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Q&A

Net-zero targets and non-CO_2 mitigation: Q&A with Andy Reisinger and Oliver Geden

After the conclusion of the 27th Conference of the Parties to the UN Framework Convention on Climate Change (COP27) climate talks in Sharm el-Sheikh, some have described the goal of limiting warming to no more than 1.5°C as dead, whereas others describe it as being on life support. Dr. Andy Reisinger, commissioner at He Pou a Rangi (the New Zealand Climate Change Commission) and vice chair of Working Group III at the Intergovernmental Panel on Climate Change (IPCC); and Dr. Oliver Geden, senior fellow at the German Institute for International and Security Affairs, lead author for IPCC Sixth Assessment Report (AR6) Working Group III, and member of the core writing team for the IPCC AR6 Synthesis Report, have recently spoken with *One Earth* about the prospects for limiting warming to 1.5°C and windows of opportunity to accelerate climate action. The views expressed by Dr. Reisinger and Dr. Geden are their personal views only and not those of their associated institutions.

Andy Reisinger
He Pou a Rangi (New Zealand's Climate Change Commission) and IPCC Working Group III (photo by IISD/ENB)

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Ahead of COP27, the 2022 UN Emission Gap Report found that the international community is falling far short of the Paris Agreement's goals such that no credible pathways to 1.5°C are in place. In your opinion, have the COP27 negotiations ameliorated these concerns?

COP27 did not manage to make limiting warming to 1.5°C more plausible. This is not even in the more flexible interpretation used in the Emissions Gap and Intergovernmental Panel on Climate Change (IPCC) reports, which allow for a limited temporary overshoot of 0.1°C and return to 1.5°C before 2100 through net-negative CO_2 emissions. To be fair, COP27's primary focus was on "loss and damage" and not the mitigation of climate change. And although COP27's cover decision is weaker on mitigation than its COP26 predecessor, it has to be noted that countries by and large failed to deliver on the Glasgow Climate Pact, which suggests a limited value of repeat political declarations.

The litmus test for the Paris Agreement's ability to facilitate the achievement of its long-term temperature goal will be the "global stocktake" (GST). This process is intended to assess the collective progress made, compare it with what would be needed for achieving agreed global goals, and inspire a "ratcheting up" of national pledges to help close existing gaps. The first GST will be concluded at COP28 and is thought to inform the next formal round of nationally determined contributions (NDCs), to be delivered by 2025. If these NDCs don't come with a massive strengthening of emission-reduction ambitions for 2030 and 2035, then the Paris Agreement's "pledge and review" approach is likely to face a credibility crisis. But even more important than closing the ambition gap will be to actually implement the pledges made in the NDCs.

Roadmaps to net-zero emissions highlight the need to peak global greenhouse gas (GHG) emissions as soon as possible and halve global emissions by 2030. However, the ambition to peak emissions by 2025 has been removed from the final text of COP27. To what extent does this jeopardize net-zero targets?

Net-zero targets are generally formulated at the country level and increasingly by

businesses at the sub-national level. The biggest challenge to those targets is not whether the COP recognizes the need for global emissions to peak before 2025 but rather the lack of clear pathways to achieving stated near-term goals, policies to drive them, and institutions to sustain the path toward net-zero targets beyond electoral cycles and competing crises. Of course, the political tone at COP meetings trickles down to countries, but the more significant COP decisions related to mitigation are on matters of implementation, such as on climate finance. The limited progress made around those aspects at COP27 will have made some countries more reluctant to simply reiterate ambitious global emission targets.

Of growing interest and relevance is the rise of net-zero targets adopted by businesses and cities. These are partly driven by increasing investor concerns and disclosure requirements and partly by frustrations over continued blockages at national policy levels. Such initiatives are increasingly complementing and influencing national strategies and policies, especially where the goals of global corporations can affect the economies of smaller countries. This has given rise to concerns not only about ample scope of greenwashing but also of corporate approaches failing to deliver on the equity principles that underpin global political agreements. This will be an important space to watch because it will increasingly shape national net-zero targets and policies.

The target date for achieving global net-zero CO_2 emissions is a few decades ahead of when global non-CO_2 GHG emissions might reach net zero. Could bringing forward non-CO_2 GHG net-zero emission targets help make up for the current mitigation shortfalls? Can we make up for a lack of effort to reduce CO_2 emissions by doing more to reduce non-CO_2 emissions?

Achieving approximately net-zero global CO_2 emissions is a physical necessity for achieving a stable climate. Global temperature will not stop rising until we to stop adding to the accumulated pile of CO_2 emissions. Non-CO_2 emissions cause additional warming on top of this. Reducing non-CO_2 emissions can reduce this additional warming, but this cannot substitute for the need to achieve net-zero CO_2 emissions as soon as possible.

Globally, efforts to reduce non-CO_2 emissions could reduce future warming by up to about 0.5°C. Given that we are already at about 1.2°C of warming now, limiting warming to 1.5°C is impossible without deep reductions in non-CO_2 emissions alongside CO_2. Even limiting warming to 2°C would be very challenging without mitigating non-CO_2 emissions—even if we pull out all the stops to get to net-zero CO_2. More stringent reductions of non-CO_2 emissions would make it more feasible to achieve net-zero GHG emissions globally and allow such a goal to be reached earlier, but the date for this will always lag behind that for net-zero CO_2.

So far, most countries have applied much softer policy instruments for non-CO_2 emissions, and they have significant blind spots in that some sectors (most notably agriculture but also some industrial sources) don't have clear reduction targets or climate policies. This will need to change if we want to limit warming to less than 2°C. Especially in countries where non-CO_2 emissions per capita are high and make up a significant share of their national total, e.g., countries with high shares of livestock or natural gas production, more concerted action across all sectors and gases will be important. But setting net-zero GHG targets will not be feasible for all given that avoiding many non-CO_2 emissions entirely (especially from agriculture) is difficult. For some sectors and countries, a net-zero GHG target could simply drive up their demand for carbon offsets with questionable integrity rather than achieve more concerted reductions.

Part of the reason for the different net-zero timelines is that many non-CO_2 GHGs are emitted from sectors that are considered hard to transition. Where are the key sectoral opportunities to accelerate reductions in non-CO_2 GHG emissions?

By far the most important non-CO_2 GHG is methane, which comes predominantly from agriculture and fossil fuel production and use (less from waste and biomass burning). Opportunities to reduce methane emissions exist for all sectors, but their potential and cost differ significantly. There are many cost-effective options to avoid a large part of current methane emissions from fossil fuel production and use, some of which (e.g., plugging major leaks) are close to zero cost. Pathways that limit warming to 1.5°C envisage deep and rapid reductions of those emissions. There is also significant potential to reduce methane emissions from waste (both human and animal), although feasibility and cost depend on waste-management systems.

Achieving deep reductions in methane from agriculture (mostly ruminant livestock) is far more challenging. Technical options are currently limited, although the first generation of methane inhibitors that greatly reduce methane belched by ruminants is becoming available. A more readily available option lies in improving the production efficiency of livestock systems, but increased production could outpace reductions. Demand management and dietary change are therefore an important but socially and politically fraught complementary mitigation strategy.

Nitrous oxide comes mainly from agriculture and faces challenges similar to those of methane in the achievement of deep reductions, but there are efficiency gains to be made. There are also important co-benefits in intensive production systems with freshwater quality.

Synthetic gases (also referred to as F-gases or halogenated gases) are another significant group of non-CO_2 GHGs. These gases are all man made and collectively currently contribute more to global warming than nitrous oxide. They are used mostly in industrial processes and air conditioning. Improved product and process design, substitution, and effective recycling could achieve significant and often cost-effective reductions.

As the energy crisis continues to unfold in Europe, countries are increasingly investing in fossil fuel energy, particularly natural gas. The final COP27 text also encourages the development of "low-emission energy." Are net-zero roadmaps still plausible in light of the need for energy security?

Currently, European net-zero target dates are not being questioned, but

the road to net zero will obviously not be as smooth as charted out in modeled scenarios, which usually don't account for (geo)political crises. In the EU, environmental sustainability had been prioritized over energy prices and security of supply for almost a decade. But now the latter are on the top of the political agenda again. The cap introduced by the EU Emissions Trading System for now until 2030 should secure that the increased coal use in the power sector is only temporary. EU targets for renewable energy sources and energy efficiency will be upgraded because this is seen as one way to decrease fossil fuel imports. At the same time, EU countries that use gas in industry and for domestic heating (such as Germany) now have to invest heavily in new infrastructure to allow for non-Russian supplies—but overall, Germany's gas demand is intended to decrease by 15%–20% this winter. Yet, negative lock-in effects might be experienced in countries that now are encouraged to invest in additional oil and gas exploration projects.

In the wake of COP27 disappointment, many are calling for a reboot or even a completely different approach. From your perspective, what approach is needed to provide us with the best opportunity to concurrently mitigate CO_2 and non-CO_2 GHG emissions sufficiently and equitably?

COPs are here to stay even if their role might shift over time. Climate change is a global problem, covered by the UN Framework Convention on Climate Change (UNFCCC), and is therefore shaped by rules and procedures that have dominated the UN system for many decades. This might not lead to the most "efficient" processes and surely not to "optimal" outcomes, but it could still lead to the most legitimate ones. A "loss and damage" fund would not have emerged beyond the UN system. Discussions on fairness and equity are at the core of the UNFCCC process, albeit with increasing contestation. Particularly for mitigation, NDC pledges under the Paris Agreement will remain crucial, although so far, "minilateral" formats bringing together key emitting countries (G20 and G7) have not proven to be more effective than the UNFCCC process. "Climate clubs" consisting of frontrunner countries have been a recurring proposal for over a decade but have yielded only limited results.

A novel approach will go beyond debates on adequate national (i.e., economy-wide) emission-reduction targets and strive for coordinated action in economic sectors such as cement, steel, electricity, agriculture, or aviation, where mitigation challenges can be quite similar around the world, at least in G20 countries, where the bulk of global emissions are located. Such agreements will only accelerate transitions if they manage to address sector-specific circumstances, for instance, in coordinating new standards, regulations, demonstration projects, or public procurement, easing transition risks for frontrunners. Although this type of global coordination has been largely untested so far, emerging formats such as "just energy transition partnerships" (JETPs) will form a second strand of sectoral agreements in which G7 countries provide financial and technical support for sectoral transitions in emerging economies, starting with coal-heavy power sectors in South Africa and Indonesia.

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