



Investor Group on  
Climate Change

## **INVESTOR GROUP ON CLIMATE CHANGE**

Submission to Senate Standing Committee on Environment  
and Communications Inquiry into:

## **CURRENT AND FUTURE IMPACTS OF CLIMATE CHANGE ON HOUSING, BUILDINGS AND INFRASTRUCTURE**

25 August 2017

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## EXECUTIVE SUMMARY

IGCC supports robust, investment-grade policies to reduce emissions. Investors are looking for policy which delivers clear and transparent market signals which support investment confidence and better risk management over time.

This inquiry is a timely review of Australia's response to the physical impacts of climate change. IGCC notes that the chronic and acute physical effects of climate change are already impacting infrastructure and costing business and government.

The longer Australia waits to implement effective adaptation planning and infrastructure solutions the more expensive it will become to adapt. Currently the economic costs are not being adequately assessed or consistently measured.

Investors are increasingly integrating physical risk assessment into their investment decision-making processes. Better and more coordinated planning and intergovernmental collaboration would support a more consistent approach.

New investment into adaptation solutions must increase, however there are a number of barriers which need to be addressed. In March 2017, IGCC released *Risk to Return: Investing in Climate Change Adaptation*, new research setting out what we believe to be the barriers, solutions and further recommendations on how to increase private sector investment into adaptation solutions. This forms the basis of IGCC's submission.

In summary, IGCC supports:

- The effective implementation of a National Adaptation Action Plan, underpinned by Australian scientific research which delivers a roadmap for managing the costs and impacts of climate change for investors and the community.
- The development of an up to date national assessment of infrastructure at risk to the effects of climate change and an indicative quantification of the investment required into adaptation.
- Greater collaboration between all levels of government with the finance sector via the establishment of an expert advisory group to work on overcoming barriers and promoting investment in adaptation and resilience across Australia.

Better collaboration between industry, investors and financial policymakers on long term climate risk management will increase Australia's carbon competitiveness and resilience to the economic impacts of climate change.

Ultimately, the best defense against the physical impacts and rising economic costs of climate change is to work towards achieving the goals of the Paris Agreement and limit global warming to less than 2°C.

IGCC would be happy to discuss these matters further.

## 1. Introduction and overview

The Investor Group on Climate Change (IGCC) represents Australian and New Zealand institutional investors with over \$1.6 trillion of funds under management, along with members of the investment community focused on the impacts of climate and energy issues.

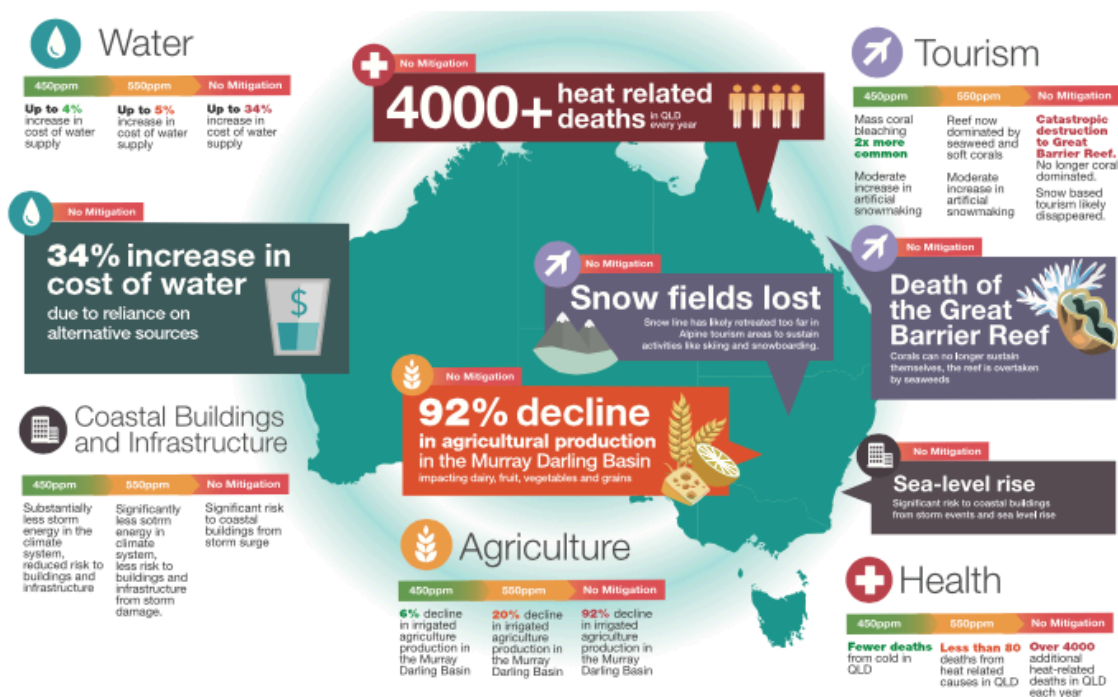
IGCC members are invested across the Australian economy and are part owners of most of Australia's large companies. As managers of retirement savings and pooled investments we are concerned with the evident and increasing impacts of climate change on the global and Australian economies and the flow through impacts for investment returns.

The 2015 Paris Agreement commitment to limit global warming to 2°C and move towards 1.5°C degrees, is a milestone in global climate policy. The Agreement provides a mandate for governments to increase action on climate change policy and enables business to plan and mobilise for a low carbon economy faster and more forcefully than ever before.

However, despite the Paris Agreement and other international efforts to reduce emissions of greenhouse gases, a certain degree of climate change is already locked into the system. Even if all global carbon emissions cease tomorrow, science tells us that sea levels will continue to rise, oceans will continue to warm, weather patterns will change, and extreme weather events will continue to devastate communities more often and in different ways than in the past.

In addition, we are not actually on track to currently achieve the targets set out in the Paris Agreement. We know that 2016 was the hottest year on record, with global average temperatures already having risen 1.1°C above pre-industrial baselines. The UN has warned that, even if all of the national commitments detailed under the Paris Agreement were fully implemented we would still be on track for global warming of 2.6°C or more.

## Climate change impacts in Australia



Source: Risk to Return: Investing in Climate Change Adaptation (IGCC, 2017)

For investors, this means that the physical risk dimensions of climate change must be part of the risk assessment process, and that increasing investment into adaptation to ameliorate the effects of climate must accelerate.

In Australia, adaptation planning is underway in many instances, but there is a long way to go in determining what actions are required, and when and how they should be implemented. IGCC believes that a crucial first step has to be an updated national assessment of infrastructure at risk to the effects of climate change and an indicative quantification of the investment required.

In responding to the Terms of Reference for this Inquiry, IGCC has sought to provide an investor perspective on key areas of a policy framework required to address current and future impacts on property and infrastructure across Australia. In particular, we have sought to highlight key challenges, barriers and potential solutions with the capacity to unlock investment in adaptation. We have not sought to respond to every particular aspect of the Terms of Reference.

This submission also draws substantially on a recent report by IGCC released in March 2017 'Risk to Return: Investing in Climate Change Adaptation'<sup>i</sup>. IGCC recommends the full report to the Committee

Engagement in the public policy discussion on the most appropriate policy framework for Australia is a significant way in which investors can positively support the development of an economically efficient and environmentally effective policy response for Australia.

IGCC welcomes the opportunity to contribute to this Inquiry.

## 2. Understanding the financial and investment implications of climate change

In recent years, a significant shift has been occurring in how business and the financial community views climate change. Specifically, carbon has moved from being seen solely an environmental issue to being understood as an economic risk. Whether physical, regulatory, market-driven or technological, climate change has financial implications for business and for investors.

In reviewing the efficacy of our national climate change policy framework, Australia needs to be managing carbon risk as an economic and a financial risk and working to facilitate an economically efficient transition to a net zero emissions economy in line with global commitments under the Paris Agreement.

The impact on investment flows should be a key consideration for policy decisions.

The IGCC has been addressing and considering the issue of climate change as a financial consideration for over a decade. In the past 18 months, we have seen a deepening in recognition across the broader business community of the financial and investment implications of climate change.

The Financial Stability Board's Taskforce on Climate-related Financial Disclosures (TCFD) released their final recommendations in June 2017. Launched in December 2015, the work of the Taskforce has – and will continue to be – hugely influential in driving strategic integration and harmonised corporate disclosure of climate change risks and opportunities. This includes significant new recommendations for assessing and reporting on the physical risk dimensions of climate change.

The legal opinion of NSW barristers Mr Noel Hutley SC and Mr Sebastian Hartford-Davis jointly released by The Centre for Policy Development and the Future Business Council in November 2016 is also driving heightened business awareness of the financial implications of climate change<sup>ii</sup>. The legal opinion sets out why directors should consider climate risks as part of the duty of care and diligence

they owe to the company under Australian Corporations law. Where directors consider climate risks to be material, there are obligations to disclose those risks and how the company intends to manage those risks under ASX Listing Rules.

In August 2017, Noel Hutley SC and James Mack released a subsequent opinion on Superannuation Fund Trustee Duties and Climate Change Risk, stating that “climate change risks can and should be considered by trustee directors to the extent that those risks intersect with the financial interests of a beneficiary of a registrable superannuation entity”<sup>iii</sup>.

A speech by Geoff Summerhayes, Executive Board Member of the Australian Prudential Regulation Authority (APRA) on 17 February 2017, clearly articulated that regulators expect investors to engage in sophisticated scenario based climate analysis describing how climate risk might impact business operations and strategies for managing material impacts. Already, this message is resonating across corporate Australia<sup>iv</sup>.

All three developments demonstrate the increasing recognition that Australian business has an obligation to identify and manage material climate change impacts for their operations and disclose material risks and impacts to the market.

Australia’s climate change policy framework must support and enable Australian business to effectively manage these obligations and respond to the emerging financial risks and opportunities which climate change represents.

## 2.1. About the Taskforce on Climate-related Financial Disclosures (TCFD)

In December 2015, as policy talks at COP 21 were moving towards finalisation of the Paris Agreement, a major new initiative was launched under the oversight of the G20 with the potential to profoundly reshape corporate disclosure on climate change – the Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD)<sup>v</sup>.

Chaired by Michael Bloomberg, the 31 members of the TCFD include capital providers, corporate reporters and business, accounting firms and rating agencies. The intent of the TCFD is to undertake an assessment of the current state of climate-related risk disclosures and to design a set of voluntary recommendations to help shape best practice for disclosure. These will apply to investors, as well as corporate reporters.

Following a lengthy and wide ranging consultative process across all major markets and jurisdictions, in late 2016 the Taskforce released their draft Recommendations, setting out a framework for disclosure within financial reporting. The Task Force has structured its recommendations around four key areas of disclosure: governance, strategy, risk management, and metrics and targets. This is supported by additional guidance for all sectors, as well as supplementary guidance for non-financial sectors (energy, transport, buildings and materials, agriculture, food and forest products) and financial sectors (banks, insurers, asset owners, asset managers).

The Taskforce defines Physical Risks as “Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns. Physical risks may have financial implications for organizations, such as direct damage to assets and indirect impacts from supply chain disruption. Organizations’ financial performance may also be affected by changes in water availability, sourcing, and quality; food security; and extreme temperature changes affecting organizations’ premises, operations, supply chain, transport needs, and employee safety”.

Acute physical risks refer to those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, or floods. Chronic physical risks refer to longer-term shifts in climate patterns (e.g., sustained higher temperatures) that may cause sea level rise or chronic heat waves<sup>vi</sup>.

In addition, one of the TCFD's key recommendations relates to reporting the potential impacts of climate-related risks and opportunities on an organisation's businesses, strategies, and financial planning under different potential future states (scenarios), including a 2° Celsius scenario. While there is clearly more work to be done on developing a robust approach to scenario analysis, the strong emphasis on scenario analysis is influential for investors as both reporters and report users.

With the finalisation of the TCFD recommendations in mid-2017, a number of organisations will be developing more prescriptive guides to reporting against the recommended TCFD framework and, in some cases, looking at avenues for integrating the recommendations into new or existing mandatory financial disclosure requirements, including for investors<sup>vii</sup>.

### 3. Response to the Inquiry Terms of Reference

Australia is one of the most vulnerable developed countries in the world to the impacts of climate change and already has a highly variable climate. Climate change is expected to increase the frequency and intensity of extreme weather events, while rising sea levels pose a significant risk to coastal communities and infrastructure. Australia faces significant environmental and economic impacts across a number of sectors, including water security, agriculture, coastal communities, and infrastructure. Decisions made today about infrastructure, health, water management, agriculture and biodiversity will have lasting consequences for future generations

Adaptation must be an important consideration by all levels of government, and for business, industry, and the community. Adaptation planning is underway in many instances, but there is a long way to go in determining what actions are required, and when and how they should be implemented. Importantly, the scale of the challenge means that costs will be high, and we need to consider how adaptation can be funded, as a large share of adaptation measures will need to be financed by private capital.

#### 3.1. UNDERSTANDING THE COST OF CLIMATE CHANGE

Determining the cost of climate change, and the amount of investment required for adaptation, can be challenging and is still at a relatively early stage. Global figures illustrate the immediate need to scale up investment into adaptation and the considerable opportunity this presents for investors. It also highlights the need for a national assessment of the anticipated cost of climate change and the investment in adaptation measures required.

A recent Citi report (2015) estimated the damage to GDP from the negative effects of climate change in the order of US\$20 trillion with 1.5°C warming; US\$44 trillion with 2.5°C and US\$72 trillion with 4.5°C warming<sup>viii</sup>. These calculations relate to the economic impacts of climate change, such as sea level rise, health, ecosystems, crop yields, tourism flows, energy demand and fisheries. They do not however include economic damages from extreme weather events or catastrophic risks, which have large economic impacts, and will require increasing levels of adaptation. Thus changes in GDP projection underestimate the total economic impacts of climate change

To date, no comprehensive estimates seem to exist on the cost of climate change impacts in Australia and the likely level of investment required for adaptation measures. This makes cost benefit analysis of climate change adaptation at an aggregated level impossible to quantify.

In Australia, the last national assessment to examine the replacement cost of coastal buildings and infrastructure at risk from climate change was undertaken in 2011. It found that the cost of related impacts is expected to reach \$226 billion in total, under a 1.1 m sea level rise scenario. However, these estimates do not cover other coastal assets such as non-land-based infrastructure, social infrastructure or natural systems<sup>ix</sup>. Local government-owned public assets at risk from climate change have been valued at \$212 billion, with roads identified as the key issue.<sup>x</sup>

Science has advanced considerably in the years since, while new proprietary risk assessment tools and integrated data sets have also become available and are currently being applied on an ad hoc basis.

Some estimates of the cost of natural disasters have been drawn from hazard data and property valuations. These reports highlight that Australia is particularly susceptible to large and frequent natural disasters that adversely impact property and infrastructure and disrupt business and communities, even without the exacerbating effects of a warmer climate and rising sea levels.

Already the Federal Government spends an estimated \$560 million on post-disaster relief and recovery, compared to the \$50 million a year invested in pre-disaster resilience measures: a ratio of more than 10 to 1. Even without including the effects of climate change, post-disaster recovery costs are expected to increase to \$2.3 billion a year by 2050, without investment in resilience<sup>xi</sup>. Even without factoring in the effects of climate change, the total economic cost of natural disasters is rising.

According to Deloitte Access Economics carefully targeted programs of resilience investment in the order of \$250 million/yr could see government spending reduce by more than 50% by 2050<sup>xii</sup>. The table below provides a summary of the key areas of adaptation that currently exist in Australia to improve pre-disaster resilience.

Adaptation area		Effectiveness	Cost	Current Usage	Key gaps
Land planning	Zoning of new development	Most effective adaptation option for new properties	Direct costs are very low but indirect costs can be very high, e.g. economic growth opportunity cost of disallowing development of multi-story residential building	Majority of councils incorporate natural perils risk in their zoning process	New developments are still allowed to be constructed in high risk areas. Lack of clear and simple rules exposes councils to legal risk and creates inconsistency between councils
	Relocating properties	Most effective adaptation option for existing properties	Costs are very high, driven largely by the price of land	Not widely used due to high costs involved. Only used for very high risk properties	No funding available
Building standards		Very effective adaptation option for new properties	Costs can be high, not all improvements will have a favourable benefit-cost ratio	Australia-wide building standards are more stringent in areas exposed to natural perils	Building standards focus on health and safety whilst minimising property damage is not an objective
Retrofitting existing properties		Can be very effective for existing properties	Costs are relatively high. Generally more expensive than cost of building new houses to the same standard	Not widely used due to high upfront costs and lack of government grants or incentives	No funding available
Infrastructure to reduce frequency and severity of individual natural perils		Effective for localised perils (flood, bushfire and storm surge). Not effective for other perils such as cyclone and earthquake. Effectiveness is often compromised due to conflicting priorities (e.g. dams being used for both water supply and flood adaptation) and poor maintenance over time	Cost are high. Key costs are construction costs and regular maintenance costs	Some infrastructure such as flood levels and seawalls are used extensively. Other infrastructure such as underground power lines are less common	No funding available
All adaptation areas					Lack of government adaptation funding. Framework to prioritise adaptation projects and funding can be strengthened

Source: Actuaries Institute’s Natural Disaster Working Group (2016), cited in ‘Risk to Return: Investing in Climate Change Adaptation’ (IGCC, 2017)



Actual adaptation projects vary across industry sectors, but can broadly be categorized as ‘soft’ and ‘hard’. Soft options are generally those which are cheaper, less engineered and generate associated social or environmental benefits. Examples include creating and maintaining urban forests to combat heat waves, education programs to increase adaptive capacity, and planting vegetation on sand dunes to stabilise sediment and prevent erosion. Hard, or engineered solutions are more costly infrastructure based solutions which are required to deal with or mitigate against more extreme effects or impacts. These may include:

- Construction of new hard structures such as seawalls to protect coastal or flood affected areas from inundation due to sea level rise or localised flooding; dams or replacing gravel roads that are washed away during heavy rain or floods with concrete structures
- Upgrading existing hard structures and technologies including infrastructure, such as replacing or widening stormwater pits, pipework or runoff systems to improve drainage and eliminate localised flooding, adopting higher standards for new and existing high-rise buildings to withstand extreme winds, implementing built surfaces that reflect heat which also decrease operational costs and improve energy efficiency; improved permeability of landscaped areas and sun shading.
- Developing and implementing broad management schemes to protect coasts and beaches that involve a combination of building revetments or groynes, placing sandbags on beaches, constructing sand pumps.
- Upgrade existing transmission and distribution infrastructure to withstand extreme storm events and heat stress caused by increased numbers of days above 35°C including grid energy storage systems to improve network capacity<sup>xiii</sup>.

What has become increasingly clear, is that the longer Australia waits to implement effective adaptation planning and infrastructure solutions the more expensive it will become to adapt. And effective planning requires an up to date national assessment of infrastructure at risk to accurately assess required investment and facilitate private sector capital flows.

### Extreme heat and heatwaves in Australia

The international commitment to limit global warming to below 2°C above pre-industrial levels (with a move towards 1.5°C) can be somewhat of a misnomer when talking about climate impacts such as heat. A 2°C target refers to an increase in global average temperature (which is currently 15°C), relative to a pre-industrial baseline. 2°C warming does not simply translate into an increase of 2°C in maximum temperature, but rather shifts the temperature distribution. Warm monthly daytime temperatures that occurred just 2% of the time during 1951-1980 for instance, now occur 11% of the time (Bureau of Meteorology, 2016).

This has a significant effect for heatwaves, one of the most devastating climate impacts for Australia. Major heatwaves in Australia have caused more deaths than storms, bushfires, flooding and earthquakes combined (Climate Council, 2017).

Heatwaves in Australia are already becoming hotter, longer, more frequent and occurring earlier, as experienced during the 2016- 2017 summer. Sydney, Brisbane and Canberra all experienced their hottest summer on record in 2017, with 205 weather records broken in 90 days across Australia. The mid February heatwave saw temperatures in western Sydney reach 47°C.

As well as human health impacts, this has implications for critical infrastructure, with excessive stress on the electricity grid and disruptions to transport networks. In January 2017, Queensland recorded an all time peak electricity demand and NSW neared peak demand (Energy Council, 2017).

In February, New South Wales narrowly avoided widespread blackouts, requiring shedding of 580 MW of load from the Tomago aluminium smelter.

These temperature extremes also have implications for the “critical thresholds” to which infrastructure needs to be designed, and the effect of interdependencies.

Heatwaves also have large economic impacts. Heatwaves during 2013 – 2014 cost approximately \$8 billion, through absenteeism and a reduction in work productivity, equivalent to 0.33% to 0.47% of Australia’s GDP (Climate Council, 2017).

(Excerpt from Risk to Return: Investing in Climate change adaptation (IGCC, 2017))

### 3.1.1. Physical risk implications for investors and asset owners

Australia has a highly variable climate, which already causes challenges for investors through droughts, heatwaves, floods, cyclones and intense storms. Understanding potential changes to the exposure of investments, and to the way in which assets and businesses can be managed to reduce exposure, is key.

Investors are increasingly taking steps to integrate physical risk assessment into the due diligence process for investment decision-making, and reviewing their portfolio for assets at risk of detrimental impacts of climate change.

Investors expect ASX300 companies which they invest in (or are currently assessing with a view to potentially invest), to have developed climate change adaptation strategies. This is because in many business sectors and asset classes there are:

- Material risks compounded by interdependencies from climate change, principally through more intense extreme weather events, that can harm the productivity, cash flow and share price of companies
- No-regret productivity enhancing adaptation opportunities which reduce companies’ risk of negative impacts, from these same intense extreme weather events
- Opportunities to easily include adaptation enhancing design improvements as part of all new major property, infrastructure and resource projects (eg: new open cut mines could easily use overburden to reduce potential for flooding)
- Opportunities for adaptation measures to improve climate change mitigation and vis-a-versa
- Opportunities for companies to take advantage of government supported adaptation programs
- Opportunities for companies to reduce their insurance premiums through undertaking adaptation measures; and
- Opportunities for companies to gain competitive advantage, identify new products and build equity in their assets.

IGCC has undertaken research on the physical risk implications for major industry sectors and asset classes, with the results published in ‘Investing through an adaptation lens – A practical guide for investors’. This report, and the supporting detailed analysis, describes the risks, opportunities and associated interdependencies related to climate change that investors need to consider in order to adapt. The guide addressed these issues for investment in three sectors: direct property investments, direct infrastructure investments and listed equities<sup>xiv</sup>.

Understanding the exposure and vulnerability of the asset/business to past, current and future climate, with sufficient granularity, is particularly important for longer-term investments and future

liabilities. The results of risk analyses and associated management plans are important for investors to be able to develop effective advice for their organisations and shareholders about direct climate associated risks and any interdependencies.

Through an extensive process of stakeholder consultation, investors identified several questions that IGCC believes should be asked across all industry sectors when undertaking due diligence. These relate to the vulnerability to climate change of the asset or organisation being considered for investment, as well as the way in which the asset is being managed to reduce exposure to a changing climate. These core considerations are supplemented by additional analysis specific of the industry sector or asset class.

### Investor questions on physical risk management, as applied across all industry sectors

Climate change risk assessment:

- Have you assessed whether climate change will affect the asset being considered, and what risks and opportunities do you see?
- How detailed a climate risk assessment has been carried out?
- Has the asset been impacted by past climatic events, and what is your expectation about its exposure to future climate impacts?
- What data and information was used to carry out the assessment?
- What is the strategy or plan for responding to identified risks and increasing resilience?

Interdependencies and risks of maladaptation:

- Does the plan include consideration of interdependencies and the risks of maladapted outcomes (unintended consequences)?
- What is vulnerability of the business to climate effects on other assets that are linked to the performance of the asset being considered? eg supply chain

Capital requirements, cost benefit analysis:

- Has there been an assessment of the cap-ex and op-ex requirements to adapt to climate effects, and does it increase or decrease over time?
- How material are they?
- Has a cost benefit analysis been done?

Others:

- What are the specific risks to your industry sector?

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Investors are also taking a more integrated approach to mitigation and adaptation as a means of realizing the co-benefits and cost reductions or an integrated approach to climate change risk and opportunity. Examples of climate change adaptation opportunities which have reasonable returns on investment; climate change mitigation co-benefits; and can potentially help reduce company insurance premiums include for example:

- Reducing company exposure to increased peak demand electricity costs due to higher demand during summer heat waves by investing in improved company energy efficiency and onsite solar PV
- Reducing exposure of staff or tenants to risks of heat stress through:
  - Improving energy efficiency of property portfolios through profitable energy efficient “green building” new builds and retrofits (ie better insulation/draft proofing of building envelop, use of white “cool” roofs)
  - Use of more efficient, productive and better insulated, industrial, light industrial, and service sector equipment (ie furnaces, ovens, kilns, motor driven systems, cooking equipment, commercial washing machines)
- Reducing company exposure to risks from drought related water restrictions and greater competition for water resources through investing in improving water efficiency.
- Reducing vulnerability to supply chain disruption through diversifying supply chains and sourcing more resource inputs from recycled sources.
- Reducing risks of damage and loss of operation from extreme weather events to property, infrastructure and resource asset classes.
- Reducing risks of drought/heat stress negatively impacting farm productivity/asset values and the supply of agricultural ingredients to Australian manufacturers – through investing in more resilient farming practices.

The full report ‘Investing Through an Adaptation Lens’ includes detailed tables which provide a succinct overview of cost effective adaptation opportunities for different asset classes and business sectors which have climate change mitigation co-benefits, highlighting the value of investors in encouraging investments in measures that can simultaneously realise adaptation and mitigation co-benefits and thereby reduce the risk of adaptation investments increasing greenhouse gas emissions<sup>xv</sup>.

#### Case study: Mirvac adaptation planning for Australian Technology Park

As part of the re-development of Australian Technology Park precinct in Sydney, Mirvac have developed a Climate Adaptation and Resilience Plan for all the buildings.

Supported by analysis from Arup, the plan identifies that major physical risks arising from climate change are related to an increase in temperatures affecting the design of the HVAC system. These include increases in temperatures placing a greater load on the HVAC system, require increased HVAC power demand to support enhanced thermal loads and increasing peak demand and further discomfort to building occupants when outside the building.

Responses vary from increased air flow, expanding the electrical system to meet HVAC maximum demand under all future scenarios, the inclusion of an onsite 350-500 kW Photovoltaic system to meet peaking requirements, greater flexibility for facility managers to adjust set-points and control dead-bands of the building while operational and allowance for future planting on the precinct to provide greater shading and shelter around the site.

## 1.1. Investing in adaptation

Adaptation finance is not currently part of the mainstream investment market in Australia and is difficult to quantify on an aggregated basis.

In many cases adaptation is embedded into project design and engineering (this is particularly the case for transport infrastructure). However, the fact that the adaptation component is often not able to be separated, or treated as an add-on feature, hinders the ability to pinpoint the exact flow of funds to adaptation, particularly from private sources.

The lack of a single coherent framework for calculating the cost of climate change in Australia and the level of investment required, the inability of many local governments or project developers to measure and pursue consistent adaptation performance outcomes and the complex and fragmented approach to developing adaptation planning are all inhibiting investment in greater resilience and adaptation outcomes across the Australian economy.

Despite the challenges, there are several large-scale and iconic developments that have incorporated adaptation features into their design. These cases demonstrate that progress is being made and that adaptation risk is being embedded and considered.

Lendlease's Barangaroo South (Sydney) involved the development of a Climate Change Adaptation and Community Resilience Plan, complete with a risk assessment that informed the building design and construction to ensure major risks were avoided (Lendlease 2016).

The construction of the parallel runway at Brisbane Airport also anticipated future climatic impacts, resulting in the decision to elevate the runway by an additional 40 cm. These case studies were highlighted in IGCC's *Investing through an Adaptation Lens* report.

While many of the current project examples involve adaptation finance by the private sector, we see significant opportunities for investment into public adaptation options as well. However, attracting private sector adaptation poses a number of challenges.

A study commissioned by the National Climate Change Adaptation Research Facility (NCCARF) identified eleven features of adaptation projects that are important for investors because they can impact the finance and/or funding options available to realise adaptation.

## Features of adaptation initiatives that impact finance/funding options

Feature	Spectrum		
<b>Size/capital requirement</b>	Small (<\$25 million)	Medium (\$25-\$50 million)	Large (\$50+ million)
<b>Lifespan of project/initiative</b>	Short-term (now to 2030)	Medium-term (2030-2070)	Long-term (beyond 2070)
<b>Physicality</b>	Soft measure/initiative (e.g. plan, community capacity building, etc.)	Scheme (e.g. partnership)	Engineered structure
<b>Discreteness</b>	Part of new structure	Upgrading existing structure	New stand-alone investment
<b>Ownership</b>	Local government	Public-private-partnership	Private
<b>Scalability</b>	Not scalable	Scalable to some extent	Scalable to a large extent
<b>Beneficiaries</b>	Single/few company/individuals	Some (countable)	Many/wider community
<b>Financial return</b>	Unable to generate	Able to generate, unable to distinguish/quantify	Calculable and demonstrable
<b>Return on investment timescale</b>	Short-term (<2 years)	Medium-term (2-7 years)	Long-term (7+ years)
<b>Risk reduction</b>	Difficult to demonstrate risk reduction	Small-scale risk reduction compared to overall project/business	Demonstrated ability to reduce substantial risk
<b>Insurability</b>	Uninsurable	Partly insurable	Insurable

Source: Banhalmi-Zakar et al (2016)

While investors are increasingly integrating physical risk assessment into their investment decision-making processes, better and more coordinated planning and intergovernmental collaboration would support a more consistent approach.

New investment into adaptation solutions must increase, however there are a number of barriers which need to be addressed.

In March 2017, IGCC published a new report 'Risk to Return: Investing in Climate Change Adaptation'<sup>xvi</sup>. Developed through a multi-stakeholder climate adaptation finance consultation process, it aims to identify real world investment barriers and recommend potential solutions, with the goal of enabling the finance sector to access adaptation investment opportunities. It also sets out a pathway forward with specific recommendations.

Well-coordinated action across tiers of government could help overcome many capacity barriers. National and State inquiries into coastal zone management have recognised inconsistent and uncoordinated approaches among state and local governments as a barrier to the integrated decision making that is required. This lack of coordination and inconsistency of approach, signals uncertainty that will not help assure private investors about the investment potential of adaptation initiatives.

IGCC would support a clearer and better coordinated approach to cross-government ownership of adaptation funding and implementation: Lack of clarity with respect to responsibility for adaptation implementation or funding is not conducive for private sector involvement.

One way forward would be to establish a reference/advisory group with representatives from all three levels of government expert and the investment/finance community to drive investment in adaptation outcomes. The Australian government already initiated such dialogue with the private sector to protect the Great Barrier Reef. The Reef Trust's Partnerships for the Reef program seeks to engage a wide range of stakeholders including financial institutions and philanthropic sector to work together in developing joint ventures to protect the Reef.

Investors and project developers have also identified the availability and consistent application of future focused climate modelling and localized data sets as a key challenges for adaptation and resilience planning. While a number of companies have developed their own tools (such as Stockland or Lendlease) an industry-wide tool consistently applied across precincts and projects would reduce the incidences of what has been terms 'adaptation arbitrage', whereby project developers and investors negotiate over the most appropriate climate scenario against which to plan.

Ongoing support for a national science and innovation agenda is also critical to ensuring Australia's future prosperity, including in the area of adaptation. IGCC has worked with the National Climate Change Adaptation Research Facility (NCCARF) on a number of occasions in recent years, translating climate science into investment practice. Ensuring funding is maintained for bodies such as this able to translate complex science into investment and industry impacts will be increasingly important as the effects of climate change itself are increasingly felt. Similarly, maintaining a technology approach to funding and grants is critical for supporting an internationally competitive research and development environment in Australia.

## **1.2. ULTIMATELY, THE BEST DEFENSE IS AVOIDING GLOBAL WARMING OF 2°C**

Ultimately, the best defense against rising costs and the physical impacts of climate change is to meet the goals of the Paris Agreement and limit global warming to less than 2°C.

Long term, transparent and predictable policy design can enable deep emissions reductions, a steady economic transition and encourage investment to take advantage of new opportunities for the Australian economy. With such a policy framework, investors will make long term, low carbon investment allocations. Delaying the resolution of a long-term policy framework is already leading to underinvestment in energy and emissions intensive industry, limiting Australia's options for economic growth and income in future.

It should be noted that if Australia and other countries chose to adopt shallow emission reduction targets in the short to medium term, either much more aggressive cuts will be required in the period 2030 to 2040 or global warming will clearly not be held below 2°C. For investors, this has implications for transition risk assessment in the immediate term and for physical risk assessment for assets and portfolios which must be factored into investment decision making.

Investors are also collaborating in unprecedented numbers to call on governments to maintain their commitment to and fully implement the goals of the Paris Agreement in national policy frameworks and support long-term emission reduction pathways. IGCC was recently one of six global investor organisations coordinating a joint statement signed by almost 400 investors representing US\$22 trillion in assets under management.

Released in June 2017, the statement calls on global leaders to:

- Reiterate their support for and commitment to implement the Paris Agreement, including the delivery of their own Nationally Determined Contributions in full.

- Bring forward focused and targeted long-term climate and energy plans that will ensure their future actions align with commitments under the pact to keep global average temperature rise to well below 2°C above pre-industrial levels and preferably to 1.5°C.
- Drive investment into the low carbon transition through aligning climate-related policies, phasing out fossil fuel subsidies and introducing carbon pricing where appropriate.
- Implement climate-related financial reporting frameworks, including supporting the Financial Stability Board Task Force on Climate-related Financial Disclosures' recommendations.

Further, the investor statement notes that “the implementation of effective climate policy mechanisms and the regular monitoring of outcomes is vital for investors to make well-informed investment decisions that can also better support governments in delivering their national commitments and priorities”. The letter is supported by a detailed Briefing Paper setting out the key issues and considerations for investors.<sup>xvii</sup>

Achieving emission reduction goals will limit the cost of adapting to the physical impacts of climate change.

#### 4. Conclusions and recommendations

Given that climate change has been such a dominant feature of global debate for over two decades now, it is perhaps surprising that the world is only now turning collective attention to the challenge of adaptation.

Within Australia, where we are highly vulnerable to the effects of climate change and have substantive investment sunk into infrastructure exposed to physical risk, it is only appropriate that we begin working through the practical challenges of managing adaptation.

Having undertaken extensive research and review across the investment community of the challenges of managing the increasing physical risks of climate change, IGCC believes that there are a number of areas where further work can be undertaken to promote greater investment into adaptation and increase community resilience.

IGCC would encourage all levels of government to collaborate on the development of a framework clearly setting out levels of government coordination and responsibility for adaptation in Australia.

Australia needs an up to date national assessment of infrastructure at risk to the effects of climate change and an indicative quantification of the investment required for adaptation.

All levels of government should collaborate in the establishment of an expert advisory group to work with the finance sector on promoting adaptation investment across Australia.

Investors would be more than willing to engage further with public climate finance bodies to identify opportunities to apply mitigation investment structures to adaptation projects to achieve blended outcomes.

Overall, better collaboration between industry, investors and financial policymakers on long term carbon risk management will increase Australia's carbon competitiveness and resilience to the economic impacts of climate change.



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- <sup>xv</sup> Tables 1-4 in Appendix 1 of the Full Report. Note these tables are not comprehensive and additional consideration is required for each specific sector and importantly for each investment decision.
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