

WHAT DOES CLIMATE CHANGE MEAN FOR YOUR LOCAL AREA?

THE FEDERAL ELECTORATE OF HERBERT

The Climate Council is an independent, crowd-funded organisation providing quality information on climate change to the Australian public.

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Figure 2: "Scuba Diving the Great Barrier Reef
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Australia is getting hotter. Seven of Australia's ten warmest years on record have occurred in the 13 years from 2002.¹ The summer of 2012/2013 was our hottest on record, and the records kept tumbling in the summer of 2013/2014 when in just 90 days over 156 records for heat, bushfires and drought were broken around the country.²

Australia's record heat continued into 2014. Spring was the warmest on record and 2014 was the third warmest year since records began.³

Parts of Australia are getting drier. Climate change will play a role in increasing drought frequency in southern Australia, with decreases in the amount of rainfall potentially as high as 10% by 2030, and 30% by 2070.⁴

Sea levels are rising around Australia. Currently sea levels have been rising at an average of 1.4 mm per year, in future this is very likely to increase, with a 1.1 m sea level rise leaving \$226 billion in commercial, industrial, road and rail, and residential assets exposed to coastal flooding.⁵

Heatwaves

Heatwaves are becoming hotter, lasting longer and occurring more often, with significant impacts for human health and natural ecosystems.

Figure 1 shows the warming trend being experienced in Queensland. The summer of 2012/2013 was the hottest on record, and all time-high maximum temperatures were set in Brisbane. Heatwaves in Queensland are becoming more intense, with the average intensity of heatwaves increasing in Brisbane by 1°C.⁶

The major heatwave of 2013/2014 gives an indication of the increasing intensity of heatwaves in Queensland. The sunshine state experienced its area-averaged hottest day on record. For the week ending on the 4th of January 2014, average maximum temperatures were 8°C or more above normal in southern inland Queensland.

More record hot days and associated heatwaves increase the risk of heat-related illnesses and death, particularly in the elderly. Deaths in Brisbane increased by 23% during the 7-26th February period when the temperature increased from 26°C to 42°C.⁷

Some of Queensland's most iconic marsupials are also at risk during extended periods of hot weather. For example, the green ringtail possum cannot control its body temperature when subjected to prolonged temperatures of over 30°C.⁸

Heatwaves are also affecting marine ecosystems. Ocean heatwaves are a well-known cause of bleaching in coral, with bleaching events occurring repeatedly on the Great Barrier Reef since 1970. The Great Barrier Reef has now lost 50% of its coral cover in the last 30 years and underwater heatwaves are contributing to this trend (see Page 6).⁹

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This is a serious concern for the electorate of Herbert, with the Great Barrier Reef Marine Park Authority located within its electoral boundaries.¹⁰

High temperatures with high humidity and low air movement can impact on the health of livestock, leading to loss of appetite, productivity, reproductive vigour, and sometimes death. Dairy cattle are particularly vulnerable to heat stress, which can reduce milk

production and quality. This has implications for the electorate of Herbert's beef cattle industry.

In the future Queensland is likely to experience an increase in hot days and heatwaves. In Brisbane for example, the average intensity of the hottest day of a heatwave has increased by 1.5°C (since 1950)¹¹

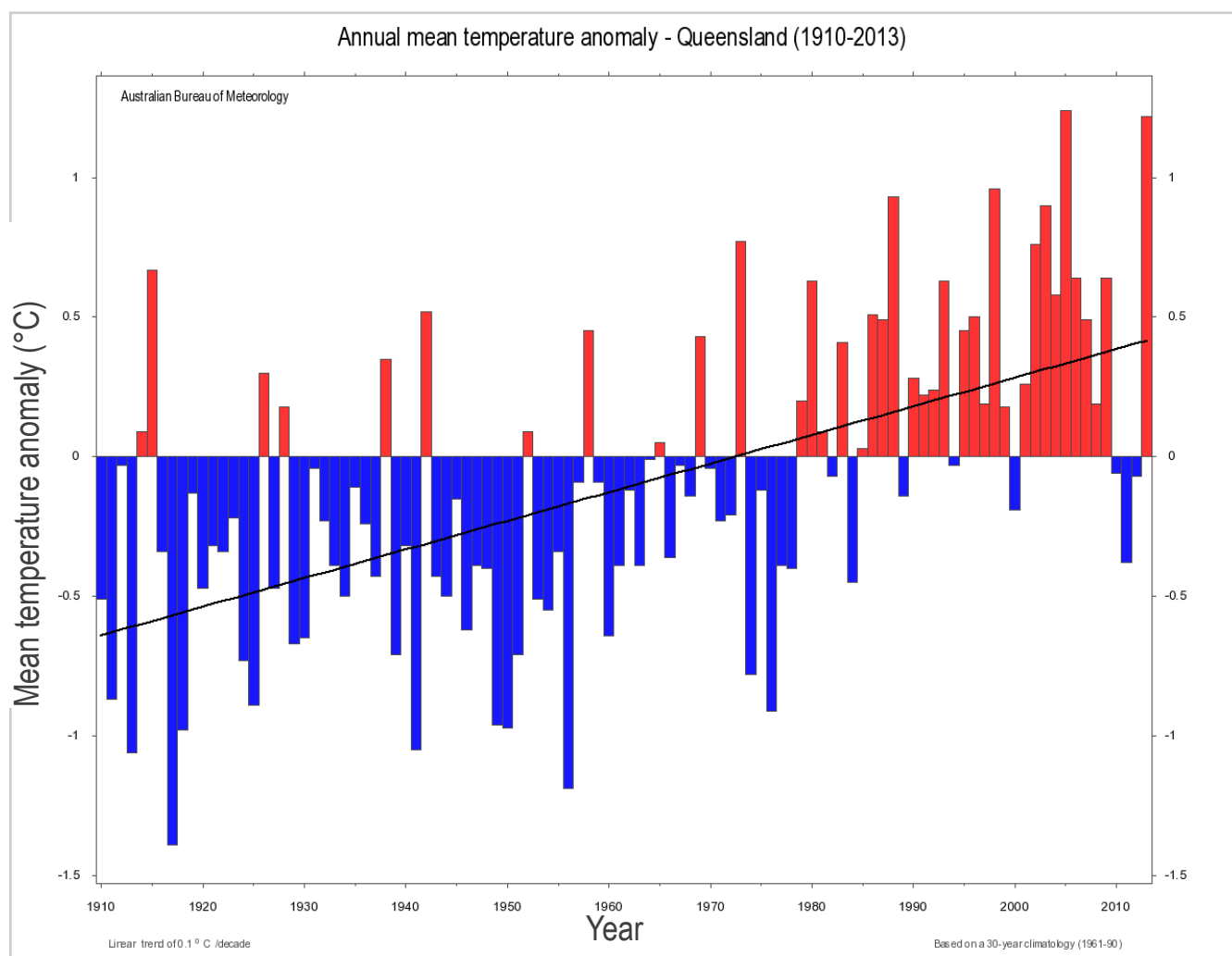


Figure 1: Queensland increasing heat (Australian Bureau of Meteorology)

Coastal Flooding:

Billions of dollars worth of damages

Queensland has the greatest combined risk, in term of both quantity and cost for a sea level rise of 1.1 metres.

For South-East Queensland the cost of coastal flooding could double by 2030 and quadruple by 2070. There are an estimated 35,200 residential buildings in Southeast Queensland currently exposed to a 1-in-100-year coastal flooding event; these buildings would suffer damages of about \$1.1 billion (2009 prices) from such an event.

By 2030, with an additional 0.2 m rise in sea level—and with the same planning and building regulations as today—the number of residential buildings at risk from a similar event is estimated to increase to about 61,500 and the costs to about \$2 billion (based on 2009 value).

By 2070, with a 0.5 m rise in sea level compared to 2000, a similar event will affect approximately 121,000

residential buildings with potential damages of about \$3.9 billion (2009\$)¹²

Over half the Australian coastline is vulnerable to recession from rising sea level, with 62% of the Queensland coast at risk.¹³

In Queensland there are 900-1,400 commercial buildings at risk from a sea level rise of 1.1 metres, with replacement costs of between \$10-\$15 billion.

Queensland also has the highest amount of residential buildings exposed to a sea level rise of 1.1 metres, with between 44,000 and 68,000 residential buildings at risk, at a cost of between \$15-\$20 billion.

Queensland also has the greatest length (between 420-570km) of rail infrastructure at risk of sea level rise.¹⁴

The electoral of Herbert is particularly vulnerable to flooding due to its proximity to the coast.

The Great Barrier Reef:

Climate change is threatening the iconic reef

Under current rates of ocean warming and acidification coral reef systems could be eliminated by mid-to late-century. If average global temperatures rise above 2°C it is expected that few coral dominated systems will survive.

The oceans have absorbed the vast majority of additional heat from the enhanced greenhouse effect –around 93%. The upper layer of the oceans, where coral reef systems are found, have absorbed most of this heat.

Increasing sea surface temperatures have already been driving significant changes in the species composition and structure of coral reefs around Australia. Increased sea temperatures have resulted in mass coral bleaching and mortality. Since the late 1970s there have been multiple mass coral bleaching events on the Great Barrier Reef and, most recently, on the Ningaloo Reef in Western Australia.

Increasing concentrations of carbon dioxide in the atmosphere means that more carbon dioxide is dissolved in the ocean. The increased ocean acidity that results poses significant risks for corals and many other marine organisms that form shells and skeletons from calcium carbonate.

Climate-related stressors on coral reef systems are exacerbated by non-climate stressors, further reducing their resilience. These include tourism, overfishing, sediment runoff and shipping.¹⁵

Rising sea levels also pose risks for Queensland's tourism. A substantial proportion of tourism revenue can be attributed directly to marine biodiversity and resources (\$5.1 billion annually and 54,000 jobs in the Great Barrier Reef catchment alone) but increased flooding and recession will damage the quality of marine and coastal ecosystems, potentially reducing marine tourism.¹⁶

The Great Barrier Reef has lost 50% of its coral cover in the last 30 years¹⁷



Figure 2: A turtle sighted on the Great Barrier Reef, Queensland

Renewable Energy in Queensland

Queensland has the second largest total emissions of any Australian state or territory at 134.5 MtCO₂e (in 2012), and emissions have been steadily increasing since 1990. In 2012, Queensland's greenhouse gas emissions represented nearly a quarter, 24.7 percent, of Australia's national emissions with stationary energy and agriculture the main sources of emissions.

Queensland does not currently have targets for reducing emissions or expanding renewable energy.

The Queensland government had previously set the following targets to limit greenhouse gas emissions:

>30 percent below 2000 levels by 2020.

> 60 percent below 2000 levels by 2050

In March 2012, Queensland abandoned its climate change policies and targets.

In 2013, Queensland had 2,219 MW of installed renewable energy. Only 682 MW of renewable capacity has been added since 2001.

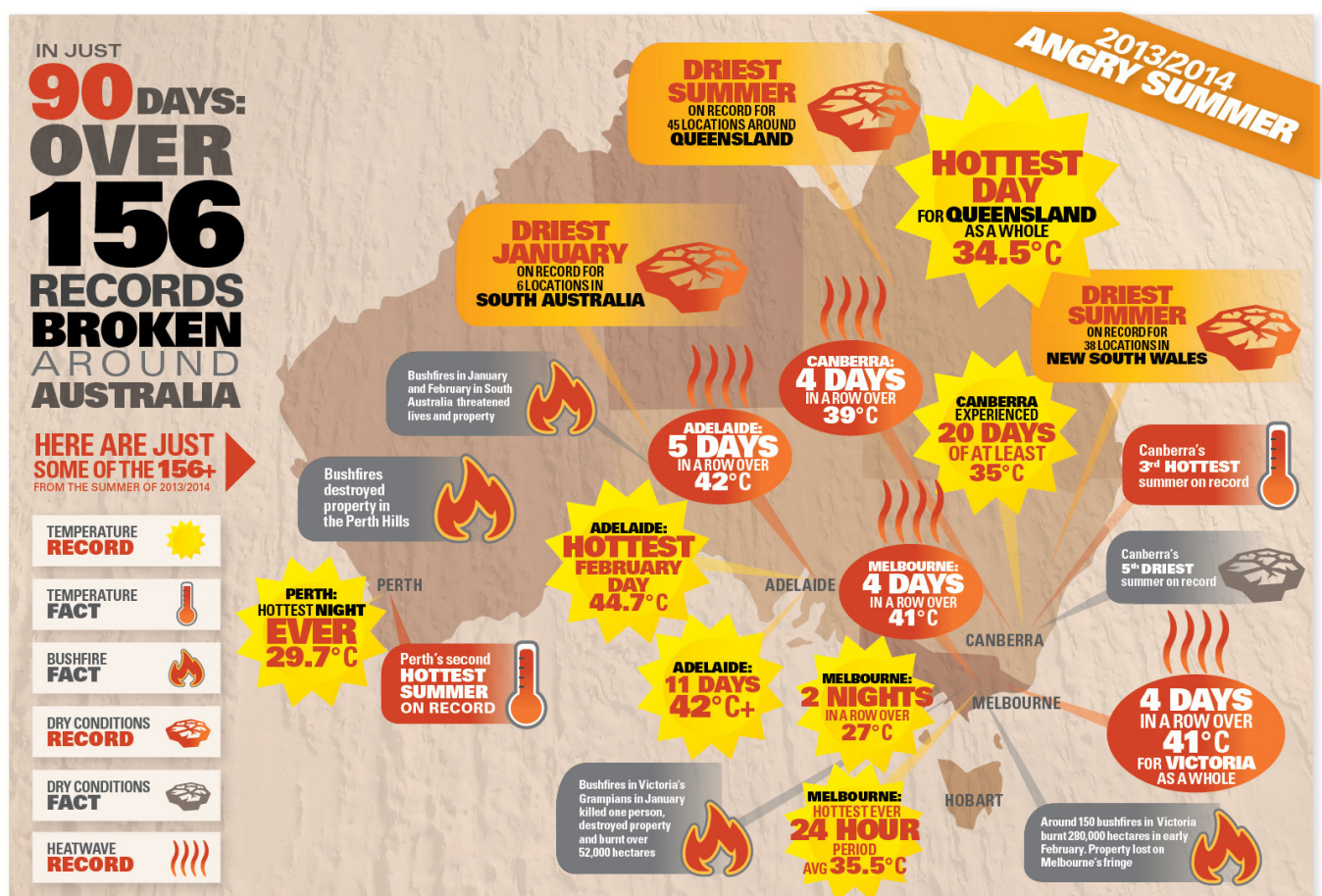
Queensland is fifth in terms of new renewable capacity per capita. Aptly referred to as the "sunshine state", almost half of Queensland's renewable energy capacity is solar PV and Queensland has the most installed solar PV capacity (1,151 MW) of any state or territory. Hydro and biomass are also significant sources of renewable energy.¹⁷

Australia's shift to competitive low emissions technology is fundamental to the country's long-term wealth creation and healthy future. Queensland has a chance to lead the way in Australia's renewable energy transition, helping to mitigate the impacts of climate change.

This is the Critical Decade for Herbert

Herbert, and Queensland more broadly, will be seriously impacted by climate change. Heatwaves, coastal flooding, ocean warming and acidification will contribute to declines in human health and cause billions of dollars in damages to vulnerable coastal infrastructure, as well as impacting tourism in the sunshine state.

The impacts of climate change are already being observed. Australia must strive to cut its emissions rapidly and deeply to join global efforts to stabilise the world's climate and reduce the risk of even more extreme events, including bushfires, heatwaves and coastal flooding. This is the critical decade to get on with the job.



Source: BoM 2014a–h; The Age 18 January 2014; The Age 11 February 2014

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Figure 3: Australia's Angry Summer of 2013/14

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