The Mandala-Zurich Climate Risk Index

Assessing the risk of climate-related perils to the Australian energy sector

Research Report
13 November 2023

MANDALA

ZURICH

Foreword

The Zurich Insurance Group has protected individuals and businesses around the world for more than 150-years, including over a century in Australia.

Insurers are on the front line of risks relating to climate change, including natural disasters and extreme weather events.

For this reason, just as communities, businesses and policy-makers have increasingly looked to focus on prevention and mitigation, Zurich has sought to complement its traditional protection solutions by providing specialised insights and tools to support the identification, quantification and assessment of risks – including climate risks such as heat, flood and fire – in order to prioritise actions and investments that can materially improve resilience.

Zurich Resilience Solutions (ZRS) has been created to address this rapidly changing risk landscape. In the face of shifting weather patterns, ZRS can derive climate risk probabilities and insights on a specific asset or portfolio of locations.

A timely and relevant example of this exposure relates to Australia's energy generators. These assets underpin almost every aspect of economic and social interaction in the 21st century, however, as the report notes, much of the focus to date has centred on the risk of the energy grid to climate change, rather than on the risk of climate change to the grid.

Undoubtedly, the planet's sustainability and actions to transition from fossil fuels and carbon remain a critical priority.

This analysis, conducted in conjunction with Mandala Partners, hopefully represents a useful input into achieving an appropriate and resilient energy transition.

More broadly, it also serves to highlight the quantum of data and insights that are now available to understand the prevailing risk environment in order to shape and prepare our collective response.

Justin Delaney
Chief Executive Officer
Zurich Australia & New Zealand

Foreword

Economies across the world have begun the process of energy transition. The transition, from the fossil fuels of the 20th century to the renewable energies of the 21st century, will be a long, challenging and complex process. But this process is essential if we are to avoid the devastating consequences of an unfettered climate catastrophe.

The Mandala-Zurich Climate Risk Index comes at a critical time. In the past few years, we have seen ever higher temperatures, more damaging floods and more fearsome bushfires. For Australia, climate change is no longer a forecast but a reality. The impact on communities and industries is increasing and the effects are compounding.

At the same time, we are seeing record investment in renewable energy and the retirement of fossil fuel facilities across the country. Navigating this transition, while ensuring security and reliability, represents the core opportunity and central challenge to energy policy. While Australia works to transition its electrical grid, it must also consider the risk climate change places on the grid.

This is Mandala's core capability. We bring cutting edge economic analysis, bespoke data assets and leading strategy consulting techniques to empower decision-makers. We believe that a rigorous, evidence-led approach to the transition will ensure it is just, orderly and timely.

Mandala is proud to have partnered with Zurich to produce this report. We believe it is the first of its kind in our country, and we see it as an important contribution to the growing evidence base – to ensure the energy transition is as effective and efficient as possible. We hope it adds to the important conversations underway with industry, workers, government and the community.

This report highlights the growing risk of climate change to the grid, how that risk is spread across the grid, and high-level options for mitigating those risks.

Our work does not serve to warn against the energy transition – but to ensure the transition is a success. With more extreme weather events on the horizon, we have no time to waste.

Amit Singh
Managing Partner
Mandala

Executive Summary

The Australian energy grid is critical to industry, consumers and the green transition

Australia's energy industry has long been significant to the nation's economy, and this will continue to be the case into the future.

However, the industry is undergoing significant change in the face of shifting weather patterns caused by climate change.

On the demand side, electrification, a growing hydrogen industry and a significant future fleet of Electric Vehicles (EVs) will drive up future demand for electricity.

On the supply side, the Australian government has committed to boosting renewables to 82% of the grid by 2030. This means a significant grid transition.

What happens to the Australian energy grid in the coming years will shape the Australian industrial landscape, our supply chains, our communities and the nation's ability to achieve its climate objectives.

Climate change affects the stability and efficiency of the grid, leaving Australia vulnerable to growing climate risk

In the face of climate change, government must consider the growing impact that changing weather patterns and extreme events will have on the grid. Government policy has so far focused on the risk of the grid to climate change but has focused less on the risk of climate change to the grid.

Climate change is already impacting the Australian grid, as seen in the price spikes of June 2022 and the Victorian bushfires of 2009.

To properly understand the risk of climate-related perils to the grid, Mandala and Zurich have partnered to develop the ***Mandala–Zurich Climate Risk Index***. This index uses IPCC climate modelling along with a climate impact assessment to understand the unique risks faced by each individual generator in the grid.

The analysis found that currently, more than a quarter of the grid is in the highest three climate risk categories. This is set to rise to around 35% of generation capacity by 2050, with nearly 40% of generation assets experiencing increased climate risk over this period.

It also found that risk varied significantly by geography and generator type. Western Australia and the Northern Territory, whose electricity grids run separately from the National Electricity Market (NEM), are particularly vulnerable. Solar power and natural gas similarly face significantly higher climate risks than other generators.

More work must be done to ensure the grid is resilient to the reality of climate change

Significant investment must be made to ensure Australia can deliver on its renewable energy targets and ensure its infrastructure can handle the many perils imposed on it by climate change.

Existing infrastructure must be upgraded to increase its resilience to the impacts of extreme weather – such as flood, fire and heat. There should be emphasis placed on the importance of site planning due to the geographic variability of climate change impacts. This includes achieving balance between utilising natural elements that will enhance renewable generation capacity, whilst navigating the elements that can conversely reduce or halt their efficiency. Site planning should also include location diversification for large generation assets to ensure widespread disruption is reduced in the event of a major localised event.

Government should ensure strengthening the grid is a major pillar for its climate change scenario planning and funding prioritisation given the significant ramifications energy instability could have on households, businesses and major industries.

1 **The Australian energy grid is critical to industry, consumers and the green transition**

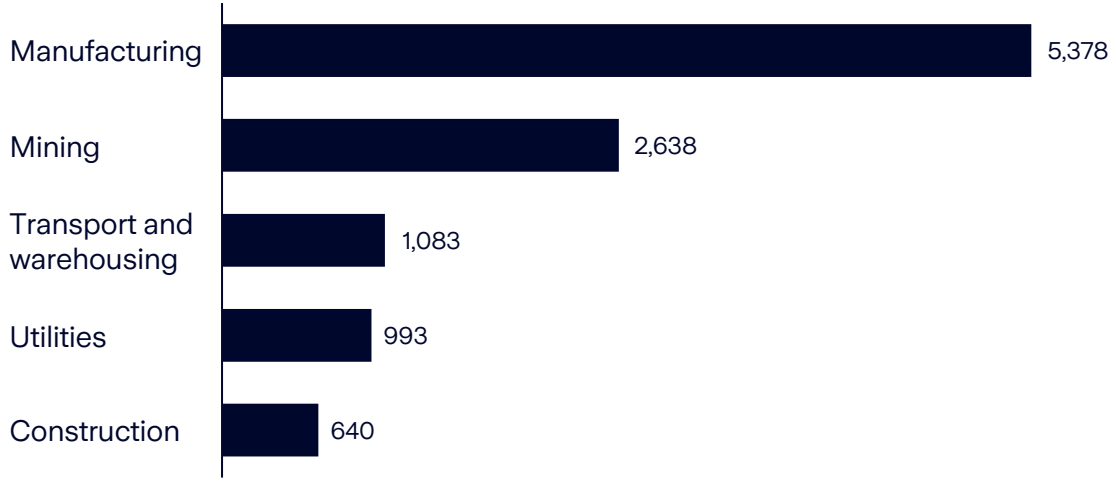
2 Climate affects the stability and efficiency of the grid, leaving Australia vulnerable to growing climate risk

3 More work must be done to ensure the grid is adapted to the reality of climate change

The energy grid shapes and supports industry and consumers across the economy

Exhibit 1: Australian energy spending by critical sectors

$ millions, 2017-18



The energy industry is a critical component of Australian industry where it is used for lighting, heating, cooling, operating equipment and appliances. In 2017-18, the manufacturing sector spent $5.4 billion on electricity, while the mining sector spent $2.6 billion.

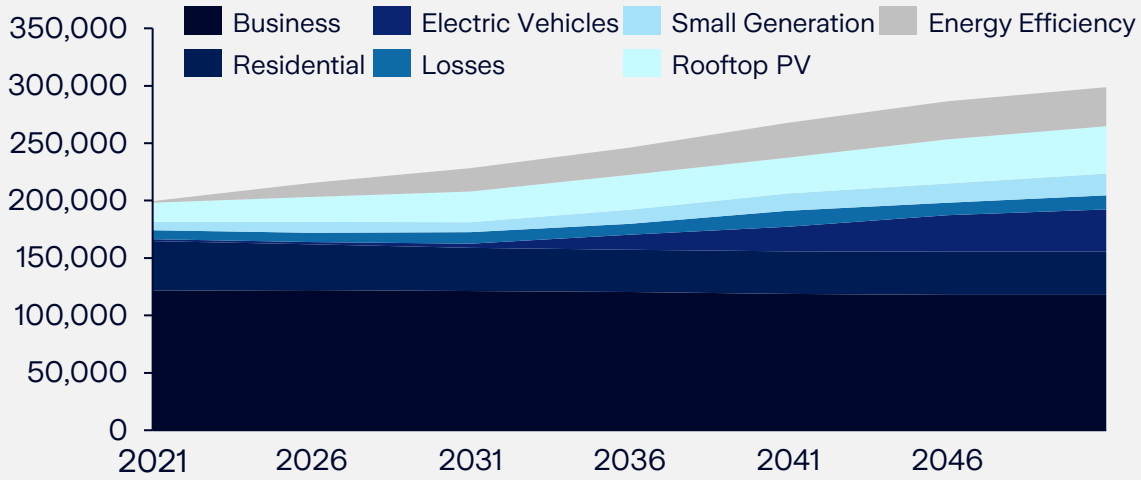
The Australian electricity market is split into sperate grids, which individually operate a market that sets a price for electricity. The eastern and southern states are connected in the National Electricity Market (NEM). Western Australia has two separate interconnected systems in the southwest and northwest, along with 35 smaller girds. The Northern Territory has three smaller, separate electricity systems.

Source: ABS (2017)

As the green transition accelerates, demand for electricity will grow at 1.4% annually to 2050

Exhibit 2: Australian NEM energy demand to 2050

GWH, annual consumption



Grids across Australia are embarking on a significant transformation, with up to 62% of the NEM's coal fleet expected to close by 2033. However, at the same time, the Australian Energy Market Operator (AEMO) forecasts overall consumption will grow, driven by economic activity, population growth, electrification across all sectors and emergence of a domestic hydrogen industry. Residential consumption is forecast to increase 31% in the next decade, driven by growth in residential dwellings and Electric Vehicles (EVs). By 2032-33, residential EVs are projected to add between 8% and 21% to residential consumption. Business consumption is expected to grow by 44% in the next decade, driven primarily by business electrification and hydrogen production.

Source: AEMO (2023)

Australia's grid policy has prioritised transitioning to renewables and minimising costs for end users

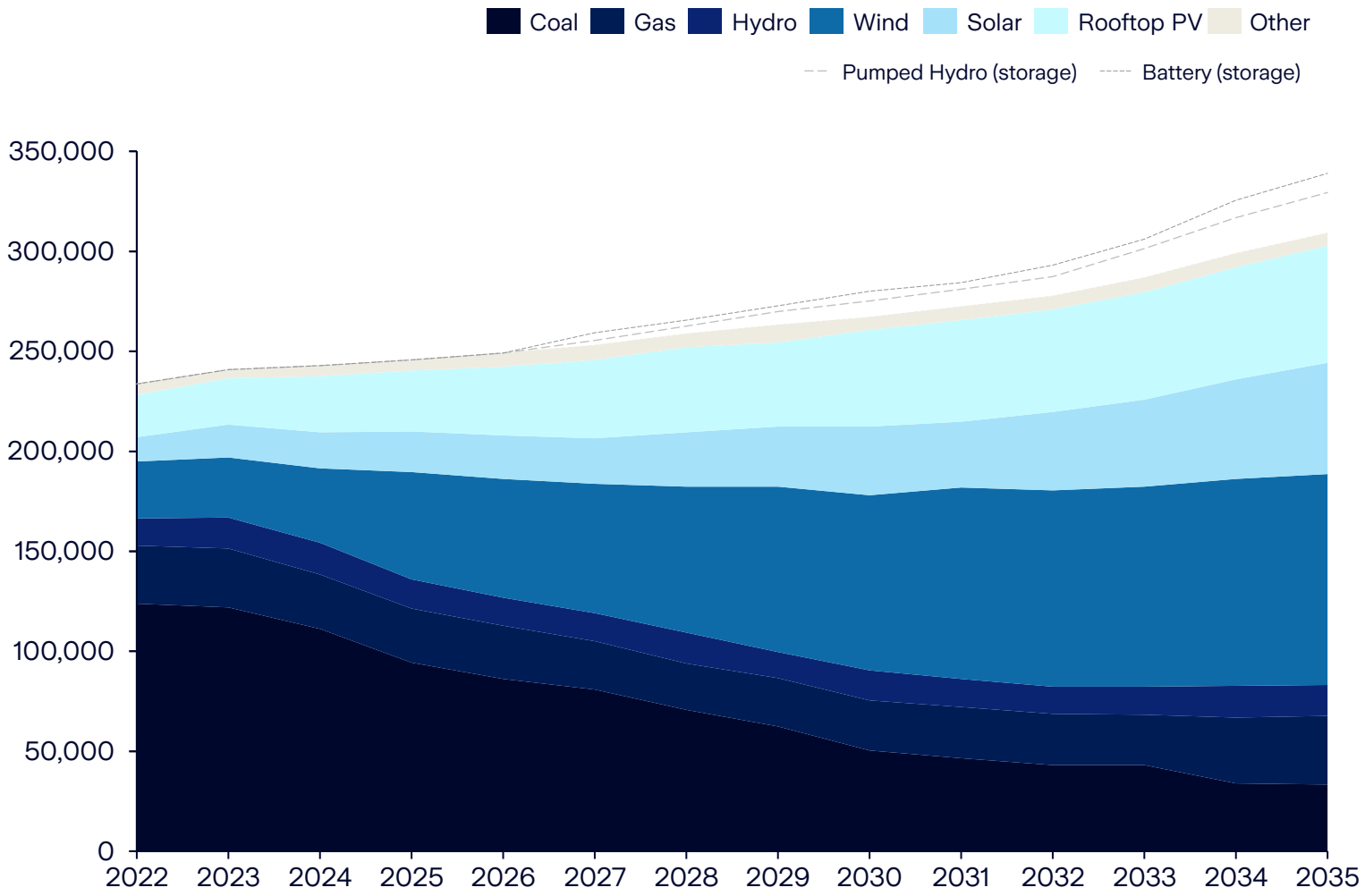
The last decade of energy policy has focused on transitioning to renewable energy sources and reducing prices for consumers. While prices have steadily climbed during this period, policies to transition the Australian grid have been fruitful.

During this period, the capacity of electricity generation from renewable sources has increased 215% from 26,700 GWh of generation in 2011-12 to 84,000 GWh in 2021-22. Under the Renewable Energy Target, this transition is required to accelerate with the goal to boost renewables to 82% of the grid by 2030.

This transition has been supported by the Australian Government's green bank, the Clean Energy Finance Corporation (CEFC), which has invested more than $12.7 billion in large-scale renewable and transmission-related projects during the last 10 years. The Australian Government's October 2022-23 budget included $20 billion for its 'Rewire the Nation' program, a National Reconstruction Fund of $15 billion and the Powering the Regions Fund of $1.9 billion. Likewise, state governments have made numerous significant investments in energy infrastructure including renewable projects, transmission upgrades, storage capabilities and jobs plans.

Exhibit 3: Australian energy supply, sources of generation to 2035

GWh



Source: DCCEEW (2022)
Note: Above figure shows modelled projections for sent-out generation by fuel type.

1 The Australian energy grid is critical to industry, consumers and the green transition

2 Climate affects the stability and efficiency of the grid, leaving Australia vulnerable to growing climate risk

3 More work must be done to ensure the grid is adapted to the reality of climate change

Climate change has already impacted power generation in Australia

In June 2022, the monthly average spot price for electricity hit above $350/MWh. In response, the AEMO suspended the entire NEM, declaring the spot market had become “impossible to operate”.

June 2022 was a case study in the vulnerability of the energy grid, showing how a system already disrupted by global factors can be tipped into chaos due to climate-related factors.

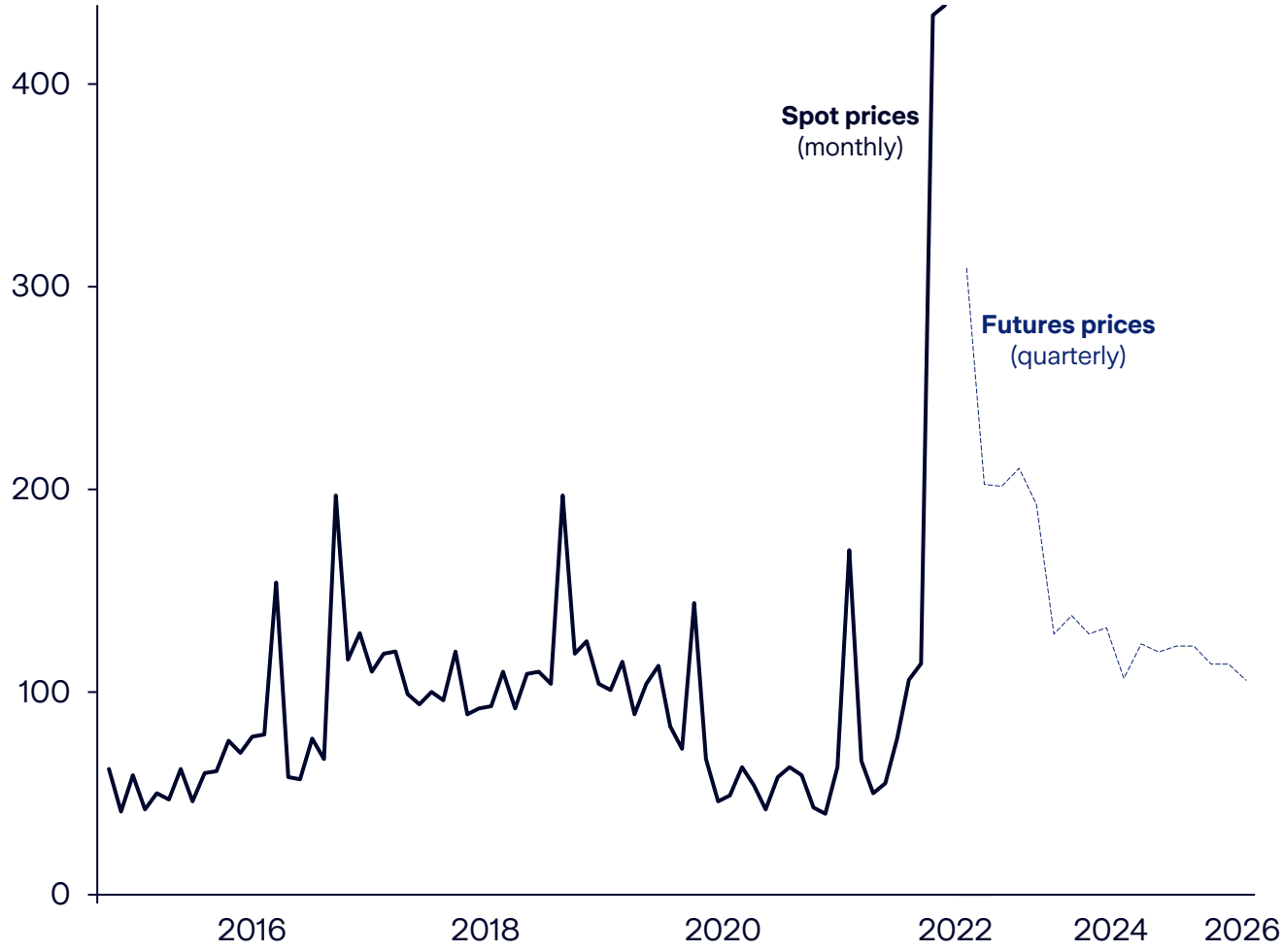
Driven by Russia’s invasion of Ukraine, demand and prices for thermal coal sharply increased. Other coal generators faced further disruption due to staff shortages and the impacts of La Niña on coal production. Lower-than-expected power generation from renewables also contributed to the overall price increase as adverse weather reduced the efficiency of solar generation. Meanwhile, total demand from the NEM was higher than in previous years. Exceptional rainfall and a series of cold fronts had impacted Queensland and Victoria and led to relatively high total demand from the period.

As these factors drove up prices, the AEMO implemented a price cap for a few days. This led to generators withdrawing from the market and caused the AEMO to suspend the NEM.

Source: RBA (2022); AEMO (2022)

Exhibit 4: June 2022 was a case study in the vulnerability of the energy grid to climate change

$/MWh, monthly spot prices, population-weighted average



Source: RBA (2022); Mandala analysis

Black Saturday bushfires

The 2009 Black Saturday bushfires in Victoria devastated more than 450,000 hectares of land, 173 people tragically lost their lives and more than 400 were injured. A Royal Commission into the event found that several fires were caused by failed electricity assets, including the Kilmore East-Kinglake fire which killed more than 100 people and resulted in the biggest class-action settlement in Australian legal history at the time. The fires also caused loss of power for up to two weeks in some cases, which significantly hindered relief efforts.

Numerous grid adaptations were made to ensure infrastructure would be less likely to cause bushfires and more resilient in the event one occurs. A technical taskforce was formed, with the government investing $750 million in a Powerline Bushfire Safety Program. Over 700km of transmission line was replaced with underground or insulated conductors. Powerlines were also protected through a combination of Rapid Earth Fault Current Limiters (REFCLs) and Automatic Circuit Reclosers (ACRs). The government has also piloted new Early Fault Detection (EFD) technology, which monitors powerlines for network asset damage or deterioration, vegetation encroachment and other early onset electric faults that may eventually cause fires, supply outages, or both.

Source: Victorian Government (2009)

We used Zurich's geospatial climate risk modelling to assess the risk to individual electricity generators in Australia

Method Stage

Explanation

Mandala developed a dataset of Australian power generators from three primary sources: AEMO data provided to The National Map, the Global Power Plant Database from the World Resources Institute and the Open Infrastructure Map.

We combined these sources and validated inconsistencies through desktop research. This dataset consisted of the location of each plant along with its maximum output and method of generation.

Zurich's capabilities in global exposure analysis were used to determine the climate risk faced by each power plant. Established IPCC modelling of physical climate risks was utilised to develop a database of climate hazards under a range of scenarios. This modelling allows Zurich to generate a climate risk rating from 'low' to 'very high' across 23 hazard metrics in nine peril categories (e.g. drought and flood) for each $10m^2$ of the globe. This data provided a ranking for each individual generator from 'low' to 'very high' for the impact posed by each climate peril.

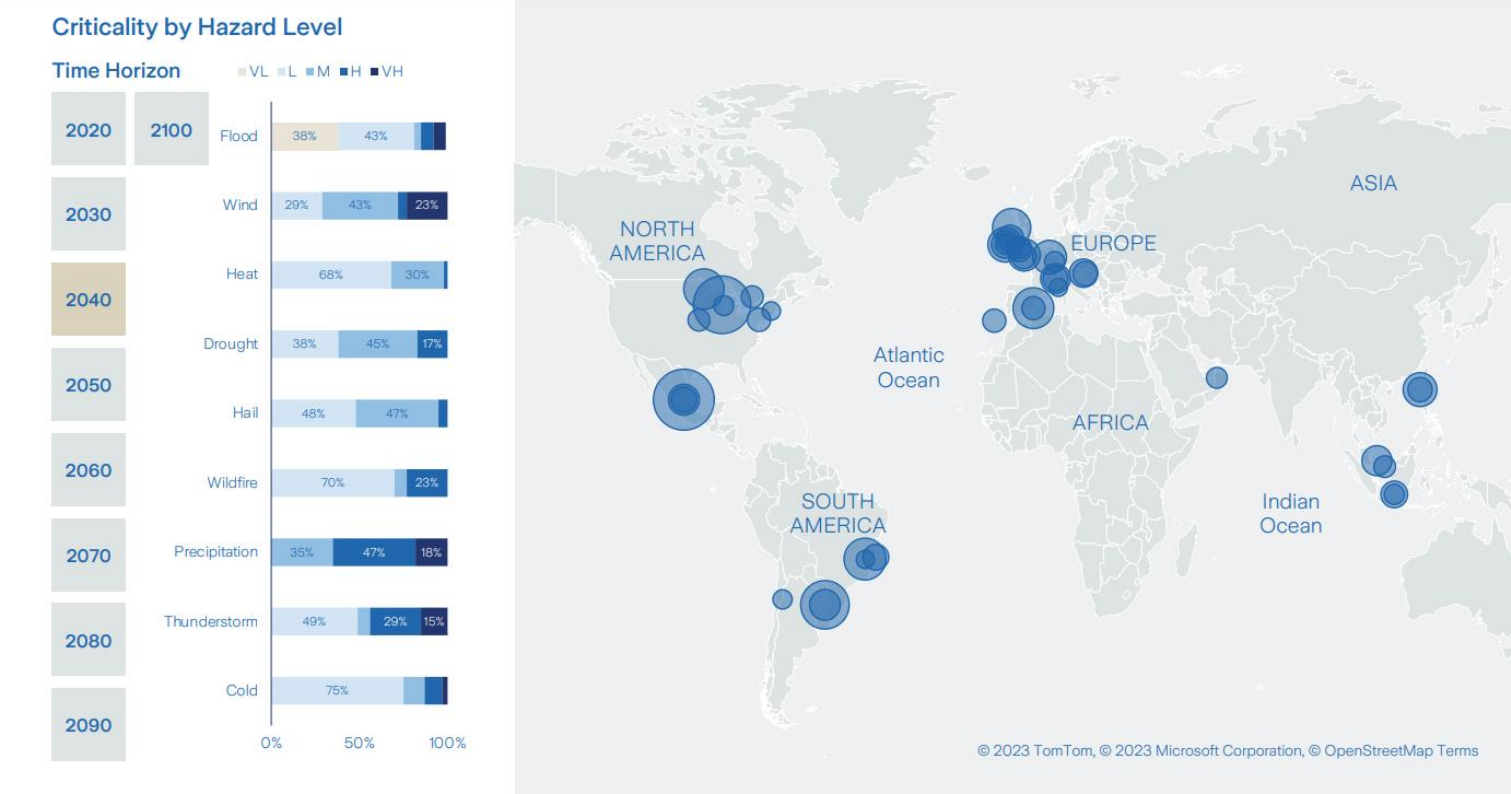
We then developed an impact assessment that determined the risk a particular climate peril would have on each generation type. Each generation type and climate peril combination was assigned a value of 'low' to 'very high', reflecting the impact a particular climate peril would have on the operations of that generator. This was to ensure that calculations of climate risk would accurately reflect impact on a generation type. For example, drought has significantly more impact on hydropower than wind power.

An index was then developed for each generator in the database. This calculation consisted of converting the ratings of the impact and risk assessment from 'low' to 'very high' to a 1-4 scale. The value of the risk and impact for each generator were then multiplied together.

For example, if a particular solar farm had a 'very high' risk of hail (a value of 4) and solar farms have a hail impact score of 'high' (a value of 3), then the index for that particular farm would be 12.

Zurich Resilience Solutions (ZRS)

ZRS provides insights and solutions to help organisations proactively manage and build resilience to traditional and evolving risks, such as climate change and cyber.



Global exposure analysis

ZRS global exposure analysis transforms location or asset data into deep climate risk insights.

Through a customised and interactive dashboard, businesses and asset owners can understand the probability that climate risks – such as heat, flood and fire – may impact a specific asset or portfolio of locations over different time horizons using three IPCC-based climate scenarios.

These insights quantify and contextualise climate exposure to ensure risk can be understood, tracked and shared in order to appropriately prioritise actions and investments.

Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6

Climate can impact both the stability and efficiency of the grid and will affect various forms power generation differently

Exhibit 5: Impact risk assessment

	Wind	Flood	Heat	Storms	Drought	Bushfire	Hail	Explanation
Coal								Coal plants require significant amounts of water to function, making water availability critical. Hail can impact asbestos cladding and pipe insulation often found at these sites.
Oil								Very similar to coal-powered stations because many of these stations have been converted from one to the other.
Natural gas								Flooding and debris can significantly impact electrical equipment, particularly in combined cycle plants with steam turbines close to the ground. Open cycle plants have reduced power generation in heat.
Solar								Solar plants are susceptible to damage from hail as well as debris carried in wind and storms. Extreme heat can reduce power output and wildfires can lead to inverter or cable fires.
Hydropower								Flooding is a significant concern. Spillways may not be designed for significant rainfall flow, topping hydro dams can cause dam failure, and high rain can cause excessive debris in water flow damaging turbines. Conversely, low water levels cause hydros to go offline.
Wind								High wind speeds can damage turbines and halt energy production, with low wind speeds also resulting in no generation. Storms can also significantly damage turbines with foundation or tower weakness.
Biomass/ biogas								Flood risk is significant. Deep biomass pits are difficult to extract water from and biomass itself is difficult to process and has reduced calorific value when damp. Like coal plants, these sites also require significant amounts of water to function.

Source: Zurich Resilience Solutions; Mandala analysis

More than 25% of Australia's power generation assets are in the three highest categories for climate change risk

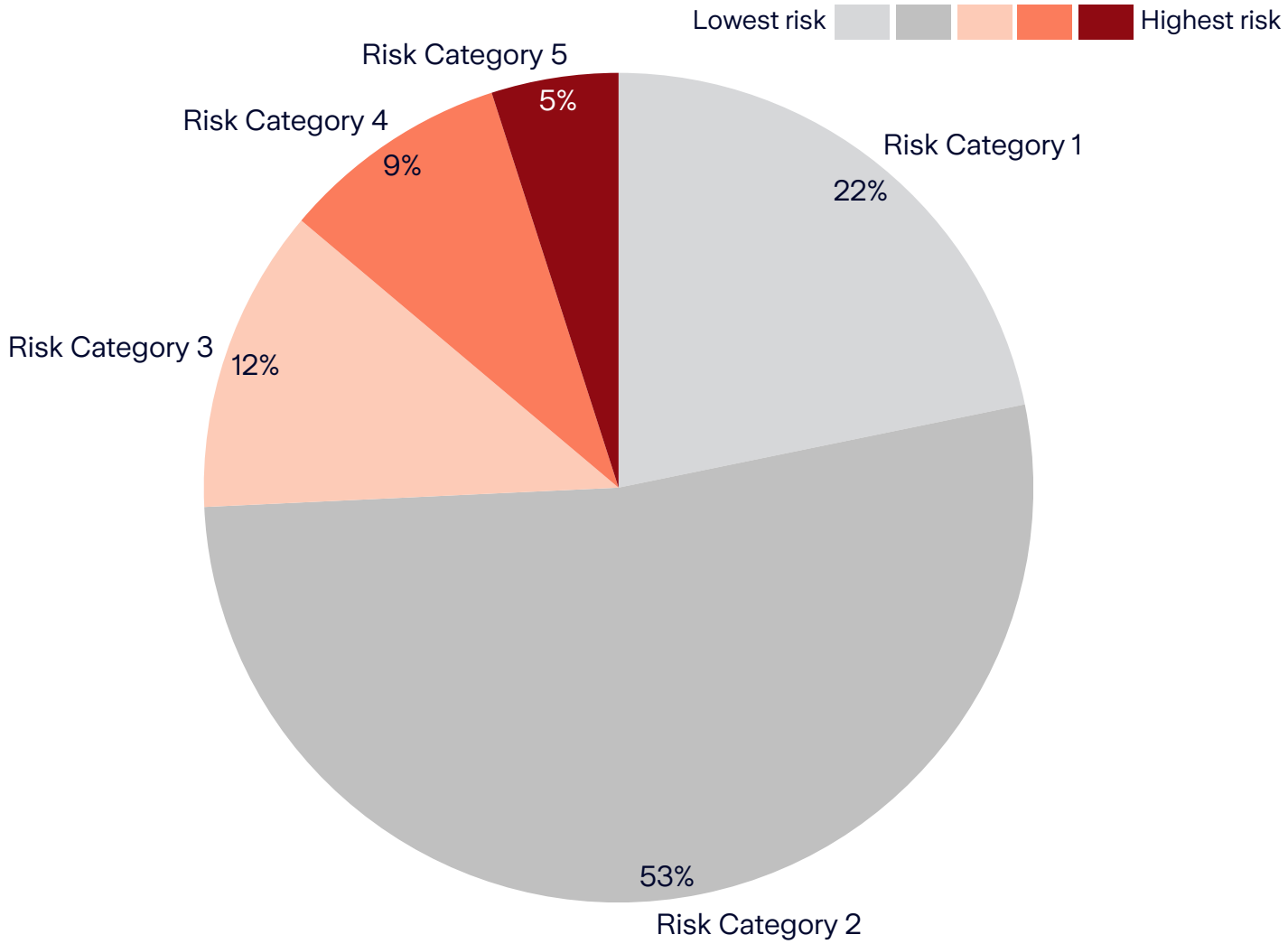
Mandala and Zurich found that Australia's generation assets generally faced relatively low levels of risk, with 75% of sites in the lowest two categories. However, there was still a significant amount of generation capacity in the highest three risk categories.

Risk categories were determined based on a threshold value for the index calculated for each generator.

- **Category 1 (Index value between 0 and 10):** one minor risk with a moderate level of impact or multiple minor risks with low level of impact
- **Category 2 (Index value between 11 and 15):** one moderate risk with a moderate level of impact or many minor risks with low to moderate levels of impact
- **Category 3 (Index value between 16 and 18):** one very high risk with a very high impact or multiple moderate risks with moderate impact
- **Category 4 (Index value between 19 and 23):** multiple high risks with high to very high levels of impact
- **Category 5 (Index value above 25):** multiple very high risks with a very high level of impact

Exhibit 6: Proportion of generators in each risk category

%, weighted by size of generation

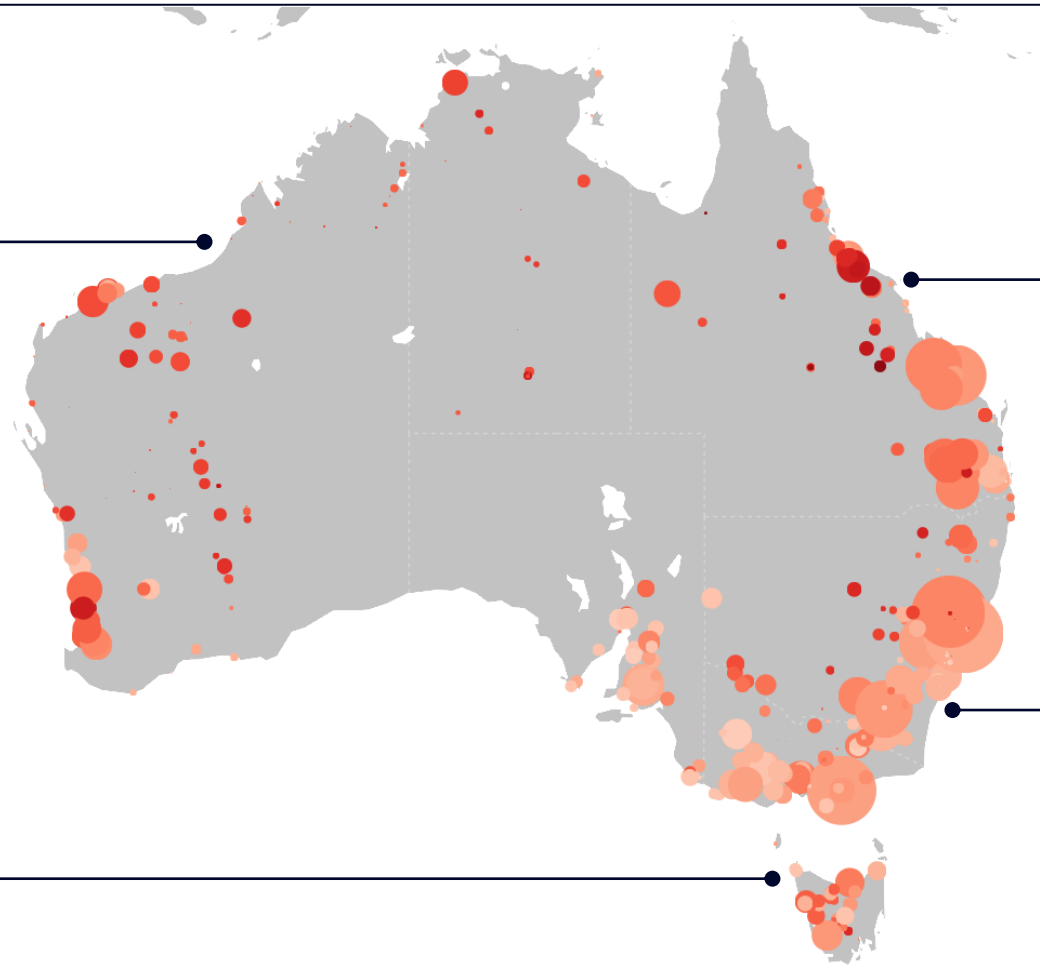


Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

Climate risk varies significantly across Australia and for different generator sizes

Exhibit 7: Climate risk across Australia

Value of risk index, size of dot reflects total generation capacity



Lower risk — Higher risk

Lower generation — Higher generation

Generation in the Northern Territory and Western Australia is separate from the National Electricity Market (NEM) due to distance. This means they run many separate grids that are vulnerable to losses in generation.

Generation in Northern Queensland is predominantly solar. These farms face significant risk from wind, wildfire and heat.

The largest generators in Victoria and New South Wales tend to be coal plants. These plants tend to face lower climate risk as they are less vulnerable to climate-related perils.

Tasmania relies on hydropower, which is vulnerable to both flooding and drought. An occurrence of either could severely impact generation.

Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

The energy grids in the Northern Territory and Western Australia face much higher climate risk than other regions

There is significant variation in the climate risk to electricity generation across Australia.

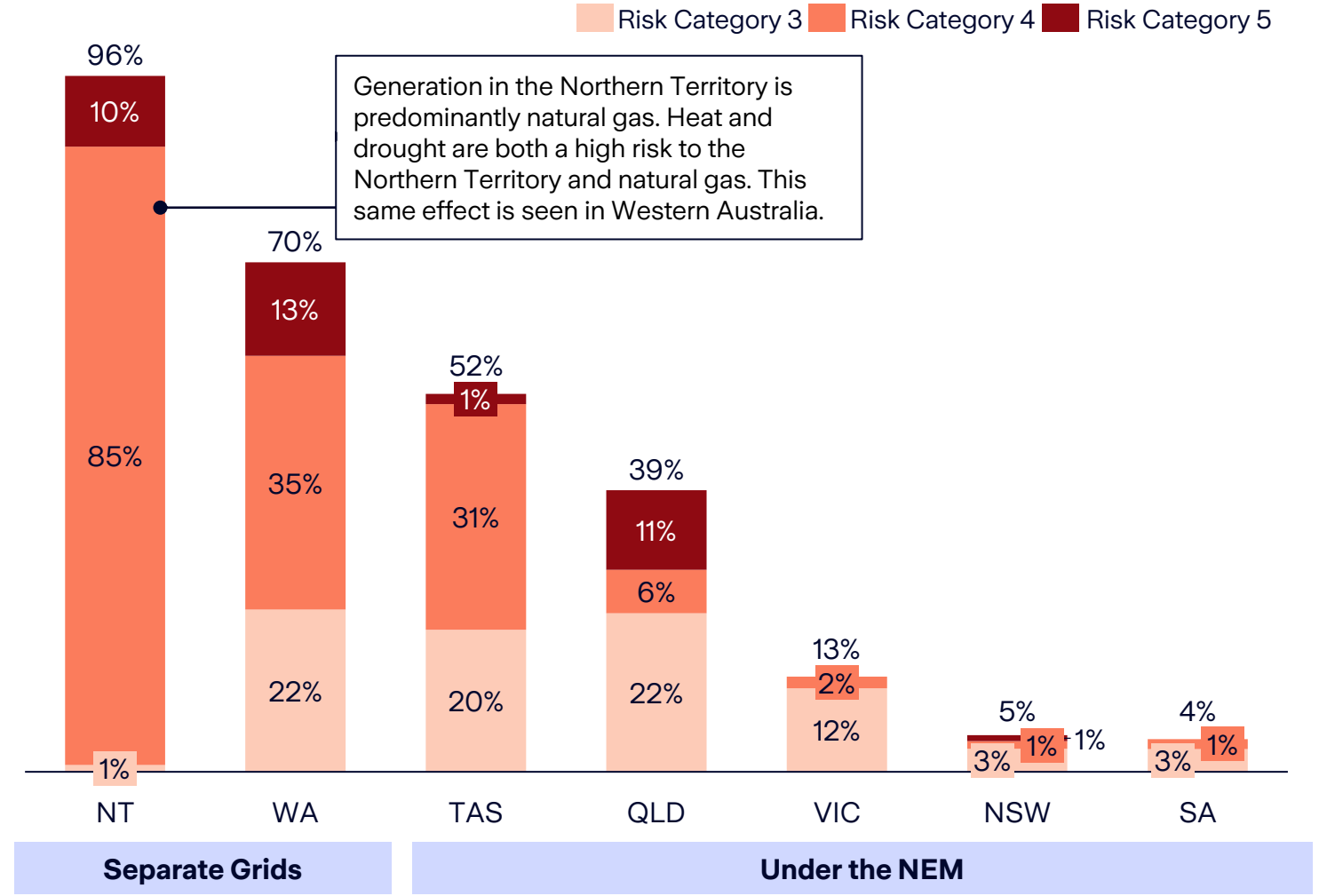
The Zurich-Mandala Index found that 96% of generation in the Northern Territory is in the highest three risk categories, including 85% of generation in risk category 4. Similarly, Western Australia and Tasmania were found to have 70% and 52% in the highest three categories, respectively. Across the rest of the states, the risks were relatively low.

Due to distance, Western Australia has two separate interconnected grid systems in the southwest and northwest along with 35 smaller grids. Similarly, the Northern Territory has three smaller, separate electricity systems. This means that risks in these grids must be offset by other generation in the jurisdiction, resulting in greater overall risk of climate in these regions.

The eastern and southern states are connected in the National Electricity Market (NEM). This means that grid risks in Queensland, Tasmania and Victoria can be offset by the relatively low risk states of South Australia and New South Wales.

Exhibit 8: Climate risk by region

%, weighted by size of generation



Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

Solar generation is currently most consistently at risk, while coal and biomass are least at risk across Australia

The risk posed by climate perils varies significantly by generation type. Based on the location of current generation sites, solar and natural gas face the highest risk.

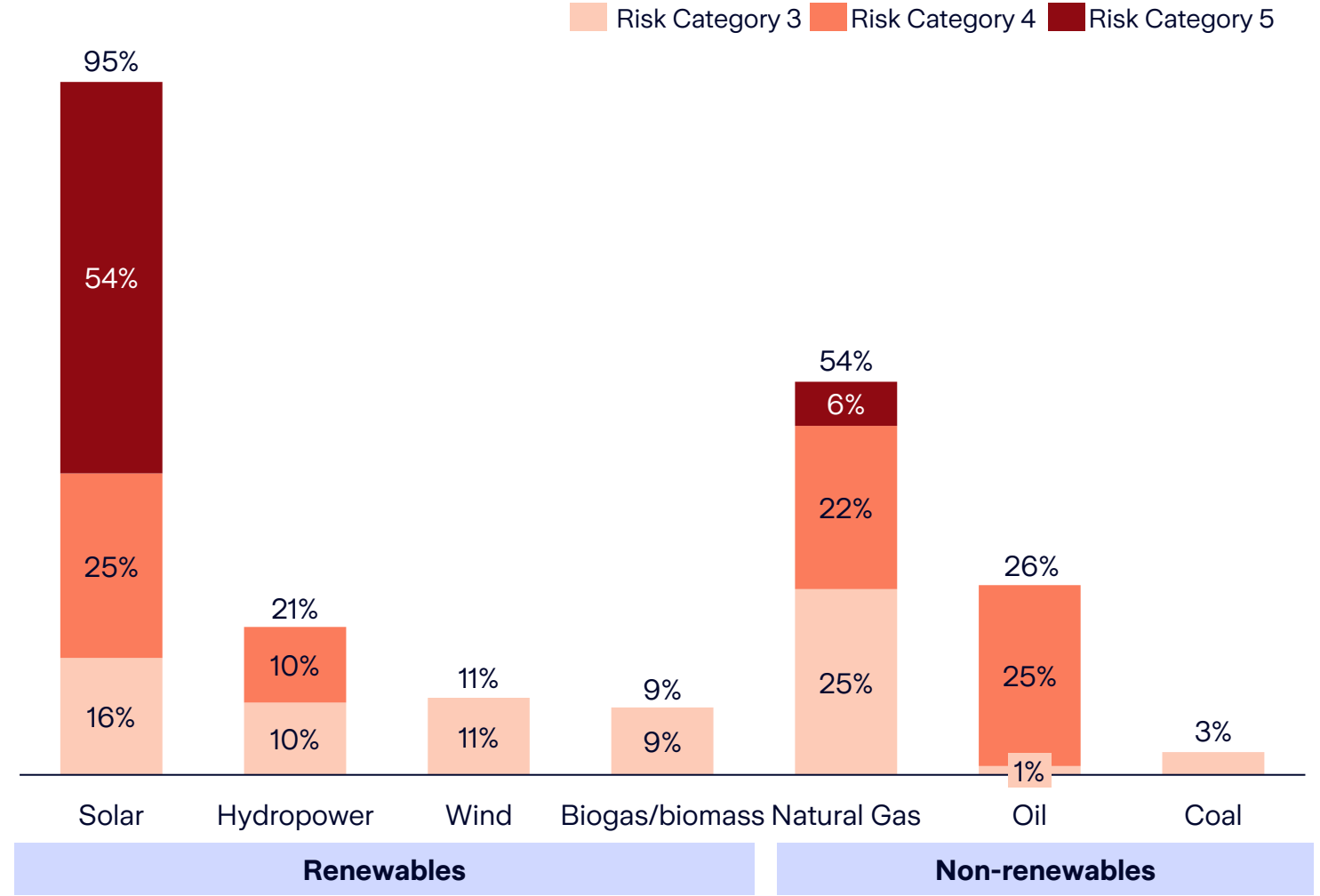
The Zurich-Mandala Index found that 95% of solar generation sites were in the three highest risk categories, with 54% in the highest category. This reflects the relative vulnerability of solar panels to numerous perils. Note that this analysis does not include rooftop solar as no granular data is available on its locations. This means that overall risk for solar generation may be more diversified.

The second most at-risk generation types were natural gas and oil, which were found to have 54% and 26% of their generation respectively in risk category 3 and above. This result has been driven by the susceptibility of these generation types to perils such as high temperatures and drought.

Other forms of renewable energy like wind and biogas/biomass sat alongside coal with relatively low risk. A minimal number of these sites were in the highest three categories and less than 1% of generation were in risk categories 4 and 5.

Exhibit 9: Risk category by generation type

%, weighted by size of generation



Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

Drought and heat pose the greatest climate risk to the grid, but each region must adapt their generators to different challenges to reduce their risk

Exhibit 10: Contribution of climate peril to the risk index by region

%, weighted by size of generation

Lower risk — Higher risk

	Flood	Wind	Thunder-storm	Hail	Heat	Drought	Wildfire	Explanation
Australia	17%	5%	4%	12%	21%	23%	16%	
QLD	12%	3%	4%	17%	29%	16%	20%	Coal and natural gas in QLD are the critical sources of power explaining the contribution of heat, hail and wildfire.
NSW	19%	3%	3%	20%	18%	23%	14%	Coal is the largest generation source in NSW, driving the importance of drought, hail and flood risk.
NT	15%	0%	0%	1%	45%	23%	16%	NT's relative heat and the fact that its generation is dominated by natural gas means it is most impacted by drought and heat.
SA	22%	9%	7%	2%	22%	19%	20%	Wind and natural gas are the key sources in SA, explaining the relative importance of flood, heat and drought.
TAS	38%	1%	1%	0%	4%	49%	7%	Tasmania heavily relies upon hydropower which is most impacted by drought and flood.
WA	18%	1%	1%	3%	32%	29%	16%	WA, like NT, is both relatively hot and reliant on natural gas explaining the similarity in their results.
VIC	19%	6%	4%	9%	15%	34%	13%	VIC faces relatively high risks for flooding, hence the relative importance of this factor. It is also dependent on coal and wind which explains the importance of drought.

Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

The risk-profile of Australia's energy grid is set to worsen considerably over time

Under the Intergovernmental Panel on Climate Change (IPCC) SSP2-4.5 climate scenario, Australian power generation will face greater climate risk over time.

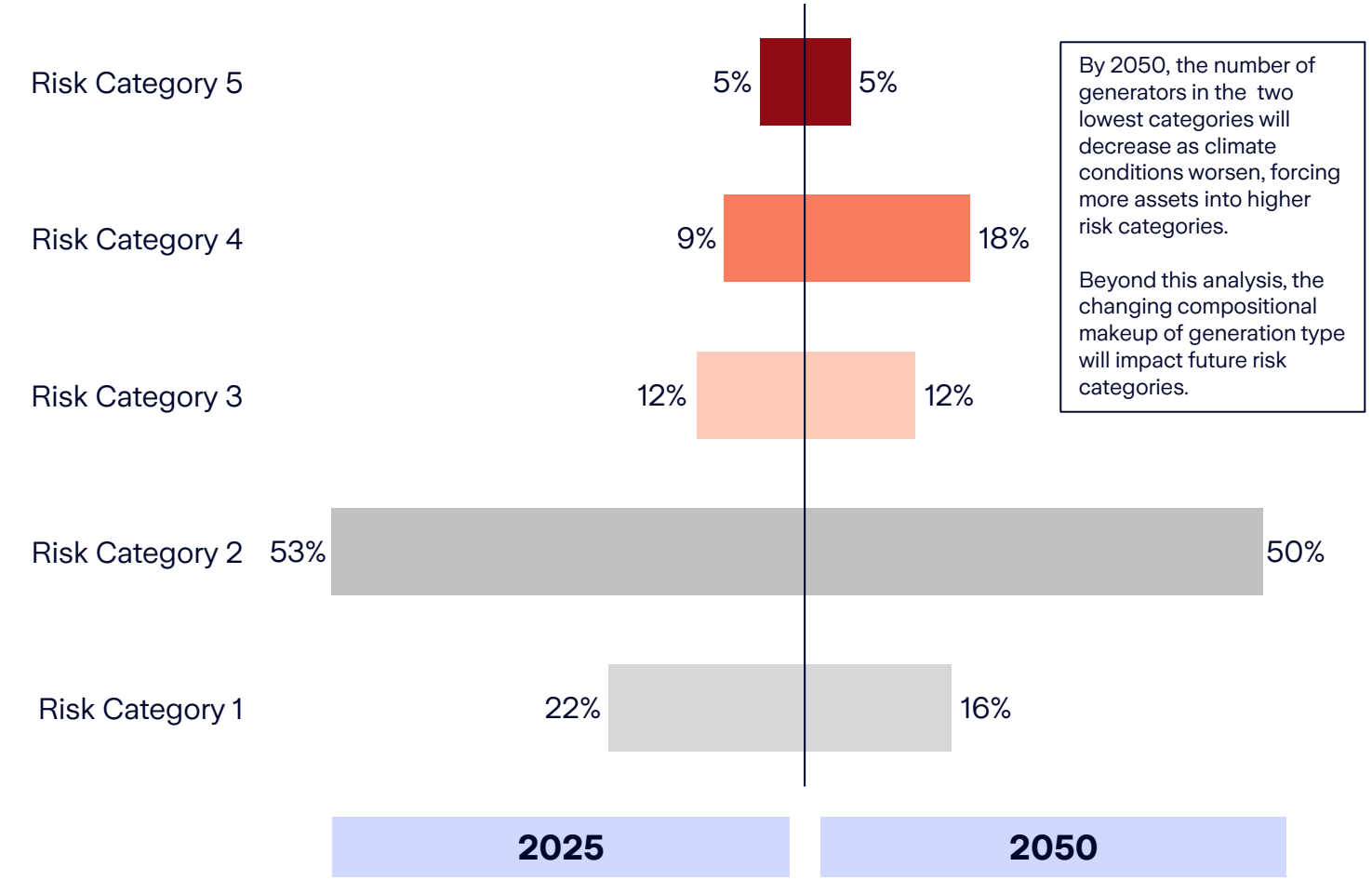
SSP2-4.5 is an intermediate scenario for climate risk that assumes 2 degrees Celsius of warming by 2041-2060. It is considered the most likely climate scenario over the near/mid-term given current and committed climate actions.

In the 25 years from 2025 to 2050, the proportion of generation in the highest three risk categories will rise from 26% to 35%. Generators in the highest three categories are likely to face significant risk from multiple perils with a high impact on respective power generation types (i.e. a coal generator with a 'high risk' from drought and 'very high' risk from hail). Overall, the risk index of 207 out of the 566 generators increased between 2025 and 2050.

Under the SSP5-8.5 climate scenario, which assumes no climate action, 43% of all generation in 2050 will be in risk category 3 or above. This includes 11% of generation in the highest risk category and 14% in the second highest.

Exhibit 11: Proportion of generators in each risk category over time under SSP2-4.5

%, weighted by size of generation



By 2050, the number of generators in the two lowest categories will decrease as climate conditions worsen, forcing more assets into higher risk categories.

Beyond this analysis, the changing compositional makeup of generation type will impact future risk categories.

Source: Zurich Resilience Solutions using Jupiter Intelligence's ClimateScore Global 2.6; Mandala analysis.

Climate can also present a risk to the other systemically important parts of the electricity grid, impacting its stability

Exhibit 12: Overview of impact of climate risks by other sections of grid

Transmission Lines

- Transmission lines carry high voltage electricity over long distances from generators to substations.
- Transmission lines are more likely to be in remote or regional areas. This means when climate perils impact these lines, they can be difficult to easily fix.
- These lines can be significantly impacted by bushfires, which are more common in these areas. They can also be damaged by storms and high wind.

Distribution Lines

- Distribution lines carry low voltage electricity over shorter distances from substations to customers.
- Distribution lines are more likely to be in suburban and urban areas.
- These lines tend to be less robust than transmission lines, meaning they are less resilient to storms and high winds which can regularly damage lines.

Substations

- Substations contain transformers that increase or decrease voltages between transmission and distribution lines.
- Substations tend to be durable to the majority of climate risks.
- However, under higher temperatures transformers can become less efficient. This means that over time, climate change could severely reduce the efficiency of substations in the grid.

1 The Australian energy grid is critical to industry, consumers and the green transition

2 Climate affects the stability and efficiency of the grid, leaving Australia vulnerable to growing climate risk

3 More work must be done to ensure the grid is adapted to the reality of climate change

Adaption measures should be implemented in the planning and building of future generators

Exhibit 13: Overview of adaption methods by type of generation

The impacts of extreme weather events caused by climate change put the stability and efficiency of Australia's energy industry at risk. Extreme weather can impact all points of the energy production and consumption process – including fuel extraction, processing, transportation, generation, transmission and storage, and customer demand. **As shown by this report, site selection and planning is critical to ensure new infrastructure is resilient given variability in peril type and severity is significantly impacted by geography.** Beyond this, structural and management adaptation measures are also important for building resilience, particularly for existing sites.

Solar 	Install passive and/or active cooling system capacity for solar energy in extreme heat prone locations. Install tracking systems to optimise panel angles for diffuse light conditions and to rotate out of wind. Use reinforced glass for plate collectors to withstand hail. Reduce vegetation under and around panels to enhance bushfire resilience.
Wind 	Install blade heating, modify blade coatings and ensure blades are frequently cleaned and maintained depending on ambient air conditions. Reinforce support structures and use robust construction material to withstand wind and storm extremes. Design turbines to operate and withstand higher speeds such as vertical axis turbines.
Hydropower 	Build or augment water storage reservoirs to reduce impacts from water scarcity. In preparation for flooding and storms, strengthen defence structures for dams and turbines and adjust water management strategies for storage of excess water.
Grid 	Increase transmission tower height in flood prone areas or move lines underground in areas with wind or bushfire risk. Use stainless steel material to reduce corrosion from water damage. Decentralise generation by building localised facilities that reduce reliance on long transmission lines and implement microgrids to reduce reliance on centralised grids. Invest in battery storage to provide backup power and improve reliability in extreme events.
Coal/Oil/Natural gas 	Convert water systems from 'once-through' to recirculating to improve reliance on water availability and improve cooling efficiency where possible. Raise adapting structures to protect against flooding.

Zurich Financial Services Australia is a life insurance, commercial insurance and investments specialist that has been participating in the Australian market since 1920. Since its acquisition of OnePath Life from ANZ in 2019, the company provides life insurance to more than 1.5 million Australian customers under both the Zurich and OnePath Life brands. Further information about Zurich Financial Services Australia is available at www.zurich.com.au.

Zurich Insurance Group (Zurich) is a leading multi-line insurer serving people and businesses in more than 200 countries and territories. Founded 150 years ago, Zurich is transforming insurance. In addition to providing insurance protection, Zurich is increasingly offering prevention services such as those that promote wellbeing and enhance climate resilience. The Group has about 60,000 employees and is headquartered in Zurich, Switzerland. Further information is available at www.zurich.com.

Zurich Resilience Solutions (ZRS) provides specialised insights and tools to support customers with building resilience to traditional and evolving risks. ZRS helps businesses to understand how climate change could impact their operations and how best to mitigate these risks. Operating in 40 countries, ZRS has a network of more than 850 Risk Engineers who conduct over 60,000 risk assessments annually. In Australia, ZRS completes more than 3,600 underwriting assessments and risk improvement actions per year across Motor Fleet, Property, Marine, Construction and more.

Mandala is a research firm with offices in Melbourne, Canberra, Sydney and Brisbane. Mandala specialises in combining cutting-edge data and advanced analytical techniques to generate new insights and fresh perspectives on the challenges facing businesses and government.