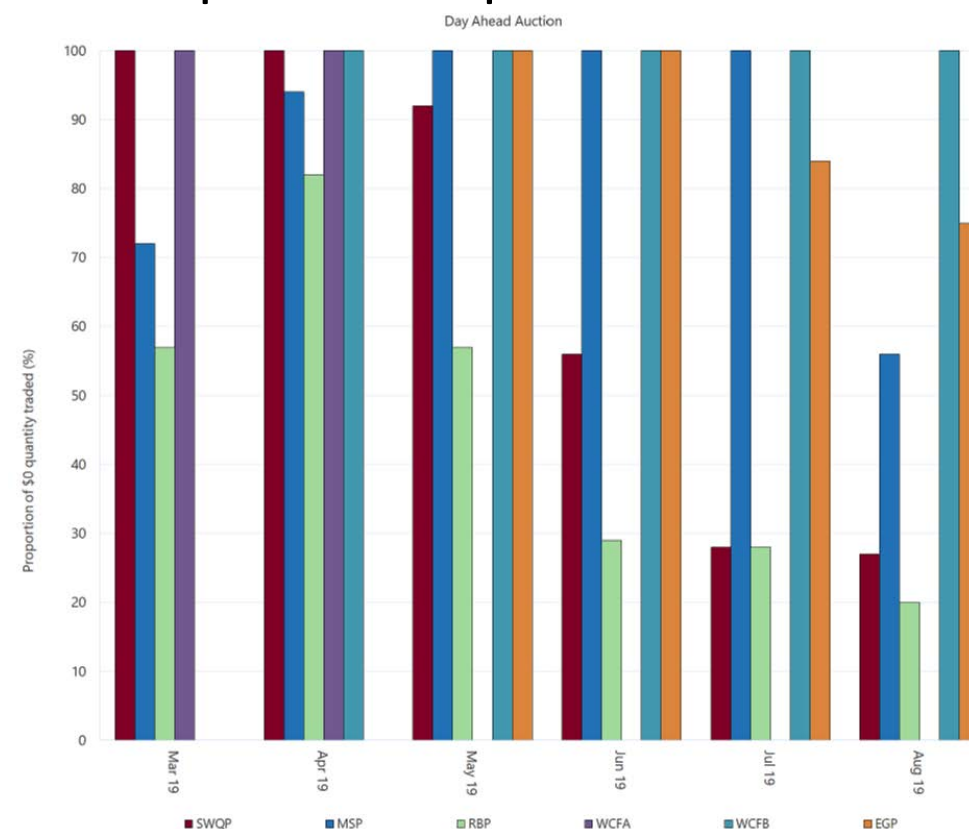
- April 2016 - Final Report of the ACCC East Coast Gas Inquiry delivered.
- August 2017 - New information disclosure and arbitration regime introduced.
- October 2018 – Financial information disclosure commences.
- March 2019 - Capacity auctions introduced.
- August 2019 – 7th Interim Report of the ACCC Gas Inquiry delivered
 - New regime delivering improved outcomes for customers
 - 01/08/17 – 15/03/19 – 193 new and modified contracts executed, none requiring arbitration
 - Concerns with pipeline operators' application of some information disclosure requirements

Auction delivering major quantities of low-priced capacity

Capacity acquired



Proportion acquired at zero cost



Source: AER; AEMO, Last updated: 12 Sep 2019 - 5:35 pm

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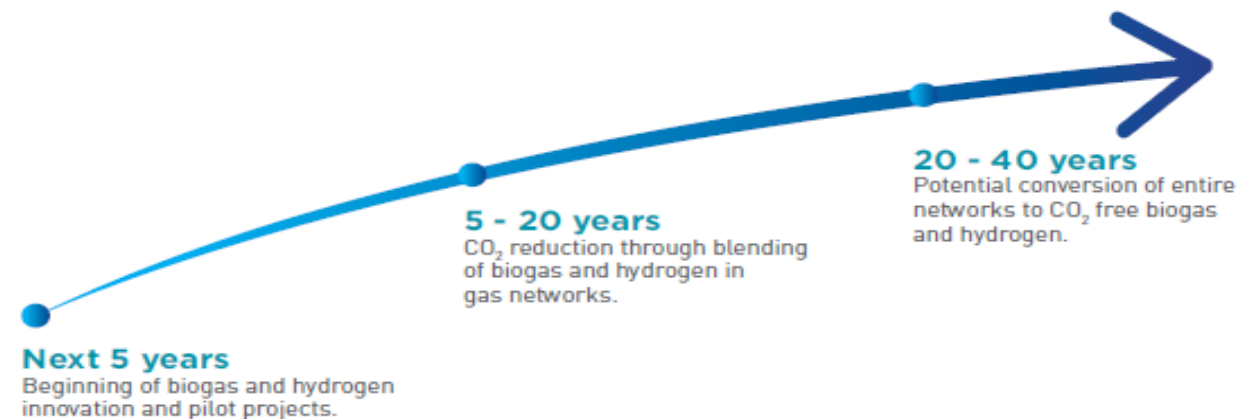
Pipeline challenges

- Sustained high gas prices
- Political and policy uncertainty
- Public perception of natural gas
- Tendency for regulation to consider gas and electricity equivalent
- Adjusting to a changed investment environment and shorter-term requirements of customers

Future of gas – Gas Vision 2050



- An industry-wide vision to decarbonise the gas sector – released March 2017.
- Highlights the importance of gas today and into the future.
- Sets out a credible path to decarbonisation.
- Industry leading the way. Seven-year commitment to the Future Fuels CRC.
- Exploring how to best leverage Australia's gas infrastructure to deliver affordable, decarbonised gaseous fuels.





Thank you

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Jane Norman
Head of Gas Commercialisation,
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Natural Gas Breakfast
25 September 2019

Q&A Session



Graeme Bethune
CEO & Founder,
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Steve Davies
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APGA



Jane Norman
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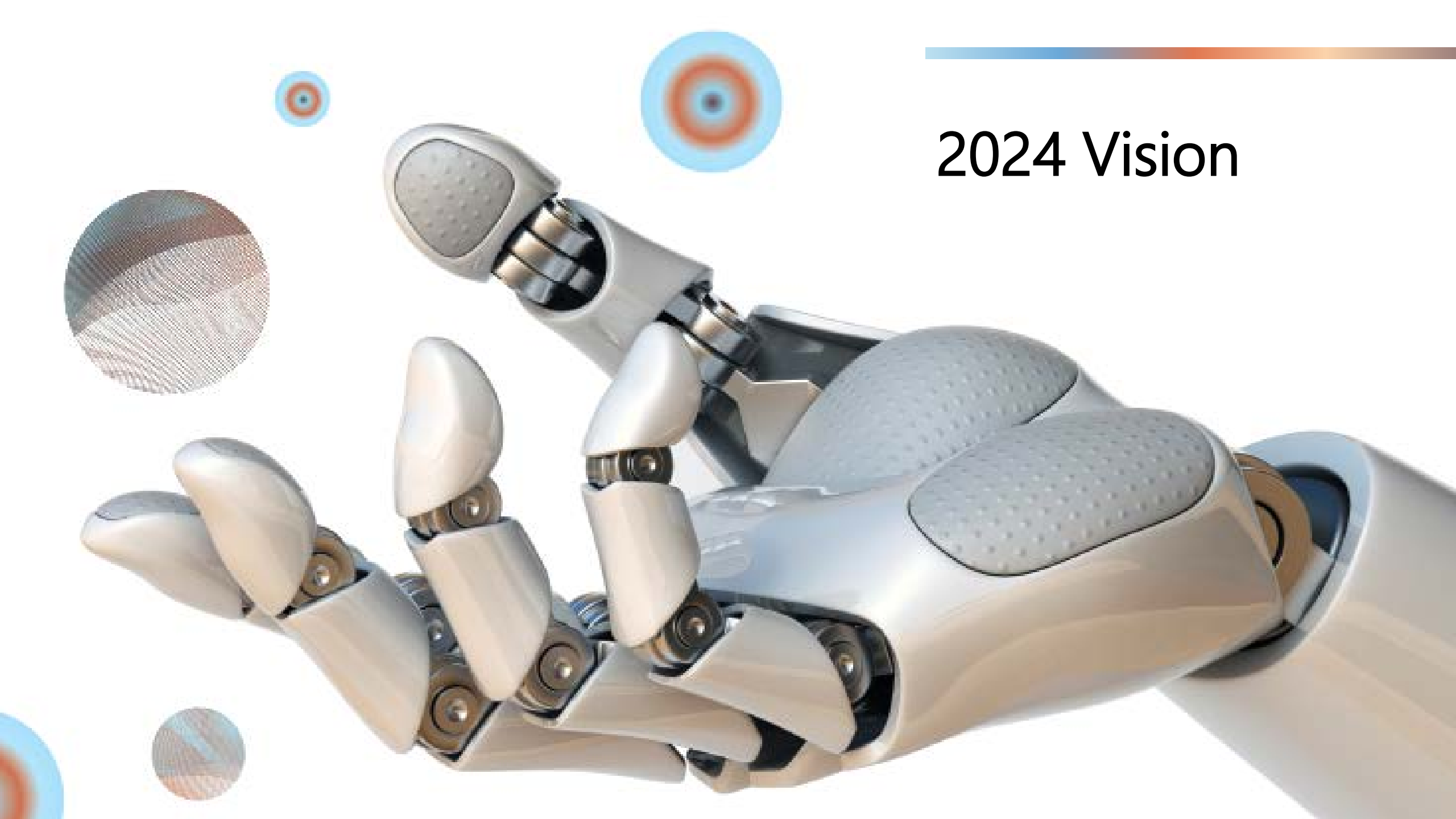
Copper



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2024 Vision



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