# PLANETARY SOLVENCY

## GLOBAL RISK MANAGEMENT FOR HUMAN PROSPERITY

BY **SANDY TRUST**

**Imagine a successful mid-to-late career individual in a non-financial industry. This senior and respected person has had limited exposure to pensions. Of course, they make contributions but they've never needed to be close to technicalities. Suddenly this individual is elected to the trustee board! She needs to learn all about funding ratios, solvency, longevity, investment strategies, employer contributions and so on. She's never needed to know this but now it is essential knowledge if she is to do a good job.**

This is analogous to us today, needing to work out how to drive human activity within the finite limits of the planet we live on. Until recently we really didn't need to worry about climate change, destroying nature or running out of resources like critical minerals or water. Things have changed though because despite huge progress in terms of lifespans, wealth and technology we are sailing into increasingly choppy waters. How so?

Human activity is now of such pace and scale we are driving outcomes on a planetary level. Scientists have mapped out how we are doing against the concept of Planetary Boundaries, producing a Planetary Health Check. The latest assessment shows we have exceeded 6 out of 9 Planetary Boundaries. The lights on this particular dashboard, which includes climate change, are flashing red. >

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Do we need to worry about this though? Is going past Planetary Boundaries really a problem, or is it like an overdraft, can't we invent some new technologies and pay it off in the future? If it is a problem, then how can we put in place some planetary risk management to bring us back inside these boundaries? Lets answer these questions and see where we get to.

### *Do we need to worry about going past Planetary Boundaries, is it a problem?*

Oh yes, unequivocally we need to worry. Although we don't think about this a lot in our modern society, it is obvious that you can't have an economy without a society and you can't have a society without somewhere for them to live.

That sounds dramatic yet scientists are warning of significantly reduced human habitability if we do not mitigate climate change. Our global civilization has evolved in an unprecedentedly stable climate for the last 12,000 years, known as the Holocene. It is very handy for agriculture if you can be reasonably sure about seasons and good conditions for growing your crops.

The impact of human activity is now changing these conditions, with a rapidly changing climate starting to impact reliability of the food system, often through too much water or too little water. This seems counterintuitive, how can there be both too much and too little? Well, a warmer atmosphere holds more water, 7% more for every degree rise in temperature. It gets sucked up from somewhere (droughts) and dropped somewhere else (floods). So the weather is changing.

However, as the global average temperature increases past 1.5C we invoke the looming menace of tipping points. These tipping points include irreversible Greenland ice sheet melt, coral reef loss and major ocean current disruption, with the potential for catastrophic impacts, including loss of capacity to grow major staple crops, multi-metre sea level rise, altered climate patterns and accelerated global warming. Tipping points can trigger each other, causing a domino effect or cascade of accelerating and unmanageable damage.

Another way of putting this is that for every 0.1C temperature rise, we decrease our agency and increase the challenge of bringing temperatures back down. If tipping cascades are triggered we may push the planetary system out of the Holocene stability pattern and into a hot-house Earth state. As far as we can tell, the Earth has never been above the 2C mark for millions of years. Scientists call this the corridor of life, if we leave it we enter what climbers call the death zone – escalating climate impacts which it might prove very challenging to successfully adapt to.

Tipping points show that the overall threat posed by the climate and ecological crisis is far more severe than is commonly understood. Climate change and nature risks, driven by human activity, are now a matter for human security with populations already impacted by food system shocks, water insecurity, heat stress and infectious diseases. If unchecked then mass mortality, involuntary mass migration, severe economic contraction and conflict become more likely.

So although 1.5C may not sound like much, perhaps we should view it and other planetary boundaries as akin to solvency limits for our civilization. Developing the concept further we could seek to define risk tolerances and appetites, leveraging our financial risk and solvency management toolkit to supply a risk led message to policyholders.

### *Developing a global risk management toolkit, to raise the profile of these systemic risks*

In 2022 *Climate Endgame*, proposed a new scale of societal impacts for climate change, recognizing that there has been limited analysis of higher warming scenarios. This isn't scaremongering, >

| RATING | FINANCIAL IMPACT | NON-FINANCIAL IMPACT | | | |
|---|---|---|---|---|---|
| | GDP losses | Human mortality | Climate | Nature | Societal |
| EXTREME | ≥ 50% | ≥ 50%<br>> 2 billion deaths | 3C or more by 2050<br>Multiple climate tipping points triggered, tipping cascade. | Breakdown of several critical ecosystem services and Earth systems. High level of extinction of higher order life on Earth. | Significant socio-political fragmentation worldwide and/or state failure with rapid, enduring and significant loss of capital, and systems identity. Frequent large scale mortality events. |
| CATATROPHIC | ≥ 25% | ≥ 25%<br>> 2 billion deaths | 2C or more by 2050<br>High number of climate tipping points triggered, partial tipping cascade. | Breakdown of several critical ecosystem services and Earth systems. Major extinction events in multiple geographies. Ocean circulation severely impacted. | Severe socio-political fragmentation in many regions, low lying regions lost. Heat and water stress drive involuntary mass migration of billions. Catastrophic mortality events from disease, nutrition, thirst and conflict. |
| DECIMATION | ≥ 10%<br>> $10 trillion annual losses | ≥ 10%<br>> 800 million deaths | Global warming limited to 2C by 2050. Several climate tipping points triggered. | Severe reduction in several critical ecosystem services. Major extinction events in some geographies. Frequent global food and water crises. | Severe socio-political fragmentation in regions exposed to climate and/or nature impacts. Failure of vulnerable states and mass mortality events in impacted areas. |
| SEVERE | ≥ 5%<br>> $5 trillion annual losses | ≥ 5%<br>> 400 million deaths | Global warming limited to 1.5C by 2050 following overshoot.<br>Some proximate climate tipping points triggered. | Some impacts to critical ecosystem services. Ongoing species extinction. Regular global food and water crises. | Some socio-political fragmentation in most vulnerable states, where adaptation has been limited. Fragile states exposed to climate risks see mass migration and mortality events from heat, water and stress and weather events. |
| LIMITED | ≥ 5%<br>> $1 trillion annual losses | ≥ 1%<br>> 80 million deaths | Global warming below 1.5C by 2050, with limited overshoot.<br>Climate tipping points largely avoided. | Mass extinction avoided and ecosystem services largely functional. Occasional global food crises and widespread water crises. | Ongoing significant climate impacts with many hundreds of billion dollar + loss events annually and associated mortality and socio-political stress. |

it's simply good risk management to think about adverse outcomes, and to inform whether any additional action is required to mitigate or avoid risks based on the defined appetites.

Planetary Solvency builds on *Climate Endgame* to define a civilization level risk impact matrix across five dimensions of mortality, economy, nature, climate and society as shown above. >

Once your risk matrix is determined, then its relatively simple to plot risk positions and trajectories. The risk analysis is based on current scientific knowledge, meaning that the risk-based approach is applied to detailed scientific climate analyses that have already been performed. Based on the impact definitions in the risk matrix, our risk trajectory is concerning, with *Catastrophic* or even *Extreme* climate impacts *Likely* or *Highly Likely* by 2050. As with any risk management exercise, the likelihood and impact levels need to be combined, so that the high likelihood and high impact should ring a loud warning bell.

Accompanying this risk assessment would be high-level commentary, supported by further supporting detail. For example, for the climate change dimension this might be:

**CLIMATE CHANGE: There is a risk that climate change is not mitigated, leading to further global temperature increases and increasingly severe climate impacts, which overwhelm societies ability to adapt.**

**a) Risk position: AMBER**
Impact Limited, trending to Severe in 2024 with increase in $billion+ loss events and 10k+ mortality events globally. Ongoing increase of emissions and GHG levels, with warming implications. The risk mitigant of the energy transition is accelerating rapidly.

**b) Risk trajectory: RED**
Tipping points increase risk exponentially past 1.5C. Emissions and GHG levels imply >2C by 2050. *Highly likely Catastrophic* warming levels experienced pre 2050 with *Extreme* warming *Possible* to *Likely*. Policy support required to radically accelerate transition, reduce emissions and leverage natural solutions.

Risks are interconnected, climate and nature impacts are likely to have societal consequences. But as in financial services, a *Catastrophic* level of warming does not mean there will be an immediately *Catastrophic* economic shock or mortality event. For example, today we are at around 1.5C of warming, so *Severe* on the climate dimension but still impacts are *Limited* on the economic and mortality dimension. However, as climate and nature risks ratchet up, increasingly severe societal impacts become more likely.

As with any risk management exercise, Planetary Solvency would point to the action required to mitigate risk.

With policymakers seemingly unable to hear warnings about risks to ongoing human progress or unwilling to act upon them with the urgency required, could this be an enhancement to global risk management that could help to mitigate the systemic risks we face? <

**SANDY TRUST** is an IFOA Council member and supports a variety of industry initiatives on climate and nature risk assessment.