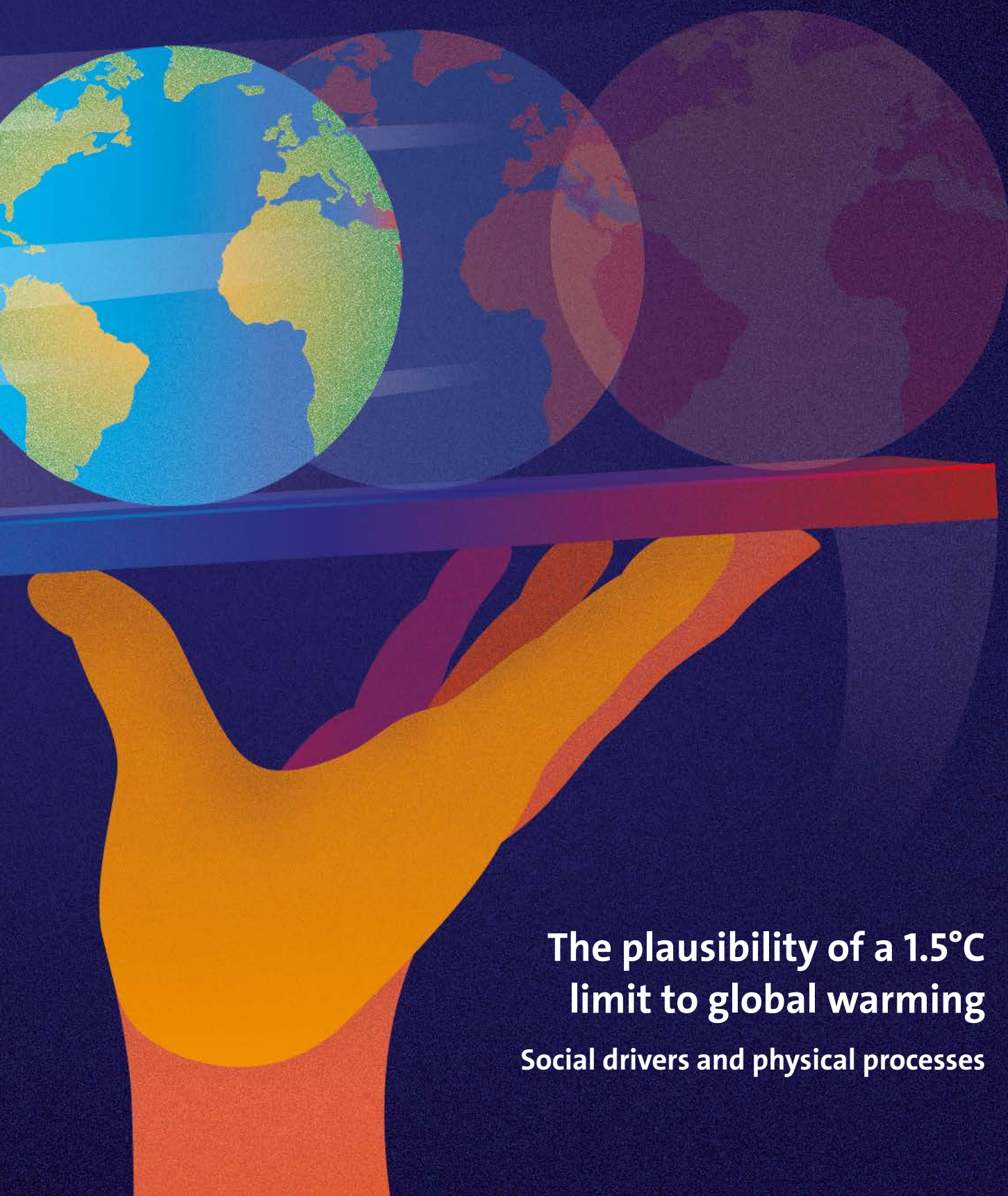


2023

HAMBURG CLIMATE FUTURES OUTLOOK



**The plausibility of a 1.5°C
limit to global warming**
Social drivers and physical processes

5

Implications of the CLICCS plausibility assessment for climate futures

Achieving the 1.5°C Paris Agreement temperature goal is currently not plausible. Limiting the global surface temperature rise to well below 2°C can become plausible if ambition, implementation, and knowledge gaps are closed. This assessment outcome is based on our theoretical models of social transformation toward deep decarbonization by 2050 and the available empirical evidence we hold against these models. The outcome is furthermore based on our understanding of how sensitively global surface temperature responds to anthropogenic greenhouse gas emissions; this understanding has recently again been assessed comprehensively by the IPCC. Enabling conditions might still push the social drivers toward deep decarbonization in the years to come, the world might witness a densification of climate action resources and repertoires within a global opportunity structure supporting the Paris Agreement emissions goal. However, the social world would have to undergo deep transformative change. Currently, the global governance architecture is not adequately equipped to drive deep transformative change: The UN climate governance is weak, and multilateralism is put under additional stress by Russia's invasion of Ukraine. Transnational initiatives have not yet gained sufficient momentum, and many countries around the world are still strongly dependent on revenues from fossil fuels, while currently no mechanisms, structures, and incentives exist on a global scale that would enable alternative paths away from fossil-fuel dependency. Climate protests and social movements can create considerable political pressure, but they also always carry the risk of strong setbacks—by state power or by counter-movements. Furthermore, there is no governance mechanism in place to limit built-in growth requirements of the current capitalist mode of production and consumption in any binding way.

We have assessed how six select physical processes of broad public interest have changed and will change with global warming. Global-warming-induced changes in the dynamics of all six physical processes have extensive effects on, for example, regional hydrological cycles, ecosystems' resilience, or communities' well-being. However, three processes (polar ice-sheet melt, Arctic sea-ice decline, and regional climate change and variability) barely influence global surface temperature, and thus do not affect the plausibility of attaining the Paris Agreement temperature goals. The three other processes (permafrost thaw, AMOC instability, and Amazon Forest dieback) can moderately affect the

global surface temperature and thus moderately inhibit the plausibility of attaining the Paris Agreement temperature goals.

What are the implications of our plausibility assessment for climate futures? The 2023 Outlook highlights that merely understanding the feasibility of technical responses in these contexts neither is sufficient to assess important dynamics nor provides the resources to achieve both deep decarbonization by 2050 and the Paris Agreement temperature goals. While the importance of technology has become visible in our assessments (Box 4), we caution against a growing number of assessments that mainly rely on technological development to achieve climate goals. Our assessments highlight that achieving climate goals depends on social and political processes in the first place. The case of fossil-fuel divestment underlines that renewable technologies are an important condition creating the opportunity to phase-out. Nevertheless, there is no causal link between the deployment of renewable energy sources and fossil-fuel divestment, because the question whether society stops exploiting fossil fuels is inevitably a political one. Currently powerful states and private actors continue to depend on and benefit from fossil-fuel extraction irrespective of whether emissions are compensated.

In light of our empirical findings, we highlight two main issues and their implications for climate futures:

Social dynamics and conditions for change: Because the sheer reliance on technological developments will not turn the deep decarbonization scenario into a plausible one, more attention should be given to social dynamics, political developments, and conditions for change. Human agency is key to create and strengthen the enabling conditions of social drivers toward deep decarbonization by 2050. In this regard, we identify social drivers and dynamics that may leverage change toward this climate future scenario: The political agenda of some member states make a huge difference to the UN system (6.1.1), transnational initiatives create important momentum for non-state actors to engage in climate action (6.1.2), climate-related regulation is key in setting binding goals and implementing them (6.1.3), climate protests and social movements create the necessary political pressure for structural change (6.1.4), successful cases of climate litigation help closing both ambition and implementation gaps (6.1.5), private corporations are key to switching production processes toward deep decarbonization

(6.1.6), financial actors and instruments create the basis for how profits can be gained (6.1.7), consumers have the power to send political and economic signals if they switch to low-carbon consumption patterns (6.1.8), the media can provide the political, cultural, and individual frames that are needed to get public attention (6.1.9), and knowledge production can help bring inequalities and injustices to the fore and include diverse ways of knowing climate change into climate research and policy (6.1.10).

Sustainable climate adaptation: Considering that achieving the 1.5°C Paris Agreement temperature goal is currently not plausible, more attention to sustainable ways of adapting to climate change is required. The same is true for the limits of and interconnections between climate mitigation and climate adaptation. While social-ecological systems are changing due to climate change impacts, steering systemic shifts toward sustainable development pathways is not only possible but necessary to safeguard the life-supporting capacities of the Earth system. Climate adaptation is thus a potential leverage point for sustainability transformations. However, neither the possibility nor the necessity of sustainable development pathways guarantee that sustainable climate adaptation actually takes place. Several enabling and constraining conditions may influence the plausibility of such a pathway materializing in context-specific settings over the next years. Assessing the plausibility of climate future scenarios and sustainable ways of adapting to climate change requires systematic, in-depth analyses of regional and local dynamics. To this end, this Outlook has introduced the building blocks of a Sustainable Adaptation Plausibility Framework, which will be further developed and integrated into upcoming editions of the Outlook as a tool for integrated and systematic plausibility assessments. This is a fundamental step toward better understanding the challenges and opportunities for sustainability transformations across multiple scales of governance.

We conclude that a densifying global opportunity structure provides a broad repertoire of symbolic and material resources for climate action, which societal actors can use to foster deep decarbonization. This must not be taken for granted, inasmuch as setbacks and counter-movements coexist with climate action. During the recent COP27 in Sharm el Sheikh, Egypt, advances have been made with regard to the issues of adaptation and loss and damage. At the same time, this happened at the expense of further materializing required mitigation efforts, which would turn the Paris Agreement temperature goals of staying well below 2°C into a plausible climate future. In the presence of various actors and dynamics opposing substantial mitigation steps, such as agreeing on phasing out fossil fuels, the necessary focus on adaptation is also creating the risk of diluting mitigation targets and creating false adaptation hopes with loss and damage as a growing social reality particularly in the Global South. This contentious simultaneity is also a current experience

by protesters who have turned to a strategy of civil disobedience. Spectacular but minor disruptive actions of social movements like the Last Generation ironically shift public and political attention away from the root causes of climate change—the continued dependence on and extraction of fossil fuels—toward the morals and norms of protesting. As our social plausibility assessment shows, human agency needs to be organized around addressing the root causes of climate change if achieving the Paris Agreement temperature goals should become plausible.

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