

From Maxine:

Summary: this article has its own: the first two paragraphs. Sobering reading. I am reminded of the Pablo Casals quote: "The situation is hopeless. We must take the next step."

"Collapse of civilisation is the most likely outcome: top climate scientists"

Asher Moses, Voice of Action (16/6/20)

Australia's top climate scientist says "we are already deep into the trajectory towards collapse" of civilisation, which may now be inevitable because 9 of the 15 known global climate tipping points that regulate the state of the planet have been activated.

Australian National University emeritus professor Will Steffen (pictured) told *Voice of Action* that there was already a chance we have triggered a "global tipping cascade" that would take us to a less habitable "Hothouse Earth" climate, regardless of whether we reduced emissions.

Steffen says it would take 30 years at best (more likely 40-60 years) to transition to net zero emissions, but when it comes to tipping points such as Arctic sea ice we could have already run out of time.

Evidence shows we will also lose control of the tipping points for the [Amazon rainforest](#), the West Antarctic ice sheet, and the Greenland ice sheet in much less time than it's going to take us to get to net zero emissions, Steffen says.

"Given the momentum in both the Earth and human systems, and the growing difference between the 'reaction time' needed to steer humanity towards a more sustainable future, and the 'intervention time' left to avert a range of catastrophes in both the physical climate system (e.g., melting of Arctic sea ice) and the biosphere (e.g., loss of the Great Barrier Reef), we are already deep into the trajectory towards collapse," said Steffen.

"That is, the intervention time we have left has, in many cases, shrunk to levels that are shorter than the time it would take to transition to a more sustainable system.

“The fact that many of the features of the Earth System that are being damaged or lost constitute ‘tipping points’ that could well link to form a ‘tipping cascade’ raises the ultimate question: Have we already lost control of the system? Is collapse now inevitable?”

This is not a unique view – leading Stanford University biologists, who were first to reveal that we are already experiencing the sixth mass extinction on Earth, released [new research this week](#) showing species extinctions are accelerating in an unprecedented manner, which may be a tipping point for the collapse of human civilisation.

Also in the past week [research emerged](#) showing the world’s major food baskets will experience more extreme droughts than previously forecast, with southern Australia among the worst hit globally.

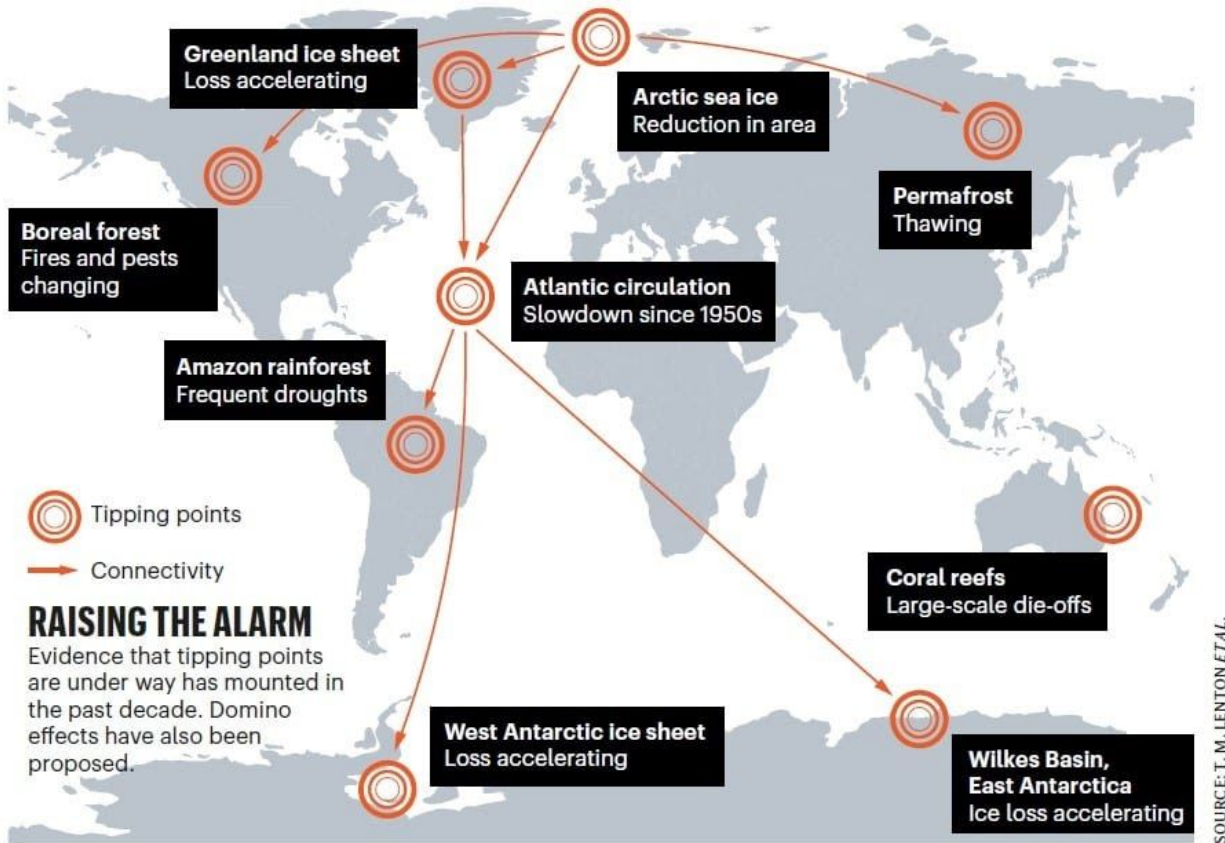
Steffen used the metaphor of the Titanic in one of his recent talks to describe how we may cross tipping points faster than the time it would take us to react to get our impact on the climate under control.

“If the Titanic realises that it’s in trouble and it has about 5km that it needs to slow and steer the ship, but it’s only 3km away from the iceberg, it’s already doomed,” he said.

‘This is an existential threat to civilization’

Steffen, along with some of the world’s most eminent climate scientists, laid out our predicament in the starkest possible terms in a [piece for the journal Nature](#) at the end of last year.

They found that 9 of the 15 known Earth tipping elements that regulate the state of the planet had been activated, and there was now scientific support for declaring a state of planetary emergency. These tipping points can trigger abrupt carbon release back into the atmosphere, such as the release of carbon dioxide and methane caused by the irreversible thawing of the Arctic permafrost.



9 of 15 known Earth tipping points have been activated

“If damaging tipping cascades can occur and a global tipping point cannot be ruled out, then this is an existential threat to civilization,” they wrote.

“No amount of economic cost–benefit analysis is going to help us. We need to change our approach to the climate problem.

“The evidence from tipping points alone suggests that we are in a state of planetary emergency: both the risk and urgency of the situation are acute.”

Steffen is also the lead author of the heavily cited 2018 paper, [Trajectories of the Earth System in the Anthropocene](#), where he found that “even if the Paris Accord target of a 1.5°C to 2°C rise in temperature is met, we cannot exclude the risk that a cascade of feedbacks could push the Earth System irreversibly onto a ‘Hothouse Earth’ pathway.”

Steffen is a global authority on the subject of tipping points, which are prone to sudden shifts if they get pushed hard enough by a changing climate, and could take the trajectory of the system out of human control. Further warming would become self-sustaining due to system feedbacks and their mutual interaction.

Steffen describes it like a row of dominos and his concern is we are already at the point of no return, knocking over the first couple of dominos which could lead to a cascade knocking over the whole row.

“Some of these we think are vulnerable in the temperature range we’re entering into now,” said Steffen.

“If we get those starting to tip we could get the whole row of dominos tipping and take us to a much hotter climate even if we get our emissions down.”

Even the notoriously conservative United Nations Intergovernmental Panel on Climate Change (IPCC) has found that already with the 1.1°C of warming we have had to date, there was a moderate risk of tipping some of these – and the risk increased as the temperatures increased.

Steffen believes we are committed to at least a 1.5°C temperature rise given the momentum in the economic and climate system, but we still have a shot at staying under 2°C with urgent action.

+4°C world would support < 1 billion people

Professor Hans Joachim Schellnhuber, director emeritus and founder of the Potsdam Institute for Climate Impact Research, believes if we go much above 2°C we will quickly get to 4°C anyway because of the tipping points and feedbacks, which would spell the end of human civilisation.



“There is a very big risk that we will just end our civilisation”: Professor Schellnhuber

Johan Rockström, the head of one of Europe’s leading research institutes, warned in 2019 that in a 4°C-warmer world it would be “difficult to see how we could accommodate a billion people or even half of that ... There will be a rich minority of people who survive with modern lifestyles, no doubt, but it will be a turbulent, conflict-ridden world”.

Schellnhuber, one of the world’s leading authorities on climate change, said that if we continue down the present path “there is a very big risk that we will just end our civilisation. The human species will survive somehow but we will destroy almost everything we have built up over the last two thousand years.”

Schellnhuber said in a [recent interview](#) that the IPCC report stating we could stay below 1.5°C of warming was “slightly dishonest” because it relies on immense negative emissions (pulling CO2 out of the air) which was not viable at global scale. He said 1.5°C was no longer achievable but it was still possible to stay under 2°C with massive changes to society.

If we don't bend the emissions curve down substantially before 2030 then keeping temperatures under 2°C becomes unavoidable. The "carbon law" [published in the journal Science](#) in 2017 found that, to hold warming below 2°C, emissions would need to be cut in half between 2020 and 2030.

Steffen told *Voice of Action* that the three main challenges to humanity – climate change, the degradation of the biosphere and the growing inequalities between and among countries – were "just different facets of the same fundamental problem".

This problem was the "neoliberal economic system" that spread across the world through globalisation, underpinning "high production high consumption lifestyles" and a "religion built not around eternal life but around eternal growth".

"It is becoming abundantly clear that (i) this system is incompatible with a well-functioning Earth System at the planetary level; (ii) this system is eroding human- and societal-well being, even in the wealthiest countries, and (iii) collapse is the most likely outcome of the present trajectory of the current system, as prophetically modelled in 1972 in the Limits to Growth work," Steffen told *Voice of Action*.

Eternal growth is not possible

The [Limits to Growth model](#) released by the Club of Rome in 1972 looked at the interplay between food production, industry, population, non-renewable resources and pollution.

The basic findings were that you can't grow the system indefinitely as you will cause environmental and resource issues that will ultimately cause the whole global system to collapse (ABC's This Day Tonight program covered it [here](#)). At the time of the model's release it accurately reproduced the historical data from 1900 to 1970.

A [2008 study](#) by Graham Turner, then a senior CSIRO research scientist, used three decades of real-world historical data to conclude that the Limits to Growth model's predictions were coming to pass: "30 years of historical data compare favourably with key features of a

business-as-usual [BAU] scenario called the 'standard run' scenario, which results in collapse of the global system midway through the 21st century.”



Former CSIRO scientist Graham Turner has been warning about collapse for decades

Turner ran updated figures through the model [again in 2012](#) for another peer-reviewed paper, and [again in 2014](#) when he had joined the University of Melbourne’s Sustainable Society Institute.

“Data from the forty years or so since the LTG study was completed indicates that the world is closely tracking the BAU scenario,” Turner concluded in the 2014 paper.

“It is notable that there does not appear to be other economy-environment models that have demonstrated such comprehensive and long-term data agreement.”

Turner semi-retired in 2015 but runs a small organic market garden on a rural property in the NSW south coast’s Bega Valley.

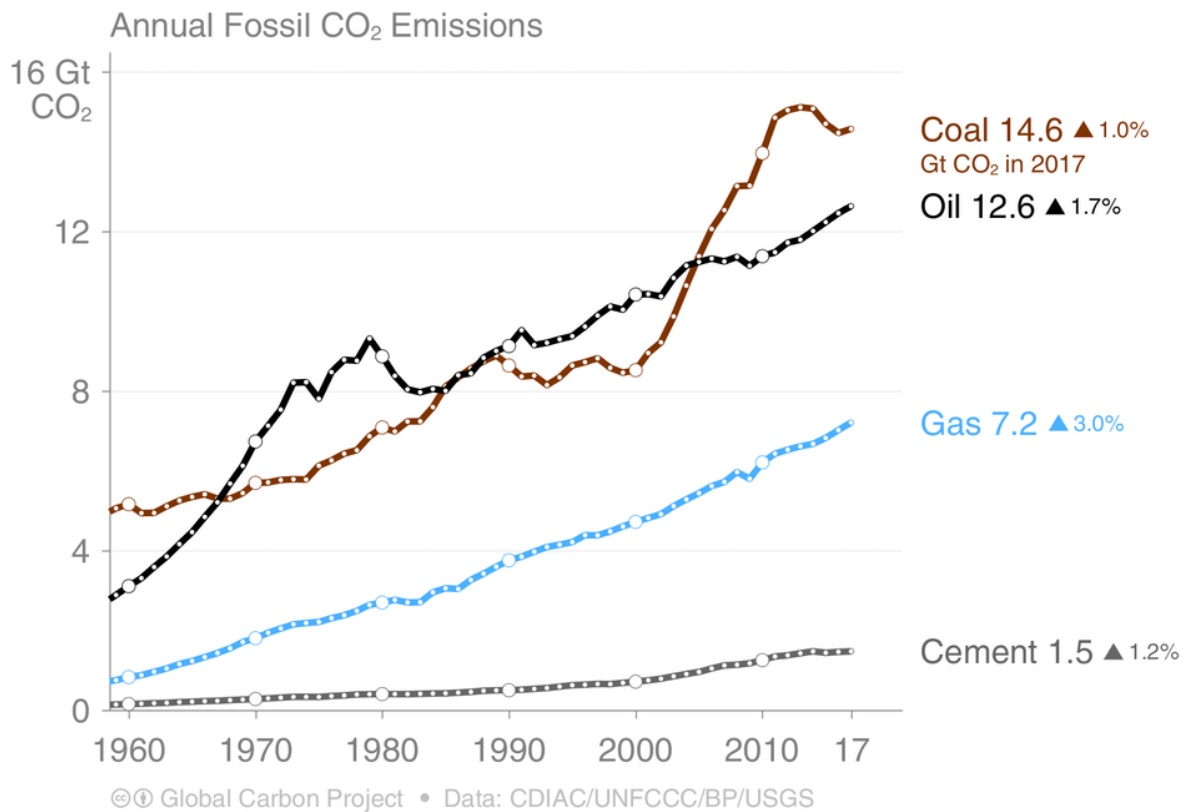
He and his wife grow most of their own food and live off grid powered by a solar energy system. Turner said this saved him during last summer's catastrophic bushfires as his power stayed online but most people in the area lost power for weeks.

Turner has continued tracking the data as best as possible since his last official report in 2014, and last year he helped a Harvard masters student update the data for their thesis.

Turner told *Voice of Action* that under his modelling the business as usual scenario "ends up resulting in a global collapse from about now through the next decade or so".

It was difficult to predict a timeline but Turner said he believed "there's an extremely strong case that we may be in the early stages of a collapse right at the moment".

"Vested interests and corrupt politicians combined with a population happy to deny problems overwhelm those that are trying to promulgate truth and facts," said Turner.



Fossil fuel emissions continue to rise

'By 2030 we'll know what path we've taken'

Steffen told *Voice of Action* that it's "highly likely that by 2030 we'll know what pathway we've taken", "the pathway towards sustainability or the current pathway towards likely collapse".

"I think the 'fork in the road' will come in this decade, probably not a single point in time but as a series of events," said Steffen.

Steffen told *Voice of Action* he believes collapse "will likely not come as a dramatic global collapse, but rather as overall deterioration in many features of life, with regional collapses occurring here and there".

"For example, it appears that the USA is entering a long period of decline in many aspect of its society, with a potential for a more rapid collapse in the coming decade," said Steffen.

Samuel Alexander, a lecturer with the University of Melbourne and research fellow at the Melbourne Sustainable Society Institute, told *Voice of Action* that the coming collapse would not be a single black or white event.

"With respect to civilisations, what is more likely is that we have entered a stage of what JM Greer calls 'catabolic collapse' – where we face decades of ongoing crises, as the existing mode of civilisation deteriorates, but then recovers as governments and civil society tries to respond, and fix things, and keep things going for a bit longer," said Alexander.

"Capitalism is quite good at dodging bullets and escaping temporary challenges to its legitimacy and viability. But its condition, I feel is terminal."

Alexander, who studies the economic, political and cultural challenges of living on a full planet in an age of limits, believes the future will be "post-growth / post capitalist / post-industrial in some form".

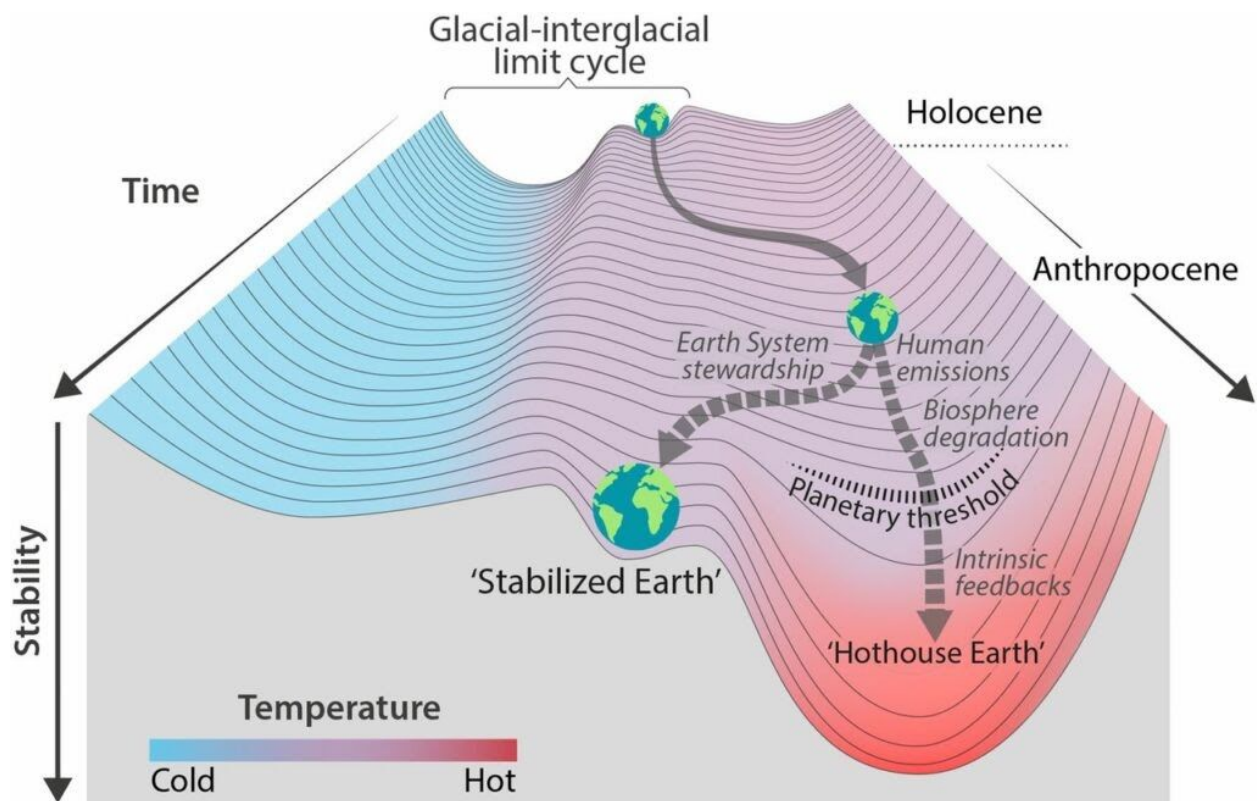
"The future will like arrive in part by design and in part by disaster. Our challenge is to try to constitute the future through planning and community action, not have the future constitute us," said Alexander.

Alexander said that it would never be “too late” to act sensibly as whether we’re trying to avoid or manage collapse there is lots of work to be done (“a 3 degree future is better than a 4 degree future”).

Steffen believes the current US mass uprisings are not a sign of collapse but one of “growing instability”.

Alexander said it was a sign of “steam building up within a closed system”. Without bold grassroots and political action we were “likely to see explosions of civil unrest increasingly as things continue to deteriorate”.

“As economies deteriorate and as inequalities deepen, more people get disenfranchised, incentivising resistance and sadly sometimes making people look for scapegoats to blame for new or intensifying hardships (e.g. the so-called alt-right),” said Alexander.



If we don't stabilise the climate we will fall into an irreversible Hothouse Earth scenario

Funding dried up after inconvenient truths

When Turner joined CSIRO in the early 2000s the organisation was working on the Australian Stocks and Flows Framework – a model of the economy using physical things rather than dollars.

The work was funded by the Department of Immigration but Turner says the reports – the last of which was done in 2010 – were buried because the conclusions did not support high population growth.

The research found the economic benefits in terms of wealth per person would be outweighed by social ills including the impact on quality of life and the environment from resource use and pollution. The reports warned there would be nil net flow to the Darling River, loss of habitat and animal and plant species, traffic congestion, city water deficits and reduced biodiversity due to polluted creeks.

Turner's findings went against the neoliberal orthodoxies as they challenged the notion of infinite growth on a finite planet. He said he and others pursuing similar research in "stocks and flows" models of the economy "found it harder and harder to get work funded".

It is no wonder then that the latest Breakthrough National Centre for Climate Restoration report found "there is no literature that synthesises the large scale impacts that climate change could have on Australia's economy, and no reliable snapshot of Australia's economic vulnerability to future climate warming in a regional and global context".

Steffen said he hadn't received any political pressure over his work "but I probably haven't attacked the growth/capitalism paradigm as directly as Graham [Turner] has". He says he has not hesitated to note the incompatibility of the neoliberal economic system with a stable Earth system in his talks.

"It seems obvious that very fundamental changes are required, all the way down to core values – what do we really value in life?," said Steffen.

Turner said the "absolutely immense changes" required to deliver a sustainable future were just "too hard for the vast majority of people to contemplate".

“You’d have to halve the birth rate, you’d have to have net zero immigration, you’d have to go totally renewable energy and double efficiencies in every sector of the economy, and the really key thing is you’d have to reduce the working week over time so that it would become half of what it is,” said Turner.

“But that would also mean that people wouldn’t have the same level of income and it goes hand in hand with reducing household consumption by half. And unless you do all of those things, you don’t achieve a steady state, sustainable future, and if you leave some things out you’ve got to go even harder at the others.”

Turner believes it would be possible to provide for everyone’s needs in a sustainable way but we would have to live a 1950s or 1960s-style lifestyle with limits such as one car and TV per household. We wouldn’t be living in caves and we’d still have technology but the rate of change would be a lot slower.

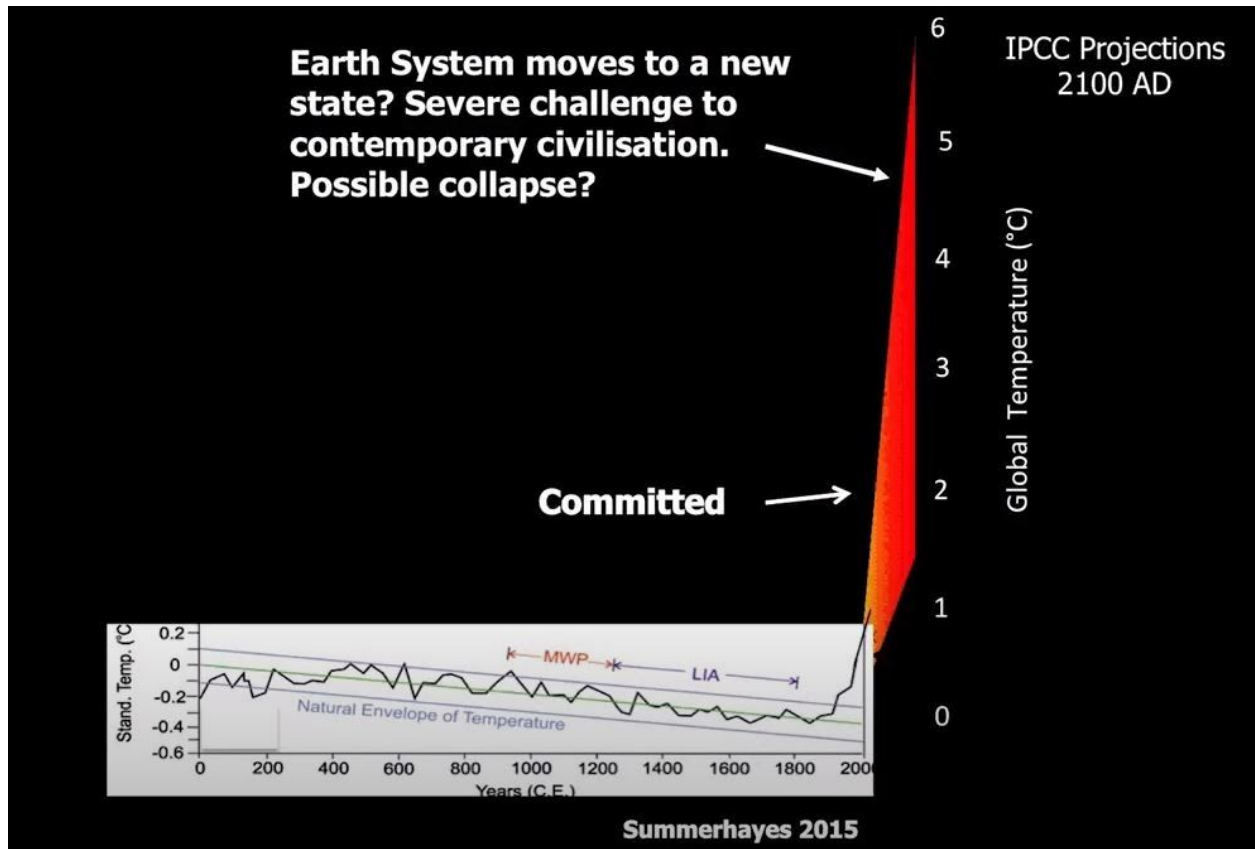
“I think if we all manage to live a simpler and arguably more fulfilling life then it would be possible still with some technological advances to have a sustainable future, but it would seem that it’s more likely ... that we are headed towards or perhaps on the cusp of a sort of global collapse,” Turner told *Voice of Action*.

Turner said he fears that the public at large won’t take the problem seriously enough and demand change until they’re “actually losing their jobs or losing their life or seeing their children directly suffer”.

‘Potentially infinite costs of climate change’

The political discourse is about getting back to growth, supported by taxpayer-subsidised fossil fuels, but evidence shows that even if the government was committed to renewable energy, “green growth” is just not possible at a global scale.

A 2019 IMF Working Paper notes a growing agreement between economists and scientists “that risk of catastrophic and irreversible disaster is rising, implying potentially infinite costs of unmitigated climate change, including, in the extreme, human extinction”.



Slide from Steffen's recent presentation showed the temperature anomaly over 2000 years

The Australian-based Breakthrough National Centre for Climate Restoration has spent years publishing reports warning that the science shows we are headed for civilisational collapse. They stress there is no further carbon budget today for a realistic chance of staying below 2°C, so there can be no further fossil fuel expansion.

The Breakthrough reports have been critical of the scientific community – including the IPCC – for underplaying the full risks of climate change particularly the tipping points and existential risk. Its [latest report](#), *Fatal Calculations*, takes aim at economists for failing to adequately account for costs of inaction in their models, which in turn has been used by politicians to delay action.

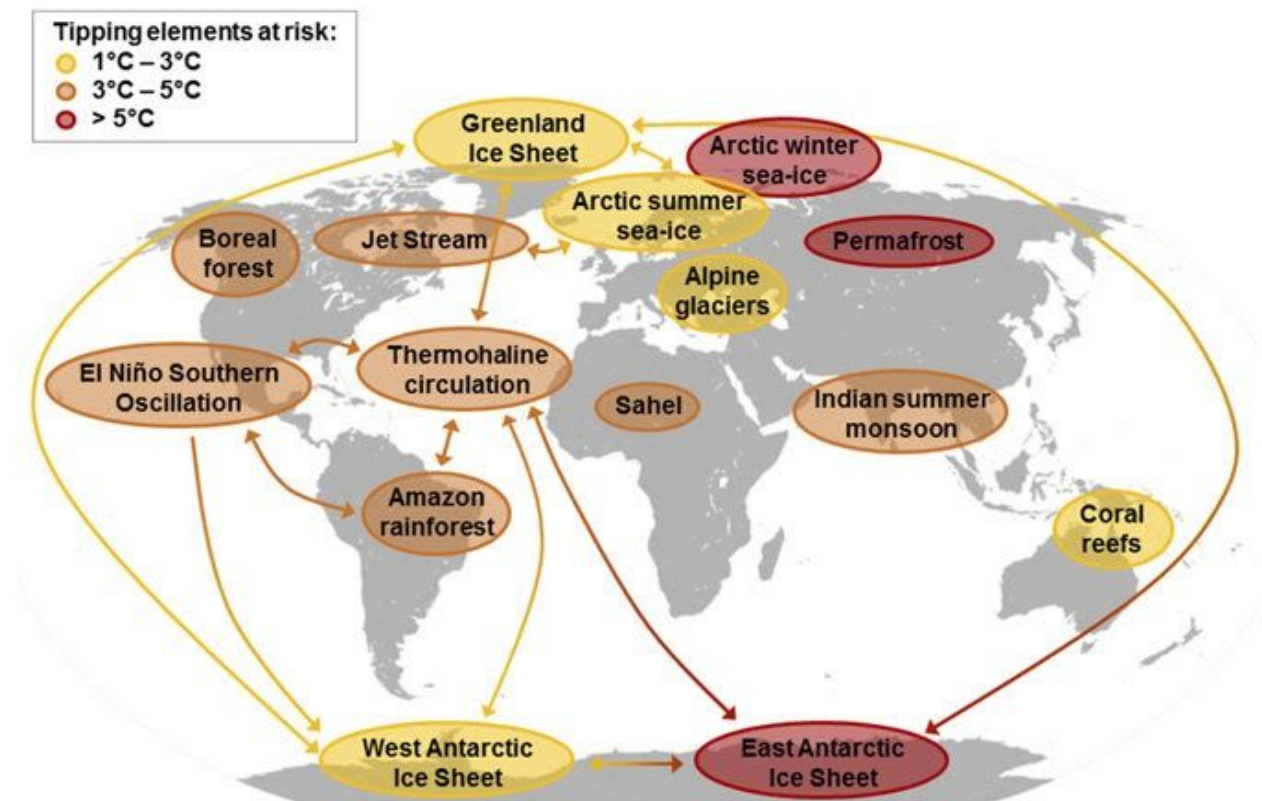
“Despite the escalating climate disasters globally, not least our bushfires, this preoccupation with the cost of action — and a blind eye turned to overwhelming future damage — remains the dominant thinking within politics, business and finance,” the Breakthrough report found.

“Because climate change is now an existential threat to human society, risk management and the calculation of potential future damages must pay disproportionate attention to the high-end, extreme possibilities, rather than focus on middle-of-the-spectrum probabilities.”

In a [discussion paper](#) released in May, titled COVID-19 climate lessons, Breakthrough draws parallels between climate change and the lack of preparedness for the pandemic.

“The world is sleepwalking towards disaster. The UN climate science and policymaking institutions are not fit-for-purpose and have never examined or reported on the existential risks,” the paper reads.

“There are no national or global processes to ensure that such risk assessments are undertaken and are efficacious. The World Economic Forum reports on high-end global risks, including climate disruption, once a year and then everybody goes back to ignoring the real risks.”



Tipping points are poorly accounted for in climate change models

Human activity is causing temperature rises beyond the envelope of natural variability that the biosphere is built to support. Steffen said there's only been two times in the last 100 million years that we have seen a spike in temperature like this, the first was when the dinosaurs were wiped out 65 million years ago and the second was another mass extinction event 56 million years ago.

The last time atmospheric carbon dioxide emissions were at the current level was during the early-to-mid Pliocene 3–4 million years ago, when temperatures were around 3°C warmer than the late 19th century, and sea levels were around 25 metres higher.

Government failing to meet the challenge

Despite recent bushfires which burnt 35 million hectares, caused 445 excess deaths from smoke and incinerated 1 billion animals – doubling Australia's annual CO2 emissions in the process – the government is refusing to commit to even modest emissions reduction targets and is pushing a “gas-fired recovery”.

It has emerged this week that the government was warned about the likelihood of severe bushfires but failed to do enough to prepare. Fire chiefs were also gagged from talking about climate change.

The Great Barrier Reef this year was hit with its third mass bleaching event in 5 years.

The Australian government, beholden to the fossil fuel industry and with no corruption watchdog to keep it in check, continues to resist pressure to increase its climate change commitment. Australia will not even be able to meet its Paris targets without an accounting loophole – targets which themselves are inadequate to prevent collapse.

It's not just climate change that is leading us to collapse but also the fact that nature is declining globally at rates unprecedented in human history.

Around 1 million animal and plant species are now threatened with extinction, many within decades. As Steffen notes, the web of life on Earth is getting smaller and increasingly frayed.

Humans thoroughly dominate the land biosphere making up 32% of all terrestrial biomass followed by around 65% in domesticated animals, leaving less than 3% of vertebrate wildlife.

There has also been what's called "The Great Acceleration", whereby human population and economic growth is accelerating leading to accelerating use of resources like water and energy. This has also led to exponential growth in: greenhouse gas emissions, ocean acidification, ozone depletion, surface temperatures, marine fish capture, terrestrial biosphere degradation, tropical forest lost and domesticated land.

Many countries, including parts of Australia, are running out of water and having to truck in bottled water. It is predicted that 1.8 billion people will be living in water-scarce regions by 2025.

Steffen says net zero emissions by 2050 would be "too late" and the only thing that will save us are radical solutions committing to:

- No new fossil fuel developments of any kind from now
- A 50% reduction in greenhouse gas emissions by 2030 and 100% renewable energy
- Reaching net zero emissions by 2040

Steffen says it's much, much cheaper not to use fossil fuels in the first place than to try to capture the CO₂ after the fact, as you're "fighting the second law of thermodynamics when you're trying to recapture CO₂".

Turner believes the Corporations Act should be rewritten "so that corporations don't have more legal rights than people, and are not compelled to make a profit for shareholders".

'We're possibly gone already'

Associate Professor Anitra Nelson, honorary principal fellow at the University of Melbourne's Melbourne Sustainable Society Institute, advocates for "de-growth" policies which would reduce global consumption and production to sustainable levels. She says we're currently consuming resources as if there were four Earths and if we don't change fast we will face conditions that we can't survive under.



'Time for degrowth': Anitra Nelson

“On the current trajectory we’re possibly gone already, and if we’re not, unless we act very quickly and in very serious ways we just can’t get back into a kind of balance with nature,” Nelson told *Voice of Action*.

“I do actually think we’re already into the collapse and it’s just likely to get worse and more quickly worse as we go.”

Nelson said we have to wholesale change how we live on this planet and that includes discussions about population control (such as restrictions on the number of kids people have) and even maximum income limits.

Nelson said we also need to get rid of capitalism as fundamentally that economic system could not survive without growth.

Instead of firms competing in a global market we need to be “localising economies” so that “basically people are producing locally for local needs and only basic needs”. This would involve having “autonomous communities” with “substantive and direct democracy” and consensus decision making.

Tim Buckley, director of energy finance studies at the Institute for Energy Economics and Financial Analysis (IEEFA), told *Voice of Action* that our economic model “will have to change or collapse” as “we are reaching the limits to growth”. The health and social costs were increasingly evident and “we are getting to the point where it can’t be avoided”.

“I think global capitalism is realising that the parasitical nature that has emerged (where the top 1% own the vast majority of the world’s wealth), can only be sustained for so long,” said Buckley.

“If they kill the host (the bottom 99% of the people), their position in absolute terms is worse off, even if they own all the wealth, the total pie will shrink, and they are most impacted. So in order to protect their ‘elite’ position, they will allow changes to make the model more sustainable, so they can remain the top 1%, but sharing a little more to make the model more sustainable.”

Buckley is more optimistic than most in that he believes the world’s financial elites will reorganise the global economy to become sustainable out of self preservation.

“The economics of renewables make this economically sensible. It is not about saving the poor of the world. It is about an economic reality – solar is killing coal fired power plant investments. Technology and economics win, not environmentalism.”