



The Critical Decade 2013

Climate change science, risks and responses

Key Findings

Two years ago the Climate Commission warned that 2011-2020 is the 'Critical Decade' for tackling climate change. In particular, this is the Critical Decade for turning around rising emissions of greenhouse gases, and putting us on the pathway to stabilising the climate system.

One quarter of the way through the Critical Decade, many consequences of climate change are already evident, and the risks of further climate change are better understood. It is clear that global society must virtually decarbonise in the next 30-35 years. This means that most of the fossil fuel reserves must stay in the ground.

1. Our understanding of the climate system has continued to strengthen.

- › Over the past half-century, rapid changes have been observed across the world in many features of the climate system, including heating of the ocean and the air; changing rainfall patterns; reduction in the area of Arctic sea ice; mass loss of polar ice sheets; increasing sea level; and changes in life cycles and distribution of many plants and animals.
- › There is a very strong consensus that the climate is changing and that human activities, like the burning of fossil fuels, are the primary cause.
- › Scientists are now moving to new challenges, for instance, improving our understanding of shifting rainfall patterns and of potential abrupt or irreversible changes in major features of the climate system.

2. We are already seeing the social, economic and environmental consequences of a changing climate

Many of the risks scientists warned us about in the past are now happening.

- › **Heatwaves:** The duration and frequency of heatwaves and extremely hot days have increased across Australia and around the world. The number of heatwaves is projected to increase significantly into the future.
- › **Bushfire weather:** Climate change has already increased the risk of extreme fire weather in some parts of Australia, especially the populous southeast.
- › **Rainfall** patterns are shifting. The southwest corner of Western Australia and much of eastern Australia has become drier since 1970. The southwest and southeast corners of Australia are likely to remain drier than the long-term average or become even drier.
- › **Sea-level rise:** Global average sea level is now rising at a rate of 3 cm per decade and will continue to rise through the rest of this century and beyond, contributing to an increased frequency of coastal flooding around the world including Australia. For example, Fremantle has already experienced a three-fold increase in high sea level events since 1950.

3. The changing climate poses substantial risks for health, property, infrastructure, agriculture and natural ecosystems.

- › **Health:** Heat causes more deaths than any other type of extreme weather event in Australia. Increasing intensity and frequency of extreme heat poses health risks for Australians and can put additional pressure on health

services. Changes in temperature and rainfall may allow mosquito-borne illness like dengue fever to spread south.

- › **Property and infrastructure** across Australia has been built for previous climatic conditions and much of it is ill-prepared to cope with increasingly frequent and/or intense extreme weather.
- › **Agriculture:** Changing rainfall patterns and increasing risk of extreme heat and bushfire weather present challenges for Australian agriculture. Production of temperature- and water-sensitive broad-acre crops, fruit, vegetables and wine grapes needs to adapt to these changing growing conditions or move to locations where growing conditions are becoming more amenable for their production.
- › **Natural ecosystems:** Many Australian plants and animals are already responding to climate change by changing their distributions and the timing of life cycles. Climate change, in combination with other stresses, is increasing the risk of species extinctions and threatening many iconic ecosystems including the Great Barrier Reef, Kakadu National Park and the alpine zone.

4. One quarter of the way into the Critical Decade it is clear: some progress is being made globally to reduce emissions. However, far more will need to be done to stabilise the climate.

The decisions we make from now to 2020 will largely determine the severity of climate change our children and grandchildren experience.

- › There has been meaningful global progress in the last two years. All major economies, including China and the United States, are putting in place solutions to drive down emissions and grow renewable energy. It will take some time to see the full impact of these policies.

- › Carbon dioxide concentrations are at the highest level in over one million years. Despite global efforts they continue to increase at a rate much faster than at any other time in the recent geological record
- › Most nations of the world, including Australia, have agreed that the risks of a changing climate beyond 2°C are unacceptably high. The temperature rise is already approaching 1°C above pre-industrial, nearly halfway to the 2°C limit.
- › The best chance for staying below the 2°C limit requires global emissions to begin declining as soon as possible and by 2020 at the latest. Emissions need to be reduced to nearly zero by 2050.
- › Stabilising the climate within the 2°C limit remains possible provided that we intensify our efforts this decade and beyond.

5. Most of the available fossil fuels cannot be burned if we are to stabilise the climate this century.

- › The burning of fossil fuels represents the most significant contributor to climate change.
- › From today until 2050 we can emit no more than 600 billion tonnes of carbon dioxide to have a good chance of staying within the 2°C limit.
- › Based on estimates by the International Energy Agency, emissions from using all the world's fossil fuel reserves would be around five times this budget. Burning all fossil fuel reserves would lead to unprecedented changes in climate so severe that they will challenge the existence of our society as we know it today.
- › It is clear that most fossil fuels must be left in the ground and cannot be burned.
- › Storing carbon in soils and vegetation is part of the solution but cannot substitute for reducing fossil fuel emissions.

