

CLIMATE CHANGE

19/2024

Final report

Support to the technical and political phase of the first Global Stocktake under the Paris Agreement

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Abstract: Support to the technical and political phase of the first Global Stocktake under the Paris Agreement

The Global Stocktake (GST) under the Paris Agreement periodically assesses the collective progress towards achieving the long-term goals of the Agreement. A project commissioned by the German Environment Agency accompanied all phases of the first GST, focussing on the thematic area of mitigation.

An analysis of inputs for the GST highlighted that current Nationally Determined Contributions (NDCs) are insufficient to reduce greenhouse gas emissions in line with pathways consistent with 1.5°C global warming. Collectively, Parties will not achieve their NDC targets with the mitigation actions which are currently implemented and planned.

In order to be able to formulate and achieve more ambitious targets, transformative mitigation actions need to be implemented, covering the sectors energy, transport, industry, agriculture, land use and waste. It will be important for policy makers to consider different audiences, channels, messages and tone when communicating the need for such enhanced action.

Kurzbeschreibung: Vorbereitung und Begleitung der technischen und politischen Phase der ersten Globalen Bestandsaufnahme unter dem Übereinkommen von Paris

Die Globale Bestandsaufnahme (Global Stocktake, GST) im Rahmen des Übereinkommens von Paris bewertet in regelmäßigen Abständen den kollektiven Fortschritt bei der Erreichung der langfristigen Ziele des Übereinkommens. Ein Projekt im Auftrag des Umweltbundesamts begleitete alle Phasen des ersten GST mit einem Fokus auf das Thema Emissionsminderung.

Eine Analyse der Beiträge zum GST ergab, dass die derzeitigen Nationalen Klimaschutzbeiträge (Nationally Determined Contributions, NDCs) nicht ausreichen, um die Treibhausgasemissionen entsprechend der Pfade zu reduzieren, die mit einer globalen Erwärmung von 1,5°C vereinbar sind. In ihrer Gesamtheit werden die Vertragsparteien ihre NDC-Ziele mit den derzeit durchgeführten und geplanten Minderungsmaßnahmen nicht erreichen.

Um ambitioniertere Ziele formulieren und erreichen zu können, müssen transformative Minderungsmaßnahmen umgesetzt werden, die die Sektoren Energie, Verkehr, Industrie, Landwirtschaft, Landnutzung und Abfall abdecken. Für Entscheidungsträgerinnen und Entscheidungsträger wird es wichtig sein, unterschiedliche Zielgruppen, Kanäle, Botschaften und den Tonfall zu berücksichtigen, wenn sie die Notwendigkeit dieser Maßnahmen kommunizieren.

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List of abbreviations

Abbreviation	Explanation
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
GHG	Greenhouse gas
GDP	Gross Domestic Product
GST	Global Stocktake
IPCC	Intergovernmental Panel on Climate Change
IGO	Intergovernmental Organisation
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

Summary

The Global Stocktake (GST) under the Paris Agreement periodically assesses the collective progress towards achieving the purpose of the Agreement and its long-term goals. The first GST was conducted in the period from 2021 to 2023. The information collected was assessed and discussed during a technical dialogue consisting of workshops, roundtables and other events with representatives from Parties and non-Party stakeholders.

The first GST concluded with the ‘consideration of outputs’ phase in the run up to and during the Dubai climate change conference in December 2023. During this conference, Parties formulated the output of the GST in the form of a decision of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (1/CMA.5).

Support for the first Global Stocktake

A project commissioned by the German Environment Agency accompanied all phases of the GST, focussing on the thematic area of mitigation. The overall project objective was to contribute to ensuring that the results of the GST have an impact and that more ambitious Nationally Determined Contributions (NDCs) are submitted in 2025.

Analysis of inputs to the Global Stocktake

A wide range of sources provided information on the collective progress of Parties towards greenhouse gas emission reductions. These include synthesis reports by the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat and constituted bodies under the UNFCCC, reports by the Intergovernmental Panel on Climate Change (IPCC), and reports on gaps in ambition and implementation and on projected greenhouse gas emissions. An analysis of these documents produced the following key messages on collective progress:

- ▶ Current NDCs are insufficient to reduce greenhouse gas emissions in line with pathways consistent with 1.5°C warming.
- ▶ Collectively, Parties will not achieve their NDC targets with the mitigation actions which are currently implemented and planned.
- ▶ Technologies to reduce greenhouse gas emissions are available in every sector, and their costs have been decreasing significantly.

These messages were reflected in many submissions by non-Party stakeholders and in several submissions by Parties as well. Very similar messages were also discussed and included in the outcomes of the technical dialogue under the GST.

The findings of the GST on collective progress highlight the importance of communicating and implementing more ambitious NDCs. While Parties are directly responsible for further updating their current NDCs and developing new NDCs by 2025, non-Party stakeholders such as NGOs and researchers will continue to play an important role in analysing new NDCs and monitoring collective progress.

Submissions under the Global Stocktake

Ahead of the sessions of the first Technical Dialogue and ahead of the Consideration of Outputs component of the first Global Stocktake, Parties and Non-Party Stakeholders were invited to submit their views on the contents and process of the Global Stocktake. For the Technical Dialogue, a general call for inputs had three deadlines for the different sessions. For the

Consideration of Outputs, views on the approach to this component were invited, and a separate call asked for views on its elements.

The submissions for the three sessions of the technical dialogue addressed gaps in the progress towards the goals of the Paris Agreement and necessary transitions. Many referenced the IPCC's Sixth Assessment Report and stated that urgent action is needed across thematic areas of the GST.

The submissions on the approaches to the consideration of outputs component of the first GST addressed, inter alia, the expectations on the processes including timelines, workshops, high-level events, and the format and content of outputs of the GST.

Finally, the submissions on the elements for the consideration of outputs component suggested, inter alia, that the GST should highlight the assessment of collective progress in undertaking mitigation, urgency for implementation of mitigation actions, and the need for scaling up collective mitigation ambition. Many submissions also requested that a clear way forward should be provided on how to implement the results of the first GST.

Options for the political phase of the Global Stocktake

During 2023, Parties prepared for the political phase of the Global Stocktake, which culminated in the 'consideration of outputs' at the climate change conference COP28 in Dubai. The approach for the consideration of outputs had not been defined beforehand, and Parties were asked to submit their views on how to organise this component.

Among the suggestions for the organisation of this component, two options were put forward by many stakeholders: The organisation by thematic area as defined by the GST (i.e., covering mitigation; adaptation; and means of implementation and support), complemented during the discussions by response measures and loss and damage and, alternatively, the organisation by sector, with specific guiding questions, meetings and tailored outputs separately for each sector.

It was found that both options were suitable for engaging non-Party stakeholders, for taking into account equity and the best available science, for ensuring high-level participation and visibility and for incorporating the results of the technical phase of the GST. Organising the political phase by thematic area possibly facilitates high-level participation and visibility and follows the structure of the technical dialogues under the GST, while organising this phase by sector possibly facilitates the information of Parties in enhancing their NDCs, and international cooperation, in specific sectors.

Besides options for the political phase, several types of outputs of the GST were identified. These include the cover decision, political declarations or sectoral commitments, one or several CMA decisions, and a technical annex. These types of outputs were non-exclusive, and several of them could be combined. It was found that a CMA decision, combined with a technical annex and sectoral commitments may be most suitable for addressing Parties and non-Party stakeholders with specific, practicable guidance on enhancing ambition and implementation. One single type of output would not necessarily be suitable to address collective progress, to address the need to increase ambition, and provide guidance to Parties.

In the preparation for the consideration of outputs phase of the first GST, the option of organising this phase according to thematic areas was chosen. As far as the outputs of the GST are concerned, it became clear in the run-up to COP28 that the outputs would be in the form of a decision under the Paris Agreement (CMA). The main argument for focussing on this single output was that it should be Party-driven and that time would not be sufficient for Parties to agree on several outputs.

Addressing equity in the Global Stocktake

The principle of equity plays an important role in the GST. During the first GST, equity was considered in the assessment of where Parties stand collectively, and the GST was expected to inform Parties how they could increase ambition and address equity in their new NDCs.

Parties differed in their understanding of a forward versus a backward-looking perspective when considering equity. For the distribution of mitigation efforts, as well as adaptation actions and means of implementation and support, several competing concepts have been proposed. Depending on the concept, action or support may be distributed in different ways between countries, between groups or between individuals. The proposed equity concepts included responsibility, capabilities, egalitarianism and sufficientarianism.

The analysis performed in this project showed that the application of one concept only may not be sufficient to ensure equitable and ambitious climate action. In all areas of climate action, it is critical to take into account capabilities, which are different from country to country and within countries. It is important to use all available capabilities and opportunities and to increase them.

Transformative mitigation actions as an outcome of the Global Stocktake

The outputs of the GST are key in informing Parties in updating and enhancing their actions and support, as well as in enhancing international cooperation for climate action. In the run-up to the political phase of the GST, many stakeholders called for the inclusion of specific actions which could be taken up by Parties in their subsequent NDCs.

Based on available material, such as research papers and IPCC reports, the following key mitigation actions were identified in this project and published:

- ▶ Boost wind and solar electricity supply
- ▶ Increase energy efficiency and sufficiency
- ▶ Phase out fossil fuels
- ▶ Phase out fossil fuel subsidies while enabling a just transition
- ▶ Electrify the vehicle fleet and facilitate a shift in transportation modes
- ▶ Improve efficiency and shift towards renewable energy in the buildings sector
- ▶ Decarbonize industrial production
- ▶ Circular material flows
- ▶ Reduce methane emissions from fossil fuels, agriculture and waste
- ▶ Stop deforestation and maximise removals on land
- ▶ Sustainable food systems

Rather than listing specific actions, CMA decision 1/CMA.5 on the GST calls on Parties to contribute to a wide range of global efforts. These efforts roughly cover the main mitigation actions which were proposed in the discussion paper.

Analysis of collective progress

In line with the common approach in the climate negotiations, the GST's mandate to assess collective progress is interpreted such that it must not assess the ambition and implementation performance of individual countries. Still, the GST process should recognise that substantial

differences between countries exist, both in terms of where they are now and where they may be heading. Making Parties aware of these differences can act as an enabler for increased ambition, by showing what is already possible, identifying trends and the existence of leaders and laggards.

A performance distribution is a histogram that groups countries based on how they fare on a specific indicator, such as sectoral GHG emissions per capita. The analysis of progress in performance distributions showed that in all sectors, several countries had per capita emissions in 2019 below 2000 levels. Reasons for these declines vary, but these countries can provide useful lessons learned for others. In several subsectors, countries show a recent decline in emissions per capita. However, the development of total emissions observed in recent years is not in line with the temperature goal of the Paris Agreement.

In some sectors, such as buildings and agriculture, most countries have per capita emissions below 2000 levels. This is encouraging but in order to substantively decrease emissions, profound changes are still needed in these sectors. In other sectors, such as industry and transport, a rapid change in direction is needed since most countries have per capita emissions above 2000 levels and emissions per capita in subsectors still increase.

The decision on the first GST calls on Parties to contribute to sector-specific global efforts. In particular, it calls for a clear acceleration and increase of efforts to reduce emissions in the energy supply sector. It includes a global target to triple renewable energy capacity by 2030 and a call to accelerate efforts for coal power phase-down. That these targets were explicitly included in the Global Stocktake outcome indicates that there is broader agreement that reducing emissions in the sector is important and that increasing renewables will play a pivotal role in doing so.

Leveraging the echo of the Global Stocktake

With the conclusion of the first GST at COP28, a window of opportunity has opened to leverage its results for more ambitious climate action. The NDC cycle can be understood as a policy process with different stages, specifically agenda-setting, policy formulation and decision-making. Based on the experiences gathered in previous policy processes at the science-policy interface, the following three key recommendations for leveraging the response to the Global Stocktake for enhanced climate action are suggested based on the analysis of this project:

- ▶ Engage in considerable coordination and communicative efforts from several stakeholders to ensure that the results of the GST are taken up in the national level political discourse. And this, in turn, requires substantial resources committed and capacities invested early in the process.
- ▶ Design differentiated strategies to affect and influence different stages of the NDC policy process, considering the different audiences, channels, messages and tone to achieve effective communication for each phase.
- ▶ Coordinate a messaging coalition of like-minded parties in policymaking, NGOs, private sector entities and research and focus on positive messages, highlighting the opportunities arising from ambitious climate action and taking inspiration from other countries.

In conclusion, a successful leverage of the Global Stocktake would include forming a large like-minded messaging coalition including national partners to carry the messages into the respective countries. Furthermore, the communication should be specifically tailored for each stage of the NDC cycle:

- ▶ **Agenda-setting:** This stage aims to benefit first from the initial public attention the GST generated at the global level and second from the start of the national NDC process. The media and the public in general are therefore the key recipients for the communication on the national level. At this stage messages should be kept simple since reduced complexity enables better reception by the targeted audiences. To contextualize the exclusively collective information generated by the Global Stocktake, external sources for robust country-specific information corresponding to the standard of 'best available science' should be used.
- ▶ **Policy formulation:** In this stage, the communication should address the competent authority – depending on the country line ministries or legislative bodies – and key individuals within these authorities. More comprehensive and complex messages are needed at this stage and good practice examples collated during the technical phase of the Global Stocktake could prove particularly useful.
- ▶ **Decision-making:** To ensure that ambitious policies are adopted, the decision-makers should be targeted. The degree of complexity of the message varies with the decision-maker, i.e. whether they are part of ministerial bureaucracy or whether they are citizens voting on a plebiscite. At this stage, it will also be vital that the communication comes from stakeholders within the country to maximize the legitimacy of the message.

Handling the inputs to the second Global Stocktake

Ahead of the second GST, extensive information sources will become available, including the reports submitted by Parties under the Enhanced Transparency Framework. In order to effectively handle the inputs to the second GST, researchers, Parties and NGOs should aim at analysing information that is comparable across Parties and information which is particularly useful for other Parties when they update their current NDCs and prepare new NDCs. The results of this analysis should be considered in the guidance for the inputs for the second GST.

Zusammenfassung

Die Globale Bestandsaufnahme (Global Stocktake, GST) im Rahmen des Übereinkommens von Paris bewertet in regelmäßigen Abständen den kollektiven Fortschritt bei der Erreichung des Zwecks des Abkommens und seiner langfristigen Ziele. Der erste GST wurde von 2021 bis 2023 durchgeführt. Die gesammelten Informationen wurden im Rahmen eines technischen Dialogs bewertet und diskutiert, der aus Workshops, runden Tischen und anderen Veranstaltungen mit Vertreterinnen und Vertretern von Vertragsparteien und anderen Interessensgruppen bestand.

Der erste GST wurde mit der Phase der „Erörterung der Ergebnisse“ im Vorfeld und während der Klimakonferenz in Dubai im Dezember 2023 abgeschlossen. Während dieser Konferenz formulierten die Vertragsparteien die Ergebnisse der GST in Form eines „Beschlusses der Konferenz der Vertragsparteien, die als Tagung der Vertragsparteien des Übereinkommens von Paris dient“ (1/CMA.5).

Unterstützung für die erste globale Bestandsaufnahme

Ein Projekt im Auftrag des Umweltbundesamts begleitete alle Phasen des GST und fokussierte auf den Themenbereich Emissionsminderung. Das Projekt sollte einen Beitrag dazu leisten, dass die Ergebnisse des GST Wirkung zeigen und dass im Jahr 2025 ehrgeizigere nationale Klimaschutzziele (Nationally Determined Contributions, NDCs) vorgelegt werden.

Analyse der Beiträge zur globalen Bestandsaufnahme

Informationen über den kollektiven Fortschritt der Vertragsparteien bei der Minderung der Treibhausgasemissionen waren aus einer Vielzahl von Quellen verfügbar. Dazu gehören zusammenfassende Berichte des Sekretariats der Klimarahmenkonvention (United Nations Framework Convention on Climate Change, UNFCCC) und ihrer Gremien, Berichte des Weltklimarats (Intergovernmental Panel on Climate Change, IPCC) sowie Berichte über Lücken in Ambition und Umsetzung. Eine Analyse dieser Dokumente ergab die folgenden Kernaussagen zum kollektiven Fortschritt:

- ▶ Die derzeitigen NDCs reichen nicht aus, um die Treibhausgasemissionen im Einklang mit den Pfaden zu reduzieren, die mit einer Erwärmung um 1,5°C vereinbar sind.
- ▶ Die Vertragsparteien werden ihre NDC-Ziele mit den gegenwärtig durchgeführten und geplanten Minderungsmaßnahmen insgesamt nicht erreichen.
- ▶ Technologien zur Verringerung der Treibhausgasemissionen sind in jedem Sektor verfügbar, und ihre Kosten sind erheblich gesunken.

Diese Aussagen fanden sich in vielen Beiträgen von Interessensgruppen und auch in mehreren Beiträgen von Vertragsparteien wieder. Ähnliche Botschaften wurden auch in den Ergebnissen des technischen Dialogs im Rahmen des GST diskutiert und aufgenommen.

Die Ergebnisse des GST zum kollektiven Fortschritt unterstreichen, dass die Kommunikation und Umsetzung ehrgeizigerer NDCs von entscheidender Bedeutung ist. Die Vertragsparteien sind direkt für die weitere Aktualisierung ihrer derzeitigen NDCs und die Entwicklung neuer NDCs spätestens 2025 verantwortlich. Andere Interessensgruppen wie Nicht-Regierungsorganisationen und Forschende werden weiterhin eine wichtige Rolle bei der Analyse neuer NDCs und der Überprüfung des kollektiven Fortschritts spielen.

Einreichungen im Rahmen der globalen Bestandsaufnahme

Im Vorfeld der Sitzungen des ersten Technischen Dialogs und vor der Phase der „Erörterung der Ergebnisse“ des ersten GST wurden die Vertragsparteien und Interessengruppen aufgefordert,

ihre Ansichten zu Inhalt und Verfahren des GST darzulegen. Für den technischen Dialog erfolgte ein Aufruf zur Einreichung von Beiträgen mit drei Fristen für die verschiedenen Sitzungen. Für die Phase der „Erörterung der Ergebnisse“ wurden Stellungnahmen zum Konzept erbeten, und in einem separaten Aufruf wurde um Stellungnahmen zu den einzelnen Elementen dieser Phase gebeten.

Die Einreichungen für die drei Sitzungen des technischen Dialogs befassten sich mit Lücken beim Fortschritt im Hinblick auf die Ziele des Übereinkommens von Paris und notwendigen Transformationen. Viele nahmen Bezug auf den Sechsten Sachstandsbericht des IPCC und wiesen auf dringenden Handlungsbedarf in allen Themenbereichen des GST hin.

Die Einreichungen zu Ansätzen für die Phase der „Erörterung der Ergebnisse“ befassten sich unter anderem mit den Erwartungen an die Prozesse, einschließlich Zeitplan, Veranstaltungen, Format und Inhalt der Ergebnisse.

In den Einreichungen zu den Elementen der „Erörterung der Ergebnisse“ wurde unter anderem vorgeschlagen, dass der GST die Bewertung des kollektiven Fortschritts beim Klimaschutz und die Dringlichkeit der Umsetzung von Minderungsmaßnahmen hervorheben sollte. Er sollte auch auf die Notwendigkeit hinweisen, die kollektive Ambition zu erhöhen. In vielen Beiträgen wurde gefordert, einen klaren Weg für die Umsetzung der Ergebnisse des ersten GST aufzuzeigen.

Optionen für die politische Phase der Globalen Bestandsaufnahme

Im Lauf des Jahres 2023 bereiteten sich die Vertragsparteien auf die politische Phase der globalen Bestandsaufnahme vor, die mit der „Erörterung der Ergebnisse“ auf der Klimakonferenz COP28 in Dubai abgeschlossen wurde. Das Konzept für die Erörterung der Ergebnisse war im Vorfeld nicht festgelegt worden, und die Vertragsparteien reichten Vorschläge zur Gestaltung dieser Komponente ein.

Unter den Vorschlägen für die Organisation dieser Komponente wurden von vielen Beteiligten zwei Optionen vorgeschlagen: Die Organisation nach Themenbereichen, wie sie vom GST definiert wurden (d.h. Minderung, Anpassung und Mittel zur Umsetzung und Unterstützung), ergänzt um die Themen „Gegenmaßnahmen“ und „Verluste und Schäden“, und alternativ die Organisation nach Sektoren, mit spezifischen Leitfragen, Sitzungen und Ergebnissen für jeden Sektor separat.

Beide Optionen stellten sich als geeignet heraus, um Interessengruppen einzubinden, Gerechtigkeitsaspekte und die besten verfügbaren wissenschaftlichen Erkenntnisse zu berücksichtigen, eine hochrangige Beteiligung und Sichtbarkeit zu gewährleisten und die Ergebnisse der technischen Phase des GST einzubeziehen. Eine Organisation nach Themenbereichen kann eine hochrangige Beteiligung und Sichtbarkeit erleichtern und folgt der Struktur der technischen Dialoge im Rahmen der GST. Eine Organisation nach Sektoren kann andererseits Orientierung für die Verbesserung der NDCs und für die internationale Zusammenarbeit in spezifischen Sektoren bieten.

Neben den Optionen für die politische Phase wurden mehrere Arten von Ergebnissen des GST betrachtet. Dazu gehören ein Rahmenbeschluss, politische Erklärungen bzw. sektorale Verpflichtungen, ein oder mehrere CMA-Beschlüsse und ein technischer Anhang. Diese Arten von Ergebnissen schließen sich nicht aus, und mehrere von ihnen können kombiniert werden. Ein CMA-Beschluss in Kombination mit einem technischen Anhang und sektoralen Verpflichtungen ist am besten geeignet, um den Vertragsparteien und Interessensgruppen konkrete, praktikable Hinweise zur Steigerung der Ambition und zur Umsetzung zu geben. Eine einzelne Art von Output wäre weniger geeignet, um den kollektiven Fortschritt, die Ambitionssteigerung und eine Anleitung für Vertragsparteien abzudecken.

Bei der Vorbereitung der Phase der „Erörterung der Ergebnisse“ des ersten GST wurde entschieden, diese Phase nach Themenbereichen zu organisieren. Was die Ergebnisse des GST betrifft, so stellte sich im Vorfeld der COP28 heraus, dass diese in Form eines Beschlusses im Rahmen des Übereinkommens von Paris (CMA-Beschluss) vorliegen würden. Das Hauptargument für den Fokus auf diesen einen Output war, dass er von den Vertragsparteien bestimmt werden sollte und dass die Zeit nicht ausreichen würde, um sich auf mehrere Outputs zu einigen.

Berücksichtigung von Gerechtigkeitsaspekten in der globalen Bestandsaufnahme

Der Grundsatz der Gerechtigkeit spielt im GST eine wichtige Rolle. Während des ersten GST wurde dieser Aspekt bei der Bewertung des kollektiven Fortschritts berücksichtigt, und es wurde erwartet, dass der GST die Vertragsparteien anleitet, wie sie ihre Ambition erhöhen und Gerechtigkeitsaspekte in ihren neuen NDCs berücksichtigen können.

Die Vertragsparteien unterschieden sich in ihrem Verständnis einer vorwärts- bzw. rückwärtsgerichteten Perspektive bei der Berücksichtigung von Gerechtigkeit. Für die Verteilung von Klimaschutz- sowie Anpassungsmaßnahmen und von Mitteln zur Umsetzung und Unterstützung wurden mehrere konkurrierende Konzepte vorgeschlagen. Je nach Konzept können Maßnahmen oder Unterstützung auf unterschiedliche Weise zwischen Ländern, Gruppen oder Einzelpersonen aufgeteilt werden. Zu den vorgeschlagenen Gerechtigkeitskonzepten gehören Verantwortung, Fähigkeiten, Egalitarismus und Genügsamkeit.

Es zeigte sich, dass die Anwendung eines einzelnen Konzepts möglicherweise nicht ausreicht, um gerechte und ehrgeizige Klimaschutzmaßnahmen zu gewährleisten. In allen Bereichen des Klimaschutzes ist es von entscheidender Bedeutung, die Fähigkeiten zu berücksichtigen, die von Land zu Land und innerhalb der Länder unterschiedlich sind. Es ist wichtig, alle verfügbaren Fähigkeiten und Möglichkeiten zu nutzen und diese auszubauen.

Transformative Minderungsmaßnahmen als Ergebnis der Globalen Bestandsaufnahme

Die Ergebnisse des GST sind von entscheidender Bedeutung für die Anleitung der Vertragsparteien bei der Aktualisierung und Verbesserung ihrer Maßnahmen und Unterstützung sowie für die Verbesserung der internationalen Zusammenarbeit im Klimaschutz. Im Vorfeld der politischen Phase des GST forderten viele Interessengruppen die Aufnahme spezifischer Maßnahmen, die von den Vertragsparteien in ihren nachfolgenden NDCs aufgegriffen werden könnten.

Auf der Grundlage von verfügbarem Material, wie z. B. Forschungsarbeiten und IPCC-Berichten, wurden im Rahmen dieses Projekts die folgenden zentralen Minderungsmaßnahmen ermittelt und in einem Diskussionspapier zusammengestellt:

- ▶ Ausbau der Wind- und Solarstromerzeugung
- ▶ Steigerung der Energieeffizienz und -suffizienz
- ▶ Ausstieg aus fossilen Brennstoffen
- ▶ Ausstieg aus Subventionen für fossile Brennstoffe, wobei ein gerechter Übergang ermöglicht wird
- ▶ Elektrifizierung der Fahrzeugflotte und Verlagerung von Verkehrsträgern
- ▶ Verbesserung der Effizienz und Umstellung auf erneuerbare Energien im Gebäudesektor

- ▶ Dekarbonisierung der industriellen Produktion
- ▶ Zirkuläre Stoffströme
- ▶ Verringerung der Methanemissionen aus fossilen Brennstoffen, Landwirtschaft und Abfall
- ▶ Stopp der Entwaldung und Maximierung von Senken im Landsektor
- ▶ Nachhaltige Lebensmittelsysteme

In der CMA-Entscheidung 1/CMA.5 zum GST werden keine spezifischen Maßnahmen aufgelistet. Stattdessen werden die Vertragsparteien aufgefordert, zu einem breiten Spektrum globaler Anstrengungen beizutragen. Diese Anstrengungen decken in etwa die wichtigsten Minderungsmaßnahmen ab, die in dem Diskussionspapier vorgeschlagen wurden.

Analyse des kollektiven Fortschritts

Im Einklang mit dem Ansatz bei den Klimaverhandlungen wird das Mandat des GST zur Bewertung des kollektiven Fortschritts so ausgelegt, dass er die Ambitionen und Leistungen einzelner Länder nicht bewerten darf. Dennoch sollte der GST-Prozess erhebliche Unterschiede zwischen den Ländern anerkennen, sowohl in Bezug auf den derzeitigen Stand als auch auf die mögliche Entwicklung. Wenn die Vertragsparteien auf diese Unterschiede aufmerksam gemacht werden, kann dies als Anreiz für mehr Ambition dienen: Es wird aufgezeigt, was bereits möglich ist, und Trends sowie Vorreiter und Nachzügler können identifiziert werden.

Eine Leistungsverteilung ist ein Histogramm, das die Länder nach ihrem Abschneiden bezüglich eines bestimmten Indikators gruppiert, beispielsweise bezüglich der sektoralen Treibhausgasemissionen pro Kopf. Eine Analyse des Fortschritts in den Leistungsverteilungen zeigte, dass in allen Sektoren die Pro-Kopf-Emissionen mehrerer Länder im Jahr 2019 unter dem Niveau des Jahres 2000 lagen. Die Gründe für diese Rückgänge sind unterschiedlich, aber diese Länder können nützliche Lehren für andere Länder liefern. In mehreren Subsektoren sind die Pro-Kopf-Emissionen in den letzten Jahren zurückgegangen. Die in den letzten Jahren beobachtete Entwicklung der Gesamtemissionen steht jedoch nicht im Einklang mit dem Temperaturziel des Übereinkommens von Paris.

In einigen Sektoren wie Gebäude und Landwirtschaft liegen die Pro-Kopf-Emissionen in den meisten Ländern unter dem Niveau von 2000. Dies ist ermutigend; um die Emissionen aber wesentlich senken zu können, sind in diesen Sektoren tiefgreifende Veränderungen erforderlich. In anderen Sektoren wie Industrie und Verkehr ist ein rascher Richtungswechsel erforderlich, da die Pro-Kopf-Emissionen in den meisten Ländern über dem Niveau von 2000 liegen und die Pro-Kopf-Emissionen in den Subsektoren weiter steigen.

Im Beschluss über den ersten GST werden die Vertragsparteien aufgefordert, zu sektorspezifischen globalen Anstrengungen beizutragen. Insbesondere wird zu einer deutlichen Beschleunigung im Bereich der Energieversorgung aufgerufen. Der Beschluss enthält ein globales Ziel zur Verdreifachung der Kapazitäten für erneuerbare Energien bis 2030 und einen Aufruf zur beschleunigten Abkehr von der Kohleverstromung. Die Tatsache, dass diese Ziele ausdrücklich in die Ergebnisse der globalen Bestandsaufnahme aufgenommen wurden, zeigt, dass ein breiter Konsens über die Verringerung der Emissionen in diesem Sektor besteht, und dass der Ausbau der erneuerbaren Energien dabei eine zentrale Rolle spielen wird.

Das Echo der Globalen Bestandsaufnahme nutzen

Mit dem Abschluss des ersten GST auf der COP28 hat sich ein Zeitfenster geöffnet, in dem die Ergebnisse für ehrgeizigere Klimaschutzmaßnahmen genutzt werden können. Der NDC-Zyklus

kann als ein politischer Prozess mit verschiedenen Phasen verstanden werden, insbesondere Agenda-Setting, Politikformulierung und Entscheidungsfindung. Ausgehend von den Erfahrungen aus früheren politischen Prozessen an der Schnittstelle zwischen Wissenschaft und Politik werden die folgenden drei Empfehlungen für die Nutzung der Ergebnisse der globalen Bestandsaufnahme für verstärkte Klimaschutzmaßnahmen vorgeschlagen:

- ▶ Koordinierungs- und Kommunikationsanstrengungen verschiedener Interessengruppen, um sicherzustellen, dass die Ergebnisse des GST im politischen Diskurs auf nationaler Ebene aufgegriffen werden. Dies erfordert eine frühzeitige Bindung von Ressourcen und Kapazitäten.
- ▶ Differenzierte Strategien, um die verschiedenen Phasen des NDC-Politikprozesses zu beeinflussen, unter Berücksichtigung unterschiedlicher Zielgruppen, Kanäle, Botschaften und Tonalitäten, um eine effektive Kommunikation für jede Phase sicherzustellen.
- ▶ Eine Messaging-Koalition aus gleichgesinnten Akteuren aus Politik, Nichtregierungsorganisationen, Privatwirtschaft und Forschung, die sich auf positive Botschaften konzentriert. Sie hebt Chancen hervor, die sich aus ambitionierten Klimaschutzmaßnahmen ergeben, und lässt sich von anderen Ländern inspirieren.

Eine erfolgreiche Nutzung der Globalen Bestandsaufnahme umfasst die Bildung einer großen, gleichgesinnten Koalition für die Verbreitung von Botschaften. Dazu gehören auch nationale Partnerinnen und Partner, um die Botschaften in die jeweiligen Länder zu tragen. Darüber hinaus sollte die Kommunikation speziell auf die einzelnen Phasen des NDC-Zyklus zugeschnitten sein:

- ▶ **Agenda-Setting:** Diese Phase soll von der öffentlichen Aufmerksamkeit profitieren, die der GST auf globaler Ebene erzeugt hat. Ebenso soll sie und vom Beginn des nationalen NDC-Prozesses profitieren. Die Medien und die Öffentlichkeit im Allgemeinen sind die wichtigsten Adressaten für die Kommunikation auf nationaler Ebene. In dieser Phase sollten die Botschaften einfach gehalten werden, da eine geringere Komplexität eine bessere Aufnahme durch die Zielgruppen ermöglicht. Um die ausschließlich kollektiven Informationen, die im Rahmen der globalen Bestandsaufnahme gewonnen wurden, zu kontextualisieren, sollten externe Quellen für solide länderspezifische Informationen genutzt werden. Diese sollen dem Standard der "besten verfügbaren Wissenschaft" entsprechen.
- ▶ **Politikformulierung:** In dieser Phase sollte die Kommunikation auf die zuständige Behörde – je nach Land auf Fachministerien oder gesetzgebende Organe – und auf Schlüsselpersonen innerhalb dieser Behörden gerichtet sein. In dieser Phase sind umfassendere und komplexere Botschaften erforderlich. Beispiele für bewährte Verfahren, die während der technischen Phase der globalen Bestandsaufnahme zusammengestellt wurden, können sich als besonders nützlich erweisen.
- ▶ **Entscheidungsfindung:** Um sicherzustellen, dass ambitionierte Maßnahmen beschlossen werden, sollte der Fokus auf Entscheidungsträgerinnen und Entscheidungsträger gerichtet werden. Der Grad der Komplexität der Botschaft hängt von diesen Personen ab, d.h. davon, ob sie Teil der Ministerialbürokratie sind oder ob es sich um Bürgerinnen und Bürger handelt, die in einem Plebiszit abstimmen. In dieser Phase ist es auch von entscheidender Bedeutung, dass die Kommunikation von Interessengruppen innerhalb des Landes stammt, um die Legitimität der Botschaft zu maximieren.

Umgang mit den Eingaben für die zweite globale Bestandsaufnahme

Im Vorfeld des zweiten GST werden umfangreiche Informationsquellen zur Verfügung stehen, darunter auch die Berichte, die von den Vertragsparteien unter dem Erweiterten Transparenzrahmens vorgelegt werden. Um die Beiträge zum zweiten GST effektiv zu verarbeiten, sollten Forschende, Vertragsparteien und Nichtregierungsorganisationen jene Informationen analysieren, die zwischen den Vertragsparteien vergleichbar sind, sowie Informationen, die für die Aktualisierung von NDCs und die Ausarbeitung neuer NDCs besonders nützlich sind. Die Ergebnisse dieser Analyse sollten in den Leitlinien für die Eingaben für die zweite globale Bestandsaufnahme berücksichtigt werden.

1 Introduction

Under the Paris Agreement, the Global Stocktake (GST) periodically assesses the collective progress towards achieving the purpose of the Agreement and its long-term goals. The outcome of this process shall inform Parties to the Paris Agreement in updating and enhancing their actions and support, as well as in enhancing international cooperation for climate action (Paris Agreement, UNFCCC 2015, Article 14).

The first Global Stocktake

The first GST was conducted in the period from 2021 to 2023. In a first phase, information was collected on the status of greenhouse gas emissions, mitigation actions and the overall impact of Nationally Determined Contributions (NDCs) as well as on how climate action could be increased. In addition, information on the status of and opportunities to increase adaptation efforts, finance flows aligned with the Paris Agreement's long-term goals, and means of implementation was collected. Information on specific barriers and challenges for developing countries, and opportunities for international cooperation were also gathered.

The information collected was assessed and discussed during a technical dialogue consisting of workshops, roundtables and other events with representatives from Parties and non-Party stakeholders. The technical dialogue took place in three parts in June 2022, November 2022 and June 2023. While the focus of the first part was on the information base and gaps in information, the second part identified how to bridge gaps and shift the focus to implementation. The third part of the technical dialogue focused on next steps, including how to increase collective efforts towards achieving the goals of the Paris Agreement (UNFCCC 2023b).

The first GST concluded with the 'consideration of outputs' phase in the run up and during the Dubai climate change conference in December 2023. During this conference, Parties formulated the output of the GST in the form of a decision of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA). This CMA decision (1/CMA.5, UNFCCC 2023a) constitutes a consensus of all Parties on collective progress made so far under the Paris Agreement, and on the way forward to increase action and support to effectively address climate change.

Support for the first Global Stocktake

The project commissioned by the German Environment Agency 'Technical and political support for the first Global Stocktake' accompanied all phases of the GST. The focus of the project was on the thematic area of mitigation. The overall objective was to contribute to ensuring that the results of the GST have an impact and that more ambitious NDCs are submitted in 2025. Furthermore, the results of the work were used as an input for the German Foreign Office and the EU in the international climate negotiations.

Contents of this final report

This final report provides the main results of this project. It presents the key results and messages from the various work packages, discusses their relevance for the process of the first GST and presents conclusions for the follow-up of the first and preparation of the second GST.

Chapter 2 focuses on inputs to the GST, namely submissions by Parties and non-Party stakeholders as well as reports by the Secretariat of the United Nations Convention on Climate Change (UNFCCC), by independent researchers and by non-governmental and intergovernmental organisations. The chapter summarises the inputs which were assessed during the project and the key messages which were derived from these inputs. It discusses how these messages were taken up during the technical dialogue and in the final CMA decision, and it

addresses implications for future work. The chapter also summarises three publications which were produced under this project based on the inputs to the GST:

- ▶ Options for the political phase of the Global Stocktake;
- ▶ Addressing equity in the Global Stocktake; and
- ▶ Transformative mitigation actions as an outcome of the Global Stocktake.

Chapter 3 of this final report presents an analysis of collective progress, which was conducted during the project. It presents the distributions of greenhouse gas emissions per capita and changes in emissions across countries. Such distributions are presented at total and sectoral levels, and they can complement existing analyses of greenhouse gas emissions. This approach shows that not all countries are equal while simultaneously maintaining the GST requirement of assessing collective progress. It helps to define the performance of laggard or frontrunner countries and visualise sectoral progress.

Chapter 4 presents the work on how to leverage the outcome of the GST. It provides an overview of possible actions to maximize the outreach related to the first GST for future climate policy and especially for the next round of NDCs starting in early 2025. A communication model is used which distinguishes between the role of the sender and recipient as well as the tone, channel and content of the messages.

In chapter 5, the work done in this project is discussed in the light of the outcomes of the GST. In particular, the handling of inputs to the GST, the support of the mitigation theme during the GST and the role of independent research in informing the GST are addressed.

2 Analysis of inputs to the Global Stocktake

2.1 Information on collective progress

The GST assesses collective progress of all Parties towards the goals of the Paris Agreement, rather than focussing on individual Parties. Information on such progress is generally not available in national reports, but is compiled by the UNFCCC Secretariat, by independent researchers and by non-governmental and intergovernmental organisations.

As already stated in the introduction, this project focused on the thematic area of mitigation, i.e., on greenhouse gas emission reductions and progress towards the temperature goal of the Paris Agreement.

2.1.1 Overview of inputs assessed under this project

A wide range of sources provided information on the progress towards greenhouse gas emission reductions. These include synthesis reports by the UNFCCC Secretariat and constituted bodies under the UNFCCC, reports by the Intergovernmental Panel on Climate Change (IPCC), reports on gaps in ambition and implementation and on projected greenhouse gas emissions. The following table provides an overview of these reports and studies.

Table 1: Information sources for collective progress

Title and link. Reports are listed in chronological order.
Synthesis reports by the UNFCCC Secretariat and constituted bodies under the UNFCCC
UNFCCC Secretariat (2021), Nationally determined contributions under the Paris Agreement. Revised synthesis report by the secretariat, https://unfccc.int/documents/307628 and https://unfccc.int/documents/309619
UNFCCC Secretariat (2021), National greenhouse gas inventory data for the period 1990–2019, https://unfccc.int/documents/306767
UNFCCC Secretariat (2022), Synthesis report for the technical assessment component of the first global stocktake: State of greenhouse gas emissions by sources and removals by sinks and mitigation efforts undertaken by Parties, https://unfccc.int/documents/461466
UNFCCC Secretariat (2022), Synthesis report on the overall effect of Parties' NDCs and overall progress made by Parties towards the implementation of their NDCs, https://unfccc.int/documents/461517
Consultative Group of Experts (2022), Constituted Body GST synthesis report: Consultative Group of Experts Input to the technical assessment of the global stocktake, https://unfccc.int/documents/461732
Technology Executive Committee (2022), Constituted Body GST synthesis report: Information on matters related to technology development and transfer, https://unfccc.int/documents/461611
UNFCCC Secretariat (2022), Nationally determined contributions under the Paris Agreement – Synthesis report by the secretariat, https://unfccc.int/documents/619180
UNFCCC Secretariat (2022), Long-term low-emission development strategies – Synthesis report by the secretariat, https://unfccc.int/documents/619179
Reports of the IPCC
IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P.

Title and link. Reports are listed in chronological order.

Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, doi:10.1017/9781009157896, <https://www.ipcc.ch/report/ar6/wg1/>.

IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. Doi: 10.1017/9781009157926, <https://www.ipcc.ch/report/ar6/wg3/>

IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp., doi: 10.59327/IPCC/AR6-9789291691647, <https://www.ipcc.ch/report/ar6/syr/>.

Reports on gaps in ambition and implementation

UN Environment Programme DTU (2021), UNEP Emissions Gap Report 2021, <https://www.unep.org/resources/emissions-gap-report-2021>

Climate Action Tracker (2021), Glasgow's 2030 credibility gap: net zero's lip service to climate action, <https://climateactiontracker.org/publications/glasgows-2030-credibility-gap-net-zeros-lip-service-to-climate-action/>

Climate Resource (2021), Updated warming projections for NDCs, long-term targets and the methane pledge. Making sense of 1.8°C, 1.9°C and 2.7°C, <https://www.climate-resource.com/tools/ndcs>

PBL (2021), Climate Pledge NDC Tool, <http://www.pbl.nl/indc>

Friedlingstein et al. (2021), Global Carbon Budget update 2021, <https://essd.copernicus.org/preprints/essd-2021-386/>

Boehm et al. (2021), State of Climate Action Report, <https://www.wri.org/research/state-climate-action-2021>

Meinshausen et al. (2022), Realization of Paris Agreement pledges may limit warming just below 2 °C, <https://www.nature.com/articles/s41586-022-04553-z>

UNDP, The State of Climate Ambition, <https://climatepromise.undp.org/state-of-climate-ambition>

World Meteorological Organization (2022), United in Science, https://public.wmo.int/en/resources/united_in_science

Climate Action Tracker (2022), CAT Climate Target Update Tracker 2022, <https://climateactiontracker.org/climate-target-update-tracker-2022/>

Peterson, L. (2022), Determining climate ambition, https://ndc-aspects.eu/sites/default/files/2022-08/Deliverable_4_1_final.pdf

Boehm et al. (2022), State of Climate Action 2022, <https://www.wri.org/research/state-climate-action-2022>

UNEP (2022), UNEP Emissions Gap Report 2022, <https://www.unep.org/resources/emissions-gap-report-2022>

Friedlingstein et al. (2022), Global Carbon Budget 2022, <https://essd.copernicus.org/articles/14/4811/2022/>

Title and link. Reports are listed in chronological order.**Papers and reports on projected greenhouse gas emissions**

Ou et al. (2021), Can updated climate pledges limit warming well below 2°C?, <https://doi.org/10.1126/science.abl8976>

Nascimento et al. (2021), Greenhouse Gas Mitigation Scenarios for Major Emitting Countries. Analysis of Current Climate Policies and Mitigation Commitments: 2021 Update, <https://newclimate.org/2021/10/07/ghg-mitigation-scenarios-for-major-emitting-countries-analysis-of-current-climate-policies-2021-update/>

Kuramochi et al. (2020), Beyond national climate action: the impact of region, city, and business commitments on global greenhouse gas emissions. In: Climate Policy 20, 275–291, <https://www.tandfonline.com/doi/full/10.1080/14693062.2020.1740150>

Hoehne et al. (2021), Wave of net zero emission targets opens window to meeting the Paris Agreement, <https://doi.org/10.1038/s41558-021-01142-2>

International Energy Agency (2022), Breakthrough Agenda Report 2022, <https://www.iea.org/reports/breakthrough-agenda-report-2022>

International Energy Agency (2022), Achieving Net Zero Heavy Industry Sectors in G7 Members, <https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members>

Den Elzen, M. (2022), Updated nationally determined contributions collectively raise ambition levels but need strengthening further to keep Paris goals within reach, <https://link.springer.com/article/10.1007/s11027-022-10008-7>

Nascimento et al. (2022), Greenhouse Gas Mitigation Scenarios for Major Emitting Countries. Analysis of Current Climate Policies and Mitigation Commitments: 2022 Update, <https://newclimate.org/resources/publications/emissions-scenarios-for-major-economies-2022-update>

International Energy Agency, World Energy Outlook 2022, <https://www.iea.org/reports/world-energy-outlook-2022>

Geden et al. (2023), State of Carbon Dioxide Removal, <https://www.stateofcdr.org/>

Other reports

UNFCCC Secretariat (2021), Climate action pathways, https://unfccc.int/climate-action/marrakech-partnership/reporting-and-tracking/climate_action_pathways

Romanello et al., The Lancet countdown on health and climate change, [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(22\)01540-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01540-9/fulltext)

2.1.2 Key messages from the information on collective progress

The documents listed in Table 1 included, inter alia, the following key messages on collective progress related to mitigation:

- ▶ Current NDCs are insufficient to reduce greenhouse gas emissions in line with pathways consistent with 1.5°C warming.
- ▶ Collectively, Parties will not achieve their NDC targets with the mitigation actions which are currently implemented and planned.
- ▶ Technologies to reduce greenhouse gas emissions are available in every sector, and their costs have been decreasing significantly.

These messages were reflected in many submissions by non-Party stakeholders and in several submissions by Parties as well (cf. section 2.2 for more information on these submissions). Very similar messages were also discussed and included in the outcomes of the technical dialogue under the GST:

2.1.3 Reflections on collective progress in the technical dialogue

In the synthesis report by the co-facilitators of the technical dialogue (UNFCCC 2023b), the gap between current NDCs and emission pathways aligned with 1.5°C is addressed in key finding 4 (paragraphs 92 to 100). While the report acknowledges that implementation of the Paris Agreement has led to significant reductions in projections of future global warming, it details the gap between projected GHG emissions according to current NDCs and emissions pathways from the Sixth IPCC Assessment Report.

The synthesis report of the technical dialogue also identifies an implementation gap between current mitigation policies and actions and the targets and pledges included in the NDCs. It does not put a specific focus on this gap. However, it focuses on the need to update current NDCs and submit ambitious new NDCs and discusses how mitigation actions can and must be strengthened across various sectors.

The technologies to reduce greenhouse gas emissions are addressed in key finding 3 (paragraphs 87 to 91) and key finding 6 (paragraphs 112 to 130). This key finding states that ‘systems transformations generate many opportunities, but rapid change can be disruptive.’ It also makes the link to equity, by stating that a focus on inclusion and equity can increase ambition in climate action and support.

2.1.4 Reflections on collective progress in the CMA decision on the Global Stocktake

The messages on collective progress were further discussed in the consideration of outputs phase of the GST, which took place in the run up and during the climate change conference in Dubai in November-December 2023. In the final CMA decision on the GST (UNFCCC 2023a), collective progress in the area of mitigation is addressed in section II.A (paragraphs 18 to 25). The CMA decision acknowledges significant collective progress compared to projections prior to the adoption of the Paris Agreement but notes with concern that current NDCs would not substantially reduce greenhouse gas emissions by 2030.

In the decision on the GST, the CMA also notes with concern a gap in the implementation of NDCs and resolves to take action to urgently address this gap. Finally, it expresses with concern another aspect of insufficient progress in greenhouse gas emission reductions, namely that ‘that the carbon budget consistent with achieving the Paris Agreement temperature goal is now small and being rapidly depleted’.

In the CMA decision, the reflections on collective progress are included in the same section as the guidance to Parties for updating their NDCs in the area of mitigation (paragraphs 28 to 42), Hence the key messages on the insufficient ambition of current NDCs and on the implementation gap feature prominently in a key section of the decision on the GST.

2.1.5 Implications for future work

The findings of the GST on collective progress highlight the importance of communicating and implementing more ambitious NDCs. While Parties are directly responsible for further updating their current NDCs and developing new NDCs by 2025, non-Party stakeholders such as NGOs and researchers will continue to play an important role in analysing new NDCs and monitoring collective progress.

Although section II.A of the CMA decision on the GST addresses both collective progress (backward-looking) and guidance for new NDCs (forward-looking), the links between the backward- and forward-looking elements are not that evident. The linking of these elements is an issue of political controversy related to equity considerations which is difficult to resolve. Nevertheless, information on collective progress could be analysed more systematically, in order to be able to give more specific guidance to Parties how to react to gaps in ambition and implementation.

An example of presenting backward-looking information that can be used to inform the development of new NDCs is the presentation of performance distributions (cf. chapter 3, below). In the second GST, information on emission reductions achieved by Parties should be used more actively as good practice examples that can be followed by other Parties.

In this context, it may be beneficial for the second GST to put less emphasis on *collective* progress and to highlight more strongly the approaches that led to progress made by individual Parties. Although the concept of collective progress is an important element of Article 14 of the Paris Agreement, the urgency of stepping up climate action will require Parties to address individual progress more thoroughly and learn from positive examples from other Parties. As an example, the performance distribution approach (cf. chapter 3) allows assessing individual progress in the context of collective progress.

2.2 Submissions under the Global Stocktake

Parties and Non-Party Stakeholders were invited to submit their views under i) the information collection and preparation component for consideration in the three sessions of the Technical Dialogue of the first Global Stocktake and ii) the consideration of outputs component of the first Global Stocktake regarding its general approach and its specific elements.

- ▶ Technical Dialogue: A general call for inputs from Parties and Observer States, UN Agencies and other International Organizations and Non-Party Stakeholders and Observer Organizations had three deadlines for the different sessions of the first dialogue with a final deadline for the third session on June 1st 2023.¹
- ▶ Consideration of Outputs: Views on the approach to the consideration of outputs component of the first global stocktake were invited with the deadline February 15th 2023.
- ▶ Consideration of Outputs: Views from Parties and non-Party stakeholders on the elements for the consideration of outputs component taking into account the informal note by the co-chairs were invited with the deadline September 15th 2023.

An overview on the number of total submissions under these three calls for submissions is provided in the following table.

¹ Deadlines are those given in the Submission Portal. Entities submitted inputs after these deadlines as §19 in decision 19/CMA.1 specifies that inputs should be submitted at least 3 months before their consideration in the technical assessment.

Table 2: Overview on Submissions to the First GST

Title	Deadline	No. of Submissions by					Total
		Party	UN System	IGOs	NGOs	NAE	
Views on the approach to the consideration of outputs component of the first global stocktake	15.02.23	20	6	1	17	n.a.	44
Technical Dialogue: Call for inputs from Parties and observer States, UN Agencies and other international organizations and non-Party Stakeholders and observer Organizations, to the first global stocktake	01.06.23	33	16	23	175	33	280
Views from Parties and non-Party stakeholders on the elements for the consideration of outputs component taking into account the informal note by the co-chairs available at https://unfccc.int/documents/630104	15.09.23	29	5	2	33	5	74
Total		82	27	26	225	38	398

Source: Own compilation based on UNFCCC Submission Portal, <https://www4.unfccc.int/sites/submissionsstaging/Pages/Home.aspx> and Global Stocktake Information Portal, https://unfccc.int/topics/global-stocktake/information-portal?field_document_topic_target_id=All&field_document_type_target_id=4188.

Deadlines are those given in the Submission Portal. Entities submitted inputs after these deadlines as §19 in decision 19/CMA.1 specifies that inputs should be submitted at least 3 months before their consideration in the technical assessment. Some inputs were submitted even later.

2.2.1 Submissions analysed

The timing of the analysis of submissions was organised according to the GST process and negotiation schedule. A priority objective was to support German and EU negotiators with overviews and highlights from the submissions just in time prior to consultation meetings. Due to the huge total number of submissions, a prioritisation was made with the result to focus on Party submissions as well as some selected other submissions.

Furthermore, the analysis of submissions informed the discussion papers on “Options for the political phase of the Global Stocktake” and “Addressing equity in the Global Stocktake” described below.

2.2.1.1 Submissions to the Technical Dialogue of the first GST

Decision 19/CMA.1, paragraph 19 requested the Chairs of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation to issue a call for the inputs referred to in paragraphs 36 and 37 of the same decision. A total of more than 280 inputs were submitted between December 2021 and November 2023 (after the official submission deadline June 1st 2023). Submissions were analysed prior to each of the three sessions of the Technical Dialogue of the first GST. Due to the high total number, not all submissions could be dealt with in equal detail. A total of 38 submissions was selected (table 3, table 4) for a detailed analysis. In order to cover at least the huge and rich variety of submissions in the collection phase of the

First Technical Dialogue, all other of the submissions before an internal cut-off date (May 26th 2023) were covered to the extent of summarizing their main areas as a bullet point list.

Table 3: Overview on numbers of submissions analysed in this project for the technical dialogue of the first GST

Call for inputs to the first global stocktake	No. of submissions analysed				
	Party	UN System	IGOs	NGOs	NAE
Third Session of the Technical Dialogue of the first GST (TD1.3)	4	0	2	0	0
Second Session of the Technical Dialogue of the first GST (TD1.2)	11	1	1	1	2
First Session of the Technical Dialogue of the first GST (TD1.1)	13	1	2	0	0
Total: 38	28	2	5	1	2

Source: Own compilation.

Submissions were analysed regarding:

- ▶ Statements on necessary level of ambition, incl. carbon budget,
- ▶ Type of gaps covered (e.g. ambition gap, implementation gap, information gap),
- ▶ GST process/design,
- ▶ Statements on opportunities/barriers and how to exploit/overcome them,
- ▶ Recommendations on policies and measures,
- ▶ For submissions by Parties: Statements on plans for further mitigation actions,
- ▶ other issues.

Table 4: List of submissions to the information collection and preparation component for the three sessions of the first Technical Dialogue analysed in this project

Session	Submitted by, submission date and link
TD1.3	United States of America, 24.04.2023 Link: United States' Submission on the Third Technical Dialogue of the First Global Stocktake -- April 2023
TD1.3	Russian Federation, 09.03.2023 Link: RU Submission GST p6 Feb 2023 EN 230301
TD1.3	Ghana on behalf of Climate Vulnerable Forum, 06.06.2023 Link: CVF Submission to the GST
TD1.3	China, 01.12.2022 Link: China's Submission on the Global Stocktake
TD1.3	International Energy Agency (IEA), 08.03.2023 Link: IEA Updated Submission to the First Global Stocktake

Session	Submitted by, submission date and link
TD1.3	Organisation for Economic Co-operation and Development (OECD), 06.03.2023 Link: 2023.02 — Inputs to the Global Stocktake
TD1.2	Bolivia on behalf of LMDC, 10.11.2022 Link: LMDC GST TD2 Submission
TD1.2	African Group of Negotiators, 7.11.2022 Link: AGN Submission on GST
TD1.2	United Kingdom, 28.10.2022 Link: UK GST submission - final
TD1.2	Colombia on behalf of AILAC, 21.10.2022 Link: AILAC Submission on GST TD1.2
TD1.2	Norway, 19.10.2022 Link: Norway second submission GST
TD1.2	Japan, 12.08.2022 Link: Japan Global Stocktake Submission 220810
TD1.2	Iceland, 05.08.2022 Link: Global Stocktake Submission Iceland August 2022
TD1.2	United States of America, 08.06.2022 Link: United States GST Submission final
TD1.2	Alliance of Small Island States, 08.06.2022 Link: AOSIS CC GST
TD1.2	Pakistan on behalf of the G77 and China, 05.06.2022 Link: G77 and China input to GST
TD1.2	Bhutan on behalf of Bhutan and Nepal, 01.06.2022 Link: Joint submission Bhutan Nepal GST
TD1.2	International Renewable Energy Agency (IRENA), 05.08.2022 Link: IRENA Submission Global Stocktake August 2022
TD1.2	OECD / IEA Climate Change Expert Group, 03.08.2022 Link: OECD-IEA Climate Change Expert Group Submission to the First Global Stocktake
TD1.2	Wuppertal Institute on behalf of The NDC ASPECTS Project Consortium, 10.08.2022 Link: 20220805 NDC ASPECTS GST submission
TD1.2	High-Level Champions, 08.08.2022 Link: 20220805 HLCs Updated submission TD1-2
TD1.2	Under2 Coalition, 08.08.2022 Link: Under2 Coalition Submission to GST 20220805
TD1.1	Zambia on behalf of the African Group of Negotiators (AGN), 18.05.2022 Link: AGN Submission by the Republic of Zambia on GST
TD1.1	India on behalf of LMDC, 17.05.2022 Link: Submission by India on behalf of LMDC on GST
TD1.1	Senegal on behalf of the Least Developed Countries (LDCs), 06.05.2022 Link: LDC Submission GST 20220506

Session	Submitted by, submission date and link
TD1.1	Canada, 29.04.2022 Link: Submission by Canada -- First Technical Dialogue under the Global Stocktake
TD1.1	Kuwait on behalf of Arab Group, 28.04.2022 Link: Arab group submission GGA- GST TED1
TD1.1	Kenya, 07.04.2022 Link: Kenya's Submission on Response Measures
TD1.1	Australia, 01.04.2022 Link: Australia's Submission to the UNFCCC -- GST First Technical Dialogue -- Final 31 March 2022
TD1.1	EU, 28.03.2022 Link : FR-2022-03-28 Soumission UE Bilan Mondial
TD1.1	Norway, 24.03.2022 Link: Submission input from Norway to GST 24.03.22
TD1.1	Indonesia, 21.03.2022 Link: Indonesia Submission on First GST 2022 FINAL
TD1.1	Switzerland on behalf of the Environmental Integrity Group (EIG), 16.03.2022 Link: EIG Submission of inputs to the Global Stocktake
TD1.1	Russian Federation, 04.03.2022 Link: https://www4.unfccc.int/sites/SubmissionsStaging/Documents/202203041421---RU%20Submission%20Response%20Measures%20Feb%202022%20(ENG).pdf
TD1.1	Iceland, 28.02.2022 Link: Global Stocktake Cryosphere Iceland FEB2022
TD1.1	IEA, 09.03.2022 Link: IEA The First Global Stocktake
TD1.1	OECD, 07.03.2022 Link: 2022.02-OECD-Inputs-to-the-Global-Stocktake
TD1.1	GCAP -- UNFCCC Global Climate Action Portal, 28.02.2022 Link: https://unfccc.int/sites/default/files/resource/GCAP%20Synthesis%20Report_Info%20as%20at%2028%20Feb%202022.pdf

Source: Own compilation.

2.2.1.2 Submissions to the Consideration of Outputs Phase

For the preparation of the Consideration of Outputs, two streams of submissions on the general approach and on specific elements have been invited with submission deadlines on February 15th 2023 and September 15th 2023, respectively.

During the COP27 climate change conference in Sharm El-Sheikh in November 2022, the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) acknowledged the need to prepare for the consideration of outputs component of the first global stocktake (FCCC/SBI/2022/20, para 51)². The call for submissions

² Report of the Subsidiary Body for Implementation on its fifty-seventh session, held in Sharm el-Sheikh from 6 to 12 November 2022, FCCC/SBI/2022/20, <https://unfccc.int/documents/626552>

by 15 February 2023 provided an opportunity for Parties to present their views and suggest ways how the consideration of outputs should be organised, and how these outputs should be designed. Including a number of submissions after the official deadline, 17 of the 20 Party submissions have been covered in the analysis with a cut-off date of April 4th 2023 which was already beyond the official submission deadline (Table 5). The cut-off date was decided in order to prepare the analysis as support for German and EU negotiators in time for an intersessional consultation in a hybrid format in April 2023 which was held by SBSTA and SBI chairs.

The analysis focused on

- ▶ Highlights of the submissions,
- ▶ Conflict / controversies mapped out in the submissions,
- ▶ Overview on other issues covered in the submissions.

Table 5: Party submissions analysed on the approach to the consideration of outputs phase, February 2023 deadline

Submitted by, submission date and link
Switzerland on behalf of the Environmental Integrity Group, 06.04.2023 Link: EIG Submission on the Global Stocktake Consideration of outputs phase final
Colombia on behalf of AILAC, 04.04.2023 Link: Submission GST – AILAC f
Saudi Arabia on behalf of LMDC , 26.03.2023 Link: LMDC Consideration of Outputs Submission Final
United States of America, 23.03.2023 Link: USA GST Submission
Cuba on behalf of the Group of 77 and China, 22.03.2023 Link: G77 GST Submission Mar 2023
Australia, 17.03.2023 Link: GST Submission – Australia – March 17 2023
Senegal on behalf of Least Developed Countries, 09.03.2023 Link: LDC Group – GST-Final Feb 2023
Samoa on behalf of AOSIS, 08.03.2023 Link: AOSIS GST arrangements consideration of outputs
African Group of Negotiators (AGN), 08.03.2023 Link: Submission by the Republic of Zambia on behalf of the African Group of Negotiators (AGN) on GST 8 March 2023
Brazil on behalf of ABU, 06.03.2023 Link: fev2023 ABU GST Submission
Algeria on behalf of Group Arab States, 01.03.2023 Link: GST Submission ArabStates_15February2023FINAL
China, 27.02.2023 Link: Chinas Submission on the Approach to the Consideration of Outputs Component of the First Global Stocktake

Submitted by, submission date and link

Norway, 24.02.2024

Link: [Norway 3 GST consideration of output component](#)

United Kingdom, 17.02.2023

Link: [UK GST Submission February 2023](#)

Japan, 15.02.2023

Link: [Japan_GST submission on consideration of output_20230215](#)

Russian Federation, 15.02.2023

Link: [RU Submission GST.p8 Feb 2023 \(ENG\)](#)

Republic of South Africa, 10.02.2023

Link: [South Africa Feb 2023 submission on the GST](#)

Source: Own compilation.

Another set of submissions was invited to present views on the elements for the consideration of outputs component (mandated in FCCC/SBI/2023/10 and FCCC/SBSTA/2023/4). SBSTA and SBI chairs were requested to convene an intersessional in-person workshop in October 2023 to develop these elements. 23 of the 29 Party submissions, including a majority of submissions after the official deadline, have been covered in the analysis with an internal cut-off date of October 2nd 2023 (table 6). The cut-off date was selected in order to prepare the analysis as support for German and EU negotiators just in time for the intersessional workshop.

The analysis focused on the submission sections on:

- ▶ Mitigation
- ▶ Response measures
- ▶ Context and cross-cutting considerations
- ▶ International Cooperation
- ▶ Guidance and way forward
- ▶ Other issues

Each focus section identified key asks (what seemed to be most important to the submitting entity) and an indication of their red lines.

Table 6: Party submissions analysed on the elements for the consideration of outputs phase, September 2023 deadline

Submitted by, submission date and link

Cuba on behalf of G77 and China, 02.10.2023

Link: [G77 GST Submission Sept 2023](#)

New Zealand, 25.09.2023

Link: [New Zealand submission on the outcome of the first Global Stocktake September 2023](#)

United Kingdom, 22.09.2023

Link: [United Kingdom GST Submission September 2023](#)

Submitted by, submission date and link

Brazil on behalf of Brazil, South Africa, India and China (BASIC), 22.09.2023

Link: [Sep 2023 BASIC GST submission](#)

African Group of Negotiators (AGN), 22.09.2023 and update 27.09.2023

Link: [Submission by the Republic of Zambia on behalf of the Africa Group of Negotiators on GST CMA Elements and Updated AGN Submission](#)

Türkiye, 21.09.2023

Link: [Türkiye GST Submission September 2023](#)

Switzerland on behalf of the Environmental Integrity Group, 21.09.2023

Link: [EIG Submission on the Global Stocktake Consideration of outputs 2023](#)

Senegal on behalf of Least Developed Countries, 21.09.2023

Link: [LDC Group Submission_GST Final_Sept2023](#)

Algeria on behalf of Arab Group, 21.09.2023

Link: [GST Submission by Algeria on behalf of Group Arab States_20September2023\[FINAL\]](#)

Australia, 20.09.2023

Link: [GST submission – Australia – 20 September 2023](#)

Guatemala on behalf of AILAC, 20.09.2023

Link: [20092023 AILAC – Consideration of Outputs – GST](#)

Nepal, 20.09.2023

Link: [Nepal GST Submission](#)

Chile on behalf of Chile, Colombia, Honduras, Monaco, Peru, the Republic of Korea and the United Kingdom, 20.09.2023

Link: [Ocean GST submission 20 sept 2023](#)

China, 20.09.2023

Link: [China – Submission on the Elements for the Consideration of Outputs Component of Global Stocktake](#)

Samoa on behalf of AOSIS, 20.09.2023

Link: [Final AOSIS Submission Sept 2023 GST 1 – Consideration of Outputs Phase](#)

Saudi Arabia on behalf of the LMDC, 19.09.2023

Link: [LMDC GST Consideration of Outputs Submission Final 19092023](#)

Norway, 19.09.2023

Link: [Norway GST consideration of outputs](#)

Russian Federation, 18.09.2023

Link: [RU Submission GST outputs component \(ENG\)](#)

Brazil on behalf of ABU, 18.09.2023

Link: [ABU Submission \(Word file only\)](#)

United States of America, 16.09.2023

Link: [US GST Submission September 2023](#)

Indonesia, 15.09.2023

Link: [INDONESIA Elements for Consideration of the Outputs Component](#)

India, 15.09.2023

Link: [India Submission – Consideration of Outputs of the First Global Stocktake](#)

Submitted by, submission date and link

Japan, 15.09.2023

Link: [The Government of Japan GST Submission](#)

Source: Own compilation.

2.2.2 Outputs and main messages

In this project, three internal working documents were prepared as outputs to support German and EU negotiators with overviews and highlights from the submissions prior to consultation meetings:

- ▶ A tabular compilation summarizing main points of selected submissions and an overview of main issues of all other submissions covering TD1.1 and TD1.2,
- ▶ Two compilations in narrative format, one covering TD1.1-TD1.3, and one covering the approach and elements to the consideration of outputs phase.

The submissions under the information collection and preparation component for the three sessions of the technical dialogue included, inter alia, the following key messages related to mitigation:

- ▶ Submissions focus on necessary transitions, on not being collectively on track or not being on track to meet NDC targets. Many state that further efforts are required to achieve the long-term goals of the Paris Agreement, and some that enhanced NDCs are crucial. Many identify and describe ambition, implementation, support, and information gaps.
- ▶ Submissions often reference the IPCC's Sixth Assessment Report and state that urgent action (rapid, deep and sustained) is needed across thematic areas of the GST and therefore, the first GST outcome must provide a clear political signal. However, there is also a position that the first GST should not introduce country-specific, prescriptive or intrusive requests and outcomes.
- ▶ As the GST is considered crucial to enhance collective ambition, some submissions include calls for net zero by 2050. Several submissions argue for a sectoral approach.
- ▶ Generally, a number of submissions link enhanced mitigation action to equity/fairness considerations and common but differentiated responsibilities and respective capabilities. They call for equity and fairness to be further operationalized.
- ▶ The gap in fulfilling existing commitments and gaps in climate finance in general are seen as a barrier for developing countries.
- ▶ Regarding GST processes, there is a focus on procedural issues for an effective technical dialogue. This includes suggestions for the sequencing of the technical dialogue and for the format and contents of its outputs. The submissions also include various demands to ensure inclusiveness / effective participation of non-Party stakeholders. It is pointed out that the GST outcome should not only take stock but provide guidance to drive ambition and action.

The submissions on the approaches to the consideration of outputs component of the first GST focused, inter alia, on the following:

- ▶ Expectations on the processes including timelines, workshops, high-level events etc. in the run-up to and at COP28 and the roles of the Joint Contact Group and High-Level Committee.

- ▶ Format and content of outcomes/outputs such as outline of a CMA decision, content of a political or presidential declaration, structure and content of a technical annex.
- ▶ Substance such as including a call for raising ambition, guidelines for informing the next round of NDCs in 2025, backward and forward-looking character.
- ▶ How equity/fairness should be considered.

The submissions on the elements for the consideration of outputs component of the first GST focused, inter alia, on the following:

- ▶ Highlighting the assessment of the collective progress in undertaking mitigation, highlighting urgency for implementation of mitigation actions, and highlighting the need for scaling up collective mitigation ambition.
- ▶ Political direction, for example in order to accelerate ambition a towards net zero and to peak global emissions by 2025.
- ▶ Focus on systems transformation across all sectors and contexts required to keep 1.5°C in reach.
- ▶ Parties' reflections on the best available science.
- ▶ Equity considerations and support from developed to developing countries.
- ▶ including a signal to enhance international cooperation.
- ▶ identifying a clear way forward (roadmap) how to consider / implement the results of the first GST, exchange on how GST could inform the next round of updated NDCs.

Some submissions on elements of the consideration of outputs phase included an indicative draft structure for a CMA decision. Some argued for a political signal that points the way to net zero and fossil fuel phaseout, others called for an equity-based approach to fossil fuel phasedown.

2.3 Publications on key issues

During the analysis of inputs to the GST, various issues emerged from publications and submissions, which were of particular relevance for the technical dialogue and/or to the consideration of outputs phase of the GST. Under the project, discussion papers were drafted to contribute to the discussion of these issues. The papers addressed the following topics:

- ▶ Options for the political phase of the Global Stocktake;
- ▶ Addressing equity in the Global Stocktake; and
- ▶ Transformative mitigation actions as an outcome of the Global Stocktake.

In the following, key findings are presented from each of these papers, including a discussion of their relevance for the first GST, and a discussion of subsequent research questions.

2.3.1 Options for the political phase of the Global Stocktake

During 2023, Parties prepared for the political phase of the Global Stocktake, which culminated in the 'consideration of outputs' at the climate change conference in Dubai. The approach for the

consideration of outputs had not been defined beforehand, and Parties were asked to submit their views on how to organise this component (cf. section 2.2).

Key findings of the discussion paper

In a discussion paper developed as part of this project (Moosmann et al. 2023a), two options for the process of the political phase are presented, as shown in the following table. This phase could be organised by thematic area as defined by the GST, i.e., covering mitigation (including response measures or as a separate section); adaptation (including loss and damage or as a separate section); and finance flows, means of implementation and support. Alternatively, the political phase could be structured by sector, with specific guiding questions, meetings and tailored outputs separately for each sector. Table 7 provides an overview of the main finding of this paper.

Table 7: Fulfillment of functions for two options for the political phase of the GST

Function	Option 1: Thematic areas	Option 2: Sectors
Engagement of non-Party stakeholders	Fulfilled	Fulfilled
Taking into account equity and the best available science	Fulfilled	Partly fulfilled
Ensuring balanced high-level participation and visibility	Fulfilled	Partly fulfilled
Ensure that the results of the technical phase effectively inform the political phase	Fulfilled	Partly fulfilled
Ensure that the outcomes can be linked to other process under the Paris Agreement	Fulfilled	Not fulfilled
Effectively informing Parties in enhancing their NDCs	Partly fulfilled	Fulfilled
Enhancing international cooperation on climate action	Partly fulfilled	Fulfilled

Source: Moosmann et al. (2023a).

As shown in Table 7, both options were found suitable for engaging non-Party stakeholders, for taking into account equity and the best available science, for ensuring high-level participation and visibility and for incorporating the results of the technical phase of the GST. Organising the political phase by thematic area possibly was assessed to facilitate high-level participation and visibility and follows the structure of the technical dialogues under the GST, while organising this phase by sector possibly facilitates the information of Parties in enhancing their NDCs, and international cooperation, in specific sectors.

Besides options for the political phase, several types of outputs of the GST were identified, as shown in the following Table 8. These include the cover decision, political declarations or sectoral commitments, one or several CMA decisions, and a technical annex.

Table 8: Types of outputs of the GST

Type of output	Suitability for addressing collective progress	Suitability for providing guidance on increasing ambition and implementation
Cover decision	Suitable	Less suitable
Political declaration	Less suitable	Less suitable

Type of output	Suitability for addressing collective progress	Suitability for providing guidance on increasing ambition and implementation
High level sectoral commitments	Less suitable	Less suitable
Specific CMA decision(s)	Suitable	Suitable
Technical annex	Suitable	Partially suitable

Source: Own compilation, based on Moosmann et al. (2023a).

These types of outputs were non-exclusive, and several of them could be combined. It was found that a CMA decision, combined with a technical annex and sectoral commitments may be most suitable for addressing Parties and non-Party stakeholders with specific, practicable guidance on enhancing ambition and implementation. One single type of output would not necessarily be suitable to address collective progress, to address the need to increase ambition, and provide guidance to Parties.

Relevance for the first Global Stocktake

In the preparation for the consideration of outputs phase of the first GST, the option of organising this phase according to thematic areas was chosen. This option was suggested by many submissions on the organisation of this phase, and several of them argued that such an approach would support functions such as those depicted in Table 7, above.

As far as the outputs of the GST are concerned, it became clear in the run-up to COP28 that the outputs would be in the form of a single CMA decision. The main arguments for focussing on this single output was that the GST output should be Party driven and that time would not be sufficient for Parties to agree on several outputs. The following table provides a simplified summary of the various options and the reasons for selecting or not selecting them.

Table 9: Types of outputs and their selection for the first GST

Type of output	Reasons for selecting/not selecting this type of output
Single CMA decision	This is a format which is routinely discussed and adopted at climate change conferences, and there are good chances that the output will be supported by all Parties.
Political declaration	A political declaration would likely be supported by a smaller number of Parties only.
High level sectoral commitments	Parties may not be ready to agree on sector-specific commitments in the time remaining.
Specific CMA decision(s)	There may not be enough time available to agree on several CMA decisions.
Technical annex	It may not be possible for all Parties to agree on substantial details in a technical annex.

Source: Own compilation.

Future research questions

When the political phase of the second GST is planned ahead of the 2028 deadline, the experience gained during the first GST will help in this planning. From the experience with the preparation and conduction of the political phase of the first GST, the following questions should be further addressed:

- ▶ How can the GST be organised to provide more substantial output to the preparation of the next NDCs, in addition to a CMA decision?
- ▶ How can the GST outputs provide more specific guidance on sector-specific ambition increase in the NDCs?
- ▶ How can the GST build more strongly on the non-negotiated agenda and a follow-up on initiatives?
- ▶ How can the implementation of guidance and results from the first GST in NDCs, work programmes and constituted bodies be reflected in the second GST?

Independent research projects could develop options for answers to these questions, and Parties could then use this information to discuss and agree on a process for the political phase of the second GST.

2.3.2 Addressing equity in the Global Stocktake

The principle of equity plays an important role in the Global Stocktake. Equity is considered in the assessment of where Parties stand collectively, and the Global Stocktake informs Parties how they can increase ambition and address equity in their new NDCs.

For the distribution of mitigation efforts, as well as adaptation actions and means of implementation and support, several competing concepts have been proposed. Depending on the concept action or support may be distributed in different ways between countries, between groups or between individuals. In a discussion paper (Moosmann et al. 2023b) four equity concepts are discussed, as summarised in the following box:

Concepts of equity in the context of addressing climate change

Responsibility: Historical and/or current responsibility is taken into account in the distribution of efforts to address climate change. Cumulative historical greenhouse gas emissions are often used as an indicator (Rajamani et al. 2021).

Capabilities approach: Different capabilities between countries are taken into account when addressing climate change. Gross Domestic Product (GDP) per capita may be used as one indicator to measure capability (Rajamani et al. 2021).

Egalitarianism: Greenhouse gas emissions or a remaining carbon budget are distributed evenly (Baatz and Ott 2015). For the distribution of carbon budgets between countries or between individuals, several options have been proposed, including equal shares per capita of the remaining budget (van den Berg et al. 2020).

Sufficiency / right to subsistence emissions: Ensuring that climate action does not compromise living conditions under a certain threshold (Gesang 2011).

Besides the concepts listed here, the concepts of ‘grandfathering’ and ‘cost optimal allowances’ have also been suggested for the distribution of greenhouse gas emissions (van den Berg et al. 2020). However, we do not address them here because these approaches generally lead to high shares of greenhouse gas emissions for countries with historically high emissions, which cannot be seen as equitable (Rajamani et al. 2021). In general, it should be noted that equitable effort sharing is a normative matter and that many proposed approaches to quantify fair contributions are not value-neutral (Dooley et al. 2021).

Key findings of the discussion paper

For the main thematic areas and topics of the GST, the paper discusses which concepts of equity may be applicable to them. Table 10 provides an overview which concepts are relevant, or partly relevant, to the various thematic areas.

Table 10: Thematic areas of the Global Stocktake and concepts of equity

Thematic area/topic	Responsibility	Capabilities	Egalitarianism	Sufficientarianism
Mitigation	X	X	X	X
Adaptation	(X)	X		(X)
Means of implementation and support	X	X	X	X
Efforts that address social and economic consequences and impacts of response measures	(X)	X		X
Efforts that avert, minimize and address loss and damage associated with the adverse effects of climate change	(X)	X		(X)

X ... The principle is relevant for the thematic area/topic. (X) ... The principle is partly relevant for the thematic area/topic.

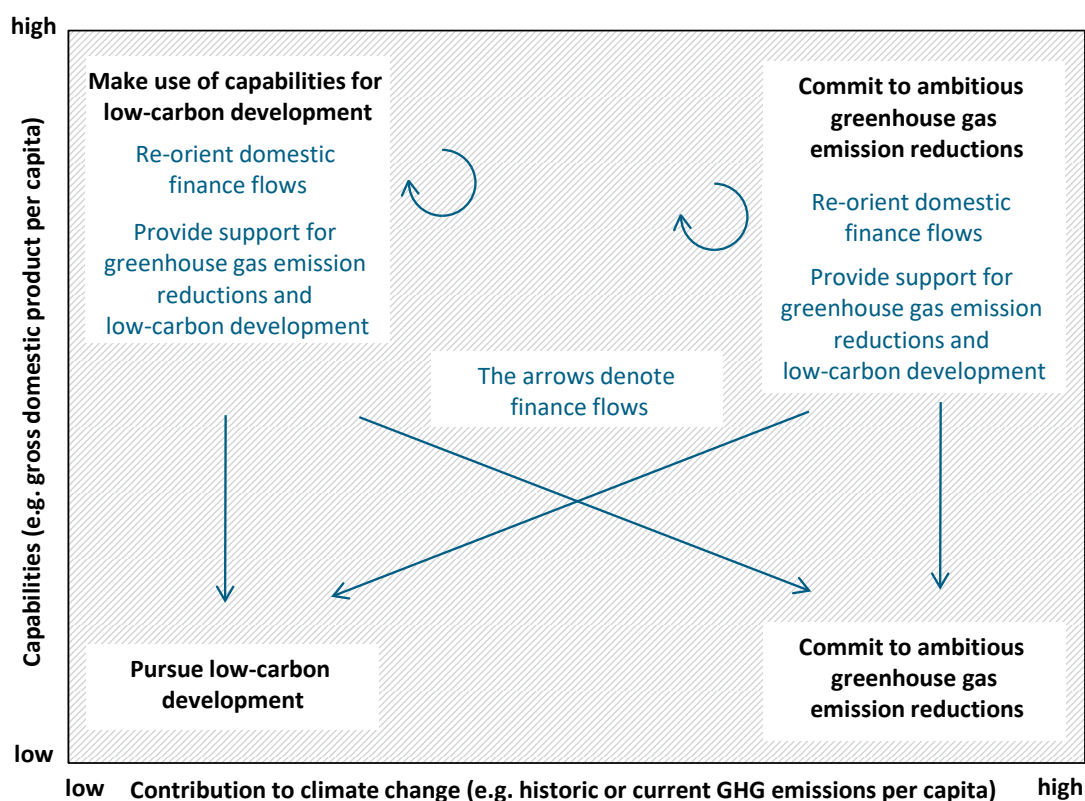
Source: Moosmann et al. (2023b)

Each of these concepts has advantages and drawbacks, and the application of one concept only may not be sufficient to ensure equitable and ambitious climate action. For example, if a remaining budget of per-capita emissions is distributed evenly between all countries, this may cause hardships for countries that do not have the capabilities to decarbonise quickly, while countries with higher capabilities lack an incentive for ambitious emission reductions. In all areas of climate action, it is critical to take into account specific capabilities, which are different from country to country. It is important to use all available capabilities and opportunities and to increase them. Support plays an important role in enhancing and facilitating the use of available capabilities.

Conversely, inequality can prevent countries and individuals from taking climate action. It can reinforce socio-political lock-in and political and economic barriers. No matter whether mitigation or adaptation action is taken, one has to take into account that equitable transformation is context- and society-specific. Overall, a lack of mitigation action will result in increasing climate change impacts which affect vulnerable communities disproportionately.

The paper also discusses how the outputs of the Global Stocktake can be reflected in new NDCs, in particular in the section on the NDCs which explains how the NDC is considered to be fair and ambitious. The following figure shows in a schematic way where the focus of new NDCs could be, depending on how a Party can be characterized with respect to capabilities and contributions to climate change.

Figure 1: Possible focus in new NDCs, depending on capabilities and contributions to climate change



Source: Moosmann et al. (2023b).

As depicted in the figure, countries with a high contribution to climate change should commit to ambitious greenhouse gas emission reductions. Those with limited capabilities should be supported in their efforts. Countries with a low contribution to climate change should focus on a low greenhouse gas emission development. They should make use of available capacities and/or be supported in their efforts.

As also depicted in the figure, the provision of support is not the only relevant finance flow. It will be central for countries to mobilise additional support and to re-orient domestic finance flows in line with the goals of the Paris Agreement.

Relevance of equity for the first Global Stocktake

The discussion paper suggested considering the following points when Parties and other stakeholders reflect equity in the consideration of outputs phase:

- ▶ Acknowledge that different concepts of equity exist. Point out the importance of building trust and making a convincing case that a Party's response to climate change, including its new NDCs, is fair and ambitious.
- ▶ Take into account a country's historic and current contribution to climate change as well as its capabilities for climate action. Explore countries' capabilities for supporting others in taking action.
- ▶ Point out that some egalitarian approaches would result in greenhouse gas emission increases in developing countries at a scale which would not make it possible to keep the 1.5 °C goal within reach. Encourage developing countries to make use of available mitigation

capabilities. Point out the importance of providing support to these countries to help them make use of such capabilities.

- ▶ Acknowledge that inequalities do not only exist between countries, but also between different groups within countries (such as income groups), and Parties need to address such inequalities. Highlight the importance of equity between generations and that, as a consequence, each Party needs to reflect its highest possible ambition in the short-to medium term, including in its new NDCs.
- ▶ Acknowledge that patterns of inequity exist between and within countries that are linked to historical and ongoing colonialism, and governance challenges. Make a convincing case that these inequalities can be addressed in a manner that is perceived as fair and ambitious by providing sufficient support and by highlighting the co-benefits of low-carbon, sustainable development, e.g., for access to clean energy and health.
- ▶ Point out the importance of exploring all opportunities to address climate change, many of which entail significant co-benefits for sustainable development, and of facilitating equal access to these opportunities in all countries.

The discussion paper also suggested that the CMA decision on the GST could also provide guidance on how to better address equity in the new NDCs.

Equity in the technical dialogue

The topic of equity was addressed in several submissions to the GST and discussed during the technical dialogue. In the synthesis report of the co-facilitators of the Global Stocktake (UNFCCC 2023b), equity is central to two of the key findings, namely:

- ▶ Key finding 3 on systems transformations: ‘A focus on inclusion and equity can increase ambition in climate action and support.’
- ▶ Key finding 7 on just transitions: ‘The concept of equity is complex and multidimensional. In discussions at the first TD, diverse views were expressed on dimensions of equity in mitigation. A common thread was that equity should align with an upward spiral of ambition in implementing the Paris Agreement’

Equity in the CMA decision on the Global Stocktake

Interestingly, in the CMA decision on the GST, equity is addressed only in the preambular paragraphs, in the general and cross-cutting section, and in the section on mitigation. Equity is not mentioned in the sections on adaptation, means of implementation and support, loss and damage, response measures, or international cooperation.

The preambular paragraphs and the cross-cutting section of the CMA decision only refer to wording on equity which is already in the Convention and Paris Agreement. The section on mitigation mentions equity in paragraph 26 on modelled pathways that limit warming to 1.5 °C. The CMA notes that ‘that time frames for peaking may be shaped by sustainable development, poverty eradication needs and equity and be in line with different national circumstances’.

Future research questions

The CMA decision mentions equity very sparsely, which is a result of the diverging views of Parties on this topic. The only new context in which equity is mentioned is the context of mitigation pathways, but without providing guidance to Parties how to address equity in this context. With rapidly diminishing global carbon budgets, the question of how to address equity in mitigation should be further addressed in the preparation for the next GST. Equity aspects in

other thematic areas, which were not touched upon at all in the CMA decision, should also be addressed.

Questions that should be addressed include:

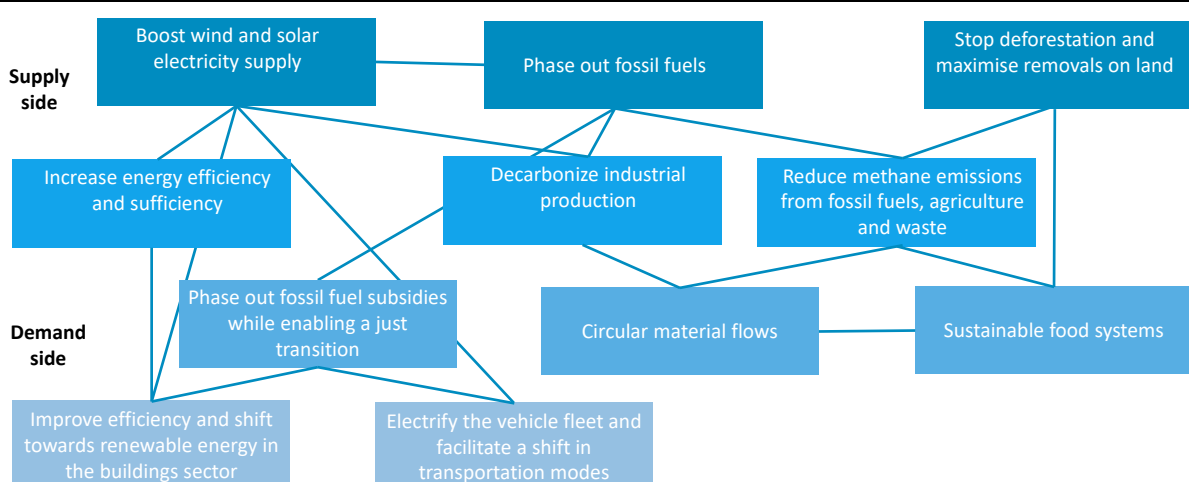
- ▶ How can Parties take into account equity in increasing their ambition in new and updated NDCs?
- ▶ How can Parties with high historic and current greenhouse gas emissions best contribute to climate action and support?
- ▶ How can countries with limited capabilities be supported in reducing greenhouse gas emissions?
- ▶ How can the multiple costs of inaction, which include not only climate impacts but also impacts such as local pollution and high energy bills in many countries, and the multiple benefits of stronger climate action be better reflected and leveraged to enhance ambition?

2.3.3 Transformative mitigation actions as an outcome of the Global Stocktake

The outputs of the GST are key in informing Parties in updating and enhancing their actions and support, as well as in enhancing international cooperation for climate action. In the run-up to the political phase of the GST, many stakeholders called for the inclusion of specific actions which could be taken up by Parties in their subsequent NDCs.

Based on available material, such as research papers and IPCC reports, a discussion paper (Moosmann et al. 2023c) was produced which suggested key mitigation actions which should be included in the outcome of the GST, as shown in the following figure. The discussion paper presents, for each mitigation action, possible target(s), core measures, indicators and other information such as costs and co-benefits.

Figure 2: Suggested key mitigation actions and selected links between them



Note: The mitigation actions are roughly structured between the supply and demand side, although several actions address both supply and demand.

Source: Moosmann et al. (2023c).

Key findings of the discussion paper

The discussion paper pointed out the importance of transformative mitigation actions. Criteria for such actions include:

- ▶ High mitigation potential
- ▶ Low investment and/or lifetime costs
- ▶ Co-benefits
- ▶ Enable a just transition
- ▶ Implementation at various levels

The discussion paper also suggested steps to be taken by Parties, in order to turn the outcomes of the GST into more ambitious mitigation actions, as shown in the following table.

Table 11: Main steps to be taken in response to the Global Stocktake in the area of mitigation

Step	Description
Assess feasibility of proposed actions	For each of the main mitigation actions proposed or included in the outputs of the Global Stocktake, assess how they could be implemented.
Explore additional actions	Explore additional actions which can help mitigate climate change in the national context.
Assess social and economic impacts	Assess social and economic consequences and impacts of these mitigation actions, maximise positive impacts and minimise negative impacts.
Address barriers and enablers	Evaluate barriers and how to overcome them. Evaluate enablers and how to use them.
Set targets and plan mitigation actions	Set targets which correspond to the highest possible ambitions and plan mitigation actions accordingly. Plan targets and implementation: <ul style="list-style-type: none"> - for the time horizon up to 2030; and - for the time horizon up to 2035.
Align with long-term strategies and goals	Ensure that the targets and actions are aligned with any long-term low GHG emission strategy or long-term goal.
Address finance flows	Assess financial resources, support needs (if applicable) and ways of mobilising additional and redirecting current finance flows to implement the mitigation actions.
International cooperation	Assess ways of making use of international cooperation to further increase ambition. Use actions and targets planned by other countries as benchmarks, where relevant.
Update current NDCs (2030 horizon)	Based on the planned mitigation actions, update the mitigation target in the current NDC and communicate an updated NDC.
Prepare new NDCs (2035 horizon)	Define a new mitigation target for the next NDC and communicate it.
Implement the mitigation actions	Implement the mitigation actions in line with the assessment and plan above.

Source: Moosmann et al. (2023c).

Relevance for the first Global Stocktake

The mitigation actions listed in the discussion paper had already been brought forward by other stakeholders, and they were discussed actively in technical dialogue under the GST. In addition,

the COP presidency proposed a global renewable energy target and a global energy efficiency target (Al Jaber 2023), which were included in the final CMA decision.

Rather than listing specific actions, CMA decision 1/CMA.5 on the GST calls on Parties to contribute to a wide range of global efforts. These efforts roughly cover the main mitigation actions which were proposed in the discussion paper, as shown in the following table.

Table 12: Mitigation efforts called for in the GST, and related mitigation actions

Efforts on mitigation in decision 1/CMA.5	Related mitigation actions
<p>Renewable Energy §28(a) Tripling renewable energy capacity globally [...] by 2030</p>	<p>Boost wind and solar electricity supply Increase solar power generation capacity. Increase wind power generation capacity. Develop the electricity grid and storage infrastructure</p>
<p>Energy Efficiency [§28(a) continued:] <i>doubling the global average annual rate of energy efficiency improvements by 2030</i></p>	<p>Increase energy efficiency and sufficiency Introduce national standards for energy efficiency. Support energy efficiency improvements in various sectors of the economy. Public information campaigns on energy efficiency and energy demand reduction.</p>
<p>Coal Power phase-down §28(b) Accelerating efforts towards the phase-down of unabated coal power</p>	<p>Phase out fossil fuels Develop and implement phase-out plans for fossil fuel power plants. Stop new fossil fuel infrastructure projects.</p>
<p>Net zero energy systems §28(c) Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century</p>	<p>Energy-related mitigation actions Increase renewable power generation capacity and develop the electricity grid and storage infrastructure. Foster renewable energy in the building sector. Electrify the vehicle fleet.</p>
<p>Transition away from fossil fuel §28(d) Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science</p>	<p>Mitigation actions related to fuel type Install renewable power generation capacity and develop the electricity grid and storage infrastructure. Foster renewable energy and retrofitting in the building sector. Electrify the vehicle fleet.</p>
<p>Zero- and low- Emission Technologies §28(e) Accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;</p>	<p>Energy and industry-related mitigation actions Install renewable power generation capacity and develop the electricity grid and storage infrastructure. Foster renewable energy in the building sector. Electrify the vehicle fleet. Implement zero-emission technologies in industry.</p>
<p>Non-CO2 emissions §28(f) Accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030</p>	<p>Reduce methane emissions from fossil fuels, agriculture and waste Strengthen regulations for monitoring and leak detection and repair. Provide incentives for low-methane agricultural practices. Replace landfilling by other waste management approaches such as recycling or incineration with energy use. Capture methane emissions from landfills.</p>

Efforts on mitigation in decision 1/CMA.5	Related mitigation actions
<p>Transport §28(g) Accelerating the reduction of emissions from road transport on a range of pathways, including through development of infrastructure and rapid deployment of zero-and low-emission vehicles;</p>	<p>Electrify the vehicle fleet and facilitate a shift in transportation modes Incentivise a shift towards electric vehicles through regulations, pricing schemes or subsidies. Provide charging infrastructure. Expand public transport. Provide an environment for sustainable transportation modes such as walking and cycling.</p>
<p>Fossil fuel subsidies §28(h) Phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible;</p>	<p>Phase out fossil fuel subsidies while enabling a just transition Phase out fossil fuel subsidies. Provide support for alternative fuels. Provide support for alternative transportation modes.</p>
<p>Nature conservation §33 Further emphasizes the importance of conserving, protecting and restoring nature and ecosystems towards achieving the Paris Agreement temperature goal, including through enhanced efforts towards halting and reversing deforestation and forest degradation by 2030, and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and by conserving biodiversity, while ensuring social and environmental safeguards, in line with the Kunming-Montreal Global Biodiversity Framework;</p>	<p>Stop deforestation and maximise removals on land Prevent deforestation. Support reforestation with a long-term perspective. Expand conservation areas . Implement sustainable land use and management plans.</p>
<p>Oceans and coastal ecosystems §35 Invites Parties to preserve and restore oceans and coastal ecosystems and scale up, as appropriate, ocean-based mitigation action;</p>	<p>Ocean-related mitigation actions (not included in the discussion paper) Expand conservation areas. Restore degraded coastal ecosystems.</p>
<p>Sustainable lifestyles and circular economy §36 Notes the importance of transitioning to sustainable lifestyles and sustainable patterns of consumption and production in efforts to address climate change, including through circular economy approaches, and encourages efforts in this regard;</p>	<p>Mitigation actions relation to sustainable lifestyles and circular economy Facilitate re-use and recycling. Facilitate the transition towards low-emission transport modes. Facilitate lifestyle changes including towards lower meat consumption. Support initiatives to reduce food waste. Reduction of raw material consumed.</p>

Source: Own compilation based on decision 1/CMA.5. With the exception of the ocean-related mitigation actions, all actions are taken from Moosmann et al. (2023c).

Reflecting mitigation efforts in NDCs

The mitigation efforts listed in Table 12 are key in informing Parties in the preparation of their new or updated NDCs. The mitigation efforts, which constitute a very specific output of the GST, can be taken up by Parties in several ways (Moosmann and Pischke 2024):

- ▶ Parties can include in their NDC additional mitigation actions that contribute to the global efforts. Such additional actions will allow Parties to formulate and achieve more ambitious emission reduction targets and provide concrete information on what they plan to implement to achieve them.
- ▶ In addition, Parties can define indicators to track these additional mitigation actions. As an example, installed renewable energy capacity would be an indicator for tracking a Party's contribution to the global effort of tripling renewable energy capacity by 2030.
- ▶ Finally, Parties can define new NDC targets that mirror the global efforts called for in the GST decision. As an example, they could define a specific level of renewable energy capacity as one of their updated NDC targets for 2030. Such a target would mirror the global effort of tripling renewable energy capacity by 2030.

The NDCs of many Parties consist of economy-wide emission reduction targets, in line with Article 4.4 of the Paris Agreement. While these Parties may continue using one comprehensive quantified target, they still have the opportunity to provide additional information in their NDC on how they plan to achieve this target. They can include information on specific measures, targets and indicators in the descriptive part of their NDC. By doing so, they can spell out how they contribute to the global efforts, which were collectively agreed in the GST.

Future research questions

As the outcome of the GST does not elaborate on specific mitigation actions and leaves a wide range of possibilities to Parties, additional research could help Parties select and implement those actions which are most ambitious, and at the same time cost-effective, and can be implemented without delay. Based on available literature and examples from countries, the following questions could be elaborated:

- ▶ Which mitigation actions have the highest mitigation potential?
- ▶ In which areas can actions lead to transformative change?
- ▶ How can co-benefits of mitigation actions be maximised and adverse social and economic impacts be minimised?
- ▶ How can a just transition be ensured?
- ▶ How can equity aspects be included in the development and implementation of mitigation actions?
- ▶ How can the multiple benefits of stronger climate action be better reflected and leveraged to enhance ambition?
- ▶ What processes and elements enable the accelerated implementation of mitigation actions?

3 Analysis of collective progress

The GST's mandate to assess collective progress is interpreted such that it must not assess the ambition and implementation performance of individual countries. Still, the GST process should recognise that substantial differences between countries exist, both in terms of where they are now and where they may be heading. Making Parties aware of these differences can act as an enabler for increased ambition, by showing what is already possible, identifying trends and the existence of leaders and laggards.

However, there are challenges to match these two conditions – assessing collective progress without singling out individual countries and providing actionable information for developing subsequent NDCs. Analyses that provide global emissions or warming estimates are important but focus on outcomes and lack the nuance necessary to translate information into action.

In 2019, we proposed graphical methods, so-called “performance distributions” for presenting collective progress with more nuance by (1) looking at indicators that are more detailed than total GHG emissions and (2) showing distributions of developments across countries (Jeffery et al. 2019). This approach fulfils the GST mandate to assess collective progress but clearly demonstrates differences across Parties. Under this project, we developed the approach further by publishing an online interactive tool (globalstocktakedata.org) and using the tool to assess progress in emissions with the results included in an official submission to the GST (Nascimento et al. 2023c).

3.1 Analytical tool for assessing collective progress

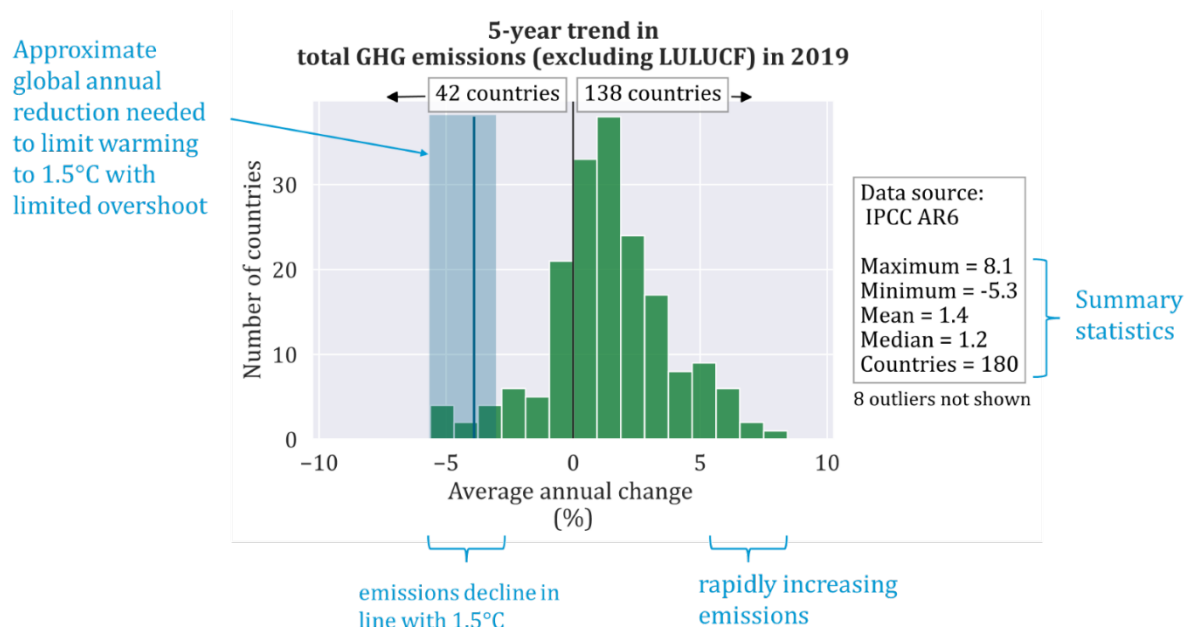
A performance distribution is a histogram that groups countries based on how they fare on a specific indicator, such as sectoral greenhouse gas (GHG) emissions per capita, as shown in the following figure. These plots count countries within a certain interval and show which intervals contain more countries than others (Jeffery et al., 2021). They also indicate how the indicator is spread across countries, which supports comparisons and assessing change over time.

Additionally:

- ▶ Performance distributions are aligned with the GST mandate to assess collective progress without singling out individual countries.
- ▶ They support national-level discussions, since interested actors can locate their country and benchmark progress against others.
- ▶ They assess whether countries move together, or whether a few economies substantially affect global trends.

Under this project, we made an interactive tool available at globalstocktakedata.org so that emissions and energy data can be explored by the user.

Figure 3: Example of the performance distribution figure showing the average five-year change rate of total GHG emissions across 180 countries between 2015 and 2019



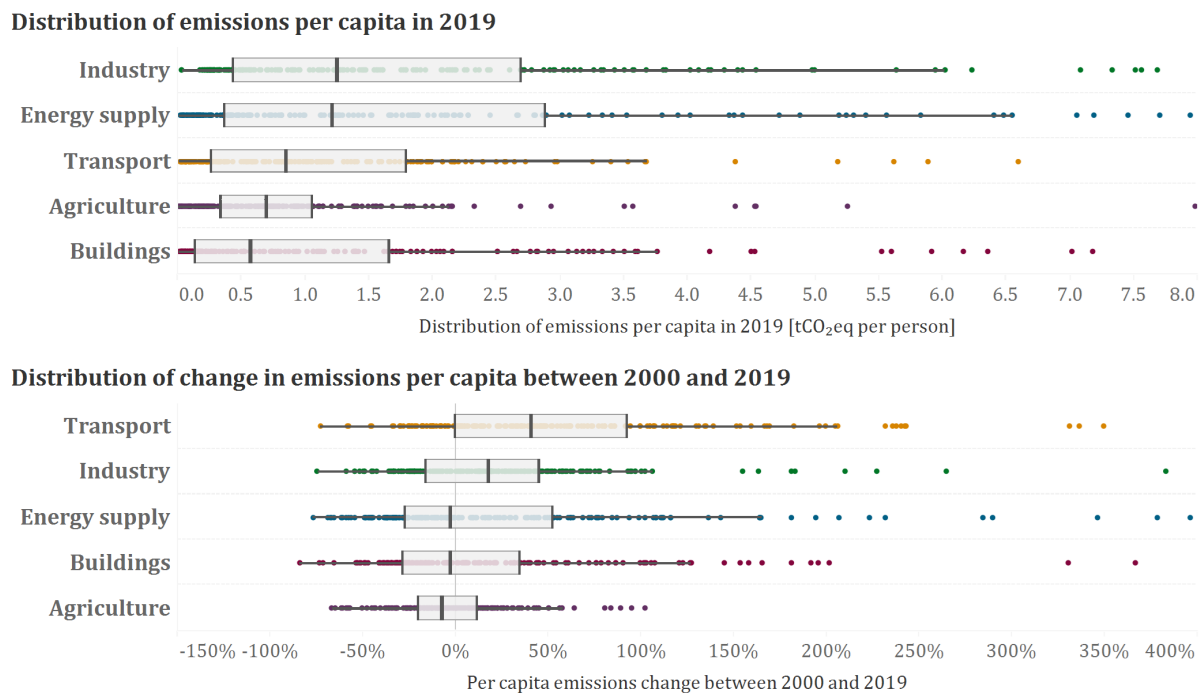
Source: Nascimento et al. (2023b).

3.2 Key insights regarding collective progress across countries and sectors

Nascimento et al. (2023b) used the performance distribution tools to examine global progress across a range of sectoral emission indicators and demonstrated how the tools allow for a detailed and nuanced analysis without singling out individual countries. Using trends in sectoral GHG emissions per capita, possible use cases for the distribution tools were demonstrated and some initial insights gained. The display as a performance distribution can be used to understand the spread in changes across countries, to explore progress over time, and to demonstrate what rates of decarbonisation are possible.

The analysis of progress across countries and sectors showed that:

- ▶ In all sectors, several countries had per capita emissions in 2019 below 2000 levels. Reasons for these declines vary, but these countries can provide lessons for others.
- ▶ In several subsectors, countries show a recent decline in emissions per capita. However, the development of total emissions observed in recent years is not in line with the temperature goal of the Paris Agreement.
- ▶ In some sectors, such as buildings and agriculture, most countries have per capita emissions below 2000 levels (see the following figure). This is encouraging but in order to substantively decrease emissions, profound changes are needed in these sectors.
- ▶ In other sectors, such as industry and transport, a rapid change in direction is needed since most countries have per capita emissions above 2000 levels and emissions per capita in subsectors still increase (see the following figure). However, some countries show that such a change in direction is possible.

Figure 4: Distribution of emissions per capita in each sector

Source: Nascimento et al. (2023b).

3.3 Relevance of findings to the first Global Stocktake

Our findings show that sectoral patterns and rates of emissions growth vary by country and sector. This implies that differentiated strategies are required to advance national mitigation efforts. Energy supply is currently the highest emitting sector but is also the focus of substantial policy attention (Nascimento and Höhne 2023). The first global stocktake decision called for a clear acceleration of efforts to reduce emissions in the energy supply sector (UNFCCC 2023a). It includes a global target to triple renewable energy capacity by 2030 and a call to accelerate efforts for coal power phase-down. That these targets were explicitly included in the Global Stocktake outcome indicates that there is broader agreement that reducing emissions in the sector is important and that increasing renewables will play a pivotal role in doing so.

We also found that emissions per capita in the transport sector grew faster than in any other sector. Countries with increasing emissions also have substantially fewer policies in the transport sector (Nascimento and Höhne 2023). Although the Global Stocktake sent clear signals on the importance of accelerating efforts in the transport sector, explicitly mentioning road transport and highlighting zero- and low- emissions vehicles, it did not present clear global targets for the sector. Global 1.5°C compatible targets for transport have been evaluated by independent researchers but were not included in the Global Stocktake outcome. Interestingly, “sales of light-duty electric vehicles” was the only indicator that the State of Climate Action 2023 report found to be on track for 2030 (Boehm et al. 2023). All other indicators were evaluated as being “off track”, “well off track”, or even “heading in the wrong direction”, indicating that other areas of transportation (e.g. modal shift, heavy duty vehicles, shipping, and aviation) will require more attention in the coming years.

The Global Stocktake outcome doesn’t explicitly address demand side measures or process emissions from buildings, industry or agriculture (paragraph 28, UNFCCC 2023a). Mitigation measures for direct emissions in these three sectors could be implicit in the call for a transition

away from fossil fuels in energy systems, such as gas boilers for heating. Similarly, paragraph 36 of the decisions text *“Notes the importance of transitioning to sustainable lifestyles and sustainable patterns of consumption and production in efforts to address climate change, including through circular economy approaches, and encourages efforts in this regard.”* which, alongside the calls to double the rate of energy efficiency improvements, does recognize the importance of demand side measures. To fully meet the Paris Agreement temperature goal, supply and demand side measures across all sectors will be needed. Despite significant evidence regarding what is required in these sectors being submitted to the technical phase of the GST for consideration, the first GST did not take these measures up in the concrete list of efforts and targets.

The first Global Stocktake outcome took a major step forward in setting explicit sector specific global targets. Analyses such as that performed under this project support the evidence base for setting sectoral targets, progress towards those targets, and provide additional guidance to support implementation.

3.4 Assessment of collective progress for subsequent Global Stocktakes

The second and subsequent Global Stocktakes should continue to assess collective progress on reducing total GHG emissions but, in addition, should now also assess progress toward the new goals identified during the first Global Stocktake (paragraph 28, UNFCCC 2023a). The performance distribution approach can continue to be used to generate insights on progress toward the new goals, including on renewable energy capacity, coal phase-down and non-CO₂ emissions reductions. Without singling out specific countries, the performance distributions can show whether countries are moving in a similar manner or if there are leaders that could be further analysed to understand how to overcome barriers and provide positive insights to others.

Under this project, we focused on bringing the sectoral perspective into the GST. In the future, the performance distribution tools could also be applied to questions more closely related to the original mandate of the GST. For example, one of the tenets of the Paris Agreement is the sequence of policies and targets (Nascimento et al. 2023a). In the coming phases of the GST, we could expand the indicators covered by the performance distribution analysis to account for some more forward-looking elements, such as progress towards NDC targets. These include, but are not limited to, comparing emissions projections based on current policies to NDC targets to calculate the implementation gap across countries. The implementation gap per country could be included in the performance distribution tools to assess international progress towards NDC targets, disaggregating global results without singling out individual countries. This would allow for earlier course corrections and enhance the chance that such approaches are picked up as part of the official GST process.

Finally, although the performance distribution tools were helpful, we also found that other graphical data representations were useful in gaining insights of collective progress across countries (e.g. Figure 4). A larger suite of tools could be developed to display information in different ways and to answer more targeted questions, such as “which sectors are progressing more rapidly than others?” or “In which regions is coal being phased out most quickly?”.

4 Leveraging the echo of the Global Stocktake

4.1 Key findings of the policy paper

At COP28, the first Global Stocktake came to an end and a window of opportunity to leverage its results for more ambitious climate action opened. Although the first GST touched upon mitigation, adaptation, finance as well as loss and damage, the language leaves room for interpretation. One example is the ‘Transitioning away from fossil fuels (...), accelerating actions in this critical decade, so as to achieve net zero by 2050 (...)’ (UNFCCC 2023a §28d) which mentions fossil fuels for the first time in a CMA decision and sets a timeline but provides no clear roadmap on how to achieve this goal. Another example is the ‘Phasing out of inefficient fossil fuel subsidies (...)’ (UNFCCC 2023a §28h) where it remains unclear how the term ‘inefficient’ is defined. Some messages such as ‘Tripling renewable energy capacity globally (...)’ (UNFCCC 2023a §28a) are more straightforward but still require coordinated effort on the national level to ensure compliance.

A policy paper developed under this project (Hermwille et al. 2024) provides an overview of possible actions to maximize the outreach of the first GST for future climate policy and especially for the next round of NDCs starting in early 2025. The NDC cycle can be understood as a policy process with different stages, specifically agenda-setting, policy formulation and decision-making. Since the GST is a unique international process which has not been conducted before, the recommendations rely on the examination of other processes in which an attempt was made to transfer scientific knowledge into political action. To this end, an analysis of the relevant literature of previous processes, a focus group discussion and expert interviews were conducted. The processes which were examined include the expert dialogue under the periodic review of the long-term global goal under the Convention, the work of the Presidential Climate Commission in South Africa and the Citizens’ Climate Assembly which convened in France.

A communication model is used which distinguishes between the role of the sender and recipient as well as the tone, channel and content of the message.

Based on the experiences gathered in previous policy processes at the science-policy interface, the following three key recommendations for leveraging the response to the Global Stocktake for enhanced climate action are suggested:

- ▶ Do not take for granted that the outcomes of the Global Stocktake will trickle down into national level political discourse. It will require considerable coordination and communicative efforts from several stakeholders to achieve. And this, in turn, requires substantial resources committed and capacities invested early in the process.
- ▶ Design differentiated strategies to affect and influence different stages of the NDC policy process, considering the different audiences, channels, messages and tone to achieve effective communication for each phase.

Coordinate your messaging coalition of like-minded parties in policymaking, NGOs, private sector entities and research and focus on positive messages, highlighting the opportunities arising from ambitious climate action and taking inspiration from other countries.

4.2 Relevance for the follow-up to the GST

It is now incumbent on national governments to digest and reflect on the Global Stocktake’s outcomes in the light of their national circumstances. But it cannot be taken for granted that the results of the GST will indeed be taken up in the national level political discourse. A successful

leverage of the Global Stocktake involves the formation of a messaging coalition including national partners to carry the messages into the respective countries. This requires thorough preparation and a lot of communicative and organizational work. This work will vary depending on the phase of the NDC policy cycle: agenda-setting, policy formulation, and decision-making.

- ▶ **Agenda-setting:** This stage aims to benefit first from the initial public attention the GST generated at the global level and second from the start of the national NDC process. The media and the public in general are therefore the key recipients for the communication on the national level. At this stage messages should be kept simple in order to reduce complexity. To contextualize the exclusively collective information generated by the Global Stocktake, external sources for robust country-specific information corresponding to the standard of 'best available science' should be used.
- ▶ **Policy formulation:** In this stage, the communication should address the competent authority – depending on the country line ministries or legislative bodies – and key individuals within these authorities. More comprehensive and complex messages are needed at this stage and good practice examples collated during the technical phase of the Global Stocktake could prove particularly useful.
- ▶ **Decision-making:** To ensure that ambitious policies are adopted, the decision-makers should be targeted. The degree of complexity of the message varies with the decision-maker, i.e. whether they are part of ministerial bureaucracy or whether citizens vote on a plebiscite. At this stage, it is also vital that the communication comes from stakeholders within the country to maximize the legitimacy of the message.

4.3 Future research questions

In terms of future research, it will be of particular interest to closely monitor and evaluate the uptake of the first GST into the next round of NDCs. This ensures that recommendations for the next GST can be made. Furthermore, the examples discussed in the policy paper showed that deep dives into country cases and the uptake of the GST in their NDCs can enable the identification of successful and unsuccessful communication measures.

The following questions could be addressed once new NDCs have been communicated and before the start of the second GST:

- ▶ How can the process of the second GST be improved based on the experiences made in the first GST?
- ▶ How have the results of the first Global Stocktake been incorporated into the NDCs?
- ▶ How did the communication around the GST work in specific countries?
- ▶ How can the consideration of cross-cutting aspects such as gender, human rights and concerns of marginalised groups be better integrated in the GST process?

5 Conclusions and outlook

This chapter discusses possible follow-up work in response to the Global Stocktake, building upon the results of the project.

5.1 Handling the inputs to the Global Stocktake

In this project, a wide range of information was assessed, which served as input to the GST. This information included research papers and submissions by Parties and non-Party stakeholders. Although the project focused on the thematic area of mitigation only, it was a time-consuming exercise to gain an overview of all the available information.

For the second GST, the available information will even be more extensive. In particular, reports submitted by Parties under the Enhanced Transparency Framework will be available. However, the outcomes of the IPCC's Seventh Assessment cycle may not be available completely, or they may be available late in the process only.

In order to effectively handle the inputs to the second GST, researchers, Parties and NGOs should take into account the following considerations:

During the collection and analysis of inputs, the focus should be on information that is comparable across Parties. In the area of mitigation, information from Biennial Transparency Reports will constitute an important source of information. Greenhouse gas emissions and removals, projections and information on mitigation policies and measures will be available in tabular format and will be reviewed by technical experts. However, it has to be taken into account that the data may not be completely comparable, due to flexibilities in reporting provided to developing countries under the Paris Agreement and due to different levels of detail chosen by the various Parties in the Biennial Transparency Reports.

The collection and analysis of inputs should focus on information which is useful for other Parties when they update their NDCs and prepare new NDCs. In the area of mitigation, this could include specific information on mitigation actions with a high mitigation potential.

5.2 Supporting the mitigation theme during the Global Stocktake

It can be expected that in the second GST, the topic of mitigation will face a wide range of challenges. These may include an ongoing implementation gap, questions on how to effectively increase ambition in new NDCs, and equity questions, given the further depletion of carbon budget. In the preparation of and during the second GST, the following approaches may support Parties in achieving an ambitious outcome:

- ▶ Highlight best practices in the response to the first GST: The dynamic development of the energy sector, including the rapid spread of renewables, will likely provide for examples of successful implementation of the efforts called for in the Global Stocktake.
- ▶ Consider aspects that contribute to successful implementation of NDCs such as an enabling policy framework and the link between investments in climate action and fulfilling the sustainable development goals.
- ▶ Critically discuss collective progress: The decision on the first GST called for a range of collective efforts in various sectors. The collective progress on some of them can be measured using quantitative indicators, while the progress on some efforts are more difficult to quantify. It will be important to critically discuss progress on each of the efforts called for

by the first GST. Based on this discussion, Parties could deliberate whether to call for similar, but more ambitious efforts in the outcome second GST, or whether to include new elements, such as more specific guidance in the area of mitigation.

5.3 Outlook

From the experience gained in this project which supported the first GST, the following conclusions can be drawn for a possible support of the technical and political phase of the second GST:

Both during the technical dialogue and ahead of the consideration of outputs phase, it proved beneficial to analyse submissions by Parties and non-Party stakeholders. It will be helpful to do such analyses during the second GST, structured along few key questions. It should be taken into account that such analyses will require considerable time due to the large number of submissions.

Due to the wide range of available input, it is however challenging to provide an overall analysis of this input. Rather than attempting to analyse all main inputs according to the same criteria, it proved essential to pose specific research questions first, followed by an in-depth analysis of related inputs. In the present project, the topics 'process of the political phase', 'equity' and 'transformative mitigation actions' were chosen. These topics required the analysis of specialised literature and specific parts of submissions and inputs.

Beyond the submissions by Parties and stakeholders, independent research will provide important input to the technical dialogue under the second GST. As the GST focuses on collective rather than individual progress, innovative ways of illustrating this progress will be needed. Such approaches can make use of the wide range of information available from Parties but have to aggregate this information in a way that characterises collective progress and helps in finding solutions for more effective mitigation actions.

As far as the uptake of the outcome of the GST is concerned, the coming months will tell how Parties manage to implement the outcome of the first GST in their new NDCs. Challenges such as a lack in public or institutional support for the implementation of new mitigation actions should be analysed, and ways should be found how the political phase of the GST and its output can provide guidance to Parties how to plan and implement ambitious mitigation actions.

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