

## COMMENTARY:

# Renegotiating the global climate stabilization target

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Climate policy has gained focus with the adoption of the 2°C target, but action to avoid dangerous climate change has not occurred as expected. It is time to reconsider the target, and most importantly, the relationship between climate science and policy.

One of the few points of general consensus in international climate policy is to limit the average global surface temperature increase to 2°C above pre-industrial levels to prevent 'dangerous' climate change. In this respect, the 2°C target has helped to translate the broader stabilization objective formulated in Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC) into a simple, specific and broadly applicable formula.

The 2°C target is the result of a co-operative and mutually beneficial relationship between climate science and policy — a process that began as early as the mid-1990s. The target was formulated through a dialogue between climate scientists and scientific policy advisors<sup>1</sup>, and was formally adopted by policymakers at the 2010 UN climate change conference in Cancún. The 2°C limit has been widely considered a prime example of science-based policymaking, but it is currently under scrutiny as the conditions to meet the target continue to deteriorate. What once seemed a non-negotiable planetary threshold might need to be renegotiated soon.

A number of experts had already criticized the 2°C target before its adoption by the UNFCCC<sup>2,3</sup>, arguing that a single metric cannot represent the threshold to 'dangerous' climate change and that abstract long-term targets usually don't catalyse tangible short-term action. Since 2013 (refs 4–7), a growing number of scientists have been calling for its reconsideration or revision in light of constantly rising emissions. The idea that the average global surface temperature increase can be kept below the 2°C limit seems increasingly unlikely. But so far, neither UN climate negotiators nor international leaders have been willing to confront the question of whether the 2°C target is actually

achievable. Policymakers are avoiding this critical debate, which they believe might diminish the prospects of a positive outcome at the UN climate summit in Paris in 2015. As climate negotiators want to evade any sign of failure, even a sensible approach, such as establishing a three-tiered risk-management framework that accounts for potential policy failures and climate emergencies<sup>7</sup> has little chance of being seriously considered before 2016. However, there is no doubt that the global emissions trajectory, which is still rising, is unlikely to be reversed in just a few years. Therefore, pressure will mount to modify the 2°C target — and with it the relationship between climate science and climate policy.

## The 2°C target as an anchoring device

For almost two decades, the 2°C target has been a common point of reference for climate scientists, policymakers and society at large. It has been described as an 'anchoring device'<sup>8</sup> that allows networks of diverse actors to communicate and interact — albeit with varying motivations and objectives<sup>9,10</sup>. For climate policymakers, the 2°C target has served as a prominent symbol of an ambitious global mitigation effort. For climate scientists, it has provided the basis for complex calculations to determine carbon budgets and emissions reduction paths, which in turn are used to demonstrate the usefulness of scientific tools in the design and evaluation of climate policies. Through their interactions, scientists and policymakers provide each other with mutual reinforcement and recognition: political efforts to advance the climate policy agenda are given support and legitimacy by the scientific community, while climate research is greeted by support from policymakers, as reflected in heightened public awareness and significantly increased funding.

Should the mainstream of climate science accept that the 2°C target cannot be met, climate scientists and policymakers will lose this crucial device that aligns and consolidates their efforts. For national governments that take climate policy seriously, it is unthinkable to continue pursuing political goals that are patently unachievable. This will make it necessary to modify the 2°C target in some way<sup>5</sup>. However, if it becomes apparent that the threshold between non-dangerous and dangerous climate change is not absolute and scientifically definable — as the public has been led to believe by prominent science advisors in the past — but rather the result of negotiations that directly involve researchers, the reputation of climate science would be at risk.

## Modifying scientific advice for policy

The 2°C target is a key outcome of the relationship between scientists and policymakers, and it has been crucial in establishing the authority of both in the global climate debate. Modifying the target would almost surely deteriorate the image of international climate policy, as well as the public standing of climate science. Policymakers and climate scientists do not seem ready to take on such risk. Yet a first step towards target modification is already underway, in the form of a reinterpretation of the conditions considered necessary to meet the 2°C target. In contrast to the Intergovernmental Panel on Climate Change (IPCC)'s fourth assessment report<sup>11</sup> and the annually published mitigation scenarios from the UN Environment Programme<sup>12</sup> and the International Energy Agency<sup>13</sup>, which point to a last possible emissions peak well before 2020 (keeping the long-term stabilization target within reach), the IPCC's fifth assessment report takes a more flexible approach to the 2°C target. The report by

Working Group III on mitigation<sup>14</sup> merely states that delaying mitigation until 2030 would increase the challenges of limiting the temperature increase to 2 °C. According to the report, with emissions levels in 2030 higher than today, limiting the atmospheric concentration of greenhouse gases to levels compatible with a 2 °C target would still be possible, but it would require the large-scale deployment of unproven technology, such as bio-energy combined with carbon capture and storage. The predicted impact of such technologies allows modellers' calculations of net 'negative emissions'. In this way, the IPCC has avoided a crucial 'make-or-break' point for the 2 °C target — at least for now.

In light of the current path towards a temperature increase in the range of 3.7–4.8 °C by 2100 (ref. 14), there is a fair chance that policymakers will begin discussing direct target modification in the near future. Does the 2 °C target have to be interpreted as an absolute upper limit, or might it be understood as a threshold that could be crossed temporarily? Might a less ambitious global target that is higher than 2 °C — perhaps based on different metrics — be acceptable under some circumstances? And if these options were politically feasible, what role could climate scientists play in this process? Should they take an active role in shaping the way towards a new stabilization target — for example, by shifting the threshold to dangerous climate change, at least temporarily — and hope that world leaders will comply this time? Or should they deliberately restrict themselves to the role of 'mapmakers', leaving the responsibility for policy formulation entirely up to the UNFCCC and its 196 'navigators'<sup>15</sup>?

The 2 °C target is likely to change owing primarily to the failure of international climate policy. Yet its failure is rooted in an approach to science-based policymaking that has been dominant since the 1990s: the attempt to limit political options by setting a fixed target and defining a corresponding global carbon budget. The history of the 2 °C objective demonstrates that a strict numerical target contributes little to effective risk management. The target might have worked well as a focal point for climate policy formulation, but it has clearly failed as a focal point for appropriate action. While major emitters constantly refer to the UNFCCC objective, they refuse to implement the corresponding measures because the emissions reduction pathways developed by climate economists appear too ambitious to them. Their behaviour is, in fact, highly inconsistent. But expecting real-world climate policy to be based on comprehensive scientific rationality is quite misleading, as inconsistencies between policy discourse,

decisions and implementation are a defining feature of everyday political life<sup>16</sup> — which holds true even for climate policy leaders such as the European Union or Germany<sup>17</sup>. Designing effective climate policies has to take into account prevailing political rationalities, first and foremost the manifold limitations for 'optimal' policymaking in national and international arenas<sup>18</sup>.

The 2 °C target failure also points to how climate change is framed. It is widely assumed that a global problem such as climate change needs expert consensus to arrive at a political solution. If knowledge-based authority is considered the main or even sole foundation of political authority, then policy debates can be based on scientific evidence alone<sup>19</sup>. Empirical findings indicate, however, that political effectiveness and public trust cannot be reduced to a function of the breadth and depth of scientific consensus. While the IPCC has been able to provide a common knowledge base for international climate policy, the uptake of its findings and the credibility of the institution itself in the eyes of citizens and policymakers worldwide still vary significantly<sup>20</sup>.

Decisions on acceptable risks are inherently political in nature. Thus, effective solutions are not found solely through scientific investigation, but also, and above all, through civic deliberation and political negotiation. Scientific or expert judgements can only inform, not replace, public debate on the moral, social, political, ethical and economic ramifications of the different possible responses to climate change. Politicians must learn not to hide behind scientific uncertainty when asked to make complex judgements<sup>21</sup>. Creating effective climate policies is not a matter of reducing scientific uncertainty, but of establishing the right political conditions to deal with uncertainty.

Within the still dominant 'planetary boundaries' paradigm<sup>22</sup>, only quantitative metrics such as global stabilization targets of 2 °C or lower qualify as definitions of 'acceptable' environmental change. However, since its third assessment report, the IPCC has held the position that the question of what constitutes 'dangerous' climate change or 'acceptable' risk should not be treated as a matter of incontrovertible scientific fact, as it involves judgements concerning the value of the many things that will be affected by a changing climate. The IPCC's position on value judgements, although reiterated in its latest assessment report, has barely been noticed by policymakers and the media. Therefore, the popular framing of the 2 °C target as being a non-negotiable limit still obscures the inherent normativity of deciding how to react to environmental change.

Eventually, it will be the task of public policy institutions to decide on such questions. Climate policymakers are facing multiple trade-offs here — not only economic and political, but also moral and aesthetic. Judgements on how to balance these trade-offs are always subject to political contestation and, at least in democracies, negotiation between various stakeholders. If climate change is one of the main challenges of the future, then climate policy should not be derived from 'planetary boundaries' exclusively determined by science. Rather, climate policy has to remain open for alternative choices<sup>23</sup>. In this regard, the coming renegotiation of the global climate stabilization target, although primarily driven by constantly rising emissions, should not be interpreted as a sign of decline, but as the beginning of a more pluralistic approach to scientific advice for climate policymakers. □

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