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Reclaiming "Climate Emergency"

Fifteen years ago, the term "climate emergency" was employed in the book *Climate Code Red: The Case for Emergency Action* to propose that we are in an emergency (as a problem statement) and that we need to declare and act on this climate emergency with an urgent mobilisation of unprecedented scale in peacetime (a solutions strategy).[1]

"Climate emergency" was the Oxford Dictionaries' Word of the Year in 2019.[2] Remarkably, only two years earlier, the term was in use only within relatively limited climate activist circles. And today the phrase has become ubiquitous and applied so indiscriminately – even by governments who simultaneously champion the fossil fuel industry – that it has significantly lost meaning. Reclaiming the term "climate emergency" is an urgent task.

The Genesis of "Climate Emergency"

The origins of the idea that we are in a climate emergency go back at least 19 years. The US environmental analyst Lester Brown advocated "climate action on the scope of the WWII mobilisation" in his 2003 *Plan B*, and in subsequent editions.[3] Whilst not using the language of "climate emergency", Al Gore in a 2006 essay entitled *The Moment of Truth* and in the film *An Inconvenient Truth* urged the world to take the threat of climate change no less seriously than the threat of the Nazis during WWII, to face the "global emergency."[4]

1 David Spratt and Philip Sutton, *Climate Code Red: The Case for Emergency Action*, Melbourne, Scribe, 2008.

2 OUP, "Word of the year", Oxford Languages, https://languages.oup.com/word-of-the-year/2019, accessed 22 December 2022.

3 Lester R. Brown, *Plan B: Rescuing a Planet Under Stress and a Civilization in Trouble*, New York, W. W. Norton and Company, 2003.

4 Al Gore, "The moment of truth", *Vanity Fair,* May 2006; Davis Guggenheim (dir.), *An Inconvenient Truth*, Lawrence Bender Productions/Participant Productions, 2006.

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The term "climate emergency" was popularised – and perhaps first codified – by Philip Sutton and myself in a 2007 report and subsequently in the June 2008 book *Climate Code Red*, which initiated the climate emergency movement in Australia. A network of grassroots climate activists emerged and set out to wake up the world to the fact that climate disruption constitutes an emergency, requiring a response at emergency scale and speed of action. The book argued the need to:

> [D]evote as much of the world's economic capacity as is necessary, as quickly as possible, to this climate emergency. [...] Declaring a climate and sustainability emergency is not just a formal measure or an empty political gesture, but an unambiguous reflection of a government's and people's commitment to intense and large-scale action.[5]

Climate Code Red was the spark for *Climate Safety: In Case of Emergency...* published in November 2008 in the UK and launched at an event with Green Party leader Caroline Lucas, George Monbiot, Jeremy Leggett, Prof. Kevin Anderson, and Tim Helweg-Larsen.[6]

In 2011, Paul Gilding's *The Great Disruption* laid out the reasons to "address the emergency with the commitment of our response to WWII and begin a real transformation to a sustainable economy."[7] This was a follow-up to his November 2009 *The One-Degree War Plan* essay with Jorgen Randers, which stated that it was time to "develop a global emergency response to cut climate emissions and pursue a safe climate 'whatever the cost'."[8]

Awareness of the need for a qualitatively higher level of action grew. "We are now at a tipping point that threatens to flip the world into a full-blown climate emergency," wrote Tony de Brum, the Marshall Islands political leader, Kelly

5 Spratt and Sutton, *Climate Code Red*, pp. 230, 251.

6 Richard Hawkins, Christian Hunt, Tim Holmes, and Tim Helweg-Larsen, *Climate Safety: In Case of Emergency...*, London, Public Interest Research Centre, 2008.

7 Paul Gilding, *The Great Disruption: How the Climate Crisis Will Transform the Global Economy*, London, Bloomsbury, 2011.

8 Jorgen Randers and Paul Gilding, "The one-degree war plan", *Journal of Global Responsibility*, 1 (1/2010), pp. 170–188.

Rigg, and Mary Robinson, the former Republic of Ireland President, in November 2013.[9]

In September 2014, The Climate Mobilization (TCM) was launched in the USA by Margaret Klein Salamon and Ezra Silk, calling for governmental climate action on the scale of the WWII mobilisation, a proposal which was detailed in 2016 in Silk's *Victory Plan*[10] and Klein's *Leading the Public into Emergency Mode*.[11] TCM drew on the work of Gilding and Brown on mobilisation, and on the climate emergency proposals developed in Australia and *Climate Code Red*. TCM's advocacy resulted in a climate mobilisation resolution being included in the Democratic Party's platform for the 2016 Presidential election.

In June 2018, before the US Congressional primaries, Justice Democrat candidate Alexandria Ocasio-Cortez signed TCM's pledge to champion climate mobilisation; in October, TCM proposed to Ocasio-Cortez's communications director that she "introduce a climate emergency declaration into Congress as a first step toward shifting America into a wartime-level mobilization in response to the accelerating climate crisis."[12] She subsequently championed the Green New Deal.

In Australia, grassroots activists campaigned for politicians and candidates at all levels of government to declare their support through various climate emergency declarations[13] and campaigns such as CACE, the Council and Community Action in the Climate Emergency. This led the City of Darebin in the suburbs of Melbourne in December 2016 to become the first council in the world to recognise the climate emergency, as part of an international campaign focused on local government. In the USA, such work by TCM led to the Montgomery County

9 Tony de Brum, Kelly Rigg, and Mary Robinson, "Warsaw climate talks: The world's poorest cannot wait for a 2015 deal", *The Guardian*, 21 November 2013, https://www.theguardian.com/environment/2013/nov/21/warsaw-climate-talks-the-worlds-poorest-cannot-wait-for-a-2015-deal, accessed 22 December 2022.

10 Ezra Silk, *The Climate Mobilization Victory Plan*, New York, The Climate Mobilization, 2016.

11 Margaret Klein Salamon, *Leading the Public into Emergency Mode: Introducing the Climate Emergency Movement*, New York, The Climate Mobilization, 2016.

12 Ezra Silk, "Proposal: A Congressional climate emergency declaration", TCM memo to Corbin Trent, 20 October 2018, pers. com.

13 CED, "Petitions", Climate Emergency Declaration, https://climateemergencydeclaration.org, accessed 22 December 2022.

Council becoming the first council in that country to follow suit, in December 2017, and subsequently others, including the City and County of San Francisco.

In the UK, a campaign initiated by The Green Party, and subsequently supported by Extinction Rebellion (XR), resulted in more than a hundred councils – starting with Bristol City Council and including the City of London – rapidly supporting the climate emergency approach, starting in November 2018. XR also drew inspiration from the work of TCM to make local declarations and the climate emergency a key part of its strategy and the November 2018 protests in London. A separate initiative in Canada led to councils covering more than 10 million people declaring a climate emergency ("*la déclaration d'urgence climatique*"), starting in August 2018.

The local government declaration movement spread quickly: by May 2019, 548 councils in twelve countries had adopted climate emergency language, though the meanings attached to the term varied, from full societal mobilisation to statements of increased ambition, although a general common thread was the goal of zero emissions by 2030, and often a call for large-scale carbon drawdown. By November 2022, 2,295 jurisdictions from local to national in 39 countries had declared a climate emergency, with the populations covered by those jurisdictions exceeding one billion citizens.[14]

The use of the term "climate emergency" exploded in late 2018 following its use by School Strike for Climate activities around the world and Greta Thunberg's brutally direct language, the rapidly growing climate emergency local government campaigns, its adoption by XR, and the enormous response in the USA, and internationally, to Green New Deal proposals.

The term was applied by a group of eminent scientists in 2019.[15] And in June 2019, both the language and the analysis were taken up by UN Secretary General António Guterres:

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[14] CED, "Climate emergency declarations in 2,305 jurisdictions and local governments cover 1 billion citizens", Climate Emergency Declaration, 12 December 2022, https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens, accessed 22 December 2022.

[15] Timothy M. Lenton, Johan Rockström, Owen Gaffney, Stefan Rahmstorf, Katherine Richardson, Will Steffen, and Hans Joachim Schellnhuber, "Climate tipping points – too

> So we are losing the race, climate change is running faster than we are, and we need to sound the alarm, this is an emergency, this is a climate crisis and we need to act now [...] Unfortunately in politics, there is always a huge trend to keep the status quo. The problem is that the status quo is a suicide. Those (Paris) commitments, even if fully met, would lead to an increase in temperature [...] above 3 degrees which would mean a catastrophic situation.[16]

That same year, Nobel Laureate Joseph Stiglitz concluded that: "the climate emergency is our third world war. Our lives and civilization as we know it are at stake, just as they were in the second world war";[17] Pope Francis said that "faced with a climate emergency [...] we must take action accordingly, in order to avoid perpetrating a brutal act of injustice toward the poor and future generations";[18] and Patricia Espinosa, then executive secretary of the United Nations Framework Convention on Climate Change, declared: "We are literally in a climate emergency, and [...] we are increasingly hearing that this is the fight of our lives."[19]

Climate Code Red

The purpose of the 2008 book *Climate Code Red: The Case for Emergency Action* was to codify "climate emergency" as both a problem statement in the first two sections of the book, and as a solutions strategy in the third section.

Part 1 dealt with the science of climate change, scientific reticence, and why emerging observations and research showed that the biophysical circumstances

risky to bet against", *Nature*, 575 (2019), pp. 592–595.

16 Julia Pyper, "UN chief Guterres: The status quo on climate policy 'Is a suicide'", gtm, 7 June 2019, https://www.greentechmedia.com/articles/read/un-chief-guterres-the-status-quo-is-a-suicide, accessed 12 December 2022.

17 Joseph Stiglitz, "The climate crisis is our third world war. It needs a bold response", *The Guardian*, 4 June 2019, https://www.theguardian.com/commentisfree/2019/jun/04/climate-change-world-war-iii-green-new-deal, accessed 12 December 2022.

18 Carol Glatz, "Mitigate global warming, spare further injustice to poor, pope says", *The Catholic Spirit*, 14 June 2019, https://thecatholicspirit.com/news/nation-and-world/from-the-pope/mitigate-global-warming-spare-further-injustice-to-poor-pope-says, accessed 12 December 2022.

19 Megan Rowling, "UN climate chief says 3C hotter world 'just not possible'", *Thomson Reuters Foundation*, 18 June 2019, https://www.reuters.com/article/us-global-climatechange-talks-idUSKCN1TI23E, accessed 12 December 2022.

were more disturbing, and the action required more urgent, than policymakers appeared to understand.

Part 2, on targets, challenged the policymaking paradigm of "avoiding dangerous anthropogenic influence" by limiting warming to two degrees Celsius (2°C) as an appropriate target, and instead proposed the goal of a "safe climate" (safe for all people and species) which, following James Hansen et al., meant warming within the Holocene range and CO_2 levels of no more than 325 ppm.[20] The book proposed the goal of maximum protection so that concerns for people and other species, and for current and future generations, could be "amalgamated into a concern to protect the welfare of 'all people, all species, and all generations'."[21]

Part 3 drew on the experience of WWII and emergency responses to natural disasters to paint a picture of an emergency mode in which all available/necessary resources are devoted to the threat, in contrast to the "business-as-usual" mode of contemporary climate policymaking, which is characterised by incrementalism and trade-offs. *Climate Code Red* included this table comparing the two modes:[22]

Normal political-paralysis mode	Emergency mode
Crises are constrained within business-as-usual mode.	Society engages productivmodeely with crises, but not in panic mode.
Spin, denial, and 'politics as usual' are employed.	The situation is assessed with brutal honesty.
No urgent threat is perceived.	An immediate, or looming, threat to life, health, property, or the environment is perceived.
The problem is not yet serious.	A high probability of escalation beyond control if immediate action is not taken.
The time of response is not important.	The speed of response is crucial.
The crisis is one of many issues.	The crisis is of the highest priority.

[20] James Hansen, Makiko Sato, Pushker Kharecha, David Beerling, Robert Berner, Valerie Masson-Delmotte, Mark Pagani, Maureen Raymo, Dana L. Royer, and James C. Zachos, "Target atmospheric CO2: Where should humanity aim?", *The Open Atmospheric Science Journal*, 2 (1/2008), pp. 217–223.

[21] Spratt and Sutton, *Climate Code Red*, p. 112.

[22] *Ibid.*, p. 224.

A labour market is in place.	Emergency project teams are developed and labour planning is instituted.
Budgetary 'restraint' is shown.	All available/necessary resources are devoted to the emergency and, if necessary, governments borrow heavily.
Community and markets function as usual.	Non-essential functions and consumption may be curtailed or rationed.
A slow rate of change occurs because of systemic inertia.	Rapid transition and scaling up occurs.
Market needs dominate response choices and thinking.	Planning, fostering innovation, and research take place.
Targets and goals are determined by political trade-offs.	Critical targets and goals are not compromised.
There is a culture of compromise.	Failure is not an option.
There is a lack of national leadership, and politics is adversarial and incremental.	Bipartisanship and effective leadership are the norm.

A threat may be civil or military: physical (such as fire, flood, tsunami, or earthquake); political (war and conflict); biomedical (infectious diseases); or the result of a combination of factors, such as famine or population displacement. A climate emergency response was necessary because the neoliberal reliance on markets and incremental change had and would continue to fail:

> Sharp changes mean disruption, and disrupting business or lifestyle is a political sin. In the developed world, "politics as usual" places the free-market economy at the heart of its project, and governments, as a matter of political faith, are loath to intervene decisively. Even though Sir Nicholas Stern named global warming as the "greatest market failure" in history, governments have been ideologically reluctant to act sufficiently to correct this great distortion of the market.[23]

So the key is decisive government intervention in planning and coordinating the transition. The particular nature of such a government would depend on the ca-

[23] *Ibid.*, p. 214.

pacity of people to build its democratic character, and to provide national leadership when conventional politics fails to do so:

> It should not be assumed that strong state intervention requires an autocratic government. If, as a society, we are to engage in a rapid change, it will require the active democratic participation of the population, rather than its passivity.[24]

Finally, *Climate Code Red* argued that the emergency must be seen as a climate *and* sustainability emergency, a multi-issue crisis of sustainability that incorporates food, water, peak oil, and global warming. Climate-specific solutions (such as renewables replacing fossil fuels) would not by themselves solve the biodiversity and resource overuse crises.

So how has the *Climate Code Red* analysis fared in the fifteen years since publication?

Faster than Forecast

The reticent nature of the reports of the Intergovernmental Panel on Climate Change (IPCC), and indeed the essentially conservative nature of the scientific method, are now more widely appreciated.

The 2018 Breakthrough report *What Lies Beneath* examined the scientific underestimation of existential climate risk, particularly in relation to the IPCC. In the foreword, Prof. John Schellnhuber, then Director of the Potsdam Institute, wrote that a scientific "trend towards 'erring on the side of least drama' has emerged" and "when the issue is the very survival of our civilisation, *conventional means of analysis may become useless*" (emphasis added),[25] in that:

> [C]alculating *probabilities* makes little sense in the most critical instances, such as the methane-release dynamics in thawing permafrost areas or the potential failing of entire states in the climate crisis. Rather, we should identify *possibilities*, that is,

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[24] *Ibid*., p. 220.

[25] Hans Joachim Schellnhuber, "Foreword", in D. Spratt and I. Dunlop, *What Lies Beneath: The Understatement of Existential Climate Risk*, Melbourne, Breakthrough National Centre for Climate Restoration, 2018, p. 2.

> potential developments in the planetary make-up that are consistent with the initial and boundary conditions, the processes and the drivers we know.[26]

The conclusions of *What Lies Beneath* were echoed in a 2019 paper, "Climate tipping points – too risky to bet against", by a number of eminent scientists, including Schellnhuber, which directly took up the existential risk idea, and provided an "existential formula" and this conclusion:

> 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 [...] If damaging tipping cascades can occur and a global tipping point cannot be ruled out, then this is an existential threat to civilisation.[27]

The Earth's climate systems are undergoing abrupt change, which is happening faster than forecast only two decades ago. At the current 1.2°C of global average warming, tipping points have been passed for Arctic sea ice,[28] the Greenland Ice Sheet,[29] the Amundsen Sea glaciers in West Antarctica,[30] the eastern Amazonian rainforest,[31] and the world's coral systems.[32] Research released in December

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26 *Ibid.*, p. 3.

27 Lenton, Rockström et al., "Climate tipping points – too risky to bet against", p. 595.

28 Paul Voosen, "Growing underwater heat blob speeds demise of Arctic sea ice", *Science*, 25 August 2020, https://www.science.org/content/article/growing-underwater-heat-blob-speeds-demise-arctic-sea-ice, accessed 12 December 2022; Robert Monroe, "Research highlight: Loss of Arctic's reflective sea ice will advance global warming by 25 years", Scripps Institution of Oceanography, 22 July 2019, https://scripps.ucsd.edu/news/research-highlight-loss-arctics-reflective-sea-ice-will-advance-global-warming-25-years, accessed 12 December 2022.

29 Nick Breeze, "Professor Jason Box | Greenland today & [not for] tomorrow #COP26Glasgow", YouTube, 12 November 2021, youtube.com/ watch?v=P6LrGetz10g, accessed 23 December 2022; Willow Hallgren, "What Greenland's record-breaking rain means for the planet", *The Conversation*, 25 April 2021, https://theconversation.com/what-greenlands-record-breaking-rain-means-for-the-planet-166567, accessed 12 December 2022.

30 Eric Rignot, Jérémie Mouginot, Mathieu Morlighem, Hélène Seroussi, and Bernd Scheuchl, "Widespread, rapid grounding line retreat of Pine Island, Thwaites, Smith, and Kohler glaciers, West Antarctica, from 1992 to 2011", *Geophysical Research Letters*, 41 (10/2014), pp. 3502–3509.

31 Thomas E. Lovejoy and Carlos Nobre, "Amazon tipping point'" *Science Advances*, 4 (2/2018).

32 Terry P Hughes, James T. Kerry, Andrew H. Baird, Sean R. Connolly, Tory J. Chase, Andreas Dietzel, Tessa Hill, Andrew S. Hoey, Mia O. Hoogenboom, Mizue Jacobson, Ailsa Kerswell,

2021 provided new evidence that West Antarctica's Thwaites Glacier has passed the tipping point, likely triggering a cascade of similar events on the peninsula.[33] The events at both poles are not properly incorporated into current climate models.[34] By way of comparison, successive IPCC reports suggested that most of these systems would still be stable at 2°C.

Individual elements of the climate system that are tipping and/or changing rapidly may also interact and cascade. "Hothouse Earth" is a plausible scenario in which climate system feedbacks and their cascading interactions drive the Earth system climate to a "point of no return", whereby further warming would become self-sustaining.[35] This is not to say that this scenario is already locked into the system, but the authors warned that it may become active in the 1.5–2°C range, which is where we are heading now and will likely exceed, at an accelerated rate of warming, over the next two to three decades.

In finding robust solutions, special attention should be devoted to potential high-end outcomes in a climate system changing faster than forecast, and beyond conventional risk-management practice. But this is what the IPCC and climate research has overwhelmingly not done. New analysis shows that the potential to end humanity is "dangerously underexplored" by the IPCC, with

Joshua S. Madin, Abbie Mieog, Allison S. Paley, Morgan S. Pratchett, Gergely Torda, and Rachael M. Wood, "Global warming impairs stock–recruitment dynamics of corals", *Nature*, 568 (7752/2019), pp. 387–390.

33 Erin C. Petit, Christian Wild, Karen Alley, Atsuhiro Muto, Martin Truffer, Suzanne Louise Bevan, Jeremey N. Bassis, Anna J. Crawford, Ted A. Scambos, and Doug Benn, "C34A-07 – Collapse of Thwaites Eastern Ice Shelf by intersecting fractures", presentation to AGU Fall Meeting, 16 December 2021, https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/978762, accessed 12 December 2022.

34 Andy Aschwanden, Timothy C. Bartholomaus, Douglas J. Brinkerhoff, and Martin Truffer, "Brief communication: A roadmap towards credible projections of ice sheet contribution to sea level", *The Cryosphere*, 15 (12/2021), pp. 5705–5715; Peter Hannam, '"How lucky do you feel?': The awful risks buried in the IPCC report", *The Age*, 11 August 2021, https://www.theage.com.au/environment/climate-change/how-lucky-do-you-feel-the-awful-risks-buried-in-the-ipcc-report-20210811-p58hut.html, accessed 22 December 2022.

35 Will Steffen, Johan Rockström, Katherine Richardson, Timothy M. Lenton, Carl Folke, Diana Liverman, Colin P. Summerhayes, Anthony D. Barnosky, Sarah E. Cornell, Michel Crucifix, Jonathan F. Donges, Ingo Fetzer, Steven J. Lade, Marten Scheffer, Ricarda Winkelmann, and Hans Joachim Schellnhuber, "Trajectories of the Earth System in the Anthropocene", *Proceedings of the National Academy of Sciences*, 115 (33/2018), pp. 8252–8259.

textual analysis finding that IPCC assessments have shifted away from high-end warming to increasingly focus on lower temperature rises,[36] even as "global heating could become 'catastrophic' for humanity if temperature rises are worse than many predict or cause cascades of events we have yet to consider, or indeed both."[37] "We know least about the scenarios that matter most," says Luke Kemp from Cambridge's Centre for the Study of Existential Risk.[38]

The Efficacy of the 1.5 and 2°C Targets

When 154 nations signed the UN Framework Convention on Climate Change (UNFCCC) in June 1992, the goal was "preventing dangerous anthropogenic interference with Earth's climate system," with subsequent discussion centring on the 2°C target.[39] But today Earth is already too hot and climate change is already dangerous, so what is the goal now?

By the time of the Paris Agreement in 2015, preventing dangerous interference was out the window, replaced by "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels,"[40] even though the concrete commitments made by nations in 2015 would produce an outcome of 3°C or more.

The agreement was warmly embraced by most climate advocates and policymakers, with barely a whisper that the Paris range was far from safe and would be an existential threat to the most climate vulnerable, including small-island states, for example. Even as the 1.5°C goal was being elevated in 2015, there was clear evidence that climate change was already dangerous at just 1°C, for ex-

36 Florian U. Jehn, Luke Kemp, Ekaterina Ilin, Christoph Funk, Jason R. Wang, and Lutz Breuer, "Focus of the IPCC assessment reports has shifted to lower temperatures", *Earth's Future*, 10 (5/2022).

37 University of Cambridge, "Climate change: Potential to end humanity is 'dangerously underexplored' say experts", *phys.org*, 1 August 2022, https://phys.org/news/2022-08-climate-potential-humanity-dangerously-underexplored.html, accessed 23 December 2022.

38 *Ibid*.

39 Samuel Randalls, "History of the 2°C climate target", *Wiley Interdisciplinary Reviews: Climate Change*, 1 (4/2010), pp. 598–605.

40 UN, *Paris Agreement*, United Nations, 2015, p. 3, https://unfccc.int/sites/default/files/english_paris_agreement.pdf, accessed 12 December 2022.

ample 2014 research showing that glacial loss in West Antarctica was unstoppable.[41]

Sir David King, the former Chief Scientist and adviser to the UK government, had collaborated with the small-island states in the lead-up to the 2015 Paris conference, arguing successfully that global temperature should not go above a 1.5°C rise for safety. But in 2021, *The Independent* journalist Donnachadh McCarthy reported that King "astounded me by saying he now realised this was wrong, and believes the passing of the Arctic tipping point has been reached. […] He said the *1.1°C rise that we already have is too dangerous* – and candidly admitted he believed US climate professor James Hansen had been right after all in 1988, when he warned the US Congress that we should not pass 350 ppm CO_2. We have now breached 415 ppm and are heading fast towards 500 ppm, Sir David said" (emphasis added).[42]

Hansen's proposition is well supported. In 2009, scientists proposed that "human changes to atmospheric CO_2 concentrations should not exceed 350 ppm by volume, and that radiative forcing should not exceed one watt per square metre above pre-industrial levels. Transgressing these boundaries will increase the risk of irreversible climate change, such as the loss of major ice sheets, accelerated sea-level rise and abrupt shifts in forest and agricultural systems."[43] Other evidence points to the need to return to pre-industrial levels of 280 ppm, for example in relation to the cryosphere.[44] And in 2022 a group of Australian scientists suggested that from a geologic perspective: "a justifiable aim for a future climate is one akin to pre-industrial conditions."[45]

41 NASA, "West Antarctic glacier loss appears unstoppable", Jet Propulsion Laboratory, 14 May 2014, www.jpl.nasa.gov/news/news.php?release=2014-148, accessed 12 December 2022.

42 Donnachadh McCarthy, "We need to start refreezing the Arctic Ocean as soon as possible to save our megacities", *The Independent*, 8 February 2021, https://www.independent.co.uk/climate-change/opinion/arctic-ocean-ice-temperature-climate-change-b1790779.html, accessed 12 December 2022.

43 Johan Rockström et al., "A safe operating space for humanity", *Nature*, 461 (2009), p. 473.

44 ICCI, *Thresholds and closing windows: Risks of irreversible cryosphere climate change*, International Cryosphere Climate Initiative, December 2105, https://iccinet.org/wp-content/uploads/2015/11/ICCI_thresholds_v5_151128_high_res1.pdf, accessed 12 December 2022.

45 Andrew D. King, Jacqueline Peel, Tilo Ziehn, Kathryn J. Bowen, Harry L. O. McClelland, Celia McMichael, Zebedee R. J. Nicholls, and J. M. Kale Sniderman, "Preparing for a post-net-zero world", *Nature Climate Change*, 12 (9/2022), p. 775.

It is well-known from paleoclimate research that the current level of greenhouse gases is enough, over time, to inundate coastal cities, low-lying island nations and regions, and the world's agriculturally rich alluvial deltas. Scientists from the University of NSW conclude: "An equilibrium climate under *current* temperatures would have a sea level several metres higher than what we have today (likely 5–10 metres higher). We also know that an equilibrium climate under *current* CO_2 concentrations would have a sea level 5–25 metres higher" (emphasis added).[46] US government agencies have a high sea-level-rise scenario of 2.5 metres by 2100, and even the Pentagon uses a two-metre scenario.

There can be no excuse for not knowing that 1.5°C of warming will create a disastrous outcome, but few climate advocates, governments, and policymakers have chosen to say so. Is 1.5°C a desirable end-goal, or a political trade-off? What are their goals and what are they aiming to protect?

Maximum Protection or Acceptable Damage?

For a quarter of a century, policymakers have speculated about the maximum climate damage that civilisation and the Earth system can tolerate and adapt to. How close to the edge of the climate cliff can we stand without falling to our death?

Clearly, the goal pursued in mainstream climate advocacy is not the provision of "maximum protection" to the most climate vulnerable,[47] or concern "to protect all people, all species, and all generations,"[48] but rather some poorly-informed notion of maximum acceptable damage.

To protect small-island states, the Great Barrier Reef, Antarctica, the Amazon – indeed to provide protection for the many places and people we care about – re-

46 Andy Pitman, Ian Macadam, Nerilie Abram, Steve Sherwood, and Martin De Kauwe, "Can we limit global warming to 1.5°C?", ARC Centre of Excellence for Climate Extremes Briefing Note 15, 2021, https://climateextremes.org.au/briefing-note-15-can-we-limit-global-warming-to-1-5c, accessed 22 December 2022.

47 Adam P. A. Cardilini and Philip Sutton, *Delivering Maximum Protection: An Effective Goal for a Climate Emergency Response*, Melbourne, Breakthrough National Centre for Climate Restoration, February 2020. Available at https://www.breakthroughonline.org.au/papers.

48 Spratt and Sutton, *Climate Code Red*, p. 119.

quires returning to a climate similar to the relatively stable Holocene conditions of the last 9,000 years of fixed human settlement, during which time CO_2 levels did not exceed 280 ppm. It also requires preventing a cascade of tipping points in the meantime, a task to which policymakers have turned a blind eye.

If this were the goal, advocates and policymakers would advocate a "three levers" approach to reversing global warming: a "reduce, remove, and repair"[49] strategy:

- **Lever 1. Reduce emissions to zero at emergency speed**. 2030 – not 2050 – is the crucial time frame. The primary task is to build capacity for emergency speed and scale emissions elimination, and to minimise the rate and magnitude of warming. Long-term targets are an excuse for procrastination, as the history of international climate policymaking shows. Fast reduction of methane emissions must be a focus, because the gas is short-lived in the atmosphere and its mitigation can reduce the climate forcing.
- **Lever 2. Remove carbon from the atmosphere.** Removing CO_2 from the atmosphere can cool an overheated Earth. Stabilisation (at the current climate) would require carbon drawdown of 60 ppm (back to ~350 ppm) to stop further warming of ~0.7°C. Lowering the current level of warming would require more drawdown.[50] Drawdown is a slow process that will not provide active cooling until it is greater than the level of ongoing emissions. Some nature-based processes are well-known, safe, and can be enhanced. Other new technologies are far from being proven viable and safe, so large-scale research and deployment is also crucial.
- **Lever 3. Short-term cooling and repair.** We need ways to cool the planet and/or protect vital climate systems in the near term, particularly in the polar regions, until the other two levers have time to take effect. Options for polar cooling include enhancing the capacity of marine clouds to reflect incoming radiation, and sulfate aerosols injection (SAI) – using cooling aerosols – which can have a strong, immediate cooling effect. Early studies of climate repair should be incrementally scalable – so they can be paused or reversed

49 CCAG, The Global Climate Crisis and The Action Needed, London, Climate Crisis Advisory Group, 2021.

50 Karina von Schuckmann et al., "Heat stored in the Earth system: where does the energy go?", *Earth System Science Data*, 12 (3/2020), p. 2029.

at any point; and transparency and good governance will consolidate trust in the process, states the Climate Crisis Advisory Group.[51]

The harsh reality is that the first two levers alone – zero emissions and drawdown – are not sufficient to prevent a catastrophe of difficult to comprehend proportions. Warming to date plus the observed Earth Energy Imbalance (EEI) at the top of the atmosphere adds up to about 2°C for today's level of greenhouse gases. And the paleoclimate record suggests the current level of CO_2 would result in 3°C or more of warming in the longer term, so a strategy of emissions elimination only will not prevent a global disaster. Large-scale carbon drawdown is essential, but this cannot be done at a scale and speed fast enough to prevent more tipping points being activated and the possibility of a cascade of consequences or triggering the "Hothouse Earth" scenario.

Hence, the third lever of action is required: the urgent scaling up of research and investigation into an additional range of climate interventions that aims to rapidly cool the planet, including various solar radiation management (SRM) options. If shown to be efficacious, SRM could play a vital role in flattening the warming peak whilst allowing time for zero emissions and carbon drawdown to create a path back to a safe, liveable climate.

Too often, climate strategy has been reduced, if somewhat unconsciously, to a "triage politics" of selecting what to save and what to abandon. Whilst advocates would likely claim this is grossly unfair, that is what setting 1.5–2°C as the goal means.

In the absence of normative goals for the maximum protection of species, peoples, and the Earth system, there is a tendency for political trade-offs between protection and sounding politically reasonable. Thus, goals may be set, only to be abandoned as warming accelerates. "Avoiding dangerous climate change" has already been left by the wayside. When warming hits 1.5°C within a decade, will the Paris goal be abandoned too?

[51] CCAG, *A critical pathway for a manageable future for humanity*, London, Climate Crisis Advisory Group, 2022.

The Emergency Is Now

Covid supply-chain disruption and the war in Ukraine have sidelined the task of rapid emissions reductions. Both have contributed to inflation and a political focus on cost-of-living pressures, and the war has disrupted energy markets, driven a return to coal, whose use is at an all-time high, prompted an increase in emissions-intensive arms production and use, and become an excuse for governments to delay climate action. Increased fertiliser costs, driven by rising fossil fuel prices, have contributed to food insecurity in developing nations.

Atmospheric levels of all three main greenhouse gases have reached record highs.[52] The latest International Energy Agency projections show that global carbon emissions from energy may peak in 2025, but are likely to plateau at a high level after that for a decade or more, rather than decline in any significant manner.[53]

The warming trend will reach 1.5°C around 2030, irrespective of any emissions reduction initiatives taken in the meantime;[54] the UN Environment Program says there is no longer a credible path to holding warming below 1.5°C in the short term,[55] without deploying global cooling interventions. Keeping warming to 2°C

52 Helena Horton, "Atmospheric levels of all three greenhouse gases hit record high", *The Guardian*, 27 October 2022, https://www.theguardian.com/environment/2022/oct/26/atmospheric-levels-greenhouse-gases-record-high, accessed 12 December 2022.

53 Jasper Jolly, "Carbon emissions from energy to peak in 2025 in 'historic turning point', says IEA", *The Guardian*, 22 October 22, https://www.theguardian.com/environment/2022/oct/27/carbon-emissions-to-peak-in-2025-in-historic-turning-point-says-iea, accessed 12 December 2022.

54 H. Damon Matthews and Seth Wynes, "Current global efforts are insufficient to limit warming to 1.5°C", *Science*, 376 (6600/2022), pp. 1404–1409; IPCC, "Summary for Policymakers" in V. Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge UK and New York NY, Cambridge University Press, 2021, table SPM.1.

55 Taejin Park, Hirofumi Hashimoto, Weile Wang, Bridget Thrasher, Andrew R. Michaelis, Tsengdar Lee, Ian G. Brosnan, and Ramakrishna R. Nemani, "What does global land climate look like at 2 degrees warming?", *Earth's Future*, published online 20 December 2022; UN, *Emissions Gap Report 2022: The Closing Window,* Nairobi, UN Environment Programme, 27

means aiming for zero emissions by 2030 for high-per capita emitters, but with emissions and greenhouse gas levels still rising, the Earth will likely reach 2°C of global warming by the 2040s and the 2°C target will very likely be missed by a significant margin,[56] as the Chatham House analysis suggests (discussed below).

When large-scale, self-reinforcing climate system feedbacks are considered, current emissions reduction commitments may still lead to 3°C or more of warming, which US security analysts say could result in a world of "outright chaos."[57] And six in ten climate scientists surveyed by the journal *Nature* say that they expect the world to warm by at least 3°C by the end of the century.[58]

Global demand for food by 2050 is likely to be 50% higher than today. Over that time, the impacts of climate change on the capacity to feed the global population, which is projected to increase 20% over three decades, will have a profound negative impact on human and global security. Chatham House's *Climate Change Risk Assessment 2021* warned that the world is "dangerously off track" to meet the *Paris Agreement* goals, that the risks are compounding, and that "without immediate action the impacts will be devastating" in the coming decades, especially for food security.[59] The report concluded that impacts likely to be locked in for the period 2040–2050 unless emissions rapidly decline include a global average 30% drop in crop yields by 2050, and that more severe and extensive droughts will contribute to cascading climate impacts that will "drive

October 2022, https://wedocs.unep.org/bitstream/handle/20.500.11822/40874/EGR2022.pdf, accessed 22 December 2022.

56 UN, *Nationally Determined Contributions under the Paris Agreement – Synthesis Report by the Secretariat*, New York, UNFCCC, 26 October 2022, p. 7, unfccc.int/sites/default/files/resource/cma2022_04.pdf, accessed 22 December 2022.

57 Kurt M. Campbell, Jay Gulledge, J. R. McNeill, John Podesta, Peter Ogden, Leon Fuerth, R. James Woolsey, Julianne Smith, Richard Weitz, Derek Mix, and Alexander T. J. Lennon, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*, Washington DC, Center for Strategic and International Studies /Center for New American Security, p. 7, www.csis.org/analysis/age-consequences, accessed 22 December 2022.

58 Jeff Tollefson, "Top climate scientists are sceptical that nations will rein in global warming", *Nature*, 599 (7883/2021), p. 24.

59 Daniel Quiggin, Kris De Meyer, Lucy Hubble-Rose, and Antony Froggatt, *Climate Change Risk Assessment 2021*, London, Chatham House, 2021.

political instability and greater national insecurity, and fuel regional and international conflict."[60]

The current policymaking path has failed. Every meeting of the Conference of the Parties under the UNFCCC has seen emissions and temperature trends rise in the following period. Species are dying off as much as a thousand times more frequently than before the arrival of humans 60 million years ago.[61] Climate-specific solutions (such as renewables replacing fossil fuels) will not in themselves solve the biodiversity and resource overuse crisis.[62] Turning recognition of the climate and sustainability emergency into an emergency plan and mobilisation around the world is the only strategy that matches ambition to the scale of the problem.

Disruption and the Market

Markets crave stability and fear disruption. Yet the world is entering an era of instability and uncertainty driven in part by climate-related financial risks, preventing the market generation of reliable prices. Energy markets provide just one example.

In 2011, Paul Gilding concluded that it was an illusion to think the contradictions can be resolved within the current economic frame and that disruption and chaos was now inevitable as system failure occurs.[63] Five years earlier, Nicholas Stern had said that "paths requiring very rapid emissions cuts are unlikely to be economically viable" and disruptive because "it is difficult to secure emission cuts faster than about 1% per year except in instances of recession."[64]

Analyst Alex Steffen concludes that:

60 *Ibid*., p. 36.

61 Jurriaan M. De Vos, Lucas N. Joppa, John L. Gittleman, Patrick R. Stephens, and Stuart L. Pimm, "Estimating the normal background rate of species extinction", *Conservation Biology*, 29 (2/2105), pp. 452–462.

62 Christopher Ketcham, "Addressing climate change will not 'Save the planet'", *The Intercept*, 3 December 2022, https://theintercept.com/2022/12/03/climate-biodiversity-green-energy, accessed 22 December 2022.

63 Gilding, *The Great Disruption*.

64 Nicholas Stern, *The Economics of Climate Change: The Stern Review*, London, UK Treasury, 2006, pp. 203–204.

> It is no longer possible to achieve [an] orderly transition, to combine action at the scale and speed we need with a smooth transition and a minimum of disruption. [...] We are not now capable of designing a future that works in continuity with our existing systems and practices while producing emissions reductions and sustainability gains fast enough to avoid truly dire ecological harm. This is an option that no longer exists.[65]

And the risk intelligence company Verisk Maplecroft assesses that "there is 'no longer any realistic chance' for an orderly transition for global financial markets because political leaders will be forced to rely on 'handbrake' policy interventions to cut emissions."[66]

So, when all is said and done, the choice is social collapse and economic disruption due to the failure to act fast enough, or economic disruption as a necessary consequence of emergency-level fast change. There is no third way.

Yet climate policymaking has been built on two foundational pillars: a bedrock assumption that change should be slow and incremental in a manner that not does disrupt growth or inhibit the market, or leave capital stranded; and that levers for change should be market-focused, thus the emphasis on such mechanisms as carbon prices, tradeable offsets, tax credits, new markets for carbon capture and storage with or without bioenergy, and even commodifying nature.[67] This is reflected in IPCC reports and the preferred net-zero-2050 scenarios of central bankers and the fossil fuel industry.

The major fossil fuel producers and nations have ensured that their sector is not targeted by policymakers. The COP 21 *Paris Agreement*, for example, is almost devoid of substantive language on the cause of human induced climate change

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65 Alex Steffen, "Discontinuity is the Job", *The Snap Forward*, 9 August 2021, https://alexsteffen.substack.com/p/discontinuity-is-the-job, accessed 23 December 2024.

66 Jillian Ambrose, "Prepare for disorderly shift to low-carbon era, firms and investors told", *The Guardian*, 26 May 2021, https://www.theguardian.com/environment/2021/may/26/prepare-for-disorderly-shift-to-low-carbon-era-firms-and-investors-told, accessed 23 December 2022.

67 Todd Woody, "Scientists to carbon markets: Don't monetize the whales", *Bloomberg*, 16 December 2022, https://www.bloomberg.com/news/articles/2022-12-15/whale-conservation-funded-by-carbon-markets-scientists-push-back, accessed 22 December 2022.

and contains no reference to "coal", "oil", "fracking", "shale oil", "fossil fuel", or "carbon dioxide", nor to the words "zero", "ban", "prohibit", or "stop". By way of comparison, the term "adaptation" occurs more than eighty times in 31 pages, although responsibility for forcing others to adapt is not mentioned, and both liability and compensation are explicitly excluded.

Instead, emphasis is given to speculative, but potentially highly-profitable, market-based solutions. There is no better example than most economy–energy–climate Integrated Assessment Models' (IAMs) scenarios, which have come to dominate IPCC mitigation pathway reports and net-zero-2050 paths.[68] They contort a path towards the Paris targets by – in the best Orwellian tradition – "overshooting" the target and then returning to it by century's end through an undue reliance on bioenergy with carbon capture and storage (BECCS), a technological imaginary that would pay oil and gas producers to pump gigantic volumes of carbon dioxide into wells they have emptied of fossil fuels. The focus is on the "efficiency" of the market; in the IPCC's most recent Working Group 3 report, the expression "cost-effectiveness" is mentioned 173 times.[69]

IAMs reflect modellers' values and policymakers' perceived needs. Depending on how modellers perceive the roots of the problem to be solved, they will "design the model structure, including possible instruments and relationships within the model accordingly. Hence, the very structure of a model depends on the modeller's beliefs about the functioning of society."[70] IAMs are based on faith in the efficacy and efficiency of market-driven change and so privilege particular pathways, and entice policymakers into thinking that the forecasts the models generate have some kind of scientific legitimacy.

IAMs project only gradual physical changes, in which climates will "migrate" slowly, yet we are now in an era of physical disruption, cascades and fast change. The models, says financial analyst Spencer Glendon, quoting Thom-

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68 David Spratt and Ian Dunlop, *Degrees of Risk: Can the Banking System Survive Climate Warming of 3˚C?*, Melbourne, Breakthrough National Centre for Climate Restoration, 2021, pp. 25–26.

69 Robert Chris, pers. com., 24 December 2020.

70 Saskia Ellenbeck and Johan Lilliestam, "How modelers construct energy costs: Discursive elements in Energy System and Integrated Assessment Models", *Energy Research and Social Science*, 47 (2019), p. 73.

as C. Schelling, "probably cannot project discontinuities because nothing goes into them that will produce drastic change. There may be phenomena that could produce drastic changes, but they are not known with enough confidence to introduce into the models."[71] Thus, the very models that underpin climate policy-making are not fit for purpose.

Mathematical models of the climate and the economy use quantifiable, probabilistic risk analysis to reduce complexity and high levels of uncertainty to numerical expressions and formulae, but cannot adequately express non-linear processes in the climate system. Schellnhuber describes a "probability obsession," which he says makes little sense in the most critical instances, in part because "we are in a unique situation with no precise historic analogue."[72]

Corporate and state climate policies and scenarios lack appropriate non-probabilistic risk-management approaches to both the physical and social risks, and exhibit an inadequate understanding of the high-end possibilities. Mostly, they are based on IPCC processes and methods, which are scientifically reticent and a poor basis for understanding the full range of potential outcomes.

Neo-classical economics assumes an idealised world of market participants operating with "perfect knowledge" to produce smooth change and optimal outcomes via efficient prices. If risk is quantifiable, then it can be priced, so that uncertainty is tamed by the market. But markets so far have been poor at recognising and pricing risks and suffer from the "tragedy of the horizon"[73] and the "tragedy of the commons": hence greenhouse gas emissions continue to rise at worst-case rates.

The global economy relies on endless layers of systems that were built within the stable climate of the past, but "investing in an environment where tomor-

71 Spencer Glendon, "A price, but at what cost?", Woodwell Climate Research Centre, 18 February 2019, https://www.woodwellclimate.org/a-price-but-at-what-cost, accessed 23 December 2022.

72 Schellnhuber, *What Lies Beneath*, p. 3.

73 Mark Carney, "Breaking the tragedy of the horizon – climate change and financial stability", Bank of England, 29 September 2015, https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability.pdf, accessed 12 December 2022.

row doesn't look like today is very tricky," as Dickon Pinner, a senior partner at global management consultants McKinsey, acknowledges. Pinner says that if investors do not change direction now, then governments will likely "have to pull that lever hard [...] and I think that would cause a lot of massive, massive disruption."[74]

Climate change is not a market optimisation problem, it is a risk problem – the risk of the loss of capitalism – says Spencer Glendon.[75] He also notes that the economics of climate change "will be seen as one of the worst mistakes humans have made."[76]

Thus, the current, market-dominated approaches to managing climate risks are not efficacious, and another approach – that of state-led mobilisation is necessary – but barely on the agenda.

Collapse, or State Leadership?

In times of emergency – wars, pandemics, natural disasters – what is salient is the key role of government in planning and overseeing the immediate response to the threat, and then the transition out of the crisis. In these cases, markets fail because they cannot adequately assess or respond to the risks which are society-wide and cascading, and because the solutions are not reducible to a bazaar of tradable goods and services.

This is also true for weapons of mass destruction, for ecological collapse, and for other existential risks, where the primary risk-management responsibility lies with the state apparatus. And it is the case for climate disruption, where markets have hitherto failed to heed the high-end, planetary-wide risks, and the range of potential second-order impacts is difficult to articulate.

Faced with, in Glendon's language, the "loss of capitalism," why has capital's own response been so myopic and so self-destructive in the longer-term? Per-

74 Carolyn Kormann, "Will big business finally reckon with the climate crisis?", *New Yorker*, 4 February 2020.

75 Spencer Glendon, "Climate risk and the capital markets', *Fintech TV*, 20 September 2020, fintech.tv/climate-risk-and-the-capital-markets, accessed 12 December 2022.

76 Kormann, "Will big business finally reckon with the climate crisis?".

haps that is its nature. Perhaps much of the global elite, by their inaction, indicate that they think they can survive well enough despite disabling climate impacts, and have made a fateful – if delusional – decision to live with warming rather than face the disruptive consequences of large-scale state intervention and mobilisation.

According to Bruno Latour, a super-rich caste recognises that in a hotter world there will not be enough Earth for everyone, hence they have given up on a common future purpose for humanity and are determined that a sort of gilded fortress must be built for that small percentage who would be able to make it through.[77] In this world, artificial intelligence and automation will replace the shrinking global population, with elaborate plans for self-protection such as escape to a remote island or a New Zealand hideaway as plan B, or heading for Mars as plan C, led by Musk, Branson, and Bezos.

Latour describes:

> [T]he sense of vertigo, almost of panic, that traverses all contemporary politics arises owing to the fact that the ground is giving way beneath everyone's feet at once, as if we all felt attacked everywhere, in our habits and in our possessions. [...] The most basic right of all is to feel safe and protected, especially at a moment when the old protections are disappearing.[78]

The old certainties have disintegrated, and the dynamics of business have become more and more short term. Gone are the days of long-term thinking, and career-long jobs in both public and private sectors. Horizons have shrunk to the time it takes private equity to buy out a company, strip costs, return it to the market, and pocket the gains – or the length of many electoral cycles – of about three to four years.

The global elites' capacity – or perhaps willingness – to fully imagine the climate consequences of their inaction seems limited. In my experience, few at the highest levels of politics and business in my own country, Australia, demon-

77 Bruno Latour, *Down to Earth: Politics in the New Climatic Regime*, Cambridge, Polity, 2018.
78 *Ibid.*, pp. 8, 11.

strate a full understanding of the real climate risks and the likelihood of societal collapse.

A 2016 report, *Thinking the Unthinkable,* based on interviews with top leaders around the world, found that "A proliferation of 'unthinkable' events [...] has revealed a new fragility at the highest levels of corporate and public service leaderships. Their ability to spot, identify and handle unexpected, non-normative events is [...] perilously inadequate at critical moments."[79] The report identified a deep reluctance, or what might be called "executive myopia" amongst top leaders to contemplate even the possibility that "unthinkables" might happen, let alone how to handle them. At the highest board and senior management levels, executives confessed to often being overwhelmed, including by the rate and scale of change. Time is at such a premium that the pressing need to think, reflect, and contemplate in the ways required by the new "unthinkables" is largely marginalised. Often blind eyes were turned, either because of a lack of will to believe the signs, or an active preference to deny and then not to engage.

With regard to climate change, the Managing Director of Royal Dutch Shell, Ben van Beurden, confirmed: "Yeah, we knew. Everybody knew. And somehow we all ignored it."[80]

Then there is the "group-think" that pervades the public and private sector global elites. The delusional "official future" is expressed, for example, in the preferred net-zero-2050 scenarios of the world's central bankers of a world of manageable risks, economic growth, and steady transition where fossil fuels still provide one-third of primary energy in 2050, dutifully set out in the imaginary landscape of IAMs. These scenarios feature temperature overshoot, a large role for currently non-viable technologies, and a gross underestimation of future damages, based on a poor understanding of the dynamics of the climate system and its tipping points.[81] Overshooting climate targets to 2°C or more could significantly increase the risk of tipping cascades, and large tipping risks can be

79 Nik Gowing and Chris Langdon, *Thinking the Unthinkable: A New Imperative for Leadership in the Digital Age*, London, Chartered Institute of Management Accountants, 2016, p. 4.

80 Justin Worland, "The reason fossil fuel companies are finally reckoning with climate change", *Time*, 16 January 2020, https://time.com/5766188/shell-oil-companies-fossil-fuels-climate-change, accessed 23 December 2022.

81 Spratt and Dunlop, *Degrees of Risk*, pp. 25–26.

avoided only if temperatures are below the current level of global warming of 1.2°C, say Potsdam Institute researchers.[82]

This is also the world of global climate policymaking. In the comfort of large numbers of fellow professionals, surrounded by fossil fuel lobbyists and fuelled by the reticence of IPPC reports, policymakers at the annual UNFCCC Conferences of the Parties have constructed a make-believe "official future" of incremental change and unimpeded growth. This is bolstered by a lowest-common-denominator consensus decision-making process – the power of the big fossil fuel exporting nations to sabotage effective outcomes – that has no capacity to engage in the existential risk management required.

Most substantially, capital has been unprepared to face the consequences of planetary limits being exceeded – both in the overuse of finite resources and by climate disruption – and to acknowledge that market forces have been unable to adequately respond to these crises, and to recognise that neoliberalism is incapable of resolving the contradictions.

Four critical features of our time are: climate denial and delay; the overuse of resources and the exceedance of planetary boundaries; deregulation; and growing inequality (both within and between nations). They can only be addressed together, with an emergency mobilisation to "reduce, remove and repair" requiring global cooperation and an ethic of collective responsibility and a fair sharing of the burden.

Oxfam has reported that the wealthiest 1% of humanity are responsible for twice as many emissions as the poorest 50%, and that the richest 5% were responsible for over a third (37%) of this growth of 60% in annual emissions between 1990 and 2015.[83] Growing inequality has contributed to disillusionment with govern-

82 Nico Wunderling, Ricarda Winkelmann, Johan Rockström, Sina Loriani, David I. Armstrong McKay, Paul D. L. Ritchie, Boris Sakschewski, and Jonathan F. Donges, "Global warming overshoots increase risks of climate tipping cascades in a network model", *Nature Climate Change*, 22 December 2022.

83 Oxfam, "A billionaire emits a million times more greenhouse gases than the average person", media release, *Oxfam*, 7 November 2022, https://www.oxfam.org/en/press-releases/billionaire-emits-million-times-more-greenhouse-gases-average-person, accessed 23 December 2022; Oxfam, "Carbon emissions of richest 1 percent more than double the emis-

ment as an agency that will protect the vulnerable. The hyper-consumption of the world's most affluent 10–20% – no matter whether they live in the developed or developing economies – is a material obstacle to building global agreement on the necessarily disruptive and at times painful economic and social transitions towards the fair use of finite resources.

In a world where resource use is already unsustainable, economic growth can only occur by the absolute decoupling of production (producing more while reducing the absolute quantity of resource inputs), but decoupling is a "fiction":

> What policy wonks call "absolute decoupling" – the only kind that would do the climate any good – turns out to be a fantasy akin to a perpetual motion machine, a chimera of growth unhindered by material constraints. One recent analysis of 835 peer-reviewed articles on the subject found that the kind of massive and speedy reductions in emissions that would be necessary to halt global warming "cannot be achieved through observed decoupling rates." The mechanism on which mainstream climate policy is betting the future of the species, and on which the possibility of green growth rests, appears to be a fiction.[84]

Using the measure of "domestic material consumption", which is the total weight of raw materials (biomass, minerals, metals, and fossil fuels), the evidence shows that our material footprint has not diminished and is outpacing GDP growth.[85] And a 2020 study estimated that a "successful decoupling" – 2% annual GDP growth and a decline in resource use by 2050 to a level that could be sustainable and compatible with a maximum 2°C global warming – would

sions of the poorest half of humanity", media release, *Oxfam*, 21 September 2020, https://www.oxfam.org/en/press-releases/carbon-emissions-richest-1-percent-more-double-emissions-poorest-half-humanity, accessed 23 December 2022.

84 Dominik Wiedenhofer, Doris Virág, Gerald Kalt, Barbara Plank, Jan Streeck, Melanie Pichler, Andreas Mayer, Fridolin Krausmann, Paul Brockway, Anke Schaffartzik, Tomer Fishman, Daniel Hausknost, Bartholomäus Leon-Gruchalski, Tânia Sousa, Felix Creutzig, and Helmut Haberl, "A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, Part I: Bibliometric and conceptual mapping", *Environmental Research Letters*, 15 (6/2020); Ben Ehrenreich, "We're hurtling toward global suicide", *The New Republic*, 18 March 2021; https://newrepublic.com/article/161575/climate-change-effects-hurtling-toward-global-suicide, accessed 23 December 2022.

85 Jason Hickel and Giorgos Kallis, "Is green growth possible?", *New Political Economy*, 25 (4/2020), pp. 469–486.

require 2.6 times more GDP out of every ton of material used between 2017 and 2050, and concluded that "there are no realistic scenarios for such an increase in resource productivity."[86] Voluntary market self-regulation can provide no path to sustainable resource use.

Within resource limits and with no path to absolute decoupling, there is no credible scenario of affluence for nine billion people, and a global buy-in for emergency mobilisation will only happen if there is a global reallocation of resources based on the threefold needs of the climate emergency, reducing resource use to sustainable levels, and equitable responsibility.

Boris Frankel, in his *Fictions of Sustainability*, has pointed out that in the present economic circumstances – low growth, stagflation, disruption – the material needs of decarbonisation cannot be absorbed by growth, but only by reallocation.[87] He says that if there are no major technological breakthroughs in the next decade (especially regarding decoupling), then climate disruption and resource depletion will force governments to take emergency action and scale back production in the face of systemic breakdown.

Climate disruption and resource overuse will also destabilise markets, resulting in the continuation of low growth and growing inequality. Markets have and will likely continue to fail to respond to the twin crises, and instead creeping financialisation – credit-fuelled consumption, speculation in everything from shares and real estate to NFTs and crypto currencies, and an increasing burden of debt and debt servicing – will continue to be the hallmark of neoliberalism's pernicious hold.

If resources are to be redirected to economic transition and equity needs, there is a crying need to curb the power of financial capital and rechannel current economic behaviour away from speculation to socially-useful ends: a liveable and biodiverse planet. Against this possibility, business has strongly opposed state intervention as a guiding principle of its behaviour, and succeeded in block-

86 Tere Vadén, Ville Lähde, Antti Majava, Paavo Järvensivu, Tero Toivanen, and Jussi T. Eronen, "Raising the bar: on the type, size and timeline of a 'successful' decoupling", *Environmental Politics*, 30 (3/2021), pp. 462–476.

87 Boris Frankel, *Fictions of Sustainability: The Politics of Growth and Post-Capitalist Futures*, Melbourne, Greenmeadows, 2018, p. 192.

ing state leadership of the climate emergency. Australian financial commentator Alan Kohler once quipped that politics is a sideshow, as central banks run the global economy and Silicon Valley governs society.[88]

The urgent need is to take back and rebuild state institutions destroyed by neoliberalism in order to redirect production to socially-necessary goals (decarbonisation and cooling, and basic public needs including secure food and water, and health, education, and transport), to plan and manage the transition and adjustment, and to curb the destructive path of financialisation. This would be a massive politically-directed reallocation of resources not only in the OECD, but in China, India, Nigeria, and more. In the first instance, this is not a question of growth versus degrowth, but what needs to be, and can be, produced within resource sustainability and safe-climate boundaries.

There is a battle for the role of the state, with democratic community movements around the world – including student strikers, the labour movement, Extinction Rebellion and its successors, and a myriad of other constituencies – demanding that the state act to overturn deregulation's hegemony. And just as proposals focussed on Green New Deals and market-driven growth have failed to deal with systematic market failure regarding climate risks and resource depletion, so enhanced social expenditure will also fail if state leadership does not provide a path out of the climate and ecological crises via an emergency mobilisation.

The situation is unprecedented and there are complex issues about political agency, and democratic or authoritarian solutions. Frankel asks whether preventing ecological and civilisational disaster is more important than democracy, especially as the "conflicted state" is wedged between the need to transition to a sustainable economy operating within safe planetary boundaries, and the need to ensure political support from business and the community by adhering to a narrative of prosperity through growth.[89]

Emergency-level action will become inevitable, but will it be democratic? In terms of states' capacity to mobilise, authoritarian China is perhaps best placed.

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88 *Ibid*.

89 Boris Frankel, *Capitalism Versus Democracy: Rethinking Politics in the Age of Environmental Crisis*, Melbourne, Greenmeadows, 2020.

People do not lightly accede to deep change, even when it is necessary to protect the things they care about, and reducing the hyper-consumption of the world's most affluent seems like an unimaginable political obstacle, whether in North America or Europe, the Gulf, China, or Japan.

Perhaps there is a path forward which starts with an honest, and necessarily disturbing, public conversation about the choices we face and the need to act upon the realistic assessments of the existential threat that scientists and activists have exposed, and which capital and governments have done everything to avoid. In times of adversity, people are willing to accept radical changes to their circumstances if there is a commonly shared purpose. Ukraine is but one example.

Studies of rationing imposed during WWII in the UK found that the population largely accepted the rigours and deprivations imposed by the state because they saw them as both fair and necessary.[90] Yet when it comes to climate change and the objective need for an emergency mobilisation, the conversation about equitable responsibility has barely started, and a message of economic reallocation will fall on deaf ears unless people see that the affluent are carrying their fair share of the burden and disruption.

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