clex@unsw.edu.au
The ARC Centre of Excellence for Climate Extremes

23rd November 2023

Committee Secretary
Senate Standing Committees on Environment and Communications
PO Box 6100, Parliament House
Canberra ACT 2600
ec.sen@aph.gov.au

Submission to Senate Standing Committees on Environment and Communications

Dear Committee Chair,

Inquiry into the Climate Change Amendment (Duty of Care and Intergenerational Climate Equity) Bill 2023.

The ARC Centre of Excellence for Climate Extremes (the Centre) welcomes the opportunity to make a submission to the Inquiry into the Climate Change Amendment (Duty of Care and Intergenerational Climate Equity) Bill 2023.

The Centre comprises five partner universities - The University of New South Wales, Monash University, The Australian National University, The University of Melbourne and The University of Tasmania, as well as multiple international partner organisations. We work to understand and reduce Australia's vulnerability to climate extremes through leading the development of fundamental climate science and improving models which analyse the extremes of the past and predict the extremes of the future.

We collaborate with the federal government through ongoing scientific engagement across government portfolios and specifically on regional projections of future climate change. We support all government efforts to understand, consider and incorporate the best available climate science in policy and legislation.

As Australia's leading climate science centre, we recognise the risks of climate change for all Australians. Australia faces severe impacts from weather and climate events with risks growing through time if emissions are not reduced. The effects are already felt across society, from food and water to fuel and finance, leading to damage of Australia's social, environmental and economic systems.

Our centre's researchers are acutely aware of the state of the climate and this submission, in part, reflects their assessment. As Director of the Centre, my concern lies with the younger researchers, who are just beginning their careers in climate science, but whose future is already shaped by unprecedented levels of warming. They are continually voicing their anxiety about how changes in the future may change and affect them and climate anxiety is now the subject of seminars and courses across the sector, including organisations such as CSIRO. They are inheriting problems which no other generation has encountered and as climate scientists, they will be at the centre of understanding, and projecting how we respond. It is against this backdrop that I support the proposed amendment to the Climate Change Act.

I thank the Senate Standing Committees on Environment and Communications for the opportunity to make a submission on this topic and offer the expertise of the Centre on Australia's climate extremes whilst highlighting the voice of the next generation of climate scientists.

We are happy to provide further information on any matters arising from this submission.

Yours sincerely,

Professor Andrew Pitman, AO, FAA
Centre Director
ARC Centre of Excellence for Climate Extremes

Introduction

The ARC Centre of Excellence for Climate Extremes (the Centre) supports the proposed amendment (Climate Change Amendment (Duty of Care and Intergenerational Climate Equity) Bill 2023) to the Climate Change Act 2022 to require decision makers to consider the wellbeing of current and future children when making certain decisions that are likely to contribute to climate change across scope one, two or three emissions.

In the following submission in support of the amendment, we demonstrate the alarming state of the climate and its current and future impacts on us as a society in Australia and globally. We include the perspectives of younger climate scientists in our Centre to outline why this amendment is necessary and timely.

The state of the climate

The link between greenhouse gas emissions and global warming is unequivocal. The Earth's climate is warming, primarily due to the increase in carbon dioxide (CO_2) emitted into the atmosphere by human-driven activities including burning fossil fuels (coal, oil, and natural gas) land use and land cover change.

The United Nations warned earlier this year, that 'Climate breakdown has begun'[1] while the World Meteorological Organisation confirmed that July 2023 was Earth's hottest month on record[2]. The latest report from the UN's Intergovernmental Panel on Climate Change (IPCC)[3] states climate change is causing greater impacts than anticipated, and these impacts are emerging at lower amounts of warming than expected. The report underlined the urgent need for emissions reductions to limit warming.

Every additional fraction of a degree of warming increases the risk of extreme weather events.

Australia's climate has warmed by 1.47 ± 0.24°C since 1910[4], slightly faster than global average warming. The first two decades of the 21st century were both warmer than any decade in the 20th century. Australian surface temperatures will continue to rise until at least 2050 under all emission scenarios and further increases in climate extremes are inevitable[5].

The Australian federal government has outlined in its Intergenerational report 2023[6] that climate change is one of the five major forces that will shape the whole Australian economy over the coming decades.

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[1] https://www.aljazeera.com/news/2023/9/6/un-announces-climate-breakdown-after-record-summer-heat
[2] It's official: July was Earth's hottest month on record | National Oceanic and Atmospheric Administration (noaa.gov)
[3] IPCC, 2021, Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, https://www.ipcc.ch/report/ar6/wg1/chapter/summary-for-policymakers/
[4] Bureau of Meteorology and CSIRO, 2022, State of the Climate 2022, http://www.bom.gov.au/state-of-the-climate/
[5] Herold et al., 2021, Projected changes in the frequency of climate extremes over southeast Australia, Environmental Research Communications, https://doi.org/10.1088/2515-7620/abe6b1
[6] 2023 Intergenerational Report | Treasury.gov.au

Every day brings news of recording breaking, dramatic and exceptional weather phenomena not just in Australia but from around the world, with global temperatures for September described as 'absolutely gobsmacking bananas'[7]. Provisional data shows the planet had its warmest October on record, whilst also the fifth consecutive month a global heat record was set[8].

As extreme events continue to break records yet, Australia remains one of the highest per capita emitters in the world[9].

Added to this, there is published work from Hansen et al., stating that the rate of global warming is increasing[10]. Hansen, a director at the Earth Institute at Columbia University, is a renowned climate scientist whose 1988 testimony to the US Senate first brought global attention to climate change[11].

The amount of global warming depends on future global greenhouse gas emissions and the ability to deploy rapid and sustained actions to reduce atmospheric carbon dioxide.

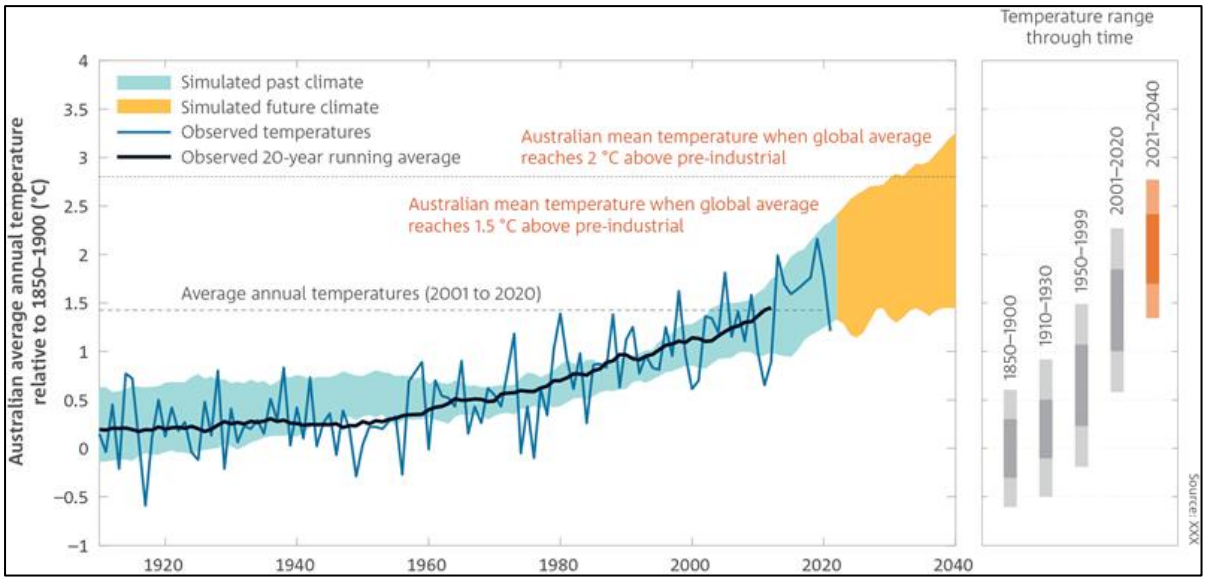

Figure 1: Australian average annual temperature in observations and global climate models shown relative to the 1850–1900 baseline approximating the pre-industrial era. Past and future-coloured bands show the 20-year running average from models for historical conditions and all plausible future scenarios to 2040. Black dashed lines show the approximate average warming expected for Australia when the global average temperature reaches 1.5 and 2.0 °C above the pre-industrial era. The panel to the right shows the range of temperatures (one and two standard deviations) in various epochs from observations and the 2021–40 period as simulated by one climate model (the results from which broadly reflect the mean of all models). Source: CSIRO.

Australia's emissions reduction target of 43% below 2005 levels by 2030 and reaching net zero emissions by 2050, whilst a positive signal on climate action falls short of the deep,

[7] https://www.theguardian.com/environment/2023/oct/05/gobsmackingly-bananas-scientists-stunned-by-planets-record-september-heat

[8] https://weather.com/news/climate/news/2023-11-03-record-warmest-october-earth-2023

[9] https://www.iea.org/commentaries/the-world-s-top-1-of-emitters-produce-over-1000-times-more-co2-than-the-bottom-1

[10] https://www.columbia.edu/~jeh1/Documents/PipelinePaper.2023.05.19.pdf

[11] https://edition.cnn.com/2023/11/02/climate/the-planet-is-heating-up-faster-than-predicted-says-scientist-who-first-warned-the-world-about-climate-change/index.html

urgent cuts advocated by the IPCC and United Nations[12]. The earlier we cut emissions towards the net-zero target, and the earlier we reach that target, the greater the chance we have of maintaining a safe and habitable Earth for all of us. This is essential for our younger generation.

We note that the bill provides for decision makers to recognise and consider Scope 1, 2 and 3 emissions. At present, emissions associated with the export of coal and gas are not charged against the national emissions inventory. It should be clear that atmosphere does not respect the source of emissions; that all emissions impact the climate.

Climate impacts now and in the future

With the impacts from climate extremes likely to increase with the warming that is already locked in, action towards future prevention is a national responsibility as well as a moral obligation to our future generations.

Anthropogenic climate change has and will causes changes in our climate.

1. The number of new hot (high-maximum and high-minimum temperatures) temperature records increased dramatically in recent decades, while the number of cold records decreased. Increased hot record breaking occurs only in model experiments with anthropogenic forcings[13].
2. Local extreme temperatures can increase at a significantly higher rate than global average temperature under warming of 1.5°C and 2°C[14].
3. Global average marine heatwave frequency and duration increased by 34% and 17%, respectively, resulting in a 54% increase in annual marine heatwave days globally. Importantly, these trends can largely be explained by increases in mean ocean temperatures, suggesting that we can expect further increases in marine heatwave days under continued global warming[15].
4. Heatwaves in Australia have undergone major increases in the 2000's compared to earlier decades. With increases in global warming of 1.5-2°C, heatwaves may be 85% more frequent[16].

There are numerous impacts which are being felt in a warmer world. The IPCC's Sixth Assessment Synthesis report[17] has stated that there have already been widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere which has led to widespread adverse impacts (Figure 2). In turn, climate and weather extremes are affecting many facets of Australian society including infrastructure, human health, soil and water, agriculture, energy security, financial security and our natural environment, posing significant risks to the Australian and global economy. Our children and young people are experiencing a much

[12] https://www.ohchr.org/en/press-releases/2023/09/decarbonisation-and-de-pollution-strategies-must-be-guided-human-rights-un
[13] Lewis and King, 2015, Dramatically increased rate of observed hot record breaking in recent Australian temperatures, https://doi.org/10.1002/2015GL065793
[14] Lewis et al., 2019, Regional hotspots of temperature extremes under 1.5 °C and 2 °C of global mean warming, https://doi.org/10.1016/j.wace.2019.100233
[15] Oliver et al., 2018, Longer and more frequent marine heatwaves over the past century, https://doi.org/10.1038/s41467-018-03732-9
[16] Trancoso et al., 2020, Heatwaves intensification in Australia: A consistent trajectory across past, present and future, https://doi.org/10.1016/j.scitotenv.2020.140521
[17] IPCC, 2023, AR6 Synthesis Report: Summary for Policymakers Headline Statements, https://www.ipcc.ch/report/ar6/syr/resources/spm-headline-statements/

hotter and changed climate than previous generations. The growing concern around the tipping points in the earth's climate system only adds to the risk of major climate changes that our younger generations may face [18].

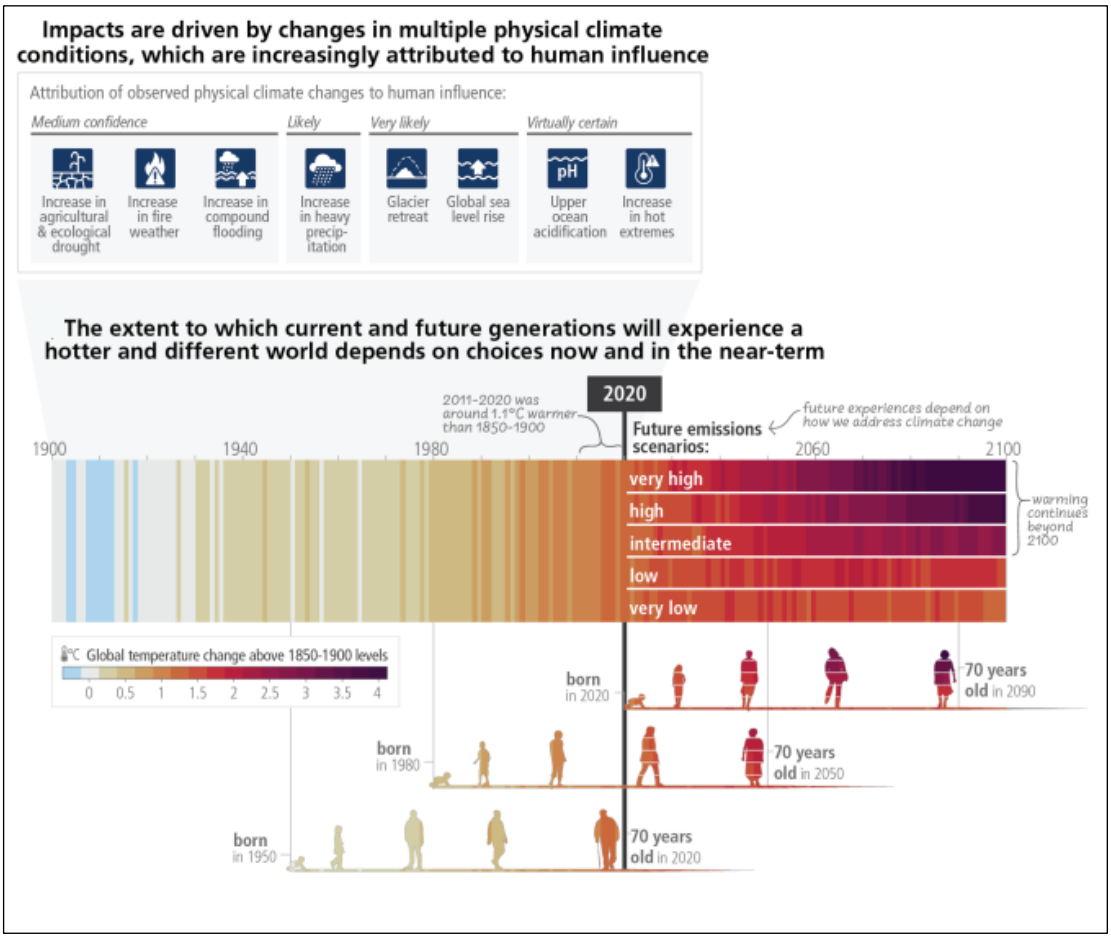

Figure 2: Adverse impacts from human-caused climate change will continue to intensify. Source: IPCC.

Here is a snapshot some of the impacts from events such as droughts, floods storms, heatwaves and wildfires, which are all set to become more intense and more frequent. They are translating into social, economic and health effects on society and likely only to be intensified for future generations.

Risks to human health from heat

Heatwaves are prolonged periods of extreme temperature which can impact a wide range of sectors including public health. Heatwaves in Australia are becoming more frequent and lasting longer as shown by the Centre's researchers[19]. Heatwaves will continue to increase with climate change and may be 85% more frequent in Australia with global warming of 1.5-2°C [20]. Global warming also makes higher heat extremes possible. Importantly, local scale

18 https://www.science.org/doi/10.1126/science.abn7950
[19] Jyoteeshkumar, R.P, Perkins-Kirkpatrick, S.E. and Sharples, J.J., 2021. Intensifying Australian heatwave trends and their sensitivity to observational data. Earth's Future, 9(4), p.e2020EF001924.
[20] Trancoso et al., 2020, Heatwaves intensification in Australia: A consistent trajectory across past, present and future. https://doi.org/10.1016/j.scitotenv.2020.140521

temperature extremes can increase at a significantly higher rate than the global average temperature increase rate[21].

High temperatures during heatwaves can lead to heat-related illnesses such as heat exhaustion and heatstroke, particularly affecting vulnerable groups including the elderly, children, Indigenous populations and individuals with pre-existing health conditions. Moreover, heatwaves can exacerbate respiratory and cardiovascular diseases, trigger dehydration, and increase the risk of heat-related fatalities[22]. In addition to high temperatures, the combination of heat and humidity during heatwaves can further intensify the health risks. High humidity reduces the body's ability to cool itself through perspiration, leading to increased heat stress and discomfort. Research on heat stress and hospital admissions emphasises the need to choose suitable heat stress indices for modelling purposes[23].

Research led by our Centre has shown that high heat stress in urban areas pose a serious threat to human health[24]. Centre research has investigated the impact of urban land cover on thermal comfort, finding that increased grass and tree cover can reduce temperatures by 5°C [25]. Currently Centre research is assessing the risk of heat stress as a function of socio-economic status and population density in Australia. This will provide insight into the vulnerability of different socio-economic groups and densely populated areas to heat stress in Australia.

Fire

From 1 July 2019 to the end of the bushfire season on 31 March 2020, there were more than 11,400 bush and grass fires across NSW. The fires burnt 6.2 per cent of the state – the largest burnt area recorded in a single fire season in eastern Australia[26].

Fire is a natural part of the Australian climate which can cause injuries, loss of life and other health impacts. The impacts from bushfires are expected to increase with climate change (IPCC synthesis report)[27]. In Australia, extreme fire weather days have become more frequent, and the fire season has lengthened since 1950 in various locations. Projections indicate that fire weather events in Australia will continue to increase in intensity, frequency and duration[28,29] . Several significant fires in southern-eastern Australia, such as those in the

[21] Lewis et al., 2019, Regional hotspots of temperature extremes under 1.5 °C and 2 °C of global mean warming. https://doi.org/10.1016/j.wace.2019.100233
[22] Gasparrini, A. et al., 2017. Projections of temperature-related excess mortality under climate change scenarios. The Lancet Planetary Health, 1(9), pp.e360-e367.
[23] Goldie, J et al., 2017. Comparative evaluation of human heat stress indices on selected hospital admissions in Sydney, Australia. Australian and New Zealand journal of public health, 41(4), pp.381-387.
[24] Nazarian, N. et al., 2022. Integrated assessment of urban overheating impacts on human life. Earth's Future, 10(8), p.e2022EF002682.
[25] Nice, K.A. et al., 2022. Isolating the impacts of urban form and fabric from geography on urban heat and human thermal comfort. Building and Environment, 224, p.109502.
[26] Black Summer bushfires, NSW, 2019-20 (aidr.org.au)
[27] IPCC, 2023. AR6 Synthesis Report: Summary for Policymakers. https://www.ipcc.ch/report/sixth-assessment-report-cycle/
[28] IPCC, 2021. 2021: Weather and Climate Extreme Events in a Changing Climate. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. doi:10.1017/9781009157896.013.
[29] Cruz, M. G., 2012. Anatomy of a catastrophic wildfire: The Black Saturday Kilmore East fire in Victoria, Australia. Forest Ecology and Management, 284, 269–285. https://doi.org/10.1016/j.foreco.2012.02.035

Black Saturday bushfires[30], the 2003 Canberra bushfire[31], and the 1983 Ash Wednesday bushfires have occurred in recent times resulting in mortalities or increased health burdens[32],[33]. Exposure to hazardous pollutants and smoke particles during fire weather wide ranging health impacts including eye and throat irritation, headaches, anxiety, respiratory issues, and cardiovascular problems[34].

Rainfall

Heavy rainfall and storms can lead to flooding, which poses immediate risks to human life and safety[35] as well as damage to infrastructure. The east coast floods in 2022 were the costliest in Australia's history totalling $5.45 billion in insured losses across Queensland and New South Wales[36]. Events like the east coast floods have lasting health effects with disadvantaged populations being particularly vulnerable. Notably, in the 2017 Lismore flood, more than 80% of the residents lived in the lowest socio-economic neighbourhoods[37]. Lismore, additionally, has a history of flooding, highlighting how compounding impacts of multiple disasters require on-going health services support. A compound event is caused by multiple hazards or drivers. In this case, a combination of meteorological phenomena caused persistent, heavy rain to fall on catchments that were already sodden and primed for flooding due to a second consecutive La Niña event. Persistent, stalled weather systems resulted in multiple flooding events exacerbating an already flooded area[38].

Rainfall trends vary across different parts of the country as shown by research undertaken by the centre[39,40, 41,42]. As the planet warms, the atmosphere's capacity to hold moisture is expected to increase globally. High intensity rainfall events are likely to increase with climate change, impacting the risk of flash flooding[43] however, rainfall is also expected to become more variable, with more frequent swings from extreme droughts to flooding rains[44].

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[30]Engel, C. et al., 2013. The meteorology of Black Saturday. Quarterly Journal of the Royal Meteorological Society, 139(672), 585–599. https://doi.org/10.1002/qj.1986

[31] Mills, G. A. 2005. On the subsynoptic-scale meteorology of two extreme fire weather days during the Eastern Australian fires of January 2003. Australian Meteorological Magazine, 26.

[32] Rodney R, et al., Front. Public Health, 14 October 2021. Sec. Disaster and Emergency Medicine. Volume 9 - 2021. https://doi.org/10.3389/fpubh.2021.682402

[33] Balasooriya, N. N., et al., Air pollution and health outcomes: Evidence from Black Saturday Bushfires in Australia, Social Science & Medicine, Volume 306, 2022, 115165, ISSN 0277-9536, https://doi.org/10.1016/j.socscimed.2022.115165.

[34] Grattan Institute. 2020. The health effects of the 2019-20 bushfires Submission to the Royal Commission into National Natural Disaster Arrangements. https://grattan.edu.au/wp-content/uploads/2020/04/Grattan-Institute-submission-to-Royal-Commission.pdf

[35] Gray, S. Long-term health effects of flooding, Journal of Public Health, Volume 30, Issue 4, December 2008, Pages 353–354, https://doi.org/10.1093/pubmed/fdn092

[36] Insurance Council, 2022, Updated data shows 2022 flood was Australia's costliest, https://insurancecouncil.com.au/resource/updated-data-shows-2022-flood-was-australias-costliest/

[37] Rolfe, M.I. et al., 2020. Social vulnerability in a high-risk flood-affected rural region of NSW, Australia. Nat Hazards 101, 631–650. https://doi.org/10.1007/s11069-020-03887-z

[38] Holgate, C., Evans, J.P., Taschetto, A.S., Gupta, A.S., Santoso, A. 2022. The Impact of Interacting Climate Modes on East Australian Precipitation. Moisture Sources. Journal of Climate 35, 3147–3159. doi:10.1175/JCLI-D-21-0750.1

[39] Dey, R et al., 2019. A review of past and projected changes in Australia's rainfall. WIREs Climate Change 10, e577.

[40] Dey, R., Gallant, A. J. E. & Lewis, S. C., 2020. Evidence of a continent-wide shift of episodic rainfall in Australia. Weather and Climate Extremes 29, 100274.

[41] Guerreiro, S. B. et al., 2018. Detection of continental-scale intensification of hourly rainfall extremes. Nature Clim Change 8, 803–807.

[42] Hope, P., Timbal, B. & Fawcett, R. 2010. Associations between rainfall variability in the southwest and southeast of Australia and their evolution through time.

[43] Ayat, H et al., 2022. Intensification of subhourly heavy rainfall. Science, 378(6620), pp.655-659.

[44] Fowler et al., 2021. Towards advancing scientific knowledge of climate change impacts on short-duration rainfall extremes, Phil. Trans. R. Soc. A., https://doi.org/10.1098/rsta.2019.0542

Other novel health effects

It is important to note that there is a probability that unknown health impacts may emerge due to increased temperatures. For example, Candida auris is a novel fungal disease which has emerged on three different continents, and generally affects immunosuppressed individuals. It may be the first example of a new fungal disease emerging where amongst other factors, climate change has contributed[45].

Impacts of weather events on younger generations

Everyone caught up in a weather event is affected in some way, whether it is environmentally, economically, socially, culturally, or through health. However, for children, the harm is disproportionate [46] with the effects being long-lasting. Events can be dangerous, resulting in physical harm and impacts to food and water supply effecting nutrition, displacing families, and education. Psychologically, effects can range from grief to stress and social disruption.

We have demonstrated using examples, only a small fraction of the impacts attributed to anthropogenic greenhouse gases. The younger generation are the major stakeholder for society's policy response to climate change, as the main group who possess an interest, moral right and are affected by the issue and the response to it. In any well-designed effective policy response, the Australia government consults with key stakeholders. It is a crucial aspect of policymaking and service delivery. Younger generations are and will be the beneficiaries of the gamut of policy responses to climate change. They have fewer avenues through which they can voice their opinions. It is therefore our responsibility to advocate for them[47]. Here we provide a voice from the younger members of our Centre.

Intergenerational Equity Bill – Early Career Researcher contribution

The following response has been written by postdoctoral researchers and higher degree research students (hereafter early career researchers; ECRs) at the Australian Research Council Centre of Excellence for Climate Extremes (the Centre). They are the emerging climate scientists who were all keen to express their views on the Intergenerational Equity Bill. Their views are conveyed below.

Authors: Isabelle Greco, Wilma Huneke, Sramana Neogi, Jon Page, Ramkrushnbhai Patel

Introduction

As early career researchers (ECRs) of climate science in Australia, climate change and its mitigation is the defining challenge of our careers, and our generation. Climate change will

[45] Casadevall, A., Kontoyiannis, D.P. and Robert, V., 2019. On the emergence of Candida auris: climate change, azoles, swamps, and birds. MBio, 10(4), pp.10-1128.
[46] Kousky, Carolyn. "Impacts of Natural Disasters on Children." *The Future of Children*, vol. 26, no. 1, 2016, pp. 73–92. *JSTOR*, http://www.jstor.org/stable/43755231. Accessed 5 Oct. 2023.
[47] Getting stakeholder engagement right | Australian Public Service Commission (apsc.gov.au)

affect all aspects of our lives: the work we perform[48], the food we eat[49], the energy we use[50], and the places in which we live[51]. There will undoubtedly be challenges on the road to net-zero and climate change mitigation. However, failure to take the necessary actions will force our generation and those after us to face even more serious crises. As such, we unequivocally support the Climate Change Amendment (Duty of Care and Intergenerational Climate Equity) Bill 2023.

We have a unique perspective on Australia's efforts to mitigate climate change. Although we are younger scientists, we are experts in climate science whose research enriches global understanding of climate risks both here in Australia and internationally. We have contributed to understanding the increasing occurrence of terrestrial and marine heatwaves[52], the changing risk of droughts[53] and flooding rains[54], southeast Australian bushfires[55], and the increasing risk of compound events in a warmer world[56].

The projections we generate and the impacts we study are not purely academic to us but are frightening indications of the future we and future generations will have to live through. The burden of being those responsible for understanding the alarming consequences of climate change whilst being rendered powerless to prevent them by poor political decisions, weighs heavily on our collective consciousness. Our generation is grappling with the uncomfortable reality that our future may not be getting better. We strongly urge you to act and ensure that we, as the next generation, can believe in a brighter tomorrow.

Impacts on our generation

There are many impacts of the evolving climate crisis which will affect our generation. We have outlined a selection below which represents the broad range of considerations which we will and are encountering - from our health to our environment.

Physical health impacts

The physical health implications of climate change are already manifesting across Australia and globally[57]. The escalating frequency and severity of heatwaves are leading to a surge in heat-related illnesses and fatalities, especially in warmer urban regions[58]. Concurrently,

[48] Mayfield et al, 2023, Labor pathways to achieve net-zero emissions in the United States by mid-century, Energy Policy, https://doi.org/10.1016/j.enpol.2023.113516
[49] Willett et al., 2019, Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems, https://doi.org/10.1016/S0140-6736(18)31788-4
[50] International Energy Agency, 2022, World Energy Outlook 2022, https://www.iea.org/reports/world-energy-outlook-2022
[51] Australian Government Department of Agriculture, Water and the Environment, 2021, National Climate Resilience and Adaptation Strategy 2021-2025, https://www.agriculture.gov.au/sites/default/files/documents/national-climate-resilience-and-adaptation-strategy.pdf
[52] Pathmeswaran et al., 2022, Exploring Potential Links Between Co-occurring Coastal Terrestrial and Marine Heatwaves in Australia, https://doi.org/10.3389/fclim.2022.792730
[53] Hobeichi et al., 2022, Towards a Robust, Impact-Based, Predictive Drought Metric, Water Resources Research, https://doi.org/10.1029/2021WR031829
[54] Reid et al., 2021, Extreme Water Vapor Transport During the March 2021 Sydney Floods in the Context of Climate Projections, Geophysical Research Letters, https://doi.org/10.1029/2021GL095335
[55] Jyoteeshkumar reddy et al., 2021, Modulating influence of drought on the synergy between heatwaves and dead fine fuel moisture content of bushfire fuels in the Southeast Australian region, Weather and Climate Extremes. https://doi.org/10.1016/j.wace.2020.100300
[56] Ridder et al., 2022, Increased occurrence of high impact compound events under climate change, npj Climate and Atmospheric Science, http://dx.doi.org/10.1038/s41612-021-00224-4
[57] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health
[58] https://www.sciencedirect.com/science/article/pii/S2212420921006324#:~:text=This%20study%20analyses%20statistics%20of,of%20these%2C%20244%20within%20buildings

bushfires are contributing to hazardous declines in air quality, while heavy rainfall and flooding pose threats to water purity, among other concerns. Beyond the obvious, we are beginning to discern connections between climate change and mosquito-borne disease transmission. Furthermore, our understanding of the interplay between bushfires, the energy grid, and domestic safety is deepening. Children, in particular, are identified as a vulnerable group susceptible to these adverse impacts in Australia[59]. The choices we make today bear directly on tomorrow's weather and climate, thereby, wielding a direct influence on the physical well-being of young Australians — those who are children today and those yet to come.

Emotional response to the climate crisis

As climate scientists, we know on a professional level, and feel on a personal level, the innumerable impacts our decisions and emissions have. Many of us limit and deeply consider our travel, weighing our desire to explore, learn, and grow as generations before us did with the intimate awareness of the impacts of our emissions. Eating has become an ethical minefield, as we attempt to balance our needs with the ethics of animal products, imported food, or harmful farming practices and come up short every time. In the face of all these concerns, many of us experience an element of eco-anxiety, eco-grief, eco-guilt, and eco-anger. It is easy at times to feel abandoned by the generations who have gone before us, seemingly happy to have ignored the climate change problem for so long.

However, as Australia finally becomes increasingly aware of the existing impacts of our changing climate, some of this anxiety, grief, guilt, and anger is tempered by a sliver of hope. Taking steps towards net-zero have been shown to reduce climate anxiety. Considering young people in current decision-making reminds us that we are not alone in this generational challenge. Just as every new fossil fuel project approved feels devastating, every decarbonisation project initiated with our future in mind is a victory for us. As we mentally prepare ourselves for the increasingly troubling future, you, the Australian Government, can support us. Do your part to gift us and future generations the best future you can.

Family Planning

ECRs are often of the age where family planning begins to take an important role in our lives. For many people, nurturing the next generation is a fundamental and cherished aspiration, contributing to a lasting, positive legacy for society. While there are obviously many factors influencing the decision to have a child, we are amongst the first generation for whom climate change is necessarily a consideration[60]. The moral and ethical dilemma of bringing the future generation into an existence that is plunging rapidly towards climate catastrophe causes anguish amongst those of us who desire or are contemplating children. Furthermore, for those who still decide to have children, climate change will have negative effects on parent and child both before and after birth[61,62,63].

Environmental & ecosystem impacts

[59] https://www.climatechange.environment.nsw.gov.au/climate-impacts-our-health-and-wellbeing
[60] https://link.springer.com/article/10.1007/s10584-020-02923-y
[61] https://www.bmj.com/content/371/bmj.m3811
[62] https://onlinelibrary.wiley.com/doi/10.1111/ppe.12822
[63] https://obgyn.onlinelibrary.wiley.com/doi/10.1111/1471-0528.12397

The Australian identity is inseparable from the natural environment, with our pride rooted in our unique marsupials and fauna as well as the rugged beauty of the bush. However, the impact of climate change is evident as it continues to degrade ecosystems, putting more of our treasured national species and environments at risk. The gradual endangerment and extinction of the landscapes and ecosystems we grew up with leave us with the unsettling realisation that the Australia we know may be denied to future generations. This trend is especially distressing for our First Nations peers, whose deep connection to the Country is threatened by its degradation. To truly embody the Australian spirit, it is essential to cherish the bush and the rich diversity of life it supports. Failing to act will deprive our children and their descendants of the same profound connection to our land.

Apart from the environmental, social, and cultural impacts of the loss of our Australian ecosystems, there are also certain tangible economic risks involved. The tourism industry, which forms a major part of the Australian economy, is also perhaps the most threatened by climate change impacts. We have already seen multiple significant coral bleaching events in the Great Barrier Reef (https://www.climatecouncil.org.au/resources/tourism-2018/)), and the future projections of high temperatures in the Red Centre and sea level rise at iconic beaches do not bode well for tourism prospects. The economic damage however will, once again, be felt most severely by current and future young Australians.

Opportunities for a new approach

While it is tempting to believe all hope is lost, we, the authors, admit to occasionally succumbing to this sentiment. We are acutely aware of the irrevocable climatic changes we have sealed in, changes we would have preferred to avoid. Nevertheless, we also know that there are emissions pathways which likely enable us to keep warming below two degrees. With a combination of existing and emerging technologies and the dedication of numerous individuals committed to adapting our world to the inevitable impacts of climate change, the challenge, though daunting, offers the promise of transformative positive impacts.

We sincerely hope that when the well-being of current and future Australian young people are considered, we will see why we cannot continue to approve new coal, oil, and gas projects. Young Australians cannot consent to shouldering the amplified risks to their built and natural environments that these decisions entail. Society must acknowledge the burden that carrying this monumental risk places upon them. We hope that this lens on risk will direct decision makers towards the many positive projects that can support young Australians, rather than lock in future harm. If Australia is to do right by our young people and rapidly transition to net-zero, we will need to transform our energy, our agriculture, our infrastructure, and the structure of our society as quickly as possible. We must pave the way for the younger generation to become the scientists, engineers, visionaries, and leaders that we need. The transition presents an opportunity for young people to create the world in which they wish to live, and for all of us to support them on this journey.

As a society, we must avoid policy and legislative decisions which actively harm young people but instead give them hope. We hope that when you are asked ‘what did you do, once you knew’ (as Bob Brown did), you are able to respond that you took action to create a nation in which young and future Australians could thrive.