South Australian Chamber Of Mines & Energy

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





Activism





Electricity





GLNG, Curtis Island, QLD





Pipelines





Natural Gas





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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

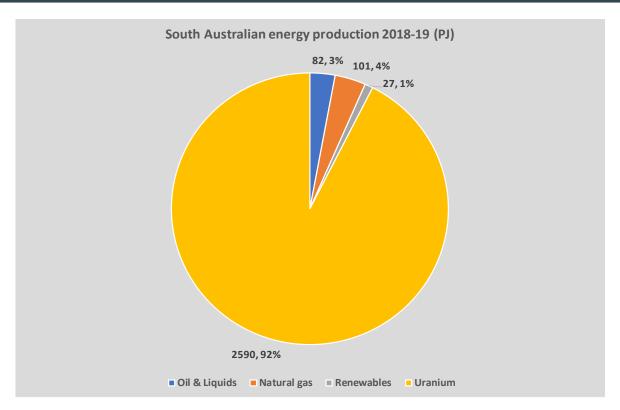


EnergyQuest

- 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

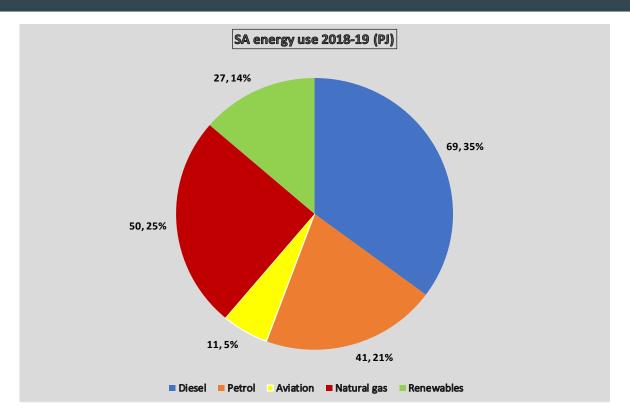




Sources: EnergyQuest, Dept of Environment and Energy

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

SA energy 101: consumption

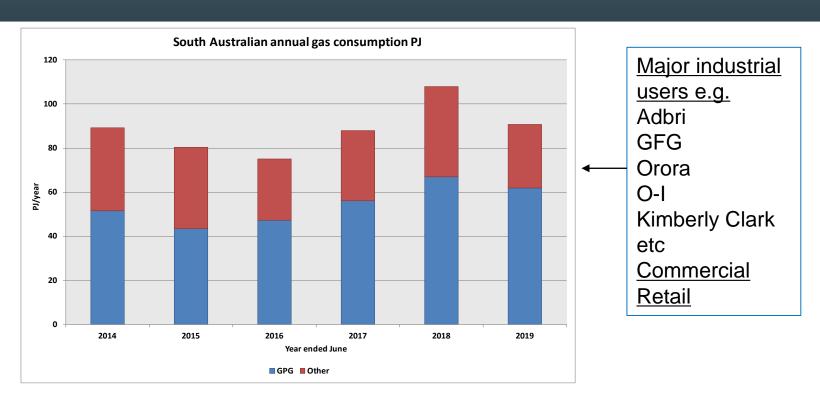




Sources: EnergyQuest, Dept of Environment and Energy

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)

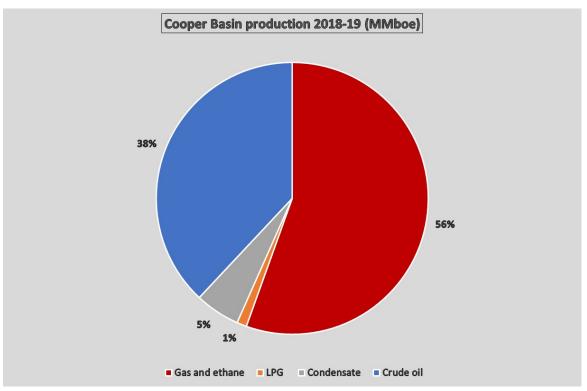




Source: EnergyQuest

 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?

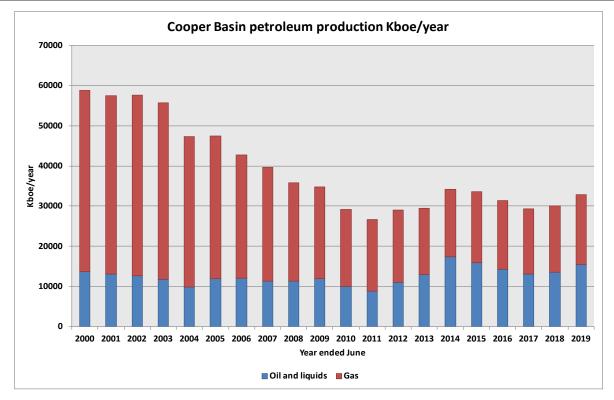




Source: EnergyQuest

 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

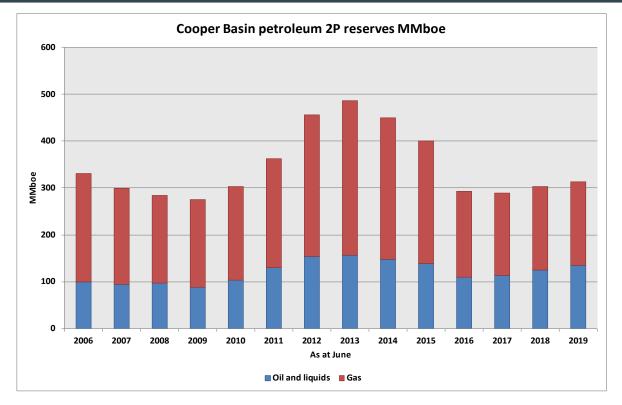




Source: EnergyQuest

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

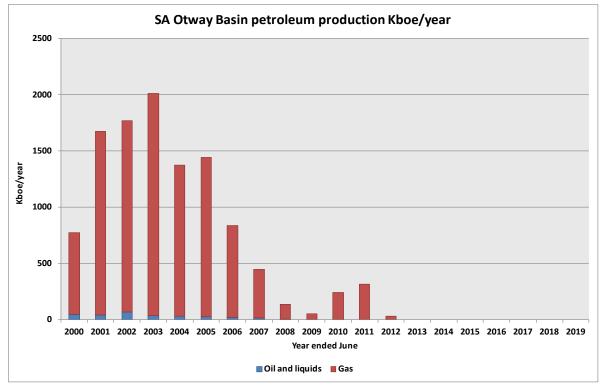




Source: EnergyQuest

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

South East onshore production

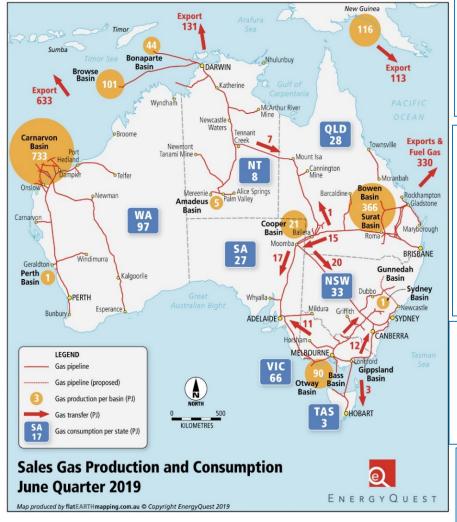




Source: EnergyQuest

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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South Australian Chamber Of Mines & Energy



Steve Davies CEO Australian Pipeline & Gas Association

Natural Gas Breakfast 25 September 2019



SACOME Natural Gas Forum

Steve Davies Chief Executive Officer

September 2019



Overview

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

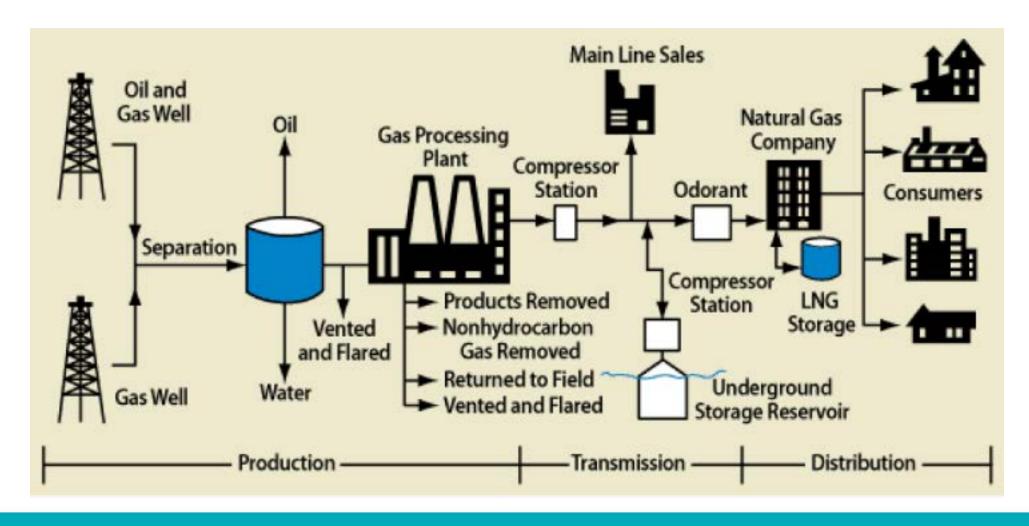


The Australian Pipelines and Gas Association

- 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.

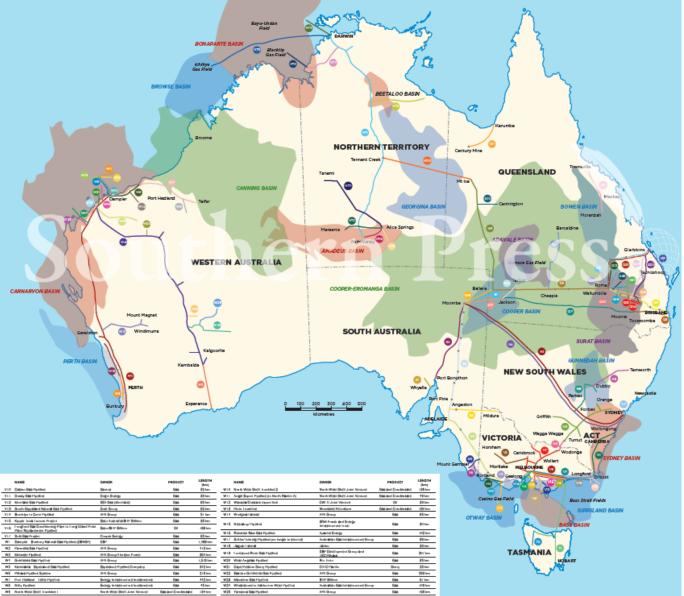
This map is a schematic representation only and shows the approximate location of major. Australian pipelines. It does not show exact pipeline routes. Route, length and capacity information is approximate and intended as a guide only, and is correct as at June 2019.

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

Note: 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.



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One petajoule (PJ) explained



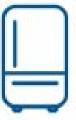
The joule is the standard unit of energy in general scientific applications. One joule is the equivalent of one watt of power radiated or dissipated for one second.

One petajoule is 1015 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

The average home uses approximately 23 gigajoules of electricity in 2017-18

¹A typical 3 star fridge uses 400 kWh of electricity per year

¹A 55 inch 5 star label television uses 320 kWh of electricity per year

^{*}A car consuming 6 litres of unleaded petrol per 108 kilometres.



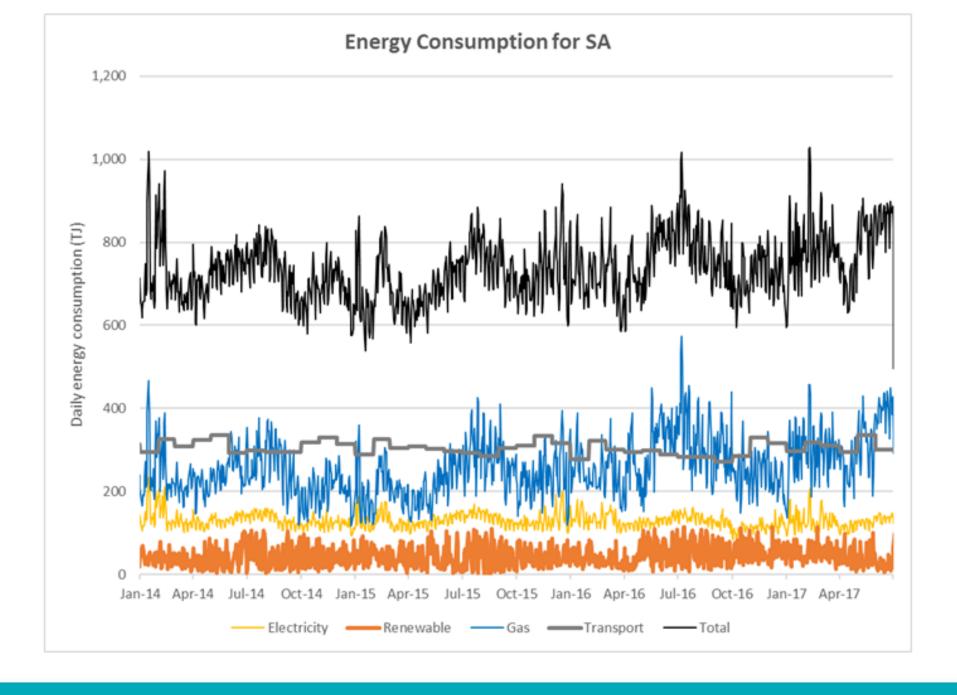
Gas is a major source of energy for Australia

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

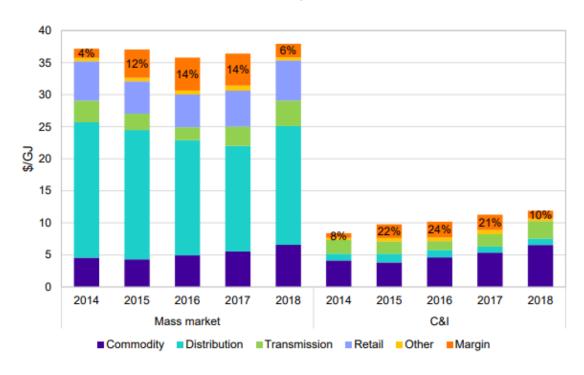






Delivered Gas Price

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



Source: ACCC analysis of information provided by the major retailers

e: 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



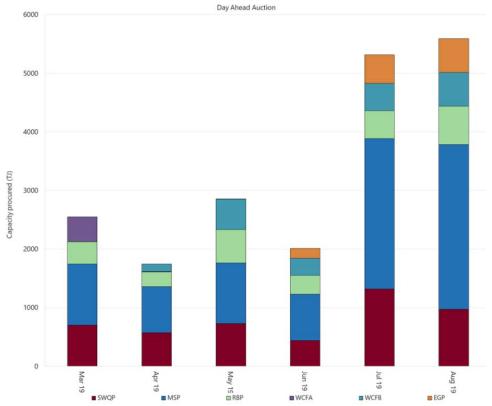
Pipeline Market Reforms

- 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



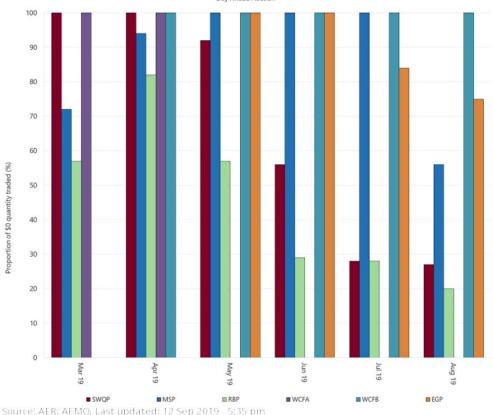
Auction delivering major quantities of lowpriced capacity

Capacity acquired



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

Proportion acquired at zero cost





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

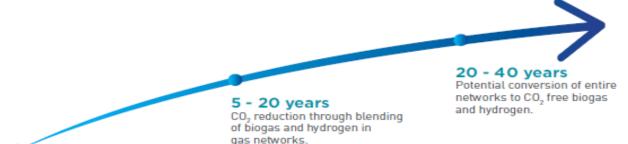


- An industry-wide vision to decarbonise the gas sector released March 2017.
- Highlights the importance of gas today and into the future.

Next 5 years

Beginning of biogas and hydrogen innovation and pilot projects.

- 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

Steve Davies sdavies@apga.org.au (02) 6273 0577



South Australian Chamber Of Mines & Energy



Jane Norman Head of Gas Commercialisation, Santos

Natural Gas Breakfast 25 September 2019 South Australian Chamber Of Mines & Energy

Q&A Session



Graeme Bethune CEO & Founder, Energy Quest



Steve Davies CEO, APGA



Jane Norman Head of Gas Commercialisation, Santos

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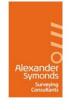
Platinum



Silver



Copper











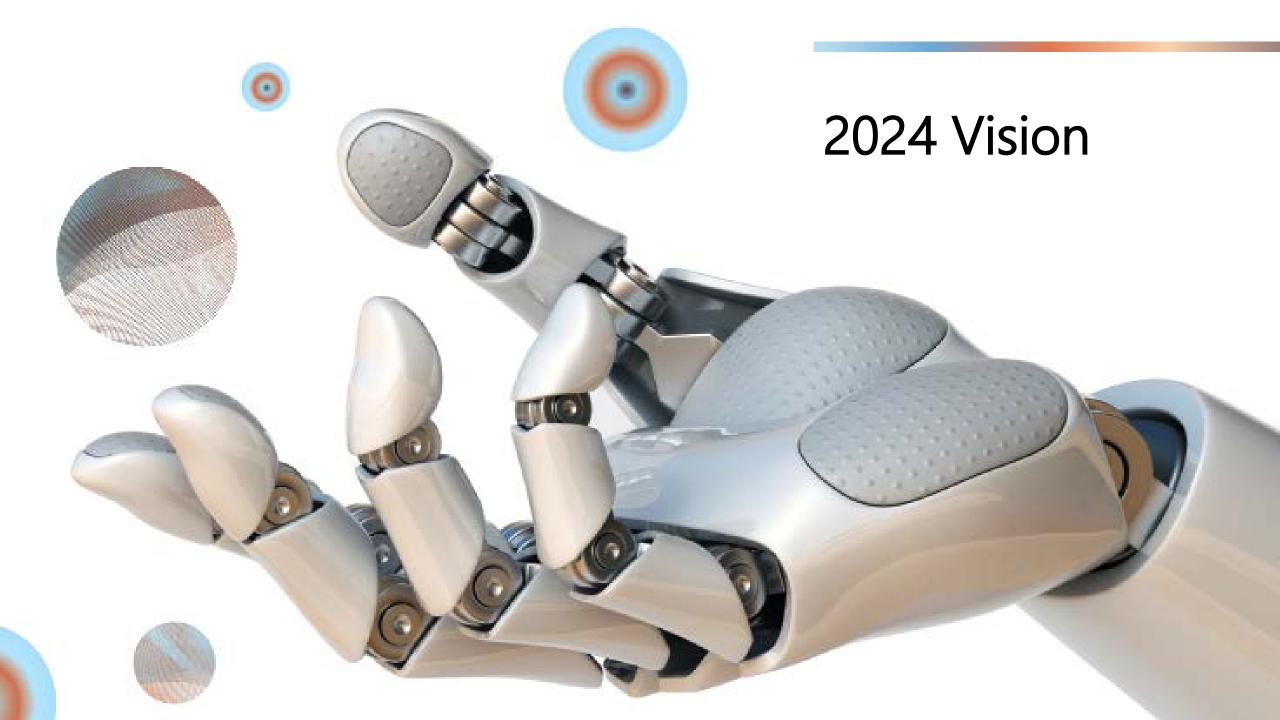


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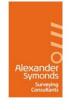
Platinum



Silver



Copper













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