Climate Transition Action Plan

September 2022

agl

Progress for life

Contents

Our inaugural Climate Transition Action Plan continues our track record of market-leading climate disclosures, and demonstrates our commitment to communicating transparently with our stakeholders about our approach to decarbonisation. Shareholders will have the opportunity to vote on this Climate Transition Action Plan through the 'Say on Climate' resolution at our 2022 Annual General Meeting.

On 30 May 2022, AGL committed to undertaking a review of AGL's strategic direction which would determine the best way for an integrated AGL to deliver long-term shareholder value in the context of Australia's energy transition. This CTAP is aligned with the outcomes of this review which were announced to the market on 29 September 2022, and should be read in conjunction with the limitations outlined on page 25.

In preparing this CTAP, we have used the Climate Action 100+ *Net Zero Company Benchmark* and the Investor Group on Climate Change (IGCC) *Corporate Transition Plans: A guide to investor expectations* to gain an insight into the issues that matter most to our stakeholders and to structure the disclosures in our CTAP accordingly. In preparing the scenario analysis outlined in Appendix A of this report, we have also used the Taskforce on Climate-related Financial Disclosures (TCFD) framework, and referred to the 2022 Integrated System Plan published by the Australian Energy Market Operator (AEMO). Comprehensive greenhouse gas emissions data and information in relation to climate-related risks, as recommended by the TCFD framework, are available in our **FY22 Annual Report** and **ESG Data Centre**.

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.

Our Climate Transition Action Plan at a glance

Building on our proud history as Australia's leading private investor in renewable energy, we are committing through our Climate Transition Action Plan to do the following:

We are targeting the closure of Loy Yang A Power Station by the end of FY35[1]. This targeted exit from coal-fired generation, up to a decade earlier than previously announced, would avoid up to **200 $MtCO_2e$[2]** of greenhouse gases being emitted compared to previous Loy Yang A Power Station closure date.

We will reduce our annual greenhouse gas emissions[3] by at least **17%** by FY24[4] following the closure of Liddell Power Station in April 2023.

We will reduce our annual greenhouse gas emissions[3] by at least **52%** by FY35[4] following the closure of Bayswater Power Station by 2033.

We will be **Net Zero** for operated Scope 1 and 2 greenhouse gas emissions following the closure of all AGL's coal-fired power stations.

We will develop a decarbonisation pathway to achieve our ambition of being Net Zero for Scope 3 greenhouse gas emissions by 2050.

We will seek to supply our customer demand with ~12 GW of additional renewable and firming capacity, requiring a total investment of up to $20 billion[5], before 2036. Our initial target is to have up to 5 GW of new renewables and firming capacity in place by 2030, funded from a combination of assets on our balance sheet, offtakes and via partnerships.

Together with our ambition to invest in new renewable and firming capacity, we have brought forward the targeted closure dates for AGL's coal-fired power stations to support the transition to a lower carbon world aligned with the Paris Agreement[6] goals.

Our plan recognises that a balance needs to be struck between responsible transition and rapid decarbonisation to keep Australia's electricity supply secure, reliable, and affordable. We are committed to working constructively with our stakeholders, including government, our people and the communities in which we operate, to lead a responsible and orderly transition.

1. Asset management plans will be structured to support the targeted closure of Loy Yang A Power Station by the end of FY35, and AGL will notify AEMO that the Expected Closure Year (per the National Electricity Rules (NER) 2.2.1(e)(2A)) for Loy Yang A Power Station is the end of FY35. Further, the carrying value of AGL's 'Generation' cash generating unit property, plant and equipment has been reduced as a result of the targeted closure of Loy Yang A Power Station by the end of FY35, as reflected in the impairment announced to the market on 29 September 2022. The ability for AGL to execute on this target will be subject to uncertainties and risks, as described on page 12.
2. Maximum emissions avoidance estimated based on maximum annual output from Loy Yang A Power Station over the FY36 - FY46 period.
3. Operated Scope 1 and 2 greenhouse gas emissions, as reported under the National Greenhouse and Energy Reporting Act 2007, against a FY19 baseline.
4. 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.
5. Based on capital cost estimates from AEMO Inputs, Assumptions and Scenarios Workbook, June 2022, adjusted for AGL views where considered appropriate.
6. Based on scenario modelling of the National Electricity Market (NEM) undertaken by ACIL Allen (as outlined in Appendix A) 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.

Background

About AGL

Proudly Australian for 185 years, AGL supplies energy and other essential services to residential, small and large businesses and wholesale customers. We operate Australia's largest private electricity generation portfolio, with a total installed capacity of 10,330 MW, which accounts for approximately 20% of the total generation capacity within Australia's National Electricity Market (NEM). We are also the operator of the largest portfolio of renewable generation and storage assets of any ASX-listed company.

We have a strong track record in delivering action on climate change and the energy transition, and provide a range of products and services to help our customers decarbonise their businesses and homes.

Generation portfolio: Invested more than $4.8 billion in renewable and firming generation over past two decades; delivered more than 2,350 MW of new renewable and firming generation capacity to the grid since 2003.

Carbon neutral: 390k+ carbon neutral services in FY22, with the popularity of the program continuing to rise.

Hydrogen: Feasibility studies underway to explore the development of green hydrogen hubs at Torrens Island in South Australia and as part of our Hunter Energy Hub in New South Wales. AGL is also part of a world-first hydrogen energy supply chain project, working with the Australian, Japanese and Victorian governments and a consortium of companies to pilot the delivery of liquefied hydrogen from the Latrobe Valley to Japan.

Grid-scale batteries: 250 MW Torrens Island battery operational by mid-2023; construction of 50 MW Broken Hill battery to commence later in 2022; 500 MW Liddell battery and 200 MW Loy Yang battery received planning approval.

Decentralised assets under orchestration: >100,000 customers enrolled in our multi-asset virtual power plant with over 1 GWh of flexible energy provided over FY22. It is made up of residential and business customers including peak energy rewards, batteries, solar, demand response, electric vehicles and back-up generation.

Electric vehicles: Electric vehicle subscription product available in four States.

Commercial solar: No 1 in Commercial solar[1], with more than 140 MW of commercial solar assets under monitoring and management.

Biogas: Acquired Energy360 in FY22, extending our decarbonisation offerings for business into biogas plants.

Development pipeline: Existing 2.9 GW pipeline of energy projects, comprising ~2 GW of wind capacity and 900 MW of firming, including the Muswellbrook Pumped Hydro project which was recently awarded a government feasibility grant.

1. SunWiz Executive Insights January 2022 report - Sub 100 KW Top 5 Commercial 2021

Background (continued)

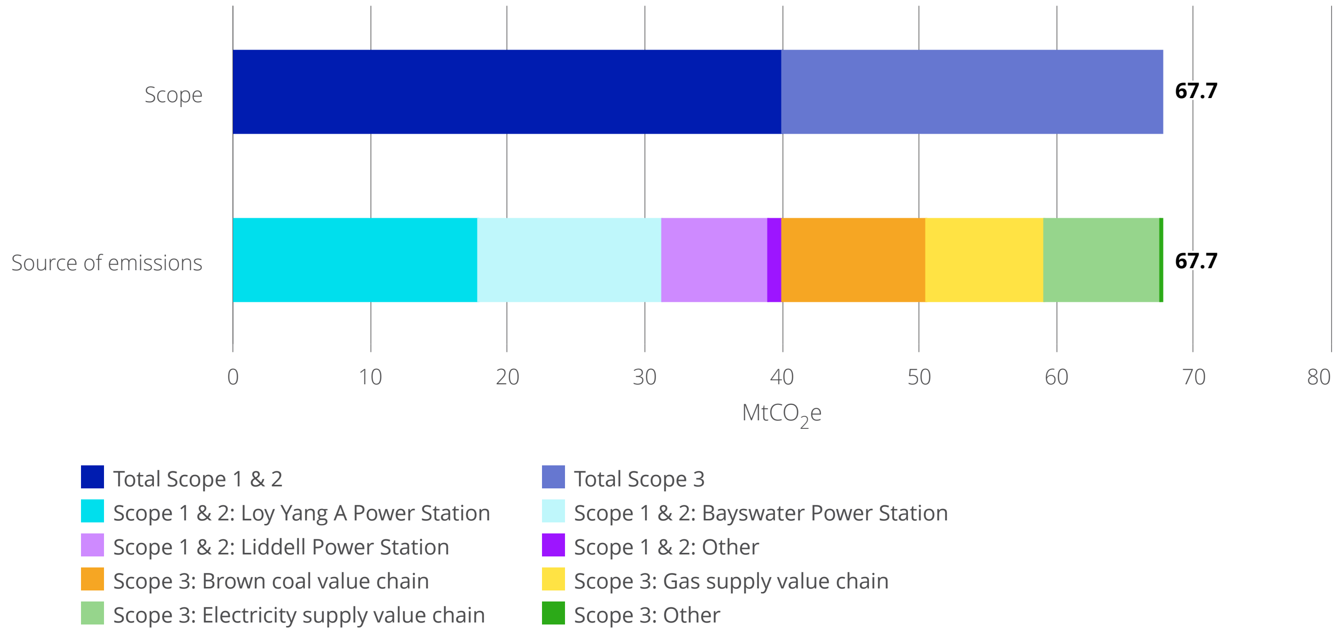
AGL's emissions profile

As Australia's largest electricity generator, we are also Australia's largest greenhouse gas emitter.

Our operated Scope 1 and 2 emissions[1] account for approximately 8% of Australia's total emissions[2]. Over 95% of AGL's Scope 1 emissions arise from the combustion of coal at our Liddell, Bayswater and Loy Yang A power stations for the generation of electricity for our customers as well as other customers in the NEM.

In FY22, our operated Scope 1 and 2 emissions comprised approximately 60% of our total Scope 1, 2 and 3 emissions. Our Scope 3 emissions predominantly comprise emissions arising from the combustion of brown coal sold by AGL to the Loy Yang B Power Station and emissions associated with the supply of electricity and gas to our customers.

AGL's FY22 operated Scope 1 and 2 greenhouse gas emissions and Scope 3 greenhouse gas emissions



Operating environment

By 2050, AGL considers that Australia has the opportunity to be carbon neutral and an energy superpower. 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.

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.

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.

Current operation of the NEM

The NEM supplies around 200 TWh of electricity annually to around 9 million customers in Australia's eastern and southern States. The NEM is a gross pool market, where generators bid into a market that is priced and centrally dispatched by the market operator on a five-minute basis in order to meet operational electricity demand. While generators control the volume and price of generation they are bidding into the market, the market operator (Australian Energy Market Operator (AEMO)) is responsible for ensuring that overall system needs are met.

In order to meet operational demand, the market operator dispatches resources on a five-minute schedule taking into account not only generation bids and volumes, but also the current state of the system and factors such as network congestion and transmission constraints, and the need for essential system services such as inertia and frequency control services.

1. Scope 1 emissions comprise direct greenhouse gas emissions arising from activities over which AGL has operational control as defined by the National Greenhouse and Energy Reporting Act 2007. Scope 2 emissions comprise indirect greenhouse gas emissions arising from the consumption of purchased electricity, heat or steam, arising from activities over which AGL has operational control as defined by the National Greenhouse and Energy Reporting Act 2007. Emissions data is calculated based on measured parameters for material sources, which make up approximately 99% of total scope 1 and 2 emissions, with estimates for minor sources. Scope 3 emissions comprise other indirect emissions and are estimated.
2. Based on the National Greenhouse Inventory Quarterly Update: March 2022, Department of Industry, Science, Energy & Resources.

Background (continued)

If there is a forecast or actual shortage of energy or system services, AEMO will request generators to be available, or may direct generators to be online to maintain system reliability and security. In the NEM, the vast majority of dispatchable capacity is currently provided by coal-fired generation, alongside hydro and gas-fired generation.

Electricity as an essential service

Electricity is unlike many other commodities in that the amount that is required to be dispatched at any instant must precisely match the amount that is being consumed. Electricity grids also have unique physical attributes that must be maintained to ensure the safety and quality of supply. As a result, and because electricity cannot yet be stored in the required quantities, sufficient quantities and type of generation must therefore always be available to operate to support the grid.

These physical requirements present challenges for the market operator as some electricity generators consider reducing output and exiting the market earlier in order to meet climate objectives. While strong price signals encourage generation to be available during certain periods, the imperative to reduce emissions is driving the earlier exit of some generation.

Modelling from AEMO for its 2022 Integrated System Plan (ISP) highlights a range of development pathways that the NEM could follow to meet climate policy objectives. At the same time, AEMO's modelling of the future reliability of the NEM (e.g. the Electricity Statement of Opportunities (ESOO) and NEM Engineering Framework) shows a high degree of operational uncertainty as plant exits the market, demand increases, physical risks increase, and more reliance is placed on variable generation.

In addition to these operational concerns, governments have put in place regulations to prevent unilateral closure of plant without adequate notice. For example, there are currently restrictions on withdrawing plant from the market without notice and bringing forward closure dates of plant within certain time periods. Governments are also considering additional policy action to ensure that sufficient dispatchable plant is available, both existing and new.

Climate and energy policy

Energy and climate policy in Australia is fragmented, with both State and federal governments having implemented several policies over the last two decades to incentivise new generation but also keep the system reliable, secure, and affordable. As the ESB has noted, similar changes are occurring in many electricity markets across the world, but Australia stands out for the rapid pace of its change[1].

In recent years, governments have implemented specific renewable energy investment programs, most notably the federal Large-scale Renewable Energy Target (LRET). The contribution of renewable programs has seen emissions from the electricity sector reduce significantly over the past decade as higher-cost emissions-intensive generation has exited the market.

Recent State and federal government policies aimed at meeting emissions reduction targets and climate commitments will further accelerate the uptake of variable renewable generation. In NSW, the Electricity Infrastructure Roadmap will see contracting with 12 GW of new variable renewable generation prior to 2030, and in Victoria, the Renewable Energy Target (VRET) to achieve 50% generation from renewable sources by 2030 is being achieved through reverse auctions. The federal government has also announced an ambition to rapidly accelerate the delivery of renewable generation through a $20 billion investment program to deliver new transmission infrastructure.

Despite these broad incentives for new renewable generation, there is still no overarching policy that has supported a coordinated approach to the earlier closure of thermal assets. Existing government policies, while seeking to incentivise new renewable generation, are not tied to emissions intensity targets or sectoral carbon budgets.

1. Energy Security Board Post-2025 Market Design Final advice to Energy Ministers Part A, 27 July 2021, p13

Climate Transition Action Plan

Net Zero ambition

AGL supports the Australian Government's target of achieving Net Zero by 2050.

- AGL will be Net Zero for operated Scope 1 and 2 emissions following the closure of our coal-fired power stations. This may involve the use of offsets for residual[1] Scope 1 and 2 emissions.
- AGL also has the ambition of being Net Zero for Scope 3 emissions by 2050, and is currently working on a decarbonisation pathway for these emissions.

Scope 1 and 2 emissions

AGL has set the following emission reduction targets[2] for its operated Scope 1 and 2 emissions:

- Achieve a reduction of at least 17% in annual Scope 1 and 2 emissions against a FY19 baseline[3] by FY24[4] following the closure of the Liddell Power Station.
- Achieve a reduction of at least 52% in annual Scope 1 and 2 emissions against a FY19 baseline[3] by FY35[4] following the closure of the Bayswater Power Station.
- Achieve Net Zero emissions following the closure of AGL's coal-fired power stations (Liddell, Bayswater and Loy Yang A power stations).

Annual emissions reductions are expected to exceed the 17% and 52% targets in some years due to operational variability.

Scope 1 and 2 decarbonisation plan

The closure timeframes for AGL's coal-fired power stations are as follows:

- Liddell Power Station will be closed by April 2023 (confirmed and underway)
- Bayswater Power Station will be closed between 2030-2033[5] (no later than 2033 (FY34))
- Loy Yang A Power Station is targeted to close by the end of FY35[6].

The operating life of some of AGL's existing gas peaking power stations may extend beyond the targeted closure of Loy Yang A Power Station by the end of FY35 to provide firming capacity to the market. Following the closure of our coal-fired power stations, Scope 1 and 2 greenhouse gas emissions arising from the operation of gas peaking plant will be offset.

AGL will progressively build and access energy assets to respond to the needs of our customer base. AGL will supply energy from owned assets, contracts, partnerships and trading. We will seek to supply our customer demand with ~12 GW of renewable and firming capacity by 2036. Our initial target is to have up to 5 GW of new renewables and firming capacity in place by 2030, funded from a combination of assets on our balance sheet, offtakes and via partnerships. We currently have a 2.9 GW pipeline of projects as well as 300 MW under construction, and we aim to expand this pipeline to deliver on our ~12 GW ambition.

Following the closure of our coal-fired power stations, Scope 1 and 2 greenhouse gas emissions arising from AGL's residual operations will be offset. 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.

Annual operated Scope 1 and 2 greenhouse gas emissions (indicative scale only)

1. Residual emissions include operated Scope 1 and 2 emissions arising from renewable and gas-fired generation assets, corporate and other activities and Energy Hubs. These emissions make up less than 3% of AGL's total operated Scope 1 and 2 emissions as of FY22.
2. Offsets may be used to help achieve emission reduction targets where necessary.
3. 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.
4. 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.
5. Asset management plans will be structured to support closure in 2033; a move to earlier years is dependent on market and portfolio factors that will become clearer in coming years.
6. Asset management plans will be structured to support the targeted closure of Loy Yang A Power Station by the end of FY35, and AGL will notify AEMO that the Expected Closure Year (per the National Electricity Rules (NER) 2.2.1(e)(2A)) for Loy Yang A Power Station by the end of FY35. Further, the carrying value of AGL's 'Generation' cash generating unit property, plant and equipment has been reduced as a result of the targeted closure of Loy Yang A Power Station by the end of FY35, as reflected in the impairment announced to the market on 29 September 2022. The ability for AGL to execute on this target will be subject to uncertainties and risks, as described on page 12.

Climate Transition Action Plan (continued)

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.

Actions AGL is currently undertaking that support reductions in Scope 3 emissions are outlined below for each material source of Scope 3 emissions.

Brown coal value chain

Scope 3 emissions arising from the sale of brown coal to Loy Yang B Power Station account for around 10 $MtCO_2e$ annually, comprising over one third of AGL's current Scope 3 emissions.

AGL has a long-term contract to supply coal from our AGL Loy Yang Mine to LYB Australia Limited (LYB) for combustion in LYB's Loy Yang B Power Station.

Strict competition laws governing the way competitors can interact with each other mean that AGL cannot make decisions on behalf of LYB either on how it operates the Loy Yang B Power Station or on when it closes. We cannot at this stage determine what the appropriate coal arrangements will be in the event that the Loy Yang B Power Station was to operate beyond Loy Yang A Power Station, and we are therefore unable to set interim targets to reduce this category of Scope 3 emissions. AGL will deliver 100% reduction in Scope 3 emissions arising from coal sales to LYB when we cease to operate the AGL Loy Yang Mine before FY47.

Gas supply value chain

Scope 3 emissions arising from the supply of natural gas to our customers and end-use of natural gas by customers currently accounts for around 9 $MtCO_2e$ annually, comprising approximately 30% of AGL's current Scope 3 emissions.

AGL's long-term ambition is to reduce the Scope 3 emissions arising from the supply of natural gas to our customers. AGL recognises that governments are contemplating and introducing initiatives and policy measures aimed at decarbonisation through the gas supply value chain, including incentivising the uptake of hydrogen and other low-carbon or carbon neutral gases. AGL will work with customers, communities, industry and government to advocate for the coordinated decarbonisation of Australia's natural gas sector, through the advancement and uptake of electrification technologies and green gas alternatives. AGL will also continue to offer carbon neutral gas to enable customers to advance the decarbonisation of their energy supply.

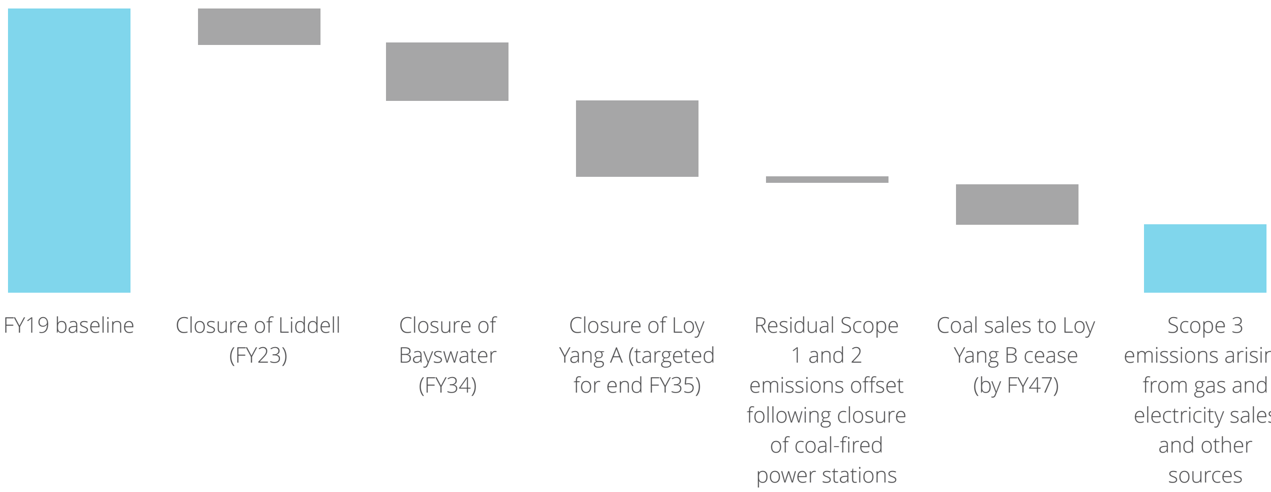
Electricity supply value chain

Scope 3 emissions arising from the supply of electricity to our customers currently accounts for over 8 $MtCO_2e$ annually, comprising approximately 30% of AGL's current Scope 3 emissions.

AGL's long-term ambition is to decarbonise the Scope 3 emissions arising from the supply of electricity to our customers. AGL will work with customers, communities, industry and government to advocate for the coordinated decarbonisation of Australia's electricity sector. We will invest in renewable generation and firming technologies as we progressively decarbonise our operated generation portfolio. We will partner with customers to drive the uptake of decentralised energy solutions and unlock greater energy efficiency for customers, and will continue to offer carbon neutral and renewable electricity products to enable customers to advance the decarbonisation of their energy supply.

As a result of thermal asset closures across the NEM, alongside the growth of renewables needed to support the supply of electricity customers due to the removal of this capacity from the market, the intensity of the National Energy Market will decline significantly, resulting in a reduction in this category of AGL's Scope 3 emissions, with the resulting Scope 3 emissions dependent on a number of factors including AGL's electricity sale volumes, the scale of AGL's generation portfolio and the balance of electricity that would be purchased from the grid.

Annual operated Scope 1 and 2 greenhouse gas emissions and Scope 3 greenhouse gas emissions (indicative scale only)



Climate Transition Action Plan (continued)

Responsible and orderly transition

AGL is committed to working constructively with our stakeholders, including the communities in which we operate, our people, our customers, government and regulators. As we plan the retirement of our large thermal sites, we are working closely with local business, industry, government and educational institutions to identify new investment prospects and encourage economic diversification.

Our sites

AGL is committed to repurposing its large thermal generation sites into low carbon industrial 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.

- We will work with our people and the communities where we operate to create the energy industry of the future through the development of our industrial Energy Hubs and the industries they support.
- We will continue to progress our plans in the Upper Hunter, where our Energy Hub concept contemplates a mixed industrial development including solar thermal storage systems, grid-scale batteries, and energy from waste facilities.
- Further, with the strong support of large industry partners, AGL has an ambition to establish a clean hydrogen industry in the Hunter Valley and Adelaide, and support the creation of an energy efficient, low-carbon ecosystem and circular economy. We have already commenced feasibility studies to explore the development of green hydrogen production facilities at our Hunter and Torrens Island Energy Hubs. We will work closely with industry, and use the findings of our feasibility studies, to assess the viability of developing hydrogen facilities at the appropriate scale and with the right timeframes and product types to support both local and export industries in their own decarbonisation journeys.

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.

- We will work with the local community in a transparent, sensitive and constructive manner.
- We will cultivate respectful, trusted and meaningful connections with Traditional Owners of the lands on which we operate and recognise that this is critical to our success. We believe that our relationships with Aboriginal and Torres Strait Islander people bring diverse experiences, knowledge and perspectives that enrich our business and help us better serve our communities. We acknowledge that our operations impact Aboriginal and Torres Strait Islander lands and communities. By building strong connections, we listen to Aboriginal and Torres Strait Islander voices and learn so we can shape our community engagement approach and create consistency across the organisation when working with local Traditional Owners and communities.
- We will continue to work with local business, industry, government and educational institutions to identify new investment prospects, encourage economic diversification and create new employment opportunities.

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.

- As we navigate our industry's transition to renewables, AGL's approach is to treat people fairly and respectfully.
- AGL will work closely with any impacted employees to explore opportunities for career transition. This may include transition to retirement, re-training, re-skilling and alternative career pathway opportunities.
- We will work constructively to consult with employees and their representatives to keep them informed and updated as we progress through the energy transition.
- Safety is AGL’s top priority and we remain focused on the safe and efficient management of our thermal assets through to closure, de-commissioning and site rehabilitation.

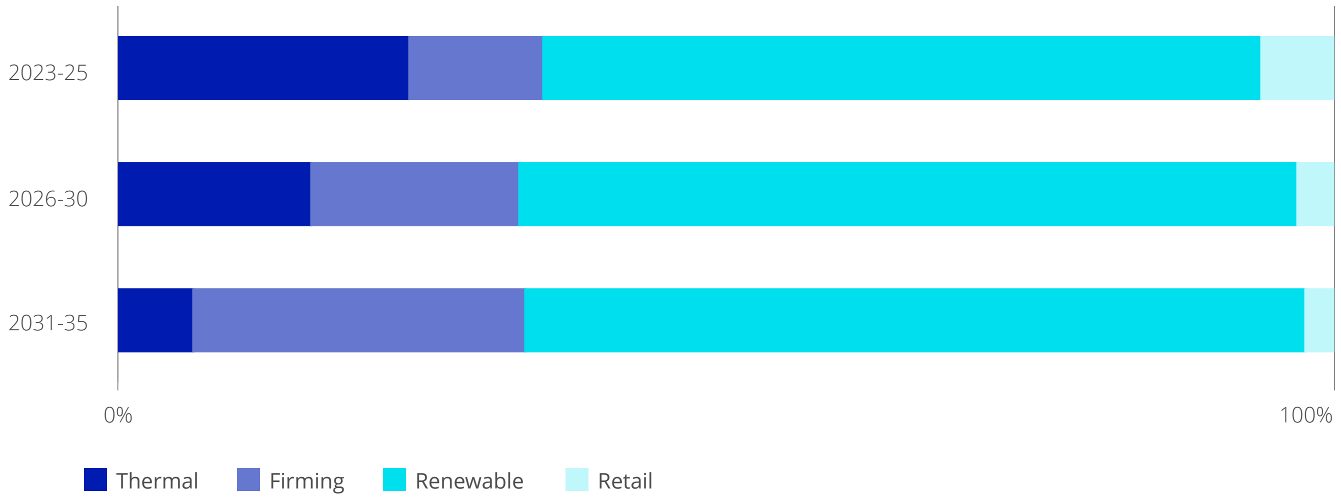
Climate Transition Action Plan (continued)

Portfolio reshape and capital allocation alignment

AGL intends to transition our portfolio to support a low carbon world, and will seek to supply our customers' energy demand by building and accessing ~12 GW of new renewable generation and firming capacity, requiring a total investment of up to $20 billion[1], before 2036.

- AGL will evolve its capital allocation over time to support a portfolio focused on renewable and firming generation as AGL transitions to an integrated low-carbon energy leader.
- Our interim target is to have up to 5 GW of new renewables and firming capacity in place by 2030.
- To meet this interim target, projects are expected to be funded through a combination of:
  - Assets on AGL's balance sheet, utilising available debt capacity and strong operating cash flows from existing coal-fired generation operations; and
  - Selective projects backed by offtakes and partnerships.
- AGL will continue to deploy capital to its existing thermal assets to ensure they remain safe and reliable for the remainder of the period to their targeted closure dates.
- AGL uses the capital allocation principles set out below to guide capital investment decisions.

Capital allocation evolution[1]



1. Allocation of forecast capital spend and/or offtake commitments for the discrete time periods, independent of sources of capital.

Capital allocation framework

Investment evaluation	• Assessing projects using risk matrices that balance strategic alignment, portfolio positioning, and financial outcomes with broader stakeholder and ESG considerations • Evaluated through a management committee independent of project sponsors
Managing risk	• Value at Risk stress testing to evaluate portfolio exposures • Stress testing of key liquidity, shareholder return and debt/credit metrics • Governance frameworks and committees
Investment returns	• Investment return hurdles set with consideration to project specific risks, absolute vs relative returns and optimal capital structures • Analysis against credit metrics and targeted shareholder returns

Green revenue

Over the long term, AGL will continue to grow the share of our revenue derived from the customer-led decarbonisation of our products and services.

- 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[2] to at least 22.2%, with a stretch goal of achieving 27.0%.

1. Based on capital cost estimates from AEMO Inputs, Assumptions and Scenarios Workbook, June 2022, adjusted for AGL views where considered appropriate.
2. Green energy revenue represents: green revenue excluding State-based green schemes; RET revenue from green charges passed through to customers; and other revenue from State-based charges passed through to customers.

Climate Transition Action Plan (continued)

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.

We recognise that meeting the objectives of the Paris Agreement will require significant policy action from governments and collaboration between the private and public sectors. In our policy engagement we will advocate for greater action from governments to commit to progressive decarbonisation of the energy sector and policies that are consistent with the objectives of the Paris Agreement.

We also support emissions reductions and policies for other sectors across the economy, and consideration of how abatement in all sectors will contribute to overall economy-wide targets.

We recognise that stakeholders expect that our involvement in public policy development is undertaken transparently and consistently. As such:

- We will publish submissions made to government processes on our website.
- In accordance with our Political Donations Policy, we will not make any monetary or in-kind political donations to political parties, either directly or through third parties.
- In accordance with our Industry Association Membership Policy, we will monitor the policy positions and public advocacy in relation to climate change of industry associations of which we are a member, and will annually disclose memberships, membership fees, and areas where AGL's position on climate change differs materially from the associations of which we are a member.
- Annually, we will provide a summary of our positions on climate-related policy and steps we have taken to advocate for these positions through public processes and participation in industry associations.

Climate governance

AGL will incorporate climate change performance elements within our executive remuneration framework to incentivise leadership on climate change and the energy transition.

- AGL will include climate transition metrics in its long-term incentive (LTI) plans for AGL's executive team. Carbon transition metrics are already included in the LTI plans which will vest in FY24, FY25 and FY26. Climate transition metrics aligned to AGL's Climate Transition Action Plan will be included in future Remuneration Reports.

AGL is committed to ensuring that its corporate governance framework, policies and practices reflect a high standard of corporate governance to support sustainable performance by AGL over time.

- Consideration of the social, ethical and environmental impact of AGL's activities is identified as one of the core responsibilities of the AGL Board, as documented through the **Board Charter**. This includes consideration of AGL's climate commitments and relevant closure dates for its power stations. The Audit and Risk Management Committee and the Safety and Sustainability Committee also have specific responsibilities in relation to climate change and transition, including considering material exposure to climate-related risks and monitoring climate policies and related stakeholder engagement. 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.
- We recognise the need to ensure that the AGL Board has Directors with the appropriate capabilities to assess and manage climate-related risks and opportunities. 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.

Further information about AGL's corporate governance framework, policies and practices are outlined in our annual Corporate Governance Statement, available at **agl.com.au/corporategovernance**.

Transparency

AGL is committed to having transparent communications with our stakeholders, including our investors, about our decarbonisation journey.

- 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.
- 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.
- 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.

Alignment of AGL's Climate Transition Action Plan to the Paris Agreement

AGL undertakes detailed scenario analysis on a periodic basis in order to understand the impact of different decarbonisation scenarios on the NEM to inform strategic decisions. AGL recently engaged ACIL Allen (ACIL), an independent economic, policy and strategic advisory firm, to undertake economic modelling of four different decarbonisation scenarios for the NEM. In order to provide a level of comparability to other recognised scenarios, ACIL utilised relevant assumptions from AEMO's ISP. The outputs of the scenario analysis (refer to Appendix A) were considered as part of the review of AGL's strategic direction and in formulating this Climate Transition Action Plan.

PARIS AGREEMENT

In this analysis, we refer to different decarbonisation scenarios in terms of how they relate to aspects of the Paris Agreement. Among other commitments, Parties to the Agreement commit to the following objective:

"Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change" - Article 2, Part 1 (a)

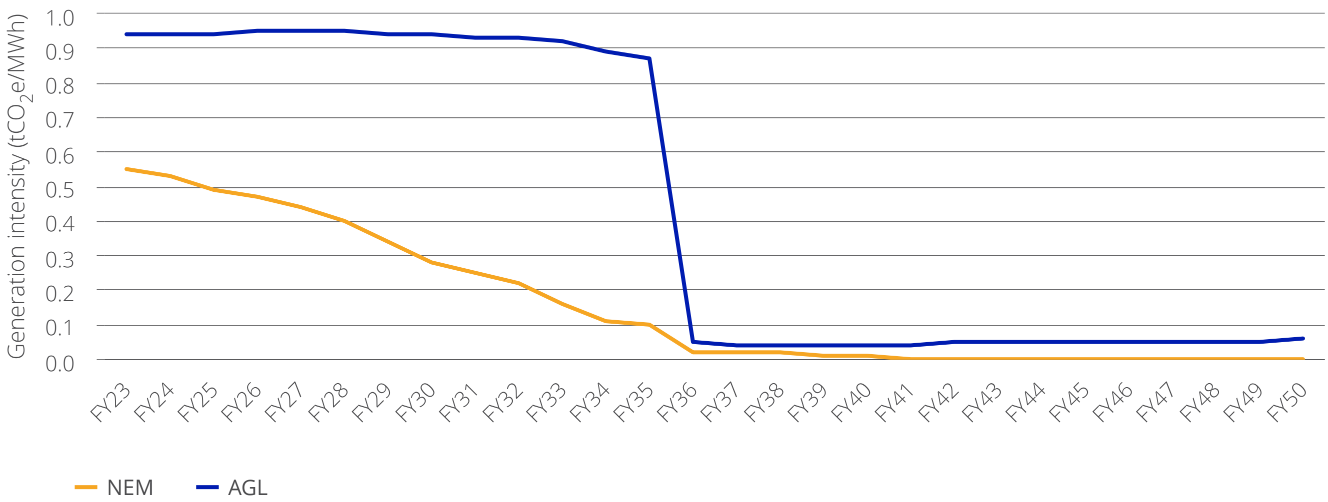
Well below 2 degrees

The high proportion of emissions-intensive generation in the NEM provides a challenging starting point from which to rapidly decarbonise, while also continuing to meet operational requirements as well as governments' reliability and affordability objectives. Nevertheless, emissions in the electricity sector are reducing at a rapid rate, much faster than other sectors of the Australian economy, and our scenario analysis suggests that the NEM may be able to transform sufficiently rapidly in order to reach net zero by 2045[1] and meet a carbon budget that is consistent with the Paris Agreement's objective of limiting warming to well below 2 degrees. Under Scenario III (Well below 2 degrees), Bayswater and Loy Yang A power stations close in FY34 and FY35 respectively, with the capacity factors of these power stations ranging between 56%-69% and 69%-83% respectively, ramping down from these ranges one to two years prior to closure.

The targeted closure dates for AGL's thermal coal assets outlined in this Climate Transition Action Plan are consistent with a decarbonisation scenario where the NEM achieves a well below two degrees outcome, and with the climate ambition of the 'Step Change' scenario within AEMO's 2022 Integrated System Plan. Our plan recognises that to achieve a net zero energy system in an orderly and efficient way, individual generators and asset owners will decarbonise at different rates as the NEM efficiently decarbonises as a whole. Market settings in the NEM will result in less reliable and higher-cost assets exiting the market first, while more reliable, lower-emissions, and lower-cost assets will remain in the system to support reliability and affordability objectives as the system rapidly decarbonises in the most efficient way. Other possible approaches to decarbonise AGL's portfolio more rapidly may represent less economically efficient outcomes, which may also result in higher costs for customers, in the absence of policy action to support earlier asset closures. Scenario modelling shows that under Scenario III (Well below 2 degrees), some coal-fired generation remains in and is required by the NEM until 2040, five years following the targeted closure of AGL's coal assets.

Our scenario modelling shows that AGL's operated generation intensity is estimated to be as high as 0.95 tCO_2e/MWh until Loy Yang A closes for our existing operated generation portfolio. However, the scenario analysis shows that under Scenario III (Well below 2 degrees), with both Bayswater and Loy Yang A operating in 2030, the NEM could achieve an intensity of 0.29 tCO_2e/MWh by 2030, and an intensity of 0.07 tCO_2e/MWh following the closure of all of AGL's thermal coal-fired power stations.

Generation intensity of AGL compared to NEM under Scenario III (Well below 2 degrees)



1. Residual combustion emissions from the NEM are well below 0.1 $MtCO_2e$ from 2045 under Scenario III.

Alignment of AGL's Climate Transition Action Plan to the Paris Agreement (continued)

In order to deliver a well below 2 degree outcome, a major infrastructure and asset replacement program would be required across the NEM, requiring substantial investments in new variable generation, transmission, low-emissions dispatchable plant, storage, and technologies providing system services. Our modelling suggests that while this is feasible, the scale of investment required to meet modelled timeframes will present some challenges under current market arrangements and may present risks to affordability and reliability constraints within certain parameters.

The Energy Security Board (ESB) considers the existing market, and its related arrangements, are unlikely to be sufficient to ensure the commercial provision of the right mix of resources required as the market transitions towards a higher penetration of variable renewables. This is due to a range of uncertainties currently facing investors in the market, including technological and demand uncertainty, uncertainty over the timing of the closure of ageing generation plant, government interventions to drive investment in new generation and those to manage the closure of existing plan, impacting long term investment signals for the right mix of resources necessary to support the energy transition.[1]

Further information in relation to the significant uncertainties and external risks associated with achieving the targets and commitments outlined in our Climate Transition Action Plan is provided on page 12.

1.5 degree goal

Uncertainties in the market including those identified by the ESB also impact the ability of the Australian electricity sector to deliver the required renewable and firming capacity to replace thermal assets at the pace required to meet its share of the carbon budget that would be required to meet the Paris Agreement's higher ambition of limiting global warming to 1.5 degrees above pre-industrial levels. The scenario analysis suggests that coal-fired plant within the NEM would need to retire by no later than FY31 in order for the NEM to meet a decarbonisation pathway that is consistent with this ambition (Scenario IV[2]). The scenario analysis suggests that approximately 100 GW of additional capacity would be required by 2030; additional capacity and associated costs rising to approximately 270 GW and over $180 billion respectively by 2050[3].

Although delivering the energy needs of NEM customers under Scenario IV may be feasible within scenario modelling, the level of new investment to achieve this outcome is materially more ambitious than under a well below 2 degree scenario, and would require a significant shift in government policies to provide new incentives for low-emissions generation and supporting infrastructure such as transmission, storage, distributed energy and demand-side resources, and technologies to provide essential system services.

In the absence of reforms to enable a more supportive operating environment for transition, closure of all coal-fired generation by FY31 is unlikely to be feasible based on forecast system requirements, current market settings to drive investment in replacement generation, and the scale of the supporting transmission and generation infrastructure that must be built in a timely and coordinated way. Closure of all coal-fired generation will also require significant advances in the operation of the grid to accommodate much higher penetration of variable renewable generation, which may not be delivered on a timeframe that is consistent with a 1.5 degree goal. As the market operator AEMO has noted, a step-change in power system capability and engineering effort is also required to maintain secure and efficient operation and investment in the long-term interests of consumers.[4]

Significant changes would also need to be made to the market to ensure costs for new generation and infrastructure are recovered equitably from customers without impacting on energy affordability. At this stage, there is no indication from governments that these changes will be made on a timeline that would be consistent with achieving a 1.5 degree goal.

In addition to material challenges posed by the current market operation and design, the ESB has identified major risks associated with the scale of the energy transition including critical data needs, potential changes to the policy landscape, its governance, the need for an adaptive management approach, interdependencies between the pathways, and costs of implementation[5], all of which impact on the ability of the electricity sector to meet a more rapid decarbonisation pathway that is aligned to a 1.5 degree ambition.

Further information in relation to the significant uncertainties and external risks associated with achieving the targets and commitments outlined in our Climate Transition Action Plan is provided on page 12.

Notwithstanding the challenges faced by the Australian energy sector in pursuing a 1.5 degree ambition, AGL recognises that the global pursuit of a 1.5 degree outcome remains important. As such, AGL supports broader policy action to limit warming to 1.5 degrees above pre-industrial levels, and will continue to work with relevant stakeholders to explore options and implications for accelerated decarbonisation pathways including the role and relative contributions that other sectors of the Australian economy may play in the pursuit of this outcome.

1. Energy Security Board, Post-2025 Market Design Final advice to Energy Ministers Part A, 27 July 2021, p7-8
2. As noted in Appendix A, for Scenario IV, the modelled outcome exceeds the target carbon budget by around 15%, demonstrating that there would be additional pressures in meeting a smaller carbon budget
3. 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. AEMO, NEM Engineering Framework – Priority Action, June 2022, p16
5. Energy Security Board, Post-2025 Market Design Final advice to Energy Ministers Part A, 27 July 2021, p12

Risks to Climate Transition Action Plan

AGL's modelled pathways for decarbonisation are subject to significant uncertainties and external risks.

To ensure the continued delivery of reliable and affordable energy, the decarbonisation of AGL's generation portfolio requires the delivery of significant amounts of supporting infrastructure to support a low-emissions electricity system. This will require an unprecedented level of coordination between all levels of government, regulated networks, private businesses, and the broader community, as well as a favourable external operating environment for energy businesses and global advances in the cost of low-emissions technologies.

The ability for AGL to execute on our commitments will also be subject to ongoing structural developments within Australia's energy markets in the future, as well as external political and macroeconomic risks.

The material risks to achieving the targets and commitments outlined in our Climate Transition Action Plan include (in no particular order):

Issue	Implication
Lack of supportive market structures	The structure of the NEM and other adjacent markets (e.g., gas markets, carbon markets) may not provide sufficient incentives to deliver new infrastructure to support the energy transition at the pace required. This may relate to a lack of incentives for new low-emissions generation and storage, transmission and distribution augmentation, integration of distributed energy and other demand-side resources, and resources that provide essential system services.
Increase in actual or perceived reliability risks	An increased risk of actual or forecast load-shedding events, where there is insufficient capacity available to meet customer needs, may heighten the demand for existing dispatchable capacity to remain connected to the NEM to contribute to system reliability.
Increase in actual or perceived system security risks	Efforts to manage a grid that comprises a much higher penetration of variable renewable generation and inverter-based resources may take longer than expected. There may be material constraints that prevent the exit of existing synchronous generation on more aggressive timelines.
Discoordination between federal and State governments	Governments may resist implementing policy in the electricity sector that aligns with economy-wide climate targets. Governments may implement policies that present conflicting incentives and obligations for plant operators with respect to closure of thermal generation.
Implementation of policies to allow government to extend the life of power stations	Governments may enact further policies that mandate continued operation of plant to meet system security and reliability requirements.
Energy demand, electrification and fuel switching	Electricity demand may materially increase, especially as a result of fuel-switching or new demand sources such as electrified passenger vehicles, requiring substantially more dispatchable capacity to meet annual energy requirements. This would result in higher output and emissions.
Technology development and costs	Technology costs for new generation may not decline as forecast, resulting in greater demand for lower-cost generation or the continued operation of existing power stations.
Shortage of critical skills, materials, and resources	A global push for similar skills, materials, and resources, alongside supply chain and delivery pressures, may create substantial delays and/or increases in cost for new generation and transmission projects, necessitating the ongoing operation of existing plant.
Inability to achieve adequate social licence	Local communities may not support the development of new generation and transmission projects that are required in order to meet faster decarbonisation pathways most efficiently. As a result, existing infrastructure may be relied upon for longer than expected.
Changes in weather and climate	Physical hazards associated with climate change can directly impact on assets such as power stations and transmission infrastructure, and have secondary impacts on energy markets and supply chains, which may result in greater requirements for electricity generation from thermal baseload plant.
Other asset closures	The timing of other asset closures, which may be brought forward voluntarily or as a result of plant failures, may impact on the expected order of power station closures, requiring older or more emissions-intensive power stations to continue to operate beyond forecast closure dates to meet system requirements.
Geopolitical risks	A range of possible geopolitical risks, such as international conflicts and trade disputes may directly impact on government policy in the domestic energy sector, limiting the ability to meet more ambitious targets in the electricity sector or restrict the ability for market participants to make operational decisions regarding their plant.
Climate change targets and methodologies	Data and methodologies relating to carbon budgets and accounting, which are in turn used to derive emissions trajectories and closure dates, may change over time and impact on the modelling of pathways to meet climate targets.
Access to capital and other markets	Owners of thermal plant may experience reduced access to debt, equity, insurance, and other markets that support capital requirements for executing a planned transitional pathway. In addition, competition for capital to fund new growth assets may impact project financial viability and delivery timeframes.
Environmental regulation	Changing environmental regulation could materially affect the timing of asset closures across the NEM. Asset closures may be impacted by regulatory reforms relating to the emission of greenhouse gases, other pollutants, and/or particulates, changes in site and mine rehabilitation obligations, restrictions in land use and water rights, or other conditions in environmental licences.
Infrastructure delivery	Decarbonisation of the NEM requires large volumes of new generation to be commissioned, much of which represents greenfield projects that requires new transmission infrastructure to be built in order to connect to the NEM. The scale of this infrastructure replacement presents challenges to the security and reliability of the grid, and the affordability of electricity supply.

Appendix A – Scenario analysis

A1. Methodology and approach

To better understand the long-term implications of climate-related issues for the resilience of AGL's business, during 2022 AGL engaged ACIL Allen (ACIL) to undertake economic modelling of the NEM. This type of analysis is undertaken periodically to enable AGL to explore the economic implications of different decarbonisation pathways on our business at a more a granular level that is more relevant to AGL's operations than is generally available in other scenario analyses such as that developed by AEMO for its 2022 Integrated System Plan (ISP).

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

Modelled scenarios

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 $MtCO_2e$ 2030-2050 RCP 4.5 (2.6^{0}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 $MtCO_2e$ 2024-2050 RCP 2.6 (1.8^{0}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^{0}C-aligned pathway.	453 $MtCO_2e$ 2024-2050 RCP 1.9 (<1.5^{0}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.

The starting point for ACIL's modelling was the scenarios in the ISP. As outlined in the table below, some core inputs used in ACIL's scenarios are based on the ISP scenario inputs to provide a level of consistency with established, third-party scenarios that are used for NEM planning and forecasting.

The ISP scenarios have utilised the IPCC's Special Report on Global Warming of 1.5^{0}C to determine the respective carbon budgets for the NEM using a multi-sectoral modelling approach. Subsequent publication of the IPCC's Sixth Assessment Report may have implications for the revision of these carbon budgets in future modelling.

Since the development of the scenarios, notable developments include Labor winning the May 2022 federal election and committing to reduce national emissions by 43% by 2030. Given the 43% target is largely consistent with pre-existing State-based targets already incorporated into the scenarios, we do not consider that this materially impacts the relevance of this scenario analysis.

While the core inputs to the modelled scenarios are broadly comparable to the four scenarios presented in AEMO's ISP, due to the differences between simulation models, the results of the economic modelling undertaken by ACIL differ from the outcomes of the modelling undertaken by AEMO for market forecasting and planning purposes.

AEMO utilises two different modelling approaches across its ISP scenarios. Information about the methodology used by AEMO is available at **aemo.com.au**. For the Progressive Change scenario, AEMO employs a 'revenue forecasting and least-cost hybrid retirement approach', which allows coal closures to be brought forward prior to 2030 by considering the wholesale market profitability of each generator. In contrast, the remaining three scenarios (Slow Change, Step Change, and Hydrogen Superpower) employ a 'pure least cost' approach, where retirement trajectories are modelled to optimise the condition of meeting a long-term carbon constraint where applicable, in priority of other market conditions such as generator revenues.

As a result of this 'pure least cost' approach, AEMO has stated that while the total volume of retiring thermal generation is useful for ISP scenario planning, the choice of units to retire in its model can be "somewhat unintuitive after considering real world dynamics". This is because the ISP modelling does not take into account all of the considerations that individual plant operators must when making decisions about whether to continue to operate their plant.

While using similar inputs to the ISP scenarios, ACIL has utilised a different modelling approach to AEMO, which provides a different outcome for the trajectory of likely thermal retirements under certain scenarios.

ACIL models the NEM using PowerMark, its simulation model which includes a linear program to dispatch and settle the market in a similar way to the NEM Dispatch Engine (NEMDE). PowerMark simulates the market every hour, and in each period the offer of the marginal generator sets the price. PowerMark allows each portfolio of generators to dynamically set the offer curve of each generator within the given portfolio by using re-bids to give the portfolio the opportunity to seek to improve its position. Beyond assumed investment in generation capacity as part of prescribed State-based renewable energy policies, PowerMark introduces new investment when prices are sufficient to meet the hurdle rate of different new investment technologies. Similarly, beyond committed retirements of existing capacity, PowerMark retires capacity when prices are insufficient for the economic viability of the given generator.

Appendix A – Scenario analysis (continued)

For relevant scenarios, the ACIL modelling also derives a carbon price trajectory required to achieve the emissions budget. For Scenario II and III, the modelled NEM emissions are within 2% of the targeted carbon budget over the period where the carbon constraint applies, due to modelling resolution. For Scenario IV, the modelled outcome exceeds the target carbon budget by around 15%, due to the way the ACIL model resolved carbon budgets between calendar and financial years.

As a result, the scenarios represent different, but plausible alternative outcomes for the NEM than those presented in the ISP. For example, under Scenario III, the modelled closure dates for power stations across the NEM vary from AEMO's Step Change scenario, however the resulting NEM emissions remain consistent with the corresponding carbon budget used by AEMO.

For Scenario III, an iterative modelling process was undertaken which included fixing the Loy Yang A Power Station closure date at the end of FY35 in order to demonstrate that this operating timeframe is commensurate with the Paris-aligned carbon budget from AEMO's Step Change scenario. Although a closure date of FY35 for Loy Yang A Power Station is three years later than suggested by AEMO's Step Change scenario, the overall NEM carbon budget remains balanced due to slight contractions and extensions to the operating lives and load profiles of other generators in the NEM as well as the timing and technology type of new entrants compared to the Step Change scenario.

The table below summarises key assumptions for each scenario, highlighting the relative differences between the modelled scenarios for each core parameter. The table also identifies the material variances in the assumptions used compared to the AEMO scenarios.

Scenario assumptions

Parameter	Scenario I	Scenario II	Scenario III (Below 2 degrees)	Scenario IV (1.5 degree goal)
Relevant AEMO ISP scenario	Slow Change	Progressive Change	Step Change	Hydrogen Superpower (modified[1])
Policy settings	No emissions targets – 50% NSW roadmap[2] achieved by 2030 & 100% by 2035; 100% Tasmanian Renewable Energy Target (TRET); Queensland Renewable Energy Target (QRET) extended to 2033.	26-28% reduction by 2030 and net zero by 2050 are met; State government policies of 50% reduction by 2030; 100% NSW roadmap; 100% QRET; 100% TRET. Policy to require gas-fired generation to run on green hydrogen from 2040 onwards.	Economy-wide net zero before 2050, exceeding 26-28% reduction by 2030. Pace of decarbonisation consistent with limiting global temperature rise to well below 2 degrees above pre-industrial levels.	Economy-wide net zero by early 2040s, exceeding 26-28% reduction by 2030. Pace of decarbonisation consistent with limiting global temperature rise to 1.5 degrees above pre-industrial levels, via carbon price or aggressive renewable energy targets.
Target carbon budget	N/A; RCP 7 (4⁰C)	986 MtCO2e 2030-2050[3] (slightly larger than 932 MtCO_2e in ISP Progressive Change scenario) RCP 4.5 (2.6⁰C)	891 MtCO_2e 2024-2050 RCP 2.6 (1.8⁰C)	453 MtCO_2e 2024-2050 RCP 1.9 (<1.5⁰C)
GDP growth	Low	Moderate	Moderate	High
Energy efficiency	Low	Moderate	High	High
DSP growth	Low	Moderate	High	High
BTM solar	Moderate	High[3] (ISP Progressive Change scenario assumes Moderate)	High	High
Battery storage capacity	Low	Moderate	High	High
Battery storage coordination	Low	Moderate	High	High
BEV uptake	Low	High[3] (ISP Progressive Change scenario assumes Moderate)	High	High
BEV charging coordination	Low	High[3] (ISP Progressive Change scenario assumes Moderate)	High	High
Electrification of other sectors	Low	High[3] (ISP Progressive Change scenario assumes Moderate)	Moderate	Moderate

Appendix A – Scenario analysis (continued)

Parameter	Scenario I	Scenario II	Scenario III (Below 2 degrees)	Scenario IV (1.5 degree goal)
Hydrogen demand	Low	Low domestic demand (however, gas-fired generation runs on green hydrogen from 2040). Little or no export demand (aside from any potential demonstration plant).	Moderate	High (excluding hydrogen economy)
SSP	SSP3	N/A[3] (ISP Progressive Change scenario assumes SSP2)	SSP1	SSP1
IEA World Energy Outlook (WEO) scenario	Delayed	N/A[3] (ISP Progressive assumes States' policy)	Sustainable Development	Net Zero Emissions
Generator and storage build costs	CSIRO GenCost Central	Similar to CSIRO GenCost Central[3] (ISP Progressive Change Scenario assumes CSIRO GenCost Central)	CSIRO GenCost High VRE	CSIRO GenCost High VRE
Generator retirements	Per announced closure schedule, or earlier if economic	Closure of existing generators where the generator is projected to be unprofitable over an extended period of time or the generator's expected closure year as indicated to AEMO – whichever is earlier. Assumes Callide C and Millmerran close at the end of 2049)[3] (ISP Progressive Change scenario assumes per closure schedule, or earlier if economic or driven by decarbonisation objectives post-2030)	Per closure schedule, or earlier if economic or driven by decarbonisation objectives	Per closure schedule, or earlier if economic or driven by decarbonisation objectives

1. Excludes the hydrogen export component and associated energy infrastructure requirements of AEMO's ISP Hydrogen Superpower scenario.
2. NSW Electricity Infrastructure Roadmap.
3. Differs from reference ISP scenario assumption.

Key	Relative to current state:	Low	Moderate	High

Appendix A – Scenario analysis (continued)

A2. Results of scenario analysis

Scenario I

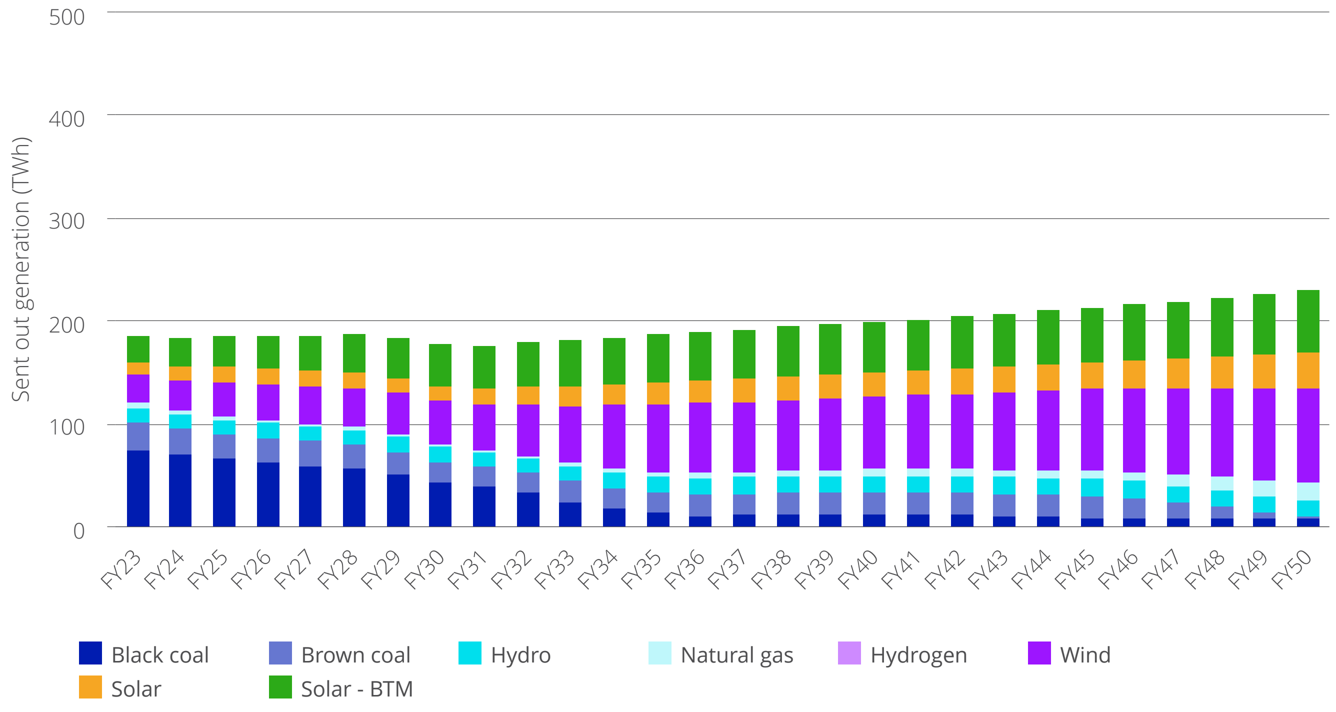
Under Scenario I, limited growth in system demand results in relatively stable annual generation levels and generation capacity in the NEM to 2050. Coal-fired generators run at relatively low load factors as a result of low system demand. Annual emissions and emissions intensity of NEM generation decline 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.

Key modelling outcomes

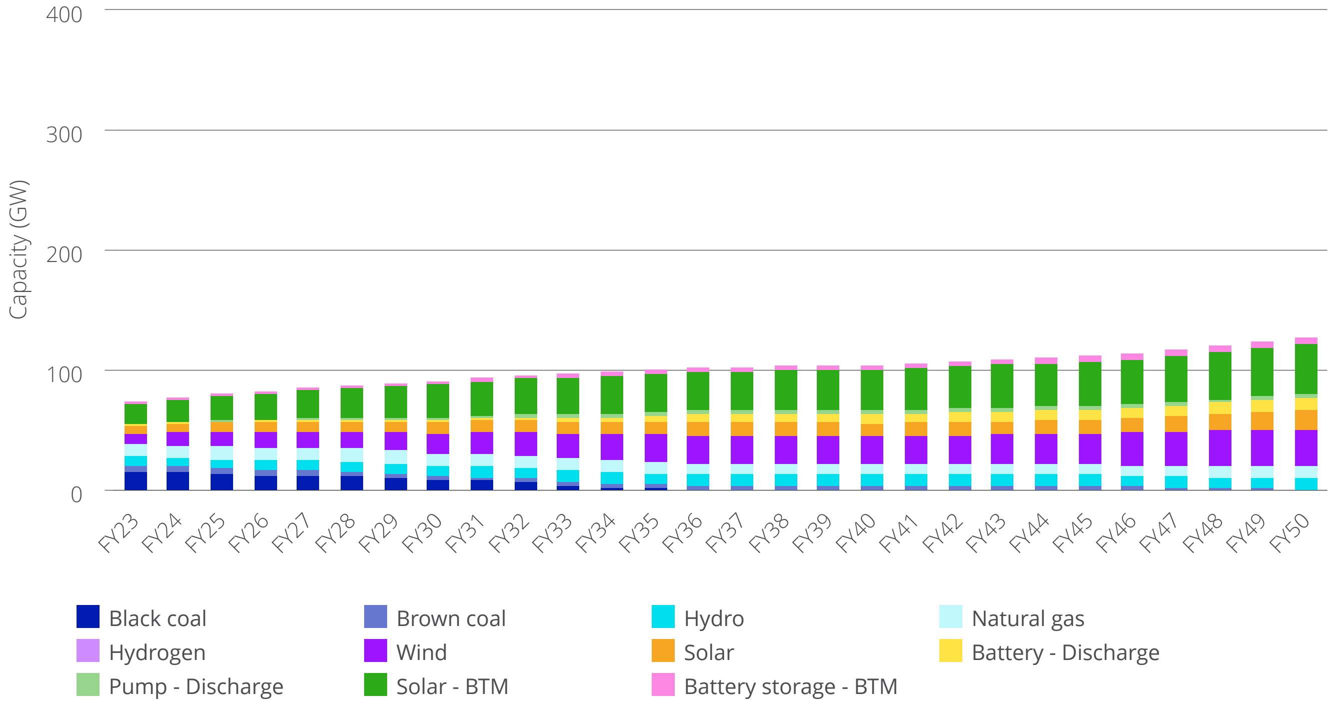
NEM intensity in 2030	0.42 tCO_2e/MWh
Investment required[1]	Scale of investment required: +31 GW/>$25bn by 2030; +70 GW/>$60bn by 2050
AGL coal asset closures	Bayswater FY34, Loy Yang A FY46
AGL coal asset average capacity factors[2]	Bayswater 53%, Loy Yang A 71%
AGL generation portfolio modelled emissions (2024 – 2050)	470 $MtCO_2e$

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.
2. Average annual capacity factors based on gross generation volumes, excluding 1-2 year period of capacity rampdown prior to closure.

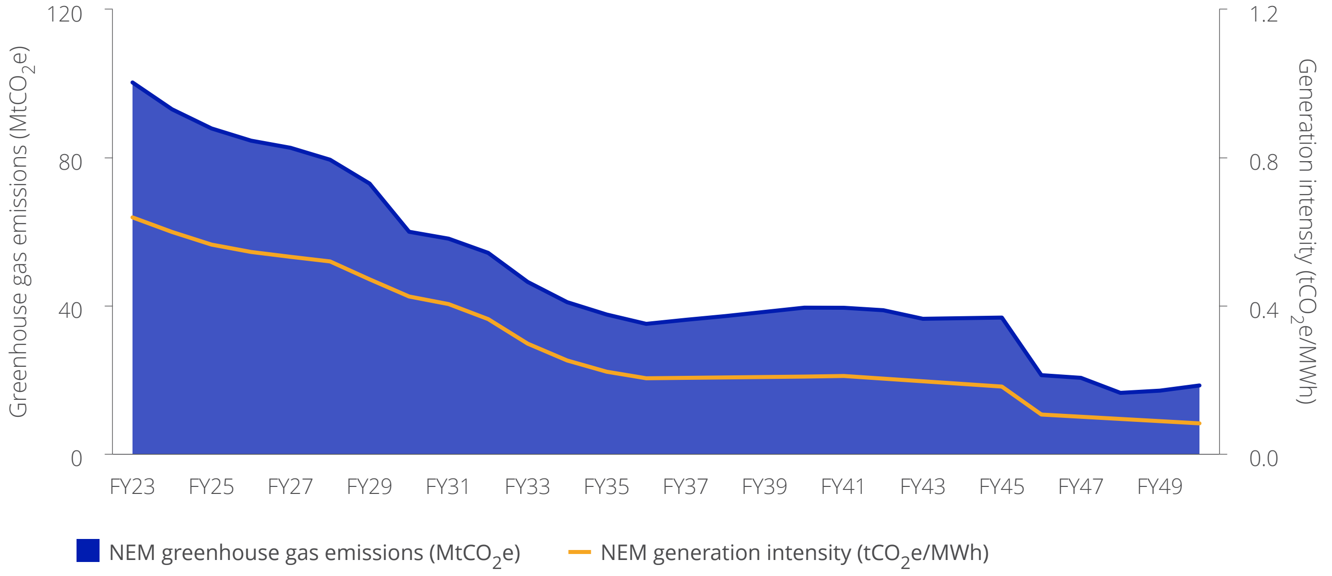
Scenario I: NEM generation by technology type



Scenario I: NEM capacity by technology type



Scenario I: NEM greenhouse gas emissions and generation intensity



Appendix A – Scenario analysis (continued)

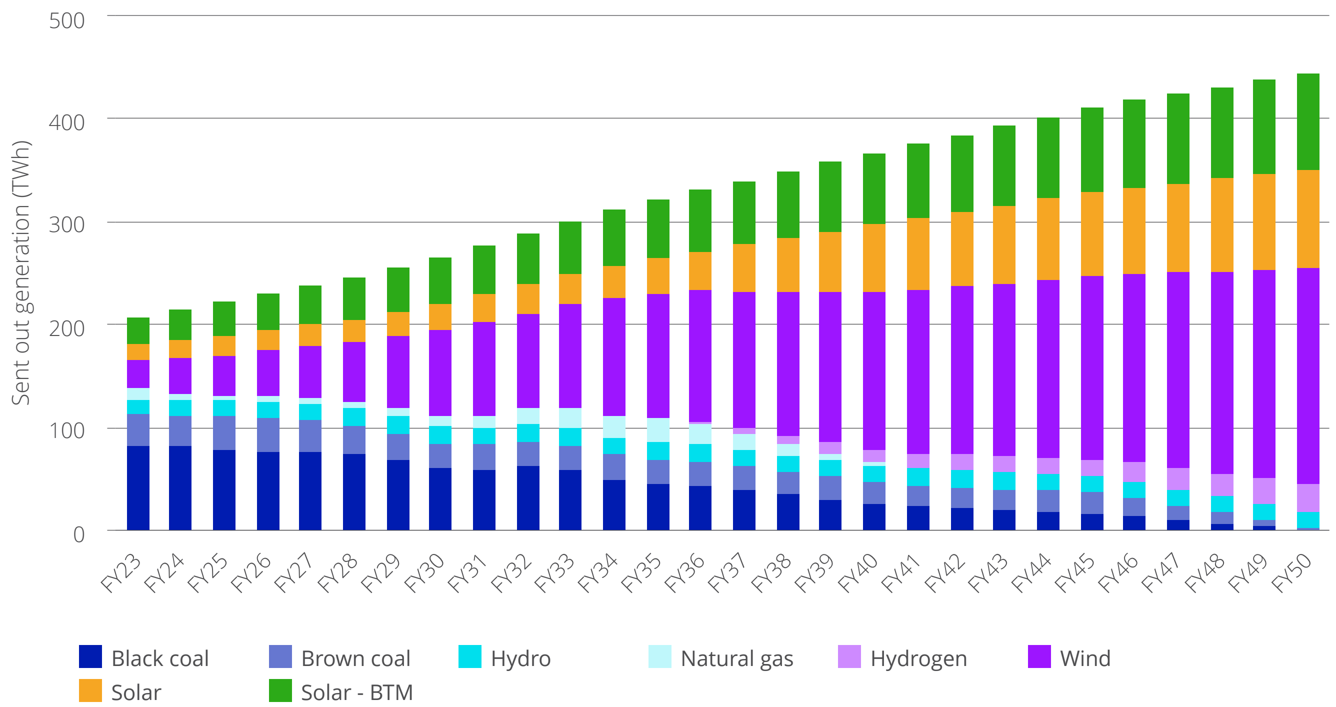
Scenario II

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.

Key modelling outcomes	
NEM intensity in 2030	0.31 tCO_2e/MWh
Investment required[1]	+54 GW/>$55bn by 2030; +225 GW/>$180bn by 2050
AGL coal asset closures	Bayswater FY34, Loy Yang A FY46
AGL coal asset average capacity factors	Bayswater 68%, Loy Yang A 79%
AGL generation portfolio modelled emissions (2024 – 2050)	540 $MtCO_2e$

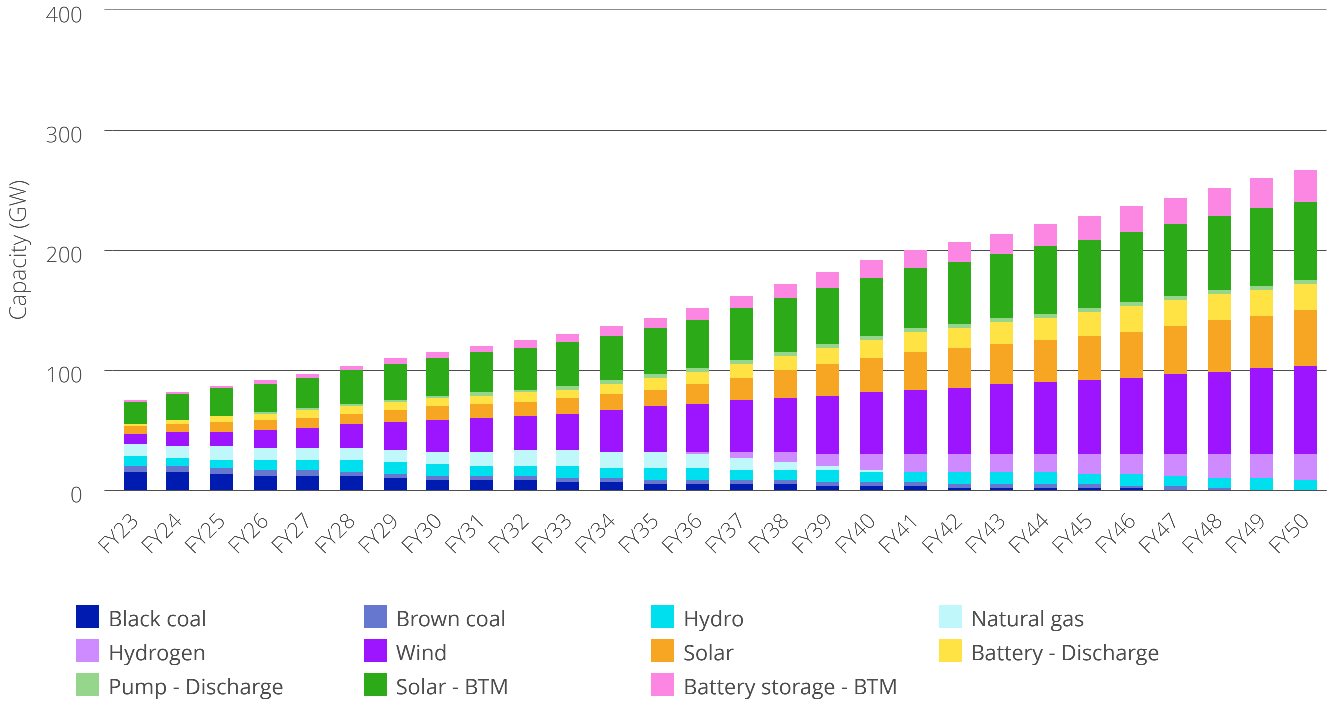
1. Investment requirement capacity includes new renewable and storage build requirement including behind the meter technology across the NEM. Investment cost includes capital costs for new wind and utility-scale solar and storage build across the NEM and excludes transmission and distribution, in real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

Scenario II: NEM generation by technology type

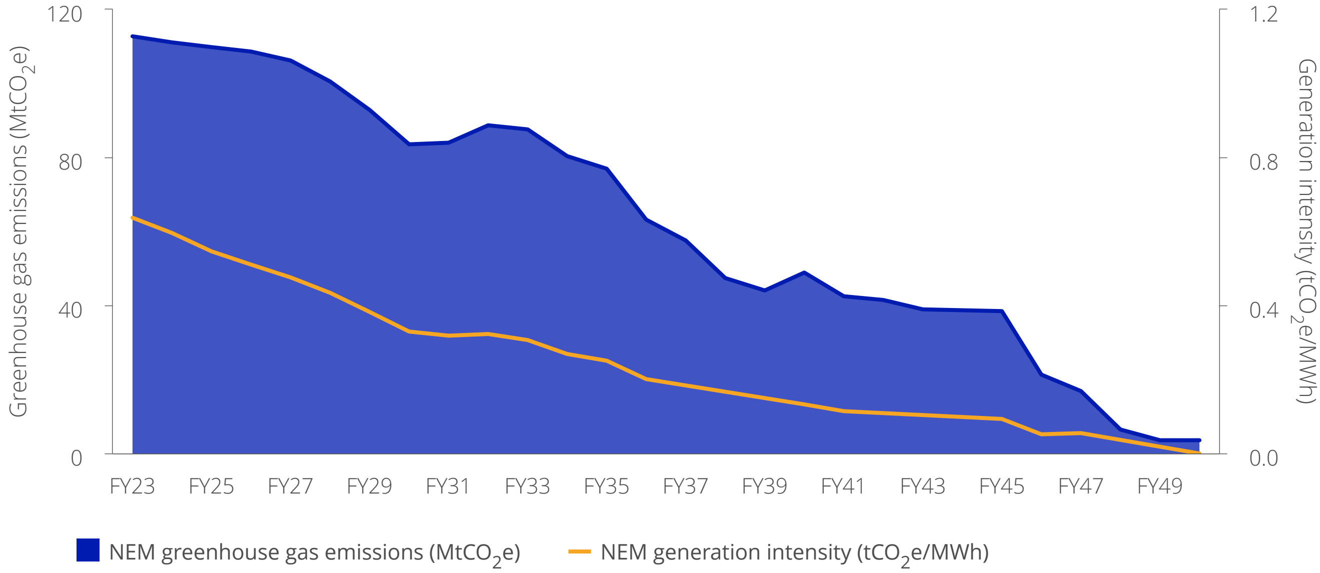


Appendix A – Scenario analysis (continued)

Scenario II: NEM capacity by technology type



Scenario II: NEM greenhouse gas emissions and generation intensity



Appendix A – Scenario analysis (continued)

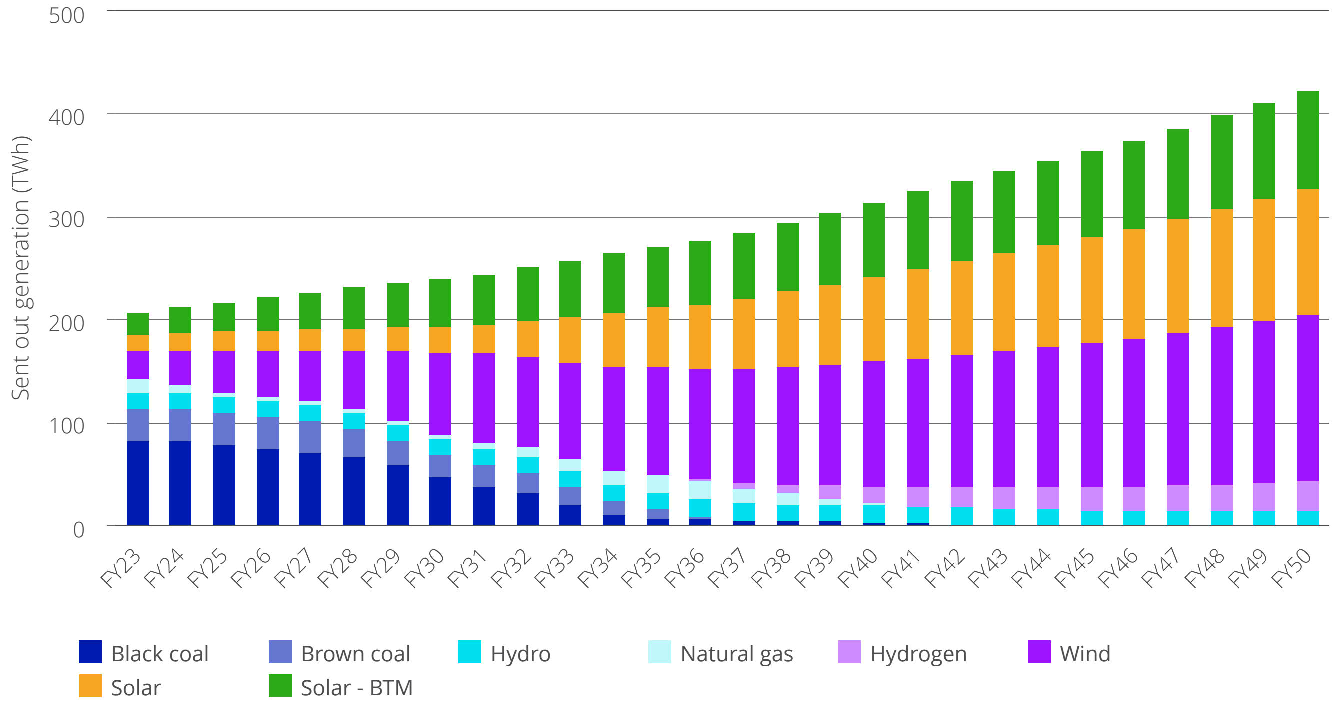
Scenario III (Well below 2 degrees)

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, whilst the increasing electrification macrotrend 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.

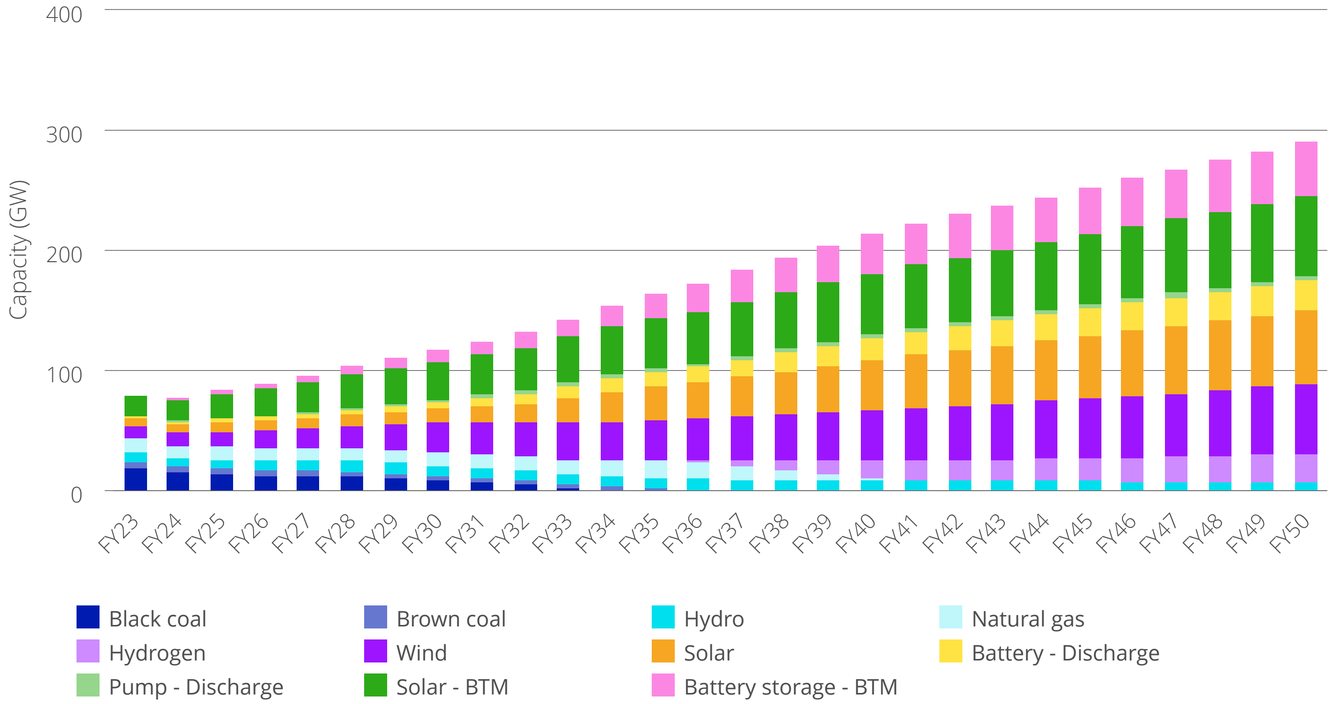
Key modelling outcomes	
NEM intensity in 2030	0.29 tCO_2e/MWh
Investment required[1]	+58 GW/>$50bn by 2030; +250 GW/>$150bn by 2050
AGL coal asset closures	Bayswater FY34, Loy Yang A FY35
AGL coal asset average capacity factors	Bayswater 62%, Loy Yang A 77%
AGL generation portfolio modelled emissions (2024 – 2050)	330 $MtCO_2e$

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.

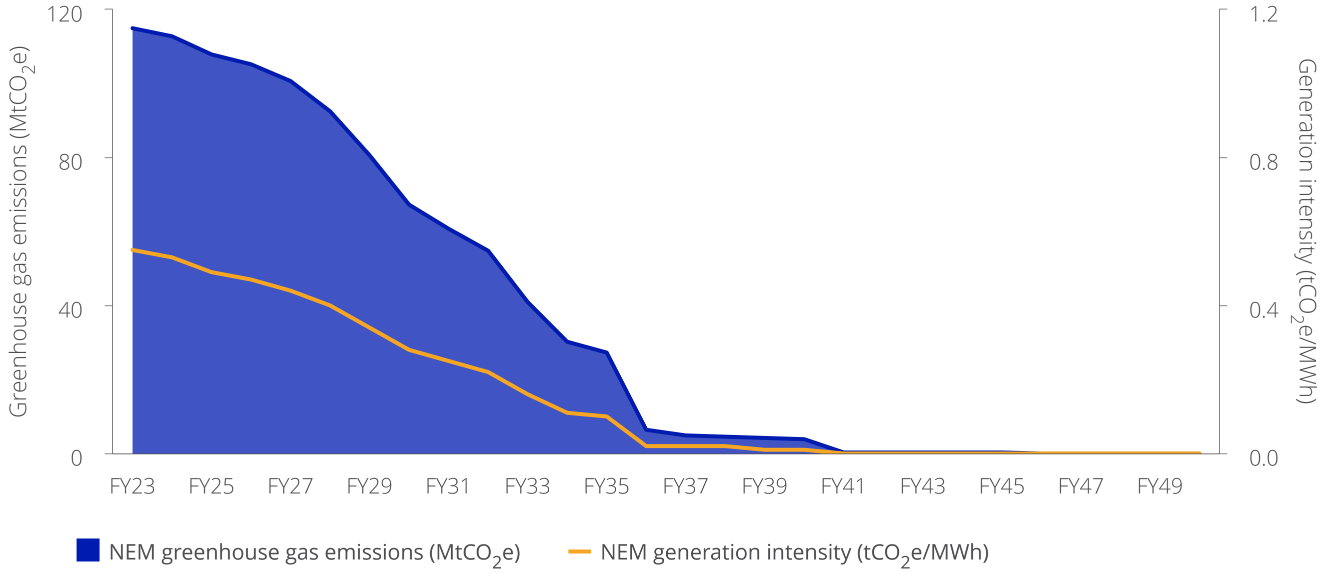
Scenario III (Well below 2 degrees): NEM generation by technology type



Scenario III (Well below 2 degrees): NEM capacity by technology type



Scenario III (Well below 2 degrees): NEM greenhouse gas emissions and generation intensity



Appendix A – Scenario analysis (continued)

Scenario IV (1.5 degree goal)

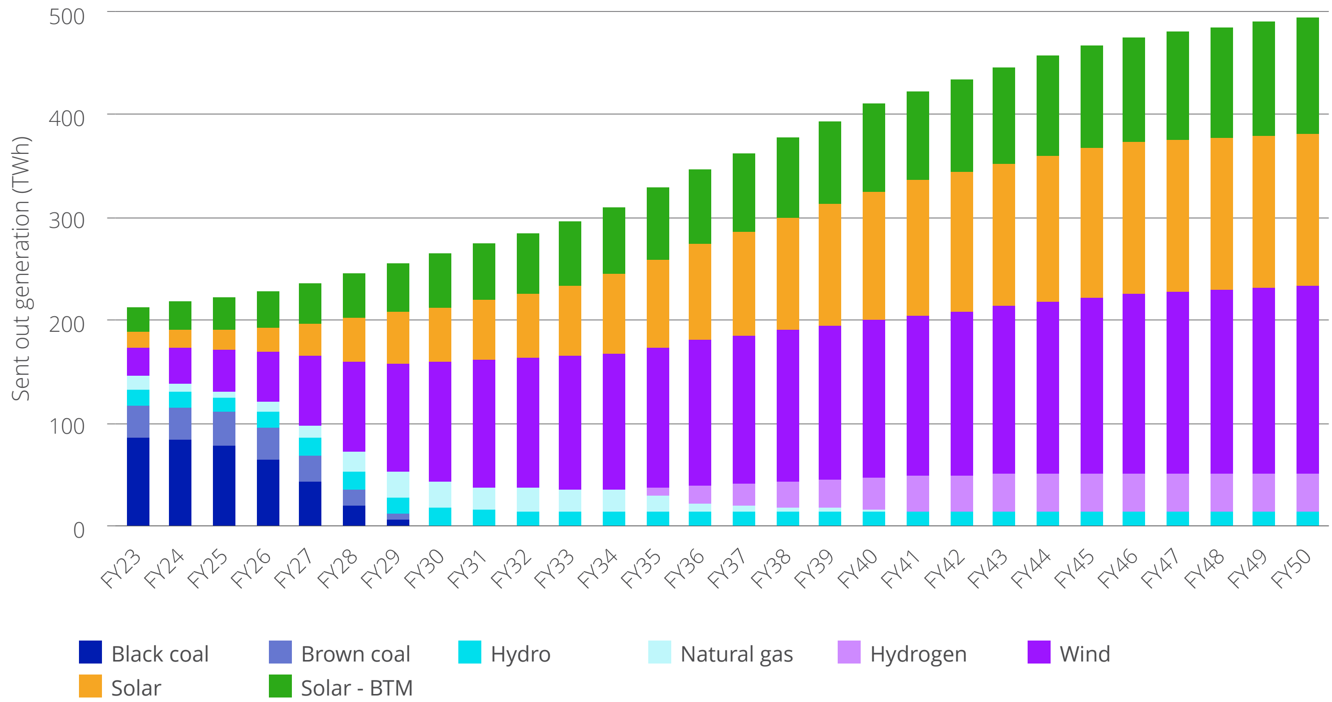
Under Scenario IV, meeting a Paris-1.5°C aligned carbon constraint results in an accelerated exit of coal-fired generation from the system, with all coal closed by the early 2030s, whilst the increasing electrification macrotrend and longer term shift to hydrogen generation technology drives a strongly 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.

Total new generation capacity required under this scenario by 2050 is 45 GW more than required under Scenario III (Well below 2 degrees). Notably, 40 GW of this is required to be delivered by 2030, with Scenario IV (1.5 degree goal) requiring an additional 98 GW by 2030 compared to an additional 58 GW under Scenario III (Well below 2 degrees). As discussed on page 11, this would present significant delivery challenges.

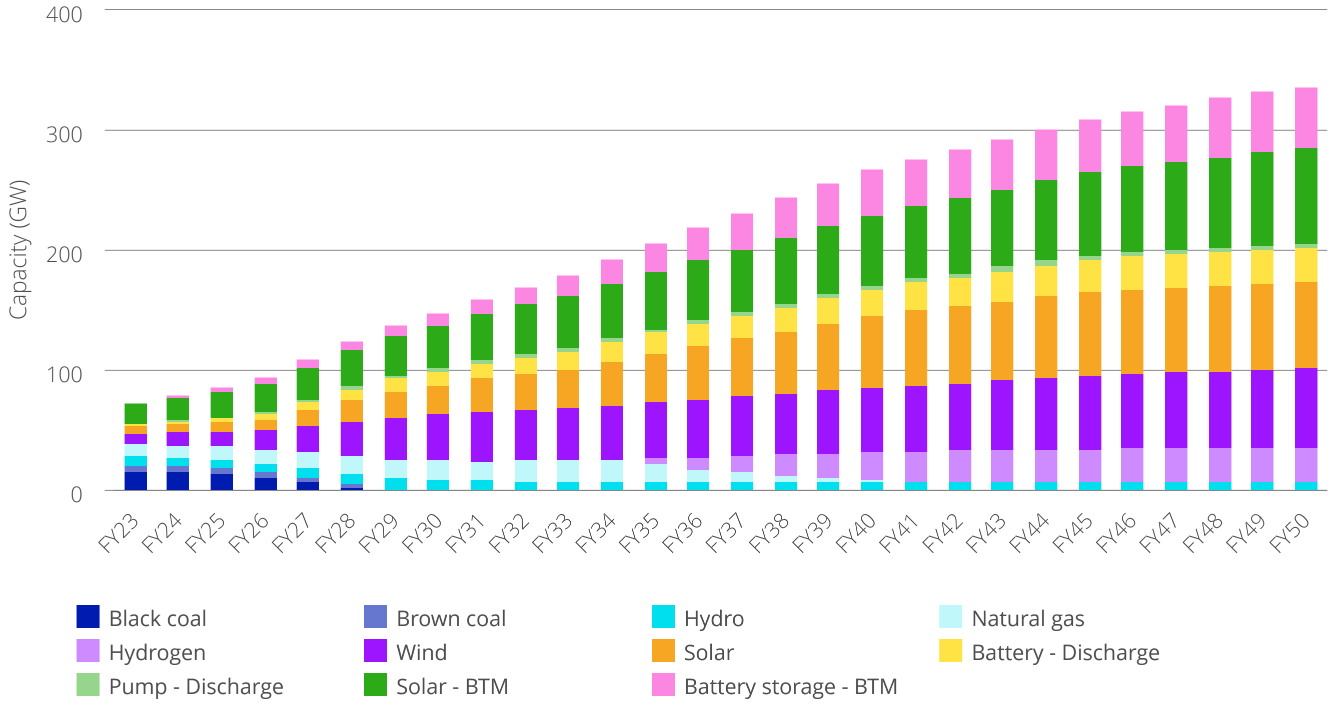
Key modelling outcomes	
NEM intensity in 2030	0.04 tCO_2e/MWh
Investment required[1]	+98 GW/>$90bn by 2030; +295 GW/>$180bn by 2050
AGL coal asset closures	Bayswater FY28, Loy Yang A FY29
AGL coal asset average capacity factors	Bayswater 64%, Loy Yang A 79%
AGL generation portfolio emissions (2024 – 2050)	135 $MtCO_2e$

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.

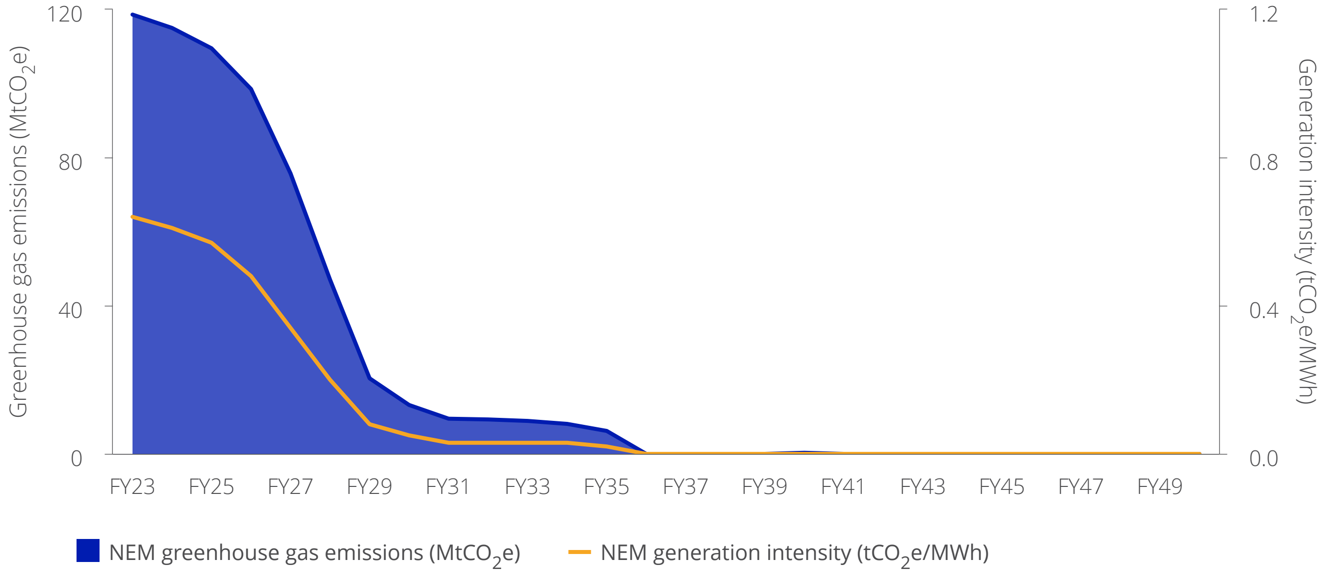
Scenario IV (1.5 degree goal): NEM generation by technology type



Scenario IV (1.5 degree goal): NEM capacity by technology type



Scenario IV (1.5 degree goal): NEM greenhouse gas emissions and generation intensity



Appendix A – Scenario analysis (continued)

A3. Implications for system reliability and affordability

Outcomes in the four modelled scenarios represent significant differences from the current state of the NEM. In each scenario, large volumes of new generation must be commissioned, much of which represents greenfield projects that requires new transmission infrastructure to be built in order to connect to the NEM. The scale of this infrastructure replacement presents challenges to the security and reliability of the grid, and the affordability of electricity supply. These challenges are exacerbated by more ambitious scenarios, which seek to replace existing infrastructure in a significantly accelerated timeframe.

Identified risks to the delivery of modelled pathways

Several risks to the delivery of modelled pathways have been identified on page 12 of this report.

These include a number of risks relating to the timely delivery of new projects including: inappropriate market structures, lack of access to capital, onerous approval processes and other regulatory barriers, discoordinated generation and transmission investment, social licence risk, geopolitical and physical risks, supply chain and logistical risks, and inability to access specific materials, resources, and work force.

These risks have been identified as posing challenges to the delivery of new infrastructure projects required for the energy transition.

Because of the need to deliver more new projects on an accelerated timeframe, the achievement of scenarios III and IV are much more susceptible to these delivery risks.

Security and reliability implications

In each modelled scenario, system reliability is maintained if all projects are committed and commissioned on time and in a coordinated way. However, the achievement of Paris-aligned scenarios (III and IV) is more sensitive to identified risks, as more new projects must be delivered on an accelerated timeframe.

In the event of increased reliability risk, existing dispatchable plant will likely be required to stay connected to the NEM. Increased reliability risk may occur as a result of an inability to connect new generation and/or transmission in time to replace ageing dispatchable plant, or if other variables change such as an increase in operational electricity demand.

Other risks to the continuing secure operation of the grid are challenging to forecast. In its Engineering Framework for the NEM, AEMO has identified a number of conditions which will dramatically change the operation of the grid, many of which present material technical challenges for the market operator to overcome. The market operator has advised that more ambitious Paris-aligned scenarios accelerate the emergence of these risks, including fewer synchronous generators online, ubiquitous rooftop solar, and extensive grid-scale variable renewable generation.

Although AEMO has identified mitigating actions that can be taken to address some of these risks, it is not yet clear that these can be implemented on timelines that are consistent with the modelled Paris-aligned decarbonisation pathways.

Affordability and system cost implications

More ambitious Paris-aligned scenarios require significantly more forward investment in new generation and transmission projects. These pathways also require incentives (such as carbon prices or other government support mechanisms) in order to drive development at the speed required to meet modelled carbon constraints.

The way that these costs are recovered and subsequent implications on energy affordability are not clear. However, in the absence of significant market reforms, it is likely that in the short-term overall system costs would be much higher in order to recover these capital costs. Forward investment also reduces potential benefits from anticipated cost declines and improved optionality from later investment.

Under more ambitious scenarios, the delivery of efficient wholesale prices and minimisation of overall system costs is heavily reliant on an orderly transition and the delivery of new projects according to the modelled pathway.

Delays in new projects, in particular new transmission and generation projects to replace existing dispatchable plant, would have the impact of increasing price volatility as well as the risk of higher average wholesale prices. To minimise system costs in these scenarios, governments may implement policies that retain existing dispatchable plant, which may impact on the delivery of the carbon constraint.

Supply chain constraints, materials and labour shortages, planning delays, and external factors such as monetary policy settings, may also impact on the cost of new projects when compared to the ongoing operation of existing infrastructure. In the absence of appropriate policy settings to overcome these impacts, more ambitious Paris-aligned pathways may therefore be more expensive than continuing to use existing infrastructure on a total system cost basis.

At the same time, reliance on thermal generation creates exposure to other risks that may impact on total system costs and affordability, such as the impact of global commodity prices and the effect of forced outages on the broader NEM.

Limitations

Forward looking statements

AGL's 2022 Climate Transition Action Plan (CTAP) has been prepared for submission to a non-binding shareholder advisory vote at the 2022 Annual General Meeting (AGM) of AGL. It has not been prepared as financial or investment advice or to provide any guidance in relation to the future performance of AGL. Nothing in this CTAP should be construed as either an offer or a recommendation to buy or sell AGL shares.

This CTAP includes a number of forward-looking statements. The words 'anticipate', 'believe', 'expect', 'project', 'forecast, 'estimate', 'likely', 'intend', 'should', 'could', 'may', 'will', 'commit', 'target', 'plan' and other similar expressions are intended to identify forward-looking statements. Any forward-looking statements are based on the current expectations, best estimates and assumptions of AGL's management as at the date of preparation, but they may be affected by a range of factors which could cause actual results to differ materially, including but not limited to, actual energy demand, regulatory and policy development, the development of technology and general economic conditions. These forward-looking statements are not guarantees or predictions of future performance, and are subject to known and unknown risks, uncertainties and may involve significant elements of subjective judgement and assumptions as to future events that may or may not be correct and be beyond AGL's control. Except as required by applicable regulations or by law, AGL does not undertake any obligation to publicly update or review any forward-looking statements, whether as a result of new information or future events. Forward-looking statements speak only as of the date of this CTAP. Past performance cannot be relied on as a guide to future performance. No representation or warranty, express or implied, is given as to the accuracy, completeness or correctness, likelihood of achievement or reasonableness of any forward-looking information contained in this CTAP. AGL cautions against reliance on any forward-looking statements.

Scenario analysis

This CTAP considers a number of different scenarios. These scenarios are not predictions of what is likely to happen or what AGL would prefer to happen. Rather they explore the possible implications of different judgements and assumptions concerning the nature and pace of the energy transition in Australia. There are inherent limitations with scenario analysis. Assumptions may or may not be, or prove to be, correct and may or may not eventuate, and scenarios may be impacted by factors other than assumptions made. Further, the scenarios do not provide a comprehensive description of all possible outcomes. The scenarios cover a range of possible outcomes to assist in the formation of judgements about the uncertainty surrounding the energy transition in Australia. AGL also considers a wide range of other analysis and information when forming its long-term strategy.