Australian National University

Submission: Select Committee on Information Integrity on Climate Change and Energy

ANU Institute for Climate, Energy & Disaster Solutions

This submission is the collated perspective of independent researchers that work at the Australian National University. The views and opinions expressed in this submission reflect those of the authors and contributors.

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TEQSA Provider ID: PRV12002 (Australian University)
CRICOS Provider Code: 00120C

11 September 2025

Senator Peter Whish-Wilson
Committee Chair
Select Committee on Information Integrity on Climate Change and Energy
Department of the Senate
PO Box 6100
Parliament House
Canberra ACT 2600

Re: Submission invitation – Inquiry into Information Integrity on Climate Change and Energy

Dear Senator Peter Whish-Wilson,

Please find enclosed a submission by the ANU Institute for Climate, Energy and Disaster Solutions (ICEDS) for the Select Committee on Information Integrity on Climate Change and Energy.

Based in the ACT, ICEDS connects industry, governments and communities with climate, energy and disaster-risk research from the Australian National University. Our goal is to advance innovative solutions to address climate change, energy system transitions and disasters. We facilitate integrated research, teaching and policy engagement across disciplines.

The enclosed submission contains contributions from experts in science and climate communication, science misinformation, climate economics and policy, environmental policy, psychology and linguistics.

Our network of ANU researchers will gladly offer further consultation.

Sincerely,

Llewelyn Hughes

Director, Institute for Climate, Energy and Disaster Solutions

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Executive Summary

The Australian National University (ANU) Institute for Climate, Energy and Disaster Solutions (ICEDS) welcomes the opportunity to provide input to the Senate Select Committee on Information Integrity on Climate Change and Energy.

In this submission we examine the growing challenge of climate and energy misinformation in Australia and provide recommendations to strengthen information integrity. We outline the context of climate misinformation, highlighting its amplification through digital platforms, traditional media, and interpersonal communication.

We consider the prevalence of climate and energy misinformation in Australia. Examples include conspiracy narratives around Cyclone Alfred, false claims about bushfire causes during the 2019–20 Black Summer, and misleading statements about progress toward climate goals and energy costs.

We then examine the factors that enable the spread of climate and energy misinformation, including: the role of digital platforms, where algorithms amplify sensationalist content and create echo chambers; the challenge of effectively communicating science in ways that engender trust; and the greater vulnerability of minority communities due to limited access to culturally appropriate information.

Finally, we explore the role of actors spreading misinformation, including climate contrarian think tanks, AI-driven bots, and astroturfing campaigns that undermine renewable energy initiatives and seed distrust in climate policies.

We recommend:

1. Requiring greater transparency from social media and digital platforms about how their internal algorithms curate users' social feeds and determine content recommendations.
2. Funding digital and media literacy education training initiatives and climate change education that specifically teach students and youth how to evaluate the credibility of information they encounter and how people's biases may affect their judgements.
3. Funding professional training and education to enhance the quality and accuracy of science reporting. This could include the importance of localising climate coverage in order to tie stories to local identities and impacts.
4. Improving cultural sensitivity of government climate and energy messaging. This could involve the formation of collaborative networks to deliver linguistically and culturally appropriate messages to minority groups.
5. Supporting research into the effectiveness and potential adverse impacts of "pre-bunking" or psychological "inoculation" campaigns. These would educate people about the rhetorical techniques being used by dishonest actors to seed disinformation, and how to build resilience against such techniques.
6. Funding research into how digital research methods could be enhanced to detect networks of fake opinion and bots as they emerge in response to public debate about climate and energy.
7. Supporting research into the efficacy of these recommendations and any unintended consequences thereof, as some have limited evidence or formal evaluation, particularly in the Australian context.

1. Introduction and Definitions

The proliferation of misinformation and disinformation has emerged as one of the defining challenges of the contemporary information environment, spreading through multiple channels including digital platforms, traditional news media, and everyday interpersonal communication. False or misleading information about science, health and politics circulates through television and radio broadcasts, newspaper coverage, workplace conversations, family discussions, community gatherings, social media networks, and other digital channels. This challenge has been amplified by the development and widespread adoption of modern communication technologies, economic pressures on the news media and people's motivations to find answers that suit strongly held attitudes.

Climate change represents a critical domain within this broader misinformation challenge. Climate science involves complex, long-term processes that can be difficult for non-experts to evaluate, creating opportunities for selective presentation of data, cherry-picking of studies, and exploitation of scientific uncertainty (an inherent feature of all scientific inquiry). Further, likely responses to the risk of climate change involve government intervention, raising concerns among those with strong suspicions about the government's role in our economy and broader society.

We adopt the definition of misinformation used by the National Academies of Sciences, Engineering and Medicine (2025), who define misinformation about science as, "information that asserts or implies claims that are inconsistent with the weight of accepted scientific evidence at the time (reflecting both quality and quantity of evidence). Which claims are determined to be misinformation about science can evolve over time as new evidence accumulates and scientific knowledge regarding those claims advances," (National Academies of Sciences, Engineering, and Medicine, 2025, p2.)

This definition has several useful components. First, it includes claims contrary to the weight of scientific consensus that cannot be substantiated with evidence, such as new claims that have not yet been examined through empirical methods. Importantly, it does not imply that new insights with a robust empirical basis are classified as misinformation simply because they run counter to the established evidence. This would instead be viewed as the normal functioning of scientific debate and advancement. Second, the test for misinformation is whether it is consistent with evidence at the time, avoiding prolonged arguments about who should determine what is misinformation and what is not. Third, the definition acknowledges that the evidence base in any topic of science may change as new or better research is conducted, or if circumstances change.

Disinformation is like misinformation but with two additional features. First, that the agent communicating the claim is aware that it cannot be substantiated with evidence. This includes hyper-partisan claims, for example. Second, that the agent communicating the claim is aware that it is likely to lead to harm, at least for some people. This could include financial deception such as scams, or political manipulation, such as misleading propaganda. Establishing an agent's intentions is not easy, however, and, either way, both misinformation and disinformation can harm, and can harm significantly. Therefore, we use misinformation as an umbrella term unless we refer to disinformation explicitly.

2. Prevalence

2.1 Misinformation in Australia

Measuring misinformation prevalence among the Australian population is challenging. While some research has attempted to do this in social media contexts in other countries, these

attempts generally do not include misinformation shared through the traditional news media or through personal communication between people.

Case examples of climate change misinformation in Australia are wide ranging and can include climate denial and misinformation regarding climate change solutions and causes of disasters. Alternative narratives to disasters are propagated on social media, for example, during Cyclone Alfred in Queensland some misattributed the disaster to geoengineering (Smith, 2025). Other examples include the false narratives circulated during the Black Summer bushfires of 2019-2020, which wrongly assigned the disaster to arson, denying links to climate change (Weber *et al*., 2020). Misinformation around disasters is intrinsically linked to climate change misinformation. Increasing disaster frequency and severity is one manifestation of a changing climate. These narratives can have harmful consequences for individuals' understanding of climate change and disasters, their trust in government institutions and messaging, their obedience to evacuation orders, and their ability to recover after a disaster (Hilberts et al., 2025). These cases illustrate how climate misinformation pervades Australia's public discourse, disseminated through diverse strategies from cherry-picking data to promoting previously debunked arguments.

As Australia faces increasing climate impacts and considers policy responses that will shape the nation's economic and environmental future, ensuring public access to accurate, relevant and useful climate information has become essential for informed democratic decision-making and effective policy implementation. It is crucial that communicators from trusted institutions, such as universities, engender public trust by clearly stating the limits of current knowledge and expertise, avoiding the conflation of values with empirical facts (to the extent that facts can be separated from values), and ensuring that they communicate with transparency and integrity. Despite the clear consensus in the scientific data about climate change (Cook *et al*., 2016), surveys find that many Australians do not believe the climate is changing or believe that any change to the climate is not influenced by human behaviour (e.g., ANCPAS, 2018; Neumann *et al*., 2022). Further, 18% of Australians believe that "climate change is a hoax and scientists touting its existence are lying" (Stockemer & Bordeleau, 2024). While misinformation does not explain this gap in full, repeated exposure to climate misinformation can change people's beliefs in line with common misinformation claims, even those who endorse the scientific consensus (Jiang *et al*., 2024).

3. Enabling Factors

3.1 Communication Environment

In the current communication environment, it is easier than ever to share information with other people. People participate in social networks which connect them with other people, whose behaviour and opinions can influence their own (and in turn, whose behaviour and opinions they can influence). With the advent of the internet, and particularly social media, these systems are becoming larger than ever and include people who are spatially separated. A result of this has been the growing importance of peer-to-peer and networked communication in place of top-down communication (Nerlich *et al*., 2010), with friends and relatives seen as trusted sources of climate change information (Connor *et al*. 2016). This has significantly amplified the propagation of misinformation, which is no longer constrained by the editorial decision-making of traditional media.

Information passed through social networks may differ from the original message (Connor *et al.,* 2016), so climate information people receive may not be accurate. Additionally, these networks may only be receptive to particular types of messaging. Williams *et al.* (2015) found a high degree of segregation in climate change discussion on Twitter, with users tending to seek out

and interact with other like-minded users magnifying their exposure to similar messaging and creating climate misinformation echo-chambers.

Algorithms and financial incentives determine content presented on private social media platforms and its visibility. Platforms earn revenue through users' exposure to advertising content, a financial model that has led to the use of algorithms for pre-selecting the information users see based on how attention grabbing it is, rather than how accurate or useful it may be. Information that is sensationalist or confirms existing biases receives more attention and content producers compete in the 'attention market', marked by an oversaturation of information (Just & Latzer, 2016). People are also more likely to engage with material that stimulates outrage (Vosoughi *et al.*, 2018, McLoughlin *et al.*, 2024), and more likely to click through to links with negative rather than positive sentiment in the titles (Robertson *et al.*, 2023). With the collection of personal data and emergence of advanced algorithms, the information users see is being tailored to individuals' sensitivities and preferences, further amplifying the echo-chamber effect and the frequency with which a user is exposed to the same message (Sirbu *et al.*, 2019; Cinelli *et al.*, 2021). This creates a reinforcing feedback loop whereby users are exposed to increasingly sensationalist content by producers competing for their attention, a loop which has been linked to opinion fragmentation and polarisation of climate change views (Sirbu *et al.*, 2019; Treen *et al.*, 2020).

These selection processes are occurring through black-box algorithms, preventing transparency around what content the population is exposed to or how it is selected. This gives social media companies control of determining what information users see, with essentially no societal oversight. It also hampers any efforts to regulate these platforms (Hunt & McKelvey, 2019). The influence of these algorithms and lack of transparency has been linked to the spread of misinformation, along with the amplification of hate speech and declining mental health (Gausen *et al.*, 2024). Greater transparency could empower users to make informed decisions about how they engage with social media and digital platforms.

Recommendation One: Require greater transparency from social media and digital platforms about how their internal algorithms curate users' social feeds and determine content recommendations.

Compounding the challenges presented by the online communication environment are the shortcomings in school-based climate education described by Australian students (Jones and Davison, 2021) and teachers (Beasy *et al.*, 2023). The Australian Curriculum offers little in the way of mandate or practical guidance for teaching this challenging topic, and there is no coherent national policy for climate education (Whitehouse and Gough, 2022). Lacking meaningful climate education at school, curious students may supplement their learning online. What they encounter there may indeed be misinformation: young people have described such explorations as "going through a loophole of social media and getting fed this false information" (Russell, 2024, p.8) and "an existential rabbit-hole" (Russell, submitted). Providing young people with a comprehensive education about climate change and media literacy is therefore an important avenue for systemic intervention.

Recommendation Two: Fund digital and media literacy education training initiatives and climate change education that specifically teach students and youth how to evaluate the credibility of information they encounter and how people's biases may affect their judgements.

3.2 Communicating Expert Knowledge

Many historic and current efforts to communicate climate change see the public as being in an information deficit. By making information more available, the public is expected to come to understand and agree with the scientific consensus (Nerlich *et al.*, 2010). This flawed 'knowledge deficit model', has been criticised for being overly simplistic, eroding trust, and inaccurately characterising the relationship between knowledge, attitudes, beliefs, and behaviours, particularly for politically polarised issues like climate change (Suldovsky, 2017;

Grant, 2023). This disregards the different realities groups inhabit that affect the way they receive science communication. The creators and receivers of climate change and energy communication are often both spatially and socially separated, which can result in them having distinct standpoints. What is commonsense or compelling to one group may feel alien and threatening to another. These different ways of knowing and being should be taken seriously, and caution is warranted when making claims by appealing to an unrealistic ideal of scientific objectivity (De Wit & Haines, 2022), as some communities may not share this understanding of objectivity. There is also little evidence to suggest that attempting to correct misinformation by supplying more scientific facts is effective (Chan & Albarracín, 2023).

When assessing the prevalence of misinformation, there is need for caution when labelling a claim as such. Some may still contain a 'grain of truth', or a truthful claim may be selectively framed within a context that exacerbates the implications of the claim (Winter *et al.* 2024). The misinformation label in such cases reinforces stereotypes of elites seeking to censor things that they do not want to believe (Bellamy, 2024; Buck, 2024). This highlights the need for people in positions of epistemic authority to be hypervigilant to the accuracy of their own claims. Enough evidence now shows the importance of 'intellectual humility' or acknowledging limitations to knowledge as being a trait that underpins credibility of and trust in science communicators. People who view scientists as intellectually humble tend to have more faith in science and scientists across a variety of disciplines, including climate change (Koetke *et al.*, 2025). Researchers have also found that people high in intellectual humility tend to hold higher trust in science and scientists, and tend to be less sceptical of climate change (Huynh et al., 2025). People view political leaders who express intellectual humility via expressing their openness to alternative views more positively even when they do not agree with that politician (Cooper & Okten, 2024). There is a need for more research into the importance of intellectual humility for communicating expert knowledge, particularly how perceived intellectual humility amongst scientists and experts could engender trust and reduce climate scepticism.

3.3 Groups Susceptible to Misinformation

Not all people are equally susceptible to misinformation. Like in other countries, prior research has shown that many (but not all) Australians who reject the science of climate change also reject the science of vaccination, indicating that their attitudes may be based on deeply held attitudes about science or other psychological factors such as a tendency towards conspiratorial thinking (Hornsey *et al.,* 2018; Richardson *et al.*, 2023). This aspect requires more research, though we note that the Australian Government has listed this in its National Science and Research Priorities (Commonwealth of Australia, 2024).

Underrepresented and minority communities can also be particularly vulnerable to misinformation for several reasons. First, they are less likely to see themselves and their interests reflected in traditional media and so may be more likely to get their news from social media (Amazeen *et al*., 2024). Second, some marginalised people may have less access to independent, high-quality media, as well as limited opportunities to partake in digital literacy training which may mean they are less able to determine the factual status of news they come across (Cover et al., 2022). Finally, the use of majority languages in communication may evoke histories of domination and mistrust in minority language communities which can influence the perceived trustworthiness of the communicator (Di Carlo *et al*., 2022).

Climate and energy communication must strategically engage with minority communities in a culturally sensitive way in order to be effective (Amazeen *et al*., 2024). As Lewandowsky (2021) notes, culturally aligned messages are easier for people to understand and are received more favourably. The language used for communication is also crucial. Information conveyed in a person's native language is more likely to trigger an emotional response, thus making it more memorable (Di Carlo et al., 2022) and avoiding the difficulty that can come from navigating unfamiliar concepts encoded in one's non-native language. There could be significant value in

forming transdisciplinary networks between linguists, science communication experts, and community members in order to deliver linguistically and culturally appropriate messages to minority groups that could otherwise be more susceptible to misinformation (Di Carlo et al. 2022).

Recommendation Three: Fund professional training to enhance the quality and accuracy of science reporting. This could include the importance of localising climate coverage in order to tie stories to local identities and impacts.

Recommendation Four: Improve cultural sensitivity of government climate and energy messaging. This could involve the formation of collaborative networks to deliver linguistically and culturally appropriate messages to minority groups.

4. Actors

4.1 Role of Think Tanks and Influence Networks

Climate action contrarian think tanks are active around the globe, including in Australia (Fraussen & Halpin, 2016). These think tanks and their associated influence networks play a significant role in disseminating disinformation about climate change and renewable energy. This includes attempts to 'manufacture scientific controversy' (Ceccarelli, 2011). For example, Australian research found that just ahead of the UNESCO "In danger" recommendation for the Great Barrier Reef, the warning was preceded by thinktank messaging reframing the reef as currently healthy and anything stating otherwise as 'alarmist' (Lubicz-Zaorski, 2023). To add legitimacy to these contrarian claims, such thinktanks portray themselves as neutral organisations offering an alternative to academia with unbiased experts. However, in reality these entities are often funded by extractive industries and others looking to oppose climate and environmental policy. The Australian Institute for Public Affairs, which worked to discredit science and media narratives about the Great Barrier Reef's ailing health, was found to have up to half of its activities funded by an Australian mining magnate (Lubicz-Zaorski, 2023). The goal of many of these actors is not necessarily to promote clear disinformation but to instead promote sufficient doubt to delay any actions to prevent the harm of climate change, using similar tactics previously employed by the tobacco industry (Oreskes & Conway, 2011).

Thinktanks also fund academic research, and while this can be subject to peer review, they can significantly influence what is researched, the values underpinning the research, and the form, framing, and content of the messages that originate in academia (Graham, 2024). Climate contrarian thinktanks operate in coordinated ecosystems with other similarly aligned actors including advocacy organisations, advertising agencies, trade associations, and universities (Santamaría *et al*., 2024). Climate misinformation is seeded by these groups amongst Australian social media accounts on platforms such as YouTube, X, and Facebook (Lubicz-Zaorski, 2023; de Nadal, 2024). According to Winter *et al*. (2024), computer-assisted analysis of contrarian climate claims shows that conservative think tanks have moved from denying climate change to spreading misinformation about climate policies and renewable energy. Likewise, anti-wind farm lobby groups have gained greater media visibility, frequently using claims unsupported by scientific evidence.

Globally, obstructionist communicators employ various deceptive and misleading arguments about the harms of climate action. Major actors include fossil fuel companies and the agri-food sector, which depict climate policies as harmful to the national economy, promote gas as an essential transition fuel, and present renewable energy sources as expensive and inefficient (Santamaría *et al*., 2024).

Recommendation Five: Support research into the effectiveness and potential adverse impacts of "pre-bunking" or psychological "inoculation" campaigns. These would educate people about the

rhetorical techniques being used by dishonest actors to seed disinformation, and how to build resilience against such techniques.

4.2 Autonomous Actors

While disinformation is not a new phenomenon, the presence of AI and social media "bots" has reduced the cost and increased the ease of production of high-quality misinformation in vast quantities available for circulation on media platforms. Automated bots play a significant role in amplifying climate misinformation. Notably, a Brown University analysis reported that roughly a quarter (25%) of all tweets about the climate crisis were likely produced by bots, with bots responsible for an even higher fraction of tweets pushing climate-science denial or attacking climate policies (Marlow *et al*., 2021). A study by Shao *et al.* (2018) found that content produced by bots was more likely to spread virally on social media platforms and reach massive exposure. Bots were also engaged in advanced tasks such as following and responding to comments as well as accounting for 33% of the dissemination of misinformation, acting as "super-spreaders". When they observed human behaviour, humans were just as likely to share low-quality bot-created content as human content. The activity of bots contributes to a disproportionate amount of human engagement with low-credibility content.

4.3 Influence of Astroturfing

'Astroturfing' refers to the artificial creation of apparently spontaneous grassroots movements by sectional interests, such as think tanks, businesses, advocacy groups, or political parties. These groups aim to persuade governments that there is widespread community support for a particular issue, hoping officials will pay more attention to what appear to be independent voters rather than vested interests with clear agendas. A range of mechanisms can be used to fabricate the illusion of community sentiment, making it hard to detect third-party manipulation. These include using software to simulate mass online backing or organising rallies that conceal the involvement of vested interests (Wear, 2014).

Social licence for the rollout of renewable energy infrastructure has been challenged by efforts that appear similar to 'astroturfing'. Examples include political actors opposed to renewable energy projects co-opting legitimate fears but amplifying those legitimate fears with unreliable or dubious claims to foster public resistance to offshore wind projects. In one case, a fake article purporting to have been published in a reputable academic journal on ocean policy asserted that turbines proposed for the waters off the Illawarra and Hunter Valley would kill 400 whales a year. This fake article was disseminated through social media to networks of opposed and concerned people (O'Malley, 2023).

Hobbs *et al.* (2020) used digital research methods to examine whether there was an astroturfing campaign on Twitter in support of the Adani Carmichael coal mine in 2017. The study highlighted how covert social media campaigns can be used to undermine community interests in favour of corporate goals. They found that a small network of accounts posted a series of suspiciously similar pro-Adani tweets, suggesting a form of deceptive lobbying. The methods used in the study have been posited as a viable approach for detecting astroturfing.

Recommendation Six: Provide funding for research into how digital research methods could be enhanced to detect networks of fake opinion and bots as they emerge in response to public debate about climate and energy.

Recommendation Seven: Support research into the efficacy of recommendations in this submission and any unintended consequences thereof, as evidence is limited in this space and there is a lack of formal evaluation, particularly in the Australian context.

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