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Hello everyone.

This is James Hall speaking, General Manager of Corporate Finance at AGL.

Thank you for listening to this presentation on AGL's approach to reporting under the Task Force for Climate-related Financial Disclosure, or TCFD, framework.

We have had a great deal of interest in this process from stakeholders of many different kinds, and we are very grateful for the input we have received.

Our objective today is to explain the scenario modelling we have undertaken for the 2020 report.

This follows the commitments we made last year to extend the timeframe of the report – which we have done, to 2050 – and to expand the analysis to include a scenario in which temperature rises were limited to 1.5 degrees above pre-industrial levels.

I do want to note that the modelling was undertaken prior to the COVID-19 lockdown, but that – given the long term nature of the model – we do not believe the impacts we have seen on energy prices and economic activity would make a material difference to the outcomes.

We have modelled four scenarios in all – and in this presentation I am going to provide a preliminary view of the outcomes – including the emissions pathways and some of the opportunities that would arise in each case.

We want to answer as many questions as we can, and we are also looking for feedback ahead of publication of the final report in August.

AGL sees our TCFD reporting as a journey and we are already thinking about how we can improve and iterate the approach next year.

So, let's get going.

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TCFD analysis is an essential component of AGL's reporting

As Australia's largest electricity generator and carbon emitter, we have an important responsibility for clear disclosure, transparency and responsible transition

We recognise the large part we can play in Australia's transition to a low carbon economy


TCFD reporting deepens our assessment of climate and carbon risk and how our strategy considers decarbonisation

Our approach assesses how a range of forward-looking scenarios impact our business, and test our resilience

The 2020 modelling shows, under all scenarios:

- Significant decarbonisation of the Australian electricity sector by 2050
- AGL in effect achieving net zero emissions from electricity generation by 2050 or earlier
- AGL being resilient and positioned to benefit from opportunities created by the transition

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AGL considers reporting against the TCFD framework an essential tool to assist in managing climate risk within our business.

It provides a framework to assess how AGL's strategy considers, and can remain flexible under, various decarbonisation scenarios.

We are then able to use this scenario modelling to assist our portfolio planning, enterprise risk management and capital allocation processes.

As Australia's largest electricity generator and carbon emitter we of course have a large part to play in the responsible transition to a low carbon economy.

AGL accepts the science as outlined by the Intergovernmental Panel on Climate Change and remains committed to the objectives of the Paris Agreement.

Our Greenhouse Gas Policy published in 2015 committed AGL not to extend the life of its coal-fired power stations beyond their current technical lives, and not to invest in new coal power.

Since 2016, we've included climate risk and strategy disclosures in our annual reporting.

We subsequently have delivered year-on-year improvements in the depth and level of integration of these disclosures with our traditional financial reporting.

Before I talk more about the detail of this year's work, I want to highlight some of the key findings.

Under all scenarios, our modelling shows significant decarbonisation of the Australian electricity sector by 2050.

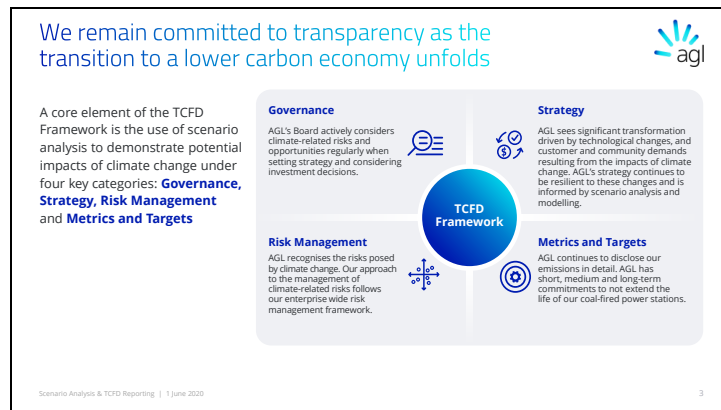
Under all scenarios, AGL in effect achieves net zero emissions by 2050, with more than 20 percent emissions reduction within five years, due to the closure of the Liddell Power Station.

Under all scenarios, there is significant opportunity for AGL and others to invest in renewable generation, grid scale storage, orchestration and behind the meter technologies.

AGL's strategy will continue to remain flexible to respond to the transition as customer needs, community expectations and technology develop and as government and regulatory policy evolves.

Irrespective of how the future unfolds, we are resilient and well positioned to capitalise on the opportunities created by the market transition.

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Let me briefly touch on the TCFD framework itself, and how its four key tenets apply at AGL.

First is governance.

For a business like ours, climate and the energy transition more broadly is so integral that it is a constant and key issue for the Board at all times.

Second is risk management.

Our approach follows our enterprise risk management framework, overseen formally by the Audit & Risk Management Committee.

Our TCFD approach at present primarily focuses on the strategic risk to AGL of the energy transition, as opposed to the specific physical risks that may arise as a result of climate change.

We anticipate physical risk will be a larger component of future reports.

Third is strategy.

We have three strategic priorities: Growth, Transformation and Social Licence, and the energy transition is a major consideration in the delivery of all three.

The TCFD report will assess how our strategy is likely to be impacted in each of the four scenarios.

Fourth is metrics and targets.

AGL continues to disclose its greenhouse gas emissions, including scope 1, 2 and 3 emissions, consistent with the requirements of the National Greenhouse and Energy Reporting Scheme, as well as participating in more than a dozen well recognised voluntary surveys.

In terms of targets, we have committed to a broad range of actions that will reduce emissions including:

- Providing the market with safe, reliable, affordable, and sustainable energy options
- Not building, financing, or acquiring new conventional coal-fired power stations in Australia or extending the life of existing coal-fired generation
- Improving the greenhouse gas efficiency of our operations, and continuing to invest in new renewable and near-zero emission technologies
- Making available innovative and cost-effective solutions for our customers such as distributed renewable generation, battery storage and demand management solutions
- Incorporating a forecast of future carbon pricing into all generation capital expenditure decisions, and
- Continuing to be an advocate for effective long-term government policy to reduce Australia’s emissions in a manner that is consistent with the long-term interests of consumers and investors.


Of course, AGL operates in a highly regulated environment.

Our portfolio is an integral part of the reliability and efficient functioning of the Australian energy market.

It is not practical for us to adopt unilateral positions that are inconsistent with broader market settings.

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Our approach to the 2020 scenario analysis reflected international standards and expert third-party input



TCFD Principles	Application										
<ul style="list-style-type: none"> • AGL developed scenarios “top down” to facilitate comparability with global and national scenario modelling and ensure the global context of the impacts of climate change were considered • The scenarios were developed to be consistent with the scenario development principles outlined in the TCFD framework • AGL engaged KPMG and Aurora Energy Research to support development of the scenarios and modelling to ensure they were robust 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #0070C0; color: white;">Plausible</td> <td>Each scenario was developed using a range of credible global and domestic sources including the AEMO 2020 Integrated System Plan and the Intergovernmental Panel on Climate Change RCPs and SSPs. *</td> </tr> <tr> <td style="background-color: #0070C0; color: white;">Distinctive</td> <td>The scenarios were developed to test a range of possible, and distinct, future outcomes and trajectories.</td> </tr> <tr> <td style="background-color: #0070C0; color: white;">Consistent</td> <td>The scenarios were developed using a consistent set of inputs including globally developed RCP and SSP narratives, aligned with domestic electricity sector input assumptions sourced from Aurora and AEMO.</td> </tr> <tr> <td style="background-color: #0070C0; color: white;">Relevant</td> <td>The scenarios address current issues being considered by the energy industry and broader economy in Australia. Each scenario provides insight associated with a decarbonisation pathway to facilitate consideration by AGL.</td> </tr> <tr> <td style="background-color: #0070C0; color: white;">Challenging</td> <td>Each scenario requires different aspects to be the material factor in decarbonisation, whilst offering insight into the challenges that would be faced.</td> </tr> </table>	Plausible	Each scenario was developed using a range of credible global and domestic sources including the AEMO 2020 Integrated System Plan and the Intergovernmental Panel on Climate Change RCPs and SSPs. *	Distinctive	The scenarios were developed to test a range of possible, and distinct, future outcomes and trajectories.	Consistent	The scenarios were developed using a consistent set of inputs including globally developed RCP and SSP narratives, aligned with domestic electricity sector input assumptions sourced from Aurora and AEMO.	Relevant	The scenarios address current issues being considered by the energy industry and broader economy in Australia. Each scenario provides insight associated with a decarbonisation pathway to facilitate consideration by AGL.	Challenging	Each scenario requires different aspects to be the material factor in decarbonisation, whilst offering insight into the challenges that would be faced.
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* RCP: Representative Concentration Pathway, concentration pathways for greenhouse gases and aerosols, demonstrating possible future emissions and radiative forcing (i.e. temperature increase) scenarios for the world until 2100, as defined by the IPCC
 SSP: Shared Socioeconomic Pathways, which describe how socioeconomic trends around the world may evolve over time, as defined by the IPCC (2017)

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Let's now look in some detail at how we formulated the four scenarios we have used this year.

We developed the scenarios "top down" to enable consistency across them and to enable comparison with international and national models.

On the slide you can see a summary of how the approach taken meets the five TCFD principles of plausible, distinctive, consistent, relevant and challenging.

We engaged independent external advisers, Aurora Energy Research and KPMG, to assist.

We used the IPCC's Representative Concentration Pathways and Shared Socioeconomic Pathways, then translated these into Australian scenarios and carbon budgets.


To do this, we utilised AEMO and Aurora input assumptions as well as other Australian research sources.

These input assumptions then informed our electricity sector market models.

Using expert independent consultants has helped deliver robust, referable and repeatable scenarios.

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Our four scenarios were based upon scenarios defined by the IPCC and AEMO



	Description	Temperature outcome (°C)	Global References		AEMO ISP Scenarios
			RCP	SSP	
Scenario A - National Targets	Current industry commitments and policy settings are maintained over the medium to long-term without material change Assumes AGL meets its Paris commitments of reducing emissions by 26% to 28% of 2005 levels by 2030	Not assessed	N/A	SSP3	Central
Scenario B - Response 2020	Policies and technology allow for a steady, market-led decarbonisation	1.7 - 3.2	RCP4.5	SSP2	Fast Change
Scenario C - Response 2030	Limited action over the short to medium term prior to stronger policy intervention for rapid decarbonisation from 2030	1.7 - 3.2	Blended (~RCP4.5) RCP6.0 (2020-2030) / RCP2.6 (2030-2050)	Blended SSP3 (2020-2030) / SSP1 (2030-2050)	Central and Fast Change
Scenario D - 1.5 Degree Limit	Coordinated, cooperative and immediate decarbonisation approach with combined government intervention, policy and market approaches to achieve rapid decarbonisation	0.9 - 2.3	RCP2.6	SSP1	Step Change

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All of those assumptions and interactions led to the four scenarios you can see here being modelled out to 2050.

Scenario A, National Targets, is one book end of the analysis.

It assumes the status quo.

We modelled current industry commitments and assumed policy settings are maintained over the medium to long term without material change.

As such it is the only one of the four scenarios modelled "bottom up" based on certain settings rather than top down to achieve a notional temperature limit.

Scenario B, Response 2020, models policy and technology which allows for a steady, market-led decarbonisation.

Scenario C, Response 2030, models delayed action prior to stronger policy intervention for rapid decarbonisation from 2030 to achieve a similar outcome to Scenario B.

Our other bookend is Scenario D, 1.5 Degree Limit.

It models a coordinated and immediate decarbonisation approach with combined government intervention, policy and market approaches to achieve rapid decarbonisation and deliver a limit on warming of as low as 0.9 degrees.

The modelling assumes a carbon constraint is applied to the NEM across Scenarios B, C and D to ensure the predetermined carbon budget for each scenario is met.

This is not an argument for or against such a constraint – it's a necessity of making the model deliver the desired warming outcome.

The model is policy agnostic: the carbon constraint is simply applied at the minimum cost level to drive the decarbonisation required to meet the budget.

The modelling process uses a 'net zero' rather than 'absolute zero' approach to emissions reduction, resulting in the need for some offsets in scenarios B,C and D to be used to meet the carbon budget in 2050.

It does not assume the development or deployment of any technologies not already in existence to achieve this.

I want to stress that any scenario modelling is by definition hypothetical.

The scenarios are not forecasts, predictions or sensitivity analyses.

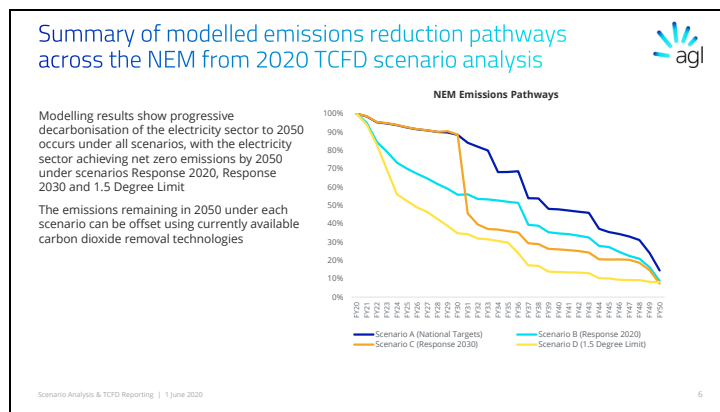
Scenario analysis is a tool to enhance critical strategic thinking and risk management.

In reality, we may see a combination of the different scenarios or none or that the drivers in each case are different to what we have contemplated or modelled today.

Either way, they're designed to give us insights, and help us recognise trends, identify risks and possibilities and act quickly on the opportunities we see – not to predict the future.

We'll regularly revisit and update the drivers – and the scenarios themselves – as the transition evolves.

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I'll now take you through some of the preliminary scenario modelling outputs.

I will focus on emissions output, which shows the rate at which decarbonisation occurs, and generation and demand mix, which shows investment opportunities available through the transition.

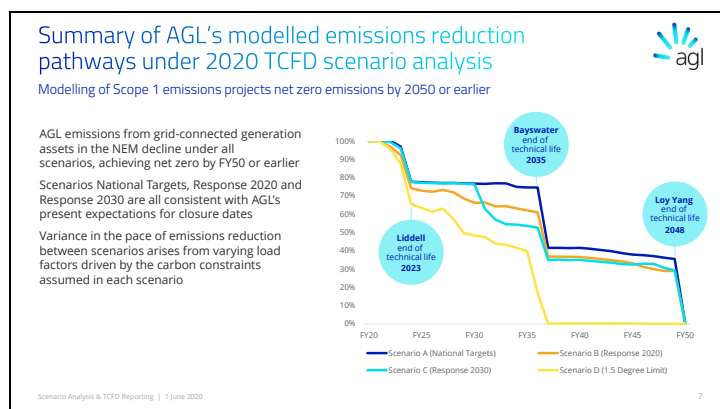
I'll start with the emissions reduction pathways across the National Electricity Market.

The graph on the right outlines the emissions trajectories from FY20 to FY50 under each of our modelled scenarios.

Unsurprisingly, progressive and substantial decarbonisation of the electricity sector to 2050 occurs under all four scenarios.

The variance in trajectories between each scenario is indicative of the speed at which decarbonisation occurs.

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Let's now have a look at what those scenarios mean for AGL's emissions and fleet.

The shape of the emissions pathways for AGL assets closely matches the trajectories for the NEM, albeit with larger step changes.

The graph shows that AGL will reach net zero emissions from NEM assets by 2050 or earlier.

This is as a result of generator retirements as already planned and lowered capacity factors as assets age and carbon constraints increase.

Note that the significant reduction in emissions of more than 20 percent around the mid 2020s driven by the staged closure of Liddell during 2022 and 2023.

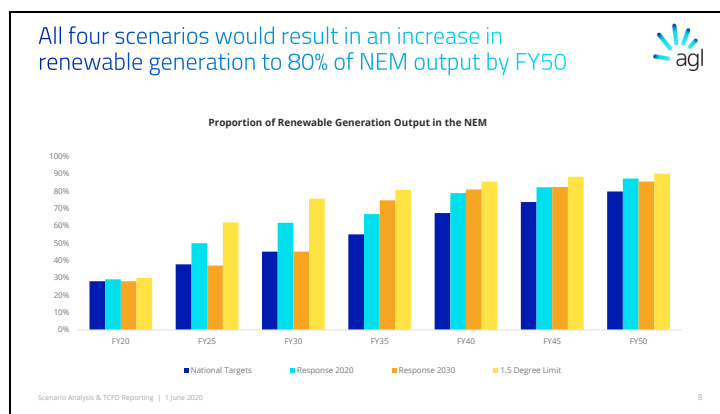
In scenarios A, B and C, generator retirements are consistent with our present expectations.

Only under Scenario D, would AGL Loy Yang need to close earlier in order to meet the constraints applied in the model.

The variance in emissions between these scenarios, especially from 2040 in scenarios A, B and C, arise from varying load factors driven by the carbon prices in each scenario.

The enduring nature of our assets, and their ability to keep operating even at these lower levels of output, is reflective of their relatively favourable position in the NEM cost stack.

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So what do all these scenarios mean for AGL and our strategy?

In simple terms, there is a huge opportunity to invest in or support the development of renewables, storage and firming technologies, as well as distributed energy behind the meter products and other low carbon technologies.

You can see in the graph here that under all scenarios the NEM will probably be deriving at least 50 percent of its energy from renewables by 2030 and 80 percent by 2050.

The transition to renewables as a result of technology developments and emissions reduction efforts means that our portfolio of large thermal generation and variable renewables is evolving.

This will accelerate.

Baseload generation is not constantly required at the same levels that it once was.

The market is now after dispatchable power to reflect a new supply-demand dynamic and the market is moving to embrace this capacity.

As such, our investments in flexible assets, including gas firming, hydro and grid-scale batteries, will enable the transition to renewables while capturing value for AGL as the market changes.

AGL has already heavily invested and continues to invest in renewable energy generation.

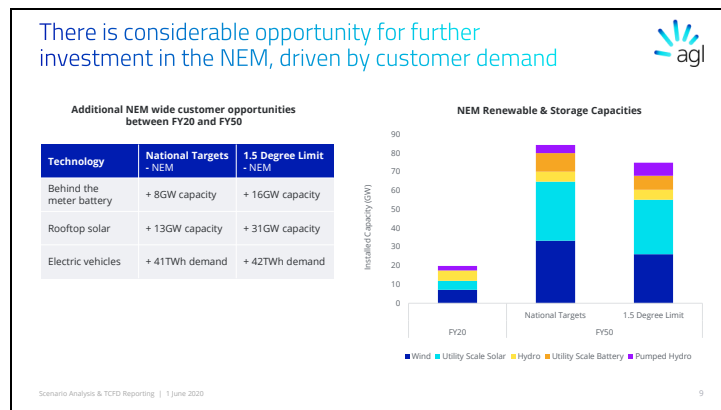
In the past decade we have increased our renewable energy generation by more than 300 percent to over 4.4 terawatt hours per annum.

In addition to the development of renewable assets, AGL has been developing cleaner firming capacity in the form of fast-start gas power and grid-scale batteries

AGL will continue to seek out these opportunities and invest or underwrite where economically feasible.

We will continue to use the TCFD framework to inform our strategy and investment decisions.

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This slide shows the opportunities for these kinds of investments throughout the NEM under our two book-end scenarios, National Targets and 1.5 Degree Limit.

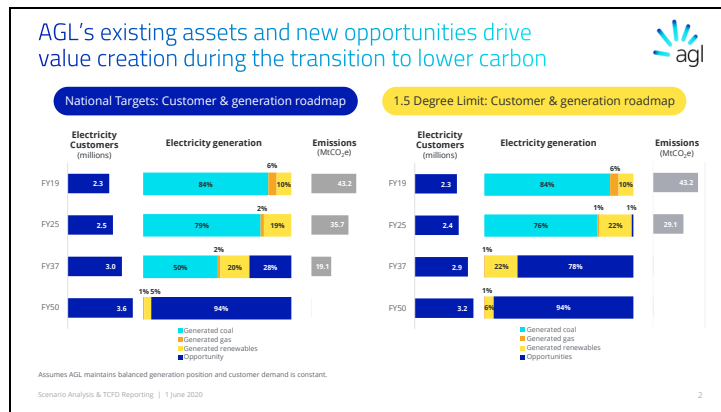
Our modelling shows that, over the next 30 years, the NEM will require a further 60 gigawatts of utility-scale renewable and storage capacity.

This is an enormous new investment opportunity, a sizeable part of which will be developed or supported by AGL.

Most of the new capacity will be wind farms and grid scale solar, while grid scale batteries will provide the firming capacity and the smoothing of increasing variable demand and generation in the grid.

This fundamental transition is underway driven by developments in customer needs, community expectations and technology, regardless of which scenario proves most realistic.

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Here we show a view of the size of the prize for AGL in the two book end scenarios, consider what AGL's generation volumes and emissions would look like under each scenario and compare that with what customer demand would be.

New opportunities (represented on the graphs as dark blue) arise as customer demand and numbers increase and older plants are retired.

This aligns with our current expectations of asset life, although in scenario D opportunities would occur earlier and are larger given the more rapid decarbonisation.

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Conclusion

AGL's business and strategy is resilient and flexible to adapt to all scenarios

- The full finalised report will be released on 13 August with our Annual Report
- The finalised report will include:
 - Full results, risks and opportunities analysis
 - Implied closure dates under each scenario
 - Quantum and type of renewable capacity investment necessary
 - Financial impacts – coal asset NPVs under the different scenarios
- The next steps in our TCFD journey will be defined via consultation with you our external stakeholders and the senior leaders within our business

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Broken Hill Solar Farm, NSW
Photo courtesy of AGL

The detailed scenario analysis work we have done this year has been insightful and constructive; and I am proud of what the team here have achieved.

AGL is an essential services provider operating in a complex, highly regulated and integrated electricity system.

As such it is important to model decarbonization across the NEM to understand the risks and opportunities of the carbon transition.

While the paths vary, our modelling shows the destination is clear:

- Decarbonization of the electricity system will be achieved by 2050 and is accelerating; and
- All scenarios present AGL with numerous opportunities for investment, driven by technology and customer demand.

And under each scenario we've found our business is resilient.

The full TCFD report will be published with our full-year results on 13 August.

It will contain comprehensive information, analysis and discussion on the assumptions, process and outcomes I've covered today.

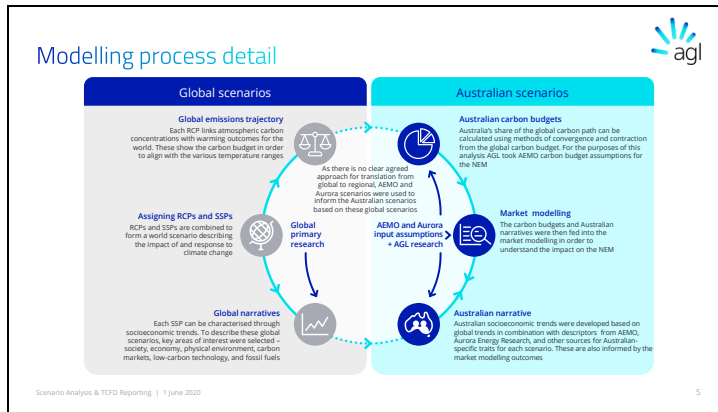
But as we finalise the report, we want to keep consulting.

So with that we'll now go to questions.

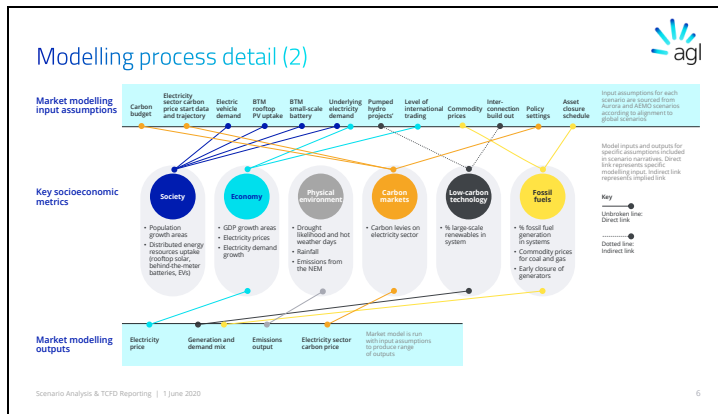
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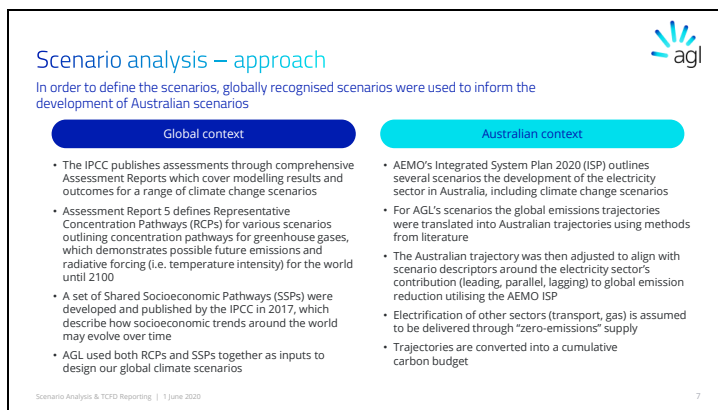
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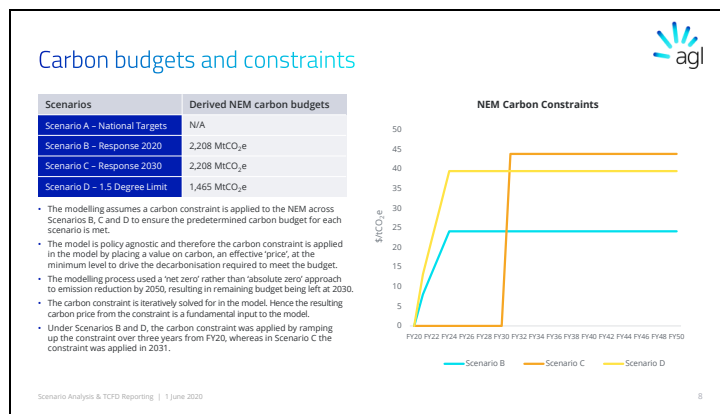
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Scenario assumptions and limitations




Alignment of scenarios to RCPs	This work has been undertaken with reference to the IPCC Assessment Report 5 (AR5), and uses the RCPs as outlined within. We note that the RCPs will differ in AR6 however AR6 is still under development and is not referenced.	NEM market structure	The electricity sector market modelling assumes that the market structure for the NEM does not change over the modelling period to 2050.
Translating global emissions trajectories into Australian carbon budgets	There are a range of methodologies for deriving Australian carbon budgets for the purposes of our analysis we have relied on AEMO's assumptions for Australia's contribution to global carbon reductions under each relevant RCP. There is a risk that other countries may not reduce emissions in line with AEMO's assumptions, or that Australia's share may be in excess of that described by AEMO. This risk has not been modelled. Carbon budgets associated with the AEMO scenarios do not assume the use of Kyoto carryover credits, and as a result this modelling does not assume their use.	Refit costs for coal power stations	The market model does not include refit costs for coal fire power stations. It was determined that the fairest approach to take in the modelling was to exclude that cost for all generators.
Role of other sectors in Australia	The role of sectors other than electricity in contributing to Australia's emissions reduction is out of scope of this modelling. We have relied on AEMO's assumptions for these. No economic modelling or impact of other sectors on the electricity sector has been performed. We note if mechanisms to achieve decarbonisation are required for other Australian sectors, this may have feedback loops and impacts on the wider economy and electricity market assumptions. These risks have not been modelled.	Physical climate change impacts	Modelling physical climate change impacts on the electricity sector (and broader economy) is out of scope for the purposes of this report, and physical climate change impacts have been considered as part of our scenario narratives only.
		General	The FY20 model outputs do not represent actual data and do not take into account the Loy Yang outage or the current pandemic.
		COVID-19	The impacts of the broad economic disruptions resulting from the COVID-19 pandemic have not been accounted for in AGL's scenario analysis as the modelling was undertaken prior to the outbreak reaching the pandemic stage. Further details on the overall impact of the pandemic on the modelling will be disclosed once that impact is better understood.

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Disclaimer and important information



<ul style="list-style-type: none"> The material in this presentation is general information about AGL's activities as at the date of this presentation. It is provided in summary form and does not purport to be complete. It should be read in conjunction with AGL's periodic reporting and other announcements lodged with the Australian Securities Exchange. This presentation is not an offer or recommendation to purchase or subscribe for securities in AGL Energy Limited or to retain any securities currently held. It does not take into account the potential and current individual investment objectives or the financial situation of investors. Before making or varying any investment in securities in AGL Energy Limited, all investors should consider the appropriateness of that investment in light of their individual investment objectives and financial situation and should seek their own independent professional advice. This presentation includes certain forward-looking statements that are based on information and assumptions known to date and are subject to various risks and uncertainties. Actual results may materially vary from any forecasts in this presentation. Future major expenditure remains subject to standard Board approval processes. 	Statutory Profit and Underlying Profit: <ul style="list-style-type: none"> Statutory Profit is prepared in accordance with the Corporations Act 2001 and Australian Accounting Standards, which comply with International Financial Reporting Standards. Underlying Profit is Statutory Profit adjusted for significant items and changes in fair value of financial instruments. Underlying Profit is presented with reference to the Australian Securities & Investments Commission's Regulatory Guide 230 "Disclosing non-IFRS financial information" issued in December 2011. AGL's policy for reporting Underlying Profit is consistent with this guidance. The Directors have had the consistency of the application of the policy reviewed by the external auditor of AGL Energy Limited. Amounts presented as Statutory Profit and Underlying Profit are those amounts attributable to owners of AGL Energy Limited.
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Contact 

James Hall
General Manager, Corporate Finance
Phone: +61 2 9921 2789
Mobile: +61 401 524 645
Email: jhall@agl.com.au

Chantal Travers
Head of Investor Relations
Phone: +61 2 9921 2132
Mobile: +61 428 822 375
Email: ctravers@agl.com.au

 agl.com.au  131 245  Download the app  agl.com.au/community  facebook.com/aglenergy  [twitter.com/@aglenergy](https://twitter.com/aglenergy)  youtube.com/aglenergy