

## PULLING BACK FROM CLIMATE TIPPING POINTS – 1.5°C IS NOT AN OPENING GAMBIT

Four reports issued this past week in the run-up to COP27 (all on October 26) paint a damning picture of where the world is heading in addressing the three-pronged climate crisis – climate change, biodiversity loss and pollution. These reports (one each from the UN Environment Programme (“UNEP”), the UN’s World Meteorological Organization (“WMO”), the International Energy Agency (“IEA”) and the UNFCCC secretariat (“UN Climate Change”)) unfortunately are just the latest warnings from global climate experts pleading for urgent and collective action to save the planet from what UN Secretary-General Guterres has characterized as a potential “global catastrophe.” (See, for example, my previous briefing notes, available [here](#), [here](#) and [here](#)). The warnings differ perhaps only in tone, as the window for effective action narrows and we face new (largely) unexpected challenges – the geopolitical and economic impact of Russia’s war against Ukraine, evident most clearly in energy and food insecurity, global inflation and domestic political upheavals that, in effect, at the very least have distracted policymakers and, more worryingly, have undermined the willingness of countries to take concerted action.

The reports prompted Johan Rockström, director of the Potsdam Institute for Climate Impact Research, to warn that we are extremely close to irreversible changes, with the planet poised to trigger a series of climate tipping points.<sup>1</sup> Speaking to The Guardian, he notes ([Real Science](#) and [Close to Irreversible](#)) that collective action is needed more now than at any time since WWII to avoid these tipping points, but we will fail if we treat 1.5°C as an arbitrary number - a political number – the opening gambit in a negotiation. We are extremely close to irreversible changes and the failure to respect the implications of 1.5°C would be fatal. We risk breaching what he framed back in 2009 as “[planetary boundaries](#),” within which humanity can continue to develop and thrive. “Every fraction of a degree more is dangerous,” he adds.

The climate crisis demands action, but regrettably the world is largely focused on other priorities. The British press this week, understandably focused on the political upheavals of the past three weeks, did highlight Rishi Sunak’s decision *not to* attend COP27, and the alarm at Number 10 of Boris

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<sup>1</sup> Nine global “core” climate tipping points (CTPs) that contribute substantially to the functioning of the Earth’s system, and seven “regional impact” CTPs that contribute substantially human welfare or have great value as unique features of the Earth system are described in an [article](#) published in September in Science. The <2°C CTPs are:

- the collapse of the Greenland ice sheet
- the abrupt loss of the Barents Sea ice
- the collapse of the Labrador Sea/Subpolar Gyre
- the abrupt thaw of the Boreal permafrost
- the die-off of the low latitude coral reefs
- the collapse of the West Antarctic ice sheet

These may already have been surpassed. At 1.5°C, four of the five move from possible to likely.

The 2-4°C CTPs are:

- the loss of mountain glaciers in Latin America
- the dieback of the Amazon rainforest
- the shift of the Sahel monsoon.

The >4°C CTPs are

- the collapse of the Arctic winter sea ice
- expansion of the Boreal forest
- the collapse of the Boreal permafrost
- the collapse of the Atlantic Meridional Overturning Circulation (AMOC, the Gulf Stream currents)
- the dieback of the Boreal forest

Johnson's plans to attend. Rishi Sunak's predecessor, had asked King Charles not to attend, and the environment secretary, explaining the new PM's decision, has described COP27 as a "gathering of people in Egypt." President Biden [plans](#) to attend COP27, where he can tout the Inflation Reduction Act (*see* my previous briefing note, available [here](#)), which is poised to bring about a fundamental transformation of American society to address the climate crisis. The legislation brings us within striking distance of fully meeting our commitments, although experts say (*see* [Casey Katims](#) of the US Climate Alliance) there is still a gap we need to close, and that assumes the legislation is not undermined should the midterms yield a new majority in Congress.

Ironically, if you look, there are plenty more voices framing the threat. Again just this past week, a [study](#) published in Science Advances posits that we have been underestimating the true economic costs of global warming and are likely underestimating the costs into the future. The research estimates that the financial impact of heatwaves alone since the 1990s on infrastructure, agriculture, productivity and human health, among others, is in the range of \$16 trillion. Much of the impact is in the Global South, which is warmer and more economically vulnerable, and yet has contributed least to the global crisis as its carbon emissions are far lower than the GHG emissions of the industrialized economies. Ironically, as the West seeks greater support among the nations of the Global South in geopolitical terms, the failure to meet Paris Agreement commitments and provide financing to aid in just transition are further diminishing trust in the West.

## **The Reports**

### ***UNEP Emission Gap Report***

The UNEP's [Emission Gap Report 2022](#) lays out in unambiguous terms that, in spite of promises made at the 2015 Paris Climate Conference to prevent average temperatures rising by more than 1.5°C above pre-industrial levels, there is "no credible pathway to 1.5°C in place today."

Among its findings, the report notes that countries are "off-track to achieve even the globally insufficient [nationally determined contributions](#) ("NDCs"). New and updated NDCs since COP26 point to a 2.6°C increase in temperatures by 2100, well in excess of the goals of the Paris Agreement. Policies currently in place, with no additional action, point to a 2.8°C increase by 2100, representing a gap between national commitments and the efforts to enact those commitments. Implementing unconditional and conditional NDC scenarios reduce this to 2.6°C and 2.4°C, respectively. In the best case scenario, full implementation of conditional NDCs, plus additional net zero commitments, point to a 1.8°C rise. However, this best-case scenario is currently not credible." (*See also* [9 Things to Know About National Climate Plans \(NDCs\)](#) and [Making Sense of Countries' Paris Agreement Climate Pledges](#), both published by the World Resources Institute.)

Insufficient progress on cutting carbon emissions means the only way to limit the worst impacts of the climate crisis is a rapid and fundamental transformation of societies. Incremental change is no longer a viable option. In the words of the Executive Director of UNEP, "[w]e had our chance to make incremental changes, but that time is over. Only a root-and-branch transformation of our economies and societies can save us from accelerating climate disaster." In short, as the UNEP [notes](#), a "large-scale, rapid" fossil-fuel shake-up is needed of "electricity supply, industry, transport and buildings sectors, and the food and financial systems" to cut emissions by 45% to limit global warming to 1.5°C, and by 30% to keep average temperature rise to 2°C." The report considers transformation in electricity supply, industry, transport and buildings, and also considers systemic transformation of food systems and the financial markets, crystallizing that there is significant potential to reduce GHG emissions beyond current mitigation pledges.

## ***WMO Greenhouse Gas Bulletin***

Underscoring the enormous challenge and urgency action to cut GHG emissions, the WMO has reported in its 2022 [Greenhouse Gas Bulletin](#) that the three main GHGs warming our planet – carbon dioxide, methane and nitrous oxide – all reached new record highs in 2021.

- The Bulletin explains that after COVID-related lockdowns in 2020, global CO<sub>2</sub> emissions have rebounded, primarily from fossil fuel and cement production. Of the total emissions from human activities during the 2011–2020 period, about 48% accumulated in the atmosphere, 26% in the ocean and 29% on land. WMO notes that there is concern that the ability of land ecosystems and oceans to act as “sinks” may become less effective in the future, thus reducing their ability to absorb carbon dioxide and act as a buffer against larger temperature increases.
- Methane recorded the largest year-on-year increase since systematic measurements began almost 40 years ago. Methane is the second largest contributor to climate change and consists of a diverse mix of overlapping sources and “sinks,” so it is difficult to quantify emissions by source type. Some research indicates that a large amount of methane is coming from “biogenic sources,” such as wetlands and rice paddies.
- Nitrous oxide is emitted into the atmosphere from both natural sources (57%) and anthropogenic sources (approximately 43%), including oceans, soils, biomass burning, fertilizer use and various industrial processes.

According to a UN [press announcement](#), between 1990 and 2021, the warming effect on our climate (known as radiative forcing) by long-lived GHGs (those that stay in the atmosphere) has risen by nearly 50%, mainly fuelled by a carbon dioxide increase. The Bulletin highlights the importance of implementing without delay the cost-effective strategies already available to tackle methane emissions, as well as to slash CO<sub>2</sub> by transforming industrial, energy and transport systems. To be more specific, CO<sub>2</sub> concentrations last year reached 415.7 parts per million (ppm), methane 1908 ppm, and nitrous oxide 334.5 ppm. These values constitute, respectively, 149%, 262% and 124% of pre-industrial levels before human activities started disrupting the natural balance of these gases in the atmosphere.

## ***IEA World Energy Report***

In its [World Energy Outlook 2022](#), the IEA dispels certain misunderstanding about the impact of the war in Ukraine on energy. The WEO notes that the war did not unleash a clean energy crisis. The world is struggling with too little clean energy, not too much. A faster transition to clean energy would have moderated the impact of the war and represents the best way out of it. There is little evidence that climate policies and net zero commitments resulted in higher energy prices; in fact, higher shares of renewables were correlated with lower electricity prices, and more efficient homes and electrified heat has provided an important buffer for consumers (albeit much remains to be done).

The IEA sees a historic turning point towards a more secure, and cleaner, energy future, thanks to the war in Ukraine and to the passage of the Inflation Reduction Act in the United States, the European Union’s [Fit for 55](#) (a package of proposals to revise and update EU legislation to reach the EU goal of reducing EU emission by at least 55% by 2030) and [REPowerEU](#) (to phase out EU dependency on Russian fossil fuels) and Japan’s [Green Transformation \(GX\)](#), among others. The WEO explores three scenarios based on assumptions about government policies – the Stated Policies Scenario (STEPS), the Announced Pledges Scenario (APS) and the Net Zero Emissions by 2050 Scenario (NZE)

In STEPS, global demand for each of the fossil fuels peaks – coal use falls back within the next few years, natural gas demand reaches a plateau by the end of the decade, and rising sales of electric

vehicles mean that oil demand levels off in the mid-2030s before ebbing slightly to mid-century. Total demand for fossil fuels declines steadily from the mid-2020s by around 2 exajoules per year on average to 2050. In APS, full achievement of all climate pledges would move the world towards safer ground, but there is still a large gap between today's ambitions and a 1.5°C stabilisation.

We are entering a critical decade for delivering a more secure, sustainable and affordable energy system. The IEA posits that the potential for faster progress is enormous if determined action is taken immediately. Investments in clean electricity and electrification, together with expanded and modernised grids, offer clear and cost-effective opportunities to cut GHG emissions more quickly, while bringing electricity costs down. Today's growth rates for deployment of solar, wind, electric vehicles and batteries, if maintained, would lead to a much faster transformation than projected in the STEPS, although this would require supportive policies across the globe. By 2030, if countries deliver on their climate pledges, every second car sold in the European Union, China and the United States is electric.

Ultimately though, a significant increase in energy investment, particularly in the Global South, is critical to reach net zero by 2050. If clean energy investment does not accelerate as in the NZE Scenario, higher investment in oil and gas would be needed to avoid further fuel price volatility, but this would imperil the 1.5°C goal. Shortfalls in Russian fossil fuel production will need to be replaced by production elsewhere, even if we are working towards net zero emissions by 2050.

### **UN Climate Change**

The 2022 [Synthesis Report on NDCs](#) finds that, while global efforts are reducing GHGs (current commitments increase emissions by 10.6% by 2030, down from last year's assessment of 13.7% by 2030), these efforts remain insufficient to achieving the 1.5°C goal by 2100. The reports finds that the combined pledges of the 193 parties to the Paris Agreement put the world on track for warming at around 2.5°C by 2100. This year's assessment shows that, while emissions would not increase after 2030, the downward trajectory is not sufficiently steep.

### **Concluding Thoughts**

In 1992, more than 1,700 scientists issued a [Warning to Humanity](#). Thirty years later, while national climate commitments are being made and updated, the trajectory is still not sufficient, and if those commitments are not met, the consequences become ever more dire. In spite of successive warnings over those 30 years, there has been roughly a 40% increase in GHG emissions (according to another [study](#) published in BioScience this past week). It is beyond question that the world faces a climate emergency, and perhaps the implications become more comprehensible if stated per that study as a climate emergency confronting humanity, poised to unleash untold human suffering in the form of an escalating number of climate-related disasters. The study reports that the current trajectory takes the Earth to a temperature level not experienced over the past 3 million years.

Evidence is all around us – this year alone, wildfires in Europe, cyclones and subsequent flooding in Australia, rivers drying up in Europe and China, Hurricane Ida in the southeast United States (the principal contributor to 2021 recording the fourth highest global insured losses since 1970, at \$105 billion, according to [Swiss Re](#)), powerful storms and extensive flooding in Bangladesh, India and Pakistan, drought, floods and wildfires in the western United States and “heat domes” in parts of Canada, the United States and the Mediterranean. (The Guardian aptly [described](#) the situation the world finds itself in as grim scenarios of climate scientists being overtaken by events.) As Johan Rockström [noted](#), the threat is not the rise of global temperatures. Rather, the threat is that the impacts of that expected rise (in global temperature) in the form of extreme weather events, amplified by warming, are far more frequent, and far more severe, than predicted.

We must find the political courage and the will to act, and we must recognize, as we learned in the pandemic, that in the face of a global threat, no country, no community, no society is immune. CPO27 has its work cut out for it, likely complicated by the not unreasonable demands for “loss and damage.” We all have a stake in the summit’s outcome.

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