Challenges and opportunities in the NEM and implications for AGL

August 2024

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Mismanagement of the transition was catalyst for 2022 board overhaul at AGL

AGL warns of further earnings drop after \$2.06b loss



Soon-to-be-demerged AGL Energy has warned of a bigger than expected slide in core earnings for the coming year after posting a "very disappointing" loss of \$2.06 billion for the full year.

Shares in AGL were down 4.9 per cent in early afternoon trading as analysts

Angela Macdonald-Smith Senior resources writer

Updated Aug 12, 2021 - 2,04pm.

first published at 8.36am

digested the bleak outlook for profits in 2021-22, with the range cited by the electricity and gas supplier below the consensus estimate.

KEY POINTS

- Revenue (\$m) 10,942.0, down 10% fi year-ago 12,160
- Underlying EBITDA (\$m) 1666.0, dov 17.8% from year-ago 2026
- Net profit (\$m) -2058.0 v year-earlie 1007
- Final dividend of 34c payable on September 29

"The deep losses revealed on Thursday serve as an example of the potentially **painful transition that large incumbent energy companies face**, having long built dominant market positions on the use of fossil fuels, and delayed the inevitable switch to renewables"

RenewEconomy, August 2021

How energy colossus AGL could be the first victim of a brave new grid

The radical corporate surgery on our biggest energy company may be too late to save it. Its once bullet-proof business model has fallen victim to death by 2.8 million solar rooftop cuts.

Matthew Warren Energy expert

Jul 20, 2021 - 12.00am



After 2022 AGM: Investors gave board space but hopes were high







In 2023 the tone on the NEM transition shifted swiftly

The energy transition is far too slow, AEMO warns



Investment in new, clean electricity supply is not happening fast enough to replace closing coal power stations and the grid build-out lags what is needed for the energy transition, the head of the Australian Energy Market Operator will warn on Tuesday.

Angela Macdonald-Smith Senior resources writer Jun 20, 2023 - 5.00am

A Share

Save

Daniel Westerman will say that investments are also urgently needed in "firming" technologies – such as pumped hydro, batteries and gas – to fill in the gaps when renewable energy is not available, with storage needing to expand by a factor of 30 by 2050.

- The AFR View Energy Summit confirms stuttering transition is not on track

The scale and complexity of the task requires all hands on deck, rather than ruling out any feasible transition pathway on political grounds.

Oct 9, 2023 - 6.3	33pm

Listen to this article

— Exclusive

The renewables boom is happening at only half the pace needed



Solar and wind energy is surging in the National Electricity Market but only at about half the annual rate the market operator says is needed to hit its <u>"Step Change" scenario or the Albanese government's 2030 target of 82 per cent renewable energy.</u>

Ben Potter Senior writer Updated Jul 4, 2023 - 1.34pm, first oublished at 5.00am

The NEM, a wholesale market extending across the eastern states and South Australia, added about 8.5 terawatt hours between June 2022 and June 2023, up from 7.9 TWh added during the previous year, according to data

- Updated AGL going 'as fast as we can' on emissions reduction: CEO



AGL Energy chief executive Damien Nicks has sought to water down any tensions with the giant electricity supplier's largest shareholder over the pace of coal plant closures said the company is "going as fast as we can" and has committed to reviewing its decarbonisation plan every three years.

Angela Macdonald-Smith Senior resources writer

Aug 10, 2023 - 8.49am

Mike Cannon-Brookes' Grok Ventures, which owns just over 10 per cent of AGL, <u>in June said it was continuing to "implore AGL</u> to increase its







Grok: 2023 AGM "stop watching the transition from the sidelines"

"A stand still:" Cannon-Brookes calls on AGL to move a lot faster to green energy



"We believe that the targets set under the 'Carbon Transition Metrics' in AGL's 2023 Remuneration Report incentivise the company to stand still whilst the rest of the Australian energy market does the work: executives will be rewarded, whilst AGL, its customers and shareholders, are left behind by inaction. This unambitious attitude reminds us of the 'old AGL' thinking which was orientated towards watching the transition from the sidelines, instead of leading from the front."

Grok letter to AGL Board, November 2023



Looking ahead: New Chair and 2025 CTAP

Miles George



- New customer platform Kaluza
- Focus on firming assets over "<u>tricky</u>" large scale generation investments
- New Chair Miles George from Feb 2025
- Key priority: Enhanced ambition in 2025 CTAP



State of the National Electricity Market transition

ACCR webinar

Dr Dylan McConnell

19 August 2024





Introduction

- The Integrated System Plan
- Current status vs projections
 - Energy:
 - Coal and renewables
 - Historical and projected
 - Capacity:
 - Coal
 - Historical, projected and current status
- Causal factors
 - Policy settings and market dynamics
 - Transmission
- Future role of gas
- Summary



The Integrated System Plan

- The Integrated System Plan (ISP) is a roadmap for the transition of the National Electricity Market (NEM) power system

- Prepared by the Australian Energy Market Operator (AEMO)
- Highly consultative process
- Conducted on a 2 year cycle
- A key output is the "optimal development path"
 A "least-cost" pathway for the development of the electricity system, taking into consideration a range of plausible futures
- Incorporates Commonwealth and State policies
 - Importantly, this includes a "carbon budget" for the sector

- This is an input assumption rather than reflection of current policy settings

- Identifies transmission projects that should be progressed
 - Now has a psuedo-regulatory function, identifying "actionable" projects

- Information is used officially and unofficially in a range of other processed

- Informs the development of the Capacity Investment Scheme





ISP: Generation capacity



UNSW SYDNEY

ISP: Storage capacity











Energy: Renewables





Energy: historical vs projected

Historical annual change

Year	Coal	RE	VRE
2018-2019	-2.3	7.7	7.6
2019-2020	-8.6	7.2	7.8
2020-2021	-4.6	7.2	7.2
2021-2022	-7.1	10.5	8.9
2022-2023	-3.6	8.1	8.5
2023-2024	+0.3	4.2	5.7

[Source: openNEM]

CY2024: coal currently +3.2 TWh (+4%) FY2024: coal currently +0.9 TWh (+6%) Projected generation - TWh (ISP 2024)

	FY 2025	FY 2030	Delta	Av Rate
Coal	105.7	39.4	-66.2	-13.2
VRE	88.0	200.2	112.2	22.5



Capacity: Coal

"Coal is retiring, faster than announced"





Capacity: Coal

"Coal is retiring, faster than announced...??"



Capacity: historical

Capacity: historical & projected

	FY 2025	FY 2030	Delta	Av Rate
Utility RE	22.5	54.8	32.3	6.5
Total RE	46.0	90.9	44.9	9.0
Utility storage	3.5	17.9	14.4	2.9

Causal factors

Policy and market dynamics

- High level: there is mismatch between the projections the real world:
 - More concretely: there is a carbon budget in the projections, but no policy to realize that
 - Phrased alternatively: there is shadow carbon price in the projections that isn't matched in the real world
 - Planning challenges
 - Community acceptance and social license
- Historically, renewable generation supported by certificate scheme
 - The mandatory RET fulfilled years ago, no longer pulling through substantial new investment)
- The Capacity Investment Scheme has now emerged to fill this gap.
 - New and needs time to work
- Historically, a market oriented regime:
 - Centred around a competitive wholesale market, which was intended to quite operational decisions and investment decisions.
 - Various interventions present a challenge (and introduce additional risks) to this regime
 - This includes the CIS
 - -...and a Productivity Commission review
- Without some policy to reflect carbon goals, market dynamics present a challenge
 - Increasing penetration of RE lowers prices, which in turn reduces incentives for more renewable energy
 - Dynamics that have or could mitigate this:
 - Need RE pull (RET, CIS)
 - Coal push (Carbon Price, coal closure)
 - More storage (CIS)

Causal factors

Transmission

- Delays delays delays
- Cost escalations
- Congestion and connection
- Introduces significant co-ordination challenge

Case study: Project Energy Connect

- Started in 2016 as ~\$500m project to be delivered in 2021
- 2018: expected delivery 2022-2023
- 2020: expected delivery Dec 2024
- 2022: expected delivery July 2026
- Now (at least) \$2.6bn to be delivered in 2027 (?)

Case study: Central West Orana REZ

- 2020: Actionable project, expected delivery Dec 2024 (\$600m)
- 2022: Committed project, expected delivery July 2025
- 2024: 2024: Committed project, expected delivery 2028 (\$3.2 billion)

Table 1 Network projects in the 2024 ISP optimal development path

Committed and anticipated ISP projects		In service timing advised by proponent	Full capacity timing advised by proponent ^A
Far North Queensland REZ		June 2024	June 2024
Project EnergyConnect		Stage 1: September 2024 Stage 2: May 2026	Stage 1: December 2024 Stage 2: July 2027
Western Renewables Link (uprated) ^B Central West Orana REZ Network Infrastructure Project		July 2027	July 2027 August 2028
		January 2028	
CopperString 2032		June 2029	June 2029
Already actionable projects (confirmed in this ISP)	Actionable framework	In service timing advised by proponent	Full capacity timing advised by proponent ^A
HumeLink	ISP	Northern: July 2026 Southern: December 2026	Northern: July 2026 Southern: December 2026
Sydney Ring North (Hunter Transmission Project)	NSW ^c	December 2028	December 2028
New England REZ Network Infrastructure Project	NSW ^c	Part 1: June 2031 Part 2: June 2033	Part 1: June 2031 Part 2: June 2033
Victoria – New South Wales Interconnector West (VNI West)	ISP	December 2028	December 2029
Project Marinus ^D	ISP	Stage 1: June 2030 Stage 2: June 2032	Stage 1: December 2030 Stage 2: December 2032
Newly actionable projects (as identified in this ISP)	Actionable framework	Earliest feasible in service timing	Earliest feasible full capacity timing ^A
Hunter-Central Coast REZ Network Infrastructure project	NSW ^C	December 2027	December 2027
Sydney Ring South	ISP	September 2028	September 2028
Gladstone Grid Reinforcement	QLD ^E	March 2029	March 2029
Mid North South Australia REZ Expansion	ISP	July 2029	July 2029
Waddamana to Palmerston transfer capability upgrade	ISP	July 2029	July 2029
Queensland SuperGrid South	QLD ^E	September 2031	September 2031
Queensland – New South Wales Interconnector (QNI Connect)	ISP	April 2032	March 2033

Future role of gas

Future role of gas

[Data source: AEMO 2024, 2024 Integrated System Plan]

- Gas assets are expected to run less than 5% of the time

- Argued to present a challenge for private sector investment

- Maybe? This is common today, and is a normal method for gentailers to manage risk

- However it does present challenges to operation and financial viability of the the gas network,

Future role of gas

Summary

- Current status vs projections

- Rate of utility scale renewable generation needs to dramatically increase
- And rate of coal generation needs to dramatically decrease

- Drivers

- Missing policy, or a mismatch between what is projected what exists in the real world

- New measures might change this (CIS)
- Challenges with transmissions development

- Future role of gas

- Projections do suggest we need more dispatchable capacity. But not in the short term, and it might not be (fossil) gas!

ACCR: AGL Investor Webinar The Opportunity in the transition

19 August 2024 Stephanie Bashir

Decarbonisation is a global mission

Source: DCCEEW

- Australia committed to the Paris Climate Agreement (2015) in November 2016
 - Limit the temperature increase due to the emission of greenhouse gases to below 1.5 °C
 - Reduce total emissions to 26-28 % below 2005 levels by 2030
- In June 2022, the federal government committed to reduce greenhouse gas emissions by 43% below 2005 levels by 2030
 - Legislated in September 2022
- Net Zero by 2050
- Emissions reduction in Australia underpinned by emissions reduction in the electricity sector (and land use), but this sector is still the most significant source of emissions.

Commitments by the states played a significant role

A renewables and energy storage future

Investment certainty is needed in the near-term to ensure large-scale generation and storage capacity enters the system.

Thermal replacement

- Because of the closure of coal-fired power station, there is a massive opportunity to deliver the required renewable generation and storage to meet energy system needs over the coming decade.
- We need to build 6 GW of renewable generation every year – compared with our current rate of 2 – 3 GW.

Year-on-year capacity change highlights significant wind and solar investment, and utility storage throughout 2020s and early 2030s to replace coal

2024-25 2026-27 2028-29 2030-31 2032-33 2034-35 2036-37 2038-39 2040-41 2042-43 2044-45 2046-47 2048-49

Demand-side participation
Mid-merit gas
Hydro
Passive CER storage
Utility solar

Black coal
Flexible gas
Utility storage
Offshore wind
Rooftop solar and other distributed solar

Brown coal
Biomass
Coordinated CER storage
Onshore wind

The demand for batteries is growing at speed

AEMO's forecasts we need a storage capacity of 22 GW by 2030, and 49 GW by 2050, compared to \sim 3 GW today.

Significant investment in all durations of storage, alongside governmentsupported long-duration Pumped Hydro projects

Investment in Utility-Scale storage is needed at scale

- In 2029-30, this requires 18 GW / 404 GWh of large-scale storage.
- This requires significant investment to increase capacity from 3.5 GW / 18 GWh in 2024-25.

Snowy 2.0 Borumba Deep storage Medium storage Shallow storage

Supercharging utility scale storage

Revenue streams are evolving: Large-scale storage will provide flexible, reliable capacity for energy and system services.

Profitability and Revenue Streams:

•Energy arbitrage: Calculated as the difference between charging and discharging prices in the energy market.

•FCAS: Revenue from providing enablement in various FCAS markets.

•Capacity and other: Includes SIPS/WAPS revenue, Power Purchase Agreements (PPA) bespoke contracts, and other value derived from the battery's dispatchable capacity or services provided. FCAS currently comprises the majority of BESS revenue. As these prices compress, certainty around energy revenues will become critical

■ FCAS - Contingency ■ Energy ■ FCAS - Regulation

Federal policy changed significantly

We've seen significant support through Federal and State schemes, but further long-term mechanisms are required to underpin ongoing investment.

Commonwealth funding	Safeguard Mechanism	Capacity Investment Scheme	NSW Long-term Energy Service Agreements
 Rewiring the Nation The \$19 billion Rewiring the Nation Fund seeks to provide investment to major projects including major transmission projects - such as CWO REZ and Project EnergyConnect Powering the Regions Fund The \$1.9 billion initiative to support regional development and drive Australia's transition to net zero emissions, focusing on decarbonising existing industries and development new clean energy industries and regional workforces 	 The major ongoing Australian Government policy mechanism aiming to reduce emissions of the largest industrial polluters via baseline legislated limits, which decline yearly Set in line with the national emission reduction targets of 43% below 2005 by 2030 and net zero by 2050 	 The expanded Capacity Investment Scheme (CIS) will see 23 GW of renewables and 9 GW of storage (36 GWh) contracted over the next four years. Pilot SA-VIC storage tender for 600 MW / 2,400 MWh was 32 times oversubscribed Tender 1 - NEM generation is seeking 6 GW of renewable capacity Tender 2 - is seeking 2,000MWh of clean dispatchable capacity across the WEM 	 Tender Round 2 sought at least 380 MW of firming capacity, but was expanded to 930 MW through the CIS - resulting in 1,075 MW / ~3 GWh of projects being awarded Tender Round 3 sought 950 MW / 2,500 GWh of generation and up to 550 MW of LDS - awarding 750 MW of renewable generation and 524 MW / 4,192 MWh of LDS Tender Round 4 awarded 312 MW / 980 GWh of generation Tender Round 5 is seeking 1 GW of Long-duration Storage

Growing momentum in EVs and Electrification

Significant demand, driven by emerging commercial loads & electrification of transport, will continue to provide a strong foundation for the electricity sector.

Accelerated EV uptake in the short- and medium-term

• Significant year-on-year EV growth in excess of 40% through the 2020s before stabilising presents a significant opportunity for innovation.

Electrification and EV consumption growth will drive grid demand

Australians love rooftop solar

Distributed storage and consumer energy resources are key contributor to Australia's energy transition, but market reforms are required to maintain pace.

CER's contribution to renewable uptake

 Rooftop solar PV is now the leading generator in the NEM. In Q2 2024 – distributed PV contributed 34% of total supply during maximum instantaneous renewable penetration on 23 April

Why do Australians invest in distributed energy resources?

Nexa has previously found the main reasons driving consumer uptake are:

- To save money
- To increase independence from mains electricity
- To protect the environment

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Untapped potential is C&I Consumer Energy

By harnessing this untapped potential, businesses can realise substantial energy cost savings, while providing flexibility and reducing network impacts.

PV and consumption dynamics

- The residential sector sees limited growth in consumption and significant growth in PV as households take advantage of the opportunity of CER
- The business sector sees growth in consumption over the coming decades, but limited growth in its PV uptake-highlighting the potential.

The untapped C&I opportunity

- A significant share could be installed at C&I facilities such as warehouses, which have roof space that could generate power in excess of their actual need.
- This makes them ideal locations for the deployment of batteries turning warehouses into small and nimble dispatchable power plants.
- This opportunity has already been recognised in the property industry, with early movers such as Dexus planning to deploy more than \$25 million of batteries in its new warehouses.

VPPs and embedded energy storage needs focus

Coordination of distributed energy resources – mainly behind-the-meter of residential, commercial and industrial connections – must be better supported.

Embedded and aggregated energy storages

- AGL's Virtual Power Plant in South Australia was the first of its scale (5 MW) to demonstrate coordinated response of distributed energy resources
- This has been one of several VPP demonstrations explore demonstrate technical and commercial viability, and ongoing work by AEMO and DNSPs to overcome implementation challenges, including Projects Symphony and Edge.

Social acceptance is just as important as technical and commercial feasibility

The social licence needed to orchestrate CER remains unsecured, and there is significant work needed to gain the necessary trust of consumers.

Aggregated sources are expected to drive installed embedded

Gentailers have market power advantage- today

Despite 20 years of privatisation and deregulation, the energy industry remains dominated by a cosy oligopoly that use the advantage of scale and vertical integration to maintain their dominant positions.

Source: AER - State of the Energy Market 2023

Source: AER - Annual retail markets report 2022–23

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Innovate or be disrupted

Regulated monopoly distribution networks are moving into grid scale, community batteries and EV charging and have the backing of governments.

Business models need to change

- The real competitors are not the small retailers or solar retailers. The real competitors are the electricity networks.
- Rooftop solar PV is now the leading generator in the NEM, representing about a quarter of all generation.
- Despite strong uptake, regulations have not fully adapted to capitalise on the opportunities of CER in the energy transition.
- Lack of Network Tariff innovation continues to be missing in the discussion.

A key risk is the push to abolish ring-fencing measures by regulated monopolies. This poses a risk of distorting the innovative CER market and impeding service development and commercialisation

Innovate or be disrupted

Sustained orchestrated influence campaigns by networks are dominating the debate.

...

Power network

To get power bills down, your suburb needs a battery

A power company wants to install hundreds of local batteries. Bureaucracy is getting in the way.

Jun 28, 2024 | Aaron Patrick

We are proud to announce the launch of our latest community battery in Bondi as part of the Federal Government's Community Batteries for Household Solar Program.

Launched by the Minister for Climate Change and Energy Chris Bowen MP and Ausgrid CEO Marc England this battery will enhance local power reliability, enable more homes to benefit from solar energy, and put downward pressure on energy bills by feeding excess solar back to the grid during peak times.

We're also excited to introduce Energy Storage as a Service (ESaaS) in partnership

with EnergyAustralia and Origin Energy. ESaaS allo community batteries in a similar way to a househol costs, offering further cost savings and supporting

Endeavour Energy (NSW) Endeavour 25,128 followers 3w • S

DRIVING THE EV TRANSITION: Customers and communities stand to benefit from a proposal by the three NSW electricity distribution networks to accelerate the roll out of EV charging infrastructure across NSW.

...

Renewables

The big equity problem in household EV charging

Gavin Dufty, executive manager of policy and research at the St Vincent de Paul Society, says the current electricity tariff system is not fit-for-purpose when it comes to EV charging.

Jun 28, 2024 | Ronald Mizen

Distributors can drive lower-cost transition

Electricity distributors can help deliver a lower cost, more socially equitable transition.

Companies Energy Energy transition

Powering our energy future

The Australian Financial Review and Ausgrid hosted a roundtable exploring the role of electrification in our transition to net-zero.

Updated Jun 26, 2024 – 6.31pm, first published at 6.19pm

Save

Businesses are trusted to integrate innovation

The private and investor sector can have a significant impact on the direction, scale and speed of the transition through influence and action.

Competitive neutrality of all market players will be key.

Investors and the private market can influence government direction and market reforms:

- Innovation and competition is maintained and strengthened.
- Ringfencing of regulated monopolies is strengthened not abolished.
- Review of network regulation and frameworks by productivity commission is overdue.

Trust Imbalance: Business Most Trusted to Integrate Innovation into Society

Percent trust, in Australia

I trust each with the introduction of innovations

Trus

(60-100)

(50-59)

Beneficial

Distrust

Accessible

2024 Edelman Trust Barometer. TRU_INS_TCNG. Below is a list of institutions. For each one, please indicate how much you trust that institution to do what is right when it comes to ensuring that the introduction of new technologies and innovations into society is well-managed (e.g., they are safe, understood by the public, beneficial to society as a whole, and accessible to the people who need them). 9-point scale; top 4 box, trust. Question asked of half the sample. General

Appendix

Coal closure: uncertainty on dates

Coal closure uncertainty remains a significant risk to investment in renewables and storage, exacerbated by the potential for exit earlier than anticipated.

- The NEM currently relies on coal-fired power stations to meet electricity demand.
- Projections indicate that ageing coal power stations will phase out faster than expected closure dates.
- AEMO anticipates that up to 62 per cent of the coal generation in the NEM will retire by 2032, and that there will be no operational coal power stations by 2038.
- AEMO estimates nearly 14 GW, representing almost half (47 per cent), of the current fossil fuel generation (including gas) capacity in the NEM and nearly a quarter of all generation (24 per cent) will retire in the next decade.
- Eraring, Yallourn, Vales Point and Bayswater collectively account for over a quarter of the fossil fuel generation in the NEM (8.4 GW, 28%), highlighting the scale of the challenge in replacing this coal capacity.

We plan but don't build

the latest delivery dates in the Draft 2024 ISP show how timelines continue to slip

Thank You

Contact us to find out how we can help www.nexaadvisory.com.au | info@nexaadvisory.com.au

About Nexa

Nexa is a 'for purpose' advisory firm.

Our unwavering focus is accelerating the clean energy transition in a way that provides secure, reliable, and affordable power for consumers of all types.

Nexa Advisory is a team of experienced specialists in the energy market, policy and regulation design, stakeholder engagement, and advocacy. We work with public and private clients including renewable energy developers, investors and climate impact philanthropists to help them get Australia's clean energy transition done.

Nexa Advisory stands at the nexus of the energy sector's complex web of stakeholders. We support and direct their dialogue so as to remove the roadblocks to the transition.

We have a track record in policy creation, advocacy, political risk assessment, and project delivery. We are holistic in our approach and deliver solutions with people in mind, and commercial intent.

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