

CLIMATE CODE RED

the case for emergency action

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Note

All temperatures cited in this book are in Celsius, and increases in temperature are from 1750 pre-industrial levels unless otherwise stated.



Forewords

Ian Dunlop

As the world's population rises toward nine billion by mid-century, the inevitable logic of exponential growth in consumption is now hitting the real limits of global ecosystems and resource availability. The immediate pressure points are human-induced climate change, water availability, and peaking global oil supply, which are converging rapidly in a manner not previously experienced. But those pressure points constitute only the tip of the broader global-sustainability iceberg: further constraints and limits will become increasingly evident as the major developing countries move up the growth escalator.

This situation is not unexpected: it has been forecast for decades, going back before the 1972 publication of *The Limits to Growth*, a book that described how expanding human population and consumption patterns would run up against the limits of the natural world. In the meantime, we have created a political and capitalist system which has proved incapable of recognising that the most important factor for its own survival is the preservation of a global biosphere fit

for human habitation. Our institutions are totally short-term focused: politically, due to the electoral cycle, and corporately, due to perverse incentives. Thus, we are uniquely ill-equipped to handle these major problems, which are all long-term.

Our ideological preoccupation with a market economy that is based on maximising short-run profit is rapidly leading us towards an uninhabitable planet. As inconvenient as it may be, politically and corporately, conventional economic growth and rampant consumerism cannot continue. Markets are important, but they operate within rules; henceforth, the rules must change to ensure long-run sustainability.

Nationalism and short-term vested interests have so far prevented the development of a global governance framework capable of handling this Tragedy of the Commons, and the issue of global sustainability is now much bigger than any nation state. Global warming, in particular, is moving far faster than scientists had predicted, to the point that we are already in the danger zone.

The stark fact is that we face a global sustainability emergency, but it is impossible to design realistic solutions unless we first understand and accept the size of the problem. We know those solutions; what is lacking is the political will, first, to honestly articulate the problem and, second, to implement those solutions.

Unadorned by political spin, *Climate Code Red* is a sober, balanced analysis of this challenge that proposes a realistic framework to tackle the emergency. It should be essential reading for all political and corporate leaders and, particularly, for the community. The extent of change that we require will only occur if the political and corporate world sees that the community is demanding it.

If we are to have a reasonable chance of maintaining a habitable planet, placing our efforts on an emergency footing is long overdue. We only play this game once; a trial run is not an option.

Ian Dunlop is a former international oil, gas, and coal industry executive. He chaired the Australian Coal Association from 1987–88 and the Australian Greenhouse Office Experts Group on Emissions Trading from 1998–2000, and he was CEO of the Australian Institute of Company Directors from 1997–2001. He is chairman of the Australian National Wildlife Collection Foundation (CSIRO) and deputy convenor of the Australian Association for the Study of Peak Oil.

Ken Caldeira

For my PhD research, I studied what happened to ocean chemistry at the time the dinosaurs became extinct. The meteorite that destroyed the dinosaurs also acidified the oceans, leading to the disappearance of coral reefs and many other marine organisms. It is becoming clear that modern industrial civilisation is generating a new mass extinction (with its own ocean acidification) of a magnitude not seen since that destruction of the dinosaurs some 65 million years ago.

Over the past few centuries, vast natural ecosystems on land and in the water have been converted to human use and abuse. Our carbon dioxide emissions are heating the planet and acidifying the oceans. Our physical environment is changing

at a rate that is faster than at any time in the past hundreds of millions of years, except for those rare cataclysmic events that have killed off most life on Earth. Spratt and Sutton point out that if ‘business as usual’ means losing Arctic ecosystems, losing coral reefs, altering the great weather patterns, and so on, then we simply cannot afford it—the cost is too great.

At the risk of oversimplification: we are forced to make a choice. Either we can decide to live in a ‘wilderness world’ in which we use our technology to minimise our environmental footprint, and we grow and develop in ways that are consistent with long-term flourishing of the rich diversity of life in this planet; or we can continue heading towards a nightmare vision of an Earth where climate is shifting and species are getting tossed overboard every day, every hour. (Invasive generalists, including weeds and the wealthy, may do fairly well, but specialist species and poor people have a threatened future ahead of them.) We will either learn to live with the world, or wreck it—and in wrecking the world, we will lose.

There is inertia both in the climate system and in our industrial infrastructure. Inertia in the climate system means we can pass thresholds now that set us on an irreversible trajectory to future tragedy. Inertia in our industrial infrastructure means that, under most accepted scenarios, without early retirement of major segments of our industrial capacity, it will take many decades to replace the coal-, oil-, and gas-burning devices that pervade our planet. ‘Business as usual’ is accelerating us into ever-greater environmental risk—and eventually, that risk will come home to roost. As Spratt and Sutton point out, ‘business as usual’ must end now, if we are to allow our children and ourselves a more

natural world in which humans tread lightly and live well. Sensibly, *Climate Code Red* asks us to take stock of the climate and sustainability emergency that is unravelling around us and respond with a large-scale transition to a post-carbon economy. There is no time for slow transitions.

Ken Caldeira is director of the Caldeira Lab of the Department of Global Ecology at Stanford University's Carnegie Institution of Washington, whose research focuses on improving the science base needed to allow human civilisation to develop while protecting our environmental endowment. He also conducted research for the Energy and Environmental Sciences Directorate of the Lawrence Livermore National Laboratory from 1993 to 2005.



INTRODUCTION

A Lot More Trouble

‘This is an emergency, and for emergency situations we need emergency action ...’

— UN secretary-general Ban Ki-Moon, 10 November 2007

‘I can’t end this email without acknowledging that we are in a lot more climate trouble than we thought.’ This response from a US-based polar researcher during a discussion we were having about how quickly Greenland might melt is not an orthodox scientific statement, but its disturbing tone expresses a level of anxiety and honesty that we heard many times while writing this book.

Perhaps the frankness of such responses reflected the fact that we are not climate scientists, and that we were asking questions not as peers but as policy researchers. In conducting our enquiries, we conversed with and drew on the work of many climate scientists who gave generously of their time, patiently answering sometimes-wayward questions, and welcoming our enquiries. Although our previous work

had included advocacy on environmental and community problems, we found the scope and depth of climate research, the nuances, and interpretative differences between scientists a challenge. Yet it is critical that non-scientists engage with the science if all of us are to plot a pathway to a safe climate.

Climate scientists generally work in a specialised field, and the release of their scientific results and projections incorporates assessments of risks, probabilities, and uncertainties that can lead them to feel reticent about commenting publicly on the broader aspects of global-warming impacts and policies. Those outside the research community, however, have a different vantage-point in viewing the disparate evidence, which may explain why some of the most compelling writing on global warming has come from writers such as George Monbiot, Fred Pearce, Mark Lynas, and Elizabeth Colbert.

Climate Code Red explores what ‘a lot more climate trouble’ means, why it differs from the public story, and how we should go about thinking of new solutions to this global emergency. It concludes that we must cast aside climate policies that are doomed to fail, and that we must act with foresight and courage, because our task is urgent.

The evidence we have gathered has convinced us that we have only one chance to solve the global warming problem. Just as in hospitals, where ‘code red’ denotes a patient who needs advanced life-support, the phrase signals an emergency: an alarm that rings now, for all life on this fragile planet.

Debate over climate change took a radical new turn in September 2007, when research data revealed that the floating sea-ice in the polar north was disintegrating at a frightening speed—in the words of Penn State University climatologist

Richard Alley, 'one hundred years ahead of schedule'. Eight million square kilometres of Arctic sea-ice is breaking up, and this demands that we look anew at the impact of global warming, and at what we must do to return to a safe-climate world.

Industrial activity is propelling the world's climate to a hot state not experienced for a million years, at a time long before modern humans evolved. We face a perilous journey across unfamiliar terrain, close to a precipice that, should we cross it, will see changes beyond recognition to life on Earth.

This is not an exaggerated claim; it is the sober view of many of the world's leading climate scientists, including NASA scientist Jay Zwally. When he was a young man, Zwally hauled coal for work. At the end of 2007, he told a gathering of fellow climate experts: 'The Arctic is often cited as the canary in the coalmine for climate warming ... and now as a sign of climate warming, the canary has died. It is time to start getting out of the coal mines.'

Robert Corell, chairman of the Arctic Climate Change Impact Assessment (ACCIA), is equally blunt:

For the last 10,000 years we have been living in a remarkably stable climate that has allowed the whole of human development to take place ... Now we see the potential for sudden changes of between 2 and 6 degrees Celsius [by the end of this century].* We just don't know what the world is like at those temperatures. We are climbing rapidly out of mankind's safe zone into new territory, and we have no idea if we can live in it.

* The increase to date has been 0.8 degrees.

In the recent past, the story of climate change has been one of sudden and disruptive fluctuation as the Earth seesawed between ice ages and warm periods. This history warns that we must expect the unexpected, because dramatic changes that tip regional climates from one state to another can set off chains of events that echo around the globe.

Most of us think of climate change as a gradual, linear process that involves a smooth relationship between increasing levels of greenhouse gases and rising temperatures—that like the kitchen oven, if we are slowly turning up the control, we will produce a predictable warming. But climate doesn't work like that.

In fact, we live in a climate world of chaotic, non-linear transitions, where a small increase in the level of greenhouse gases, or in the energy imbalance of the climate system, can make a huge difference. An element of the climate system can flip from one state to another quickly and unpredictably. This is now occurring at the North Pole, where a tipping point, or critical threshold, has been passed, and an area of summer sea-ice once as large as Australia is disintegrating quickly.

Further south, if the changing climate were to produce four or five consecutive years of drought in the Amazon, it might become sufficiently dry for wildfires to destroy much of the rainforest and for burning carbon to pour into the skies. This change in the regional climate pattern would further reduce rainfall, and the drying and dead forest would release very large amounts of greenhouse gases. These impacts, like many others, would cause further threshold events.

If this kind of momentum builds sufficiently, and enough tipping points are crossed, we will pass a point of no return. We wish it were otherwise. Indeed, this is not a book we

intended to write; but when our work led us to understand that we had already entered the era of dangerous climate change, it became a story we felt compelled to tell.

Originally, we wrote this book as a report to address three areas of climate policy that we wished to bring to the attention of the Garnaut Climate Change Review (the Garnaut Review): the implications of recent climate research, appropriate reduction targets, and the case for emergency action. The review was commissioned by the Australian federal Labor leader Kevin Rudd, and the state and territory Labor governments, six months prior to the November 2007 federal election that swept Labor to power.

Our first concern in presenting ideas to the review was to draw attention to the seriousness of recent climate data.

Our second concern was to show that a response to the climate crisis in ‘politics as usual’ mode would not be fast enough to solve the problem.

Our third concern was to encourage the review to choose targets that would achieve a safe result and not replicate mistakes made elsewhere in setting targets that would be ineffective. An example of this was the Stern Review, delivered to the UK government in late 2006 and received enthusiastically in most quarters. The economist Sir Nicholas Stern had graphically outlined the future impacts of rising global temperatures. An increase of 2 degrees above the pre-industrial level was not acceptable, he explained, because it would likely mean, amongst other things, the loss of 15–40 per cent of species, a loss of fresh water of 20–30 per cent in vulnerable regions, and the potential for the Greenland ice sheet to begin melting irreversibly, pushing sea levels up several metres.

Stern's conclusion, however, was chilling: to limit the rise to 2 degrees was, in his opinion, too challenging, politically and economically. Instead, he suggested going for a 3-degree target. Yet a 3-degree rise would likely destroy most ecosystems and take global warming beyond the control of human action. It seemed incomprehensible that so few people spoke out forcefully against Stern's target and the death sentence that he was accepting for so many people and species. How could society be so mad as to go for a target that would kill much of the planet's life?

As we started to write our short submission, events in the Arctic intervened to demonstrate dramatically that dangerous climate change is not in the future, but is happening now. Over one northern summer, it became clear that the task was not to weigh up what would be a reasonable rise in temperature; rather, it was to ask: by how much do we need to lower the existing temperature to return our planet to the safe-climate zone? Global warming now demands an emergency response in which we put aside 'business and politics as usual', and devote our collective energy and capacity for innovation to stopping a slide to catastrophe.

Why do business leaders, politicians, community advocates, and sectors of the environment movement fail to grasp fully the momentous problem that we face? How can they not 'get it', when the evidence is now so abundant? We hope that this book will help to identify why real action has so often been blocked, and help to map out a pathway through the barriers.

Many people, including UN secretary-general Ban Ki-Moon, now call the situation that we face a 'climate emergency'; but it could just as easily be called a warming,

water, food, or energy emergency. The issues of global warming, water shortages, peak oil, ecosystem destruction, resource depletion, global inequity, and the threat of pandemics intersect and intertwine. Together, these threats and risks constitute a sustainability crisis, or emergency.

In exploring these ideas, our short submission became this unintentional and lengthier book. The story we tell is disturbing and compelling, in equal measure. It poses a choice: to act with great effort now, or to know that it will soon be too late to act effectively. It will be little comfort ten years from now to look back and think ruefully of what we might have done, and of what might have been achieved.

Climate Code Red has three interrelated parts.

The first section reviews the scientific evidence and a range of expert insights flowing from the increasing speed of the Arctic sea-ice melt. It also considers recent climate data and analysis about critical subjects such as carbon sinks, biodiversity loss, and climate sensitivity. Drawing on this review, the second section analyses current debates about climate targets, and proposes a set of reduction targets consistent with achieving a safe-climate future. The third section identifies the need for a rapid transition to a sustainable economy. It argues that the task needs to be constructed as a climate emergency—that we cannot continue at the meandering, slow pace dictated by ‘business and politics as usual’, which today stands in the way of necessary change.