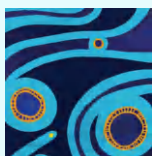


FY23 TCFD Report



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AGL recognises the Aboriginal and Torres Straits Islander peoples as the Traditional Owners of the lands on which we work, and acknowledges those communities' continuing connections to their lands, waters and cultures. We pay our respects to their Elders, past and present.

CEO Statement



I am pleased to present AGL's FY23 TCFD Report, which has been prepared in line with the Task Force on Climate-related Financial Disclosures (TCFD) framework.

This report is central to the ongoing delivery of our commitment to transparency in our inaugural Climate Transition Action Plan (CTAP) that was released in September 2022, in which we committed to continuing to use the TCFD Framework to report on governance, risk management, strategy, and metrics and targets in relation to climate change a part of our annual reporting suite.

FY23 has been a year of tremendous transformation of AGL's business following the release of our new strategy and CTAP. Our CTAP is an important step in AGL's, and by extension, Australia's, decarbonisation journey, and outlines our plans for an accelerated exit from coal generation, and the transition of our predominantly thermal energy portfolio to a fleet of operated and contracted renewable and firming generation. I am proud to report that we have already made good progress against these commitments.

Our CTAP supports the transition to a lower carbon world aligned with the Paris Agreement goals.

A stylized, handwritten signature in black ink, appearing to read 'Damien'.

Damien Nicks
Managing Director
& CEO

It balances the need to ensure reliable and affordable energy with the need for accelerated decarbonisation to meet community expectations for urgent and decisive action on climate change. Our strategy includes transitioning our energy portfolio by exiting coal up to 10 years earlier than previously planned. Following the closure of our coal generation assets, we will be net zero for operated Scope 1 and 2 emissions, and we have an ambition to be net zero for all Scope 1, 2 and 3 emissions by 2050.

Our first key milestone was achieved in late April with the safe and respectful closure of the Liddell Power Station after almost 52 years of operation. We also have an ambition to build on what is already the largest operated renewable and firming portfolio of any ASX listed company by adding ~12 GW of new renewable generation and firming capacity by the end of 2035, with an interim target of ~5 GW by the end of 2030. We're already making good progress towards this target, significantly increasing our development pipeline by 60% over the past six months. Both the Torrens Island and Broken Hill batteries are expected to commence operations this year. We're also progressing with the transformation of our thermal generation sites into low-carbon energy hubs. Further details of all these important initiatives are set out in this report.

We are also focusing on connecting our customers to a sustainable future by supporting them to decarbonise the way they live, move and work, which in turn brings exciting growth opportunities for AGL.

Our aim is to offer customers accessible, easy to understand and affordable energy products and services.

On the Commercial and Industrial side, we are partnering with customers to find innovative ways, such as microgrids and solar systems, to help customers achieve their sustainability goals and lower their energy costs.

I am very proud to lead AGL through this period of great change and progress as we responsibly and respectfully continue our decarbonisation journey and as we continue to make ESG considerations an important part of our decision-making. Recognising the significance and widespread implications of the decarbonisation process and AGL's role in it, combined with increasing stakeholder expectations of how climate change will be managed across the economy, we remain committed to engaging openly and transparently with our stakeholders.

1. Background

AGL Energy Limited (AGL) holds a prominent position as the operator of Australia's largest electricity generation portfolio within the National Electricity Market (NEM) of any ASX-listed company. With a total operated generation capacity of 8,735 MW¹, AGL plays a significant role in meeting the country's energy needs. AGL's operated generation currently accounts for approximately 20% of the total generation within the NEM.

AGL delivers 4.3 million customer services across energy and telecommunications translating to approximately 30% of households in the NEM. AGL seeks to enhance our customer engagement and provide comprehensive energy solutions.

In September 2022, AGL released our inaugural Climate Transition Action Plan (CTAP). This plan outlines the company's key commitments to address climate change and reduce emissions. A core objective of the plan is to achieve net zero emissions (Scope 1 and 2) after the closure of AGL's coal-fired power stations. AGL's climate commitments, coupled with our significant role in the energy sector, positions our business as a key player in Australia's transition to a low-carbon economy. Through our operational decarbonisation, and customer-focused approach, AGL continues to drive change within the energy industry and shape a more sustainable energy landscape for future generations.

AGL recognises that the impacts of, and the responses to, climate change at global, national, and state levels have significant implications for our business. These factors present both material risks and opportunities that can shape AGL's financial position, performance, and prospects.

As an early adopter in Australia, AGL has made a commitment to disclose climate-related information in accordance with the Task Force on Climate-related Financial Disclosures (TCFD) framework, which is currently voluntary in Australia.

AGL has been incorporating climate-related risk and strategy disclosures in our annual corporate reports since 2016, and since 2018, these disclosures have been aligned with the TCFD framework. Over time, AGL has developed scenarios and models to meet the needs of our business and stakeholders.

- In 2016, AGL released the **Carbon Constrained Future** report, which presented the results of modelled scenarios aligned with Australia's Nationally Determined Contribution (NDC) under the Paris Agreement. It also included a scenario based on limiting global warming to below 2 degrees Celsius above pre-industrial levels. This report was significant as it was the first analysis of its kind conducted by an Australian energy company.
- The **Powering a Climate Resilient Economy** report was published in 2018, providing detailed information on AGL's climate-related risks, opportunities, and our approach to climate risk management and governance. The report also included climate-related metrics in alignment with the TCFD recommendations.
- In 2019, AGL released the **Carbon Scenario Analysis** report, which presented the results of modelling three different scenarios related to electricity policy frameworks. These scenarios were the Slow Change Scenario, the State Targets Scenario, and the Deep Renewable Scenario, each illustrating a different pathway for the energy market's response to carbon constraints.
- The **Pathways to 2050** report, published in 2020, focused on scenario analysis for potential carbon reduction pathways. It explored four scenarios: National Targets, Response 2020, Response 2030, and 1.5 Degree Limit. These scenarios assessed the long-term implications for AGL's generation fleet, customers, and the National Electricity Market (NEM) as a whole.
- In 2021, AGL's **Accelerating Our Transition** report utilised the same scenarios detailed in AGL's 2020 report. The report also focused further on physical climate-related risks facing the business.
- AGL's **Climate Transition Action Plan**, released in 2022, outlined AGL's updated and accelerated pathway to decarbonisation and set out targets aligned to this pathway. In addition, it provided an overview of four new scenarios aligned with assumptions outlined in the Australian Energy Market Operator's (AEMO) 2022 Integrated System Plan (ISP). Further details on these scenarios are available in Section 3.3.

Through these reports and scenario analyses, which are available on our website, AGL has demonstrated our commitment to understanding and addressing the challenges and opportunities presented by climate change. By incorporating the TCFD framework and continually evolving our modelling and scenarios, AGL aims to inform our stakeholders about the potential impacts and strategies related to climate change mitigation and adaptation.

Many international jurisdictions, including Australia, are committed to ensuring large businesses and financial institutions provide investors and other stakeholders with greater transparency and accountability when it comes to their climate-related plans, financial risks, and opportunities. Australia is seeking to introduce standardised, internationally-aligned reporting requirements for businesses to make disclosures regarding governance, strategy, risk management, targets and metrics – including greenhouse gases. These requirements are intended to be aligned with new standards recently released from the International Sustainability Standards Board (ISSB) based upon multiple existing frameworks, including the TCFD.

1. FY23 installed capacity is the AEMO registered capacity as at 30 June 2023, also taking into account the three 25 MW upgrades to Bayswater Power Station Units 4, 2 and 3 in FY20, FY22 and FY23 respectively.

1. Background (continued)

1.1 Operating Environment

The NEM currently supplies approximately 200 TWh of electricity annually to around nine million customers in the eastern and southern states. It operates as a gross pool market, where generators submit bids into a central marketplace managed by the Australian Energy Market Operator (AEMO). AEMO dispatches and prices electricity every five minutes to meet demand while considering factors such as generation bids, system conditions, network congestion, transmission constraints, and essential system services like inertia and frequency control.

To ensure system reliability and security under all conditions, AEMO can request or direct generators to be available or come online in the event of forecast or actual shortages of energy or system services. Most dispatchable capacity in the NEM currently comes from coal-fired, hydro, and gas-fired generation. The amount of electricity dispatched must precisely match the amount being consumed at any given time. However, the imperative to reduce emissions poses challenges across the industry as some generators consider exiting the market earlier as part of decarbonisation plans.

The Integrated System Plan (ISP) developed by AEMO for 2022 explores different pathways to meet policy objectives within the NEM, including climate outcomes. However, the plan also highlights operational uncertainties arising from plant closures, increasing demand, physical risks, and a greater reliance on variable generation. To prevent the unilateral closure of power plants without adequate notice, governments have implemented regulations, which set, for example, minimum notice periods for power station closures. Additional policy actions are being considered to ensure the availability of dispatchable generation, both existing and new.

Australia's energy and climate policy landscape is fragmented, with various policies implemented by state and federal governments over the past two decades. These policies have sought to incentivise new generation while maintaining reliability, security, and affordability. Government policies have focused on renewable energy investment programs, such as the federal Large-scale Renewable Energy Target (LRET), which has significantly reduced emissions from the electricity sector. State and federal governments are now implementing policies to accelerate the adoption of variable renewable generation, including ambitious programs in New South Wales, Queensland, and Victoria, along with federal investments in transmission infrastructure.

However, there is currently no overarching policy that coordinates the earlier closure of thermal power assets. Existing government policies incentivise new renewable generation but are not directly linked to emissions intensity targets or sectoral carbon budgets. As a result, there is still a need for comprehensive coordination to align the transition to renewable energy with emission reduction goals and ensure a reliable and sustainable energy system.

Over the next three decades, substantial amounts of new large-scale renewable generation and distributed solar generation are forecast to be connected to the NEM. Ageing thermal generation will be replaced by a range of variable and flexible generation technologies with lower emissions intensity to decarbonise Australia's energy sector.

By 2050, AGL considers that Australia could become carbon neutral and embrace the substantial opportunities that the current transformation of the energy sector will enable. This will be realised by Australia generating power using zero emissions wind and solar resources, backed up by technologies like batteries, hydro power, gas, and green hydrogen. We believe this will underpin the competitiveness of the Australian economy just as widespread fossil fuels did in the twentieth century.

Although the transition to a low-emissions economy brings significant challenges, with well-designed policies there is potential to promote a more productive, inclusive economy with healthy, connected communities, underpinned by affordable energy.

2. Governance and Risk Management

2.1 Governance Approach

AGL recognises that strong corporate governance is essential to safeguard the interests of the company and foster sustainable value creation while considering the needs of various stakeholders, including shareholders, employees, customers, and the communities where AGL operates. To ensure effective governance and address climate-related issues, AGL has implemented robust structures and processes at the Board level.

The AGL Board plays a pivotal role in addressing climate-related matters. It actively considers climate-related risks and opportunities when reviewing and setting the company's strategy and making investment decisions. In September 2022, the Board approved AGL's Climate Transition Action Plan (refer to Section 3.1), underscoring our commitment to addressing climate change and transitioning to a more sustainable future.

Two Board-level committees provide oversight of climate-related risks and opportunities. The Audit & Risk Management Committee (ARMC) operates under a formal charter and consists of six non-executive, independent Directors. The ARMC is responsible for reviewing AGL's annual corporate disclosures, including the Annual Report. Additionally, the ARMC oversees the development of AGL's annual reporting aligned with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. Climate change response is a Tier 1 Strategic Risk (refer to Section 4.1), and as such this risk has been overseen throughout FY23 by the ARMC.

AGL's Safety & Sustainability Committee (SSC), also operating under a formal charter, ensures that climate-related issues are addressed from a sustainability perspective, including by considering the impacts of and opportunities for our customers, communities, and people to ensure a just transition. Comprised of five non-executive, independent Directors, the SSC reviews and oversees the development and implementation of policies and procedures that promote safe, ethical, and sustainable business practices.

The ARMC and SSC meet regularly to fulfill their responsibilities. They provide recommendations and reports to the Board, enabling effective decision-making and risk management. Through these committees, AGL ensures that climate-related risks and opportunities are thoroughly considered and integrated into the company's overall governance framework.

More information about the role of the Board and its committees can be found in the [FY23 Corporate Governance Statement](#).

AGL's commitment to strengthening our governance practices related to climate change is reflected in our efforts to enhance the Board's expertise. During FY22, AGL appointed a Chair of the SSC with specific knowledge in climate-related issues, and in FY23 appointed additional directors with specific energy and climate change experience.

AGL's CEO & Managing Director is responsible for implementing AGL's overall strategy, including responses to climate-related issues. This involves translating the strategic vision and goals into actionable plans and initiatives that effectively address the challenges and opportunities posed by climate change.

The CEO & Managing Director works closely with the Board to align AGL's strategic direction with the changing landscape of climate-related policies, regulations, and market dynamics, and plays a critical role in ensuring that climate-related issues are integrated into the core business strategy, to enable AGL to adapt and thrive in the rapidly changing energy sector.

2.2 Risk Management Approach

AGL's Risk Management Policy, approved by the Board, emphasises the use of risk management principles in decision-making at all levels of the organisation. This policy highlights AGL's commitment to embedding risk management practices throughout the company.

AGL manages climate-related transitional and physical risks through a comprehensive approach that is integrated into our risk management framework. AGL recognises the importance of addressing these risks and has developed strategies and measures to mitigate their potential impact. The following list outlines some key elements of AGL's approach:

- **Risk assessment and identification:** AGL conducts regular assessments to identify and evaluate climate-related transition and physical risks. This includes analysing the potential impacts of policy and regulatory development, technological advancements, market dynamics and physical climate hazards.
- **Scenario analysis and stress testing:** AGL employs scenario analysis and stress testing techniques to assess the resilience of our business and operations in the face of different climate-related scenarios. This helps AGL understand potential future risks and adapt our strategies accordingly.
- **Stakeholder engagement:** AGL actively engages with stakeholders, including investors, regulators, communities, and customers, on climate-related issues. This helps us understand the expectations and concerns of different stakeholders and incorporate their feedback into our risk management strategies.
- **Collaboration and partnerships:** AGL collaborates with industry peers, research institutions, and other organisations to share knowledge, best practices, and innovative solutions for managing climate-related risks. This collaboration enables AGL to stay at the forefront of industry developments and enhance our risk management approach.
- **Adaptation and resilience measures:** AGL incorporates climate resilience considerations into our infrastructure planning and investment decisions. We are increasingly assessing potential physical hazards, such as extreme weather, and implementing measures to enhance the resilience of our assets and operations.
- **Reporting and disclosure:** AGL provides transparent and comprehensive reporting on our climate-related risks, including the disclosure of relevant metrics, targets, and performance indicators. This includes aligning our reporting with recognised frameworks such as the TCFD to enhance the consistency and comparability of information.

2. Governance and Risk Management (continued)

By integrating climate-related transition and physical risks into our risk management practices, AGL aims to proactively identify, assess, and address these risks. AGL's approach enables us to navigate the challenges and opportunities associated with the transition to a lower-carbon future while safeguarding our business and creating long-term value for stakeholders.

AGL conducts a comprehensive assessment to identify key risks that could hinder the achievement of our strategic priorities. These risks, known as Tier 1 Strategic Risks, undergo a thorough review on an annual basis. Material and emerging risks are regularly monitored and reviewed, with reporting provided to the ARMC and the Executive Team twice a year. 'Climate Change Response' is one of the identified Tier 1 Strategic Risks for FY23, and reflects the potential inability of AGL to meet expectations and deliver on our commitments to transition to a lower carbon future within an acceptable timeframe.

AGL's climate-related risks can be categorised into two main categories: transition risk and physical risk. As shown below, the TCFD framework breaks transition risk into four subcategories and physical risk into two subcategories. Details of the risks and opportunities in each of these subcategories that are specific to AGL are included in Section 4.

Categories of climate-related risks

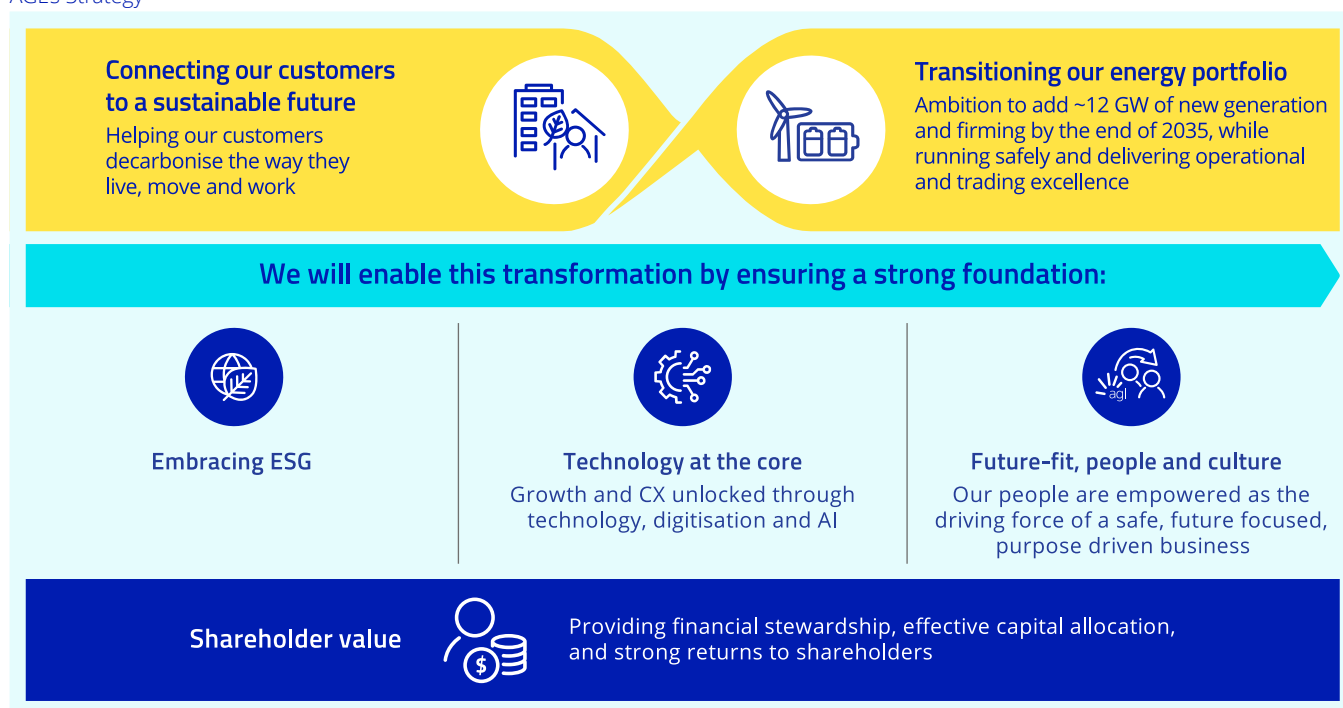
TRANSITION RISKS				PHYSICAL RISKS	
Policy and Legal Risks arising from policy or legal interventions that attempt to constrain actions that contribute to the adverse effects of climate change or actions that seek to promote adaptation to climate change.	Technology Risks arising from the technological changes which are occurring to support the transition to a low carbon economy and the disruption they can cause to markets and businesses.	Market Risks associated with changing supply and demand for commodities and other products and services.	Reputation Risks arising from changing customer and community perceptions of organisations due to their action on climate change, with impacts to reputation leading to reduced customer trust and participation with a business.	Acute These risks refer to those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, droughts or floods.	Chronic These risks refer to longer-term shifts in climate patterns (e.g., sustained higher temperatures) that may cause sea level rise or chronic heat waves.

3. Strategy

In 2022, AGL committed to conducting a comprehensive review of our strategic direction in order to determine the most effective approach for delivering long-term shareholder value amidst Australia's energy transition. This review resulted in the release of AGL's Climate Transition Action Plan (CTAP) in September 2022, together with a refreshed strategy to support Australia's transition to a lower carbon future.

Our commitments to connect our customers to a sustainable future and transition our energy portfolio are underpinned by environmental, social, and governance (ESG) principles and empowering our workforce to shape a safe, future-focused, and purpose-driven organisation. In addition, we recognise the power of technology, digitisation, and artificial intelligence (AI) in enhancing the customer experience and strengthening our trading operations and risk management capabilities. By leveraging these tools, we aim to deliver improved services to our customers while effectively managing risks.

AGL's Strategy



3.1 AGL's Climate Transition Action Plan

In September 2022, AGL released our inaugural Climate Transition Action Plan (CTAP), outlining targets which support the transition to a lower carbon world aligned with the Paris Agreement goals.¹

AGL's CTAP commitments include bringing forward our exit from coal, targeting the closure of Loy Yang A Power Station by the end of FY35 – up to a decade earlier than previously announced. Following the closure of our coal-fired power stations, AGL will be net zero for operated Scope 1 and 2 emissions.² In addition to our commitments to accelerate our exit from coal-fired generation, we are seeking to supply our customer demand with ~12 GW of additional renewable and firming capacity before 2036, with an interim target of ~5 GW by 2030. This new plan builds upon AGL's proud history as one of Australia's largest investors and operators of renewable energy.

AGL recognises the importance of striking a balance between responsible transition and rapid decarbonisation to ensure the security, reliability, and affordability of Australia's electricity supply. We are committed to working collaboratively with our stakeholders, including government bodies, employees, and the communities where we operate to lead a responsible and orderly transition.











Outlined in the table below is a summary of the commitments made by AGL in our CTAP and the progress achieved against those commitments during FY23. We engaged Deloitte to undertake limited assurance of selected quantified targets in accordance with the Australian Standard on Assurance Engagements ASAE 3000 *Assurance Engagements other than Audits or Reviews of Historical Financial Information* issued by the Australian Auditing and Assurance Standards Board. Full details of the assurance scope, process and outcome are included in the assurance statement in Appendix A.

1. Based on scenario modelling of the National Electricity Market (NEM) undertaken by ACIL Allen (as outlined in Section 3.3) utilising a carbon budget for the NEM which is consistent with limiting global temperature increases to well below two degrees Celsius above pre-industrial levels.








2. This may involve the use of offsets for residual Scope 1 and 2 emissions. Residual emissions are those arising from renewable and gas-fired generation assets, corporate and other activities and energy hubs. These emissions make up less than 2% of AGL's total current operated Scope 1 and 2 emissions.

3. Strategy (continued)

Progress against CTAP commitments during FY23

Commitment		Progress	Assurance
Scope 1 and 2 emissions			
Liddell Power Station will be closed by April 2023		Liddell ceased generation in April 2023 and decommissioning has commenced.	Yes
Achieve a reduction of at least 17% in annual Scope 1 and 2 emissions against a FY19 baseline ¹ by FY24 ² following the closure of the Liddell Power Station.		AGL operational Scope 1 and 2 emissions reduced by 18.5% ³ in FY23 compared to a FY19 baseline ¹ (Refer to Section 5.1).	Yes
Bayswater Power Station will be closed between 2030-2033 - no later than 2033 (FY34)		AGL's asset management plans have been structured to support availability and reliability until the planned closure of the Bayswater and Loy Yang A power stations in the timeframes targeted in the CTAP.	N/A
Achieve a reduction of at least 52% in annual Scope 1 and 2 emissions against a FY19 baseline ¹ by FY35 ² following the closure of the Bayswater Power Station		AGL has informed AEMO of our updated closure dates as per the requirements of NER 2.2.1(e)(2A).	
Loy Yang A Power Station is targeted to close by the end of FY35.			
Achieve net zero emissions following the closure of AGL's coal-fired power stations (Liddell, Bayswater, and Loy Yang A power stations)			
AGL will develop appropriate strategies for the use and / or origination of high-quality offsets, guided by the development of carbon markets over the coming years.		AGL is developing a company-wide offset policy.	N/A
Scope 3 emissions			
AGL has the ambition of being net zero for Scope 3 emissions by 2050 and is currently working on a decarbonisation pathway for these emissions.		AGL is developing a decarbonisation pathway to meet our ambition of net zero Scope 3 emissions by 2050. AGL's Scope 3 emissions are disclosed in Section 5.3.	N/A
Responsible and orderly transition			
Our Sites: AGL is committed to repurposing its large thermal generation sites into low-carbon energy hubs. Our industrial energy hubs at Loy Yang, Torrens Island and in the Hunter will bring together renewable energy production and storage with energy-intensive industries, centred around a shared infrastructure backbone.		Progress made to develop our energy hubs is outlined in the Assets scorecard in the FY23 Annual Report.	N/A
Our Communities: We recognise our responsibility reaches beyond the safe operation of our assets and supply of energy, and includes supporting the communities in which we operate before assets close, and managing the responsible best practice rehabilitation of our sites.		AGL's engagements with local communities, local businesses and government, and connections with Traditional Owners, are outlined in the Relationships scorecard in the FY23 Annual Report.	N/A
Our People: The energy transition is an industry-wide transformation that will involve significant changes to the way AGL operates. As we manage this transition, the labour and skills required to operate our generation assets will change over time. Our future workforce is likely to be smaller; employees will be located across a distributed network of sites, operating a diverse portfolio of energy and related assets and technology.		Actions undertaken in FY23 to develop a comprehensive capability program and manage the safe and respectful closure of the Liddell Power Station are outlined in the People scorecard in the FY23 Annual Report.	N/A
Portfolio reshape and capital allocation alignment			
AGL intends to transition our portfolio to support a lower carbon world and will seek to supply our customers' energy demand by building and accessing ~12 GW of new renewable generation and firming capacity before 2036, with an interim target of ~5 GW by 2030.		AGL has delivered 478 MW ⁴ of new firming and renewable capacity from FY23 onwards. (Refer to Section 5.5).	Yes
		AGL has a development pipeline of 5.3 GW of firming and renewable assets. (Refer to Section 3.2)	N/A
		Refer to Section 3.2 for capital allocation.	N/A
Green revenue			
In accordance with our FY23 long-term incentive (LTI) plan, we aim to increase the percentage of total revenue derived from green energy and carbon neutral products and services in FY26 ⁵ to at least 22.2%, with a stretch goal of achieving 27.0%.		The percentage of AGL's total revenue derived from green energy and carbon neutral products and services in FY23 was 17.5%. (Refer to Section 5.6).	Yes

3. Strategy (continued)

Commitment		Progress	Assurance
Climate policy engagement			
AGL will advocate for a responsible transition that balances energy reliability and affordability with the need to decarbonise. We will take action to deliver, and speak up for, a responsible transition.		<ul style="list-style-type: none"> A summary of AGL positions on climate related advocacy is available in the FY23 ESG Data Centre. All AGL submissions are published on The Hub. AGL has not made any political donations in FY23. AGL continues to monitor the policy position of industry associations of which we are a member (refer to the FY23 ESG Data Centre). 	N/A
Climate governance			
Climate transition metrics aligned to AGL's Climate Transition Action Plan will be included in future Remuneration Reports.		Climate transition metrics are included in executive remuneration. Refer to the Remuneration Report within the FY23 Annual Report. Also refer to Section 5.7.	N/A
AGL will disclose a summary of the key focus areas of the Board and its committees annually, which will include how each body has considered climate-related risks and opportunities over the year.		Refer to the Governance Summary within the FY23 Annual Report. Also refer to Section 2.1.	N/A
AGL will regularly assess Board skills in categories that cover the core competencies necessary to lead the energy transition (for example: environmental; energy markets; and entrepreneurship, commercial leadership and growth) and disclose the outcomes of these skills assessments annually		Refer to the Governance Summary within the FY23 Annual Report. Also refer to Section 2.1.	N/A
Transparency			
AGL will continue to use the TCFD Framework to report on governance, risk management, strategy, and metrics and targets in relation to climate change as part of our annual reporting suite.		This report has been prepared using the TCFD Framework.	N/A
AGL's Climate Transition Action Plan will be subject to a non-binding shareholder vote every three years at AGL's Annual General Meeting. In the event that material changes to the plan are made within the three-year timeframe, a revised plan will be put to shareholder vote at the following Annual General Meeting.		AGL's CTAP was put to a shareholder vote at the 2022 Annual General Meeting where it was supported by a majority of shareholders.	N/A
We will report progress against the commitments in our Climate Transition Action Plan annually. We will also regularly undertake independent assurance of our material operated Scope 1 and 2 emissions to allow progress against our emissions reduction targets to be measured.		AGL has reported against our CTAP commitments in this document.	N/A

1. Emissions comprise Scope 1 and 2 greenhouse gas emissions for all facilities operated by AGL, as reported under the National Greenhouse and Energy Reporting Act 2007. FY19 was selected as the baseline year as it provides a better reflection of representative historical output from thermal assets compared to FY20-FY22.
2. FY24 and FY35 represent the first full financial years where no emissions from Liddell and Bayswater power stations occur following the closure of these power stations in April 2023 (FY23) and CY33 (FY34) respectively.
3. AGL's emissions have decreased in FY23 due to the closure of the Liddell and Torrens Island A power stations, as well as the extended unplanned outage of Unit 2 at the Loy Yang A Power Station. It is anticipated that the emissions from the Loy Yang A Power Station will increase in FY24.
4. Comprises Torrens Island Battery (250MW) and Broken Hill Battery (50 MW), both under construction during the period and Rye Park Wind Farm PPA (178MW). Does not include the 14 MW upgrade currently underway at Clover Power Station.
5. Green energy revenue represents: green revenue including State-based green schemes; RET revenue from green charges passed through to customers; and other revenue from State-based charges passed through to customers.

Key  Complete  In Progress  Ongoing - met in FY23

3. Strategy (continued)

3.2 Capital allocation

AGL has implemented refreshed capital allocation principles and an updated dividend payout ratio range¹ as part of our strategy to fund the transition to a more sustainable energy portfolio. AGL remains committed to maintaining an investment-grade balance sheet, ensuring financial stability and flexibility.

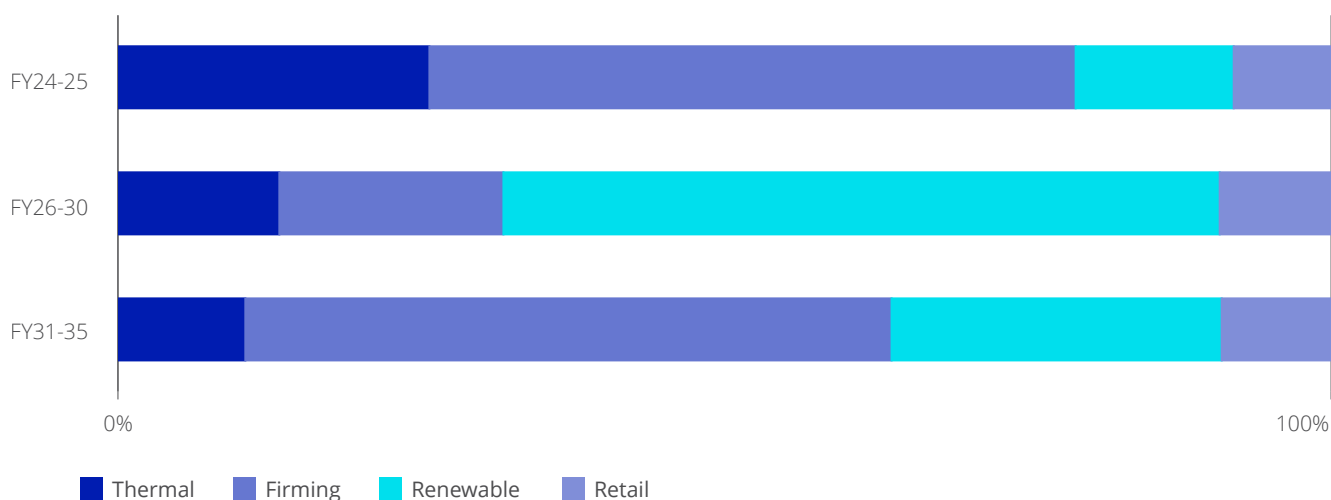
AGL will continue to allocate capital prudently, while prioritising investments that support the transition to a lower-carbon portfolio and driving shareholder returns. Notwithstanding this, AGL recognises the important role that thermal generation currently plays in providing safe, reliable and affordable electricity while renewable and firming capacity is delivered.

AGL intends to leverage our forecast strong operating cash flows to fund the transition. With a focus on financial discipline, AGL plans to deploy approximately \$3 billion of balance sheet capital by FY30 and expects to allocate an additional \$5-7 billion by FY35. These investments will be complemented by the partial underwriting of renewable developments via strategically sourced offtake agreements, and in combination will contribute to meeting our plans to deliver ~12 GW of renewable generation and firming capacity.

These capital allocation decisions reflect AGL's commitment to transition our portfolio responsibly and effectively to cleaner energy sources. By prudently investing in the necessary infrastructure and technology, AGL aims to drive sustainable growth while maintaining a strong financial foundation.

The chart below shows the anticipated evolution of AGL's capital allocation in the short, medium and longer term reflecting the proportion of capital expected to be allocated to each project type.² This has been updated post the release of AGL's CTAP report for technology change mix and latest cost estimates.

Capital allocation evolution



The table below outlines the anticipated evolution of AGL's capital allocation in the short, medium and longer term in terms of the proportion of capital expected to be allocated to carbon solutions.²

Period	Capital allocation for carbon solutions	Carbon solutions definition
FY24-25	67%	For the purposes of capital allocation, AGL defines carbon solutions as grid-scale renewable generation, grid-scale batteries and pumped hydro, and decentralised sustainable business energy solutions for customers.
FY26-30	78%	
FY31-36	74%	In relation to the graph above this represents all of the renewable capital allocation category and a portion of the firming and retail categories.

1. The new payout ratio range will be effective from the FY24 interim dividend.

2. Amounts include notional capital for offtake commitments and all capital costs of any Joint Venture arrangements. When funding occurs, AGL may only have to contribute its share of equity related contributions to Joint Venture arrangements.

3. Strategy (continued)

3.3 Scenario analysis

AGL undertakes climate-related scenario analysis on a periodic basis in order to make informed decisions regarding our operations, investments and strategic direction. AGL utilises climate scenario modelling in setting strategy and making informed decisions related to our operations and investments. Climate scenario modelling helps AGL assess potential future pathways, anticipate risks and opportunities, and align our actions with the evolving energy landscape.

In FY23 we used our scenario analysis to assist with the development of our CTAP, including our accelerated coal closure and renewable and firming capacity pipeline targets. We anticipate publishing refreshed climate-related scenario analysis within our next CTAP, currently scheduled for release in 2025.

In 2022 AGL engaged ACIL Allen (ACIL) to conduct economic modelling of four different decarbonisation scenarios for the National Electricity Market (NEM), utilising relevant assumptions from AEMO's ISP in order to provide a level of comparability to other recognised scenarios. AGL believes that the scenarios modelled remain relevant.

The scenarios modelled a broad range of outcomes in terms of climate and energy transition pathways, and are summarised below.¹

Modelled scenarios (2022)

Scenario	Description	Targeted carbon constraint ¹
Scenario I	Challenging economic environment, lack of coordinated decarbonisation policy and slow renewables infrastructure build-out slows the decarbonisation of the NEM. Emissions reduction and energy policies are not delivered due to, for example, energy affordability concerns, lags in renewable project development and connection delays.	None
Scenario II	Emissions reduction goals are progressively ratcheted up over time in pursuit of an economy wide 26-28% emissions reduction target by 2030 and economy-wide net zero emissions by 2050.	986 MtCO ₂ e 2030-2050 RCP 4.5 (2.6°C)
Scenario III (Well below 2 degrees)	Rapid consumer-led transformation of the energy sector and co-ordinated economy-wide action, fuelled by a step change in policy commitments and deployment and coordination of enabling technologies, delivering a Paris-aligned decarbonisation pathway	891 MtCO ₂ e 2024-2050 RCP 2.6 (1.8°C)
Scenario IV (1.5 degree goal)	Accelerated policy action and significant technological breakthroughs driving a rapid transformation of the economy, delivering a 1.5°C-aligned pathway.	453 MtCO ₂ e 2024-2050 RCP 1.9 (<1.5°C)

1. Relative Concentration Pathways (RCP) are concentration pathways for greenhouse gases and aerosols, demonstrating possible future emissions and radiative forcing (i.e. temperature intensity) scenarios for the world until 2100, as defined by the IPCC. The temperature outcomes represent the temperature increase delivered by 2100, relative to pre-industrial levels. Targeted carbon constraints for each scenario are taken from the AEMO ISP scenarios as identified in the scenario assumptions table below.

- Under **Scenario I**, limited growth in system demand results in relatively stable annual generation levels and generation capacity in the NEM to 2050. Coal-fired generators run at relatively low load factors as a result of low system demand. Annual emissions and emissions intensity of NEM generation decline over time as coal-fired generation exits the system, and is replaced by renewable generation technology, driven by economics. The scenario shows approximately 70 GW of renewable and storage capacity added to the grid between FY24 and FY50.
- Under **Scenario II**, significant growth in system demand owing to strong electrification drives increasing generation levels and significant growth in installed capacity in the NEM. The scenario shows approximately 225 GW of renewable and storage capacity added to the grid between FY24 and FY50, while economics drives the progressive exit of ageing coal-fired generation capacity. Annual emissions and emissions intensity of NEM generation decline over time as renewable generation grows and coal-fired generation exits the system.
- Under **Scenario III**, meeting a Paris well below 2°C aligned carbon constraint results in coal-fired generation exiting the system in advance of economic closure dates and operating at relatively lower load profiles compared to Scenario II, while the increasing electrification macro trend drives increasing system demand. This results in approximately 250 GW of renewable and storage capacity being added to the grid over the FY24-FY50 period. Annual emissions levels and emissions intensity of NEM generation declines more rapidly than under Scenarios I and II, owing to earlier coal exits and strong growth in renewable generation, and the NEM reaches net zero emissions in the early 2040s.
- Under **Scenario IV**, meeting a Paris-1.5°C aligned carbon constraint results in an accelerated exit of coal-fired generation from the system, with all coal closed by the early 2030s, while the increasing electrification macro trend and longer term shift to hydrogen generation technology drives a strongly increased long-term system demand outlook. This results in approximately 295 GW of additional renewable and storage capacity being required by the grid over the FY24-FY50 period. Annual emissions levels and emissions intensity of NEM generation decline more rapidly than under Scenarios I - III, owing to accelerated coal exits and strong growth in renewable generation, with the NEM reaching net zero emissions by 2040.

In Scenario III (Well below 2 degrees), the Bayswater and Loy Yang A power stations close in FY34 and FY35 respectively. Our modelling indicates that this operating timeframe is commensurate with the Paris-aligned carbon budget from AEMO's Step Change scenario. The targeted closure dates for AGL's thermal coal assets outlined in our CTAP are consistent with this Scenario III outcome.

1. The full details of AGL's methodology, assumptions and limitations of the scenarios are available in the CTAP.

3. Strategy (continued)

To achieve a well below 2-degree outcome in the NEM, there is a need for a significant infrastructure and asset replacement program. This will require substantial investment in new variable generation, transmission, low-emissions dispatchable plants, storage, and technologies that provide system services. Our modelling indicates that while this transition is achievable, the scale of investment required to meet modelled timeframes will present some challenges. AGL is seeking to meet these challenges through our extensive focus on building our development pipeline of renewable and firming generation as well as our battery storage projects.

Several uncertainties currently facing investors in the market affect long-term investment signals for the optimal resource mix needed to support the energy transition. These include technological and demand uncertainties, the timing of ageing generation plant closures, and government interventions to drive new generation investment (including securing the support of lending banks and debt capital market investors) and manage plant closures. These factors can affect long-term investment signals for the optimal resource mix needed to support the energy transition.

Market reforms that facilitate long-term planning and investment, improve affordability, and maintain system reliability throughout the energy transition are important. By creating a market environment that provides clearer investment signals and reduces uncertainties, the sector can attract the required investments in infrastructure and technologies to achieve Australia's climate goals.

These market challenges also have implications for the Australian electricity sector's ability to meet the renewable and firming capacity required to replace thermal assets in line with the Paris Agreement's higher ambition to limit global warming to 1.5 degrees above pre-industrial levels. Our scenario analysis suggests that coal-fired plants within the NEM would need to retire by no later than FY31 (Scenario IV). Meeting this decarbonisation pathway would require approximately 100 GW of additional capacity by 2030, with capacity needs and associated costs rising to approximately 270 GW and over \$180 billion, respectively, by 2050¹.

Ongoing government policies that provide incentives for low-emissions generation and supporting infrastructure, including transmission, storage, distributed energy, demand-side resources, and technologies for essential system services are needed to achieve this outcome.

Despite the challenges faced by the Australian energy sector in pursuing a 1.5-degree ambition, AGL recognises the importance of the global pursuit of this outcome. AGL supports broader policy actions aimed at limiting warming to 1.5 degrees above pre-industrial levels and is committed to working with relevant stakeholders to explore options and implications for accelerated decarbonisation pathways. This includes considering the role and contributions that other sectors of the Australian economy may play in achieving this outcome.

1. Investment requirement capacity includes new renewable and storage build requirement including behind the meter technology across the NEM. Investment cost includes capital costs for new wind and utility-scale solar and storage build across the NEM and excludes transmission and distribution, in real dollars, based on current technology cost curves.

4. Climate-related Risks and Opportunities

Climate change and the related transition of the energy sector present both risks and significant opportunities for our business.

This section provides an overview of climate-related risks and opportunities, and comprises:

- A list of AGL's Tier 1 strategic risks as at 30 June 2023, and the climate-related impacts associated with each of these risks (Section 4.1);
- An overview of AGL's transition risks (Section 4.2);
- A high-level assessment of physical risks, including an overview of risks for each of AGL's operated electricity generation assets (Section 4.3); and
- An overview of AGL's opportunities (Section 4.4).

4.1 Tier 1 Strategic Risks

As indicated in Section 2.2, AGL identifies key risks that could impact the achievement of our strategic priorities (Tier 1 Strategic Risks). In our strategic risk assessment for FY23, climate change response was identified as a Tier 1 Strategic Risk. However, it is important to note that climate-related impacts and opportunities are also associated with most of our other Tier 1 Strategic Risks, due to the interconnectedness of climate change and energy.

Relationship between Strategic Tier 1 Risks and climate change

Tier 1 Strategic Risk	Climate change link	TCFD risk type
Climate change response		
AGL is unable to meet expectations and/or deliver on its strategy and commitments to be a leader in the energy transition to a lower carbon future within targeted timeframes.	<p>Inherent climate change risk</p> <p>Mitigation: In September 2022 AGL released our Climate Transition Action Plan (CTAP). The CTAP outlines our commitments in relation to the accelerated closure of our coal plants and the development of a significant investment pipeline of options for new renewable and firming generation. Mid-term targets for this new renewable and firming generation have been announced, and detailed plans to meet these targets have been developed.</p> <p>Our progress against the CTAP commitments is summarised in Section 3.1.</p>	<p>Transition risk – reputation risk</p> <p>Transition risk – market risk</p>
Unfavourable government intervention		
AGL is not able to effectively anticipate, plan or respond to changing government policy.	<p>Uncertainty regarding longer term government policies may alter the pace of the energy transition.</p> <p>Mitigation: AGL continues to engage productively and transparently with all levels of government on energy and climate policy.</p>	<p>Transition risk – policy and legal risk</p> <p>Transition risk – market risk</p>
Wholesale market pricing and earnings volatility		
AGL is unable to effectively manage the impact of wholesale electricity price change and earnings or cashflow volatility.	<p>The rapid transition towards renewable energy may lead to more volatile wholesale electricity and gas prices.</p> <p>Mitigation: AGL continues to invest in storage and firming capacity and is increasing operational flexibility of our thermal portfolio to reduce exposure to volatility in the wholesale market. AGL's existing renewable generation, firming and DER capacity pipeline is currently 5.3 GW.</p>	Transition risk – market risk
Regulatory intervention		
AGL is not able to effectively anticipate or plan for regulatory intervention, or added restrictions and diversion of resource puts wider business objectives at risk.	<p>Regulators may introduce new or expanded compliance obligations. These may be direct (e.g. limits on greenhouse gas emissions) or indirect (e.g. other environmental or energy market-related regulations that may impact AGL's ability to deliver on its transition plans.</p> <p>Mitigation: AGL continues to engage productively and transparently with all regulatory bodies on energy and climate policy and regulations. AGL's CTAP outlines our decarbonisation pathway.</p>	<p>Transition risk – policy and legal risk</p> <p>Transition risk – market risk</p>
Stakeholder trust		
AGL's strategy to deliver on its social licence to all stakeholders is unclear, inconsistent, and/or poorly executed.	<p>The rapid transition towards renewable energy may lead to wholesale market volatility. Stakeholders may have differing views from AGL (and between each other) on the pace of energy transition and whether the actions AGL is taking to manage impacts to communities, the environment and the economy are sufficient.</p> <p>Mitigation: AGL continues to engage with stakeholders on climate change in a transparent manner. Transparency is one of the central tenets of AGL's CTAP. Accountability is driven through public targets with a heightened focus on responsible transition for communities and our people.</p>	Transition risk – reputation risk

4. Climate-related Risks and Opportunities (continued)

Tier 1 Strategic Risk	Climate change link	TCFD risk type
Cybersecurity and resilience		
AGL's critical systems, platforms, technology infrastructure and core business and operational processes are compromised or unacceptably disrupted by a cyber, vendor or internal event.	<p>The complexity of cyber security related risks and required controls is likely to increase as AGL transitions its portfolio, due to the decentralised nature of renewable and firming assets.</p> <p>Mitigation: AGL continues to invest in key cyber security capabilities including monitoring and defence, network security, identity and access management.</p>	Transition risk – market risk
Organisational culture and capability		
AGL is unable to foster a resilient, responsive, future-focused and purpose-driven organisation that is built on strong and ethical behaviours, talented people, a focus on health and safety, and a customer-centric mindset.	<p>AGL's new strategy as outlined in our CTAP will require both new capabilities and additional resourcing in key areas associated with the energy transition.</p> <p>Mitigation: AGL transparently engages with our people on the issue of climate change and its transition plan. AGL has identified our capability requirements for the transition and is working to prioritise and resource these key roles.</p>	Transition risk – reputation risk
Resilience of generation/critical infrastructure		
AGL is unable to generate and maintain a resilient and flexible energy supply from generation assets and related critical infrastructure.	<p>The physical impacts of climate change may affect the operation of AGL's generation assets.</p> <p>Mitigation: AGL continues to develop our understanding of potential future physical impacts of climate change on our assets and is investing in greater operational flexibility to ensure the ongoing reliability of our generation assets. Geographic and technological diversification and physical risk management plans are also utilised as mitigation strategies.</p>	Physical risk
Investment planning and execution		
AGL's major investments do not deliver on their intended benefits, announced timeframes or outcomes for shareholders, customers and the community.	<p>The rapidly changing nature of the electricity market in Australia may impact asset planning. This includes the increased uncertainty around the timing of thermal asset closures and the delivery of transmission infrastructure.</p> <p>Mitigation: AGL continues to monitor and assess the requirements of the market and make appropriate investment decisions.</p> <p>AGL's CTAP outlines a target of an additional ~12 GW of new firming or renewable generation capacity by 2036. AGL's currently has 5.3 GW of projects in its development pipeline. Our capital allocation plan is outlined in Section 3.2.</p>	<p>Transition risk – technology risk</p> <p>Transition risk – market risk</p>
Retail Market Disruption		
AGL does not adequately or appropriately identify and respond to changing customer or operating environment needs and expectations; or does not effectively harness new technologies, products or services that support these changing needs and expectations.	<p>Climate change may increase customer demand for clean/renewable energy, rooftop solar, behind-the-meter batteries and electric vehicles.</p> <p>Mitigation: AGL's Customer Markets strategy focuses on three areas: strengthening our core business and supporting our customers; capturing new and growing value pools, particularly those arising from decarbonisation and electrification; and creating efficiency through transforming our retail operations.</p>	<p>Transition risk – technology risk,</p> <p>Transition risk – market risk</p> <p>Transition risk – reputation risk</p>
Compliance and privacy		
AGL fails to comply with laws, regulations or other commitments made, including its privacy and environmental obligations.	<p>An increasingly complex regulatory environment including corporate disclosure requirements, state EPA licence provisions and other state-based energy efficiency schemes, may impact AGL's ability to maintain appropriate levels of compliance.</p> <p>Mitigation: AGL has in place a robust enterprise-wide compliance framework to manage our compliance requirements.</p>	Transition risk – reputation risk
Access to gas		
AGL is unable to source sufficient quantities of gas to meet its future demand.	<p>Climate change may lead to increased gas demand in the short term, and longer term gas demand is increasingly uncertain.</p> <p>Mitigation: AGL proactively contracts competitive gas supplies to firm up our short, medium and longer term gas position to meet gas supply demands. To limit our reliance on gas for our customers AGL is supporting electrification through innovative new products.</p>	Transition risk – market risk

To provide a more comprehensive understanding of the risks involved, we have identified multiple Tier 2 and Tier 3 risks, which represent more specific threats at business unit and asset levels. A selection of these risks is analysed in greater detail in Section 4.2, below. This analysis allows us to delve into the specific implications and challenges associated with each risk and develop appropriate strategies to address them effectively.

During FY23, as part of the annual review, climate change response was confirmed as a continuing Tier 1 Strategic Risk and will continue to be monitored and actively managed during FY24.

4. Climate-related Risks and Opportunities (continued)

4.2 Transition risks

The potential challenges and uncertainties that arise from the shift towards a low-carbon economy and the transition away from carbon-intensive industries and practices are known as climate related transition risks. These risks emerge as a result of various factors, including policy changes, technological advancements, market dynamics, and evolving societal expectations.

AGL has identified a number of transition risks which contribute to the Tier 1 Strategic Risk of climate change response. The table below outlines these risks, their current risk trend and AGL's mitigation and management strategies.

Risk category	Implications for AGL	Mitigation approach
Policy & Legal		
Risks arising from policy or legal interventions that attempt to constrain actions that contribute to the adverse effects of, or seek to promote adaption to, climate change.	<ul style="list-style-type: none"> Government policies and/or other interventions designed to limit the impacts of climate change or manage the impacts of Australia's transitioning energy system may be implemented in a disorderly or unplanned manner, increasing uncertainty for AGL's strategic direction and in the allocation of resources. Increased resourcing may be required to anticipate, understand and comply with new regulatory requirements. Any new regulations that place further restrictions or limitations on greenhouse gas emissions are likely to increase the cost of operating thermal plants. 	<p>AGL engages productively and transparently with all levels of government and regulatory bodies on energy and climate policy and regulations.</p> <p>In FY23 additional certainty was achieved as the Australian government legislated its 43% emissions reduction target as well as additional emissions limiting mechanisms as part of the Safeguard Mechanism reforms.</p> <p>AGL's emissions reduction targets align with the government's emissions reduction ambition. Additionally, the Safeguard Mechanism amendments do not apply to AGL.</p>
<i>Time horizon: short to long term</i>		
Technology		
Risks arising from technological changes which are occurring to support the transition to a lower carbon economy and the disruption they can cause to markets and businesses.	<ul style="list-style-type: none"> As low-carbon, renewable and behind-the-meter technology increase electricity supply to the NEM and change the profile of Australia's electricity supply, some energy assets and investments may no longer provide a viable economic return, and could therefore see their economic life curtailed. AGL may fail to identify and/or appropriately invest in new technologies that support the transition and are aligned to its business objectives, impacting on financial performance. 	<p>AGL's leading renewable generation position will be further advanced through the continued development of our pipeline of renewable and firming projects including batteries, wind, pumped hydro and other storage. In June 2023 AGL signed a PPA with Tilt Renewables to offtake 178 MW of wind capacity from the Rye Park Wind Farm.</p> <p>AGL also continues to develop innovative behind-the-meter products and services for customers.</p>
<i>Time horizon: medium to long term</i>		
Market		
Risks associated with changing supply and demand for commodities and other products and services.	<ul style="list-style-type: none"> AGL's existing energy generation sources and inputs may not reflect the preferences of some of our current and prospective customers, leading to the risk of reducing market share over time. AGL's access to capital markets, including debt, equity investors and insurance, may become further constrained where our energy transition timing does not meet the expectations of these markets. AGL may not be able to access the NEM for new renewable generation assets due to network infrastructure investment not keeping pace with need for higher distribution capacities. 	<p>While transitioning our generation portfolio as outlined in our CTAP, we are also committed to helping our customers decarbonise the way they live, move and work. During FY23, we have established and are scaling a range of initiatives to support decarbonisation efforts for our customers.</p> <p>To help manage risks associated with access to capital, in FY23 AGL established a Green Finance Framework. The Framework sets out the process by which AGL intends to issue and manage Green Debt on an ongoing basis to fund expenditure on firming capacity and renewable energy. This will support the delivery of AGL's CTAP by financing and refinancing assets that fall within the eligibility criteria outlined in the Framework to create sustainable outcomes.</p>
<i>Time horizon: short term</i>		
Reputation		
Risks arising from changing customer and community perceptions of an organisation's contribution or detractor from the transition to a lower carbon economy.	<ul style="list-style-type: none"> AGL's success is dependent on the ongoing support of our key stakeholders, including our people, customers, shareholders and the communities where we operate. Where AGL is unable to anticipate and/or respond to changing expectations, our ability to achieve our objectives could be significantly challenged. 	<p>AGL is committed to engaging with stakeholders in a transparent manner regarding climate change. Our CTAP aims to find a balance between meeting Australia's current and future energy requirements while responsibly reducing carbon emissions. The plan includes specific targets towards achieving net zero emissions, facilitating a responsible transition for Australia's energy market. AGL has committed to putting our CTAP to a non-binding shareholder vote every three years.</p>
<i>Time horizon: short to medium term</i>		
In FY23 AGL closed our Liddell Power Station, meeting the first of many commitments outlined in our CTAP.		

4. Climate-related Risks and Opportunities (continued)

An additional transition risk facing AGL is associated with the rehabilitation provisions for our coal-fired power stations. In a faster decarbonisation scenario AGL would face earlier closure dates for these generation assets. Earlier asset closure would in turn lead to the rehabilitation obligation occurring sooner, and an additional risk that AGL may not be able to recover the carrying value of the asset. For further details on AGL's rehabilitation provisions see the FY23 Annual Report.

4.3 Physical risks

Physical risks associated with climate change can have significant impacts on various aspects of AGL's business. These risks can be categorised into two main types: acute physical hazards and chronic physical hazards.

Acute physical hazards are characterised by extreme weather events that directly damage facilities or infrastructure. Examples of acute physical hazards include cyclones, hurricanes, floods, wildfires, and severe storms. These events often occur with high intensity and can have immediate and widespread impacts, leading to disruptions in operations, damage to assets, and potential threats to human safety. Acute hazards are typically short-term in nature, but their consequences can be severe and require immediate response and recovery efforts.

On the other hand, chronic physical hazards are gradual changes that emerge over time because of climate change. These hazards include long-term shifts in average sea levels, temperature patterns, precipitation levels, and other climatic factors. Chronic hazards have a lower-scale impact but persist over a longer duration. The effects of chronic hazards can accumulate slowly and progressively, impacting ecosystems, infrastructure, agriculture, and water resources. They may lead to issues such as coastal erosion, increased vulnerability to heatwaves, changes in rainfall patterns, and shifts in agricultural suitability.

Both acute and chronic physical hazards pose significant risks to businesses, communities, and the overall economy. They can result in direct damages, operational disruptions, increased costs for repair and maintenance, decreased productivity, and loss of assets and infrastructure. Additionally, these hazards can have cascading effects, impacting supply chains, insurance costs, investor confidence, and the overall stability of financial markets.

These physical climate hazards can additionally have both primary and secondary effects. The primary effects are the direct impacts on assets such as power stations, critical infrastructure, and corporate facilities. The secondary effects are impacts on supply chains, distribution networks, customers, and markets.

Risk category	Implications for AGL	Mitigation approach
Acute		
Event-driven risks, including increased severity of extreme weather events.	<ul style="list-style-type: none">Key risks facing AGL's thermal coal fleet include direct impacts from extreme heat and fire events, and potential storm surge risks at Torrens Island.Extreme heat, fire and wind events also present risks to the effective operation of AGL's wind and solar assets.Extreme heat may also lead to spikes in demand for electricity leading to potential electricity shortfalls.Major flooding events could cause disruption to AGL generation sites if these events occurred in areas such as the Hunter Valley.Impacts resulting from physical hazards affecting other areas of the electricity system (such as transmission and distribution systems) may also have a material impact on AGL's operations. <i>Time horizon: short to long term</i>	<p>AGL continues to improve our understanding of potential future physical impacts of climate change on our assets and is investing in greater operational flexibility to support the ongoing reliability of our generation assets.</p> <p>Geographic and technological diversification (including through the development of a pipeline of new renewable generation and firming projects), and physical risk management plans are also utilised as mitigation strategies.</p>
Chronic		
Risks arising from longer-term shifts in climate patterns.	<ul style="list-style-type: none">Water security at thermal and hydro assets may be compromised during extended drought periods, impacting asset availability.Ongoing consistent increases in average temperature may lead to increasing demand for energy from customers. <i>Time horizon: long term</i>	

4.3.1 Site-specific physical impacts

During FY21, AGL completed a desktop assessment of primary physical risks for our operated electricity generation assets and sites under a high warming scenario, utilising the RCP 8.5 scenario assessment conducted by the Climate Measurement Standards Initiative (CMSI) in September 2020. This scenario represents the expected high end of physical impacts, projecting a temperature increase of over 4 degrees Celsius by 2100. We considered this scenario to understand the potential risks our assets may face under a high warming scenario.

The tables below outline how risks to generation availability may change from 2020 to 2030 for each asset, based on the identified physical hazards in the CMSI report. This analysis does not include assets in our development pipeline or gas operation facilities.

While risks to plant efficiency resulting from physical hazards are measurable within the given timeframe, we consider them less material compared to availability risks and the impacts on other areas of the electricity system. Therefore, these efficiency-related risks have not been included in the provided tables. However, we will continue to monitor and report on these risks if they are assessed to have a material impact on our operations.

4. Climate-related Risks and Opportunities (continued)

Thermal assets: change in risk from 2020 to 2030 for impacts on availability

Physical hazard	Bayswater Power Station and Hunter Hub	Torrens Island & Barker Inlet power stations and Torrens Hub	Loy Yang A Power Station and Latrobe Valley Hub	Somerton Power Station	Kwinana Swift Power Station
Extreme wind events	○	○	○	○	○
Extreme rainfall and floods	○	○	○	○	○
Extreme fire weather days	↗	↗	↗	↗	↗
Extreme heat wave events	↗	↗	↗	↗	↗
Storm surge and coastal flooding	○	↗	○	○	○
Extended drought periods	↗	○	↗	○	○

Key ↗ Increasing risk ↗ Small increase in risk ○ Stable risk

Renewable assets: change in risk from 2020 to 2030 for impacts on availability

	Qld. wind	NSW wind	Vic. wind	SA wind	NSW hydro	Vic. hydro	NSW solar
Extreme wind events	↗	↗	↗	↗	○	○	○
Extreme rainfall and floods	○	○	○	○	○	○	○
Extreme fire weather days	↗	↗	↗	↗	↗	↗	↗
Extreme heat wave events	↗	↗	↗	↗	○	○	↗
Storm surge and coastal flooding	○	○	○	○	○	○	○
Extended drought periods	○	○	○	○	↗	↗	○

Key ↗ Increasing risk ↗ Small increase in risk ○ Stable risk

The asset portfolio is resilient to direct physical risks in part through its geographic distribution, which acts to dilute the impact of location-specific acute impacts. The generation fleet is also technologically diverse, which provides increased resilience to the impact of temperature increases on generation efficiency. In addition, water rights and supply security allow for certainty even in extensive drought conditions.

As outlined, the key direct risks faced by AGL's fleet are consistent across most assets and locations, and include increasing frequency of extreme heat and fire events, as well as water security. AGL currently has comprehensive mitigation strategies in place in relation to bushfires and water security. Refer to Sections 4.3.2 and 4.3.3 for more details.

The increasing duration and magnitude of heatwaves can reduce generator and network capacity as well as increase failure rates and maintenance costs. As outlined in our CTAP AGL will continue to invest in storage technologies thus reducing the impacts of lowered efficiencies of our generators.

Water at thermal coal and hydro assets is also an increasing risk. Thermal coal assets use considerable quantities of water and as droughts increase with rising temperatures, water availability and security become increasing risks. However, AGL holds water rights that limit the impact of these events.

The hydro assets also face water security issues. The changing climate has caused a reduction in average rainfall in much of the NEM, reducing water available for hydro generation and thermal generation cooling consumption as well as increasing power requirements for desalination. At the same time, extreme rainfall events and flooding have increased. Water availability is a key physical risk which is discussed in further detail in Section 4.3.3.

The Torrens Island and Barker Inlet power stations, as well as the new 250 MW Torrens Island battery, and Torrens Hub are in a low-lying area of South Australia at Torrens Island in Adelaide. This location makes them more vulnerable to storm surges and coastal flooding. This was taken into consideration during the construction of the Barker Inlet Power Station and the Torrens Battery.

4. Climate-related Risks and Opportunities (continued)

All wind farms in AGL's portfolio tend to face similar physical impacts, however their geographical separation would likely result in impacts not affecting all assets at the same time. Wind assets face derating (i.e., a decrease in available capacity) in extreme heat events. AEMO has noted a correlation between extreme heat events and derating of wind farms due to the turbines needing to cool their gearboxes to ensure there is no failure of the equipment. Investment in new renewable technologies will help mitigate this issue. Wind generation is also sensitive to any reduction in average wind speed as well as to increases in the frequency and magnitude of destructive gusts. In the situation of severe wind gusts, turbines will turn out of the wind to avoid the potential destructive impact of the gusts on their operations. AGL has faced wind related derating from both wind drought and extreme winds in the past, and we consider our broad geographical range of assets to be an effective mitigation strategy of this risk.

AGL recognises the need for further analysis of physical risk. As such, AGL plans to undertake a more detailed climate-related physical risk assessment of our assets which considers the potential financial implications. AGL intends to utilise this information for internal planning, strategic decision-making, and external disclosures in alignment with the TCFD framework.

4.3.2 Bushfire preparedness

Increasing temperatures, prolonged droughts, altered precipitation patterns, and more frequent extreme weather events contribute to heightened bushfire risk in Australia. AGL recognises the importance of proactive measures and robust bushfire preparedness to mitigate these risks and ensure the safety of our assets, employees, and surrounding communities.

AGL conducts regular risk assessments at all operational sites to identify potential vulnerabilities and inform appropriate mitigation measures. These assessments consider factors such as geographical location, historical fire data, climate projections, and asset exposure.

To address bushfire risks, AGL has developed and implemented bushfire management plans at relevant sites. These plans serve as guiding documents for mitigating bushfire risks and are reviewed biennially to ensure their effectiveness and alignment with evolving conditions. They outline specific strategies, responsibilities, and actions to minimise the impact of bushfires on AGL's operations and surrounding communities.

AGL also utilises tools such as Trigger Action Response Plans (TARPs) to help reduce the risk posed by bushfires. TARPs define a range of trigger levels and associated responses to be initiated when a specific trigger level is reached. These plans ensure a systematic and coordinated approach to bushfire management.

AGL implements various fire prevention measures including vegetation management programs aimed at minimising fuel loads in and around our operational sites. Regular clearing, maintaining grassed zones, and implementing passive management techniques contribute to reducing the availability of combustible materials. AGL collaborates with neighbouring landholders and local authorities to ensure coordinated efforts in fuel load management and fire prevention.

AGL's management practices mitigate the impacts of bushfire risk. While climate change will increase the frequency and extent of extreme events AGL will continue to actively manage these using our existing risk management practices.

4.3.3 Water management of hydroelectric assets

AGL operates a portfolio of hydroelectric power stations in Victoria and New South Wales. The generation output of these stations depends on local environmental conditions, such as rainfall events, irrigation patterns, and seasonal run-of-river releases. Each station has a licence agreement or entitlement to generate electricity from water released by storage or passing through the river. Notably, the Kiewa, Dartmouth, and Eildon stations have flexibility in water release timing, allowing them to adjust generation based on demand and access additional water when needed.

Based on current dam water storage capacity and climate forecasts, there are no immediate water supply impacts expected for the hydro power stations. Annual rainfall forecasts are utilised to project dam capacity and potential generation for each power station on a year-to-year basis. AGL has noted that water availability in the rivers supplying a number of our generators has been slowly declining over time. One example of this is the 70 year data set of average daily river flow available from meter data at Mongans bridge on the Kiewa river, which indicates a small but consistent decline since 1952. While this has not significantly affected AGL's ability to generate in the past we anticipate this trend continuing, which may have potential impacts in the long-term.

Independent statutory authorities (Environment Water Holders) have acquired significant water entitlements over the last decade. While this presents new challenges, as these authorities can request water releases outside of the irrigation season, it also creates additional generation opportunities. However, it can complicate maintenance scheduling, as it becomes more difficult to synchronise taking a hydro power station offline with periods when no releases are required from the dam.

AGL effectively manages both flood and drought risk, with expertise in understanding river systems and irrigation regimes. Through our years of experience, AGL has developed sophisticated knowledge and strategies to navigate these challenges. This places AGL in a strong position to handle future climate-related impacts on our hydroelectric power stations. Using this experience and employing our existing mitigation measures, AGL can ensure the resilience of operations. Further information about each asset/scheme and the water release arrangements they operate under in summarised in the following table.

4. Climate-related Risks and Opportunities (continued)

Water release arrangements for AGL's hydro fleet

Asset/Scheme	Details
Kiewa Scheme, Victoria (Bogong, McKay Creek, Clover and West Kiewa power stations)	<p>The Kiewa hydroelectric scheme is the largest in Victoria, and comprises McKay Creek Power Station (160 MW), Bogong Power Station (140 MW), Clover Power Station (29 MW) and West Kiewa Power Station (62 MW). These power stations are positioned at sequentially lower elevations to allow the water to be used repeatedly for generation before being discharged into the Kiewa River via the Mt Beauty Regulating Pondage.</p> <p>AGL is currently undertaking an upgrade of the Clover Power Station which will increase the capacity of the asset by 14 MW by 2026.</p> <p>The catchment area is within the Alpine National Park. The Kiewa Scheme diverts and utilises water from the Rocky Valley and Pretty Valley branches of the East Kiewa River, which rise on the Bogong High Plains, and the West Kiewa River, which rises near Mount Hotham. The scheme utilises water from around 310 square kilometres of the Kiewa River catchment. Additional water is transferred into the scheme from adjacent catchments via a network of open channels, with much of the water coming from snow melt, which covers the area for up to five months each year.</p> <p>AGL holds rights to water entitlements under the Water Act 1989 Bulk Entitlement (Kiewa Southern Hydro LTD) Conversion Order 1997. Bulk water entitlements exist if required to be called on.</p> <p>For around five decades, the Kiewa Scheme operator has provided snow depth and density data to BOM on a regular basis. This data is used by the BOM for a range of purposes, including tracking climatic changes.</p>
Dartmouth and Banimboola power stations, Victoria	<p>The Dartmouth Power Station has a single 180 MW unit whilst Banimboola Power Station has three generators capable of a total output of 12.2 MW. Water is sourced for the Dartmouth Power Station from the Dartmouth Dam which flows into the Dartmouth Regulating Pond, which is where the Banimboola Power Station sources its water.</p> <p>AGL has an entitlement to draw a quantity of water each year to generate electricity. Dartmouth Power Station generates primarily from irrigation releases made during the irrigation season but also has the ability to generate from entitlement water outside of the irrigation season. The Murray Darling Basin Commission controls releases from the dam to meet irrigation requirements with water generally only released to meet summer irrigation requirements.</p>
Eildon Power Station, Victoria	<p>Eildon Power Station is located at the base of Eildon Dam on the Goulburn River. The station consists of two 60 MW generators and two 7.5 MW generators. The station operates mainly during the summer when irrigation water is released from the Eildon Dam, however there is provision for limited output in winter.</p>
Rubicon Scheme, Victoria (Royston, Rubicon, Lower Rubicon and Rubicon Falls power stations)	<p>The Rubicon Scheme has a total generation capacity of 13.4 MW and is made up of the Royston Power Station (900 kW), Rubicon Power Station (9.5 MW), Rubicon Falls Power Station (260 kW) and the Lower Rubicon Power Station (2.8 MW).</p> <p>The Royston Power Station is supplied by Royston Dam with a capacity of 26.3 ML. Rubicon Power Station is supplied by Rubicon Dam with a capacity of 18 ML. Rubicon Falls Power Station is supplied by Rubicon Falls Dam with a capacity of 6 ML. Lower Rubicon Power Station water is supplied via the Lower Rubicon race line, which delivers water diverted from the Rubicon and Royston rivers, and water discharged from Rubicon Power Station.</p> <p>AGL holds rights to water entitlements under the Water Act 1989 Bulk Entitlement (Kiewa Southern Hydro LTD) Conversion Order 1997.</p>
Yarrawonga Power Station, Victoria	<p>The Yarrawonga Power Station (9.5 MW) is located on the Murray River, on the south side of the Victorian/NSW border. Water for the station is sourced from releases from Lake Mulwala. Generation is based on irrigation and flood releases governed by Goulburn-Murray Water.</p>
Pindari Power Station, New South Wales	<p>The Pindari Power Station is located on the Pindari Dam, near Inverell, on the Severn River in northern NSW. The power station has a maximum output of 5.7 MW. The station typically generates power in summer using irrigation and flood mitigation flows when the Pindari Dam discharges into the Severn River.</p>
Copeton Power Station, New South Wales	<p>The Copeton Power Station is AGL's largest hydroelectric power station in New South Wales, located 340 metres downstream from the 1,364 GL Copeton Dam. The station is capable of a maximum output of 20 MW. The station typically generates power in summer using irrigation and flood mitigation flows. Dam releases required by WaterNSW are made to assist in wildlife conservation in downstream areas, especially in the lower reaches known as the Watercourse country.</p>
Burrendong Power Station, New South Wales	<p>The Burrendong Power Station is located at the foot of the 1,190 GL Burrendong Dam on the Macquarie River in central New South Wales. The station is capable of a maximum output of 18 MW. AGL has a lease for the site for 30 years from November 1996, with three 10-year extension options.</p>
Glenbawn Power Station, New South Wales	<p>The Glenbawn Power Station was built within the Glenbawn Dam wall structure on the Hunter River about 15 kilometres southeast of Scone in New South Wales, and has a maximum generation capacity of 5.5 MW. The power station typically generates power in summer using irrigation and flood mitigation flows.</p>

4. Climate-related Risks and Opportunities (continued)

4.4 Opportunities

Climate-related opportunities may arise from addressing climate challenges, adopting new business models, developing new products and services, and capitalising on new or emerging technology, as well as through leadership differentiation and reputation enhancements which may drive customer growth and employee attraction and retention.

AGL's strategy recognises the significant opportunities arising from the decarbonisation of Australia's energy sector, and we have set ambitious targets to develop renewable and firming assets and drive growth in green revenue by delivering products and services to help our customers decarbonise. We are also advancing our plans to repurpose our thermal generation sites into low-carbon energy hubs, connecting industrial partners to a circular economy.

Key climate-related opportunities for AGL are summarised below:

Category	Description	Opportunity
Renewable energy investments	The transition away from high-emissions thermal power generation presents opportunities for investment and development of renewable energy projects. This includes solar, wind, hydro, geothermal, and other forms of clean energy generation.	<p>As committed in our CTAP, AGL has an ambition to add ~12 GW of new generation and firming by end of 2035 with an interim target of ~5 GW by 2030. Around 5.5 GW is expected to be funded on AGL's balance sheet, with 6.5 GW procured via joint ventures, partnerships, third party offtakes and DER.</p> <p>AGL anticipates that approximately 6.3 GW of the ~12 GW ambition would comprise wind and solar generation.</p> <p>In June 2023 AGL signed a PPA with Tilt Renewables to offtake 178 MW of wind capacity from the Rye Park Wind Farm.</p>
Grid-scale energy storage	<p>With the integration of intermittent renewable energy sources into the electricity grid alongside the retirements on thermal baseload power, there is a growing need for effective energy storage solutions.</p> <p>Energy storage technologies, such as batteries, pumped hydro, and thermal storage, play a crucial role in grid stability and system strength as well as storing excess energy during periods of high generation and releasing it when demand is high, or generation is low.</p>	<p>As committed in our CTAP, AGL has an ambition to add ~12 GW of new generation and firming by end of 2035 with an interim target of ~5 GW by 2030. Around 5.5 GW is expected to be funded on AGL's balance sheet, with 6.5 GW procured via joint ventures, partnerships, third party offtakes and DER.</p> <p>Of this AGL anticipates that approximately 5.9 GW of the ~12 GW ambition would comprise grid-scale batteries and long duration firming.</p> <p>AGL has already invested AUD\$180 million in the 250 MW Torrens Island battery which was completed in 2023, and AUD\$40 million in the 50 MW Broken Hill battery. Additionally AGL has planning approval for a 200 MW battery at the site of the Loy Yang A Power Station and for a 500 MW battery at the site of the Liddell Power Station.</p>
Flexibility and efficiency of operations	By maximising the flexibility and efficiency of thermal assets, AGL can facilitate the faster integration of intermittent renewable energy sources, support grid stability, and contribute to the decarbonisation of the energy sector.	<p>AGL has upgraded three of the four units of the coal-fired Bayswater Power Station to allow for minimum generation operations. Testing of this operability has been successfully completed, as has testing of similar capability at the Loy Yang A Power Station.</p> <p>The future ready program has been developed and plans are now in place for Bayswater and Loy Yang A power stations to ensure that these assets are optimally positioned for anticipated changes to their market roles. Thermal digital twins are being integrated with the energy efficiency plans for these sites to support further carbon intensity reduction objectives. These plans will address, among other goals, achieving optimum performance of these plants when operating at lower loads due to fluctuating market conditions and optimisation of fuel consumption.</p>
Repurposed infrastructure	<p>AGL is committed to repurposing its thermal generation sites into low-carbon energy hubs.</p> <p>The transition of our thermal generation sites will support the economic diversification of these regions, providing new job and skills development opportunities for the communities where we operate.</p>	<p>The Hunter Valley, Torrens Island and Latrobe Valley hubs will bring together energy production and energy-intensive industries around a shared infrastructure backbone, with a focus on circular economy principles, including innovative re-use of valuable infrastructure, recycling and co-location of complementary industries.</p> <p>The development of these hubs was already under way in FY23 including:</p> <ul style="list-style-type: none"> • In April 2023, the safe shutdown of the last unit of the Liddell Power Station; and • The construction and commissioning of the 250 MW Torrens Island Battery underway during FY23.
Shift towards decentralised energy generation	<p>Customer demand for renewable and clean energy is driving a transition towards a more decentralised energy system. This shift presents opportunities for companies like AGL to tap into a new and expanding market.</p> <p>AGL also sees opportunities to utilise decentralised orchestration to help alleviate peak demand events and capture new and growing value pools particularly.</p>	<p>AGL continues to be an industry leader in relation to providing products and services to our commercial and industrial customers and are progressing on scaling our Energy as a Service (EaaS) solutions, providing integrated offerings across energy solutions, asset management, orchestration and asset financing. We continue to be the largest solar provider in the country, delivering three times more commercial solar capacity than the nearest competitor over FY23.</p> <p>We are currently operating 316 MW of decentralised assets under orchestration.</p> <p>Our Peak Energy Rewards program is the largest flexible demand response program in the country and has been expanded to 120,000 customers.</p>

4. Climate-related Risks and Opportunities (continued)

Category	Description	Opportunity
Changing customer preferences	<p>Climate change is a growing concern among civil society. We are committed to helping our customers decarbonise the way they live, work and move.</p> <p>The increasing demand for these products and services presents a significant opportunity for AGL to continue to grow our customer offerings.</p>	<p>During FY23 we launched our pilot of Electrify Now, a first of its kind program that provides personalised recommendations for customers on ways to electrify their homes and meet their decarbonisation goals.</p> <p>AGL also provides over 440,000 carbon neutral services to customers and offers carbon neutral options across all products and services for households, business and wholesale customers.</p>
Electric vehicle (EV) infrastructure	<p>As the adoption of electric vehicles increases, there is an opportunity to play a role in developing and expanding Australia's charging infrastructure network. This includes partnering with government agencies, businesses, and communities to install EV charging stations and provide related services.</p>	<p>In June 2023 AGL and bp pulse announced a partnership launching an initial offer for customers in New South Wales to receive special charging rates at bp pulse rapid and ultra-fast chargers when they sign up for AGL's new EV home energy plan.</p> <p>During FY23 we completed an ARENA-funded smart charging trial to test customer engagement, orchestration of residential electric vehicle charging and the impact on the grid.</p> <p>AGL's electric vehicle subscription service is now the largest of its kind in the country, growing by 38% since FY22.</p>

5. Metrics and Targets

AGL is committed to transparently disclosing a range of metrics and targets to ensure investors and other stakeholders can better assess our emissions and risk exposure profiles, as well as our progress in addressing climate-related issues.

We use several metrics to measure our greenhouse gas emissions and impact and disclose this information publicly through our Annual Report, ESG Data Centre, and by responding to the CDP climate change survey, as well as numerous other investor-based surveys and benchmarks. AGL also reports emissions to the Clean Energy Regulator to meet the requirements of Australia's National Greenhouse and Energy Reporting Act 2007 (NGER Act). AGL also voluntarily discloses our emissions targets and progress against these targets to the Clean Energy Regulator's Corporate Emissions Reduction Transparency Report (CERT). By providing this information, AGL aims to enhance transparency and foster a deeper understanding of our efforts in mitigating and adapting to climate change challenges.

5.1 Operated Scope 1 and 2 emissions

Of AGL's operated greenhouse gas emissions, the most material are those arising from the combustion of coal and gas to produce electricity. The Scope 1 emissions from our material coal-fired and gas-fired power stations contribute to over 99% of AGL's total Scope 1 emissions.

In FY23 AGL's operated Scope 1 and 2 emissions totalled 35.2 MtCO₂e, a decrease from FY22 of 12%. The reduction in emissions is due to the extended Loy Yang A Unit 2 outage (commenced in Q4 FY22), and the retirement of the Liddell Power Station at the end of April 2023.

Total Scope 1 and 2 emissions from AGL's operated facilities as reported under the NGER scheme are summarised below. Further breakdowns of FY23 emissions will be available in the [FY23 ESG Data Centre](#) towards the end of 2023.

As noted in Section 3.1, AGL has set a target to reduce operated Scope 1 and 2 emissions by 17% by FY24 compared to a FY19 baseline. We estimate, based on material emissions sources that our FY23 operated Scope 1 and 2 emissions are 18.5% below our FY19 baseline.

Scope 1 and 2 emissions by generation source

AGL total carbon emissions	FY23 (MtCO ₂ e) ¹	FY22 (MtCO ₂ e)	FY21 (MtCO ₂ e)	FY20 (MtCO ₂ e)	FY19 (MtCO ₂ e)
Scope 1: black coal generation	17.8	20.9	19.8	24.0	22.6
Scope 1: brown coal generation	16.2	17.7	19.2	16.7	18.5
Scope 1: natural gas generation	0.7	0.9	1.2	1.5	1.6
Other Scope 1 emissions	<0.1	0.05	0.05	0.05	0.05
Total Scope 1 emissions ²	34.8	39.5	40.2	42.2	42.7
Total Scope 2 emissions	0.5	0.5	0.5	0.5	0.5
Total Scope 1 & 2 emissions ²	35.2	40.1	40.8	42.7	43.2

1. Data for FY23 is estimated and based on material emission sources and estimates for non-material sources; this will be updated later in the year and may change.

2. Figures may not sum due to rounding.

5.2 Generation intensity metrics

AGL's emissions intensities by generation type and as a whole are shown below. Additional breakdowns of generation intensity for FY23 will be available in the [ESG Data Centre](#) in late 2023.

AGL's overall operated generation intensity decreased from a peak of over 1 tCO₂e/MWh in FY13. The downward trajectory in FY23 is due to the retirement of the Liddell Power Station during the financial year and the extended Loy Yang A Unit 2 outage.

Emissions intensity of AGL assets and the NEM

	FY23 ¹	FY22	FY21	FY20	FY19
Operated black coal generation intensity (tCO ₂ e/MWh)	0.97	0.97	0.98	0.97	0.95
Operated brown coal generation intensity (tCO ₂ e/MWh)	1.29	1.29	1.29	1.26	1.28
Operated natural gas generation intensity (tCO ₂ e/MWh)	0.64	0.64	0.60	0.61	0.62
Total operated generation intensity (tCO ₂ e/MWh)	0.92	0.94	0.95	0.94	0.95
Total controlled generation intensity (tCO ₂ e/MWh) ²	0.917	0.938	0.949	0.934	0.946
NEM intensity (tCO ₂ e/MWh)	0.63	0.66	0.70	0.72	0.77

1. Data for FY23 is estimated and based on material emission sources and estimates for non-material sources; this will be updated later in the year and may change.

2. Controlled intensity includes assets for which AGL has contracted, and has dispatch rights for generation output but does not operate, in addition to assets which are operated by AGL.

5. Metrics and Targets (continued)

5.3 Scope 3 emissions

AGL estimates the Scope 3 emissions arising from our business with reference to the Greenhouse Gas Protocol: Technical Guidance for Calculating Scope 3 Emissions. This Protocol classifies emissions into 15 categories; AGL's material Scope 3 emissions fall into two main categories:

- Category 3 - Fuel and energy related activities (not included in Scope 1 or Scope 2); and
- Category 11 - Use of sold products.

In FY23 AGL has updated our calculation methodology for Scope 3 emissions associated with electricity supplied to customers to more accurately reflect our full supply chain.

AGL's Scope 3 emissions are dominated by the emissions associated with the supply and end use of the products that AGL sells. AGL's material Scope 3 emissions for FY23 are in the table below. Other Scope 3 emissions data will be available later in 2023.

Scope 3 emissions

Scope 3 emissions source	FY23 (MtCO ₂ e) ¹	FY22 (MtCO ₂ e)
GHG Protocol category 3		
Supply of electricity to customers: <i>Estimated emissions associated with the transmission and distribution of electricity as well as from upstream activities including generation where AGL is short, e.g., Queensland.</i>	7.0	7.5
Supply of natural gas to customers: <i>Estimated emissions associated with the production, transportation and distribution of natural gas sold</i>	1.3	1.5
GHG Protocol category 11		
End use of natural gas by customers	6.1	7.0
End use of coal sold to Loy Yang B	10.0	10.4
All other GHG Protocol categories		
Estimated emissions from staff travel, waste, investments etc.	Not available	0.1
Total Scope 3 emissions	Not available	26.4

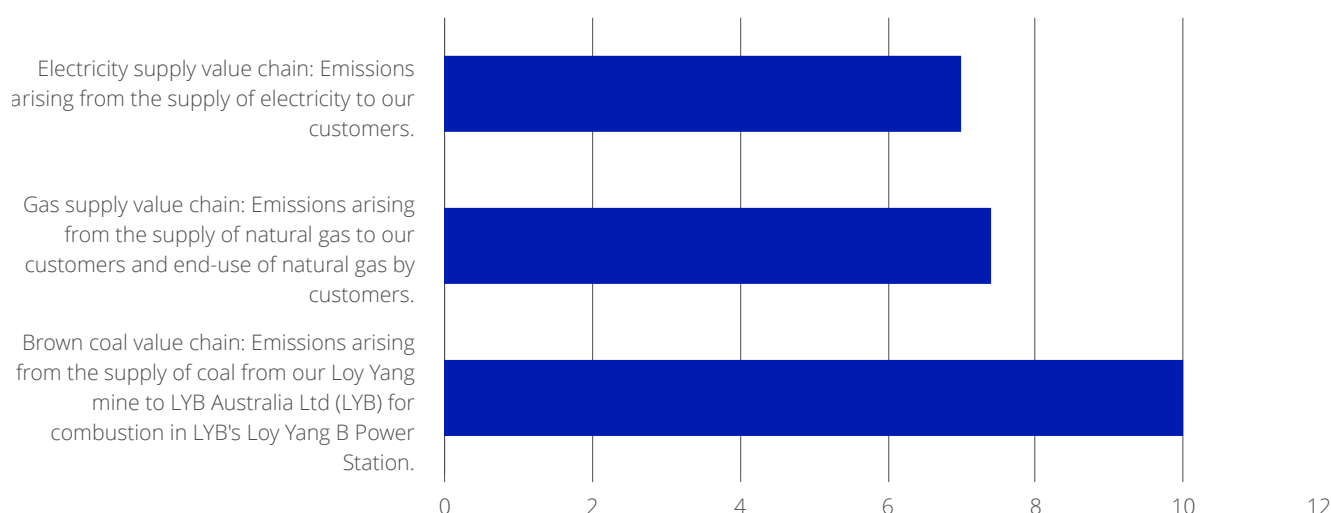
1. Scope 3 emissions for FY23 is estimated and based on preliminary data; this will be updated later in 2023 and may change.

AGL has stated our ambition of being net zero for Scope 3 emissions by 2050 in our Climate Transition Action Plan. As part of this AGL is working on a decarbonisation pathway for these emissions, with a particular focus on our material sources of emissions.

We also consider Scope 3 emissions according to the part of the value chain which they represent. Our material sources of emissions are the brown coal value chain, the gas supply value chain and the electricity supply chain.

The allocation of estimated FY23 Scope 3 material emissions is summarised below by value chain.

FY23 estimated Scope 3 emissions by value chain (MtCO₂e)



5. Metrics and Targets (continued)

5.4 Carbon offsets

AGL offers carbon neutral options for our products and services. A product is considered carbon neutral when the net greenhouse gas emissions associated with an activity are equal to zero. Carbon neutral products are intended to empower customers to drive change in the market. As of 30 June 2023, AGL has over 440,000 carbon neutral services, including more than 150,000 carbon neutral energy services.

The majority of AGL's carbon neutral products and services are certified by Climate Active, an ongoing partnership between the Australian Government and Australian businesses. To achieve carbon neutral status, we calculate the greenhouse gas emissions generated by our products and services across their lifecycle and supply chain. These emissions are then offset by surrendering an equivalent amount of carbon offsets.

AGL considers a number of different sources of carbon offsets and undertakes a rigorous selection process when it comes to the carbon offsets purchased. The eligible carbon offsets bought meet the Carbon Neutral Standard integrity requirements set by Climate Active.

AGL surrendered a total of 576,404 offsets to address our carbon emissions associated with our carbon neutral products and services for the period of CY22. These offsets represent the carbon dioxide equivalent stored or avoided by various projects. Each offset, in this case, corresponds to one tonne of CO₂e.

AGL uses offsets that are certified under internationally recognised standards including the Gold Standard, Verified Carbon Standard (VCS) and Australian Carbon Credit Units (ACCU). The table below summarises the types of offsets surrendered. For more details on specific projects refer to our [FY23 ESG Data Centre](#).

Offsets surrendered

Credit type	Project type	Volume surrendered
ACCU	Carbon removal	28,824
Gold Standard	Emissions reduction	412,331
VCS	Emissions reduction	135,249
Total offsets surrendered		576,404

5.5 Generation portfolio metrics

AGL has outlined in our CTAP that we are seeking to supply our customer demand with ~12 GW of additional renewable and firming capacity before 2036, with an interim target of ~5 GW by 2030. This builds upon AGL's previous investments in renewable energy generation. The increase in the percentage of renewable and electricity storage capacity is due primarily to the closure of the Liddell and Torrens Island A power stations.

The table below outlines the changes in the proportion of generation and capacity from renewables.

Proportion of generation output and capacity from renewables

	FY23	FY22	FY21	FY20	FY19
Operated renewable and electricity storage capacity (%)	29.1	24.2	23.0	22.5	19.9
Controlled renewable and electricity storage capacity (%)	29.7	24.2	23.0	22.5	19.6
New firming and renewable capacity (MW) ¹	478 ²	Not Applicable	Not Applicable	Not Applicable	Not Applicable

1. Measured as new firming and renewable capacity in construction, delivery or contracted from FY23 onwards.

2. Comprises Torrens Island Battery (250 MW) and Broken Hill Battery (50 MW), both under construction during the period and Rye Park Wind Farm PPA (178 MW). Does not include the 14 MW upgrade currently underway at Clover Power Station.

5.6 Revenue-related metrics

The emissions intensity of revenue has been relatively consistent over the past five years, indicating a consistent link between revenue and carbon emissions over this period. As both electricity generation and revenue sources diversify it is anticipated that this metric will decline. The decrease in intensity is due to higher wholesale revenue and a significant reduction in emissions in FY23.

AGL recognises that managing carbon risk involves managing both direct and indirect emissions and that customer preferences will continue to be a key driver for low to zero carbon products and services. The table below outlines the proportion of total revenue derived from green energy and carbon neutral products and services. The increase in FY23 is driven by residential solar revenue, carbon neutral products and certificate and pool revenue from renewable generation.

Emissions intensity of revenue & Green revenue

	FY23	FY22	FY21	FY20	FY19
Emissions intensity of total revenue (ktCO ₂ e/\$m)	2.5 ¹	3.0	3.7	3.5	3.3
Green revenue as a % of total revenue (%) ²	17.5	15.3	13.4	11.5	10.8

1. Emissions intensity of revenue is calculated on measured emissions from material sources and measured electricity generation, with estimates for minor emissions sources. This metric will be updated later in 2023 and may change.

2. The percentage of AGL's total revenue derived from green energy and carbon neutral products and services.

5. Metrics and Targets (continued)

5.7 LTI carbon transition metrics

Since FY20 AGL has included carbon transition metrics within its LTI plans. These metrics comprise the controlled intensity of generation, the proportion of controlled renewable and electricity storage capacity, and the proportion of revenue from green energy and carbon neutral products and services. Performance against these metrics is summarised below. For full detail of the vesting ranges for each metric for the LTI offers for FY24, FY25 and FY26, refer to the Remuneration Report within the FY23 Annual Report.

In our CTAP, we committed to aligning climate transition metrics in our LTI plan to the emission reduction and portfolio transition targets outlined in the CTAP. Our FY24 LTI offer is outlined in the Remuneration Report within the FY23 Annual Report. These new metrics are outlined below, the targets for these are included in Section 5.8.

The three metrics have been selected to provide a balanced approach. The emissions intensity of electricity supplied metric measures AGL's emissions plus those of electricity supplied to customers and thus ensures a focus on the energy transition as well as Scope 1 and 2 emissions. The new total firming and renewable capacity metric aligns performance with the commitments for additional capacity. The revenue uplift of green energy and carbon neutral products and services ensures there is a focus on the demand-driven transition.

Long-term Incentive plan metrics

	FY23	FY22	FY21	FY20	FY19
Controlled generation intensity (tCO ₂ e/MWh)	0.917 ¹	0.938	0.949	0.934	0.946
Controlled renewable and electricity storage capacity (%)	31.7	24.2	23.0	22.5	19.6
Green revenue as a % of total revenue (%)	17.5	15.3	13.4	11.5	10.8
Electricity supply intensity (tCO ₂ e/MWh) ²	0.900	0.929	Not Reported	Not Reported	Not Reported
New total firming and renewable capacity (MW) ³	478	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Increase in green revenue from FY19 (%) ⁴	73	41	Not Reported	Not Reported	Not Applicable

1. FY23 emissions intensity is calculated on measured emissions from material sources and measured electricity generation, with estimates for minor emissions sources. This metric will be updated later in 2023 and may change.
2. Measured as the emissions (tCO₂e) associated with the maximum of either AGL's electricity supply to the wholesale or retail market by state, as a proportion of that same volume (MWh).
3. Measured as new firming and renewable capacity in construction, delivery or contracted from FY23 onwards.
4. Increase in revenue from green energy and carbon neutral products and services compared to FY19 baseline.

5.8 Targets summary

The table below summarises all of AGL's key climate-related targets. These comprise the quantitative targets from our Climate Transition Action Plan (CTAP) as well as the climate transition metrics from our FY23 long term incentive (LTI) plan offer. In addition to the targets listed below, details of the climate transition metrics incorporated in the LTI plan offers that vest in FY24, FY25 and FY26 can also be found in the Remuneration Reports for FY20 to FY22.

Metric	Target
Reduction in operated Scope 1 and 2 emissions against a FY19 baseline.	FY24: 17% FY35: 52%
Additional renewable and firming capacity. ¹	2030: ~5 GW 2036: ~12 GW
Closure of coal-fired power stations.	FY23: Liddell Power Station 2030-2033: Bayswater Power Station FY35: Loy Yang A Power Station
Increase in green revenue from FY19. ²	FY27 minimum vesting: 75% FY27 maximum vesting: 95%
Electricity supply intensity. ³	FY27 minimum vesting: 0.907 tCO ₂ e/MWh FY27 maximum vesting: 0.868 tCO ₂ e/MWh
New firming and renewable capacity. ¹	FY27 minimum vesting: 1.5 GW FY27 maximum vesting: 2.4 GW

1. Measured as new firming and renewable capacity in construction, delivery or contracted from FY23 onwards.
2. Increase in revenue from green energy and carbon neutral products and services compared to FY19 baseline.
3. Measured as the emissions (tCO₂e) associated with the maximum of either AGL's electricity supply to the wholesale or retail market by state, as a proportion of that same volume (MWh)

6. Conclusion

FY23 has been a significant year of transformation and progress for AGL, with the release of our new strategy and inaugural Climate Transition Action Plan in September 2022, which chart a course for our accelerated exit from coal generation, and the transition of our energy portfolio to a fleet of operated and contracted renewable and firming generation.

We are commencing one of the largest contributions to the decarbonisation of the Australian economy, and our first key milestone was achieved in late April 2023 with the safe and respectful closure of Liddell Power Station after more than 50 years of operation.

Over the year we have advanced our onshore development pipeline to 5.3 GW. Since February 2023 we have added 500 MW of wind, 100 MW of solar and 900 MW of battery storage to our development pipeline, complementing existing development projects including the Liddell and Loy Yang batteries. We will continue to build up this development pipeline to enable options to be exercised as needed depending on the policy environment, economic environment, and portfolio and customer needs. In May we also announced that together with a consortium of Australian and global companies (comprising Mainstream Renewable Power, Reventus Power, AGL and DIRECT Infrastructure) we have submitted a feasibility licence application for a 2.5 GW offshore wind development in Bass Strait, off the coast of Gippsland, Victoria.

Development activities for our Hunter, Torrens and Latrobe energy hubs are also ramping up, and we have set a target to have between 6 and 8 major industrial clients located on or connected to a hub by FY27.

As indicated in our CTAP, we are committed to developing a pathway for reducing our Scope 3 emissions as part of our ambition to be net zero by 2050. We have more work to do to improve our estimation and reporting of Scope 3 emissions, however our material sources of Scope 3 emissions are well understood. We recognise that will take concerted efforts not only by AGL, but by our customers and the energy market as a whole, to drive towards net zero. We are excited by the challenge and the value creation opportunities that are presented by orchestrating and electrifying homes, businesses and transport.

The unprecedented extreme weather experienced in the 2023 northern hemisphere summer is a timely reminder of how the physical impacts of climate change may manifest in coming years. To this end, we are committed to improving our understanding of the potential physical risks that may impact our operations, including our understanding of the financial implications of these risks.

We remain committed to transparently communicating our progress to our stakeholders. We are taking action to align our reporting with the newly released International Sustainability Standards Board (ISSB) standards which will further enhance our disclosure practices. We expect transparency and comparability to increase across the market as a whole as the standards begin to be applied in the coming years.

Glossary

AASB	Australian Accounting Standards Board
AEMO	Australian Energy Market Operator
ARMC	Audit & Risk Management Committee, a Committee of the AGL Board
ASIC	Australian Securities and Investment Commission
BOM	Bureau of Meteorology
CMSI	Climate Measurement Standards Initiative
CO₂e	Carbon dioxide equivalent
Controlled boundary	AGL's controlled boundary includes all electricity assets (generation and/or storage) for which AGL has: operational control as defined by the National Greenhouse and Energy Reporting Act 2007; and/or contracted rights to control the dispatch of electricity of the asset.
CTAP	Carbon Transition Action Plan
COP21	21 st Conference of Parties to the United Nations Framework Convention on Climate Change, held in 2015 in Paris
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DER	Distributed energy resources
Derating	Decrease in available capacity
ESB	Energy Security Board
ESCI	Electricity Sector Climate Information project, being undertaken by the CSIRO and BOM in collaboration with AEMO
ESG	Environmental, social and governance
EV	Electric vehicle
FY19 Scope 1 and 2 emissions baseline	AGL's FY19 Scope 1 and 2 emissions baseline is 43.2 MtCO ₂ and comprises Scope 1 and 2 greenhouse gas emissions for all facilities operated by AGL, as reported under the National Greenhouse and Energy Reporting Act 2007. FY19 was selected as the baseline year as it provides a better reflection of representative historical output from thermal assets compared to FY20-FY22.
IFRS	International Financial Reporting Standards
IPCC	Intergovernmental Panel on Climate Change
ISP	AEMO Draft Integrated System Plan 2020 (2019)
ISSB	International Sustainability Standards Board
LTI	Long-term incentive
MW, GW, TW	Megawatt, gigawatt, terawatt
MWh, GWh, TWh	Megawatt hours, gigawatt hours, terawatt hours
NDC	Nationally Determined Contribution (under the Paris Agreement)
NEM	National Electricity Market
New firming and renewable capacity	Measured as new firming and renewable capacity in construction, delivery or contracted from FY23 onwards.
Net zero	For the purposes of this report net zero emissions is the point at which emissions have reached a level where they are able to be offset through existing commercially available technologies.
NGER	National Greenhouse and Energy Reporting Act 2007
Operated boundary	The AGL operated generation boundary includes electricity assets for which AGL has operational control as defined by the National Greenhouse and Energy Reporting Act 2007.
Paris Agreement	An agreement made at COP21 to address climate change, with the central aim of this agreement being to limit warming this century to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit warming even further to 1.5 degrees Celsius above pre-industrial levels.
PPA	Power Purchase Agreement
RCP	Relative Concentration Pathways, concentration pathways for greenhouse gases and aerosols, demonstrating possible future emissions and radiative forcing (i.e. temperature intensity) scenarios for the world until 2100, as defined by the IPCC.
Scope 1 emissions	Direct greenhouse gas emissions
Scope 2 emissions	Indirect greenhouse gas emissions arising from the consumption of purchased electricity, heat or steam
Scope 3 emissions	Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transportation and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.
SSP	Shared Socioeconomic Pathways, which describe how socioeconomic trends around the world may evolve over time, as defined by the IPCC (2017).
TCFD	Task Force on Climate-related Financial Disclosures
VPP	Virtual Power Plant

Appendix A - Assurance Statement

Independent Limited Assurance to the Management of AGL Energy Limited

Conclusion

We have undertaken a limited assurance engagement on AGL Energy Limited's ('AGL') subject matter detailed below (the 'Subject Matter') presented in the 2023 TCFD Report for the year ended 30 June 2023.

Subject Matter	Reporting Criteria
<p>Selected Climate Transition Action Plan disclosures</p> <p>The Climate Transition Action Plan ('CTAP') disclosures and performance for the year ended 30 June 2023 within the 2023 TCFD Report on pages 7-8.</p> <ul style="list-style-type: none"> Scope 1 and 2 emissions: <ul style="list-style-type: none"> The fact that Liddell Power Station ceased generation as of 30 April 2023 presented on page 7 The amount of operational Scope 1 & 2 emissions reduction in FY23 compared to a FY19 baseline (%) presented on page 7 Portfolio reshape and capital allocation alignment: <ul style="list-style-type: none"> New firming and renewable capacity from FY23 onwards (GW) presented on page 7 Green revenue: <ul style="list-style-type: none"> The percentage of AGL's total revenue derived from green energy and carbon neutral products and services in FY23 (%) presented on page 7 	<p>AGL's definitions and approaches as described in the 'AGL's Climate Transition Action Plan' section and 'Glossary' section of FY23 TCFD Report on pages 7-8 and 26 respectively.</p>

Based on the procedures performed and the evidence obtained, nothing has come to our attention that causes us to believe that the Subject Matter is not prepared, in all material respects, in accordance with the Reporting Criteria for the year ended 30 June 2023 ('FY23').

Basis for Conclusion

We conducted our limited assurance engagement in accordance with Australian Standard on Assurance Engagements ASAE 3000 Assurance Engagements Other than Audits or Reviews of Historical Financial Information ('ASAE 3000'), issued by the Australian Auditing and Assurance Standards Board.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

AGL's responsibilities

The Management of AGL are responsible for:

- ensuring that the Subject Matter is properly prepared in accordance with the Reporting Criteria;
- confirming the measurement or evaluation of the underlying Subject Matter against the applicable criteria, including that all relevant matters are reflected in the subject matter information;
- designing, establishing and maintaining internal controls to ensure that the Subject Matter is properly prepared in accordance with the Reporting Criteria;

- selecting and applying appropriate Reporting criteria;
- maintaining adequate records and making estimates that are reasonable in the circumstances.

Our Independence and Quality Control

We have complied with the independence and other relevant ethical requirements relating to assurance engagements and apply Auditing Standard ASQM 1 *Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, Other Assurance Engagements and Related Services Engagements* in undertaking this assurance engagement.

Assurance Practitioner's responsibilities

Our responsibility is to express a limited assurance conclusion on the Subject Matter based on the procedures we have performed and the evidence we have obtained. ASAE 3000 requires that we plan and perform our procedures to obtain limited assurance about whether, anything has come to our attention that causes us to believe that the Subject Matter is not properly prepared, in all material respects, in accordance with the Reporting Criteria.

A limited assurance engagement in accordance with ASAE 3000 involves identifying areas where a material misstatement of the subject matter information is likely to arise, addressing the areas identified and considering the process used to prepare the subject matter information. A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Accordingly, we do not express a reasonable assurance opinion about whether the subject matter information has been properly prepared, in all material respects, in accordance the Reporting Criteria.

Our procedures included:

- Review of AGL's process to identify and determine material issues to be included in the 2023 TCFD Report with examination of underlying assessments and evidence on a sample basis;
- Interviews with a selection of AGL's management, including AGL's sustainability management team concerning the FY 23 CTAP disclosure, methodology and calculation.
- In respect of the FY23 CTAP disclosures:
 - integrating site visits, where appropriate, to review process and data;
 - applying analytical and other review procedures including assessing relationships between the reported information and other financial and non-financial data;
 - examination of evidence for a small number of transactions or events;
 - analysing and inspecting on a sample basis, the key systems, processes and procedures and controls relating to the collation, validation, presentation and approval process of the information included in the 2023 TCFD Report;
 - review underlying evidence on a sample basis to corroborate that the information is prepared and reported in line with the relevant Reporting Criteria.

Inherent limitations

Because of the inherent limitations of an assurance engagement, together with the inherent limitations of any system of internal control there is an unavoidable risk that it is possible that fraud, error, or non-compliance with laws and regulations, where there has been concealment through collusion, forgery and other illegal acts may occur and not be detected, even though the engagement is properly planned and performed in accordance with Standards on Assurance Engagements.

Restricted Use

The applicable criteria used for this engagement was designed for a specific purpose of assisting management of AGL in their reporting of the CTAP disclosures, as a result, the subject matter information may not be suitable for another purpose.

This report has been prepared for use by management of AGL for the purpose reporting on the subject matter information presented in the 2023 TCFD Report. We disclaim any assumption of responsibility for any reliance on this report or on the Subject Matter to which it relates, to any person other than the management of AGL or for any purpose other than that for which it was prepared.

Matters relating to electronic presentation of information

It is our understanding that AGL may publish a copy of our report on their website. We do not accept responsibility for the electronic presentation of our report on the AGL website. The security and controls over information on the web site is not evaluated or addressed by the independent auditor. The examination of the controls over the electronic presentation of this Report on the AGL's web site is beyond the scope of this engagement.

Deloitte Touche Tohmatsu

DELOITTE TOUCHE TOHMATSU



PR Dobson
Partner
Sydney, 10 August 2023

agl.com.au



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