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Three welcome reports on real global progress; an article on strengthening NSW's power system; the dangers of plastic; and, finally, a critical analysis of conventional economic assumptions on the risks of climate change.

1. We face daunting global challenges. Eight reasons to be hopeful

John D Boswell, Guardian website, Tue 29 Jul 2025

Humans are wired with a "negativity bias" that triggers a stronger emotional response to bad news than good news. This loss-aversion behaviour served a purpose in our evolutionary past, when information and resources were scarce, but in the age of endless information access, it can lead to pessimism, anxiety and a distorted vision of what humanity is capable of.

In reality, we are making incredible progress in global poverty, health, longevity, climate change and much more, but these trends are harder to perceive because they accumulate gradually and quietly. As the Wired magazine founder Kevin Kelly points out, progress is often about what doesn't happen – the children who won't die of smallpox, or the farmers whose crops won't get raided.

The world is still an awful place in many ways, and the crises we face are daunting. But looking past the dark headlines, we can see bright trendlines that give us profound reasons to be optimistic for our future.

1.1 We're getting a grip on climate change

Just a decade ago or so, it appeared that civilization was on a course to cause a disastrous 4C-5C of warming above pre-industrial levels. But since then, major nations and markets have responded with surprising force and urgency; global carbon dioxide emissions have significantly

slowed, and in many countries, per capita emissions are falling even while per capita GDP and energy use are going up.

We are still not doing enough – there is a lingering risk of runaway carbon cycle feedback loops that could push us over 4C – but nations are making ambitious net-zero commitments that, if realized, could feasibly keep warming below 2C.

The pathway for avoiding the absolute worst outcomes – humanity's extinction, for one – is increasingly clear and doable, and involves a combination of decarbonization, renewable energy breakthroughs, responsible geoengineering and carbon dioxide removal.

The central reason for optimism, however, remains the coming age of radically cheap renewable energy, primarily from solar photovoltaics.

1.2 Energy abundance is within reach

The exponential growth in solar energy has stunned even expert forecasters. In 2015, the International Energy Agency predicted that the world would add about 35 gigawatts of solar energy capacity by 2023.

Their estimate was off by a factor of 10. The costs of solar have fallen below the cost of coal, a tipping point that will financially incentivize markets to go green even in the absence of policy pressures. There are strong reasons to believe this exponential progress will continue; soon it could become cheaper to create fuel out of thin air and water using solar energy than to drill for it underground.

More signs of an energy revolution are all around: The same expert-defying growth is happening in the adoption of electric vehicles, and global investment in clean energy now far outstrips that of fossil fuels. With worldwide access to radically cheap renewable energy and carbon-neutral fuels, underdeveloped countries can achieve first-world standards of living without a corresponding increase in carbon emissions. Already wealthy nations will see new waves of growth as energy abundance triggers new economic possibilities, including affordable desalination, which could address water shortages in many parts of the world. We may be on the verge of a new industrial revolution and a new era of human prosperity.

1.3 We are eradicating poverty

As the Harvard psychologist Steven Pinker points out, you've never seen a newspaper run the headline "137,000 people escaped from extreme poverty yesterday" – yet this incredible statistic has been accurate every day for decades now. Since 1990, more than a billion people have been lifted out of extreme poverty, with the impoverished share falling from 38% of the global population down to 9.1% today.

That still leaves more than 600 million people living below the international poverty line of $2.15 a day, making it clear that the fight is far from over. But with energy abundance driving new growth and economic modalities, we can expect to see the downward trend continue; ultimately, we should strive for no less than a 0% rate of poverty globally. Further progress is there for the taking.

1.4 We are living longer than ever

It might be the most feelgood statistic of all time: an average person born today can expect to live more than twice as long as someone born around 1900.

This dramatic increase is thanks to huge advances in medicine, public health and living standards, but also by a stunning fall in child mortality: for most of human history, about half of all children died before their 15th birthday; today the figure is less than 5% globally and as low as 0.4% in some wealthy nations. We can, and probably will, save millions of children's lives by driving the global rate this low – a feasible and morally urgent goal for the 21st century.

1.5 Medical breakthroughs are accelerating

Converging advancements in AI and biotechnology are pointing toward a radical enhancement of human health and wellbeing. Already, projects like Google's AlphaFold are discovering structures of pathogens and potential treatments for cancer much faster than humans could. New gene-editing tools like Crispr have the potential to cure many of the more than 10,000 diseases that are caused by single-gene mutations.

Barney Graham, an immunologist who played a pivotal role in developing mRNA vaccines, puts it thusly: "You cannot imagine what you're going to see over the next 30 years. The pace of advancement is in an exponential phase right now." In the coming decades, we could potentially gain the power to regenerate limbs, engineer designer life forms, eliminate all disease and possibly extend our life spans indefinitely.

1.6 Robots will take our jobs (and that's a good thing)

If you've ever watched two-legged robots navigating obstacle courses and landing synchronized backflips, you are familiar with the incredible developments in robotics over the past decade. But the real reason to get excited now is not the leaps in physical capabilities (save for the potential of a future robot Olympics), but in intellectual abilities. OpenAI, creators of ChatGPT, has partnered with Figure, a robotics startup, to incorporate multimodal artificial intelligence into a humanoid form factor. Their walking, talking full-body robots are learning tasks merely by watching videos – no manual training required. Tesla's Optimus bot is a direct competitor that its CEO, Elon Musk, believes will eventually be more valuable than the company's electric car business.

It's not hard to see the value: humanoid robots could address acute labour shortages and replace labour-intensive and dangerous jobs, taking on roles in disaster response, healthcare, manufacturing, space exploration and much more – freeing real people to pursue more desirable jobs, elevating quality of life and boosting economic growth.

Of course, humanity will only benefit if we can address the risks of job displacement and human safety. Half of the battle will be controlling these risks and ensuring we reap the benefits, rather than be overcome by armies of terminators.

1.7 A new space age is dawning

For decades, the final frontier was only accessible to a handful of major nations with mainly geopolitical interests. But in the past 10-15 years, launch costs have fallen drastically thanks to the advent of reusable rockets and innovative fuel types, enabling a new generation of space technologies and opening up the final frontier to a wave of commercial and scientific interests. Satellite broadband is starting to bring internet access to rural and underdeveloped parts of the world, which will bolster agriculture, education, health, economic opportunity and participation in democracy. Low-gravity environments are uniquely ideal for cell research, where scientists are growing miniature organs for study, and could lead to pharmaceutical breakthroughs.

Eventually, bolder prospects like asteroid mining could supply trillions of dollars' worth of rare materials without compromising environments back on Earth.

You can almost feel the pace quickening: this decade has already seen twice as many moon missions as the 2010s. Plans for commercial space stations like Orbital Reef and Starlab are under way and slated to be operational before 2030. Nasa has plans to put humans on the moon again as soon as 2026. To top it all off, the recently launched James Webb space telescope is already discovering new secrets of the universe only two years into its mission. It's finding water vapor on alien planets and holds the promise of detecting signatures of alien life. We may be on the verge of the most significant scientific discovery of all time. It's safe to say that a new space age has arrived.

1.8 Humans are incredibly resilient

It's not far-fetched to speculate that a major disaster may await us in the coming centuries. But humans have a long history of rebounding from catastrophic collapse. Our ancestors have survived asteroid impacts, ice ages, supervolcano eruptions and deadly plagues – each time eventually bouncing back to new heights. The upward march of humanity has never been and will never be perfectly smooth, but progress is unmistakable over the long term. It will take a truly apocalyptic sequence of events to stop us.

Conclusion: optimism is a weapon

The modern world was built and shaped by optimists. We owe it to them to carry the torch. Optimism for the future is not only justified – it's a weapon in the fight for a higher future, and a moral obligation to ourselves and to future generations.

No future is guaranteed; there will be injustices and suffering in every path forward, just as there have been forever. A utopia will never be achievable, but in striving to reach it, we can create the best possible world for us and our descendants. The larger the problems we face, the greater the opportunity for progress; the immense challenges of the 21st century can be the catalyst for a new leap in the human condition to heights we cannot yet imagine.

We have everything we need to thrive. Our resiliency will protect us; our intelligence will propel us. If there is one lesson our history can teach us, it's to never underestimate the human race.

2. IRENA Report Excerpts

Extracts from "Renewable Power Generation Costs in 2024 report, IRENA 2025 (International Renewable Energy Agency)

In 2024, global renewable power capacity additions reached an unprecedented 582 gigawatts (GW), representing a 19.8% increase compared to the capacity additions delivered in 2023 and marking the highest annual expansion since records began in 2000. Solar photovoltaics (PV) led this surge, accounting for 452.1 GW (77.8%) of the total, followed by wind, with 114.3 GW. These additions brought the total global installed renewable capacity to 4,443 GW by the end of the year.

Capacity additions for other technologies - concentrated solar power (CSP), geothermal, bioenergy and hydropower - remained modest in 2024, collectively adding approximately 15.4

GW, up from 13.7 GW in 2023. Hydropower alone accounted for 9.3 GW. Additions for CSP and geothermal continued to stagnate, while bioenergy saw a slight increase compared to 2023.

In 2024, Asia added 413.2 GW of renewable capacity – a 24.9% increase that brought the region's total to 2,374 GW. China alone accounted for 61.2% of global PV additions (276.8 GW) and 69.4% of new wind installations (79.4 GW). Other notable contributors included the United States, India, Brazil and Germany, all of which added substantial volumes of new renewable capacity, highlighting the continued global diversification of renewable investment.

The growth in renewable power capacity additions reflects the accelerating global momentum to increase the share of renewables in electricity generation. However, current deployment levels fall short of that required to triple renewable energy capacity by 2030 – the goal set out in the First Global Stocktake, known as the "UAE Consensus", at COP28. Although installed capacity reached 4,443 GW in 2024, achieving the 11,000+ GW target by 2030 requires annual additions well over 1,000 GW in the latter half of the decade. Meeting this goal will require not only a rapid scale-up in deployment but also substantial investment in enabling infrastructure – particularly grid expansion and energy storage for more than two-thirds of total generation. from fossil fuel-based power generation, enabled by supportive policies, falling technology costs and rising electrification.

Renewable energy technologies have experienced spectacular cost declines since 2010, driven by technology improvement, competitive supply chains and economies of scale). Notably, 91% of new renewable power projects commissioned in 2024 were more cost-effective than any fossil fuel-fired alternative.

Battery storage, hybrid systems and digitalisation are all critical enablers of the energy transition and the integration of variable renewables (solar PV and wind). Battery deployment must expand significantly to support a renewables-based power system, with storage technologies expected to provide the majority of short-duration flexibility needs (IRENA, 2024a). Batteries also play a central role in enabling sector coupling and electrification, contributing to emissions reductions both directly and indirectly. China dominates supply, producing over 75% of global batteries at costs 20–30% lower than in European and North American markets (IEA, 2025a), driven by scale and vertical integration. AI-enabled digital tools are improving asset performance and grid responsiveness, yet digitalisation and grid-readiness gaps remain acute in many emerging markets.

Hybrid systems, combining solar PV or wind with battery storage, are becoming standard in many markets, offering firmer output profiles, improved capacity factors and enhanced grid reliability. In China, solar-plus-storage systems have helped mitigate curtailment risks in provinces with high renewable penetration. In the United States, the integration of BESS with new solar capacity has accelerated, enabling dispatch during peak demand and deferring investments in peaking gas plants. Hybridisation is also being explored with geothermal and CSP, particularly for long-duration storage applications.

While the plant-level solar and wind costs continue to fall, grid constraints are increasingly limiting their deployment. A substantial volume of wind and solar projects worldwide are facing delays due to grid connection bottlenecks, while long procurement lead times for key components such as transformers and high-voltage cables are further affecting project timelines. These delays contribute to rising integration costs, including expenditures associated with storage, curtailment and transmission infrastructure. Although often triggered by

renewable expansion, investments in such assets enhance grid flexibility and benefit the entire power system – including non-renewable generators. Recognising and addressing these costs is essential, particularly in emerging markets, where grid investment must keep pace with rising demand. These integration costs vary significantly depending on project location, grid distance and infrastructure availability, and are often higher for projects requiring long-distance transmission or that are located in remote areas.

China's vertically integrated supply chains continue to deliver structural cost advantages across solar PV components, wind turbines and batteries. This integration reduces procurement delays, compresses margins and enables efficient scaling of gigawatt-scale projects. In 2024, Chinese manufacturers remained dominant across global supply chains for solar PV, wind and battery technologies, supplying a substantial share of key components. However, this concentration also introduces vulnerabilities, including exposure to geopolitical tensions and emissions intensity. Although renewable capacity additions in China have grown rapidly in recent years, a significant share of PV manufacturing in China is still powered by coal, raising concerns about lifecycle carbon footprints.

Increased renewable energy integration is shifting fossil fuel generation to peak or residual demand, reducing thermal plant use and exposure to volatile fuel markets. By 2024, solar and wind comprised 46.4% of global installed electricity generation capacity, significantly displacing coal and gas in key markets like China, the United States and the EU, and reducing associated greenhouse gas emissions.

3. The renewable energy revolution is a feat of technology

From an article by Rebecca Solnit, Guardian website, 30 July 2025

At the turn of the century, sun and wind in the form of solar panels and wind turbines were expensive, primitive, utterly inadequate solutions to power our machines at scale, which is why early climate activism focused a lot on minimizing consumption on the assumption we had no real alternative to burning fossil fuels, but maybe we could burn less. This era did all too well in convincing people that if we did what the climate needs of us, we would be entering an era of austerity and renunciation, and it helped power the fossil fuel industry's weaponization of climate footprints to make people think personal virtue in whittling down our consumption was the key thing.

There's nothing wrong with being modest in your consumption, but the key thing to saving the planet is whittling down the fossil fuel industry and use of fossil fuels to almost nothing by making the energy transition to renewables and an electrified world. And that's a transformation that has to be collective and not just individual.

Other stuff is great – changing our diets, especially to reduce beef consumption and food waste, protecting natural systems that sequester carbon, better urban design and better public transit, getting rid of fast fashion, excessive use of plastic, and other wasteful climate-harming forms of consumption – all matter. But the majority of climate change comes from burning fossil fuels, and we know exactly how to transition away from that and the transition is underway – not nearly fast enough, not nearly supported enough by most governments around the world, actively undermined by the Trump administration and many fossil fuel corporations and states.

But still, it is underway. And, arguably, unstoppable. Because it's just a better way to do everything. One thing that's been striking in recent years, and maybe visible in recent years because there is now an alternative, is the admission that fossil fuel is a wasteful and poisonous way to produce energy. That's the case whether it's to move a vehicle or cook a dinner.

Oil, coal, and gas are distributed unevenly around the world and just moving the fuel to the sites where it will be used is hugely energy inefficient. About 40% of global shipping is just moving fossil fuel around, and more fuel is moved on trains and trucks. But also, fossil fuel is extracted, shipped, and refined for one purpose: to be burned, and in the future coming fast, burning is going to look like a primitive way to operate machines.

As the Rocky Mountain Institute explains it: "Today, most energy is wasted along the way. Out of the 606 EJ [exajoules] of primary energy that entered the global energy system in 2019, some 33% (196 EJ) was lost on the supply side due to energy production and transportation losses before it ever reached a consumer. Another 30% (183 EJ) was lost on the demand side turning final energy into useful energy. That means that of the 606 EJ we put into our energy system per annum, only 227 EJ ended up providing useful energy, like heating a home or moving a truck. That is only 37% efficient overall." That's the old system, and it's dirty, toxic to human health and the environment – and our politics – as well as the main driver of climate chaos. And wasteful.

The new system, on the other hand, is far cleaner, and the fact that sun and wind are so widely available means that the corrosive politics of producer nations and their manipulations of dependent consumer nations could become a thing of the past. I know someone is about to pipe up with an objection about battery materials and there are two answers to that. One is that the race is on, with promising results, to produce batteries with more commonly available and widely distributed materials.

The other is that batteries are not like fossil fuel, which you incessantly burn up and have to replace; they are largely recyclable, and once the necessary material is gathered, it can be reused and extraction can wind down. But also the scale of materials needed for renewables is dwarfed by the materials to keep the fires burning in the fossil fuel economy (and the people who complain about extraction sometimes seem to forget about the monumental scale of fossil fuel extraction and all the forms of damage it generates, from Alberta to Nigeria to the Amazon).

And renewables are now adequate to meet almost all our needs, as experts like Australia's Saul Griffiths and California's Mark Z Jacobson have mapped out. Simply because it's cheaper, better and ultimately more reliable, the transition is inevitable – but if we do it fast, we stabilize the climate and limit the destruction, and if we don't, we don't. Almost no one has summed up how huge the shifts are since the year 2000, but the Rocky Mountain Institute has done that for the last decade, during which, they tell us: "clean-tech costs have fallen by up to 80%, while investment is up nearly tenfold and solar generation has risen twelvefold. Electricity has become the largest source of useful energy, and the deep force of efficiency has reduced energy demand by a fifth." Estimates for the future price of solar have almost always been overestimates; estimates for the implementation of solar have been underestimates.

Another hangover from early in the millennium is the idea that renewables are expensive. They were. They're not anymore. There are costs involved in building new systems, of course, but solar power is now the cheapest way to produce electricity in most of the world, and there's no sign that the plummet in costs is stopping. As Hannah Ritchie at Our World in Data said in 2021 of renewable energy: "In 2009, it was more than three times as expensive as coal. Now the

script has flipped, and a new solar plant is almost three times cheaper than a new coal one. The price of electricity from solar declined by 89% between 2009 and 2019."

But even cheap is a misnomer: wind and sun are free and inexhaustible; you just need devices to collect the energy and transform it into electricity (and transmission lines to distribute it). Free energy! We need to get people to recognize that is what's on offer, along with energy independence – the real version, whereby if we do it right, we could build cooperatives, local (and hyperlocal or just autonomous individual) energy systems, thereby undermining predatory for-profit utilities companies as well as the fossil fuel industry. Renewable energy could be energy justice and energy democracy, as well as clean energy.

4. Grid-forming batteries and syncons to bolster NSW grid

Extracts from Energy Source & Distribution Magazine website article, July 16, 2025

New South Wales transmission company Transgrid has finalised a report on its preferred system strength portfolio, which it says will require grid-forming batteries and synchronous condensers to bolster the strength or 'heartbeat' of the state's power system.

Transgrid assessed more than 100 individual solutions over a three-year process to finalise its preferred system strength portfolio, which will ensure the stable and reliable operation of the grid as coal generators retire over the next decade.

Transgrid acting executive general manager of network Jason Krstanoski said, "The NSW grid has traditionally relied upon coal generators to provide system strength as a byproduct of their typical operation."

"There is now an urgent need to maintain this heartbeat, as we accelerate the transition to wind and solar and as 80% of the coal capacity in NSW retires in the next decade.

"This portfolio of system strength solutions is vital to enable the NSW power system to accelerate the transition to 100% instantaneous renewables, unlocking renewable generation that would otherwise be constrained."

Transgrid this week published its Project Assessment Conclusions Report (PACR)—the final step in a three-stage regulatory process to ensure the best outcome for the market and consumers.

The report identifies a preferred portfolio of system strength solutions, including:

- Ten synchronous condensers on Transgrid's backbone network—big spinning machines specifically designed to support system strength, inertia and system voltage;
- Five gigawatts of grid-forming batteries, providing the equivalent strength to another 17 synchronous condensers
- Modifications to 650MW of synchronous generators to enable synchronous condenser-mode;
- Operation of synchronous generators to fill gaps in system strength where required; and

- Additional targeted solutions to support new renewables within the New England and Hunter-Central Coast Renewable Energy Zones.

“Our preferred portfolio utilises innovative grid-forming batteries to provide almost half of NSW’s system strength requirements, with synchronous condensers providing the other half,” Krstanoski said.

5. ‘Plastics crisis’ hitting health from infancy to old age, report warns

From an article by Damian Carrington Environment editor, Guardian website, 3 Aug 2025

Plastics are a “grave, growing and under-recognised danger” to human and planetary health, a new expert review has warned. The world is in a “plastics crisis”, it concluded, which is causing disease and death from infancy to old age and is responsible for at least $1.5tn (£1.1tn) a year in health-related damages.

The driver of the crisis is a huge acceleration of plastic production, which has increased by more than 200 times since 1950 and is set to almost triple again to more than a billion tonnes a year by 2060. While plastic has many important uses, the most rapid increase has been in the production of single-use plastics, such as drinks bottles and fast-food containers.

As a result, plastic pollution has also soared, with 8bn tonnes now polluting the entire planet, the review said, from the top of Mount Everest to the deepest ocean trench. Less than 10% of plastic is recycled.

Plastics endangered people and the planet at every stage, the review said, from the extraction of the fossil fuels they were made from, to production, use and disposal. This results in air pollution, exposure to toxic chemicals and infiltration of the body with microplastics. Plastic pollution can even boost disease-carrying mosquitoes, as water captured in littered plastic provides good breeding sites.

The review, published in the leading medical journal the Lancet, was released before the sixth and probably final round of negotiations between countries to agree a legally binding global plastics treaty to tackle the crisis. The talks have been dogged by a deep disagreement between more than 100 countries that back a cap on plastic production and petrostates such as Saudi Arabia that oppose the proposal.

“We know a great deal about the range and severity of the health and environmental impacts of plastic pollution,” said Prof Philip Landrigan, a paediatrician and epidemiologist at Boston College in the US, and lead author of the new report. He said it was imperative the plastics treaty included measures to protect human and planetary health.

“The impacts fall most heavily on vulnerable populations, especially infants and children,” he said. “They result in huge economic costs to society. It is incumbent on us to act in response.”

Petrostates and the plastics industry have argued the focus should be on recycling plastic, not cutting production. But, unlike paper, glass, steel and aluminium, chemically complex plastics cannot be readily recycled. The report said: “It is now clear that the world cannot recycle its way out of the plastic pollution crisis.”

More than 98% of plastics are made from fossil oil, gas and coal. The energy-intensive production process drives the climate crisis by releasing the equivalent of 2bn tonnes of CO_2 a year – more than the emissions of Russia, the world's fourth biggest polluter. Plastic production also produces air pollution, while more than half of unmanaged plastic waste was burned in the open air, further increasing dirty air, the report noted.

More than 16,000 chemicals are used in plastics, including fillers, dyes, flame retardants and stabilisers. Many plastic chemicals were linked to health effects at all stages of human life, the report said, but there was a lack of transparency about which chemicals were present in plastics.

The analysis found that foetuses, infants and young children were highly susceptible to the harms associated with plastics, with exposure associated with increased risks of miscarriage, premature and stillbirth, birth defects, impaired lung growth, childhood cancer and fertility problems later in life.

Plastic waste often breaks down into micro- and nano-plastics which enter the human body via water, food and breathing. The particles have been found in blood, brains, breast milk, placentas, semen and bone marrow. Their impact on human health is largely unknown as yet, but they have been linked to strokes and heart attacks and the researchers said a precautionary approach was needed.

6. Economic assumptions about risks of the climate crisis are no longer relevant, says a communications expert

*From an article by **Jonathan Watts** Guardian Global environment editor, 24 Jun 2025*

Dr Genevieve Guenther, an American climate communications specialist, is the founding director of End Climate Silence, which studies the representation of global heating in the media and public discourse. Last year, she published The Language of Climate Politics: Fossil Fuel Propaganda and How to Fight It, which was described by Bill McKibben as "a gift to the world". In the run-up to the Global Tipping Points conference in July, Guenther talks to the Guardian about the need to discuss catastrophic risks when communicating about the climate crisis.

The climate crisis is pushing globally important ecosystems – ice sheets, coral reefs, ocean circulation and the Amazon rainforest – towards the point of no return. Why is it important to talk about tipping points?
We need to correct a false narrative that the climate threat is under control. These enormous risks are potentially catastrophic. They would undo the connections between human and ecological systems that form the basis of all of our civilisation.

How have attitudes changed towards these dangers?
There was a constructive wave of global climate alarm in the wake of the Intergovernmental Panel on Climate Change (IPCC) report on 1.5C in 2018. That was the first time scientists made it clear that the difference between 1.5C and 2C would be catastrophic for millions of people and that in order to halt global heating at a relatively safe level, we would need to start zeroing out our emissions almost immediately. Until then, I don't think policymakers realised the timeline was that short. This prompted a flurry of activism – Greta Thunberg and Indigenous and youth activists – and a surge of media attention. All of this converged to make almost everybody

feel that climate change was a terrifying and pressing problem. This prompted new pledges, new corporate sustainability targets, and new policies being passed by government.

This led to a backlash by those in the climate movement who prefer to cultivate optimism. Their preferred solution was to drive capitalist investment into renewable technologies so fossil fuels could be beaten out of the marketplace. This group believed climate fear might drive away investors, so they started to argue it was counterproductive to talk about worst-case scenarios. Some commentators even argued we had averted the direst predictions and were now on a more reassuring trajectory of global warming of a little under 3C by 2100.

But it is bananas to feel reassured by that because 3C would be a totally catastrophic outcome for humanity. Even at the current level of about 1.5C, the impacts of warming are emerging on the worst side of the range of possible outcomes and there is growing concern of tipping points for the main Atlantic Ocean circulation (Amoc), Antarctic sea ice, corals and rainforests.

If the risk of a plane crashing was as high as the risk of the Amoc collapsing, none of us would ever fly because they would not let the plane take off. And the idea that our little spaceship, our planet, is under the risk of essentially crashing and we're still continuing business as usual is mindblowing. I think part of the problem is that people feel distant from the dangers and don't realise the children we have in our homes today are threatened with a chaotic, disastrous, unliveable future. Talking about the risks of catastrophe is a very useful way to overcome this kind of false distance.

In your book, you write that it's appropriate to be scared and the more you know, the more likely you are to be worried, as is evident from the statements of scientists and the United Nations secretary general, António Guterres. Why?
Some people at the centre of the media, policymaking and even research claim that climate change isn't going to be that bad for those who live in the wealthy developed world – the UK, Europe and the United States. When you hear these messages, you are lulled into a kind of complacency and it seems reasonable to think that we can continue to live as we do now without putting ourselves, our families, our communities under threat within decades. What my book is designed to do is wake people up and raise the salience and support for phasing out fossil fuels.

[It] is written for people who are already concerned about the climate crisis and are willing to entertain a level of anxiety. But the discourse of catastrophe would not be something I would recommend for people who are disengaged from the climate problem. I think that talking about catastrophe with those people can actually backfire because it'll just either overwhelm them or make them entrench their positions. It can be too threatening.

A recent Yale study found that a degree of climate anxiety was not necessarily bad because it could stir people to collective action. Do you agree?
It depends. I talk about three different kinds of doomerism. One is the despair that arises from misunderstanding the science and thinking we're absolutely on the path to collapse within 20 or 30 years, no matter what we do. That is not true.

Second, there's a kind of nihilistic position taken by people who suggest they are the only ones who can look at the harsh truth. I have disdain for that position.

Finally, there's the doomerism that comes from political frustration, from believing that people who have power are just happy to burn the world down. And that to me is the most reasonable

kind of doomerism. To address that kind of doomerism, you need to say: “Yes, this is scary as hell. But we must have courage and turn our fear into action by talking about climate change with others, by calling our elected officials on a regular basis, by demanding our workplaces put their money where their mouth is.”

You need to acknowledge people’s feelings, meet them where they are and show how they can assuage their fear by cultivating their bravery and collective action.

The most eye-opening part of your book was about the assumptions of the Nobel prize winner William Nordhaus that we’ll probably only face a very low percentage of GDP loss by the end of the century. This surely depends on ignoring tipping points?
The only way Nordhaus can get the result that he does is if he fails to price the risk of catastrophe and leaves out a goodly chunk of the costs of global heating. In his models, he does not account for climate damages to labour productivity, buildings, infrastructure, transportation, non-coastal real estate, insurance, communication, government services and other sectors. But the most shocking thing he leaves out of his models is the risk that global heating could set off catastrophes, whether they are physical tipping points or wars from societal responses. That is why the percentage of global damages that he estimates is so ridiculously lowballed.

The idea that climate change will just take off only a small margin of economic growth is not founded on anything empirical. It’s just a kind of quasi-religious faith in the power of capitalism to decouple itself from the planet on which it exists. That’s absurd and it’s unscientific.

Some economists suggest wealth can provide almost unlimited protection from catastrophe because it is better to be in a steel and concrete building in a storm than it is to be in a wooden shack. How true is that?
There’s no evidence that these protections are unlimited, though there are economists who suggest we can always substitute technologies or human-made products for ecosystems or even other planets like Mars for Earth itself. This goes back to an economic growth theorist named Robert Solow, who claims technological innovation can increase human productivity indefinitely. He stressed that it was just a theory, but the economists advising Ronald Reagan and Margaret Thatcher in the 1980s took this as gospel and argued it was possible to ignore environmental externalities – the costs of our economic system, including our greenhouse gas pollution – because you could protect yourself as long as you kept increasing your wealth.

Except when it comes to the climate crisis?
Yes, the whole spectacle of our planet heating up this quickly should call all of those economic assumptions into question. But because climate change is affecting the poor first and worst, this is used as evidence that poverty is the problem. This is a misrepresentation of reality because the poor are not the only ones who are affected by the climate crisis. This is a slow-moving but accelerating crisis that will root and spread. And it could change for the worst quite dramatically as we hit tipping points.

The difference between gradual warming and tipping points is similar to the difference between chronic, manageable ailments and acute, life-threatening diseases, isn’t it?
Yes. When people downplay the effects of climate change, they often represent the problem as a case of planetary diabetes – as if it were a kind of illness that you can bumble along with, but still have a relatively good quality of life as long as you use your technologies, your insulin, whatever, to sustain your health. But this is not how climate scientists represent climate

change. Dr Joelle Gergis, one of the lead authors on the latest IPCC report, prefers to represent climate change as a cancer – a disease that takes hold and grows and metastasises until the day when it is no longer curable and becomes terminal. You could also think of that as a tipping point.

This is a fight for life. And like all fights, you need a tremendous amount of bravery to take it on. Before I started working on climate change, I didn't think of myself as a fighter, but I became one because I felt I have a responsibility to preserve the world for my son and children everywhere. That kind of fierce protectiveness is part of the way that I love. We can draw on that to have more strength than our enemies because I don't think they're motivated by love. I believe love is an infinite resource and the power of it is greater than that of greed or hate. If it weren't, we wouldn't be here.

Ross Rutherford

ESR Newsletter Editor

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