

# Australia's response to climate change

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## Scientific evidence

The scientific evidence for global warming is unequivocal. To avoid the widespread and dangerous impacts of climate change, strong action is required by policy makers and industry, for it is extremely likely that human influence has been the dominant cause. Mitigation responses are critical to reduce the rate of warming in the global climate system. Adaptation responses are necessary to reduce the impact of current and future climate related stresses and manage future climate change risks.

The Paris Agreement came into force in 2016, with its central aim to strengthen the global response to the threat of climate change<sup>1</sup>. To meet its initial target under the Paris Agreement, Australia has agreed to reduce its greenhouse gas emissions by 26 to 28 per cent below 2005 levels by 2030.

The Academy believes that Australia's mitigation and adaptation efforts will be strongly enhanced by the timely adoption and further advancement of science and technology innovations, supported by government policy settings that encourage investment in technologies already available. With strong leadership from government and active participation by industry, Australia is well placed to meet the challenges and be a leader in capturing the opportunities in effective climate change mitigation and adaptation.

## Mitigation

Mitigation involves reducing net greenhouse gas emissions to slow the pace of climate change and lower the risk and severity of its impacts. Global efforts to mitigate emissions are gathering pace, driven by rapid technological advances and their uptake by industry and communities. However, mitigation efforts must increase to avoid the significant dangers posed by an accelerating global warming.

The Academy has identified a number of key mitigation measures worthy of immediate adoption. These measures reflect a portfolio of technologies that would help Australia mitigate climate change and capture related opportunities:

- » zero- and low-emission energy sources, particularly solar and wind;
- » innovative energy efficiency and demand side management measures and intelligent grid technologies, that reduce and manage load on the energy supply system;
- » energy storage technologies to improve electricity grid stability and security;
- » electric vehicle batteries integrated into a zero-/low-emissions electricity grid;
- » changed agricultural practices to reduce greenhouse emissions intensity and increase net carbon sequestration in the land sector;
- » biofuels and biomass as low-emission energy sources;
- » carbon capture and storage technologies for energy production and industrial processes;
- » resource extraction with reduced fugitive emissions; and
- » next generation nuclear technology in the energy generation mix.

1. Achieving this requires keeping global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius (Paris Climate Change Agreement)

## Adaptation

Adaptation is the process of proactively responding to climate change as it occurs, in a systematic way. Greenhouse gas emissions have already altered the global climate system and will continue to do so well into the future, irrespective of any mitigation efforts. The progressive warming of the atmosphere and oceans is producing changes in rainfall patterns and in the frequency and magnitude of severe weather events such as extreme heat and cold, droughts, floods and storms. Changes in the oceans and the ice caps present climatic risks for societies, economies and ecosystems but they also provide new opportunities. Effective adaptation strategies are necessary to manage these risks and proactively identify new opportunities that may emerge from these climatic changes.

The Academy has identified several adaptation measures and processes for immediate adoption, or which require further innovation and government policy support:

- » the use of climate modelling and seasonal forecasting to better guide adaptation responses;
- » an integrated approach to water, food, energy and environment sectors that recognises their interdependencies;
- » improved modelling, and continued agricultural innovation, including big data, to develop new and modified farming systems;
- » infrastructure and urban planning review and design for increasing frequency of droughts, floods, storms, rising sea levels and temperature extremes;
- » new intelligent technologies that design and manage water use systems utilising measurement and monitoring technologies to provide real time information based management;
- » systems to monitor emerging health and disease threats posed by climate change; and
- » management strategies to increase the resilience of natural ecosystems to climate change.

## Key principles

The Academy has identified four key principles that will help drive Australia's response to climate change and facilitate uptake of the measures listed above. These require a commitment by industry and government to:

1. Adopt long-term bipartisan policies and programs that encourage the actions and investments needed for rapid and intensive deployment of technologies and measures to mitigate greenhouse gas emissions and adapt to the impacts of climate change;
2. Inform and test mitigation and adaptation responses, using leading-edge climate modelling and prediction techniques (which should be enhanced in areas where Australia has recognised leadership or unique needs);
3. Increase support for low-emissions technology research, development and demonstration, prioritising areas where Australia has recognised leadership or unique needs; and
4. Support Australian participation in cooperative international programs focused on developing solutions to climate change.

The innovation required for effective climate change mitigation and adaptation efforts offers immense opportunities for the creation of social, economic and environmental benefit. Australia requires a cross-sectoral roadmap to achieve net zero carbon emissions by 2050. The Academy stands ready to play its part in the required technological revolution.

### SOURCES

The Intergovernmental Panel on Climate Change, CSIRO and Bureau of Meteorology