Drought resulting in loss of livestock
©Greenpeace/Swansborough

Homes overwhelmed by the Queensland floods, 2009
©Newspix/Jon Hargest

final warning

The world's rapid descent into **runaway climate change**

A property devastated by the recent Victorian bushfires ©AAP Image/Andrew Brownbill

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Australia Pacific

Last call on **Climate Change**

Global warming is accelerating. The Arctic summer sea ice is expected to melt entirely within the next five years - decades earlier than predicted in the 2007 Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report.

Scientists judge the risks to humanity of dangerous global warming to be high. The Great Barrier Reef faces devastation. Extreme weather events, such as storm surges adding to rising sea levels and threatening coastal cities, will become increasingly frequent.

There is a real danger that we have reached or will soon reach critical tipping points and the future will be taken out of our hands. The melting Arctic sea ice could be the first such tipping point.

Beyond 2ºC of warming, seemingly inevitable unless greenhouse gas reduction targets are tightened, we risk huge human and societal costs and perhaps even the effective end of industrial civilisation. We need to cease our assault on our own life support system, and that of millions of species. Global warming is only one of many symptoms of that assault.

Peak oil, global warming and long term sustainability pressures all require that we reduce energy needs and switch to alternative energy sources. Many credible studies show that Australia can quickly and cost-effectively reduce greenhouse gas emissions through dramatic improvements in energy efficiency and by increasing our investment in solar, wind and other renewable sources.

The need for action is extremely urgent and our window of opportunity for avoiding severe impacts is rapidly closing. Yet the obstacles to change are not technical or economic, they are political and social.

We know democratic societies have responded successfully to dire and immediate threats, as was demonstrated in World War II. This is a last call for an effective response to global warming.

This 'call to arms' from some of the country's leading scientists, plus several commentators and politicians was written following the "Imagining the Real Life on a Greenhouse Earth", Conference 11-12 June 2008, Australian National University, Canberra.

Drought in Ivanhoe, New South Wales 2007
©Greenpeace/Sewell/Oculi

Loss of lives and extensive devastation from super typhoon 'Reming', Philippines
©Greenpeace/Sarenas

It was approved by over 200 conference delegates, including:
Climate scientists: Prof Barry Brook, Prof Ian Enting, Prof Janette Lindesay, Prof Graeme Pearman, Dr Barrie Pittock, Prof Will Steffen;
Earth and prehistory scientists: Dr Geoff Davies, Dr David Denham, Dr Andrew Glikson (conference convenor), Dr Geoffrey Hope, Prof Malcolm McCulloch, Dr Bradley Opdyke;
Political leaders: Senator Lyn Allison, Dr Carmen Lawrence, Barry Jones;
Environmental lawyer: Phillip Toyne;
Health and population experts: Prof Stephen Boyden, Dr Bryan Furnass (conference co-convenor), Prof Tony McMichael, Dr Sue Wareham;
Humanists: Dr Paul Collins, Tony Kevin, Dierk von Behrens;
Poet: Mark O'Connor.

"The Arctic is often cited as the canary in the coal mine for climate warming ...now as a sign of climate warming, the canary has died. It is time to start getting out of the coal mines."

J Zwally, NASA Climate Scientist

We're running **out of time**

Massive ice crack in the Larsen B ice shelf, Antarctica ©Greenpeace/Morgan

A steady stream of new scientific findings is showing that climate change is happening much more quickly than previously thought. Changes are happening now and are racing ahead of the worst-case forecasts of the official international scientific advisory body; the Intergovernmental Panel on Climate Change.[1]

Already, the world has watched the Arctic sea ice melt dramatically in the summers of 2007 and 2008. The Wilkins ice shelf on the Antarctic Peninsula is teetering on the verge of collapse.

The events in the Arctic and Antarctic are some of the most visible examples of the rapid climate change that is occurring. The two poles are experiencing above average rates of warming because the earth's atmospheric system redistributes heat to the poles. The rapid warming of the Polar Regions will have flow-on effects that will eventually reach all parts of the globe in the form of raised sea levels, higher temperatures and changed climatic patterns. They provide a stark warning - our climate system is far more sensitive to warming temperatures than we had previously believed and humanity has less time to avert a climate catastrophe than our political leaders would like us to believe.

The Antarctic Peninsula is warming faster than anywhere else in the Southern Hemisphere — several times the global average

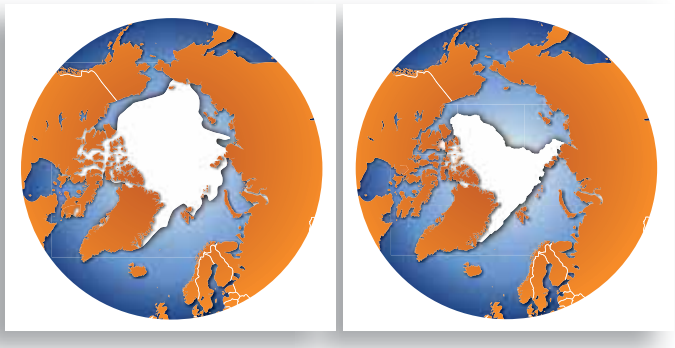
Over the past 50 years, the west coast of the Antarctic Peninsula has been one of the most rapidly warming parts of the planet. Here, annual mean temperatures have risen by nearly 3°C - approximately 10 times the mean rate of global warming.

Two of the 10 ice shelves along the peninsula have vanished in the past 30 years. Another five have lost between 60 percent and 92 percent of their original size.

The Arctic summer sea ice is now expected to melt entirely within the next five years — 80 years earlier than predicted in the 2007 IPCC report

Each summer, some of the Arctic ice melts before refreezing again over winter. Scientists have been shocked by the rate at which the melt area has been increasing each year. In 2005, a record melt was recorded and just two years later in 2007 that record was broken again. The rapidity of this melting now leads scientists to predict that the Arctic could be ice free in summer within five years.

Summer **1982** Summer **2007**



Satellite observations of the September extent of sea ice in the Arctic in 2007 shows a 23% decrease from the previous minimum, in 2005, and 39% below the average minimum extent for the time period 1979-2000.

[1]The IPCC is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP), its membership includes scientists and governments. Its processes are very thorough but each report takes several years to compile with the result that they are not able to include the very latest science. For more information about the IPCC see www.ipcc.ch

Sea level **rise**

High tides inundate houses in Tuvalu, South Pacific ©Greenpeace/Braasch

"The Greenland ice-sheet is likely to be eliminated by anthropogenic climate change unless much more substantial emissions reductions are made than those envisaged by the IPCC."[3]

Sea levels could rise by more than one metre this century, displacing millions of people

The expansion of ocean water as it warms has already caused sea levels to rise, but the problem will escalate dramatically when land-based ice, in Antarctica and Greenland, begins to melt.

The Greenland ice sheet is the second largest body of ice, after Antarctica holding six per cent of all fresh water on the planet. If it melted completely, it would cause sea levels to rise by six to seven metres. Although the complete melting of the ice sheet would take a long time, we may soon reach a point where the melting becomes unstoppable. Scientists are still unsure how much warming will need to happen for an irreversible melting of Greenland to be triggered and also, once it begins, how much it will contribute to sea level rise this century.

But current science suggests Greenland could reach a tipping point of irreversible melting if temperatures rise by just 1.5°C to 2°C.

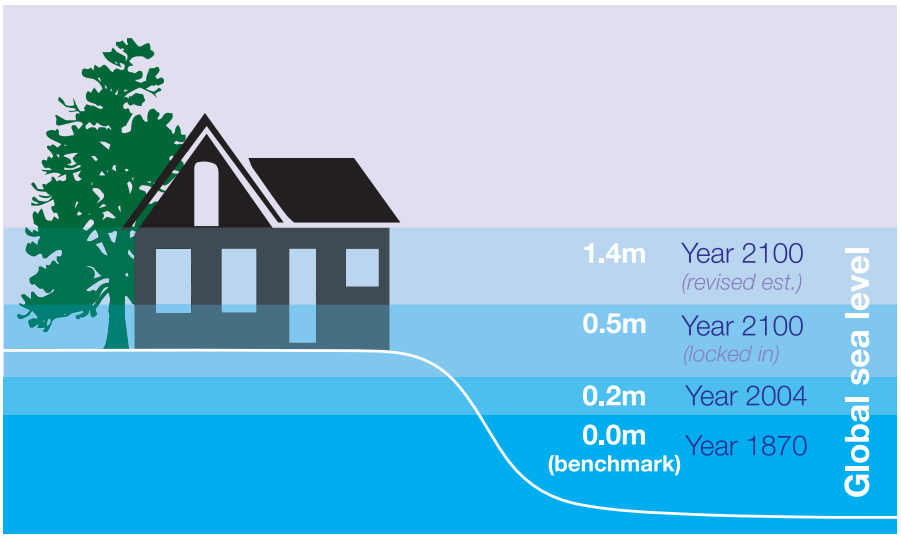
Scientists have studied what happened to ice sheets when temperatures rose at the end of the last ice age and have found that ice sheets can melt quickly and raise sea levels one metre in 100 years.

Looking at the melting that has already happened this century, Rahmstorf predicts a sea level rise of 50 cm to 1.4 metres above 1990 levels by 2100.[4]

Climate scientist James Hansen argues that sea level rise could be much greater than that if ice sheets begin to disintegrate once melting starts.[5] A recent study has found that such acceleration could mean a sea level rise of about two metres by 2100 could be a possibility.[6]

Sea level rise of one metre or more...

- Will hit low-lying coastal areas which are home to one-tenth of people on the planet – about 600 million people
- Coastal flooding events in Australia will shift from once every 100 years to several times a year by 2100
- Kiribati and Tuvalu in the Pacific, the Maldives and the Sunderbans in the Bay of Bengal will be submerged under the sea
- Cities such as London, New York and Sydney will require massive investments to provide defences against the rising waters
- Fresh water supplies will be contaminated, meaning the world's shortage of fresh water will get worse. Underground water sources in Thailand, Israel, China and Vietnam are already experiencing salt-water contamination
- Coastal farmland will be wiped out, triggering food shortages and forcing millions of people in countries like Bangladesh to leave their land
- Will flood as much as 100 metres inland of many Australian beaches



Recent studies suggest that the sea level rise this century could be much greater than predicted in the IPCC's 2007 report.

Walrus sits on melting iceflow, Chukchi Sea, Alaska ©Greenpeace/Beltra

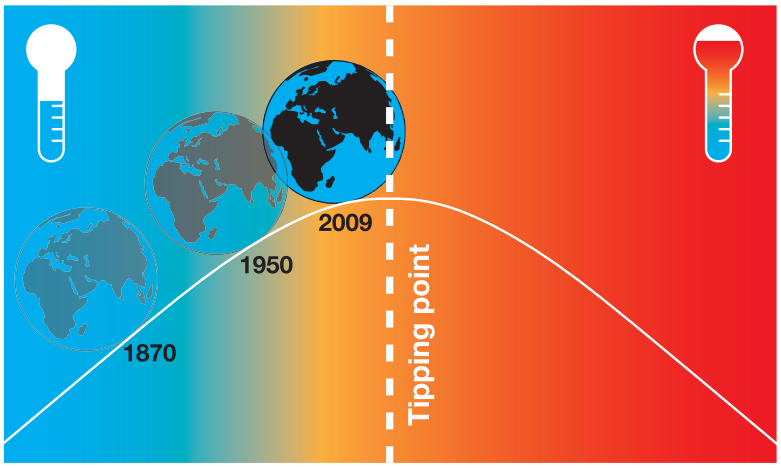
Iceshelf collapsing due to warmer temperatures ©Greenpeace/Morgan

Irreversible…

There will soon be a point when climate change will not be able to be brought under control

We are now dangerously close to tipping points in the earth's climate system; this is the point of no return, after which truly catastrophic changes become unstoppable.

Once a tipping point is reached, it's unlikely that rapid reduction of emissions and the cooling of the climate system will be able to reverse the change.



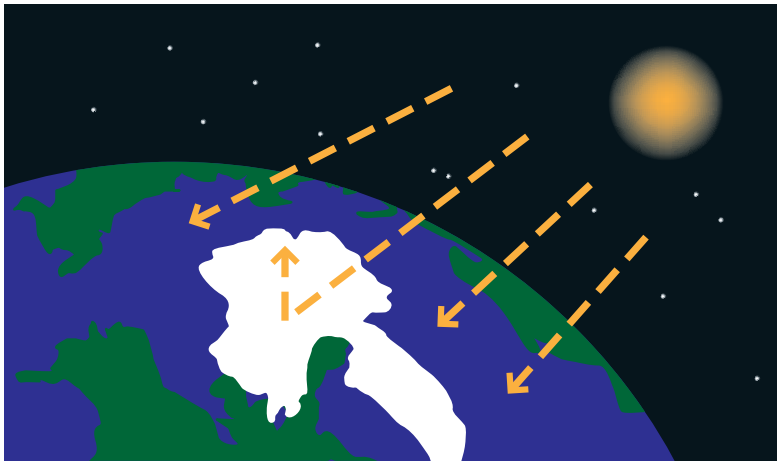
The earth is dangerously close to its tipping point.

Albedo flip

White surfaces like the Arctic ice cap reflect more sunlight than dark surfaces like the ocean. So, as the Arctic ice cap melts exposing more dark ocean, more solar radiation will be absorbed than before - adding to the warming and melting more ice.

As a result, the whole Arctic region will become warmer - speeding up the melting of ice on nearby Greenland and other frozen northern regions.

This positive feedback loop means that a climate change impact caused by greenhouse emissions will cause the release of further emissions, which in turn causes more warming and so on. The most worrying aspect of these positive feedback loops is they will move beyond human control – leading to runaway climate change.



White surfaces like ice reflect sunlight, dark surfaces like the ocean absorb sunlight.

Methane **time bomb…**

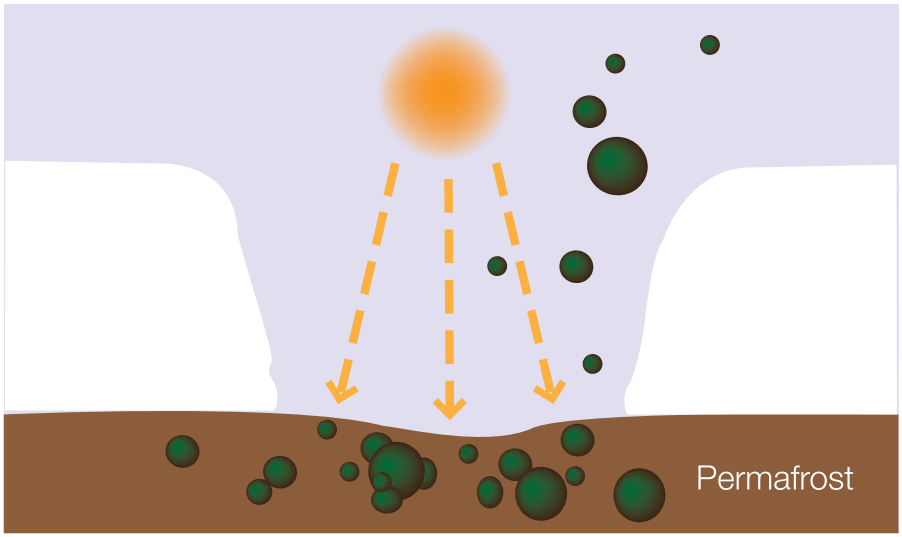
…a vicious cycle of methane release and warming

The Arctic permafrost holds more carbon in its frozen soil than is currently in the entire atmosphere today. If it thaws, it could accelerate climate change to the point where the release of more atmospheric greenhouse gases causes higher temperatures, leading to further permafrost melting and the release of yet more greenhouse gases.

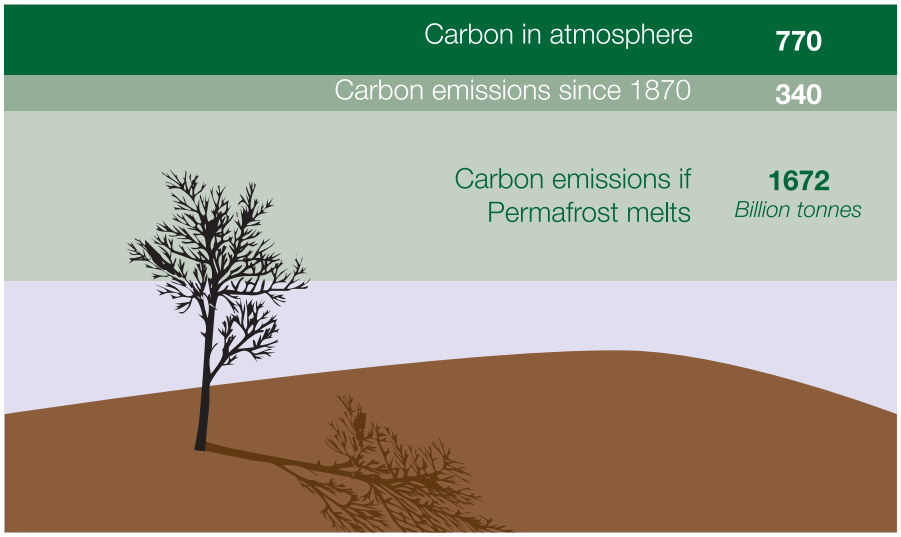
The Arctic region, including Siberia, parts of Greenland and North America, contains permanently frozen carbon-rich soil – known as permafrost. As the permafrost melts it will release vast quantities of currently trapped greenhouse gases – some in the form of methane – a greenhouse gas 21 times more potent than carbon dioxide.

The latest research shows that the Arctic contains far more frozen carbon than previously thought[7] and that methane is bubbling up to the surface up to five times faster than had been estimated.[8]

> Global warming "may be triggering a self-perpetuating climate time bomb"
>
> Seth Borenstein, The Associated Press reporting on methane release from permafrost melt



As permafrost melts, it releases vast amounts of greenhouse gases.



Permafrost contains more carbon than is currently in the atmosphere.
Sources: Schuur et al., UNEP, CDIAC.

Bleached coral ©Greenpeace/Grace

Ocean **acidification**

> "Our fossil-fuelled lifestyle is killing off coral reefs"
>
> Ken Caldeira, Carnegie Institution's Department of Global Ecology

The earth's oceans have been absorbing some of the carbon dioxide produced by human activities, acting as a 'sink' rather than source of emissions. The fact that the ocean has absorbed this greenhouse gas has helped to keep temperature rise lower than it would otherwise be. The oceans will reach a threshold limit above which the ability to keep on absorbing more carbon dioxide breaks down. At that point the oceans may become a source of greenhouse emissions. Research published in 2007 found evidence that the ocean's ability to absorb carbon dioxide was weakening.[9]

Also, as the oceans absorb the carbon dioxide they become more acidic, impacting on corals and other marine creatures that build shells. This has the potential to impact all the way up the food chain, eventually reducing the availability of large fish, including tuna and other major food sources.

Very recent studies have found that coral reefs may start dissolving when CO_2 doubles in concentration in the earth's atmosphere.[10]

Australian flag upside down 'symbol of distress', Victorian bushfire 2009 ©Greenpeace/Sewell

Dried up lake, Brazil ©Greenpeace/Hungria

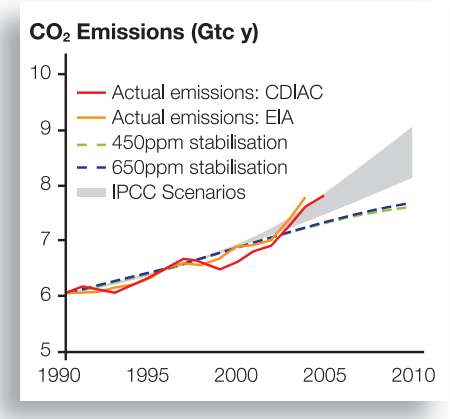
Temperature **rise**

Greenhouse emissions are rising faster than the IPCC had predicted in its climate scenarios. The amount of warming already caused by human activity means that very soon we will be unable to avoid catastrophic climate change

The IPCC has made predictions about how climate change will affect the world based on expected emission levels and subsequent temperature rises. The latest data shows that greenhouse emissions from recent years are above the IPCC's worst-case predictions. That means the world is likely to experience impacts much worse than detailed in the IPCC's 2007 report.

The temperature rise in the last few decades has also been at the extreme end of predictions and may have brought the earth to the verge of runaway climate change.

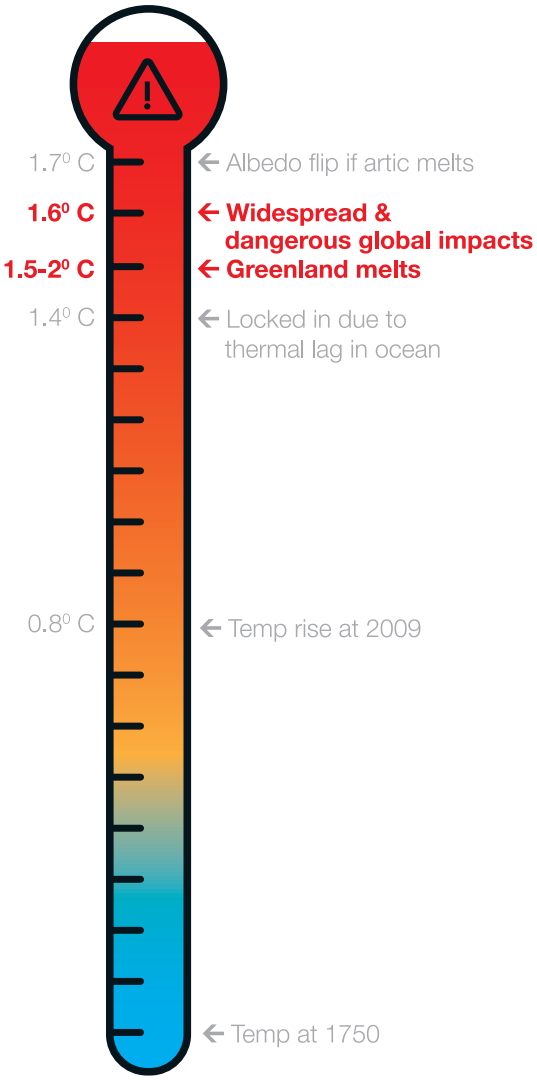
A new paper by the authors of the 2007 IPCC Fourth Assessment Report and published by the US National Academy of Sciences shows that a global average temperature rise of only 1.6°C (above pre-industrial levels) would lead to widespread and dangerous climate impacts, including increases in drought, heat waves and floods in many regions. These in turn would lead to increased water stress, wildfire frequency, flood risk and adverse health effects.[11]



Actual greenhouse emissions since 2000 have been on or above the extreme scenario pathway. Unless we can quickly bring emissions back down, the impacts of climate change can be expected to exceed all the IPCC scenarios.

As the diagram to the right shows, the greenhouse emissions already pumped into the atmosphere since the beginning of the industrial revolution may mean the earth is already on the verge of that point.

The concentration of carbon dioxide in the atmosphere is currently about 380 parts per million (ppm) compared with pre-industrial levels of 280 ppm. The rise to 380 ppm is already having serious impacts on the climate. A rise to 450 ppm - as promoted by some governments - has a 50% chance of pushing temperature rise over 2°C. This would cause catastrophic climate change.



Temperature rise may have brought the earth to the verge of runaway climate change.

Climate action protest, Canberra 2009 ©Greenpeace/Comfort

What is **required**

The rapidly melting Arctic and Antarctic ice sheets, severe storm events, unprecedented bushfires, heatwaves, crippling droughts and 150,000 climate change related deaths per year make it clear that the current level of global warming is unacceptable and any further warming is extremely risky.

It is clear that we are facing a climate emergency.

The latest science shows that the planet is at the brink of several tipping points, which, if triggered, will cause catastrophic climate change. Therefore, greenhouse emissions need to be brought down to zero as soon as possible. Taking into consideration the warming already built into the system through greenhouse emissions, we should aim to limit total warming to as far below 1.5°C as possible with a long term goal of bringing warming well below current levels. To achieve this, we need:

❶ An energy revolution to replace polluting coal-fired electricity with 100% renewables within a decade - creating tens of thousands of green jobs

❷ Australia to commit to halve its greenhouse pollution within the next decade and to stop undermining the global climate negotiations ahead of December's crucial meeting in Copenhagen.

Political failure

The climate emergency reflects a profound failure of our political system. After over 20 years of inaction, politicians are still beholden to the vested interests in the fossil fuel intensive industries. The solutions that are proposed by the Australian Government are drastically short of what is required to avert a climate catastrophe.

Our political leaders are pretending that we can 'find a balance' between the short-term economic interests of the big polluters and maintaining a safe climate that is capable of sustaining life. As former Government adviser on climate change Ross Garnaut said, the failure of this generation to act will 'haunt humanity until the end of time'.

Just as 'business as usual' will destroy our future, so will 'politics as usual'.

Your role

- ➜ Talk with others in your community about the climate emergency
- ➜ Build support for action – create a group of people to support you in agitating for change
- ➜ Link in with other groups that are pushing for action
- ➜ Take risks, speak out, organise, do whatever is in your power to help create political momentum for change

Get in touch with the Greenpeace climate campaign and get regular information about the latest developments, upcoming activities and how you can be involved

www.greenpeace.org.au/climate
Ph: 1800 815 151

Because we are rapidly running out of time…

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24 March 2009 Authorised by Steve Shallhorn, Level 4, 39 Liverpool Street, Sydney NSW 2000

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